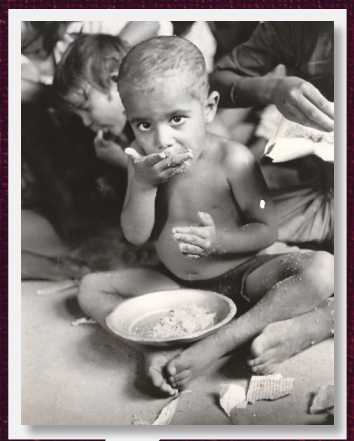
Nourishing Lives & Building the Future

THE HISTORY of NUTRITION at USAID



1960s

1970s

1980s

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2010s

USAID
FROM THE AMERICAN PEOPLE

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Nourishing Lives and Building the Future: The History of Nutrition at USAID

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Dave Cooper for USAID

LIMITATIONS

Given the size and complexity of USAID's support for global health and nutrition investments, many activities could not be explicitly described in this brief history. Even for those efforts that are mentioned in the document, much of the nuance and detail could not be included in this short overview of the highlights of five decades of work. The authors attempted to incorporate a balance of examples and illustrations across regions, countries and time, but the projects and documents cited in this report reflect only a fraction of the nutrition work supported by USAID over the past 50 years. This history report is not a comprehensive review nor an evaluation of USAID's nutrition programming. Many more specific country examples of projects and their impact in addition to program and project assessments, evaluations and related reports are available through USAID's Development Experience Clearinghouse at https://dec.usaid.gov/dec/home/Default.aspx. Descriptions of current nutrition activities in the countries in which USAID works can be found at https://www.usaid.gov.

Note to readers: USAID's online document repository, the Development Experience Clearinghouse (DEC), provides an indispensable record of USAID nutrition and other programs as they evolve over time. In the following endnotes, some documents cited are available for download through the DEC at https://dec.usaid.gov/dec/home/Default.aspx: to retrieve a document, use the search box, and enter the document's assigned code (the "DEC #" that starts with the letter "p") as found in the respective endnote.

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ACRONYMS and ABBREVIATIONS

AIDS	Acquired immune deficiency syndrome
ART	Antiretroviral therapy
BMI	Body mass index
CDC	Centers for Disease Control and Prevention
CEAP	Consumption Effects of Agricultural Policies
CMAM	Community-based management of acute malnutrition
DHS	Demographic and Health Surveys
FAO	Food and Agriculture Organization
FFP	Food for Peace
GAIN	Global Alliance for Improved Nutrition
HIV	Human immunodeficiency virus
IFPRI	International Food Policy Research Institute
INACG	International Nutritional Anemia Consultative Group
IVACG	International Vitamin A Consultative Group
LIFE	Leadership and Investment in Fighting an Epidemic Initiative
MNPs	Micronutrient powders
NACS	Nutrition assessment, counseling and support
NGO	Nongovernmental organization
PAHO	Pan American Health Organization
PEPFAR	President's Emergency Plan for AIDS Relief
RUTF	Ready-to-use therapeutic food
SBCC	Social and behavior change communication
SUN	Scaling Up Nutrition Movement
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
WASH	Water, sanitation and hygiene
WFP	World Food Programme
WHO	World Health Organization

David Burrows/ USAID's Maternal and Child Health Integrated Program

Fintrac, Inc.

Perspectives from USAID

In a world of increasing globalization and development, nutrition reaches beyond the bounds of a single food item or individual to encompass entire communities and nations, food systems, health systems and institutions. Nutrition is not only a basic human need for survival but has far reaching implications for growth, health and prosperity.

As a global community, we have invested heavily and made significant progress in improving nutrition over the past few decades. This resource, ***Nourishing Lives and Building the Future: The History of Nutrition at USAID*** describes much of USAID's investments and contributions to this progress, achieved by working closely with implementing partners, host countries, civil society, the private sector, the global research community and other key stakeholders. Our shared accomplishments remind us how far we have come, but as we look at the trends today and challenges ahead, there is still much work left to be done.

Millions of children around the world still face the devastating and long-lasting effects of malnutrition. As a global community, we need to accelerate collective action to reach our global nutrition goals. This will require increased commitment and action from many sectors and actors — we must all see improving nutrition as being a part of our jobs. Progress will require new partners to come to the table and find ways to maximize the impact of existing resources.

As USAID's 18th Administrator Mark Green states, "the purpose of foreign aid is to end the need for its existence." USAID is committed to helping countries increase their investment in and capacity to improve nutrition so they are able to reach a point when foreign assistance is no longer needed. However, malnutrition prevents progress on a country's journey to self-reliance. It is therefore critical that countries recognize nutrition as a driver of national development and worthy of prominent attention and increased funding.

To further deliver on nutrition progress, USAID has elevated nutrition to the most senior levels across the Agency, recognizing that nutrition underpins all of the work we do. We are also increasing investment in nutrition research, exploring innovative ways to engage with the private sector and improving how we collect data and track progress on nutrition. USAID is committed to working across sectors to deliver coordinated, high-quality programs that address the drivers of malnutrition, as outlined in our Multi-Sectoral Nutrition Strategy (2014-2025). But the U.S. Government cannot do it alone. We aim to spark action from other stakeholders to accelerate collective progress on nutrition. We are working toward the day when all children can have the opportunity to fully grow and develop into healthy adults and productive members of society, and toward the day when all countries are able to address their citizens' nutrition needs.

EXECUTIVE SUMMARY


Courtesy of Alan Berg


Karen Kasmauski/MCSP


SPRING Project/USAID


Sharon Tobing, ADRA International

In the late 1960s, when the U.S. Agency for International Development (USAID) began to invest in nutrition, work on nutrition in an international context was just beginning, with little known about the causes, consequences and solutions for undernutrition.

Since the 1960s, there has been much improvement in global nutrition. As documented in this history, USAID has played a leading role in the progress made; USAID's unique and pioneering role in research to answer questions and implement solutions has brought better nutrition where needed, especially for mothers and children. Through close collaboration with partners, host-country governments and the global nutrition community as a whole, USAID has worked at the intersection of this complex dynamic in research, implementation, training and assessment to save lives and improve the future for millions of the world's most vulnerable citizens.

This resource features chapters on USAID's support for specific nutrition focus areas, vulnerable populations and interventions, and highlights some of the Agency's key contributions and groundbreaking work in different areas over the past 50 years. The following is a snapshot of some of these results.

SELECT GLOBAL ACHIEVEMENTS ACCOMPLISHED WITH USAID'S SUPPORT

Over the past three decades:

- More than 100 million children have escaped the devastating and lasting effects of undernutrition.
- The prevalence of underweight and stunting among children under 5 has halved.
- Exclusive breastfeeding—the single most effective preventive intervention to reduce child mortality—has increased substantially, on average, across USAID-supported countries.
- The development and distribution of several million tons of cereal-soy fortified blended foods has enriched the diets of millions of mothers and children.
- Vitamin A supplementation has averted an estimated 1.25 million child deaths.
- Household consumption of iodized salt has increased by more than sevenfold, protecting infants and the unborn from brain damage.

MATERNAL, INFANT AND YOUNG CHILD NUTRITION

- Early recognition of breastfeeding's significance for child survival has translated to lives saved and improved long-term outcomes for countless children.
- Research and promotion of the Lactational Amenorrhea Method, an effective, short-term family planning method for breastfeeding women has offered an additional option for women to time and space their families.
- The scale up and institutionalization of community-based treatment for acute malnutrition has helped thousands of malnourished children recover.

MICRONUTRIENTS

- Breakthrough research revealed that vitamin A deficiency contributed to child mortality in addition to child blindness, leading to increased support for vitamin A supplementation to improve child survival and health.
- Assistance to scale up food fortification with micronutrients in more than 30 countries has contributed to widespread fortification in low- and middle-income countries.
- Micronutrient supplementation efforts have produced major increases in global coverage.

HIV, FOOD AND NUTRITION

- A highly successful approach combining nutrition assessment, counseling and support has been applied in more than 20 countries, fostering stronger, more comprehensive health systems.
- HIV activities have been implemented as part of 41 food assistance programs to provide both food and nutrition support to people living with and those affected by HIV/AIDS.
- Key research and technical input has helped inform global guidance on infant feeding, nutrition for breastfeeding mothers and the prevention of mother-to-child transmission of HIV.

MULTI-SECTORAL NUTRITION AND FOOD SECURITY

- Programmatic research documented the many ways that national economic policies can impact the income and diets of poor households, and showed that income alone could not solve undernutrition.
- Early investment and work on biofortification has led to the development of more vitamin A, iron and zinc rich crops and has increased household production and consumption of these foods.
- Leading the U.S. Government's efforts to reduce global hunger and food insecurity through the Feed the Future initiative has helped millions of families around the world escape hunger and poverty.

RESEARCH AND MEASUREMENT

- Early research identified the devastating causes and consequences of malnutrition, including death, leading to an increased global focus on approaches to prevent malnutrition.
- Critical research on sustainability, cost-effectiveness and governance has supported successful implementation of evidence-based nutrition interventions.
- Support for national surveys that collect data on nutritional status has deepened the understanding of health, population, nutrition and household issues and has informed programming, policies, funding priorities and research.

These and other improvements in nutrition globally have preserved human capital and prevented millions of deaths and life-long disabilities, and they show that coordination and commitment across diverse stakeholders can drive action and produce results. Yet, these improvements also highlight that there is still much to do to achieve the globally agreed upon nutrition goals. Scaling up the coverage of evidence-based nutrition interventions is vital to continuing progress to reduce malnutrition and to sustaining existing gains, as is finding innovative solutions to the new and evolving issues that enter the nutrition landscape and leveraging existing resources for greater impact. As a leader in global nutrition, USAID continues to work across sectors to support research, policies and programs to improve nutrition. These efforts foster healthier, more productive and prosperous individuals, communities and systems and support countries on their journeys to self-reliance.

Betty Press/Catholic Relief Services

1 Introduction and Overview

In recent decades, the nutrition and health-related status of millions of individuals around the world has improved as a result of substantial domestic and international actions, investments, coordination and innovations. More than 100 million children have escaped the devastating and lasting effects of undernutrition over the past three decades[1], and young children and their mothers in low-income countries now eat better and experience less disease. Playing a leading role in such successes since 1965, the United States Agency for International Development's (USAID)[2] nutrition programming, through achievements, setbacks and learning, has advanced nutrition research, policy and programming to improve the long-term health of the world's most vulnerable citizens.

With a special focus on young children and women, USAID's actions measurably reflect the overall advancements in many areas. Since 1985, the prevalence of stunting and underweight in children under 5 years has been halved. Vitamin A supplementation has averted an estimated 1.25 million child deaths across 40 countries since 1988, and more than two-thirds of children under 5 in high-priority countries are now fully protected through this supplementation.[3,4] Exclusive breastfeeding—the single most effective preventive intervention to reduce child mortality[5]—increased by an average of 30 percent across USAID-supported countries from 1990 to 2014.[6] And as of 2016, three out of four households globally consumed iodized salt, protecting infants from potential brain damage.[7]

However, the numbers assigned to the nutrition improvements that have prevented millions of deaths and long-term disabilities only partially relate the human terms, which are also found in preserved human capital, in the enabling of life-long potentials and in improved prosperity for many citizens and their countries.

Establishing the Foundation of Nutrition at USAID

This historical resource, ***Nourishing Lives and Building the Future: The History of Nutrition at USAID***, describes the Agency's pioneering role and its many contributions to global nutrition so that they are better understood at home and abroad. By highlighting USAID's nutrition activities, implemented in partnership with many actors, this legacy report aims to facilitate learning from the past to inform future nutrition programming. It is hoped that an increased appreciation of the value and impact of USAID's nutrition investments across more than five decades will inspire efforts to improve nutrition in the future–mobilizing resources from partner countries and key stakeholders in this international effort.

Looking first at the establishment of nutrition programming at USAID during the 1960s, this history recounts how the new nutrition sector emerged from the learning, experiences and needs identified in the U.S. international food assistance program, known as Food for Peace (FFP). It then briefly describes how USAID nutrition programming evolved during its first decade. The Agency's strategic implementation approaches and financial investments are also presented. The rest of the story is told in chapters highlighting advances in the major nutrition interventions, shaped and supported by USAID. Each chapter summarizes the milestones, key global results and USAID's contributions to achieving global impact over time. This review ends with conclusions and insights about future global nutrition needs, as well as the role of partner countries and of USAID in building capacity for countries to one day transition beyond the need for nutrition assistance. This USAID nutrition history also provides extensive endnotes, offering both document references and additional details of topics discussed in the text for further learning. These examples and materials, although abundant, reflect only a small fraction of USAID's nutrition legacy.

Defining Nutrition

The definition of "nutrition" for the purposes of this report comes from the World Health Organization (WHO) and encompasses the multiple interventions and approaches described in this history. As defined, "Nutrition is the intake of food, considered in relation to the body's dietary needs. Good nutrition—an adequate, well-balanced diet combined with regular physical activity—is a cornerstone of good health. Poor nutrition can lead to reduced immunity, increased susceptibility to disease, impaired physical and mental development and reduced productivity."[8]

The frequently used term malnutrition has historically been an incorrect synonym for undernutrition. In actual use, malnutrition comprises two areas. The first, undernutrition, indicates several conditions: (1) stunting or chronic malnutrition, or low height-for-age, (2) underweight, or low weight-for-age, (3) acute malnutrition or wasting, or low weight-for-height, and (4) micronutrient (vitamin or mineral) deficiencies. The second area encompasses overweight, obesity and diet-related non-communicable diseases. The most immediate causes of the nutritional status of individuals are their dietary intake and their health status. However, many underlying factors can contribute to an individual's overall nutritional status; interventions that aim to address such factors are collectively called nutrition-sensitive approaches.

USAID's Nutrition Goals

Optimal nutrition is fundamental to reducing child mortality and to achieving normal physical and mental development. It accelerates learning, productivity and economic growth, and thus is critical to achieving international targets and USAID's wider development mission. Therefore, USAID's goal is to improve nutrition to save lives, build resilience, increase economic productivity and advance development. USAID assists in the delivery of proven nutrition-specific interventions that address the immediate causes of malnutrition. To address the underlying and systemic determinants of malnutrition, USAID also works to maximize the nutritional impact of its nutrition-sensitive programs in agriculture, health and population, and water, sanitation and hygiene.

Origins and Evolution of USAID Nutrition Programming: An Overview

USAID was established in 1961 when U.S. President John F. Kennedy signed the Foreign Assistance Act into law and created USAID by executive order.[9] At this time, nutrition was not yet a priority, nationally or internationally. The science of human nutrition itself was still young, having emerged as a discipline earlier in the 20th century upon the discovery of essential vitamins, minerals and other nutrients in food that, when deficient in the diet, can cause specific diseases.[10] The field of international development was new; it was the dawn of international nutrition programming to measure/diagnose, understand, prevent and treat undernutrition in developing countries.

Early 1960s: Food for Peace Evolves to Combat Undernutrition

The large U.S. food aid program, Food for Peace, provided the entry point for nutrition at USAID. Since its inception in 1954, when President Dwight D. Eisenhower signed into law the Agricultural Trade Development and Assistance Act, Food for Peace has provided food assistance to more than 4 billion people worldwide.[11] Its original intent was to reduce U.S. agricultural surpluses, promote trade through food exports to developing countries and help people globally. In its early years, Food for Peace was administered by the Director of Foreign Operations Administration,[12] and then the International Cooperation Administration,[13] until an executive order in 1961 from President Kennedy created the White House Food for Peace Office,[14] with USAID as one of the implementing agencies. USAID, established that same year, focused food aid donations on development and humanitarian needs. An important example was the major child feeding program named Operation Niños that began in 1962 under the Alliance for Progress, launched by President Kennedy to advance economic cooperation between the United States and Latin America. Operation Niños, using Food for Peace commodities, was coordinated by Dr. Martin J. Forman; he would later

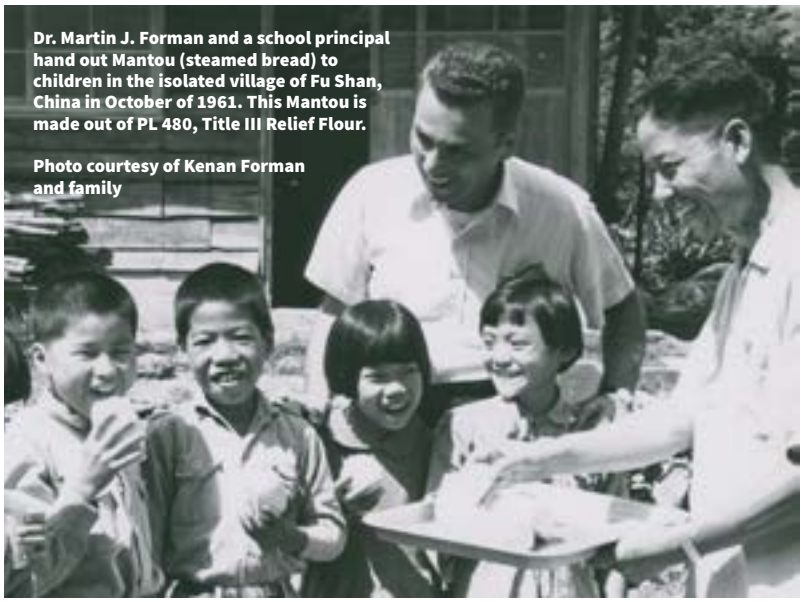
The inauguration of USAID's first Operacion Niños food van on the White House lawn, hosted by Lady Bird Johnson. This van drove from the White House to the southern tip of the Northern Hemisphere providing nutrition education and food supplements to those in need.

Photo courtesy of Alan Berg

become the USAID nutrition program's first director. In 1965, the Food for Peace program was moved to USAID, and by that year, Operation Niños had reached more than 13 million school-age children and 2 million preschool-age children throughout Latin America with daily meals.[15]

The Food for Peace program contributed to nutritional well-being during its first years by providing U.S. surplus food product donations to millions of hungry people overseas as emergency relief, school lunches and institutional feeding. At this time, however, nutrition was not yet an explicit objective, and activities were not specifically designed to have nutritional impact. Operation Niños provided USAID with an important lesson learned: feeding school-age children was too late for preventing undernutrition.[16] The priority needed to be preschool-age children, the group most vulnerable to undernutrition. USAID recognized more broadly that the food aid program presented an extraordinary opportunity not only to feed hungry populations, but, with some key changes, to address undernutrition, the causes and harms of which were just beginning to be documented. Accordingly, the food focus gradually expanded to a food and nutrition focus, targeting pregnant and lactating women and preschool-age children with food supplements to improve dietary intake, along with nutrition education and primary health care.[17]

From 1961 to1965, under Presidents Kennedy and Lyndon B. Johnson, the White House office of Food for Peace remained responsible for Food for Peace interagency coordination and its director served as a special assistant to the president.[18] Routine management of Food for Peace operations was carried out by the implementing agencies, principally USAID and the U.S. Department of Agriculture (USDA), as it still is today. By 1964, the White House Office of Food for Peace had become the U.S. Government's focal point on international nutrition assistance. A nutrition champion working there, Alan Berg, seized the unique opportunity afforded by having nutrition strategically located in the White House to advocate proactively for nutrition, resulting in markedly increased interest by senior government officials, including President Johnson.



Dr. Martin J. Forman and a school principal hand out Mantou (steamed bread) to children in the isolated village of Fu Shan, China in October of 1961. This Mantou is made out of PL 480, Title III Relief Flour.

Photo courtesy of Kenan Forman and family

> **"The task is huge. But the rewards are infinitely greater. The countries of Latin America and the United States possess the know-how and resources to do the job. To this must be added the will to do it. The Governments and Peoples of the Americas must believe that overcoming child malnutrition is of utmost importance and must act accordingly. The motivation of the people must be kindled, but hope must not be falsely aroused. There must be continuing evidence of the progress that can come with alliance. If this is done, the most powerful resource of all will be unleashed and can but lead to success."**
>
> Dr. Martin J. Forman in a 1965 Operation Niños Report

New Evidence on the Relationship between Malnutrition and Mental Retardation Sparks Action

Delegates to the 1963 World Food Conference in Washington, D.C., recommended increased attention to nutritional needs in food aid programs.[19] Data on the magnitude and severity of the undernutrition problem in developing countries were plentiful, thanks to 32 national nutrition surveys conducted by the U.S. Government's Interdepartmental Committee on Nutrition for National Defense and the National Institutes of Health from 1955 to 1965.[20] But the key momentum-generating event appears to have been the December 1964 International Conference on Prevention of Malnutrition in the Pre-School Child at the National Academy of Sciences in Washington, D.C. The meeting highlight was Dr. Joaquin Cravioto's presentation of his seminal research on the relationship between child malnutrition and mental development in Mexico and Guatemala. Cravioto's research found that severe early malnutrition not only decreases a child's body size, but also is associated with lower intelligence scores.[21]

This alarming new finding generated international concern. Malnutrition not only adversely affected individual development, but could also impede national development in countries where as many as two-thirds of the children were malnourished. The troubling discovery resonated with those in power, who were moved to act on it, but only because Alan Berg conveyed the news immediately after attending the conference in a widely read editorial, "For the Child Who Has Nothing," published in *The New Republic* (Christmas issue, December 26, 1964).[22] The editorial galvanized enough attention in the White House that a special interagency Sub-Group on Nutrition, co-chaired by Food for Peace in the White House and in USAID, was set up to recommend what the U.S. Government could do to address the now much more ominous nutrition problem.[23] The Sub-Group on Nutrition's report was circulated on March 3, 1965; 3 weeks later, President Johnson[24] spoke about it directly:

> **"The most grave health problem of the world remains hunger and malnutrition. Studies indicate that in some developing countries as high as 70 percent of preschool children are undernourished or malnourished. Such malnutrition not only results in high child death rates and widespread disabling diseases but research has now established that it also produces permanent retardation of mental as well as physical development. Food for Peace is concentrating increasing attention on nutrition, especially for the young."**
>
> President Johnson, Special Message to the U.S. Congress on February 10, 1966.

President Johnson stressed the urgency of addressing the world's nutrition problems in his Special Message to the U.S. Congress on February 10, 1966, calling for a war against hunger.[25] Again in late 1967, in his cover letter transmitting the 1966 annual report to Congress on international food aid, the President described Food for Peace's many benefits, including nutrition, stating, "To countless children it has meant freedom from the weakness, disease and mental retardation which are the tragic consequences of malnutrition."[26]

USAID's First Nutrition Action: Improving the Quality of U.S.-donated Foods

The recommendations of the Sub-Group on Nutrition were implemented, leading to yet greater attention by USAID to undernutrition in low-income countries, especially for preschool-age children. Specific steps were taken to improve the nutritional quality of foods provided to children by Food for Peace, such as the fortification of nonfat dry milk with vitamins A and D by late 1965—this marked USAID's first nutrition action. Fortification of other milled cereal commodities with essential vitamins and minerals soon followed. The annual Food for Peace Reports to Congress began featuring a section on combating malnutrition, starting with the 1966 report on the prior year's program.[27]

By 1966, the food aid program was reaching 10 million preschool-age children.[28] That year, the high-protein fortified blended food, Corn Soy Milk, was added to the list of products that could be purchased with food aid, and over 92 million pounds were programmed for 82 countries. This low-cost food product was specifically designed to meet the nutritional needs of young children at a critical time when nonfat dry milk had become too expensive for the Food for Peace program.[29]

An important obstacle to meeting nutritional needs was removed when Public Law 480 was amended in 1966, no longer restricting the Food for

BETTER NUTRITION

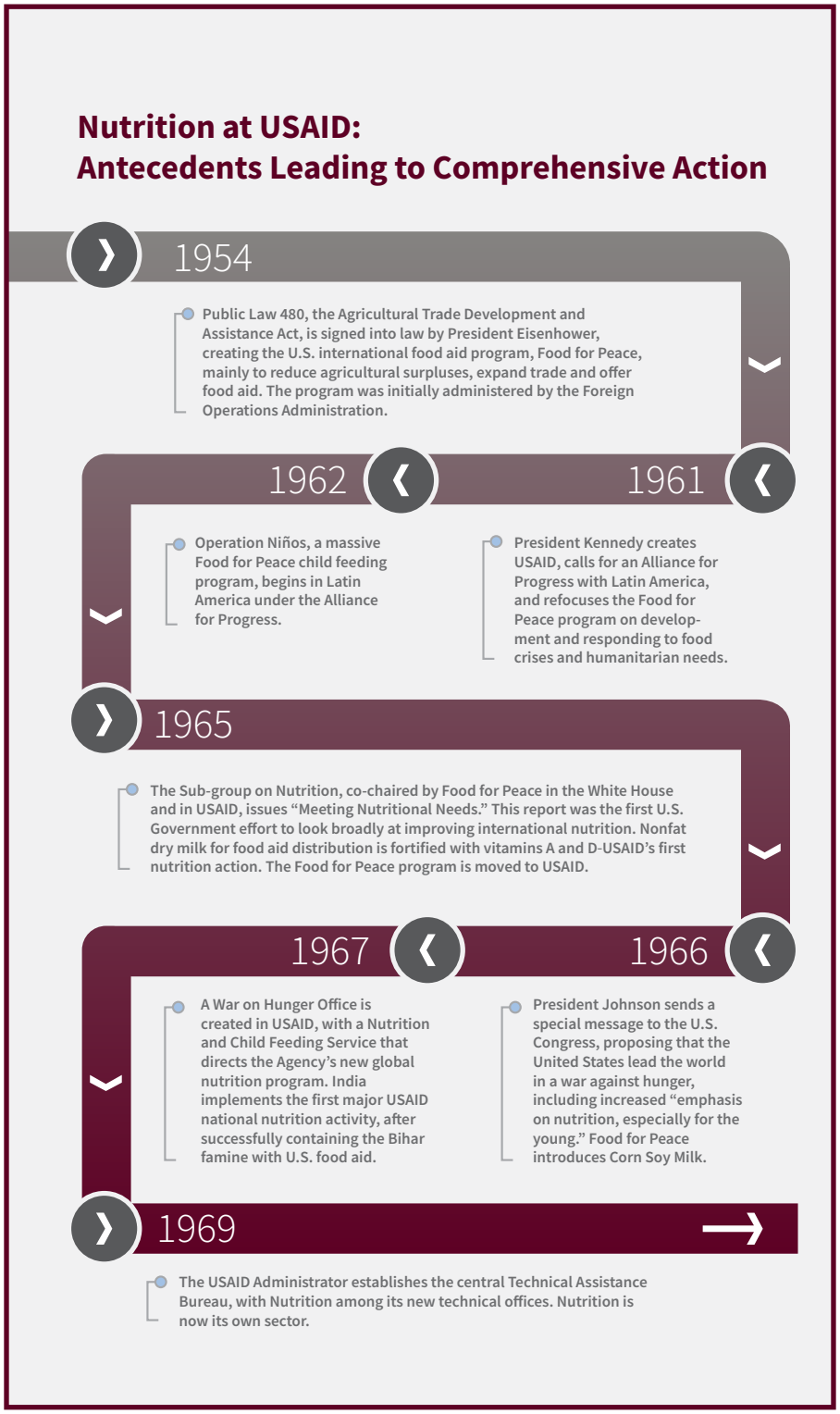
In a Special Message to Congress on February 10, 1966, President Johnson proposed that the United States lead the world in a war against hunger, including increased emphasis on nutrition, especially for the young. In the President's words:

"Beyond simple hunger, there lies the problem of malnutrition:

We know that nutritional deficiencies are a major contributing cause to a death rate among infants and young children that is thirty times higher in developing countries than in advanced areas.

Protein and vitamin deficiencies during pre-school years leave indelible scars.Millions have died. Millions have been handicapped for life–physically or mentally.

Malnutrition saps a child's ability to learn. It weakens a nation's ability to progress. It can–and must–be attacked vigorously." [31]



Peace program to distributing only surplus food and allowing U.S. farmers to produce (and sell to the U.S. Government) commodities best suited to the needs of the recipient countries and beneficiaries, including their nutritional needs.[30] Previously, soybean, a high-quality, low-cost protein source, could not be used because it was not in surplus in the United States. Soybean has since proved invaluable for making fortified blended foods to affordably meet the nutritional needs of young children.

1967-1969: USAID's Nutrition Programming Begins

Equally important to the Sub-Group on Nutrition's recommendation to improve the nutritional quality of donated foods was their recognition that USAID needed technical expertise in nutrition and should work on nutrition across its various sectors, giving particular priority to nutrition in its health programming. Formerly, USAID had been relying on the Interdepartmental Committee on Nutrition for National Defense and the National Institutes of Health for advisory services in nutrition due to limited in-house expertise. As a result of this need, the special USAID Office of War on Hunger, established in early 1967, included a new Nutrition and Child Feeding Service among its four branches– USAID's first organizational unit dedicated to implementing its nutrition programming.[32] Dr. Forman, USAID's nutrition visionary and pioneer, moved from the Food for Peace Division to create and lead the new Nutrition and Child Feeding Service.[33] In 1969, nutrition was further elevated in organizational importance when the USAID administrator established the Technical Assistance Bureau to put USAID on the cutting edge of development through research, analysis, technical assistance and technology. Nutrition Services, directed by Dr. Forman, was one of the new technical offices in this Bureau, establishing nutrition as its own sector alongside health, education and agriculture.

USAID vigorously launched its nutrition mission, seeking to prevent the immense human tragedy of widespread undernutrition and its implications. The nutrition portfolio applied nutrition science; implementation skills; food, vitamin and mineral supplements; food and fortification technology; social and behavior change communication; and integration of basic health services to improve the nutritional status, health and survival of millions of young children and women of reproductive age. Complementing its nutrition efforts, USAID supported long-term solutions to increase food production and incomes through agriculture and the Green Revolution,[34] and to increase access to family planning services. The scope of the nutrition sector rapidly expanded from strengthening the impact of the Food for Peace program to

supporting direct nutrition interventions independent of food aid, and to working with other sectors, most importantly health and agriculture, to address the underlying causes of malnutrition.

USAID Support for Food Technology and Fortification

A quick success of USAID's expanded nutrition action was its focus on food technology solutions, such as food fortification with vitamins and minerals, and the production of more affordable and nutritious foods for young children, namely fortified foods made from local blends of cereals (such as corn and wheat) and oilseeds (mainly soybean). With similar actions already underway to improve U.S. donated foods, it made sense to build on that experience. In partnership with the USDA, low- and middle-income countries received USAID assistance to initiate food fortification and production of fortified blended foods, building on technologies produced by U.S. millers and farm equipment manufacturers.[35] Several million tons of cereal-soy fortified blended foods have been distributed for over 50 years now and are still widely used by USAID, USDA, nongovernmental organizations (NGOs) and the U.N. World Food Programme to improve the diets of millions of mothers and children.

This progress was achieved through methodical actions, experiences and improvements. Back in the l960s, many of the world's leading international nutritionists believed that the major nutrition problem facing low-income countries was insufficient amounts of good-quality protein in local diets. Low intake of good-quality protein containing an adequate amount of each essential amino acid was thought to be the primary cause of undernutrition in young children.[36] Therefore, USAID prioritized activities to boost protein intakes, including the promotion of legume consumption (such as soybean), the addition of soy flour to bread and pasta and the breeding of grains with more or better-quality protein, such as high-lysine corn. But the biggest effort was research on food grains fortified with lysine—the missing or limiting essential amino acid.

The international nutrition community was hopeful that fortifying widely eaten cereal staples with lysine could potentially be as successful in reducing protein deficiency and child undernutrition as food fortification with vitamins and minerals had been for reducing micronutrient deficiencies, but the results were disappointing. The fortification technology was feasible and the fortified cereals well accepted; however, there was no discernible nutritional impact. In large, controlled lysine fortification field trials in Guatemala (corn), Thailand (rice) and Tunisia (wheat), children eating these "improved" cereals did not grow any better than children eating the traditional diet.[37]

The lack of results was consistent with new data available in the early 1970s showing that inadequate energy intake, not protein deficiency, was the principal problem affecting these populations.[38] Leading nutritionists concluded that the basic food-related solution to undernutrition was to provide more of it, not simply better or more protein, and that more attention should be paid to the major micronutrient deficiencies (iodine, iron and vitamin A) and to the underlying economic and social determinants of undernutrition. The widespread syndrome that affected so many young children who failed to grow and thrive in low-income countries was renamed from protein malnutrition to protein-energy malnutrition.[39]

Discovering that protein fortification was not a solution to child undernutrition was critical to subsequent successes. USAID nutrition programming has always been evidence-based, powered by investments in research and evaluation to determine why and how something works or does not work. Research findings have not only charted USAID's course, but also informed the broader nutrition and development communities around the world (see Chapter 6 on Nutrition Research and Measurement).

New Direction for Nutrition Interventions

Learning from the protein deficiency paradigm failure, USAID moved on, making important changes in its nutrition strategy. Realizing there is no single technical nutrient fix for ending undernutrition, the portfolio broadened to complement USAID's support for food technology. As described in Chapter 2, this included assistance for delivery of maternal and

ESSENTIAL NUTRITION ACTIONS

- Promotion of optimal breastfeeding during the first 6 months
- Promotion of optimal complementary feeding starting at 6 months, with continued breastfeeding to 2 years of age and beyond
- Promotion of optimal nutritional care of sick and severely malnourished children
- Promotion of optimal nutrition for women
- Prevention of vitamin A deficiency in women and children
- Promotion of adequate intake of iron and folic acid and prevention and control of anemia for women and children
- Promotion of adequate intake of iodine by all members of the household

child nutrition and health services, community mobilization and behavior change to improve maternal diets, infant and young child feeding practices and treatment of severe malnutrition. Addressing micronutrient deficiencies (vitamin A, iron and iodine) was also a high priority, as will be described in Chapter 3. These areas of emphasis, first introduced in the 1970s,[40] are the same evidence-based, nutrition-specific interventions at the core of USAID's Multi-Sectoral Nutrition Strategy 2014-2025,[41] which guides an integrated, Agency-wide approach to addressing global malnutrition (described in more detail in Chapter 5). These interventions are commonly known as the Essential Nutrition Actions.

Likewise, after recognizing that undernutrition could enhance the progress of human immunodeficiency virus (HIV), USAID took major steps to support research on the importance of proper nutrition for people living with HIV and integrate nutrition programming into HIV prevention, care and treatment (see Chapter 4). Multi-sectoral nutrition planning also became a hallmark of the USAID program in the 1970s. It was an ambitious attempt to address malnutrition broadly and structurally by increasing the understanding of the diverse causality of malnutrition, and generating a commitment to action from the multiple sectors needed to solve the problem. Knowledge gaps and lack of cross-sectoral support made this multi-sectoral approach non-viable at that time, but USAID has since re-invigorated this coordinated, Agency-wide nutrition programming with promising results (see Chapter 5).

Strategic Implementation Approaches and Funding

Since the start of USAID's nutrition programming in the mid-1960s, the Agency has been working with other U.S. Government agencies while also forming strategic partnerships with international and local actors to boost nutrition research, policy, advocacy and programming. These partnerships have enhanced the implementation of USAID's nutrition programming and ensured that nutrition investments will lead to long-term results.

Implementation Strategies

During its first several decades, USAID had agreements with other U.S. Government agencies for the following specialized activities: (1) integrating nutrition services into primary health care (the Office of International Health in the Department of Health and Human Services); (2) applying food technology solutions to undernutrition (USDA); (3) analyzing and influencing the consumption effects of agricultural policies on nutrition (USDA); and (4) conducting nutrition surveys and surveillance (U.S. Centers for Disease Control and Prevention [CDC]). The latter is the only inter-agency agreement spanning nearly the entire history of USAID's nutrition programming.
The Agency has also implemented nutrition programming throughout its history by partnering with host governments and with many U.S. and local institutions, including NGOs, universities, research centers, international development consulting firms and private businesses.

EARLY MULTI-SECTORAL ACTIONS AND INVESTMENTS

In 1973, the influential best seller "The Nutrition Factor: Its Role in National Development" helped to drive thinking on nutrition's vital role in national development. The book grew out of USAID's experience assisting India to establish a national nutrition policy and program in the aftermath of the Bihar famine in the late 1960s.

Alan Berg, the author and a pioneer of USAID's early nutrition actions, expanded on USAID's nutrition experience in India (where he directed the Agency's first national nutrition program), examined malnutrition as an obstacle to development, and suggested practical solutions.

The book caught the attention of World Bank President Robert McNamara and led to the World Bank starting its nutrition program in 1972 and hiring Berg as the director. This is a prime example of how USAID's nutrition investments have had a significant impact far beyond the activities themselves.

INDIA MAKES NUTRITION A NATIONAL PRIORITY | Bihar Famine, 1966-67

In 1966, the forward-looking U.S. Ambassador to India, former Under-Secretary of State Chester Bowles, personally impressed with the interagency Sub-Group on Nutrition's report, requested that USAID initiate a nutrition program in India. India's undernutrition problems were and continue to be enormous, given the country's poverty, large population, poor sanitation and status of women. U.S. NGOs were already working with the Indian government to distribute food aid in most Indian states in what was the largest Food for Peace program in the world. The Indian government had impressive human resources, infrastructure and a commitment to social protection. All of these assets were quickly harnessed to respond to India's back-to-back droughts that significantly reduced food production and led to the 1966-1967 famine centered in Bihar state. That emergency, India's worst drought of the 20th century, was contained, and food scarcity and millions of deaths from starvation were averted by successful relief efforts. The U.S. donation of 14 million metric tons of food grains (representing a fifth of the U.S. wheat harvest), efficiently distributed to 60 million individuals over the 2-year period, prevented a catastrophe.[42] During the famine response, the largest relief operation of its kind in history, important lessons were learned, including the value of early warning systems.

"Just as economic strength is the true basis of national strength, adequate nutrition is essential for the individual personality to unfold. Without attention to nutrition, we shall be denying large sections of our people an opportunity to help themselves and make their contributions to their country."

Indira Gandhi, Prime Minister of India, 1971[43]

INNOVATIVE NATIONAL NUTRITION PROGRAM

Paradoxically, this horrific famine shaped India's destiny for the better for generations to come, as its leaders took bold measures to prevent future calamities: embracing the Green Revolution to increase food production and incomes, and transitioning emergency feeding programs into more permanent means of tackling undernutrition. USAID actively encouraged and assisted the Indian government in implementing these new national priorities. Selling the nutrition "gospel" on development grounds was a catalyst for much of what followed.[44] The nutrition chapter in the Indian government's Fourth 5-Year Plan in 1967 was a first anywhere. India served as a vast learning lab for testing new approaches, such as fortification of wheat products with vitamins, minerals and lysine; early experimentation with the double fortification of salt with iron in addition to iodine; and local production of fortified blended foods for children, such as Bal Ahar made with U.S.-donated wheat and local oilseeds. The Indian private sector food and pharmaceutical industries brought in their ingenuity as part of the solution. Social marketing and mass media, applied for the first time, modernized nutrition education and created demand via commercial advertising, radio and movie shorts.[45] The U.S. Government's 1968 annual William A. Jump Award for Exemplary Service in Public Administration was a tribute to the USAID office in India's nutrition staff working on the famine and its related nutrition initiative.[46]

REACHING THE PRESCHOOL CHILD WITH NUTRITION SERVICES

Community-based, integrated nutrition services reached preschool-age children and pregnant and lactating women with USAID food supplements, nutrition counseling and health care. Project Poshak in Madhya Pradesh (1971-1975) demonstrated the benefits of a weekly take-home food delivery system for achieving higher coverage of the most vulnerable children less than 3 years of age compared to the more traditional on-site daily feeding at clinics.[47] USAID assistance to innovative community nutrition programs informed the Government of India's national preschool feeding program, known as the Special Nutrition Program, and later, India's now-famous national Integrated Child Development Services (ICDS) scheme, which began small in 1975 and, as of 2018, was the largest nutrition program in the world, having expanded massively to cover populations in need. USAID provided food and technical assistance to the ICDS through 2006, after which the Indian government covered the full costs and food needs of the program.[48]

Photo Credit: MNims/USAID

Photo courtesy of Alan Berg

The learning curve at the startup of USAID's nutrition programming was greatly accelerated by its field presence in many countries, carrying out large-scale maternal and child feeding and health activities. Implementing partners, most notably large U.S. NGOs, and host governments gained extensive applied nutrition experience that advanced worldwide learning on how to deliver effective services. Among the initial country programs, India, the site of USAID's first support for a national nutrition program, led the way by rapidly providing invaluable experience to inform both the Agency's and the global community's nutrition efforts. In the early years at the central level in Washington, D.C., USAID had a large number of smaller, more specialized nutrition projects and additional staff to manage them, whereas since the 2000s, the tendency has been to consolidate the portfolio into a few, large, multipurpose projects managed by few staff. These global projects provide technical assistance to country programs and engage in research and development to contribute guidance on state-of-the-art innovations for international nutrition programming. USAID's nutrition priorities are shaped by country needs and requests, new scientific discoveries, evidence of what works and what does not, neglected problems and new nutrition concerns and needs. These factors have contributed, in turn, to decisions to support integrated projects that address all or most of the Essential Nutrition Actions, or to fund specialized projects that focus intensely on advancing coverage of one intervention (e.g., breastfeeding promotion or vitamin A supplementation).

Nutrition Investments

The U.S. Government, through USAID, has made substantial commitments to and progress toward improving nutrition through maternal and child health, emergency and food assistance and agriculture and food security programming, dating back to the start of USAID's nutrition investments in the 1960s. From 1969 to 1973, USAID's average nutrition budget was $11.3 million[49] per year (excluding food and emergency assistance).[50] The small, budding nutrition sector received only

A community leader in rural Guatemala provides nutrition counseling to a group of women as part of a USAID program in the early 2000s.

Photo courtesy of Elizabeth Burleigh

1 percent of USAID's total budget for health, population and nutrition.[51] Nevertheless, these nutrition investments had an impact due to a strategic focus on influencing policy to achieve nutrition objectives, especially through the health and agriculture sectors.

In 1974, with the U.S. pledge to increase global nutrition and food production investments at the World Food Conference, USAID's nutrition budget more than doubled.[52] Conference commitments led to a steady rise in USAID's nutrition funding, primarily from the agriculture account.[53] The nutrition budget grew further with USAID's Child

Survival Initiative in the mid-1980s, which provided a major funding increase for the most cost-effective, life-saving health interventions, including nutrition, and especially micronutrients. A new child survival and health funding account was also created and from 1986 to 2009, the majority of USAID's nutrition activities were funded through this account.[54]

In 2010, USAID began allocating funds specifically for nutrition, as part of the overall health fund, rather than nutrition work being done within the maternal and child health budget. USAID's average annual total nutrition-specific budget continued to grow as the Agency enhanced support for improving nutrition through its global health and Food for Peace programming as well as through Feed the Future, the U.S. government's global hunger and food security initiative.[55] During this same period, with the addition of International Disaster Aid cash to the Food for Peace budget and increasing support for the use of local and regional procurement as well as cash transfers and vouchers, the Food for Peace program increased its investments in nutrition-specific and nutrition-sensitive activities in humanitarian contexts to over $3 billion annually.

Since 2010, 80 percent of USAID's annual nutrition-specific health funds are managed at the country level, while 20 percent are managed by the Agency's headquarters, with the latter's focus being on key global issues, such as improving nutrition data quality and increasing program effectiveness through implementation research.[56] USAID's country program nutrition budgets are used to implement multi-sectoral nutrition activities alongside, and leveraging investments from, other health investments, as well as Feed the Future. There is also close coordination with Food for Peace activities, particularly in long-term rehabilitation and reconstruction programs. USAID's funding for nutrition programming is just one portion of a larger global effort to reduce all forms of malnutrition among high-burden countries. As detailed in the 2018 Global Nutrition Report,[57] international funding for basic nutrition, or nutrition-specific, aid by donors and multilateral agencies amounts to an estimated U.S. $856 million per year (based on 2016 data). This equates to less than one percent of global oversees development assistance.[58] However, none of these results take into account the expansive investments in nutrition-sensitive programming, for which the United States has been the largest donor for the past few years.

While USAID and other international donors' funds have facilitated significant advances in improving nutrition globally, there remains an existing gap of $70 billion[59] to achieve the globally agreed-upon World Health Assembly Nutrition Targets by 2025.[60,61] Accelerating progress toward these targets will require action from all global and local stakeholders, with countries taking the lead on improving their own nutrition status. In addition, through involvement in and coordination with key platforms, such as the Scaling Up Nutrition (SUN) Movement, USAID is supporting increased national-level commitment and investment in nutrition. USAID staff and programs also work closely with government partners to support the development and implementation of nutrition policies and strategies, with an emphasis on domestic resource mobilization and accountability. USAID is committed to supporting host country ownership of nutrition, including through strengthening the capacity of local organizations and leveraging their investments in nutrition, looking toward a day when countries can transition out of the need for development assistance.

Thomas Cristofoletti for USAID

2 Improving Nutrition for Women and Young Children

Improving nutrition for women and young children has always been at the core of USAID's nutrition and health programs. This chapter presents the history of cross-cutting approaches USAID has advanced to better deliver nutrition services and improve dietary practices and nutritional status. The chapter begins by describing USAID efforts to address maternal nutrition and three components of infant and young child nutrition: breastfeeding, complementary feeding and the nutritional care of sick or severely malnourished children. These represent four of the Essential Nutrition Actions mentioned in Chapter One. The chapter then describes two hallmarks of USAID's nutrition activities: a community-based focus that includes growth monitoring and promotion, and USAID's innovations in social and behavior change.

Maternal Nutrition

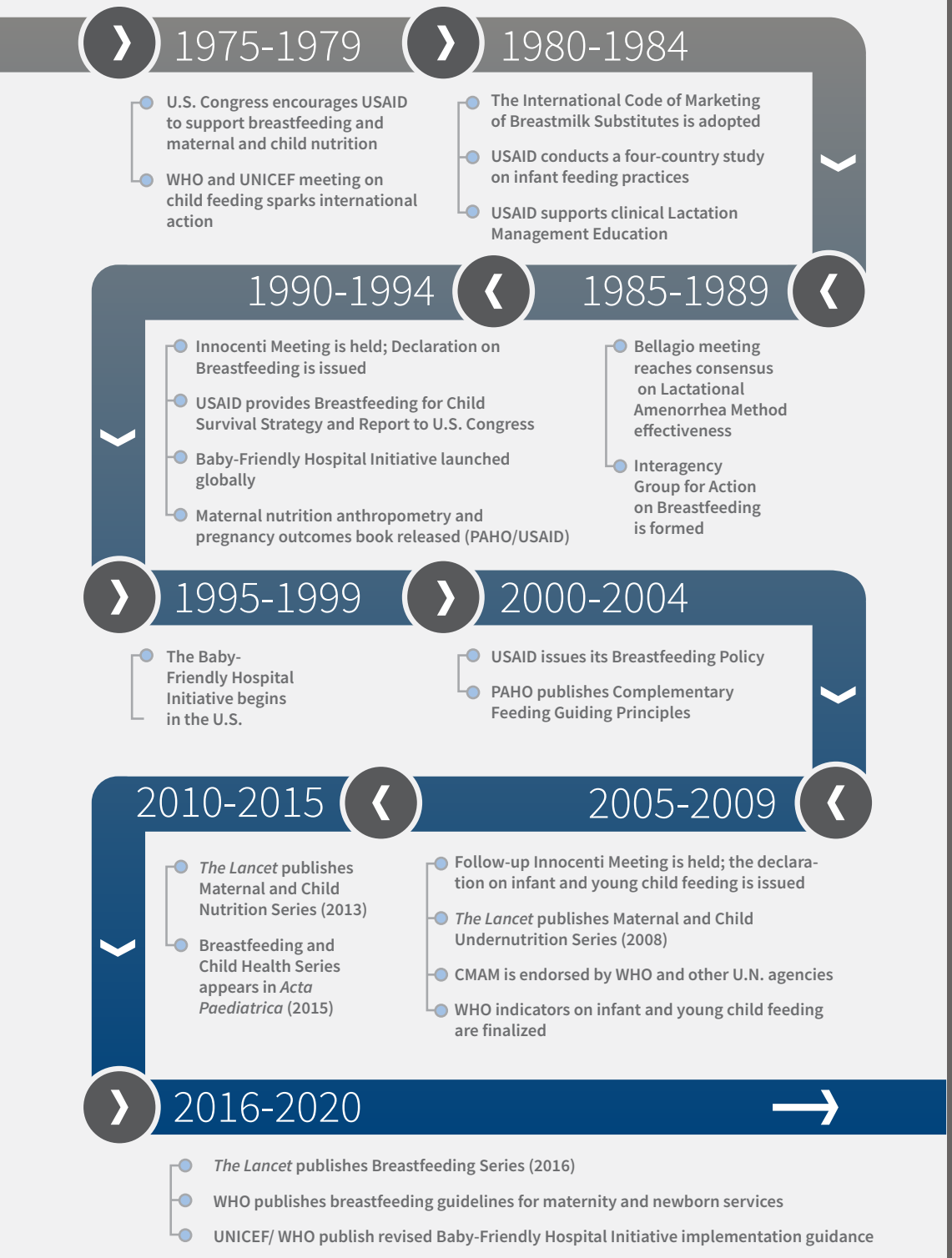
Poor maternal nutrition has many consequences for women, including increased risk for maternal death, infections, anemia, compromised immune function, lethargy and weakness, and lower productivity. It also affects infant health through heightened risk of fetal and neonatal death, intrauterine growth restriction, low birth weight and birth defects. The way the nutritional status of one generation of women affects their infants' nutritional well-being into childhood and adulthood is often referred to as the intergenerational effect of malnutrition.[2]

Nutrition-related factors are estimated to be responsible for 27 percent of maternal deaths. Maternal nutrition, especially the interrelationship between the health, nutrition and survival of mothers and their infants, has gained increased attention since the 1990s.[3] While improving maternal nutrition has been one of USAID's nutrition programming aims, the Agency's nutrition efforts through much of the 1980s and 1990s focused largely on breastfeeding, even though global USAID projects[4] also mandated maternal nutrition.[5] Constraints included the emphasis on child survival, a lack of simple technologies to apply, a low prioritization by Ministries of Health, and the view that maternal nutrition was part of a larger problem of general food insecurity.[6] Under a 1992 initiative in Africa,[7] USAID assessed the factors affecting maternal nutrition and provided recommendations for improvement. Starting in 1996, the Agency's 10-year global infant and young child feeding and maternal nutrition activity focused on behavior change counseling in communities and health facilities; this was supported by detailed information for health workers in a maternal nutrition dietary guide on appropriate weight gain, supplementation and nutrient intake for pregnant and lactating women.[8]

The accurate assessment of maternal nutrition is vital for antenatal care. Anthropometry, or the assessment of nutritional status by physical measures such as weight, weight gain, height and mid-upper arm circumference (MUAC), is important for identifying individuals at risk and for evaluating the effect of care and services. An opportunity for innovative work on maternal anthropometry arose in the 1990s by adding a nutrition component to a new USAID initiative to reduce maternal mortality and make pregnancy and delivery safer. USAID contributed to building an international consensus on evidence-based anthropometric measures of maternal undernutrition for use in primary healthcare both to identify the risk of and to prevent poor pregnancy outcomes, such as those discussed in an important Pan American Health Organization (PAHO) publication on maternal nutrition and pregnancy outcomes.[9]

Nutrition monitoring continues to provide important insights. In many countries, Demographic and Health Surveys measure the standard adult nutrition indicator, body mass index,[10] for women of reproductive age to gain a better population-level understanding of nutritional status. Since

Milestones in Improving Maternal, Infant and Young Child Nutrition



Key Global Results

- In 1991, WHO and UNICEF launched the Baby-Friendly Hospital Initiative to strengthen the promotion of breastfeeding through accrediting maternity services that are supporting mothers to breastfeed.
- Community-based management of acute malnutrition (CMAM) was adopted as a global standard of care in 2007, preventing hundreds of thousands of child deaths.

USAID Contributions to Global Results

- USAID's early recognition of breastfeeding's significance for child survival was important for later breastfeeding and child survival initiatives and support.
- From the early 1980s, USAID research and promotion helped advance the Lactational Amenorrhea Method, a 98 percent effective method of short-term family planning.
- The Agency's support for lactation management education was a foundation for the Baby-Friendly Hospital Initiative.
- CMAM for children with severe acute malnutrition was successfully scaled up and institutionalized in several sub-Saharan countries and Yemen.
- Between 1990 and 2014, the average exclusive breastfeeding prevalence doubled across 20 USAID priority nutrition countries.[1]

A young Nepali woman, 4 months pregnant with her first child, is weighed by an auxillary nurse midwife during her regular antenatal care visit at the health post in Dang.

Dave Cooper for USAID

the 2000s, maternal overweight has posed a new risk and underscored the need to address both undernutrition and overweight and obesity. Between 2005 and 2015, USAID supported collaborative research on simple yet valid indicators of the diversity of women's diets in resource-poor settings.[11] Dietary diversity represents the number of different foods or food groups consumed over a given period of time.[12] For example, one indicator of dietary diversity tracks whether or not women between 15 and 49 years have consumed at least five out of ten defined food groups, such as dairy, grains and vegetables, in the previous day or night. These widely measured indicators can be used to monitor progress in improving the diversity of women's diets.[13]

Among the Agency's most important activities to improve maternal nutrition have been increasing access to family planning services for the healthy timing and spacing of pregnancies, and providing dietary advice and food and micronutrient supplements to pregnant and lactating women. These supplements help improve maternal nutritional status; in addition, newborns of poorly nourished women receiving supplements show substantial improvements in birth weight.[14] Many barriers remain to adequate dietary intake during pregnancy and lactation, and knowledge gaps in addressing the barriers represent a challenge. Proven interventions during pregnancy, such as iron and folic acid tablets for all women, and balanced energy and protein dietary supplements for undernourished populations, are described in USAID guidance and in the 2016 WHO recommendations on antenatal care funded by USAID.[15] USAID has used this guidance to help countries improve health worker counseling tools and develop e-learning courses for students and health professionals.

In the 1990s, USAID developed a set of recommendations for improving nutrition among adolescent girls and young women. These recommendations included improving educational opportunities and school safety for girls, discouraging gender differences in food intake, and offering appropriate family planning for adolescents.[16] Data compiled for USAID in 2015 indicated that, while there has been progress in the nutritional status of reproductive-age women, adolescent girls' nutrition still lags (e.g., in South Asia, underweight status may be as high as 40 percent),[17] along with the continuing problems of anemia and inadequate micronutrient intake. In 2018, a meeting co-sponsored by USAID and PAHO led to a call for seven priority actions to improve research and programming related to adolescent nutrition, which was committed to by over 100 international organizations.[18] Over the long term, USAID's investments in improving girls' nutrition in the first 1,000 days will accrue to better adolescent and women's nutrition.

Infant and Young Child Feeding

Since the 1970s, breastfeeding has been recognized as offering an unequaled advantage for child health and survival, for disease prevention, for infant and young child nutrition and development, and for its role in birth spacing. The optimal practice is exclusive breastfeeding for 6 months, with no other liquids given, not even water. Appropriate complementary feeding, along with continued breastfeeding, from 6 months of age onward has received much attention over the past 20 years, due to increased awareness and growing evidence of its importance.[19] Infant and young child feeding is a commonly used term to describe the continuum of optimal feeding practices from birth to 2 years of age. Estimates have shown that better infant and young child feeding practices could avert nearly 2 million child deaths annually.[20]

USAID has increasingly targeted nutrition assistance to younger children and pregnant and lactating women, who are the most vulnerable to both undernutrition and its lifelong damage. The term the *first 1,000 days of life*[21] came into use in 2010 to describe the time span between a woman's pregnancy and a child's second birthday, which offers a unique window of opportunity for better nutrition.[22] Between 2008 and 2015, major medical publications such as *The Lancet* and *Acta Paediatrica* confirmed through solid evidence the importance of breastfeeding and good nutrition for children in the first 2 years of life. These publications also showed that women's nutritional conditions in adolescence, at the time

of conception and during pregnancy greatly affect maternal health and survival, fetal growth and subsequent early childhood survival, growth and development.[23,24,25]

Breastfeeding

Breastfeeding provides many health and social benefits for the infant and mother, which were not always recognized in health efforts. Early studies documented that the risk of death in formula-fed babies was several times higher than for breastfed babies,[26] largely due to the protection that breastfeeding affords against pneumonia and diarrhea, the two leading killers of children under 5. To punctuate the benefits, a 2016 breastfeeding series in *The Lancet* demonstrated that improving breastfeeding practices could save the lives of thousands of children and mothers annually.[27] Breastfeeding may also reduce the incidence of overweight and diabetes later in life,[28] and may protect women's health by reducing the risk of some breast and ovarian cancers, as well as type II diabetes. In economic terms, exclusive breastfeeding has one of the highest returns of any development action, yielding $35 in returns for every $1 invested, and improved breastfeeding practices could potentially add hundreds of billions of dollars to the global economy each year.[29]

In the 1970s, the optimal practice of exclusive breastfeeding was not yet defined, and regional declines in breastfeeding prevalence were seen. Presumed reasons included the insufficient health sector capacity to support breastfeeding, women's changing roles (especially working outside the home) and increased commercial marketing for infant formula.

In 1977, the U.S. Congress encouraged USAID to "implement maternal nursing education programs, integrated with nutrition and health improvement programs for mothers and children."[30] USAID subsequently announced plans to expand these activities,[31] documented reasons for adverse trends in breastfeeding and sponsored a 1978 National Academy of Sciences conference on maternal and infant nutrition.[32] USAID's first 10-year global project on maternal and infant nutrition, launched in 1979, put many conference recommendations and approaches into action. An impressive foundation for future USAID nutrition investments was built through support for lactation management education for health professionals, improving complementary feeding by evidence-based behavior change strategies, and research on dietary management of diarrhea in young children and other relevant issues.[33]

A mother receives breastfeeding support at Karambo Health Center in Rwanda.

Amy Fowler/ USAID

Ongoing fears about declines in breastfeeding prompted a 1979 WHO and United Nations Children's Fund (UNICEF) meeting to encourage and support breastfeeding and complementary feeding, and the appropriate marketing and distribution of breastmilk substitutes, defined by WHO as "any food being marketed or otherwise presented as a partial or total replacement for breastmilk, whether or not suitable for that purpose."[34] The meeting generated a call for urgent action by governments, international agencies, NGOs, the infant food industry and health workers.[35] In May 1981, World Health Assembly member states adopted the "International Code of Marketing of Breast-milk Substitutes," which was supported by governments and international agencies. The resolution passed with 118 countries in favor, three abstentions and the United States in opposition.[36]

In the early 1980s, USAID supported a study in Colombia, Indonesia, Kenya and Thailand[37] to better understand breastfeeding pattern changes and breastfeeding declines resulting from infant formula marketing. An important feeding pattern seen in all sites was the high rate of breastfeeding initiation; the study also identified a high rate of early mixed feeding (supplementation of breastfeeding with other milks and foods). Mixed feeding can diminish some of exclusive breastfeeding's potential benefits because breastmilk provides protections against illnesses and is the perfect nutritional balance needed by infants; mixed feeding also negatively impacts a woman's breastmilk production and overall supply. The study results helped to raise consciousness about breastfeeding issues, their complexity and needed priority actions.

At the time the study was conducted, maternity services with unsupportive practices, such as separating mothers and babies at birth and not encouraging mothers to breastfeed, were major obstacles to breastfeeding.[38] USAID confronted the problem of unsupportive maternity services in 1983 by financing and otherwise assisting Wellstart International, a U.S. NGO, to pioneer the first medical training program on lactation management education for health care professionals from teaching hospitals in developing countries. What started as a small lactation program became a global force for equipping health professionals with optimal breastfeeding support skills. Graduates returned to improve the quality of care in their own countries' maternity services and to support women with initiation and establishment of breastfeeding. Several countries also created their own national training centers. Lactation management education transformed

positively the norms for how health care professionals and maternity services supported breastfeeding. From 1983 to 1998, the program trained and supported 655 Wellstart Associates from 55 countries, leading to estimated tens of millions of mother-baby pairs receiving breastfeeding support around the world.[39]

Starting in the early 1980s, USAID research helped to deepen the understanding of the relationship between nutrition and fertility, and more specifically between breastfeeding and fertility. Studies corroborated that lactation prevents the release of hormones, menstruation and ovulation in the first 6 months after childbirth; this led to the Lactational Amenorrhea Method, a modern, short-term method of family planning.[40,41] USAID, its implementing partners and collaborators around the world conducted research, advocacy and training to test, prove the efficacy of and promote this method. Experts first confirmed at a 1988 meeting in Bellagio, Italy, that the Lactational Amenorrhea Method is more than 98 percent effective for preventing pregnancy when its three criteria are properly practiced.[42] Overall, USAID's family planning assistance and related research have played, and continue to play, an important role in improving nutrition globally for mothers and their children. Modern contraceptives help women prevent or delay pregnancies, which extends the duration of breastfeeding for the current child and lengthens birth intervals.[43]

Despite the positive evidence for breastfeeding, the advent of USAID's Child Survival Initiative and health funding increases in 1985 did not lead the Agency to prioritize or increase resources for breastfeeding promotion.[44] In 1989, the U.S. Senate Committee on Appropriations expressed this concern to USAID, noting "that less than one percent of child survival programs are being used specifically to promote breastfeeding," and requested an update. USAID's 1990 report to Congress documented breastfeeding activities and spending levels; it showed $5.6 million out of the $203.3 million total 1989 budget for child survival, or about two percent of USAID's overall budget.[45] The Agency committed to expand its support for breastfeeding promotion as one of the most cost-effective means of ensuring child survival. Soon thereafter, USAID released its "Breastfeeding for Child Survival Strategy,"[46] and began a period of intensive breastfeeding support that continued for the next two decades.[47]

Also in the late 1980s, several international agencies, including USAID, formed an ad hoc group, the Interagency Group for Action on Breastfeeding. At a groundbreaking policymakers' meeting in August 1990 at UNICEF's Innocenti Research Center in Florence, Italy, the historic "Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding" was signed and endorsed by government participants from 31 countries.[48] This declaration framed breastfeeding as a global policy issue and increased breastfeeding support by donors and countries worldwide.

Further strengthening the promotion of breastfeeding, WHO and UNICEF launched a movement in 1991 to accredit maternity services that supported breastfeeding, the Baby-Friendly Hospital Initiative. The movement multiplied the returns on USAID's investment in lactation management education by partnering with Wellstart International to design the course for maternity staff and other tools, and launch the Baby-Friendly Hospital Initiative in the United States in 1996. Many of the USAID-funded lactation management education graduates went on to serve as expert evaluators of maternity services for "baby-friendly" hospital accreditation.

In 1991, USAID collaborated with WHO to define standard breastfeeding indicators to evaluate progress towards achieving optimal practices. These standards were then implemented in USAID-supported national Demographic and Health Surveys.[49]

USAID activities contributed to major increases in the prevalence of exclusive breastfeeding in a number of countries - in Ghana from 7 percent to 52 percent (1993-2014) and in Zambia from 10 percent to 73 percent (1992-2014). In addition to supporting country-led efforts, the Agency issued the USAID Breastfeeding Promotion Policy in 2002.[50] This directive guides USAID's breastfeeding programming to support families and women to immediately and exclusively breastfeed, provide appropriate complementary foods in addition to breastmilk from 6 months of age and continue to breastfeed for two years or longer. Consistent with its policy, the Agency established access to lactation counselors and lactation rooms for employees at its headquarters and country offices.

In 2005, a follow-up to the 1990 Innocenti meeting celebrated the accomplishments to date[51] and the participants adopted the "Innocenti Declaration 2005 on Infant and Young Child Feeding," which included both breastfeeding and complementary feeding.[52] Despite the progress, breastfeeding began to decline on the global development agenda. In 2014 UNICEF and WHO, along with other partners, formed a global advocacy initiative known as the Global Breastfeeding Collective, for better financing and implementation of breastfeeding policies and programs. USAID has actively participated in the Collective and promotes related evidence-based actions in its programming, such as improving access to skilled breastfeeding counseling in health facilities.

In 2017, WHO published guidelines for protecting, promoting and supporting breastfeeding in facilities providing maternity and newborn services. This was followed in 2018 by UNICEF and WHO releasing revised implementation guidance on breastfeeding support in Baby-Friendly Hospital Initiative facilities, focusing on institutional management procedures and clinical standards of care, such as establishing ongoing systems to monitor breastfeeding and supporting women to initiate breastfeeding as soon as possible. This guidance provided new recommendations on how and why low birthweight and preterm-birth babies should be prioritized for breastfeeding protection, promotion and support in facilities implementing the Baby-Friendly Hospital Initiative. This also signaled a shift in the Baby-Friendly Hospital Initiative from efforts centered on attaining the specific baby-friendly designation into a model where countries incorporate baby-friendly practices as part of quality improvement and national standards of practice.[53] The Baby-Friendly Hospital Initiative had reached 152 countries by 2018.[54]

Complementary Feeding

Through complementary feeding, children 6 to 23 months begin to eat solid, semi-solid and soft foods while also continuing to breastfeed before fully transitioning to eating family foods.[55] The terms weaning or weaning practices were formerly common, but these could be misinterpreted as the undesirable practice of weaning the baby from breastmilk prematurely. Since around 1990, complementary feeding has been used to stress the importance of introducing diverse and adequate amounts of foods to complement continued breastfeeding—foods that, together with breastmilk, meet an infant's nutritional needs. During this transition, infants are very vulnerable to infection, especially diarrhea, often due to inadequate hygiene or food safety and handling practices. Diarrhea can cause major interruptions in a child's growth when complementary feeding and access to health services are inadequate.

Since starting in the 1960s, USAID food assistance has played an important role in improving complementary feeding for children 6 to 23 months old. For example, food distribution has been accompanied by counseling for mothers on better infant and young child feeding practices, and fortified blended foods were specially formulated by Food for Peace to meet the needs of young children and fill nutrient gaps in local diets.[56]

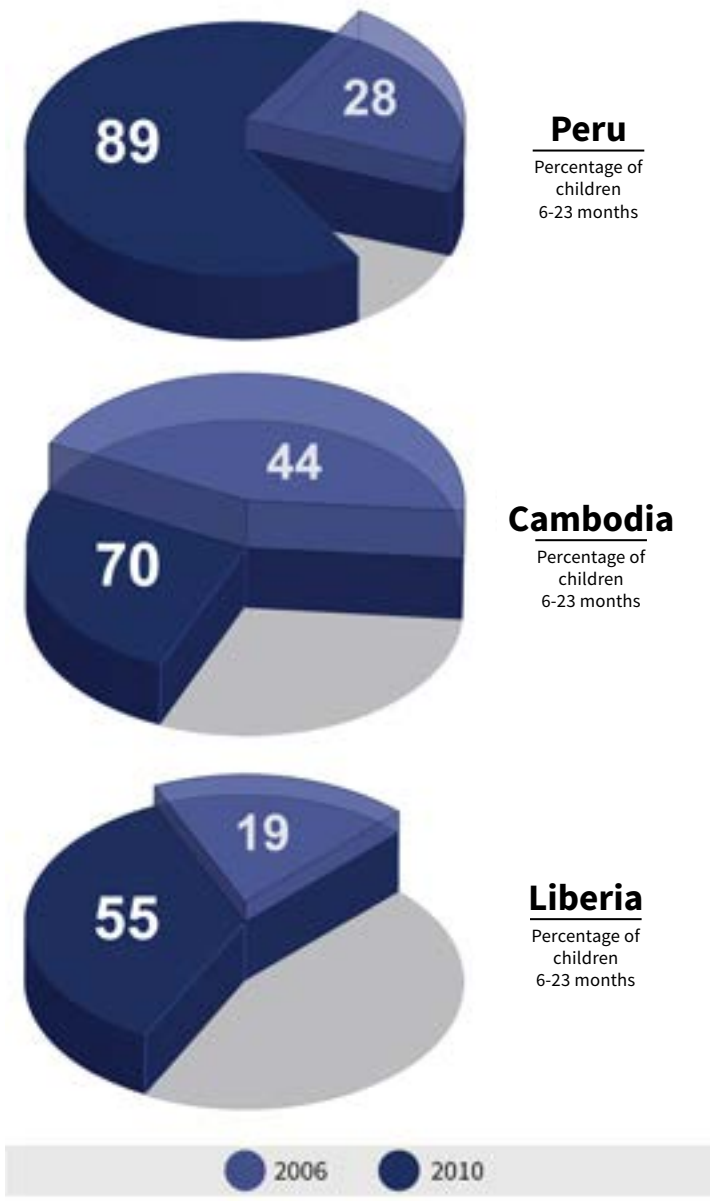
During the 1970s and 1980s, the U.S. Department of Agriculture, through its food technology agreement with USAID, assisted developing countries in producing low-cost, nutrient-rich fortified blended foods from local cereals and oilseeds (mainly soybeans) for use as complementary foods.[57] While these food products were nutritious and locally accepted, and prices were set as low as possible, many families could not afford them. They were thus not often commercially viable or sustainable without government subsidies, an investment few governments made.[58]

Recognizing the limitations of manufactured foods for people in need, USAID broadened assistance with the local or home preparation of low-cost complementary foods. This included an emphasis on cooking demonstrations and the use of indigenous recipes and local ingredients.[59]

By 1999, evidence began to build[60] that success in complementary feeding required a comprehensive approach, not necessarily only a food product.[61] Improving complementary feeding practices required a behavior change focus and appropriate counseling of mothers and caregivers about appropriate food texture, amount, consistency, frequency and variety; encouraging mothers' patience and persistence was also important.[62] Program designs improved in 2003 when WHO and PAHO published strategies and guiding principles on infant and young child feeding.[63] These filled a specific guidance need, with clarity and details on optimal practices and proven interventions, as done earlier for breastfeeding.

Percentage of Children 6-23 Months

with Minimum Acceptable Diet in USAID-Support CSHGP Project Areas



Source: USAID Child Survival and Health Grant Program (CSHGP) grantees, 2006-2010

A young child is measured and found to suffer from severe acute malnutrition at a health center in Wajid, Somalia.

World Food Programme

USAID and WHO led efforts to develop standard indicators to measure infant and young child feeding practices, which are now used globally for monitoring and evaluation and in Demographic and Health and other surveys. Guidance introduced in 2008 included indicators on complementary feeding, minimum dietary diversity, meal frequency and acceptable diet.[64] As of 2018, USAID continues to work with WHO and other partners on improving ways to measure complementary feeding practices and exploring potential new indicators.

Unfortunately, inappropriate complementary feeding practices remain widespread. These include waiting too long to start introducing complementary foods (beyond 6-8 months), or not offering a diverse or high-quality diet in the amount, consistency and frequency needed. In 2016, only one in six children ages 6-23 months old globally received a minimum acceptable diet, defined as that which provides sufficient food frequency and diversity.[65] There has also been increasing alarm about the proliferation of unhealthy snack foods and sweetened drinks aimed at children under 2 by the commercial sector.[66] Countering this, strong global interest remains to address challenges and improve conditions.

Nutritional Care of Sick or Severely Malnourished Children

Saving children's lives by adding nutritional care to the treatment of common infections and the timely treatment of acute malnutrition in development and emergency settings is a high priority for the global nutrition community and for USAID; an estimated 45 percent of child deaths are associated with undernutrition.[67] Infections harm child growth by reducing appetite, impairing nutrient absorption and increasing nutrient requirements and losses.[68] They are also major killers of children, especially malnourished children who become sick. Critical components of child growth include preventing and treating infections, and feeding children adequately during and after illness to ensure adequate nutrient intake, promote catch-up growth and reduce an infection's negative effects on growth and survival.

This Essential Nutrition Action was first defined by USAID in the late 1990s.[69] Thereafter, strengthening the nutritional care of sick children through health services became a feature of an ongoing multiagency action, the Integrated Management of Childhood Illness approach, led by the WHO and UNICEF and supported by USAID. The approach includes both preventive and curative elements, and focuses on the whole child by improving case management skills of health care staff, overall health systems and family and community health practices.[70]

Many USAID-assisted activities have promoted improved practices for feeding sick children, including (1) increasing breastfeeding frequency; (2) continuing, not reducing, feeding amounts during illness; (3) increasing fluid intake for children 6–23 months, including breastmilk; and (4) increasing the variety, frequency and amount of food given after illness until a child regains weight and good growth. These behavioral efforts are often part of community-based outreach in the Community-Integrated Management of

Childhood Illness approach.[71] Supplementary feeding provided to young children through USAID food assistance has been vital in convalescence during illnesses and catch-up growth afterwards.

Community-based Nutrition Management

Treating undernutrition in young children has always been a priority of USAID's nutrition programming. A promising early approach in 1969 was a village-based nutrition rehabilitation center, sometimes called a Mothercraft Center, where children could receive intensive feeding with locally available, nutritious foods during their 3- or 4-month recovery period.[72] While these centers successfully treated many children, their impact was low.[73] The major lesson is that focusing only on treatment is not effective; a community-wide prevention focus on improving feeding practices for all children under 2 is required.[74]

In the late 1990s, the Positive Deviance/Hearth (or PD/Hearth) model of community nutrition rehabilitation centers became popular in development food assistance programs, especially in Africa. This was a small-scale, intensive approach similar to the Mothercraft Centers. However, the nutrition education received by mothers of moderately malnourished children, and the local foods and recipes, followed the example of a "positive deviant" mother who had a well-nourished child because of her good feeding and care practices.[75] A review concluded that the programs had some success, but were unable to reduce malnutrition at the population level in the communities served. Again, the treatment-only approach did little to prevent malnutrition.[76] A resulting best practice, then, was to provide community-wide preventive services covering all women and children in the first 1,000 days.

Severe acute malnutrition is the final, life-threatening phase for children who have become extremely thin for their height due to lack of food and illnesses such as diarrhea. Until the early 2000s, the only treatment option was to admit children for in-patient care, which greatly limited access and impact. The biggest public health nutrition breakthrough in decades came with ready-to-use therapeutic food or RUTF.[77] This high energy, dry, peanut-based product was formulated in 1996 with a similar nutrient content to the therapeutic liquid milk used for inpatient treatment of severe acute malnutrition.[78] RUTF revolutionized the possibilities for outpatient care and take-home distribution; it was a soft, palatable, long shelf-life, fortified blended food that young children could easily eat straight from the package, with no need for clean water or cooking.

This innovation gave rise to community-based management of acute malnutrition (CMAM), a program model designed by two European NGOs based on the take-home distribution of RUTF.[79] USAID helped launch the model, through which the vast majority of severe acute malnutrition cases with no complications are now treated.[80]

From 2001 to 2005, USAID provided guidance and funding to test the CMAM model in different contexts. CMAM was shown to work extremely well in emergencies in Ethiopia and Malawi, where it nearly tripled the number of acutely malnourished children treated compared to traditional inpatient care.[81] With this evidence, USAID engaged private voluntary organizations to take up the model, and WHO endorsed its principles in 2005.

USAID successfully supported the integration, learning and scale up of CMAM into routine heath systems in a number of countries in sub-Saharan Africa and Yemen[82] where 10 percent or more of children suffer from moderate or severe acute malnutrition. However, a lesson learned was that investments by countries to prevent malnutrition should be the first priority, and treating malnutrition via CMAM should not be the only focus.

Coordinating with UNICEF and private sector partners, USAID has also facilitated the national production of RUTF in several countries, including Kenya, Malawi and Uganda. General benefits of local production include cost savings on the transportation of ingredients and finished products and lower tariffs; likewise, while in crisis situations, local manufacturing facilitates more responsive shifts in production and food quantity in response to context-specific dynamics and demands.[83] USAID's investments in CMAM in Ethiopia, Malawi and Niger contributed to their coverage rates of 75 percent or more through national health services, with child mortality rates reduced by more than half between 2000 and 2012.[84]

USAID facilitated the policy dialogue that led to the acceptance of CMAM as the new standard of care in a joint United Nations statement in 2007,[85] which profoundly improved global nutrition policy and saved hundreds of thousands of lives.

Emergency Nutrition

Humanitarian crises harm the nutrition, health, hygiene, sanitation and social/care situation of the affected populations. Acute malnutrition often increases in the immediate aftermath of an emergency due to the toll taken by disease and inadequate diets.[86] Because emergencies can disrupt child feeding practices, it is especially important to protect and support the nutritional needs and care of both breastfed and non-breastfed infants and young children. When determining the most appropriate and effective actions, all local practices and cultural sensitivities, the risk of infectious diseases and the expressed needs and concerns of mothers and caregivers must be considered.[87]

From the start of its Food for Peace program, the United States has been the world's major provider of emergency food assistance.[88] In 2012, Food for Peace assumed an important role in increasing access to CMAM by adding RUTF and similar supplements, complementing USAID's disaster assistance for treating acute malnutrition.[89] After 10 years of product research and development by Food for Peace in collaboration with the U.S. Department of Defense and the National Academy of Medicine, ready-to-use, nutrient-dense, fortified food bars became available in 2011. These serve as ideal meal replacements early in emergencies, before traditional food assistance arrives.[90]

A child in Yemen eats USAID-supplied RUTF

UNICEF

An important component of USAID's nutrition work during emergencies and humanitarian crises is to prevent and manage acute malnutrition, prevent increases in stunting or micronutrient deficiencies and promote optimal infant and young child feeding practices.[91] In 2015, USAID assisted in preparing a toolkit on feeding infants and young children during emergency situations, which, as part of a comprehensive support package, contained guidance on prevention and control of unsolicited, untargeted, unregulated donations of breastmilk substitutes, and the controlled provision of breastmilk substitutes if necessary.[92] To share its extensive experience and contribute to global learning, in 2017 USAID supported updates to operational guidance[93] used to provide concise, practical information on ensuring appropriate infant and young child feeding in emergency preparedness, response and recovery. This guidance is used globally by governments, donors and NGOs in the Emergency Nutrition Network, a United Kingdom-based policy and research organization working to overcome malnutrition.

Community-based Nutrition Programming

USAID has learned that a community-based, integrated approach works best for delivering the Essential Nutrition Actions in rural areas in need. By the 1970s, USAID and international health and nutrition practitioners had discovered that children under 3 years were the most vulnerable to undernutrition, and that infections and inadequate dietary intake were the major causes.[94] Reaching most young children and their mothers with preventive behavior change strategies worked best in the community and at home, not in distant health facilities. However, an integrated approach combining community nutrition activities with health outreach, referrals and facility-based care[95] was necessary to ensure that families had access to the basic health services critical to prevent undernutrition, such as prenatal and newborn care, immunization, treatment of childhood illnesses (including pneumonia and malaria) and family planning.[96] More recently, given the importance of preventing diarrhea and its devastating effects, integrated community nutrition programs since about 2000 have been more frequently including water, sanitation and hygiene activities as part of prevention.[97]

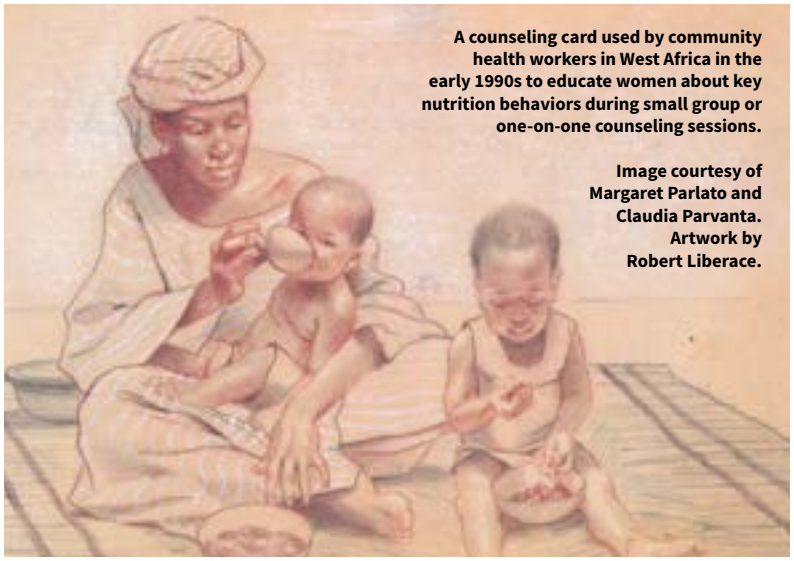
Community-based nutrition programs have provided significant learning that USAID has assisted, evaluated and documented.[98] For example, lessons from the national Indonesia program (1980-1990) resulted in the improved delivery of integrated services nationally, with family planning care moving beyond clinics to be offered at the field level, and the scope of village-based health promotion broadened to include nutrition. Many U.S. NGOs implementing community-based nutrition and child survival activities with USAID assistance utilize an approach called Care Groups, in which large numbers of village volunteers are mobilized to provide community outreach and home visits to facilitate behavior change. This approach became popular in the 2010s because organizations identified that group volunteers provided greater peer-to-peer support, developed stronger commitments to health activities and found more creative solutions compared to volunteers working independently.[99]

Health systems need to deliver the Essential Nutrition Actions as an integral part of maternal and child health care.[100] The Child Health Day model, also known as satellite or outreach clinics, has increased health service outreach in a number of USAID-assisted countries. This outreach, usually monthly at fixed day and site clinics, brings preventive services to where people live, thereby increasing coverage for multiple services at one time, such as immunization, vitamin A supplementation and child growth monitoring and promotion.[101]

Community-based growth monitoring and promotion, or regular measuring and counseling to ensure optimal child growth, is intended to spur appropriate action should any early signs of inadequate weight gain become apparent to mothers and health workers. However, programs that only weigh children with no or only weak nutrition counseling (promotion) have been common, and are widely criticized because they have little or no effect on nutritional status.[102] A 2008 global review of growth monitoring programs found that children participating in truly integrated growth monitoring and promotion, with access to health services, had better nutritional status or survival than children who did not.[103] USAID has supported a push to strengthen interpersonal counseling to improve infant and young child feeding practices in an approach re-named community-based growth promotion, implemented through national nutrition activities in countries such as Guatemala, Honduras, Nicaragua and Uganda in the 2000s. Evaluations in Uganda and Honduras found that positive results depended on mothers and children attending at least 10 monthly sessions per year and on well-established, supportive supervision.[104]

Social and Behavior Change

A hallmark of USAID's nutrition programming since the 1960s has been investing in and increasing the effectiveness of social and behavior change to achieve acceptance, adoption and continuation of improved practices and shift social norms. It is hard to change behaviors, practices and social norms; these evolve over time, with individuals learning from successes and failures.[105] Improved practices need to be continually reinforced; supplying information and knowledge acquisition are not enough to change behavior. The shift to real behavior change programming began by recognizing that most of the immediate and underlying causes of undernutrition are often behavioral, and are rooted in the context of family, community and the broader social environment.



A counseling card used by community health workers in West Africa in the early 1990s to educate women about key nutrition behaviors during small group or one-on-one counseling sessions.

Image courtesy of Margaret Parlato and Claudia Parvanta. Artwork by Robert Liberace.

Starting in India in the late 1960s and continuing in Brazil, Colombia, Ecuador, El Salvador, Nicaragua and the Philippines in the 1970s, USAID supported the novel application of modern advertising techniques and mass media (primarily radio) to promote improved nutrition practices in an approach called social marketing. The power of mass media and social marketing to change nutrition behaviors, such as use of iodized salt in Ecuador, and enriching rice porridge for infants with oil, fish and vegetables in the Philippines, established USAID and its implementing partners as communication innovators.[106]

Social marketing revolutionized communication strategies. Best practices evolved to include identifying and addressing barriers and resistance to new behaviors; offering specific information on and trials of feasible; small doable actions; and motivating participants and groups to action.[107] In the 1980s, USAID developed a new, formative research method for nutrition, Trials of Improved Practices. This method gives insights on nutrition behaviors while also testing new behaviors for feasibility. Successful behaviors are then promoted using social marketing or other techniques.[108] USAID also started providing technical support for nutrition education and communications to country programs around the world in the 1980s, raising the profile and level of nutrition communications globally.[109]

Successful community nutrition programming depends on frequent contact between well-trained community workers and caregivers of young children, often during home visits. Contacts can include checks on health and nutritional status, interpersonal counseling to improve dietary, child care, health and hygiene practices and cooking demonstrations. In the 1990s, USAID began integrating social marketing efforts with counseling, community mobilization and institutional skill-building to reinforce behaviors by delivering important messages through multiple channels to multiple audiences, an approach now collectively known as social and behavior change communication (SBCC).[110]

USAID also aims to improve community social norms around nutrition, as well as the beliefs and perceptions of influential family members and community leaders. One innovative channel USAID began using in 2012 is community video, which works to change social norms while also improving individual attitudes and self-efficacy regarding specific nutrition behaviors.[111]

In 2014, USAID reviewed SBCC and factors for success. A multiple communication strategy was among the most effective; multiple channels and approaches, targeting multiple actors (not just mothers) and multiple visits or contacts with the target audience resulted in greater change.[112] USAID-supported nutrition SBCC adheres to these best practices, and has further evolved into behavior-centered programming.[113] Efforts to influence individual behaviors are combined with structural changes, advocacy to policymakers, service quality improvements, increased access to goods and services and other interventions to remove barriers and boost actions that enable the desired behaviors.

A Solid Foundation, a Solid Future

For over 50 years, USAID's nutrition programming has directly benefited millions of women and young children. Equally important is the tremendous learning that has occurred by working together with host governments, implementing partners, civil society, communities and families. Effective nutrition interventions have been proven and implemented at scale. Country nutrition programs have shown the importance of a preventive approach with a focus on communities, including local health clinics, and on reaching all children under 2 years and their mothers during pregnancy and lactation. Although improving women's nutrition during adolescence and pre-pregnancy still needs more attention, better nutrition in the first 1,000 days will help children grow into strong, productive citizens and promote self-reliant societies.

USAID's SPRING Project

3

From Vitamin A to Zinc: Addressing Micronutrient Malnutrition

Micronutrients, or vitamins and minerals needed in small quantities, are essential for good nutrition, proper growth and development, and overall health.[8] Their deficiency contributes to extensive health problems and death throughout low-income countries, affecting millions of people globally each year.[9] The negative impacts of these deficiencies, however, are not easily perceived because clinical signs appear only under extreme situations. The term "hidden hunger" is often used to characterize the difficulty in timely detection of the consequences of micronutrient deficiencies.[10]

For decades, USAID has been a leader in addressing micronutrient deficiencies, primarily through the targeted distribution of micronutrient supplements, food fortification and social and behavior change. Since the 1960s, three micronutrients—vitamin A, iron and iodine—have been the focus of USAID support because they are most often deficient; they also profoundly affect maternal and child survival, women's health, IQ, educational achievement, adult productivity and overall resistance to illness, and can cause birth defects and blindness. Prevention and control of deficiencies of each of these micronutrients constitute three of the seven Essential Nutrition Actions.[11]

In addition, zinc became a new priority in the 1990s when USAID-supported research indicated that zinc deficiency increases child morbidity and mortality during diarrhea episodes; USAID subsequently included zinc in its assistance for diarrheal disease management.

Attention to Micronutrients in USAID's Early Years (1967-1975)

An early set of initiatives USAID undertook at the start of nutrition programming in the late 1960s and into the 1970s, in collaboration with USDA, was developing and testing low-cost food fortification technology options. Trials included tea with vitamin A in Pakistan, wheat with vitamin A in Bangladesh and with iron in Egypt, monosodium glutamate (MSG) with vitamin A in Indonesia, and salt with iodine in Pakistan.[12] A USAID nutrition program in India in the 1960s supported fortifying wheat bread and atta (whole wheat meal used to make chapatis, the flatbread staple) with multiple micronutrients and lysine (an essential amino acid to boost protein quality). The program also experimented with fortifying salt with iron and iodine (called double fortified salt). The major achievement of these partnerships among developing countries, USAID, USDA, U.S. universities and commercial fortificant companies was the invention of successful technologies for fortifying products with good consumer acceptability and nutritional value. Nevertheless, while the demonstration activities had positive results, the expectation that governments and the private sector would scale these up to national levels did not materialize in most cases. The challenges of who would pay for the fortification and how to secure the approval of governments and industry remained to be tackled.

> **What understanding of, and commitment to, micronutrients does exist in the world is due in large measure to the Agency's pioneering efforts to have them understood as a key element of public health and to put their universal acceptance and availability within reach.**
>
> Source: Putnam, Eliot, et al., "Review of USAID's Micronutrient Portfolio," Arlington, Va., HTS Project, February 1997, p. xvi.

Milestones in Reducing Micronutrient Malnutrition

1965–1969

- Food for Peace adds vitamins A & D to nonfat dry milk, and multiple micronutrients to milled cereals
- USAID's first national nutrition project (India) fortifies bread, *atta* and salt

1970–1974

- USAID conducts a global review of vitamin A deficiency and solutions
- World Food Conference: U.S. proposes a global campaign against vitamin A blindness and iron deficiency anemia
- USAID/WHO international meeting in Indonesia launches vitamin A initiative

1975–1979

- USAID establishes INACG and IVACG
- USAID supports Vitamin A fortification studies in Guatemala (sugar) and the Philippines (MSG)
- USAID/WHO surveys show widespread vitamin A deficiency in Africa; IVACG responds

1980–1984

- USAID study in Indonesia finds that vitamin A deficiency is linked to child deaths

1985–1989

- USAID Child Survival Initiative brings tenfold increase in funding for vitamin A

1990–1994

- World Summit for Children goals set: eliminate vitamin A and iodine deficiencies by 2000; reduce iron deficiency anemia by 2000

1995–1999

- USAID-sponsored Zinc for Child Health meeting is held in the U.S.
- Annual U.S. Congressional iodine deficiency earmark begins for USAID funds to UNICEF
- USAID supports global routine vitamin A supplementation for young children

2000–2004

- WHO/UNICEF add zinc supplementation to child diarrhea management protocol
- USAID expands support for food fortification
- USAID, Gates Foundation and others support GAIN

2005–2009

- INACG and IVACG merge into Micronutrient Forum
- *The Lancet* 2008 Maternal and Child Undernutrition series shows effective micronutrient deficiency interventions.[1]

2010–2015

- Vitamin A and zinc supplements are listed in top 10 actions to reduce child undernutrition (*The Lancet* 2013, Maternal & Child Nutrition series)

Key Global Results

- From 1998 to 2017, Vitamin A supplementation saved the lives of an estimated 1.25 million children.[2]
- Vitamin A supplementation programs started in more than 80 countries, and as of 2015, 26 countries had reached the target of 80 percent effective coverage.[3]
- From 2000 to 2015, the number of children receiving fully protective doses of vitamin A increased from 30 percent to 70 percent in priority countries (82 countries where vitamin A deficiency is a public health problem).[4]
- The number of households consuming iodized salt increased from 20 percent to 75 percent between 1990 and 2016, protecting millions of newborns from brain damage due to iodine deficiency disorders.[5]
- The virtual elimination of iodine deficiency disorders in the Americas was achieved in 2016.[6]

USAID Contributions to Global Results

- USAID support for field research led to the breakthrough discovery in Indonesia (mid-1980s) that vitamin A deficiency contributed to child deaths in addition to child blindness.
- Support for micronutrient supplementation has led to major increases in coverage.
- Assistance to scale up food fortification with micronutrients in 34 countries has resulted in such fortification now being widespread in low-income countries.[7]
- Since 1999, USAID support for universal salt iodization has benefitted 32 countries by protecting vulnerable individuals from serious, often life-long intellectual and developmental disability.
- USAID-funded studies on zinc for diarrhea treatment provided essential evidence leading to changes in diarrhea treatment protocols across international agencies.

By 1973, iron deficiency was determined to be the most prevalent micronutrient deficiency in low-income countries. In addition, numerous studies indicated that vitamin A deficiency could cause blindness in children.[13] To gather more data on the latter, USAID commissioned a comprehensive international review of vitamin A deficiency.[14] Studies on both of these micronutrients informed the U.S. Government's nutrition position at the 1974 World Food Conference in Rome. Then-U.S. Secretary of State Henry Kissinger challenged global partners to join the United States in ensuring food security and reducing malnutrition:[15]

> **"The United States proposes an immediate campaign against two of the most prevalent and blighting effects of malnutrition: vitamin A blindness and iron-deficiency anemia… There are available and relatively inexpensive techniques which could have a substantial impact. The United States is ready to cooperate with developing countries and international donors to carry out the necessary programs."**
>
> U.S. Secretary of State Henry Kissinger

The Rome conference marked an intensification of USAID efforts and investment to understand, assess, prevent and control micronutrient deficiencies worldwide. Within weeks, the WHO and USAID had convened a major technical meeting in Indonesia to launch a worldwide initiative on vitamin A.[16] The following year, USAID formed the International Vitamin A Consultative Group (IVACG) and the International Nutritional Anemia Consultative Group (INACG) to stimulate research, inform global policy development, host technical meetings and provide technical guidance to policymakers and program managers through state-of-the-art publications, task force reports and policy statements.[17] For the next three decades, USAID funded the IVACG and INACG secretariats. In 2006, these groups combined as the Micronutrient Forum, and USAID funding continued through 2010. As of 2018, the Micronutrient Forum was continuing its work as an international NGO to build consensus around evidence-based policies and programs that reduce micronutrient deficiencies.[18]

Research, Policy and Programming: Vitamin A, Iron, Iodine and Zinc Interventions

USAID has always addressed micronutrient deficiencies comprehensively and from a public health perspective. The Agency adopted a "from research to policy to programs" strategy, an initial approach to the concepts of implementation research and delivery science that followed.

Food Fortification

Fortifying foods with micronutrients is the practice of deliberately increasing the content of essential micronutrients to improve the nutritional quality of the food supply, and to provide a public health benefit with minimal risk to health.[19] Mass fortification refers to the addition of one or more vitamins or minerals to processed foods and condiments that are commonly consumed, such as rice, oil, wheat flour, sugar and salt.

Fortification takes advantage of widely consumed, industrially processed or packaged food products, using food industry networks to distribute these products with additional micronutrients, without seeking to change a population's dietary patterns. Micronutrient fortificants are inexpensive, and fortification is cost-effective when implemented under the suitable conditions of production, enforcement, and consumer acceptance and use.

Throughout its history, USAID has employed the latest U.S. and international research and development technologies, research trials and protocols for the fortification of foods and condiments with vitamins and minerals. Domestically, Food for Peace has defined and implemented fortification specifications to improve the micronutrient content of the products USDA procures for food assistance. USAID began addressing micronutrient malnutrition by fortifying U.S. food aid with vitamins A and D in nonfat dry milk powder in 1965, and soon thereafter by adding multiple micronutrients to processed cereal products.

Over the years, expert reviews and feasibility studies illustrated the need for periodic updating of fortification specifications for food aid commodities. Equally important was establishing procedures to monitor the quality and quantity of micronutrients added to these foods by U.S. grain millers, a process initiated in 1994 with technical support and guidance from USAID implementing partners.[20] New requirements issued by USDA went into effect in 2000. The monitoring of micronutrients in U.S.-donated commodities represented a major advance in food aid quality.[21]

Internationally, USAID assisted 34 low-income countries with fortification of staple foods, beverages and condiments.[22] Adding vitamin A to sugar has been particularly successful in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Malawi, Nigeria and Zambia.[23] Fortifying vegetable oil with vitamin A in Uganda, and wheat flour with multiple micronutrients in Nicaragua and the West/Bank Gaza, are other good examples of fortification projects in which effective food control systems were established to ensure sustainability.[24] National programs, such as in Malawi, Uganda and Kenya, launched with USAID investments, and including effective food control systems, have continued fortification independent of USAID funding.[25]

The feasibility of fortifying rice, a key global staple, advanced through USAID's technical and cost analyses.[26] Working with the World Food Programme and USDA, USAID also developed rice fortification specifications that facilitated fortified rice being distributed in food assistance programs, including its own.[27] Another USAID-supported tool was the Food Fortification Formulator,[28] an Excel-based program to formulate micronutrient content

Malian refugees receive rice from a USAID-funded UN World Food Program project in Mbera refugee camp.

Agron Dragaj, UN World Food Program

and associated costs of potentially fortified staples, depending on the pattern of consumption of each population. A number of East, Central and Southern African countries used the tool to prepare fortification standards and regulations from 2008-2011, and for training and advocacy in that region. The Kazakh Academy of Nutrition used the tool from 2015-2017 to guide food fortification recommendations for the countries of Central Asia, Afghanistan and Pakistan.

Amidst the developing world's growth in both population and urbanization, mass fortification increasingly contributes to meeting micronutrient requirements. Fortifying Guatemalan sugar with vitamin A in the mid-1970s showed remarkable increases in serum retinol (an important marker and component of vitamin A) in preschool-age children, particularly in those with low initial levels.[29] Retinol levels in breastmilk also increased substantially, improving the vitamin A status of breastfed infants and young children.[30] USAID's leadership also has been critical in determining and clearly defining the food fortification roles and responsibilities of the public sector in public-private partnerships that are key to mass fortification success.[31] The benefits of USAID's investment are reflected in the breadth of foods now being fortified globally.[32]

Periodic updates to fortification specifications, as well as quality assurance and compliance monitoring, continue to be indispensable for maximizing the impact of food fortification on micronutrient malnutrition. USAID's technical assistance has steered national food fortification programs toward sustainability and self-reliance by: encouraging the participation of commercial food and pharmaceutical industries; setting a price low enough to be compatible with the trade practices; establishing a government's commitment to maintain reliable enforcement systems; and periodically monitoring and evaluating program performance, quality, penetration and outcomes.[33]

Vitamin A Supplementation

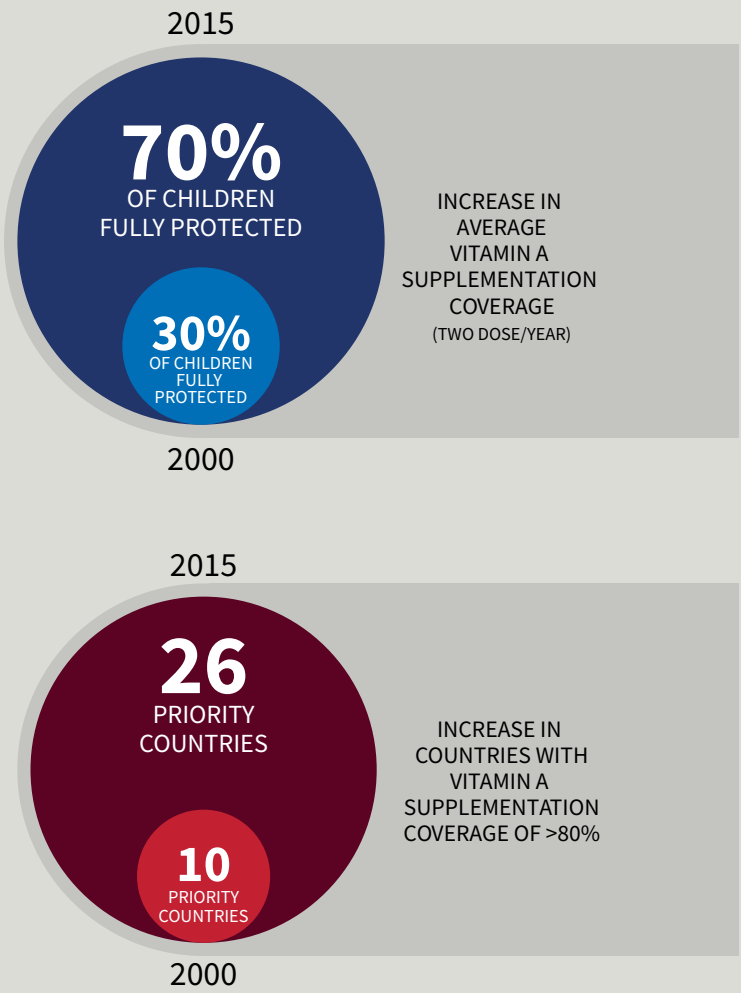
Beginning in 1976, USAID-supported studies in Indonesia revealed that severe vitamin A deficiency was the leading cause of childhood blindness in the country and, by extrapolation, in all of Southeast Asia. Importantly, vitamin A deficiency was found to be associated with a dramatic increase in risk of child death and exacerbated the severity of common infections, particularly measles. Also, for the first time, studies showed that preventing vitamin A deficiency through a large dose of vitamin A to children every 6 months could reduce their mortality by 34 percent.[34] The evidence of mortality reduction was so compelling, and the intervention so simple, that the findings were hailed as a breakthrough in international efforts to improve child survival. USAID, with assistance from other donors, funded additional major trials in Indonesia, Nepal, India, the Sudan and Ghana, with most reporting similar results.

In 1985, USAID began its Child Survival Initiative with a large increase in health funding, including a U.S. Congress earmark for vitamin A activities. This enabled USAID to increase its support for vitamin A activities tenfold.[35] Vitamin A supplementation in Asia and Africa became one of USAID's priority child survival interventions, along with breastfeeding, immunization and oral rehydration therapy. In other regions, like Central America, the mechanism of delivering vitamin A was through fortified foods.

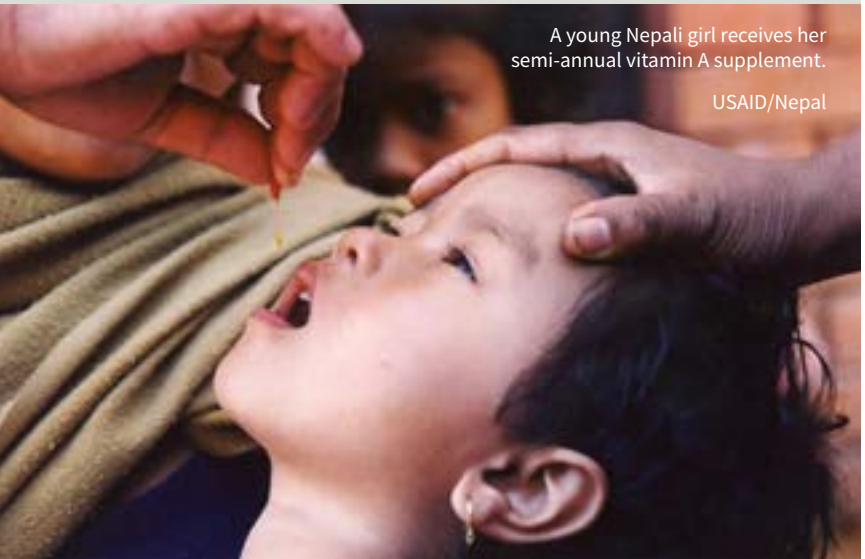
In 1990, the U.N. hosted the World Summit for Children, a meeting of government representatives from over 150 countries focused on improving the health and well-being of children.[36] The Summit articulated specific nutrition goals, emphasizing the need to reduce iodine and vitamin A deficiencies in children and reduce iron deficiency anemia in women.[37] In 1993, a synthesis of findings from multi-country studies identified that an increased intake of vitamin A from a large, semiannual supplement significantly reduced mortality among children aged 6-59 months in areas of endemic vitamin A deficiency, aligning with the results from earlier USAID-supported studies in Indonesia.[38] The synthesis authors proposed that vitamin A (first referred to as the "anti-infective vitamin" based on early studies in the 1920s) likely contributed to child survival by reducing the severity of infectious diseases, particularly measles and diarrhea. Vitamin A supplementation has been broadly adopted in countries where vitamin A deficiency is endemic and no large-scale, alternative interventions exist.[39] Vitamin A supplementation has also provided an effective entry point in many countries for the semiannual delivery of other preventive services to young children, such as malaria control, deworming, immunization and nutrition counseling.

For women in deficient areas, vitamin A interventions may bring substantial health benefits. For example, USAID-funded research in Nepal found a 40

Increased Coverage of Children with Vitamin A Supplementation in 82 High Priority Countries, 2000 and 2015



Source: UNICEF, "Vitamin A Supplementation: A Statistical Snapshot," New York: UNICEF, 2016. https://data.unicef.org/topic/nutrition/vitamin-a-deficiency/



A young Nepali girl receives her semi-annual vitamin A supplement.

USAID/Nepal

percent reduction in pregnancy-related mortality in women who took weekly doses of vitamin A or beta-carotene, a vitamin A precursor, during pregnancy, with the impact most apparent among women who were "night blind" (i.e., blindness in dim light caused by vitamin A deficiency).[40] Replication trials in Bangladesh[41] and Ghana,[42] however, did not show a significant reduction in maternal mortality, highlighting the importance of context-specific factors in determining the impact of interventions.

Building on USAID's investments in vitamin A research, policy development and programming, an array of international organizations and country governments became actively involved in vitamin A supplementation and fortification. USAID continues to support the vitamin A efforts of UNICEF, the Micronutrient Forum and the Global Alliance for Vitamin A.[43] The World Health Organization strongly recommends continuing implementation of the current policy of universal, twice-annual supplementation for children 6-59 months in countries where vitamin A deficiency is classified as a public health problem.[44] Vitamin A supplementation has also been incorporated into the Integrated Management of Childhood Illness guidelines and manuals as the standard treatment for severe measles throughout the world.[45]

Because vitamin A supplementation programs were sometimes criticized for being too narrowly focused, USAID supported implementation research to develop the now widely used Child Health Day model of outreach from health facilities. These sessions deliver, along with vitamin A supplements, a package of preventive services such as immunizations, iron supplements for women or children, oral rehydration solution packets for diarrhea, de-worming, growth monitoring and promotion, nutrition education, health services referrals, family planning counseling and contraceptives all at the same place and time, making services conveniently accessible in the communities themselves.

In priority countries around the world, there was dramatic improvement in the full protection of children with vitamin A supplements between 2000 and 2015, particularly with sub-Saharan Africa. Annually during this period, UNICEF delivered about 500 million vitamin A supplements to children worldwide with USAID support. Sustaining high coverage is an ongoing challenge.[46]

Iron Deficiency and Anemia Interventions

Anemia, or low levels of oxygen-transporting hemoglobin in the blood, has several causes. These include deficiencies of iron and vitamins such as folic acid and B-12, but also chronic and bone marrow diseases that interfere with the production of red blood cells, and sickle cell anemia. Risk factors for developing anemia include a diet lacking in certain vitamins and minerals; intestinal disorders; menstruation and pregnancy for women; advanced age; and family history.

The lack of iron is considered the most prevalent micronutrient deficiency and is presumed to be the leading cause of anemia. Iron deficiency, iron deficiency anemia, and other types of anemia cause a host of complications. During the first 2 years of life, low iron status can increase a child's risks for impaired cognitive, behavioral and motor development.[47] For women, iron deficiency

is associated with weakness, fatigue, reduced cognitive performance and diminished immune response. It is exacerbated by pregnancy and may increase the risk of low birth weight, delivery complications, and perinatal and maternal mortality.[48] In adults and children, iron deficiency can reduce the capacity for physical and mental activity.[49]

Nonetheless, research, policy and action to reduce iron deficiency and anemia have been markedly more modest than attention to reducing vitamin A deficiency. This may be in part because the consequences of iron deficiency and anemia are less obvious than the two clear consequences of vitamin A deficiency (nutritional blindness and child death). Moreover, there is ongoing debate over the safety of iron supplementation in young children in areas where malaria infection is highly prevalent or intestinal infections are common.[50,51]

USAID has taken steps toward meeting the challenges of iron deficiency by supporting supplementation and fortification, and important advocacy campaigns in national health agendas for anemia prevention and control for women and children. In addition, in more than 25 countries between 1995-2006, USAID efforts demonstrated that iron and folic acid supplementation could be made more effective with increased access and coverage and could reduce the prevalence of anemia.[52] USAID continues this important work.

The most common food vehicle for iron fortification is wheat flour. USAID invested in research to optimize the bioavailability of iron and hence its absorption in the body from foods.[53] An important development was a new and improved form of iron for fortification: sodium-iron ethylenediaminetetraacetic acid (iron EDTA). USAID-sponsored studies contributed to the determination that iron EDTA is absorbed more efficiently than other sources of iron in flours, making it a desirable, alternative fortificant for whole flours.[54] Building on this research, USAID worked with the World Food Programme and the USDA to modify the specifications of fortified flours for food assistance, such as cornmeal, wheat and blended foods (e.g., Corn Soy Blend) to include iron EDTA in order to improve the utilization of iron.[55]

Micronutrient powders (MNPs), sachets containing dry powder with micronutrients that can be sprinkled onto a child's porridge or other food, is another example of an innovation that received USAID support for initial testing. Efficacy studies have demonstrated that when the powders are used as recommended, iron deficiency anemia in children is reduced. Based on these studies, WHO recommended micronutrient powders as an alternative to traditional iron supplements.[56] Large programs distributing MNPs are ongoing. However, their sustainability and effectiveness at scale are still uncertain.[57]

USAID projects have explored addressing the multiple causes of anemia through a broad-based, multi-sectoral approach, including preventing malaria, avoiding early pregnancy, promoting delayed umbilical cord clamping, and emphasizing dietary diversity to increase micronutrient intake (including iron), as well as deworming and agricultural production of nutrient-rich foods. Such a collaborative approach permits the tailoring of a specific strategy for a particular geographic area, with major attention initially given to the primary factors contributing to anemia in the local context. Tools to support the multi-sectoral approach by countries[58] and districts[59] within countries were designed to estimate the relative importance of the causes of anemia and to plan programs accordingly.

Sustainable Elimination of Iodine Deficiency Disorders

Iodine deficiency disorders are the leading preventable cause of worldwide intellectual and developmental disabilities. Serious iodine deficiency during pregnancy retards fetal development, especially brain development, causing mental, motor and hearing deficits, including cretinism, a grave, irreversible form of mental retardation.[60] Through youth and adulthood, iodine deficiency can impair energy, work capacity, mental and physical function, and result in enlargement of the thyroid gland (goiter), among other consequences.[61]

To address this, iodine is most frequently delivered to populations through iodized salt. Since 1999, USAID has been supporting universal salt iodization through UNICEF to prevent the damage of iodine deficiency.[62] During this period, 32 countries have benefitted from investments that help protect vulnerable individuals from serious, often life-long intellectual and developmental disability. The efforts of the Iodine Global Network,[63] with partners UNICEF, USAID, Kiwanis International, the Bill & Melinda Gates Foundation and the World Bank, have dramatically increased the production and consumption of iodized salt, protecting millions of newborns from learning disabilities caused by iodine deficiency.[64] In 2016, the Iodine Global Network celebrated the virtual elimination of iodine deficiency disorders in the Americas, and estimated that 750 million cases of goiter had been prevented worldwide since 1993 as a result of increased iodized salt consumption.[65] As of 2016, 130 countries supported salt iodization through mandatory or voluntary efforts by centralized private sector salt producers and sometimes through public sector food distribution schemes, as in India.[66] Also as of 2016, only 19 countries were classified as iodine deficient, showing tremendous progress from the 113 countries in this category in 1993.[67]

Zinc and Diarrhea

The importance of zinc as an essential micronutrient for immune function, growth and development was discovered in the 1960s, but it was not until the 1980s that research focused on zinc loss in diarrhea and on zinc supplementation in diarrhea treatment. A USAID-funded meeting in 1996[68] summarized the known impact of zinc supplementation on child health outcomes, and outlined research priorities. Further study made clear that zinc supplementation, together with oral rehydration salts, reduces the duration and intensity of all forms of diarrhea.[69]

USAID-funded studies provided the essential evidence base that led the World Health Organization and UNICEF to revise the treatment protocol for

diarrhea in 2004 to include zinc supplementation as well as administration of oral rehydration salts.[70] USAID implementing partners guided pharmaceutical companies, mainly in low-income countries, with protocols and technical support to meet UNICEF procurement standards and good manufacturing practices for zinc supplements. A regular and approved supply of dispersible zinc supplements is now widely available through international and national procurement systems.[71]

Playing the lead role among donors, USAID disseminated the findings of the benefit of providing zinc supplements during diarrhea episodes, and helped prepare advocacy, training and behavior change communication materials for rollout of the new, combined diarrhea management protocol. USAID also supported a number of NGOs, who quickly integrated the new protocol into their programs.[72]

USAID Support to Country Micronutrient Programs and Global Efforts

From 1989 onward, USAID-funded micronutrient projects helped establish effective, sustainable, country-owned nutrition programs. USAID technical assistance to ministries of health and other entities built capacity and forged long-term relationships of trust with local institutions. Importantly, USAID and its implementing partners also advanced global learning and analysis of key accomplishments, and defined future directions based on evidence of what works in micronutrient programming.[73]

Research funded through USAID has developed accurate yet practical methods for assessing vitamin A status and anemia; measuring supplementation coverage with vitamin A, iron and folic acid; and determining the presence

Anemia Interventions, Organized by Sector

NUTRITION

- Dietary diversification
- Dietary modification
- High-dose vitamin A supplementation for children
- Industrial fortification
- Iron-folic acid supplementation in women of reproductive age
- Maternal, infant, and young child nutrition
- Routine micronutrient interventions for children

GENETICS

- Counseling and management of genetic blood disorders

WATER, SANITATION AND HYGIENE

- Clean play spaces
- Handwashing
- Use of basic and safely managed sanitation facilities
- Use of safely managed drinking water sources
- Water treatment

REPRODUCTIVE HEALTH

- Delayed cord clamping
- Family planning

AGRICULTURE

- Biofortification
- Increased production of nutrient-rich foods
- Promotion of food safety

DISEASE CONTROL

- Case management of malaria
- Deworming for schistosomiasis
- Deworming for soil-transmitted helminths
- Indoor residual spraying
- Intermittent preventive treatment during pegnancy
- Long-lasting insecticide treated bed nets

Source: USAID SPRING Project, Understanding Anemia: Guidance for Conducting a Landscape Analysis, 2nd edition, 2017.

A health worker in Egypt in 1988 gives a dehydrated child oral rehydration salts as part of a USAID-funded national program to control diarrheal diseases.

JSI/Egyptian National Control of Diarrheal Diseases Project

of iodized salt in households.[74] Through USAID's efforts, micronutrient-specific indicators are now included in the core modules of national Demographic and Health Surveys and the UNICEF Multiple Indicator Cluster Surveys. Key indicators include the coverage of vitamin A supplementation in children, iron supplementation in pregnant women, the presence of iodized salt in households, and the diversity or quality of complementary feeding behaviors.

USAID and the international nutrition community recognize the importance of private sector participation for achieving optimal human nutrition, especially the food and pharmaceutical industries. Thus, the Global Alliance for Improved Nutrition (GAIN) was launched at the United Nations 2002 Special Session of the General Assembly on Children with the aim of building partnerships with the private sector. USAID, together with the Bill & Melinda Gates Foundation and other sponsors, have supported GAIN since it was founded. GAIN has subsequently evolved into an international nongovernmental organization.[75]

Addressing micronutrient malnutrition has proven attractive to governments in high-need countries. These interventions are relatively simple to implement, are supported by ample evidence of efficacy and have well-established and accepted models of delivery at scale. They also provide key entry points for integration into different services and programs, result in measurable impacts on important health and nutrition indicators, and are recognized by leading economists as very cost-effective.[76]

USAID's major investments in micronutrients over the last 50 years have contributed substantially to this momentum and have yielded impressive results. USAID programming continues to support micronutrient fortification and supplementation for vulnerable populations as a high-impact intervention that enhances long-term health and productivity, and is working to facilitate increased country ownership of micronutrient programming to ensure these improved nutrition outcomes extend beyond the end of development assistance.

4

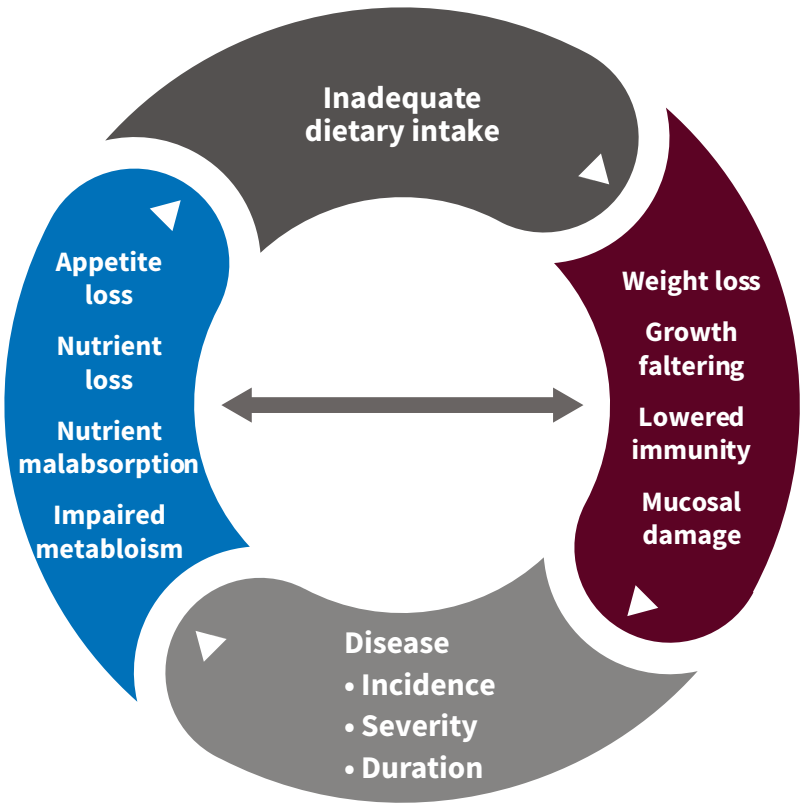
Combating the HIV Epidemic through Food and Nutrition

By the late 1990s, HIV was an unprecedented international health and development crisis. Since then, however, with intensive global and national efforts, the rates of new infections and acquired immune deficiency syndrome (AIDS)-related deaths have declined dramatically. About 1 million people died from AIDS-related causes in 2016, compared with almost 2 million in 2005; there were 2.1 million new infections in 2016, compared with 5.4 million in 1999.[3] Undernutrition has important clinical and economic repercussions for HIV, and USAID, at the forefront of global efforts to improve the nutritional status of vulnerable populations, met the relevant challenges of this new disease.

Specific to these challenges, poor nutrition among people with HIV is associated with adverse clinical outcomes, increased infections, hospitalization and mortality. HIV increases energy needs,[4] but at the same time reduces appetite, alters metabolic processes and impairs nutrient absorption. Undernutrition can hasten the progression of HIV, increase the risk of mortality (even with antiretroviral therapy, or ART) and reduce treatment effectiveness and adherence. In HIV-positive women, undernutrition has been associated with poor birth outcomes and increased mother-to-child transmission of HIV. Stunted growth, failure to thrive and frequent childhood illnesses are common in HIV-positive children, and even uninfected infants of HIV-positive mothers are at increased risk of mortality. In addition, food insecurity can lead to risky practices that increase vulnerability to HIV infection.

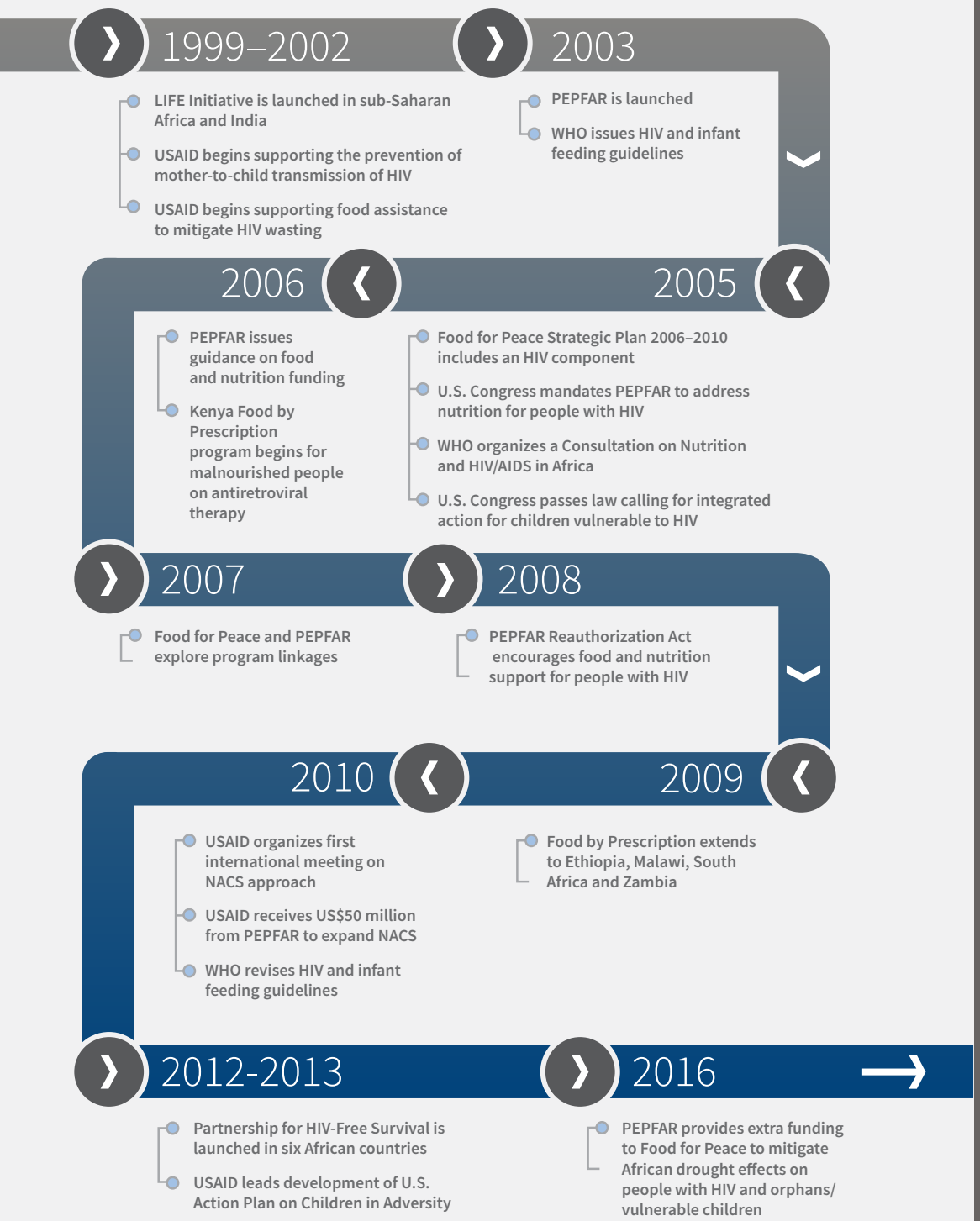
Since 2001, USAID has supported critical research on the importance of nutrition for people with HIV and dietary management of HIV-related symptoms, resulting in the first practical guidance on integrating nutrition into HIV prevention, care and treatment.[5] By 2003, USAID was supporting the development of country guidelines and training materials

The Cycle of HIV and Poor Nutrition



Source: USAID Food and Nutrition Technical Assistance (FANTA) III Project, "NACS: A User's Guide, Module 1, What Is NACS?", 2016.

Milestones in Nutrition and HIV



Key PEPFAR Global Results

- PEPFAR funding allowed significant increases in nutrition and HIV learning and programming.
- In 2017-2018, PEPFAR's response to the El Niño drought and famine in southern Africa resulted in more than 5 million people being screened for acute malnutrition through HIV services across five countries and 235,569 undernourished individuals receiving therapeutic or supplementary food.[1]

USAID Contributions to Global Results

- HIV activities and food aid were implemented by 41 Food for Peace programs in 20 countries.[2]
- The nutrition assessment, counseling and support (NACS) approach was implemented within the health systems of more than 20 countries.
- USAID provided key technical input and critical research that informed global guidance on infant feeding, nutrition for nursing mothers, and the prevention of mother to-child transmission of HIV.

on nutrition and HIV. Also in 2003, the U.S. President's Emergency Plan for AIDS Relief (PEPFAR) was legislated by Congress, to be led and managed by the U.S. Department of State's Office of the U.S. Global AIDS Coordinator and Health Diplomacy and implemented by several U.S. Government agencies, including USAID and the Centers for Disease Control and Prevention (CDC). In 2004, World Health Assembly Resolution 57.14 called on member states to promote the integration of nutrition into a comprehensive response to HIV. As treatment became more available around 2004 through PEPFAR, USAID directed its attention to the formulation and provision of therapeutic and supplementary foods to treat acute malnutrition for people with HIV, and orphans and vulnerable children.

In 2005, WHO convened the first international conference on HIV and nutrition programming to review the latest scientific evidence and identify knowledge gaps.[6] The same year, the U.S. Congress mandated PEPFAR to work with USAID to "develop and implement a strategy… to address the nutritional requirements of those on antiretroviral therapy."[7] In response, PEPFAR's 2006 report to Congress on nutrition for people living with HIV committed to coordinating with USAID and other agencies to mount a consistent response to integrating nutrition into HIV care and treatment.

In 2008, USAID produced a compendium of promising practices in nutrition and HIV,[8] and in 2009 began to help national governments refine guidelines and training materials based on the latest WHO guidance. Substantial PEPFAR funding in 2010 allowed significant nutrition and HIV learning and programming, which was used to initiate and extend the integration of the nutrition assessment, counseling and support (NACS) approach into clinic and community services (described later in this chapter). Between 2012 and 2016, interagency and external collaboration created momentum that moved the nutrition and HIV learning agenda forward beyond PEPFAR. Many implementing partners served not only as technical resources for USAID, but as important voices in the global dialogue on nutrition, health and development.

Addressing Food Insecurity in HIV-Affected Populations

After WHO announced in 1999 that AIDS had become the number one killer in Africa,[9] the White House Office of National HIV/AIDS Policy funded USAID to provide food commodities to HIV-affected children and their families in sub-Saharan Africa and India, under Food for Peace and the Leadership and Investment in Fighting an Epidemic (LIFE) Initiative (1998–2009).[10] In addition, Food for Peace included HIV in its annual proposal guidelines for 2000 and its Strategic Plan 2006–2010, to prioritize and standardize treatment approaches for these vulnerable populations within Food for Peace programs. By the early 2000s, it was apparent that HIV was disrupting farming and other livelihoods, and people on ART identified food as their most urgent need in order to cope with increased appetites and side effects from the drugs. LIFE, which worked to mitigate these concerns, represented a significant turning point in USAID's HIV response.

> **"History will surely judge us harshly if we do not respond with all of the energy and resources that we can bring to bear in the fight against HIV/AIDS."**
>
> Nelson Mandela, late President of South Africa

When PEPFAR started in 2003, Food for Peace programs were encouraged to continue providing food and livelihood assistance to HIV-affected vulnerable families, while PEPFAR itself would provide therapeutic and supplementary food to AIDS patients with acute malnutrition, to HIV-positive pregnant and lactating women, and to orphans and vulnerable children born to HIV-positive parents.[11] This co-programming proved to be challenging: Food for Peace mainly targeted highly food-insecure rural communities, and provided food according to food insecurity criteria, whereas PEPFAR targeted individuals with HIV in the more urban and peri-urban areas where HIV prevalence was highest, according to anthropometric eligibility criteria. The 2007 Food for Peace and PEPFAR HIV and Food Security Conceptual Framework sought to address this challenge, for example, by encouraging Food for Peace programs to address food insecurity in urban areas,[12] but opportunities to directly link PEPFAR and Food for Peace food assistance have been limited.

In 2007, USAID contributed to a World Bank-led compilation of technical guidance on HIV, nutrition and food security,[13] as well as a comprehensive World Food Programme guide to food assistance programming in the context of HIV.[14] Recommended approaches included not targeting food assistance solely to people with HIV (to avoid stigma and resentment in food-insecure communities), using community-based targeting, and providing food assistance as part of a strategy to strengthen long-term livelihood security, all of which are followed within USAID's Food for Peace programs.

In 2008, the U.S. Congress passed a Reauthorization Act, which reiterated the importance of proper nutrition in treating HIV. The Act encouraged PEPFAR and USAID to provide food and nutrition support for people living with and those affected by HIV/AIDS, including children, and also encouraged sustainable, community-based programs in communities where both HIV/AIDS and food insecurity were highly prevalent.[15]

Preventing Mother-to-Child Transmission of HIV: Infant and Young Child Feeding

Increasing HIV prevalence in sub-Saharan Africa and the discovery in the 1980s that HIV could be transmitted through breastmilk caused alarm and confusion about how HIV-positive mothers should feed their infants, and

Mothers and their babies participate in a group meeting for HIV-positive pregnant and breast feeding women at a clinic in Chitungwiza, Zimbabwe.

Tsvangirayi Mukwazhi/ Organisation for Public Health Interventions and Development

also threatened to reverse the gains from USAID's history of breastfeeding support. Many countries advised HIV-positive mothers not to breastfeed to avoid the risk of mother-to-child transmission. However, multiple studies in sub-Saharan Africa showed that providing infant formula to reduce mother-to-child transmission of HIV actually increased the overall rate of infant mortality, due to the loss of nutritional and antibody protections from breastmilk, and the additional challenges of a sustained supply and hygienic preparation of formula.

USAID played a pivotal global role in responding to infant feeding challenges in the context of HIV. In the 1990s, the Agency provided technical input into numerous international consultations on HIV and infant feeding, and supported critical research[16] that informed global guidance on the prevention of mother-to-child transmission of HIV. Studies under the Zimbabwe Vitamin A for Mothers and Babies trial (1997–2000) and the Breastfeeding, Antiretroviral and Nutrition study in Malawi yielded rich evidence on the associations among infant feeding practices, HIV transmission and mortality. Key findings were that mixed feeding (feeding formula or other food in addition to breastmilk) put infants at higher risk of HIV infection than exclusive breastfeeding during the first 6 months of life, and that better-nourished mothers were less likely to transmit HIV to their infants.[17]

Subsequent studies found that for HIV-infected mothers who were adherent to antiretroviral therapy and were virally suppressed, the risk of mother-to-child transmission through breastfeeding was less than 1 to 2 percent;

> **"USAID in southern Africa has been one of the strongest partners in protecting breastfeeding, and what it learned in the HIV world has also had a ripple effect in the non-HIV world."**
>
> Nigel Rollins, M.D., Department of Maternal, Newborn, Child, and Adolescent Health, WHO20

in 2010, WHO began recommending that these mothers exclusively breastfeed their infants during the first 6 months, and in a 2016 update, that they continue to breastfeed for up to 2 years or beyond, as is advised for uninfected mothers.[18]

For a community without access to safe breastmilk substitutes, USAID supported the Ndola Demonstration Project in Zambia (1999-2005) to develop and test a model program to prevent mother-to-child transmission of HIV that integrated infant feeding counseling, voluntary HIV counseling and testing, and antiretroviral prophylaxes into health facility and community services. The results showed that increasing mothers' knowledge that HIV may be transmitted through breastmilk did not erode good breastfeeding practices. USAID continued to invest in reducing the risk of mother-to-child transmission in Zambia and other countries. The NuLife Project in Uganda[19] (2008-2011) provided an opportunity to develop both infant and young child feeding materials and a model for local, private-sector production of ready-to-use therapeutic food for HIV-affected adults and children with severe acute malnutrition.

USAID also contributed to the development of tools for the UNICEF Community Infant and Young Child Feeding Counselling Package[21] and other materials that included updated information on infant feeding in the context of HIV. At the country level, USAID provided technical assistance to governments, health care providers and mothers to clarify the complex issue of breastfeeding and HIV.

Through the gradual adoption of the 2010 WHO Guidelines on HIV and Infant Feeding, many countries worked to ensure that mothers and infants received antiretroviral drugs during pregnancy and the postpartum period. The 2011 launch of the Joint U.N. Programme on HIV/AIDS, "Global Plan towards the Elimination of New Infections among Children by 2015 and Keeping Their Mothers Alive," presented a new opportunity for USAID to strengthen health systems to prevent undernutrition and mother-to-child transmission of HIV during the first 2 years of life.

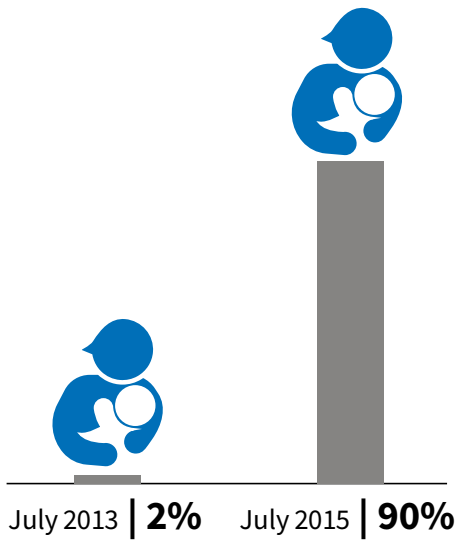
In 2013, USAID, together with WHO, UNICEF and PEPFAR, initiated the Partnership for HIV-Free Survival. In six countries with a high incidence of mother-to-child transmission—Kenya, Lesotho, Mozambique, South Africa, Tanzania and Uganda[22]—USAID implementing partners provided technical support to improve the implementation of the 2010 WHO guidelines[23] by integrating services for nutrition, maternal, newborn and child health, and the prevention of mother-to-child transmission, in order to accelerate a reduced HIV infection and mortality rate among HIV-exposed infants.

Through the Partnership, clinic staff teams met regularly to select and test areas of their work and service delivery changes for quality improvement, with the goal of increasing ART adherence, the retention of mother-infant pairs in care and optimal infant feeding. The results convinced the respective ministries of health of the efficacy of robust and systematic efforts to improve the quality of health care and services in facilities and communities. In Uganda, for example, these quality improvement efforts led to teams including counseling about infant and young child feeding in the monthly standard package of care for mother-infant pairs, and peer mentors providing counseling and breastfeeding support. These improvements increased the percentage of mother-infant pairs retained in care dramatically, from just 2.2 percent to over 90 percent, and the percentage of mothers of HIV-exposed infants who adhered to recommended feeding practices from 70 to almost 100 percent over a 2-year period.[24]

Treating Acute Malnutrition in AIDS Patients: Food by Prescription

In Africa in the 1980s, HIV was known as "slim disease" because of the weight loss that defined AIDS.[25] USAID first began supporting the dietary management of wasting and opportunistic infections associated with HIV in 2004 in Uganda through the Regional Center for Quality of Health Care, which aimed to improve the quality of health care in east, central and southern Africa. USAID later drew on its expertise in integrated delivery of health and nutrition services to pilot an approach called Food by Prescription. The provision of Food by Prescription began first in Kenya in 2005; trained health care providers in PEPFAR-supported clinics prescribed locally produced, fortified-blended food to malnourished patients according to strict anthropometric eligibility criteria. Pharmacies dispensed the food to HIV patients to improve individual clinical outcomes, while household food insecurity was tackled through separate cross-cutting mechanisms,

Two-Year Increase in Percentage of Mother-Baby Paris Receiving Standard Package of Care Monthly in Uganda*

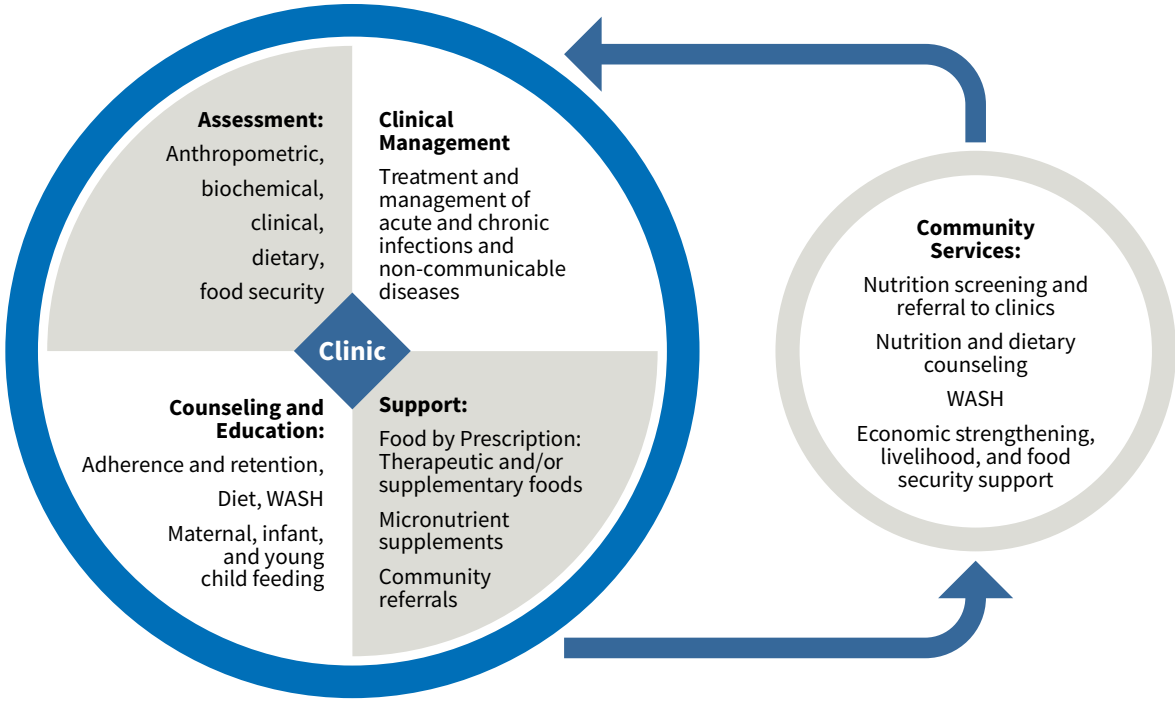


**across 22 sites supported by the Uganda Partnership for HIV-Free Survival*

Source: USAID Applying Science to Strengthen and Improve Systems (ASSIST) Project, 2017

Nutrition Assessment, Counseling and Support

A Systems Approach to Integrating Nutrition in Clinic and Community Health Services



Source: USAID 2018

such as Food for Peace or World Food Programme food assistance. The Kenya experience—and findings from elsewhere that specialized food products improved weight gain and antiretroviral tolerance—signaled the benefits of improved nutrition in HIV care and treatment, and also attracted the attention of agencies such as the Global Fund to Fight AIDS, Tuberculosis and Malaria and the World Food Programme, as well as multiple country governments, food processors, researchers and implementers.

A 2008 review of Food by Prescription in Kenya found that a majority of the enrolled patients gained weight during the first three months of their treatment. However, 56 percent of pre-ART patients and 39 percent of ART patients left the program early and were lost to follow-up. The review recommended greater efforts to track those who were lost to follow-up, minimize stigma and integrate Food by Prescription into routine service delivery.[26] Another assessment found the program to be "an excellent intervention, well-appreciated by patients and providers alike in terms of improving nutritional status and health outcomes and supporting adherence to and efficacy of ART," but also recommended strengthening government ownership and instituting a quality improvement approach.[27] USAID also recommended additional services to improve treatment outcomes through economic strengthening and livelihood promotion, water and sanitation, social protection, legal and advocacy services, family planning and malaria prevention.

USAID supported related research throughout the 2000s to inform Food by Prescription programming, including developing and testing the efficacy of therapeutic and supplementary foods for people with HIV. A USAID-commissioned study of the Food by Prescription program in Ethiopia confirmed that supplementary food had long-lasting, positive effects on health and nutritional status.[28]

As efforts moved forward, different Food by Prescription programs used different food products and ration sizes; some were imported at substantial expense outside of government systems, and others were produced locally with USAID funding (e.g., ready-to-use therapeutic food produced by a Ugandan manufacturer from peanuts grown by local farmers[29]). In all countries, inventory control and supply chain management were, and continue to be, challenging. While nutrition was already an integral part of the health care system in Kenya, with its critical mass of trained nutritionists, most other African countries had few nutritionists except at policy levels. Management of acute malnutrition also demanded follow-up that was difficult to implement without strong community linkages and support.

A USAID-trained peer group educator in Mozambique demonstrates how to deliver an in-home health behavior change lesson. These lessons included promoting HIV prevention, family planning, nutrition, hygiene and sanitation, and the importance of counseling and testing for HIV.

Sarah Day Smith / PEPFAR

Strengthening Health Systems through Nutrition Assessment, Counseling and Support

With the expansion of Food by Prescription programming, concern arose that the almost singular focus on specialized food and treatment of acute malnutrition limited attention that was needed for counseling patients on how to prevent undernutrition, maintain improved nutritional status with antiretroviral therapy, and manage HIV as a chronic disease. In this context, USAID designed the NACS approach. NACS is neither a program nor a methodology, but a patient-centered approach to operationalize nutrition policy and guidance, and to make nutrition integral to clinical health and community services. Under the NACS approach, specialized food products were only one part of the "S" (support) component, and were accompanied by clinic-community referrals for screening, follow-up, and links to community services. NACS facilitated the coordinated action of multiple U.S. Government and international partners, and since 2010 has been considered an essential standard of care by USAID. The World Food Programme has also endorsed the approach and developed NACS guidance for adults and adolescents with HIV.[30]

In 2010, USAID organized the first international meeting on NACS, bringing together participants from 18 countries in Africa and Asia to discuss issues such as specialized food product procurement and supply chain management; referrals between health facilities and community services; monitoring and reporting.[31] Two years later, the CORE Group, a nonprofit group of over 70 member organizations and networking partners, organized a pivotal meeting in Washington, D.C. to move NACS forward, with participants from the U.S. Government, United Nations, implementing partners and technical assistance agencies.[32] Building on experiences with Food by Prescription, more than 20 countries have successfully embraced and introduced the NACS systems approach within national health services.

Experience shows that food security and economic strengthening linked with HIV treatment improve the health and nutrition outcomes of people living with HIV and the well-being of households, as well as enhance household food security for orphans and vulnerable children.[33] USAID helped to establish regular clinic-to-community linkages to economic strengthening and livelihood services in order to support household food security, resilience, retention in clinical care and adherence to ART. Implementing partners assisted ministries of health with developing national guidelines, training materials and job aids to build capacity for quality clinic and community NACS service delivery. They also helped design guidance to strengthen referrals and promote economic resilience.

USAID employed social and behavior change strategies, and developed state-of-the art communication tools to promote optimal nutrition. Collecting information on local dietary practices and health-seeking

A nurse assesses a child for malnutrition during a mother-baby visit at the comprehensive care center for HIV services in the Msambweni County Referral Hospital, Kenya.

Irene Angwenyi/ USAID Kenya

behaviors helped in the design of counseling and education for improved nutrition and ART adherence for people with HIV.

NACS-related experiences in different countries generated valuable lessons for nutrition and other development programming.[34] For example, in five countries, health facility teams tested changes in service delivery to ensure that every patient received an assessment and classification of nutritional status on each visit. Once the extent of patient malnutrition was known, the teams moved on to manage malnutrition treatment and retain patients in nutrition and antiretroviral therapy care. The process achieved impressive increases in nutrition assessment, counseling and referrals, as well as in retention in care and ART adherence; there were also decreases in rates of defaulting from treatment.

While conceived in the context of HIV, NACS can help improve care, identify referral pathways, establish protocols, streamline patient flow and strengthen data management within comprehensive health care.[35] For example, Malawi, the first country to scale up Food by Prescription nationally, provides nutrition interventions for adolescents and adults with various illnesses through its national Nutrition Care, Support and Treatment program. In Kenya, NACS complements other USAID-supported interventions to improve food security under the Feed the Future initiative. In all cases, USAID has enhanced the environment for NACS through institutional and health care provider capacity building, infrastructure support, partnerships and synergies. Learning how to provide NACS to people living with HIV, who are often a distinctly different target group than the mothers and young children served by the rest of USAID nutrition programming, is a major USAID achievement.

The Future of Nutrition and HIV Programming

By 2010, HIV had become a chronic yet manageable disease, due in large part to the exponential increase in access to antiretroviral therapy made possible by PEPFAR and the Global Fund to Fight AIDS, Tuberculosis, and Malaria working with governments and civil society. Still, existing challenges remain, and new ones have arisen. Reductions in new infections have moderated in recent years, and access to ART is still limited in many low-income countries. While HIV-related stigma has decreased, many people still seek ART services at sites far from their homes to avoid being recognized and identified as HIV-positive. This makes it difficult to maintain and track adherence, viral suppression and nutritional status. More HIV-exposed, uninfected infants are surviving, but they may have a higher risk of mortality than non-exposed infants, possibly related to poor maternal health status and care practices.[36] The long-term effects of HIV and ART on child development and growth are not fully understood. Extended lifespans with ART will be accompanied by a rise in noncommunicable diseases, such as arteriosclerosis, hypertension, stroke and diabetes. These diseases will require expensive and complex medical treatment in fragile health systems, but they can be mitigated through dietary management. Conflicts, displacements and food insecurity will disrupt HIV treatment, increase vulnerability to infection, and limit patient access to health care and nutritious food. Support for pre-service and in-service nutrition training for health providers, including the quality improvement approach, is critical not only to maintain and expand services to prevent and manage undernutrition in people with HIV, but to position nutrition assessment as part of monitoring patients' clinical vital signs. USAID has unique experience, expertise and global influence to address these new demands, but the increased focus on HIV treatment has translated into a decline in resources for other aspects of care and support, including a major shift away from nutrition support in PEPFAR programming. Among the objectives of USAID's Multi-Sectoral Nutrition Strategy 2014-2025, which guides the Agency's actions on nutrition, are creating an enabling environment to meet the nutritional needs of people with HIV, and demonstrating the contribution of nutrition to achieving the Joint U.N. Programme on HIV/AIDS "90:90:90" treatment goals to help end the AIDS epidemic.[1] This will require commitments by countries and partners to ensure that expertise and resources are utilized effectively and sustainably into the future.

5 Multi-Sectoral Nutrition and Food Security

Photo by Jake Lyell, MCC

USAID and its implementing partners played a critical role in identifying the determinants of malnutrition as they have been understood through time, addressing them with a multi-sectoral lens and exploring how the agriculture sector could better contribute to solving the malnutrition problem.

USAID and Multi-Sectoral Nutrition in the 1970s

In the early 1970s, development sectors in general increased their focus on influencing centralized national planning processes; USAID was doing the same for nutrition. The term 'nutrition planning' was widely used in the 1970s to describe a process for developing and implementing national nutrition programs in countries. Planning in this context encompassed creating policies and developing strategies to support nutrition interventions, as well as coordinating nutrition program design, implementation, financing and evaluation at the country level.[1]

USAID was already beginning to understand undernutrition's multi-sectoral determinants and not simply its manifestations. As food technology-based solutions, such as lysine fortification of cereal staples to increase protein quality, were unsuccessful, the Agency began exploring integrated systems to improve nutritional status through health-related activities, complemented by actions in other sectors such as agriculture, rural development, education, social protection and water, sanitation and hygiene. The point was emphasized in the book, "The Nutrition Factor: Its Role in National Development" by Alan Berg, a pioneer of USAID's early nutrition actions, and in USAID programming under the leadership of the Agency's first nutrition director, Dr. Martin J. Forman.[2]

Multi-sectoral nutrition planning became a USAID priority, representing an ambitious attempt to address malnutrition comprehensively through better understanding the diverse causes of malnutrition. This required a commitment to action from multiple stakeholders—beyond just nutritionists—from a variety of sectors to improve nutrition. The first major international conference to address nutrition, national development and planning, held at the Massachusetts Institute of Technology (MIT) in 1971 and attended by nutrition experts and senior planning officials from 55 countries, launched the international multi-sectoral nutrition planning movement.[3] USAID provided institutional development grants to MIT, Meharry Medical College and Cornell University to conduct training and inspire creative thinking on how to do multi-sectoral nutrition planning and related strategy development. Further expanding the pool of partners and innovations, USAID also worked closely with faculty at Tulane University on specific aspects of multi-sectoral nutrition,[4] and with the Institute of Nutrition of Central America and Panama to broaden its research and training focus to assist member countries with national food and nutrition policy formulation.[5]

This early momentum led to the creation of multi-sectoral nutrition planning units in 26 developing countries during the 1970s.[6] USAID and the U.N.'s Food and Agriculture Organization (FAO) supported most of these, the majority of which included short, intensive trainings for government officials, NGOs and local USAID staff.[7] These planning units functioned with an assumption that other sectors' officials would respond by reorienting a portion of their activities and resources to better address the causes of undernutrition.[8]

USAID's efforts in Colombia, one of the most documented of all the USAID-assisted multi-sectoral planning investments, offer insights into the challenges encountered in the Agency's initial, relatively brief experience with multi-sectoral nutrition planning.

Colombia's National Food and Nutrition Plan (Plan de Alimentación y Nutrición or PAN) epitomized USAID's multi-sectoral nutrition planning

Milestones in Multi-Sectoral Nutrition & Food Security Programming

1970–1974

- USAID supports training for nutrition planning by U.S. universities and voluntary agencies
- Global food crisis occurs
- World Food Conference (1974) responds to food crisis

1975–1979

- CEAP initiative begins, led by USAID and USDA

1980–1984

- International Agricultural Research and Nutrition Conference is held in Ethiopia

1985-1989

- USAID-assisted Homestead Food Production Model is launched

1990-1994

- U.S. 1990 Farm Bill makes improved food security main goal of U.S. food assistance abroad

1995-1999

- USAID's 1995 Food Aid and Food Security policy paper prioritizes nutrition

2000-2004

- HarvestPlus is created for nutrition-related biofortification of crops

2005-2009

- Food for Peace Strategic Plan sets new directions for food assistance
- International conferences urge focus on what later is called nutrition-sensitive agriculture
- Food price crisis catalyzes L'Aquila Global Food Security Initiative

2010-2014

- U.S. Government Feed the Future initiative is launched
- The USAID Multi-Sectoral Nutrition Strategy is launched to guide nutrition across the Agency

2015-2020

- U.S. Government Global Food Security Act enacted and corresponding Strategy developed
- U.S. Government Global Nutrition Coordination Plan is released
- Food for Peace Food Assistance and Food Security Strategy is launched

Key Global Results

- In the 1970s, new multi-sectoral nutrition planning units were established in 26 countries, including training for relevant officials.
- Between 2010 and 2017, poverty dropped an average of 23 percent and child stunting by an average of 32 percent across Feed the Future focus areas.

USAID Contributions to Global Results

- Training in nutrition planning of hundreds of development professionals has significantly increased consciousness of the importance of nutrition across related sectors, and has increased skilled human resources for nutrition.
- The USAID-USDA "Consumption Effects of Agricultural Policies" (CEAP) research program (1977-1988) documented the many ways that economic policies can support or undermine the achievement of improved diets and nutrition, especially for the most vulnerable households.
- Since the 1990s, USAID has been at the forefront of work in biofortification, which has led to crops that are richer in such micronutrients as vitamin A, iron and zinc, while also increasing household production and consumption of these crops.
- From 2003 to 2009, stunting in children under 5 years fell 1.3 percentage points per year on average in communities receiving maternal and child health and nutrition services through Food for Peace assistance.

philosophy. Developed in 1974 by Colombia's National Planning Department and implemented by the responsible ministries, with political support from the Office of the President, PAN was designed to provide a wide range of services. These included rural credit, agricultural cooperatives and agro-industry to generate employment and increase incomes of low-income households; community health promoters to provide greater access to services; a well-targeted food coupon program based on a detailed Colombia poverty map; and improved access to clean water. A local area was not considered "covered" unless services from at least three different sectors were being provided.[9]

A change of government in 1978 significantly weakened PAN, and the remaining, fragmented program ended four years later. Subsequent analysis identified several explanations for PAN's termination, beyond the desire of a new government to establish its own development strategies. One was an infringement on the autonomy of sectoral ministries, which received little supplemental funding. Others were the absence of local structures and commitment, and the lack of civil society support, including the inadequate political organization and power of the low-income groups benefiting most from the program.[10]

Similar problems affected multi-sectoral nutrition planning units in other countries; the development sectors were not reorienting their activities and resources for nutrition. The units were accordingly deemed unsuccessful and began disappearing. Nutritionists, however, were quick to reassert their pre-eminence and introduced a period referred to by some as nutrition isolationism.[11] Starting around 1985, USAID nutrition programming narrowed its focus to the highly targeted, evidence-based interventions within the health sector that could save the most lives for the least cost, such as vitamin A supplementation, consistent with USAID's Child Survival Initiative.

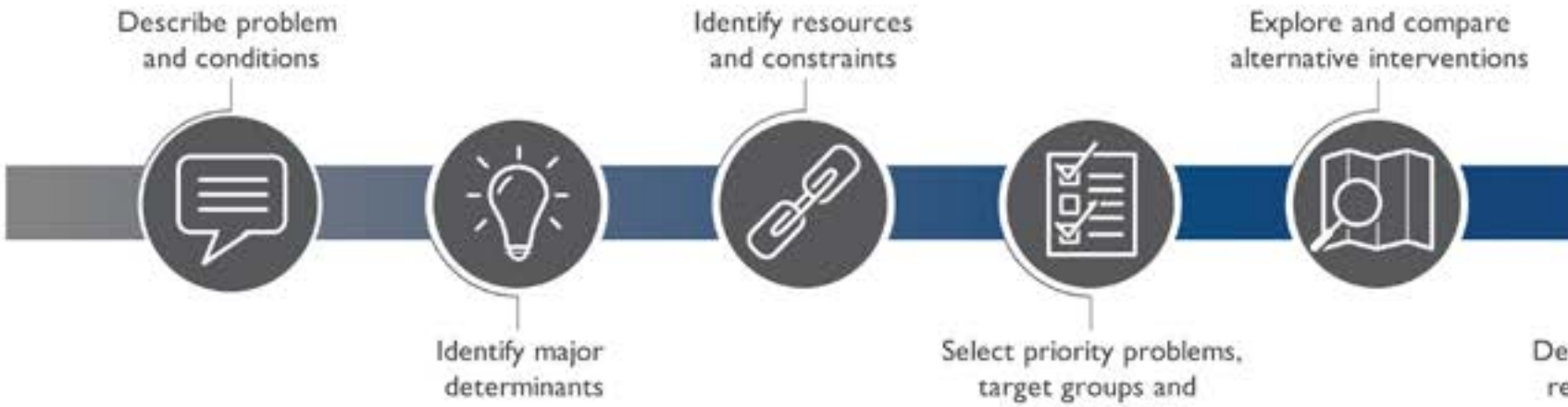
Important lessons were learned on why these multi-sectoral nutrition planning units failed. The nutrition planning approach was often very complex and based on highly elaborate causality models. Most proved too unwieldy and required too much data collection from those expected to utilize them. Planning units presented a long wish lists of multi-sectoral demands, often taken seriously only by the nutrition advocates themselves.[12]

In retrospect, knowledge gaps led to faulty assumptions. The broad perception persisting into the 1970s and early 1980s, even within USAID, assumed that improvement in nutritional well-being would be a natural outgrowth of the overall economic development actively pursued by many governments and development partners.[13] Since then, research has shown that "income generation is essential, but not sufficient, to improve nutrition outcomes."[14] Accordingly, any value added by explicit nutrition interventions appeared minimal to many; this disregard was compounded by the relative absence of clear evidence of nutrition intervention effectiveness.

In addition, doubts were reinforced by an insufficient understanding of the functional consequences of small body size and short stature in children. Some argued incorrectly that the smallness was genetic or a healthy adaptation.[15] Only with the results of valuable longitudinal studies supported by USAID and others did it become clear that stunting and linear growth faltering are associated with multiple and often irreversible negative consequences, which can affect health and survival outcomes, physical and cognitive development and economic productivity. [16]

Finally, evidence was virtually non-existent at the time on the value of addressing the underlying and systemic causes of malnutrition, through what became known as nutrition-sensitive interventions, to be pursued by

Key Steps in the Nutrition Planning Process



non-health sectors. The non-health sectors, each with their own agendas, were particularly reluctant to devote scarce resources to pursuits they perceived as peripheral to their primary objectives, which prevented coordinated, multi-sectoral action for nutrition.

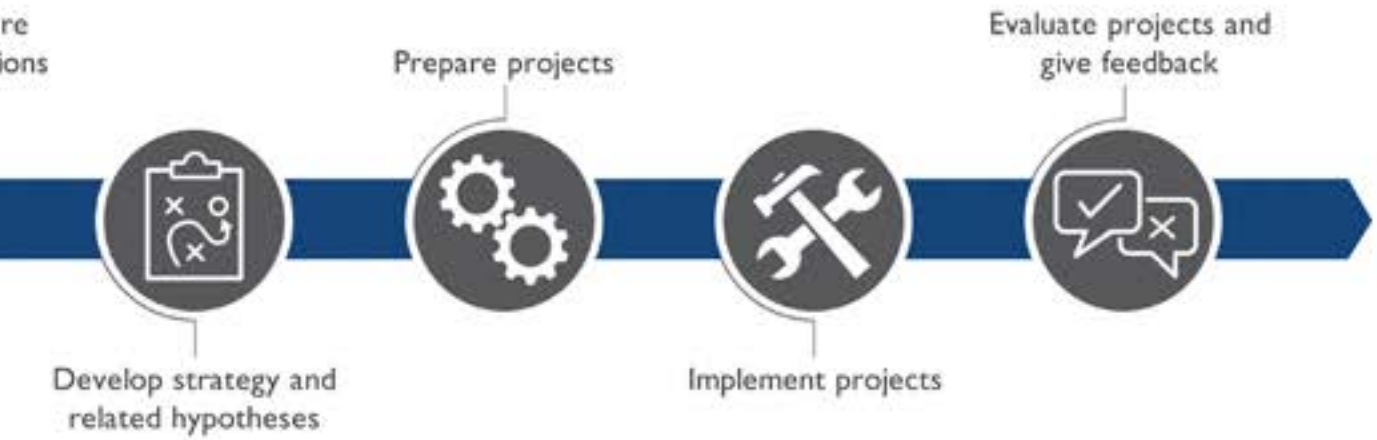
One important result that emerged from the early multi-sectoral nutrition experience and the challenges it faced was the research agenda it generated, particularly regarding the evidence base, which USAID then actively pursued.

The Consumption and Nutrition Effects of Agricultural Policies

Early industrial development policies, designed to keep food prices low for urban labor forces, were a disincentive to domestic food production. The global food crisis in the early 1970s and the additional urgency generated by the World Food Conference in 1974 led USAID to focus more on agricultural development, with the expectation that assisting developing countries to increase staple food crop production would translate into improved food consumption, particularly among the most vulnerable populations. Despite these expectations, however, little was really known about the magnitude—or even the direction—of agriculture intervention effects on food consumption. Therefore, in 1977, USAID prioritized improving its understanding of the consumption and nutrition effects of agricultural sector policies and programs,[17] and initiated a major program of applied research, technical assistance and training to generate evidence to fill the knowledge gap. This pioneering effort comprised a cluster of activities[18] that became known as the Consumption Effects of Agricultural Policies (CEAP).

A community of mothers in Madagascar stand in line to have their children weighed.
USAID

The CEAP initiative, implemented over an 11-year period, was financed and directed by USAID's Office of Nutrition, and managed by the USDA's Nutrition Economics Group.[19] The latter provided the expertise needed to develop and implement a complex set of activities through a multidisciplinary network of economists, nutritionists, anthropologists, agriculturalists, statisticians and computer specialists.[20] The initiative engaged well-known and respected U.S. academic and research institutions that had been working on mainstream USAID food and agriculture policy issues. Researchers found themselves challenged by nutrition economics, a new discipline that required them to ask questions, revise analytical frameworks and methods and work with additional types of data sets and experts.[21]



Source: Adapted from "Basic Elements of the Planning Process", a lecture by James Pines (VP of Transcentury Corporation) in 1975 at a CARE Nutritional Planning Workshop.

EXAMPLES OF IMPORTANT CONSUMPTION EFFECTS IDENTIFIED BY CEAP RESEARCH

USAID, 1977-1988

- Producer price supports for maize in Honduras benefited wealth ier farmers, while farmers with less than two hectares, who were net purchasers of maize, were hurt by the high maize price. Alternatively, in Egypt, price supports for meat had a progressive effect on income distribution, because beef is produced primarily on small farms and even landless agricultural workers engaged in beef production.
- A bread price subsidy in Sudan had a highly regressive impact on consumption, since the wealthy consumed more bread than the poor. In Sri Lanka, the government reduced its fiscal burden by switching from general food subsidies to a food stamp scheme, but this switch was also accompanied by deterioration in the nutritional status of the lowest income groups.
- Inflation in Peru more than offset retail food price control benefits, while in Jamaica it significantly reduced average calorie adequacy, with lower real incomes reflected in changes in demand for food.
- Terraced farming and some modern agricultural inputs introduced in Guatemala increased the incomes of small farmers growing vegetables by 30 percent, while those growing maize experienced only moderate income increases.

Sources: Rogers, B. "Consumption Effects of Agricultural Policies: What Do We Know? A Review of USAID Nutrition Economics Group Research," 1989; and Kramer, C.S., and L.M. Rubey. "AID Food Policy Programming: Lessons Learned: An Assessment of the "Consumption Effects of Agricultural Policies Project, 1977-1988," 1989.

Studies by CEAP included country-based policy research in Africa, Asia and Latin America[22] on producer price policies; consumer price policies and food subsidies; inputs, technology and marketing policies; and macroeconomic and trade policies.[23] Research also included country-specific, data-intensive analysis of food consumption.[24]

Income is a key pathway from agricultural production to food consumption. CEAP analyses provided numerous examples of the effects of countries' economic policies, both positive and negative, on the incomes and diets of poor urban and rural households.[25] USAID-supported research by the International Food Policy Research Institute (IFPRI) in the 1980s and 1990s generated new evidence on the importance of considering intra-household distribution of resources.[26] Additional IFPRI research provided important new insights on the nutrition effects of increased household income from cash crop production in six-countries.[27] While there is evidence of income's role in reducing hunger, this research identified that income alone could not solve child undernutrition. Also critical were investments in delivering the Essential Nutrition Actions, providing health services and improving water, sanitation and hygiene.[28]

USAID's research on the consumption and nutrition effects of agricultural policies contributed to the food security dialogue that USAID began in the early 1990s. It was an important antecedent to USAID's efforts to improve the food security and nutrition effects of Food for Peace development food assistance beginning in 1995, and of the Feed the Future initiative since 2010.

Diversifying Diets for Better Nutrition

Influenced by 1980s nutrition research on the importance of micronutrients, the international agricultural development community began to understand that the often-singular focus on staple foods was insufficient to meet nutrient requirements and assure adequate health and nutrition;[29] diversified diets were also needed to ensure sufficient intake of essential nutrients. Micronutrient supplementation and food fortification, discussed

Women in Tajikistan work together to improve food production and child nutrition.

USAID/Central Asia Republics, Tajikistan

in Chapter 3, were pursued as effective solutions to increase vitamin and mineral intake, but explicit attention to reducing nutrient deficiencies was required within the agriculture sector itself, starting with international agricultural research. Priorities for strengthening agricultural research's effect on nutrition were defined at a 1984 international conference in Ethiopia, organized by IFPRI and the U.N. Administrative Committee on Coordination/Subcommittee on Nutrition, which USAID help plan and co-chaired.[30]

Two agriculture interventions that USAID pursued to increase the production of nutrient-rich foods provide examples:

Home Gardens

From the 1980s onward, home vegetable and fruit gardens, which often are possible even for functionally landless households, were increasingly incorporated into agriculture, rural development and nutrition projects. USAID worked with the World Vegetable Center in Taiwan, the U.S. Peace Corps[31] and NGOs to promote home gardens. Nearly half of USAID's development food assistance projects implemented between 2003 and 2009, for example, included gardens.[32]

Among the best-known home garden approaches is the Helen Keller International Homestead Food Production Model, developed and tested in Bangladesh beginning in the late 1980s; it has since been applied in a number of countries in Africa and Asia, and by 2017 had reached 1.5 million families.[33] This USAID-supported model initially focused on vitamin A-rich fruits and green leafy vegetables, but added animal husbandry activities as it expanded to address protein, iron and zinc deficiencies. Over time, the model has increased emphasis on women's roles, while being attentive to the time constraints they often face; social and behavior change addressing consumption and hygiene; and the identification of agro-ecological areas best suited to home gardening. While home gardens have been shown to positively affect women's income and empowerment, impact on nutritional outcomes and dietary diversity for both women and children has varied. Through USAID-funded research activities like the Collaborative Research Support Program and its successor, the Feed the Future Innovation Lab for Nutrition, evidence continues to emerge on ways to ensure that children and households are consuming an adequate amount of their homegrown foods, and are obtaining adequate diversity in their diets from homestead food production and other sources, including nutrient-rich animal source foods.[34]

Biofortification

Increasing micronutrient intake by increasing the density of vitamins and minerals in crops through plant breeding, or biofortification, was first seriously considered by scientists from the Consultative Group on International Agricultural Research in 1993. USAID was in the vanguard, funding the work of these scientists, who, in time, were able to prove that certain nutrient-rich crop varieties could be achieved through conventional

A young Guatemalan woman feeds creole birds on her mini-household farm, created to diversify her household's diet and reduce malnutrition.

Ana Christina Chaclán/ Buena Milpa Project

breeding or agronomic practices without compromising yields. Created in the early 2000s and funded by USAID and other support, the Biofortification Challenge Program, later renamed HarvestPlus, constitutes an alliance of more than 70 partner organizations with mandates to develop and test such crops, educate farmers and consumers on their value and develop markets. The alliance has succeeded in applying biofortification to produce crops rich in vitamin A (orange-fleshed sweet potatoes, maize and cassava), iron (pearl millet and beans) and zinc (wheat and rice), and in increasing household production and consumption of these foods.[35] Biofortification is a promising approach for increasing essential micronutrients in people's diets, as part of a larger strategy to eliminate population-level micronutrient deficiencies.[36]

Food Security and the Transformation of the Food for Peace Program

Agricultural productivity increased substantially after the 1970s food crisis; by the 1980s, the resulting abundant food supplies and affordable prices were being taken for granted. A long-term decline in USAID and other donor funding followed for agricultural development.[37] The definition of food security used at the 1974 World Food Conference is that overall food supplies or availability are adequate. While this might have been the case, it did not mean that the food consumption problems of the poor had been solved. Realizing in the 1980s that more was required, the development community reached a deeper understanding of food security and nutrition determinants, some of which was derived from the lessons learned from USAID's multi-sectoral nutrition planning, analysis and research efforts

Women in Senegal harvest Okra.

Olivier Asselin, USAID/Yaajeende

described earlier. Their focus broadened to include more attention to increasing people's access to and utilization of food.[38]

The U.S. Congress recognized the concept's importance in the 1990 Farm Bill, when it designated enhancing the food security of the developing world as the overriding objective of U.S. international food assistance.[39] The law adopted a more complex view, defining food security as "access by all people at all times to sufficient food and nutrition for a healthy and productive life." Food assistance uses in the law included combating maternal and child malnutrition and promoting economic and community development. USAID also acknowledged the importance of food security in a 1992 policy determination that defined food security and described the three variables central to its attainment:

- **Food availability:** in the development context, this is whether the necessary quantities of appropriate and necessary foods are available and in proximity to the population from domestic production, commercial imports or donors.
- **Food access:** whether individuals have adequate incomes or other resources to purchase or barter for sufficient food.
- **Food utilization:** whether food is properly used; ensuring proper food processing and storage, sufficient knowledge of nutrition and child care and adequate health and sanitation services.[40]

Food for Peace began a long-term effort to enhance program performance, with new directions outlined in a 1995 USAID policy paper, "Food Aid and Food Security."[41] Major changes to development food assistance programming after 1995 included prioritizing two objectives: improving household nutrition, and increasing agricultural productivity. Nutrition was mentioned specifically in the food security definition, and improved nutritional status of young children was chosen as the ultimate indicator of success. Food for Peace worked closely with its NGO partners to convert activities implemented under its non-emergency category into truly multi-sectoral development programs.[42]

Following this 1995 policy, which continues to provide guidance for USAID food assistance, the Agency took other steps to successfully transform Food for Peace programs to better achieve food security,[43] as outlined in a 2005 strategic plan. One step was redirecting development food assistance to more food-insecure countries, initially in Africa, and, starting in 2006, to 20 priority countries,[44] using three food security indicators as selection criteria with child stunting prevalence as the most important.[45] Another step was strengthening monitoring and evaluation requirements[46] to ensure that Food for Peace and its implementing partners adequately assess and report on program performance.[47] Food for Peace also worked to phase out most school feeding and urban food-for-work activities and to reallocate the majority of resources to agriculture and natural resources management

as well as to health, nutrition and water, sanitation and hygiene.[48] As a result of these efforts, between 2003 and 2009, more than three-quarters of households receiving Food for Peace development assistance reported increases in household incomes and access to food, among areas reporting on these indicators.[49]

As outlined in a 2016 strategy, Food for Peace continues to refine and update its evidence-based programming to meet the evolving challenges of hunger, such as climate change (by broadening the understanding of potential impacts on disease vectors, water resource availability and natural disasters), rapidly growing youth populations (by focusing on young people as positive change agents) and extreme poverty (by investing resources in areas where extreme poverty is a primary driver of chronic malnutrition).[50]

Feed the Future: The U.S. Government's Global Hunger and Food Security Initiative

The 2007-2009 global food price crisis renewed the international community's interest in food insecurity. The U.S. Government responded quickly, providing more than $1 billion in food aid and development assistance to both meet immediate humanitarian needs and to stimulate increased agricultural production in the countries hardest hit by food price increases. After the crisis, the Group of Eight industrialized nations, popularly referred to as the G-8, declared the international fight against food insecurity a high priority at their 2009 summit in L'Aquila, Italy. The U.S. Government took a leading role in this global effort and launched its Feed the Future initiative.[51]

Building on efforts begun under the Bush Administration to tackle the root causes of hunger and poverty, the 2010 launch of the Feed the Future initiative galvanized the U.S. Government's commitment to reducing global poverty, food insecurity and undernutrition through inclusive agriculture-led growth. The initiative was guided by the Rome Principles for Sustainable Global Food Security (2009), which embodied best practices for effective and accountable development.[52] The Global Food Security Act of 2016 codified the U.S. Government's commitment to ending global hunger, poverty and child malnutrition by authorizing it into federal statute. As required by the Act, the U.S. Government departments and agencies collaborating under Feed the Future developed a new Global Food Security Strategy (2017-2021), which guides Feed the Future implementation.[53] Led by USAID, Feed the Future leverages the resources, skills and expertise of a variety of federal agencies and departments. The initiative also includes partnerships with host governments, other donors, multilateral institutions, foundations, NGOs, researchers, academia and the private sector, and it concentrates on geographic "Zones of Influence" in a select set of countries.[54]

Feed the Future's goal[55] is to sustainably reduce global hunger, malnutrition and poverty by addressing their underlying determinants. Assistance is provided to smallholder farmers to increase agricultural productivity and incomes, while fostering resilience and women's empowerment as well as market connections and economic growth. Notably, integrating agriculture and nutrition was an ambitious and pioneering aspect of the initiative when it was launched. A 2016 review of the Feed the Future initiative found that it increased the share of overall U.S. assistance for agriculture and nutrition, and that the focus countries were well selected based on having the requisite need and the potential for effective partnerships.[56] Between 2010 and 2017, this work contributed to an average 23 percent drop in poverty and 32 percent reduction in child stunting within Feed the Future focus areas.[57]

Nutrition-related characteristics of the Feed the Future development model include:

- Making "A Well-Nourished Population" a Feed the Future objective, along with "Accelerated, Inclusive Agriculture Sector Growth," and "Strengthened Resilience among People and Systems."
- Clarifying the major pathways, from agriculture interventions to improved food consumption and nutrition: the food production pathway, the agricultural income pathway and the women's empowerment pathway.

Message from Rajiv Shah, Former USAID Administrator

> **"This nutrition strategy is unique, because it targets a very specific challenge and elevates it across our work in health, agriculture, water and sanitation and food assistance. With it, we commit to working across our priorities to ensure that safe and nutritious foods are accessible, healthy dietary practices are followed and the prevention and treatment of infectious diseases are prioritized."**

Rajiv Shah, USAID Administrator (2010-2015)
Source: "USAID Multi-Sectoral Nutrition Strategy 2014-2025," 2014

- Adopting a nutrition-sensitive agriculture approach that promotes nutrient-rich foods (i.e., foods high in the nutrients lacking in poor diets), which for Feed the Future means prioritizing the horticulture, legume, aquaculture, livestock and dairy value chains.
- Investing substantially in performance monitoring and evaluation, including indicator development and professional data collection and analysis, to provide credible evidence of program performance.[60]

USAID's Multi-Sectoral Nutrition Strategy

While Feed the Future was revitalizing USAID's commitment to agriculture-led economic growth and improved nutrition, USAID's global health efforts focused on high-level goals to prevent child and maternal deaths, recognizing that undernutrition is estimated to contribute to 45 percent of under-5 mortality, and anemia to about 20 percent of maternal mortality.[61] Nutrition became the nexus connecting these two high-level goals for USAID. In May 2014, USAID released its first Multi-Sectoral Nutrition Strategy, which describes an integrated, Agency-wide approach to addressing global malnutrition through 2025.[62] Guided by this strategy, USAID's nutrition programming seeks to reduce malnutrition—and address its determinants—in women of reproductive age (15-49) and in children, with a specific focus on the 1,000-day window from pregnancy to the child's second birthday. This is to be realized through Feed the Future action, USAID's global health programs and USAID's Food for Peace development activities.

USAID has also been a leading member of the U.S. Government's international nutrition working groups, task forces and coordination bodies, and a leader in both the preparation and implementation of the U.S. Government Global Nutrition Coordination Plan. Launched in 2016, this cross-government effort draws experts from 11 agencies that are committed to advancing nutrition research, action and learning to address critical domestic and global nutrition concerns, leveraging existing resources to do so. Since its launch, this coordination mechanism has guided the creation of formal leadership and structure to advance progress towards U.S. Government nutrition goals and has advanced research, information exchange and learning in multiple priority areas for nutrition action.[63]

USAID Country Experiences with Multi-Sectoral Nutrition Programming

With Feed the Future and the Multi-Sectoral Nutrition Strategy in place, USAID continues tackling the challenge of integrating nutrition within agriculture and other sectors, with a high priority on coordination and collaboration. Specific elements of three country programs illustrate the range of approaches to multi-sectoral nutrition programming:

Bangladesh

In Bangladesh, USAID increased dietary diversity through the creation of Farmer Nutrition Schools. These provided information to village members on improved farming practices to grow and eat more nutrient-rich crops, as well as advised pregnant and lactating women on better child care and the importance of handwashing with soap. For women participating in the

An agricultural leader in her community educates other local farmers in Bangladesh on how to safely use pesticides.

Ashraful Islam

A woman and child wash their hands at a community hand washing station in Indonesia.

USAID

Farmer Nutrition Schools, the consumption of foods representing a diverse diet[64] rose by 50 percent between 2012 and 2015, from an average of four to six different food groups consumed.[65] In addition, USAID trained more than 65,000 individuals in modern fish farming methods and improved nutrition practices. The majority of participating households increased fish production and consumption.[66]

Nepal

USAID works through its Suaahara multi-sectoral nutrition project in Nepal (2011-2021) to reduce undernutrition among women and children in the 1,000-day period, which also involves fathers, mothers-in-law and adolescent girls. Operating in more than half of the districts in Nepal, the large-scale project had reached nearly 2.4 million people by 2016. Its main components include maternal, infant and young child nutrition; water, sanitation and hygiene; maternal and child health; family planning; and homestead food production with market linkages.[67] The project also addresses gender and other social inequities and strengthens nutrition capacity and coordination of local officials, communities and outreach workers.[68,69] This project works closely with similar Food for Peace multi-sectoral nutrition activities and Feed the Future agriculture activities in Nepal. It has also facilitated the rollout of the Nepal government's national multi-sectoral nutrition strategy.

Ethiopia

USAID's Empowering New Generations to Improve Nutrition and Economic Growth (ENGINE) Project in Ethiopia (2011-2016) forged partnerships with federal, regional and local governments in several sectors. The project worked to achieve nutrition objectives in four regions, reaching 5.7 million children under 5 years old during the project's lifetime. Among the USAID-assisted nutrition initiatives in the 2010s, the Ethiopia example may be unique in the strength of its close working relationships with Ethiopian government counterparts. USAID helped revitalize the country's multi-sectoral nutrition coordination body, which oversaw the development of the government's National Nutrition Program (2016-2020). This has been viewed as an international model for such plans. The project's activities and creative partnerships have contributed to significant reductions in stunting among children 3-36 months (with declines of 12, 14 and 20 percent in three regions), and improved young child feeding (the proportion of children meeting minimum dietary diversity standards more than doubled) and maternal nutrition (126 percent increase in the number of pregnant women who took iron-folic acid supplements).[70]

Learning to Tackle Malnutrition through Multiple Sectors

Beginning with USAID's early experiments with multi-sectoral nutrition assistance, the Agency became increasingly proactive in exploring the effects on nutrition of activities in multiple sectors, perhaps most importantly in agriculture and in development food assistance to improve food security. The vital importance of these efforts is demonstrated in the growing number of effective nutrition-sensitive and multi-sectoral projects in low-income countries.

Experiences over more than four decades provide increased clarity on multiple issues, including (1) the need for attention to the determinants as well as the manifestations of undernutrition, (2) the importance of enlisting the support of multiple development sectors to meet this need, (3) the identification within these sectors of the interventions most likely to provide or facilitate nutritional impact, (4) the necessity of an explicit focus on the most nutritionally vulnerable population groups, (5) an understanding of the importance of reducing dietary deficiencies of micronutrients as well as calories and protein and (6) the essential role of accurate and meaningful data collection and use for the design, monitoring and evaluation of strategies, plans and interventions.

In order to advance its global nutrition goals, USAID continues to refine its multi-sectoral approach, and to enhance actions to link humanitarian assistance with development programming. Through this process, it is important to the Agency to continue learning about the added value and effect multi-sectoral actions and delivery systems have on nutritional, and the synergies achieved by increased collaboration and coordination with high-impact, nutrition-specific interventions in vulnerable areas. These actions support progress towards USAID's vision of a world in which countries, communities and families have the capacity to achieve and sustain healthy, well-nourished populations.

Irene Angwenyi/USAID Kenya

6 Research and Measurement for Understanding and Reducing Malnutrition

USAID's nutrition research has positioned the Agency to not only lead in shaping evidence-based policies, but to be at the forefront of innovative technology creation and scalable program development. This research has deepened the global understanding of the causes and consequences of malnutrition and provided proven, cost-effective solutions. USAID applies a systematic and coordinated "research-to-policy-to-programs" approach, which has translated research into large-scale applications that have significantly improved the nutritional status and survival of children. Advances in measuring individual and population-level malnutrition indicators provide indispensable data for decision-making, for revealing malnutrition's magnitude and for tracking the world's progress toward better nutrition for all. This chapter highlights some of USAID's major nutrition research and measurement contributions.[1]

When USAID was created in 1961, modern nutrition science had only existed for three decades.[2] Nutrition science's primary paradigm then was identifying single nutrient deficiencies as the cause of nutrition-related problems. Severe types of child undernutrition[3] were common, e.g. kwashiorkor and marasmus, with the primary cause believed to be protein deficiency. USAID initially responded to nutritional needs with food technology and plant breeding research intended to increase the quantity and quality of protein in staple foods, including the development of specialized food products.

U.S. universities, primarily, conducted USAID's early nutrition research. The vibrant and influential Committee on International Nutrition Programs of the National Academy of Sciences, established and supported by USAID from 1967 into the mid-1980s, organized the U.S. scientific community to advise USAID and the international nutrition community.[4] According to Alan Berg, "in its day, this was probably the best science advisory group on nutrition anywhere."[5] Over time, USAID's research increasingly involved investigators from local universities in developing countries (while also building their capacity), private agencies and foundations and other international development organizations. Basic scientific research was complemented by implementation research in many countries and programs, which helped to adapt interventions to local contexts for more effective delivery and scale up.

USAID's research has also played a pivotal role in policy dialogue and advocacy, providing the evidence base to inform both sound decisions and the design and implementation of appropriate interventions and protocols. For example, USAID-funded intervention studies in Honduras showed that infants exclusively breastfed for 6 months experienced less diarrhea than those who began complementary feeding at 3 or 4 months along with continued breastfeeding to 6 months. Infants exclusively breastfed for 6 months also showed no growth deficits. This evidence played a decisive role in shaping WHO policy and recommendations to extend the optimal period of exclusive breastfeeding from 4 to 6 months.[6]

Nutrition research results are critical to advancing the work of country governments, foundations, United Nations agencies and NGOs. Other chapters in this history describe examples of research undertaken by USAID to develop and refine specific nutrition interventions and delivery systems.

Consequences of Marginal Malnutrition, an Underestimated Threat

USAID-supported research in the 1970s identified the devastating and ultimate consequence of moderate and severe underweight: death.[7] Analyses conducted as part of the Narangwal study in the Indian Punjab showed that the risk of young children dying increased proportionally with the severity of underweight; the risks doubled with each 10 percent drop below the 80 percent cut-off point then used to designate low weight-for-age.[8] The study also found that infections, especially diarrhea, were a major cause of children being underweight.

There was little known then about the consequences of the milder forms of malnutrition resulting from marginal energy deficiency. Could marginal malnutrition also adversely affect human functions? Skeptics argued that children small for their age were normal.

This knowledge gap was addressed substantially by the two largest longitudinal nutrition studies undertaken at that time in low- and middle-income countries. In Guatemala, one study (1969-1977), funded primarily by the U.S. National Institute of Child Health and Human Development with USAID supplemental support,[9] tested the efficacy of food supplements for pregnant and lactating women and children under 3 years. A follow up effort (1988-2007) measured the long-term effects. The second study was USAID's Collaborative Research Support Program on nutrition and human function (1981-1992) in Egypt, Mexico and Kenya.[10] In this study, data were collected for up to 2 years from pregnant and lactating women, newborns, infants and young and school-age children on dietary intake, growth, performance on psychological development tests, morbidity, and other health indicators.[11]

One of the most critical findings of these studies was to show that growth faltering—or a slower rate of growth than expected for a child's age and sex—starts early in life, and is accompanied by functional impairments.[12] Although low energy intake from lack of food was initially the central concern, the studies indicated that poor quality diets, deficient in vitamins and minerals, were likely more important contributors to growth faltering. The study by the Collaborative Research Support Program showed that impaired growth and development that occurs during this early period of life is responsible for small size later in childhood and most likely throughout life.[13] Particularly important was the Guatemalan study finding that once a child was born, any growth faltering, and its accompanying adverse cognitive and behavioral effects, could be remedied only before a child's second birthday.[14] Subsequent, long-term follow-up of the Guatemalan participants indicated that the observed, early nutrient deficits in young children resulted in substantial, negative consequences for the economic well-being of individuals in adulthood through reduced work capacity and intellectual performance.[15]

This important research guided USAID and the global nutrition community to focus on preventive approaches to malnutrition, especially during the first 1,000 days of life.

Harmful Effects of Undernutrition, Identified through USAID Research

In adults and women of childbearing age

- Increases risk of pregnancy complications
- Increases risk of spontaneous abortions, stillbirths, impaired fetal brain development, and infant deaths
- Increases risk of death from spontaneous abortion, stress of labor, and other delivery complications
- Increases the odds of having a low birth weight baby
- Increases risk for some infections, including HIV and reproductive tract infections
- Reduces wages
- Results in additional sick days and lost productivity

In infants and young children

- Diminishes ability to fight infection
- Impairs growth
- Increases chance of infant and young child mortality, leading to 45% of all <5 deaths
- Heightens fatigue and apathy
- Hinders mental development
- Reduces learning capacity

Source: Adapted from: Baker, J., L. Martin, and E. Piwoz. "A Time to Act: Women's Nutrition and its Consequences for Child Survival and Reproductive Health in Africa." SARA Project, December 1996.[16]

Health workers in India in the 1970s

Photo Courtesy of USAID/ Food for Peace

Governance, Sustainability and the Cost of Food and Nutrition Programs

Beyond advancing research in nutrition science, USAID has also invested in research to look at critical aspects of nutrition programming and policy to ensure the effective implementation of evidence-based interventions.

Governance

Good governance is one factor that has been shown to be important in reducing stunting. An analysis of factors contributing to stunting reductions in 116 countries between 1970 and 2012 identified safe water access, sanitation, women's education, gender equality and quantity and quality of available food to be key drivers in past reductions of stunting. Good governance, along with income growth, played essential facilitating roles.[17]

USAID works to strengthen national nutrition programs in order to ensure good governance, resource tracking and accountability, and effective management and delivery of quality services at all levels.[18] A country's National Nutrition Action Plan is usually the starting point for scaling up the coverage of essential nutrition services. The process and progress of action plans developed in Uganda, Nepal and Ethiopia were investigated in 2015 by USAID's Feed the Future Nutrition Innovation Lab.[19] The findings emphasized that good governance, effective financial decentralization and improved accountability were all critical for nutrition actions, including the need for improved human resources, implementation research to identify both successes and limitations, and routine monitoring to measure national policy and plan effectiveness.[20]

Sustainability

Development projects are truly successful only when the benefits are sustained beyond their completion, without continued external resources. In 2006, Food for Peace began requiring that all development food assistance projects include explicit plans for ensuring the sustainability of activities and benefits after the project. From 2009 to 2016, USAID-supported research explored the sustainability of development food assistance project impacts in Bolivia, Honduras, India and Kenya after external support had ended. Four critical factors for sustainability were identified: continuing resources such as user fees or systems established to ensure replacement supplies; technical and managerial capacities; the motivation of beneficiaries and providers; and connections outside of the programs to support independent operations.[21] Development food assistance projects now include actions to promote these four factors of sustainability.

Cost-effectiveness

To better inform decisions, improve program effectiveness, be accountable to stakeholders and support organizational and global learning, USAID has been investigating the cost-effectiveness of nutrition interventions since the early 1990s. USAID advanced the analysis of cost-effectiveness of nutrition interventions in Latin America from 1992 to 1995,[22] for example, in studies that demonstrated the cost-effectiveness of breastfeeding promotion in maternity services in Brazil, Honduras and Mexico.[23] Breastfeeding promotion costs $1 per diarrhea case averted and roughly $150 per diarrhea death averted, comparing very favorably with alternative interventions, such as formula use, immunizations, oral rehydration therapy, and hygiene promotion. The importance of country context was also shown. In Guatemala, a comparison of the cost-effectiveness of improving vitamin A status (through supplementation, sugar fortification or home vegetable gardens with education on eating more of the produce) concluded that fortification could achieve adequate intake at less than half the cost per person of the alternatives.[24]

Projecting costs is always important to intervention planning and budgeting, especially for more expensive services such as community-based management of acute malnutrition (detailed in Chapter 2). Therefore, USAID supported the development of a costing tool for governments and program managers to determine whether their plans for these services are financially viable, identify the resources needed and plan for effective implementation at the national, sub-national and district levels.[25] This tool was used in Ghana in 2013[26] and Malawi in 2016[27] to plan for national scale up of community-based management of acute malnutrition.

Health workers in Nepal measure a child's height as part of an assessment for nutritional status.

Fintrac, Inc

Measuring Malnutrition

Surveillance Systems

In the late 1970s, the global nutrition community recognized the value of putting systems in place in countries to continually collect information on their nutrition situation. Ongoing surveillance systems were needed to collect, analyze and present timely and reliable nutrition information to engage local decision-makers and resource allocators. To help address this challenge, USAID first supported nutrition surveillance activities from 1980 to 1987.[28] The biggest contribution was developing standard methods for nutrition surveillance, which have since been adopted globally.[29] However, it was initially difficult to establish sustainable, country-level surveillance systems.[30]

More than two decades later, a USAID review was able to document sustained and functioning nutrition surveillance systems run by government public health authorities in 12 countries across Latin America, Asia, Africa and the Middle East.[31] In collaboration with USAID, the CDC has supported governments in Nicaragua, Guatemala, Uganda, Rwanda and Burkina Faso to strengthen nutrition surveillance with high quality, nationally representative, timely and low-cost data on key indicators for all large-scale nutrition programs.[32] For example, in Guatemala, data are collected in continual, annual surveys on the nutritional status of women and children (including micronutrient status), infant and young child feeding practices and sugar, salt and wheat flour fortification levels.[33]

A nurse in an antenatal care clinic in Jinja, Uganda measures the mid-upper arm circumference of a pregnant woman.

Kate Consavage/USAID

In addition to routine surveillance systems, the 1984 East Africa famine, during which more than 1 million people died, greatly stimulated interest in surveillance systems to better prepare for emergencies. An urgent need existed for accurate, early warning systems able to measure hunger, food insecurity and poor diets; such information is challenging to obtain in resource-constrained settings with complex and constantly changing food systems. Responding to this from 1985 forward, USAID's Famine Early Warning Systems Network (FEWS NET) has provided invaluable warnings by using both remote and on-the-ground methods to monitor the indicators that best predict, in real time, food shortages and other emergencies.[34] In 2018, 38 countries were benefiting from these predictions.

New Indicators

USAID has made important investments in nutrition measurement by collaborating with WHO and UNICEF to create, define and update global nutrition indicators. While implementing Food for Peace development and emergency food assistance in the 1990s, USAID began a long-term effort to create, test and deploy cost-effective and simple indicators on dietary quality and food insecurity. These indicators are now mandatory to measure in both Food for Peace and Feed the Future programs. Significantly, indicators for food insecurity and diet quality, including the Household Hunger Scale and the Minimum Dietary Diversity for Women, whose development was facilitated by USAID, have been widely adopted by United Nations agencies, academics and NGOs, allowing for more standardized measurement in global nutrition programs.

USAID has also supported a multi-year effort, started in the early 2000s and led by WHO, to develop and reach consensus on a set of simple, valid and reliable indicators to measure infant and young child feeding practices.[35] These indicators have been integrated into multiple population-based surveys, including Demographic and Health Surveys and Multiple Indicator Cluster Surveys.

Anthropometry

USAID supports improved methods and indicators for assessing the nutritional status of individuals and the growth of children using anthropometry (measures such as weight, height and mid-upper arm circumference); these measurements are also used in surveys to determine

the prevalence of malnutrition in populations.[36] In fact, anthropometric indicators measured at the population level constitute the core of global nutrition reporting. Some advances (2012-2017) that USAID has supported include practical methods for adult anthropometry in resource-constrained field settings; for example, mid-upper arm circumference cut-off points assessed for accurately detecting acute malnutrition, and body mass index (BMI) reference tables and a tool developed for rapid and easy calculation: the BMI Wheel.[37]

Surveys

In collaboration with the CDC, USAID initiated its support for national nutrition surveys in a number of countries in the 1970s and early 1980s. Since 1984, USAID pioneered the Demographic and Health Survey (DHS) Program, providing technical and financial assistance to governments for the implementation of more than 320 household and facility-based surveys in more than 90 countries across Africa, Asia, Latin America/Caribbean and Eastern Europe, as of 2018. The data collected have deepened and transformed the understanding of population, health and nutrition issues in low- and middle-income countries. Anthropometric measurement of nutritional status was first included in the DHS in 1986, and was quickly adopted as a core survey component, along with nutrition indicators on anemia, infant and young child feeding practices, vitamin A and iron supplementation and the presence of iodized salt in the household. In the early 2000s, the surveys began including dietary quality indicators.

The standardized, high-quality, and comparable DHS data are extensively used by governments, donors, researchers and civil society; they are vital to inform health and nutrition programming, policies, accountability, funding priorities and research. For many years, these surveys were the only reliable source for such information, and they remain the principal source. The DHS data allow comparisons within and across countries of nutrition and other indicators, and trend analysis over time.[38] The wide array of data collected on health, population, nutrition and household characteristics provides a wealth of information for exploratory research into the determinants of nutritional status. Through implementation of the DHS, USAID has also supported country ownership and local capacity in data collection and analysis. Widely recognized as a global good, as of 2018, the DHS Program was the largest and longest-enduring program of its kind.

USAID also uses survey data in developing powerful nutrition advocacy. For example, along with mortality and poor health outcomes, the substantial losses to economic productivity from stunting and anemia have been quantified for selected countries, and used for advocacy with the computer-based PROFILES tool. This tool estimates the potential returns on nutrition investments and the contributions of improved nutrition to human and economic development, using country-specific data.[39] Since 1993, PROFILES has been applied for nutrition advocacy in more than 30 low-income countries.[40]

USAID has been a key partner in developing a number of survey methodologies, including SMART (Standardized Monitoring and Assessment of Relief and Transitions),[41] launched in 2002 by an international network of organizations. The SMART methodology seeks to balance simplicity (for rapid assessment in emergencies) and technical soundness, drawing from the core elements of several methodologies. SMART focuses on measuring the nutritional status of children under 5 years and a population's mortality rate, indicators that are useful for prioritizing resources and monitoring whether the relief system meets the population's needs. Thus, SMART measures the overall impact of the relief response. SMART trainings have been conducted in over 30 countries globally, and one study showed that 32 countries in sub-Saharan Africa had implemented the SMART methodology between 2013 and 2015, which indicates a strong potential for harmonizing nutrition rapid assessment methods across the region.[42]

Guided by the Agency's Evaluation Policy,[43] USAID makes evaluations a central part of its nutrition programming in order to inform decisions, improve program effectiveness, be accountable to stakeholders and support organizational and global learning. Surveys are important in the evaluation process. As projects start, surveys inform the design of activities to respond to the local context and status of the population at the baseline; periodic repeat surveys after implementation evaluate service performance and the impact on nutritional status when compared to a control group. Over time, USAID has increased its emphasis on strategic collaboration, continual learning and adaptive management, putting to work the wealth of data generated during project implementation, monitoring and evaluation. A robust learning agenda is central to USAID's multi-sectoral approach to nutrition and focuses on three key areas: (1) evaluating the impact of nutrition-specific and nutrition-sensitive activities on nutrition outcomes, (2) cost-effectively bringing proven interventions to scale and (3) identifying effective nutrition-sensitive interventions in other sectors.[44]

The Future: Evidence for Implementation Strengthening

Throughout USAID's history, research and measurement have been foundational in shaping its nutrition strategies and programs. Guided by its Multi-Sectoral Nutrition Strategy, USAID will strive to further expand the nutrition evidence base, and to increase the generation and application of innovative practices, technologies and evidence-based approaches.[45] In addition to advancing the field of nutrition science, there is an increased focus on implementation research to determine the most productive nutrition-specific and nutrition-sensitive interventions and delivery mechanisms that can most cost-effectively provide the maximum coverage of interventions. The continued application of this research to nutrition programs into the future will contribute to saving more lives, and making those lives healthier and more productive.

SPOTLIGHT

CAPACITY BUILDING AND KNOWLEDGE MANAGEMENT

A group of Itasy region farmers and school teachers work together to plant a moringa tree nursery. The group was brought together by a USAID and Peace Corps training to increase food security and nutrition in Madagascar.

Sarah Fowlkes, Peace Corps

Capacity Development

Continued long-term support for the development of human and institutional capacity is a vital component of sustaining the results of USAID's investments well beyond the end of USAID assistance. Capacity building has been an important element of USAID's nutrition work through short-term, in-service and pre-service training, and academic degree education, for millions of local health professionals, farmers, community health workers and other key nutrition-related personnel in USAID-supported countries. In addition, USAID has invested considerable resources in trainings and continued learning opportunities for employees, and has facilitated nutrition capacity building and cross-country learning and exchange for entire regions, particularly Africa and Latin America and the Caribbean.

Personnel Training

In 1969, the Agency held its first nutrition in-service workshop for over 65 employees from USAID headquarters and field offices, along with other U.S. Government staff and some external experts.[1] The workshop helped identify and unify nutrition priorities and programming across USAID and develop recommendations for USAID headquarters and country offices to improve program implementation. Multiple similar in-service workshops followed in later years to further refine these priorities and programmatic recommendations, to share the latest research and knowledge on nutrition and to help countries share experiences and best practices for nutrition programming.[2,3] Following these early in-service workshops, USAID has continually prioritized keeping staff skills current with in-service trainings, and these trainings have expanded to often include participation from implementing partners and country government staff. An example is the Global Learning and Evidence Exchange conferences on multi-sectoral nutrition and agriculture for nutrition held from 2013-2016, which aimed to bring together USAID staff from headquarters and country offices, along with experts and other practitioners in nutrition and related fields, to share and learn from one another's experiences, identify gaps in programs and strengthen USAID's collective approach to multi-sectoral nutrition programming.

In addition to in-person trainings, USAID has supported the creation of many training manuals and curricula, including online learning courses, to help staff expand their knowledge and stay abreast of the latest nutrition research and programmatic best practices. Through creating online learning courses, USAID has made nutrition information available to anyone anywhere for free, thereby greatly expanding the reach of the Agency's capacity building efforts.

Degree Training and Fellowships

Long-term training in which participants obtain advanced degrees in nutrition has also been an important USAID investment. In 1972, with funds from USAID and other donors, MIT created a new sub-discipline in nutrition studies comprised of applied courses on nutrition policy, planning and programming in developing countries. The new sub-discipline was soon offered at other universities, including Tufts and Cornell, where it continues to be taught. Senior nutrition officials in country governments, international agencies, USAID and its implementing partners have been among the many graduates of this sub-discipline.

Sponsoring fellowships that allow young professionals to gain international nutrition experience while working at USAID began in 1975 with Nutrition Planning Fellows—U.S. nutrition staff that were trained and then sent abroad to assist nutrition planning in low-and middle-income countries—and it remains an integral component of the Agency's nutrition programming. Starting in 2015, USAID has offered these fellowships for national nutrition staff from USAID country offices through a program dedicated to the work of Dr. Martin J. Forman, who established and directed the USAID Office of Nutrition for its first 20 years. They offer country staff a professional development opportunity through temporary rotational assignments, including structured learning components, at USAID headquarters in Washington, D.C.

Building Country Capacity

Enhancing countries' capacities to address their own nutrition needs underscores all of USAID's investments in nutrition. Examples of USAID's long history of enhancing country capacity can be found throughout this History, but the following are some more recent examples of the Agency's efforts to enhance countries' abilities to identify nutrition issues and develop, implement and evaluate successful nutrition programs. From 2010 to 2018, the USAID-funded Feed the Future Nutrition Innovation Lab has enhanced institutional and human research capacity in Nepal and Uganda through graduate-level trainings, short courses and conferences.[5] Managed by Tufts University, the innovation lab also partnered with a medical school in Malawi to create the country's first clinical dietetics program in 2016.

Building country capacity for nutrition is also an important component of the Scaling Up Nutrition (SUN) Movement, a global initiative that brings together government, organizations and individuals to work collaboratively to end malnutrition, of which USAID is a key participant and donor. Established in 2010, SUN focuses at the country level to help countries build an enabling social, political and economic environment to foster improved nutrition. As of 2018, 60 countries had signed on as members of the SUN Movement, committing to increase their resources for nutrition and to scale up coverage of women and children with essential, high-impact nutrition interventions.[6] High-level government stakeholders from each of these countries are engaged in SUN, as are in-country staff from many development organizations, including USAID. USAID's involvement in global movements like SUN highlight the Agency's continued commitment to strengthening local capacity and accelerating the progress of country-led programs to improve nutrition for women and young children.

Organizational Capacity

USAID's long history of strengthening the nutrition capacity of U.S. private voluntary organizations began between 1969 and 1973 when the Agency provided small grants to six agencies to increase program effectiveness and develop new, innovative nutrition programs in 20 countries.[7] In 1985, this was followed by another Agency grant-giving effort, the ongoing, competitive Child Survival and Health Grants Program for U.S. private voluntary organizations. The program supports field implementation with technical assistance and collaboration through the CORE Group, a community health coalition of more than 70 non-governmental organizations and affiliates in 180 countries. The partnership has strengthened organizational capacity of 58 U.S. private voluntary organizations, as well as governments and civil society organizations in more than 60 countries. The CORE Group has also published nutrition-specific tools and approaches for program design, research, implementation and evaluation, in addition to many resources on knowledge management and learning.[8]

Knowledge Management

From the outset, USAID has invested in widespread information dissemination to relevant audiences using innovative formats to facilitate knowledge sharing and learning. Knowledge management is a central component for USAID's work on nutrition and is reflected in each nutrition-related program, action and investment. It is therefore impossible to cover the breadth of USAID's work on this topic, but the following paragraphs offer examples of some key actions USAID has taken to expand knowledge management and learning for nutrition.

In 1968, USAID financed the establishment of the League for International Food Education, a technical nutrition consortium of U.S. scientific societies that responded to field inquiries on food technology and nutrition.[9] The League's print newsletter on global nutrition research and program experiences was the primary source of reliable and readily available technical information for field staff and country partners in the 1970s and early 1980s.[10]

In 1979, USAID assisted the American Public Health Association in creating the Clearinghouse on Infant Feeding and Maternal Nutrition, to increase access

An instructor at Ebonyi State University in Nigeria demonstrates key maternal and child health and nutrition practices for nursing students as part of their pre service education.

Karen Kasmauski/MCSP

to information by health practitioners and decision-makers in Africa, Asia and Latin America and the Caribbean.[11] This became a comprehensive information center on health and education programs, women and development, communications, education and knowledge management. For more than 15 years, this Clearinghouse also acted as a resource for USAID's partners to learn about the Agency's past efforts and results.[12]

Since the 2000s, USAID has required knowledge management systems in its programs. These systems generate, capture, organize, share and use knowledge and evidence to inform the global community and scale-up nutrition policies, programs and systems across multiple regions and partners. To extend its reach, USAID also uses newer computer technology such as websites, webinars and electronic newsletters to expand the reach of these knowledge management and learning resources. For instance, since 2011, USAID, as part of the Feed the Future initiative, has been supporting an online platform for agriculture, development and food security professionals to share content, connect to one another and learn from each other. USAID has also expanded efforts to ensure that internal staff worldwide have access to key job-related nutrition knowledge and resources, including through the creation of an Agency-wide internal nutrition resource center. As USAID's multi-sectoral nutrition programming continues to evolve, so does its approaches to knowledge management, learning and adaptation and to building country capacity, with the long-term goal of helping countries better address the nutritional needs of their populations.

Rosalie Colfs, Handicap International

7

Adapting to a Changing World

Optimal nutrition is fundamental to achieving USAID's broader mission to save lives, reduce poverty, strengthen democratic governance and help people emerge from humanitarian crises and progress beyond assistance. For over 50 years, USAID has pioneered efforts to combat the devastating effects of malnutrition, continually learning and adapting its response to ever-evolving nutrition needs and understanding.

As USAID prepares for the future, the Agency will apply new evidence to better address malnutrition and adapt to shifting needs and priorities. Scaling up the coverage of evidence-based nutrition interventions is vital to continuing progress and sustaining existing gains. The confluence of nutrition-specific and nutrition-sensitive interventions will remain of fundamental importance as USAID adapts to ever-changing conditions worldwide.

The Global Food Security Act of 2016 solidified the U.S. Government's continued, bipartisan commitment to reducing hunger, malnutrition and poverty around the world. The ongoing implementation of the U.S. Government Global Food Security Strategy 2017-2021 will maintain a focus on improving food systems and increasing the production and consumption of nutritious foods, leading to well-nourished populations.

Evolving and newly emerging nutrition issues will require innovative solutions. The rising, double burden of malnutrition, with both undernutrition and overweight and obesity prevalent in the same communities, requires increased coverage of actions to simultaneously address both forms of malnutrition. Increasing concentrations of hunger and undernutrition in countries affected by conflict need to be addressed. Continuing to expand nutrition's role in resilience will empower people to maintain their nutritional status while they cope with and recover from adversity.

The international nutrition community is also accumulating a growing body of evidence that undernutrition in adolescent girls and women prior to pregnancy leads to undernutrition during the first 1,000 days and harms the child's lifelong health and nutritional status. Greater focus is now given to interventions geared toward enabling women and girls to improve their nutrition prior to pregnancy. USAID is leading efforts to advance nutrition surveillance, including of women and adolescent girls, to enhance understanding of the most prevalent nutritional deficiencies and allow more effective interventions to be targeted to the appropriate groups of people.

Nature is playing a role, too: the negative effects of climate change on both water availability and nutrition worldwide are rapidly increasing. Studies show that some of the ways climate change is impacting nutrition include decreased food production and food security, lower birth weights, and lower body weight in women. Additionally, some crops show decreased protein, zinc and iron content due to increasing levels of carbon dioxide; it is likely that additional effects on nutrients have yet to be discovered.

New nutrition challenges are also surfacing where populations shift from rural to urban areas. Global urbanization, combined with the youth population "bulge" and large groups of young people eschewing farm lives for careers in cities, will have far-reaching effects on food security and nutrition. As these trends gain momentum, diets will transform and the double burden of malnutrition will increase across continents.

Nutrition programming will need to seek creative new ways to improve food systems, food quality, nutrition behaviors and social norms around eating, in addition to continuing to implement and scale up established approaches to improve nutrition. To achieve this, USAID will seek out strategic and innovative ways to support partners in becoming more self-reliant and capable of leading their own development journeys. This includes

A nurse leads a health education session for a group of community members. These educational sessions were part of a package of integrated services supported by USAID's Northern Uganda Malaria, AIDS and Tuberculosis program (2016-2012).

JSI, 2010

encouraging the private sector to play a positive role in improving nutrition through their products, services and marketing practices. USAID will also continue to work toward enhancing country recognition of nutrition as a driver of national development, and worthy of prominent attention and increased funding. Ongoing, strategic investments in nutrition, especially by governments and the private sector, are needed to increase the potential of achieving imperative nutrition targets.

The multi-sectoral causes of malnutrition require a multi-faceted solution. Nutrition will play a key role across USAID's multi-sectoral programs, with investments that are sensitive and specific to nutrition encompassing many areas of development. Sustaining USAID's leadership role in nutrition research and policy and continuing to make high quality technical assistance available to country programs will result in further, substantial returns on the investments USAID has already made to improve global nutrition.

Experience gained and lessons learned through the implementation of USAID's nutrition activities and broader development agenda have shaped each iteration of nutrition programming. Through close collaboration with partners, faith-based organizations, host-country governments and the international nutrition community as a whole, USAID reaches millions of vulnerable people each year, especially women and children, with nutrition interventions that save lives, treat and prevent undernutrition and improve long-term health and development. These efforts build stronger health and food systems, foster more resilient populations and assist countries on their journeys to self-reliance.

ANNEX

Methodology for developing *Nourishing Lives and Building the Future: the History of Nutrition at USAID*

This resource was prepared for the Office of Maternal and Child Health and Nutrition in USAID's Bureau for Global Health by Mary Ann Anderson, GH Pro lead consultant and Nutrition Technical Advisor, and a team of subject matter specialists with extensive USAID nutrition experience under the guidance of Anne M. Peniston, Chief of the Nutrition and Environmental Health Division; Leslie Koo, Nutrition Team Lead; and Kate Consavage, Nutrition Communications and Knowledge Management Advisor. The Report Production Editor was Terry Redding. The history project was carried out between August 2017 and May 2019 and was informed by:

- A desk review of documents produced by USAID and its implementing partners, international partners, and global nutrition and health experts. The authors reviewed documents in the USAID Development Experience Clearinghouse and other online document archives; the websites of implementing partners and multilateral organizations, and other Internet sources; and hard copies of personal and hard-to-find documents. Extensive references are provided as part of the endnotes, and hyperlinks to many information sources are included.

- Extensive research for each chapter by Mary Ann Anderson, who provided chapter authors with written input on important points and reference documents for USAID's nutrition history.

- Key informant interviews conducted by the chapter authors with 29 nutrition and health experts familiar with USAID's work. This total includes several members of the writing team who were interviewed for chapters other than their own.

- Significant archival and other information provided by Alan Berg, Senior Nutrition Advisor and Special Key Informant, on the early years of the USAID nutrition program.

[1]The writing team, in alphabetical order, included authors Mary Ann Anderson (Chapters 1, 2, 3, 6 and 7, and the Capacity Building and Knowledge Management section), Jean Baker (Chapter 2), Omar Dary (Chapter 3), Wendy Hammond (Chapter 4), Philip W.J. Harvey (Chapter 6), Laura Itzkowitz (Chapter 7), Kathleen Kurz (Chapter 3), F. James Levinson (Chapter 5), Mellen Tanamly (Chapter 5), and Roberta van Haeften (Chapter 5), and special contributors Alan Berg, Judy Canahuati, Kate Consavage, Timothy Quick and Hope Sukin.

CHAPTER 1: INTRODUCTION AND OVERVIEW

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[2] Although originally established as the Agency for International Development, AID or A,I.D., the current name of the Agency is the United States Agency for International Development (USAID). Therefore, the current name, and acronym USAID, will be used throughout this report, even when referring to historical documents and activities of "AID."

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[4] WHO. "Vitamin A Deficiency." https://www.who.int/nutrition/topics/vad/en/, accessed April 2, 2018.

[5] Jones, G., R.W. Steketee, et al. "How Many Child Deaths Can We Prevent This Year?" The Lancet 362:65-71, 2003; Exclusive breastfeeding means feeding infants from birth to 6 months of age with only breastmilk, and no other liquids, not even water.

[6] Data provided by ICF International in February 2018, processed from 2015 data showing the percentage of youngest children under two years living with the mother who are exclusively breastfed, through the USAID-funded DHS Program STATcompiler. https://www.statcompiler.com/en/.

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[12] U.S. White House, Food for Peace Office. "The First Semiannual Report of the Determination to Deal with the Abundance of Our Agricultural Production in a Constructive Way, Pursuant to Public Law 480." 83rd Congress, House of Representatives, 1955. (DEC # pbaac679)

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[15] USAID. "Operation Ninos Report: Report of Activities, July 1962-March 1965." Washington, D.C.: USAID, 1965. (DEC # pnaas636)

[16] Ibid.

[17] USAID. "Report of the In-Service Workshop on Nutrition and Child Feeding." Easton, Md., May 26-29, 1969, Washington, D.C.: USAID, 1969. (DEC # pbaaj169); USAID. "Report of the Second In-Service Workshop on Nutrition and Child Feeding." Coolfont, Berkeley Springs, W.Va., June 14-17, 1971, Washington, D.C.: USAID, 1971. (DEC # pnrab606); Keusch, G.T. and M. Katz, eds. "Effective Interventions to Reduce Infection in Malnourished Populations." American Journal of Clinical Nutrition 31: 2033-2356, 1978; Anderson, M.A. "CARE Preschool Nutrition Project: Phase II Report." New York: CARE, 1977. (DEC # pnaas698)

[18] U.S. White House. "Food for Peace: 1965 Annual Report on Public Law 480." Washington, D.C.: The White House, 1966. (DEC # pdabf755); On November 1, 1965, President Johnson moved the Office of Food for Peace and its interagency coordination function out of the White House and into the State Department, according to Alan Berg.

[19] U.S. White House, Office of Food for Peace. "The Eighteenth Semiannual Report on the Activities Carried on Under Public Law 480, 83rd Congress, as Amended, Showing Operations under the Act during the Period January 1 through June 30, 1963." Washington, D.C.: U.S. Government Printing Office, 1963. (DEC # pbaac684)

[20] Combs, G.F. "History of Interdepartmental Committee on Nutrition for National Defense: Course of Events and Nutrition Methodology in Typical Surveys." The Journal of Nutrition 135(5):1263-1265, May 2005, http://jn.nutrition.org/content/135/5/1263.full.pdf.

[21] Arroyo, P. and M. Mandujano. "Joaquin Cravioto (1922-1998)." The Journal of Nutrition 130(12):2867-2869, 2000, http://jn.nutrition.org/content/130/12/2867.short.

[22] Berg, Alan D. "For the Child Who Has Nothing." The New Republic, 151(26):7-9, 1964. (DEC # pbaaj321)

[23] As there already was an Interagency Task Force on Food and Agricultural Assistance to Less-Developed Countries at the sub-Cabinet level, the decision was to place this new team as a Sub-Group on Nutrition under that broader body, which was looking at overall food policy issues. Additional sub-group participating agencies included the Bureau of the Budget, USDA, and the ICNND; Sub-Group on Nutrition, Interagency Task Force on Food and Agricultural Development in Less-Developed Countries. "Meeting Nutritional Needs." Washington, D.C.: The White House, Food for Peace Office and USAID, Food for Peace Division, 1965. (DEC # pnaac457)

[24] Johnson, U.S. President L.B. "Statement by the President on the Food for Peace Program." March 27, 1965, provided online by G. Peters and J.T. Woolley, The American Presidency Project, https://www.presidency.ucsb.edu/ws?pid=26840.

[25] Johnson, U.S. President L.B. "Special Message to the Congress: Food for Freedom." Washington, D.C.: The White House, 1966, provided online by G. Peters and J.T. Woolley, The American Presidency Project, http://www.presidency.ucsb.edu/ws/index.php?pid=28038.

[26] U.S. White House. "The Food Aid Program 1966: Annual Report on Public Law 480." Washington, D.C.: The White House, 1967. (DEC # pdabf756)

[27] U.S. White House. "Food for Peace Program 1965: Annual Report on Public Law 480." Washington, D.C.: The White House, 1966. (DEC # pdabf755)

[28] U.S. White House. 1967, op. cit.

[29] Combs, G.F. "Development of a Supplementary Food Mixture (CSM) for Children." Protein Advisory Group Bulletin 7:15-24, 1967.

[30] International Trade and Development Education Foundation. "United States Food for Peace Program 1954-1984: A Compilation of Informational Materials on United States Public Law 480." Arlington, Va.: International Trade and Development Education Foundation, 1985. (DEC # pnaau372)

[31] Johnson, President Lyndon B. "Special Message to the Congress: Food for Freedom," February 10, 1966. Provided online by Gerhard Peters and John T. Woolley, The American Presidency Project, http://www.presidency.ucsb.edu/ws/index.php?pid=28038.

[32] USAID Office of the Administrator. "A.I.D. Transition Briefing Book." Washington, D.C.: USAID, 1968. (DEC # pbaad525). The Office of War on Hunger established in 1967 was composed of four branches: (1) food and agriculture, which included Food for Peace, (2) population, (3) research and institutional grants, and (4) health and nutrition, which housed the Nutrition and Child Feeding Service. The Population Branch was also a new USAID program in 1967.

[33] Dr. Martin J. Forman continued to direct USAID's global nutrition program from the Washington, D.C. headquarters for the next 20 years, until his death in 1987.

[34] The "Green Revolution" is a term coined in 1968 by former USAID Administrator William Gaud to describe the large increase in yields of staple crops in developing countries achieved by the use of fertilizers, pesticides and high-yield crop varieties. See: Foreword, Bureau for Food Security, USAID. "USAID's Legacy in Agricultural Development; 50 Years of Progress." Washington, D.C.: USAID, 2016. (DEC # pbaah661)

[35] Crowley, P.R, F. F. Barrett, et al. "Final Report: Food Technology for Development Project, RSSA STB-0831-R-AG-4207, 1969-1989." Washington, D.C.: USDA, 1989. (DEC # pdaaz992)

[36] Olson, R.E., ed. "Protein-Calorie Malnutrition." New York: Academic Press, 1975.

[37] Crowley et al. 1989, op. cit.; National Academy of Sciences Task Force on Amino Acid Fortification of Cereals, Committee on International Nutrition Programs, Food and Nutrition Board. "Results and Interpretation of Three Field Trials of Lysine Fortification of Cereals." Washington, D.C.: National Academy Press, 1984. (DEC # pnaaq678)

[38] Jonsson, U. "The Rise and Fall of Paradigms in World Food and Nutrition Policy." Commentary, World Nutrition 1.3: 128-158, 2010. The main reasons why the protein-only solution was not sound were: (1) most diets of the poor in developing countries were low in both protein and energy (calories), with the energy gap being greater. Faced with low energy-intakes, the body will meet its urgent need for energy by converting valuable proteins into energy, and not using protein as a source of essential amino-acids for protein synthesis for growth and maintenance of tissues; (2) the "protein quality" of the overall diet is what counts, not that of any one food eaten. If children's energy needs were met, their traditional diets were usually adequate in protein content and protein quality to meet their protein needs; (3) nutrition scientists found from their new research that the previous estimates for children's daily protein requirements were too high; (4) along with inadequate diets, poor health status was discovered to be an important cause of child undernutrition, especially diarrhea and intestinal parasites.

[39] McLaren, D.S. "The Great Protein Fiasco." The Lancet 304(7872):93-96, 1974.

[40] Austin, J.E., and M.F. Zeitlin. "Nutrition Intervention in Developing Countries: An Overview." Prepared for the Office of Nutrition, Development Support Bureau, USAID, by the Harvard Institute for International Development, Cambridge: Oelgeschlager, Gunn & Hain, 1981. (DEC # pnaas039). In addition to the Overview volume, which summarized seven studies on different interventions, these separate studies with intervention guidelines were also published (Oelgeschlager, Gunn & Hain 1981) and can be found on the USAID DEC by their identification numbers as follows: Supplementary Feeding (DEC # pnaak104), Nutrition Education (DEC # pnaak105), Fortification and Formulated Foods (DEC # pnaak107), Consumer Price Subsidies and Agricultural Production (DEC # pnaak109), and Integrated Nutrition Programs and Primary Health Care (DEC # pnaak469).

[41] USAID. "Multi-Sectoral Nutrition Strategy 2014-2025." Washington, D.C.: USAID, 2014. (DEC # pbaaa257)

[42] Berg, A. (portions with Robert J. Muscat). "The Nutrition Factor: Its Role in National Development." Washington, D.C.: The Brookings Institution, 1973. (DEC # pnaan372); Berg, A. "Famine Contained: Notes and Lessons from the Bihar Experience.", Reprint 211, Washington, DC, 1971. (DEC # pbaaj302); According to Alan Berg: "The U.S. help constituted one-fifth of the American wheat crop, requiring an armada of 600 ships, docked at a rate of three a day, requiring seven 50-car trains a day to travel 550 miles to famine areas where they deposited an average of 2 billion pounds a month."

[43] Cited in Berg 1973, op. cit.

[44] Berg, A. "Malnutrition and National Development." Foreign Affairs 46.1: 126-136, 1967. (DEC # pbaaj301)

[45] Berg 1973, op. cit.; Manoff, R.K. Social Marketing: New Imperative for Public Health. New York: Praeger, 1985; Berg, A. "Nutrition as a National Priority: Lessons from the India Experiment." American Journal of Clinical Nutrition 23(11):1396-1408, 1970. (DEC # pbaaj027)

[46] Presented at a large Washington ceremony, the citation read: "For outstanding achievement in advancing mutual understanding between the United States and India, for assistance in averting famine in Bihar Province, for encouraging the Government of India to mount a serious campaign against child malnutrition, and for stimulating the Indian food industry to become an effective instrument for improving Indian nutrition."

[47] Gopaldas, T., et al. "Project Poshak Volume One." New Delhi: CARE/India, 1975. (DEC # pbaaj051); Gopaldas, T., et al. "Project Poshak Volume Two." New Delhi: CARE/India, 1975. (DEC # pbaaj052)

[48] Pragma Corporation. "USAID Support to India's Integrated Child Development Services: Innovative Approaches to Enhance Services." New Delhi: USAID/India, 1991. (DEC # pnabq518); Anderson, M.A, N. Arora, et al. "Reproductive and Child Health Nutrition and HIV/AIDS program (RACHNA): Final Evaluation." New Delhi, India: CARE/India, 2006 (DEC # pdaci026); Singh, V., S. Ahmed, M.L. Dreyfuss, et al. "Non-Governmental Organization Facilitation of a Community-Based Nutrition and Health Program: Effect on Program Exposure and Associated Infant Feeding Practices in Rural India." San Francisco, Calif.: Public Library of Science, 2017, https://doi.org/10.1371/journal.pone.0183316.

[49] All values corrected for inflation to January 2018 constant dollars using the Bureau of Labor Statistics Consumer Price Index Calculator, https://data.bls.gov/cgi-bin/cpicalc.pl.

[50] This section excludes the Food for Peace (FFP) budget's development food assistance contribution to nutrition, which can be found in FFP reports. If the proportion of the FFP budget spent on nutrition-specific interventions were included, it would significantly augment USAID's total nutrition budget. In fiscal year 2017, the budget for FFP Title II development food assistance programs was $470.2 million, reaching 15 countries. See: USAID. "2017 Food for Peace Year in Review." Washington, D.C.: USAID. (DEC # pa00t46s); Also excluded is emergency nutrition funding from the Office of U.S. Foreign Disaster Assistance, which, for example, totaled $124 million in fiscal year 2017 for 20 countries. See: Office of U.S. Foreign Disaster Assistance. "Fiscal Year 2017 Nutrition Sector Update." Washington, D.C., USAID, 2018, https://www.usaid.gov/what-we-do/working-crises-and-conflict/responding-times-crisis.

[51] Internal annual reports on USAID's health, population and nutrition activities in fiscal years 1969-1973, prepared by the Office of International Health, U.S. Department of Health, Education and Welfare, 1975.

[52] Compared to the 1969 nutrition budget of $1.4 million ($9.6 million in 2018 constant U.S. dollars); U.S. Department of Health, Education and Welfare 1975, op. cit.

[53] USAID Office of Nutrition. "AID's Responsibilities in Nutrition." Washington, D.C.: USAID, April 1977. (DEC # pbaah941); the formal name of the agriculture account at that time was "Food and Nutrition."

[54] From 1986 to 2009, the USAID nutrition program was funded from the child survival and health account and not reported separately in reports to the U.S. Congress. This makes it difficult to find any publicly reported nutrition funding levels from 1986 to 2009.

[55] Ibid. The value reported is for nutrition-specific interventions only, excluding food aid. In fiscal year 2014, USAID's nutrition-specific annual budget of $115 million comprised 5.7 percent of the total USAID annual budget of $2.03 billion that year for "Ending Preventable Child and Maternal Deaths" reported under "Total Global Health Programs, USAID" (in nominal dollars and excluding HIV and infectious diseases).

[56] The average annual headquarters nutrition budget of $18.2 million from 2010 to 2014 was 16 percent lower than it was from 1976 to 1987. Based on analysis of USAID's Office of Nutrition's Annual Budget Submissions for 1976 (DEC # pdacb783), 1977 (DEC # pdacb784), 1978 (DEC # pdaav789), 1979 (DEC # pdacb785), 1980 (DEC # pdaax540), 1981 (DEC # pdacb897), 1982 (DEC # pdaas773), 1983 (DEC # pdaax546), 1984 (DEC # pdaaw065), 1985 (DEC # pdaas995), 1988 [S&T Bureau, not just Nutrition Office] (DEC # pdaay388); USAID. "Global Health and Child Survival Progress Report to Congress 2010-2011." (DEC # pdacw237); USAID. "Global Health Programs Progress Report to Congress Fiscal Year 2012." (DEC # pdacx520); USAID. "Annual Progress Report to Congress: Global Health Programs Fiscal Year 2013." (DEC # pbaab999); USAID. "Annual Progress Report to Congress: Global Health Programs Fiscal Year 2014." (DEC # pbaae205)

[57] The report is found at https://globalnutritionreport.org/reports/global-nutrition-report-2018/.

[58] As mentioned in the Global Nutrition Report, the basic nutrition code only acts as an imperfect "proxy" for nutrition-specific spending, as it does not capture all subsets of nutrition-specific funding.

[59] Results for Development. "Tracking Aid for the WHA Nutrition Targets: Global Spending in 2015 and a Roadmap to Better Data." April 2018, https://www.r4d.org/wp-content/uploads/R4D_NutritionReport_PolicyBrief.pdf.

[60] At a high-level meeting on Nutrition for Growth (N4G), London, 2013, participating world leaders, including those from the Scaling Up Nutrition Movement (SUN) member countries, signed the Global Nutrition for Growth Compact, which aimed to increase nutrition investment, prevent at least 20 million children from being stunted and save at least 1.7 million lives by 2020.

[61] The 2025 Global Nutrition Targets adopted at the 2012 World Health Assembly are: 1) Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50 percent, 2) 40 percent reduction in the number of children under-5 who are stunted, 3) 50 percent reduction of anemia in women of reproductive age, 4) Reduce and maintain childhood wasting to less than 5 percent, 5) 30 percent reduction in low birth weight, and 6) No increase in childhood overweight, For more on the WHO Global Targets 2025: http://www.who.int/nutrition/global-target-2025/en/.

CHAPTER 2: IMPROVING NUTRITION FOR WOMEN AND YOUNG CHILDREN

[1] Demographic and Health Surveys Program, ICF International, February 2018 analysis for USAID. The 20 priority countries are: Bangladesh, Cambodia, Democratic Republic of the Congo, Ethiopia, Ghana, Guatemala, Haiti, Honduras, Kenya, Liberia, Malawi, Mali, Mozambique, Nepal, Rwanda, Senegal, Tajikistan, Tanzania, Uganda and Zambia.

[2] Martorell, R. and A. Zongrone. "Intergenerational Influence on Child Growth and Undernutrition." Pediatric and Perinatal Epidemiology, 26(s1):302-314, 2012.

[3] Lumbiganon, P., M. Laopaiboon, N. Intarut, J.P. Vogel, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. "Indirect Causes of Severe Adverse Maternal Outcomes: a Secondary Analysis of the WHO Multi-country Survey on Maternal and Newborn Health." BJOG, An International Journal of Obstetrics & Gynaecology, 121(Suppl. 1):32-39, 2014.

[4] Maternal and Infant Nutrition Project (1979-89) and Women and Infant Nutrition Field Support (WINS) Project (1989-98).

[5] USAID Background Paper 2001, op. cit.

[6] Baker, J., L. Martin, and E. Piwoz. "The Time to Act, Women's Nutrition and its Consequences for Child Survival and Reproductive Health in Africa." Washington, D.C.: AED, SARA Project, 1996. (DEC # pnaca435)

[7] Regional Africa projects: Support for Analysis and Research (SARA 1 and SARA 2) and Sustainable Approaches to Nutrition in Africa (SANA). AED, 1992-2004.

[8] "Maternal Nutrition During Pregnancy and Lactation" is a joint publication of LINKAGES: Breastfeeding, LAM, Related Complementary Feeding, and Maternal Nutrition Program, and of the Child Survival Collaborations and Resources (CORE) Nutrition Working Group, Washington, D.C., 2004 (DEC # pnadh493). See also: Maternal and Child Survival Program (MCSP), https://www.mcsprogram.org/resource/maternal-nutrition-programming-in-the-context-of-the-2016-who-antenatal-care-guidelines/.

[9] Krasovec, K. and M.A. Anderson, eds. "Maternal Nutrition and Pregnancy Outcomes: Anthropometric Assessment." Scientific Publication No. 529, Washington, D.C.: PAHO, 1991 (DEC # pa00tb1q); see also: WHO. "Maternal Anthropometry and Pregnancy Outcomes: A WHO Collaborative Study." Bulletin of the World Health Organization, Supplement to Vol. 73, 1995.

[10] BMI is measured as body weight in kilograms divided by height in meters squared (kg/m2).

[11] Ruel, M., M. Deitchler, and M. Arimond. "Developing Simple Measures of Women's Diet Quality in Developing Countries: An Overview." Journal of Nutrition 140 (11) Supplement:2048S-2050S, 2010, https://academic.oup.com/jn/article/140/11/2048S/4630549; See also https://www.fantaproject.org/monitoring-and-evaluation/minimum-dietary-diversity-women-indicator-mddw.

[12] USAID. "Multi-Sectoral Nutrition Strategy 2014-2025." Washington, D.C.: USAID, 2014. (DEC # pbaaa257)

[13] These indicators of dietary diversity are measured in women of reproductive age (15-49 years) in USAID's Food for Peace and Feed the Future activities; "FFP Indicators Handbook Part I: Indicators for Baseline and Final Evaluation Surveys." Washington, DC: FHI 360, Food and Nutrition Technical Assistance III Project, 2015. (DEC # pbaae201).

[14] Martorell, R. and T. Cossio. "Maternal Nutrition and Birth Weight." American Journal of Physical Anthropology, Vol. 30, Issue S8, 1987; Imdad, A. and Z.A. Bhutta. "Maternal Nutrition and Birth Outcomes: Effect of Balanced Protein-energy Supplementation." Paediatric and Perinatal Epidemiology, 26 (Supp1):178-90, 2012.

[15] USAID Technical Guidance Brief, Multi-Sectoral Nutrition Strategy. "Maternal Nutrition for Girls and Women." Washington, D.C.: USAID, 2015. (DEC # pa00t2jn); WHO. "WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience." Geneva: WHO, 2016. See also: Maternal and Child Survival Program, https://www.mcsprogram.org/resource/maternal-nutrition-programming-in-the-context-of-the-2016-who-antenatal-care-guidelines/.

[16] Kurz, K.K., N.L. Peplinsky, and C. Johnson-Welch. "Investing in the Future: Six Principles for Promoting the Nutritional Status of Adolescent Girls in Developing Countries." Washington, D.C.: International Center for Research on Women, 1994. (DEC # pnacf369)

[17] Caulfield, L.E. and V. Eliot. "Nutrition of Adolescent Girls and Women of Reproductive Age in Low and Middle Incomes Countries: Current Context and Scientific Basis for Moving Forward." Washington, D.C.: John Snow Inc., SPRING Project, 2015. (DEC # pa00mf4n)

[18] SPRING Project. "Adolescent Nutrition Call to Action: Better Data Now to Drive Better Policies and Programs in the Future." June 27, 2018. https://www.spring-nutrition.org/about-us/news/adolescent-nutrition-call-action-better-data-now-drive-better-policies-and-programs, accessed November 21, 2018.

[19] WHO Complementary Feeding, https://www.who.int/nutrition/topics/complementary_feeding/en/, accessed April 23, 2018.

[20] Jones, G., R.W. Steketee, et al. "How Many Child Deaths Can We Prevent this Year?" The Lancet, 362: 65-71, 2003.

[21] 1,000 Days, https://thousanddays.org/, accessed April 14, 2018.

[22] USAID Technical Guidance Brief, Multi-Sectoral Nutrition Strategy. "The 1,000 Day Window of Opportunity." Washington, D.C.: USAID, 2017. (DEC # pbaad798)

[23] The Lancet. "Maternal and Child Undernutrition Series." 371, January 16, 2008, https://www.thelancet.com/series/maternal-and-child-undernutrition, accessed September 20, 2018.

[24] Black, R.E., et al., Maternal and Child Nutrition Study Group. "Maternal and Child Undernutrition and Overweight in Low-income and Middle-income Countries." The Lancet, 382(9890):427-451, 2013.

[25] Grummer-Strawn, L.M., N. Rollins, et al. "Impact of Breastfeeding on Maternal and Child Health." Acta Paediatrica, 104(S4670):1-134. 2015.

[26] Plank, S.J., and M.L. Milanesi. "Infant Feeding and Infant Mortality in Chile." Bulletin of WHO, 48(2):203-10, 1973; Puffer, R.R., and C.V. Serrano. "Patterns of Mortality in Childhood." Washington, D.C.: PAHO, 1973.

[27] Victora, C.G., et al., Lancet Breastfeeding Series Group. Breastfeeding 1. "Breastfeeding in the 21st Century: Epidemiology, Mechanisms, and Lifelong Effect." The Lancet, 387: 475-90, 2016; Rollins, N.C., et al. Breastfeeding 2. "Why Invest, and What it Will Take to Improve Breastfeeding Practices?" The Lancet, 387: 491-504, 2016.

[28] Horta, B.L., and C.G. Victora. "Long Term Effects of Breastfeeding." WHO, 2013.

[29] Ibid. See also: World Bank Group. "An Investment Framework for Nutrition: Reaching the Global Targets for Stunting, Anemia, Breastfeeding, and Wasting." Washington, D.C.: World Bank, 2016.

[30] USAID, Office of Nutrition, Bureau for Science and Technology. "Maternal and Infant Nutrition: Report of Assistance to Developing Countries in the Area of Improving Infant Feeding Practices and Diet During Pregnancy." Washington, DC: USAID, 1982. (DEC # pnaam556)

[31] USAID. "Implementation of Recommendations of the World Food Conference: A Report to the Congress." Washington, D.C.: USAID, p. 39, 1976. (DEC # pdacx175)

[32] Adelman, C. "A.I.D. Research and Programs in Infant Feeding." Washington, D.C.: USAID Office of Nutrition, 1977. (DEC # pnaap923); National Academy of Sciences (NAS). "International Assistance for Maternal and Infant Nutrition in Developing Countries Report of a Conference January 30-31, 1978." Washington, D.C.: NAS, 1978. (DEC # pnaag013); USAID "Report of Assistance to Developing Countries in the Area of Improving Infant Feeding Practices and Diet During Pregnancy" 1982, op. cit.

[33] Pyle, D., et al. "Final Evaluation Maternal and Infant Nutrition Project (Project No. 931-1010)." Washington, D.C.: USAID, 1989. (DEC # pdabc989); Gibbons, G. "Information for Action: The Clearinghouse Project." Development in Practice, Vol. 8(1): 79-85, February 1998, http://www.jstor.org/stable/4028867, accessed January 12, 2018.

[34] WHO. "International Code of Marketing of Breast-Milk Substitutes." Geneva: WHO, 1981.

[35] Joint WHO/UNICEF Meeting on Infant and Young Child Feeding. Geneva: WHO, 1979.

[36] WHO. "Country Implementation of the International Code of Marketing of Breast-Milk Substitutes: Status Report 2011." Geneva: WHO, 2013 (revised).

[37] Winikoff, B., M.A. Castle, and V.H. Laukaran, eds. "Feeding Infants in Four Societies, Causes and Consequences of Mothers' Choices." The Population Council, Contributions in Family Studies No. 14, 1988; Winikoff, B. "The Infant Feeding Study: Summary." New York: The Population Council, 1986. (DEC # pnabj647)

[38] Winikoff et al. 1988, op. cit.

[39] USAID, Office of Health and Nutrition. "USAID Nutrition Programs: An Overview." Washington, D.C.: USAID, 1995. (DEC # pnaby896), see also http://www.wellstart.org/about.html.

[40] Cooney, K., et al. "Taking the First Steps: The Lactational Amenorrhea Method, A Decade of Experience." Final Report of the Breastfeeding and Maternal Child Health Division of the Institute for Reproductive Health. Washington, D.C.: Institute for Reproductive Health, 1997. (DEC # pnacc118)

[41] LINKAGES Project. "Lactational Amenorrhea Method (LAM); Frequently Asked Questions." Washington, D.C.: Academy for Educational Development (AED), updated 2001. (DEC # pnacr413)

[42] Family Health International. "Consensus Statement: Breastfeeding as a Family Planning Method." The Lancet, 332(8621):1204-1205, Nov. 19, 1988; see also Kennedy, K.I., M.H. Labbokb, and P.F.A. Van Look. "Consensus Statement: Lactational Amenorrhea Method for Family Planning." International Journal of Gynecology & Obstetrics, 54:55-57, 1996; USAID still funds LAM activities: see http://irh.org/projects/fam_project/lactational-amenorrhea-method-%20lam/ and http://irh.org/projects/fact_project/.

[43] Committee on International Nutrition Programs. "Nutrition and Fertility Interrelationships: Implications for Policy and Action." Conference Report, Washington, D.C.: NAS, 1975. (DEC # pnaac681); Zeitlin, M., et al. "Nutrition and Population Growth: The Delicate Balance." Prepared by Harvard-MIT International Food and Nutrition Program, MIT International Population Initiatives Programs, and Abt Associates. Cambridge: Oelgeschlager, Gunn & Hain, 1982. (DEC # pnaay819); Conde-Agudelo, A., et al. "Effects of Birth Spacing on Maternal, Perinatal, Infant, and Child Health: A Systematic Review of Causal Mechanisms." Studies in Family Planning, 43(2): 93-114, 2012. (DEC # pnady842); Rutstein, S., and R. Winter. "The Effects of Fertility Behavior on Child Survival and Child Nutritional Status: Evidence from the Demographic and Health Surveys, 2006-2012." DHS Analytical Studies No. 37. Calverton, Md.: ICF International, 2014. (DEC # pnaed161); Rutstein, S. "Further Evidence of the Effects of Preceding Birth Interval on Neonatal, Infant, and Under-Five Years Mortality and Nutritional Status in Developing Countries: Evidence from the Demographic and Health Surveys." DHS Analytical Studies No. 37, Calverton, Md.: Macro International Inc., 2008. (DEC # pnadm649)

[44] USAID's priorities for reducing child deaths were immunization and oral rehydration therapy for diarrhea, also known as "the twin engines." In contrast, the priorities of UNICEF's child survival revolution launched in 1982 were growth monitoring, oral rehydration therapy, breastfeeding and immunization, known by the acronym GOBI.

[45] USAID. "Breastfeeding: A Report on A.I.D. Programs." Report to Congress, Washington, D.C.: USAID, 1990. (DEC # pnabg519)

[46] USAID. "Breastfeeding for Child Survival Strategy." Washington, D.C.: USAID, 1990. (DEC # pnabg518)

[47] These global projects managed by USAID/Washington provided technical assistance to country programs: "Expanded Promotion of Breastfeeding" (1991-1996); "Women and Infant Nutrition" (WINS) (1989-1999); "MotherCare" (1989-1999); the "Nutrition Communication Project" (1987-1995); "LINKAGES" (1996-2006); and "Infant and Young Child Nutrition" (2006-2011).

[48] "Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding." Florence, Italy, August 1, 1990.

[49] WHO, Division of Child Health and Development. "Indicators for Assessing Breastfeeding Practices." Geneva: WHO, 1991. Agreed indicators included early initiation, exclusive breastfeeding, timely complementary feeding, and continued breastfeeding at 1 and 2 years of age.

[50] USAID. "ADS Chapter 212: Breastfeeding Promotion." Washington, D.C.: USAID, 2012. Originally issued January 4, 2002 and revised January 4, 2006 and January 6, 2012, to incorporate WHO recommendations on HIV and Infant Feeding. (DEC # pa00stwx)

[51] LINKAGES Project. "Celebrating Innocenti 1990-2005 - Achievements, Challenges, and Future Imperatives." Washington, D.C.: AED, 2005. (DEC # pnadh113)

[52] "Innocenti Declaration on Infant and Young Child Feeding." Florence, Italy, November 22, 2005. Second edition from 2006 found at: http://www.academia.edu/12702856/The_UNICEF_Innocenti_Research_Centre.

[53] WHO. "Guideline: Protecting, Promoting and Supporting Breastfeeding in Facilities Providing Maternity and Newborn Services." Geneva: WHO, 2017; UNICEF and WHO. "Implementation Guidance: Protecting, Promoting and Supporting Breastfeeding in Facilities Providing Maternity and Newborn Services – the Revised Baby-friendly Hospital Initiative." Geneva: WHO, 2018.

[54] WHO "Baby-friendly Hospital Initiative," http://www.who.int/nutrition/topics/bfhi/en/, accessed April 27, 2018; WHO and UNICEF. "Protecting, Promoting and Supporting Breast-feeding: The Special Role of Maternity Services." Geneva: WHO, 1989, http://www.who.int/iris/handle/10665/39679.

[55] Morrow, A., and A. Naylor, eds. "Developmental Readiness of Normal Full-Term Infants to Progress from Exclusive Breastfeeding to Introduction of Complementary Feeding." AED LINKAGES Project, 2001. (DEC # pnacs46)

[56] Fleige, L., W. Moore, et al. "Recommendations for Optimization of Fortified and Blended Food Aid Products from the United States." Nutrition Reviews, Volume 68(5): 290-315, 2010.

[57] Crowley, P.R., F.F. Barrett, et al. "Final Report: Food Technology for Development Project, RSSA STB-0831-R-AG-4207, 1969-1989." Washington, D.C.: USDA, 1989. (DEC # pdaaz992)

[58] Thriposha in Sri Lanka, Incaparina in Guatemala, and Bal Ahar in India are examples of successful fortified blended foods that were sustained.

[59] Mitzner, K., N. Scrimshaw, and R. Morgan, eds. "Improving Nutritional Status of Children During the Weaning Period." Cambridge: MIT Graphics Arts Service, 1984; Crowley et al. 1989, op. cit.

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CHAPTER 3: FROM VITAMIN A TO ZINC: ADDRESSING MICRONUTRIENT MALNUTRITION

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CHAPTER 4: COMBATING THE HIV EPIDEMIC THROUGH FOOD AND NUTRITION

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CHAPTER 5: MULTI-SECTORAL NUTRITION AND FOOD SECURITY

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[19] The establishment of the Nutrition Economics Group in USDA's Office of International Cooperation and Development, noted in the Kramer and Rubey assessment (see endnote 24 below), and directed by the same person during its first 10 years (Roberta van Haeften), provided continuity and institutional memory critical to its success. Three of the original NEG employees also went on to have distinguished careers in the university community (Beatrice Lorge Rogers) and within USAID (Emmy Simmons and Patricia Rader).

[20] This network of experts included well-known U.S. food and agricultural policy economists from the academic and research community, included Drs. Marguerite Burke, Benjamin Senauer, Beatrice Lorge Rogers, Stanley Johnson, William Meyers, Roger Norton, Robert Evenson, Eric Thorbecke, Earl Heady, Terry Roe, Grant Scobie, Per Pinstrup Anderson, and Joachim von Braun. Many of these experts (and others such as Drs. Harold Alderman, Anne Swindale and Tim Frankenberger, who worked as young professionals on CEAP activities) continued this cutting-edge work for USAID, the World Bank, IFPRI, and the NGO and university communities.

[21] This included the Center for Research on Economic Development, University of Michigan, IFPRI, Iowa State University, Michigan State University, Permanent Secretariat of the General Treaty of Economic Integration of Central America, Purdue University, Research Triangle, Sigma One, Tufts University, University of Arizona, University of Kentucky, and the University of Missouri.

[22] Countries studied/assisted by CEAP include Cameroon, Dominican Republic, Egypt, Honduras, Indonesia, Jamaica, Liberia, Mali, Nigeria, Panama, Peru, Senegal, Sierra Leone, Sri Lanka, Sudan, Tanzania and Zambia.

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[24] Understanding the effects of economic policies requires disaggregated analyses. Most CEAP analyses focused on changes in consumption patterns of households—not individuals—but the linkages were still complex and context specific, varying over time and by and within countries. Households in different population groups are affected differently by policies depending on how they earn their livings, what foods they consume, and the patterns of substitution among foods in the face of changing prices and incomes. Distinctions between "farm" and "non-farm" households and between "consumer" and "producer" households are seldom clear. This means that CEAP household-based analyses were/are data intensive, and food consumption parameters from other countries and policy contexts could not/cannot be substituted for empirical investigations. Assessing the distribution of food within households requires even more information on the form in which the income is received, the source, the earner, and the locus of control of the income.

[25] Some CEAP findings led to improved policies even though the project's time and resources for this purpose were limited. To increase the relevance of and receptivity to CEAP findings, USAID country offices and host countries were consulted from the start, problems of interest to people in the country were selected, and country analysts were used whenever possible. Most CEAP analyses focused on changes in calorie and protein availability in household diets (which was consistent with the thinking in the nutrition community at that time), and not on availability of micronutrients or nutritional status.

[26] International Food Policy Research Institute. "Understanding How Resources are Allocated within Households." IFPRI Policy Brief 8. Washington, D.C.: IFPRI, 1992. (DEC # pnabn017)

[27] von Braun, J., E. Kennedy, and H. Bouis. "Comparative Analyses of the Effects of Increased Commercialization of Subsistence Agriculture on Production, Consumption, and Nutrition." Final Report. Washington, D.C.: IFPRI, 1989. (DEC # pnabf295)

[28] Ibid.

[29] Pinstrup-Andersen, P., A. Berg, and M. Forman. "International Agricultural Research and Human Nutrition." Washington, D.C.: IFPRI, 1984. (DEC # pnaar211)

[30] Ibid.

[31] Sommers, P. "Nutrition Improvement through Mixed Gardening in the Humid Tropics: A Trainer's Manual." Washington, D.C.: USAID and U.S. Peace Corps, 1984. (DEC # pnabb331)

[32] van Haeften, R., M.A. Anderson, H. Caudill, and E. Kilmartin. "Second Food Aid and Food Security Assessment (FAFSA-2)." Washington, D.C.: FHI 360, FANTA Project, 2013. (DEC # pa00jg8n)

[33] Talukder, A., N. Islam, R. Klemm, and M. Bloem, "Home Gardening in South Asia: The Complete Handbook." New York: Helen Keller International, 1993. (DEC # pnabt760); Helping Families Grow Better Food." Helen Keller International. http://www.hki.org/our-work/improving-nutrition/helping-families-grow-better-food, accessed August 17, 2018.

[34] Johnson, S.L., D. Wolking, and M.W. Demment. "Global Livestock CRSP Final Report 2010." Washington, D.C.: USAID, (DEC # pbaab611); Whaley, S.E., et al. "The Impact of Intervention on the Cognitive Development of Kenyan School Children." Conference on Animal Source Foods to Improve Micronutrient Nutrition and Human Function in Developing Countries. Journal of Nutrition, 133:3965S-3971S, 2003; Research on animal-source foods and child nutrition began in Africa from 1998-2009 under the Global Livestock Collaborative Research Support Program. It has continued in Africa and Asia with USAID support under the Nutrition Innovation Lab from 2010-2018 (see https://nutritioninnovationlab.org/) and under the Innovation Lab for Livestock Systems from 2015-2020 (see http://livestocklab.ifas.ufl.edu/).

[35] Yosef, S. "From the Ground Up: Cultivating Agriculture for Nutrition." In Gillespie, S., et.al., Nourishing Millions: Stories of Change in Nutrition. Washington, D.C.: IFPRI, 2016.

[36] Ruel, M.T., and H. Alderman. "Nutrition-sensitive Interventions and Programmes: How

They Help to Accelerate Progress in improving Maternal and Child Nutrition?" The Lancet 382 (9890):478-493, 2013; Biofortified foods need to be consumed in adequate quantities to compensate for their lower-quality, plant-source micronutrients, along with adequate fat intake and the absence of intestinal parasites (for vitamin A).

[37] USAID Bureau for Food Security. "USAID's Legacy in Agricultural Development; 50 Years of Progress." Washington, D.C.: USAID, 2016 (DEC # pbaah661). This document described agriculture as falling "out of vogue" and its share of all USAID funding declining from "well over 50 percent in 1979-81, to about 40 percent in 1986-87 and to just over 30 percent at the beginning of the 1990s" (p. 6).

[38] USAID Nutrition Sector Council. "USAID Nutrition Sector Strategy." Washington, D.C.: USAID, 1984. (DEC # pnaaq309)

[39] U.S. Congress. "The Food, Agriculture, Conservation and Trade Act of 1990." P.L. 101-624, November 28,1990.

[40] USAID. "Policy Determination: Definition of Food Security." Policy Determination 19, Washington, D.C: USAID, 1992 (DEC # pnaav468). The USAID definition of food security was, "When all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life."

[41] USAID. "Food Aid and Food Security Policy Paper." Washington, D.C.: USAID, 1995. (DEC # pnabu219)

[42] Title II development food assistance programs (non-emergency) became multi-sectoral, and included any of the following components: agriculture and natural resources management; maternal and child health and nutrition; vulnerable group feeding; HIV; education; water, sanitation and hygiene; non-agricultural income generation; infrastructure, including roads and small-scale irrigation systems; and emergency preparedness and disaster management.

[43] USAID Office of Food for Peace. "Strategic Plan for 2006-2010." Washington, D.C.: USAID. 2005. (DEC # pdacf038); USAID Office of Food for Peace. "Food Assistance and Food Security Strategy for 2016-2025." Washington, D.C.: USAID, 2016. (DEC # pbaae890)

[44] The 20 priority countries were Burkina Faso, Burundi, Chad, Democratic Republic of Congo, Ethiopia, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Sierra Leone, Sudan, Uganda, Zambia, Afghanistan, Bangladesh, Guatemala and Haiti.

[45] The methodology developed in consultation with the FANTA-2 project and IFPRI used the weighted average of three indicators that address the three basic elements of food security: (1) availability [defined as the "percentage of population undernourished"] (10 percent), (2) access [defined as "percentage of population living on less than US$1 per day"] (30 percent), and (3) utilization [defined as "percentage of children under 5 stunted"] (60 percent).

[46] The Office of Food for Peace requirements went beyond those of most other offices in USAID, e.g., the requirement that NGO implementers do population-based, representative, household baseline and final surveys to measure changes in impact and outcome indicators.

[47] Food for Peace commissioned two comprehensive food aid and food security assessments (FAFSA) of the overall Title II development program (FAFSA-1, 2002, and FAFSA-2, 2013): Bonnard, P., P. Haggerty, A. Swindale, and G. Bergeron. "Report of the Food Aid and Food Security Assessment: A Review of the Title II Development Food Aid Program (FAFSA)." Washington, D.C: Academy for Educational Development, FANTA Project, 2002. (DEC # pnacp369); and van Haeften et al. 2013, op. cit. The FAFSA-2 covered 101 programs in 28 countries underway in fiscal years 2003-2009.

[48] van Haeften et al. 2013, op. cit. Averages calculated for the period 2003-2009.

[49] van Haeften et al. 2013, op. cit.

[50] USAID Office of Food for Peace, Bureau for Democracy, Conflict and Humanitarian Assistance. "2016–2025 Food Assistance and Food Security Strategy." Washington, DC: USAID, 2016. (DEC # pa00mcqp)

[51] G-8 Summit Statement on Food Security. "L'Aquila Joint Statement on Global Food Security." L'Aquila Food Security Initiative, July 10, 2009; U.S. Government. "Feed the Future Guide." Washington, D.C.: USAID, May 2010. (DEC # pdacq522)

[52] Ibid.

[53] U.S. Government. "U.S. Government Global Food Security Strategy 2017-2021." Washington D.C.: USAID, 2016. (DEC # pbaae954)

[54] U.S. Government, Global Hunger and Food Security Initiative. "Feed the Future Snapshot Progress through 2017." Washington, D.C.: USAID, 2018 (DEC # pbaah726); Attention was concentrated on 19 focus countries through 2016, and 12 countries from 2017 onward.

[55] U.S. Government "Food Security Strategy 2017-2021" 2016, op. cit., p.8 (see https://www.usaid.gov/what-we-do/agriculture-and-food-security/us-government-global-food-security-strategy).

[56] Elliott, K., and C. Dunning. "Assessing the U.S. Feed the Future Initiative: A New Approach to Food Security." CGD Policy Paper 075, Washington, D.C.: Center for Global Development, March 2016.

[57] "Feed the Future Snapshot: Results through 2018: A Decade of Progress." Washington, D.C.: USAID, 2018.

[58] Agricultural interventions can be made "nutrition- sensitive," according to Feed the Future, if they are designed taking into account the most relevant pathways from the intervention to the desired consumption and nutrition objectives, namely the agricultural income pathway, the food production pathway, and the women's empowerment pathway. Information on "nutrition-sensitive" agriculture and these pathways is available in Technical Guidance Briefs for USAID's Multi-Sectoral Nutrition Strategy, https://www.usaid.gov/global-health/health-areas/nutrition/technical-areas. See also (DEC # pa00t2jp), (DEC # pa00t2jq), and (DEC # pa00t2jk).

[59] USAID Technical Guidance Brief. "Nutrition-Sensitive Agriculture, Nutrient-Rich Value Chains." Washington, D.C.: USAID Multi-Sectoral Nutrition Strategy, 2015. (DEC # pa00t2jq)

[60] See https://www.feedthefuture.gov/guidance-and-tools-for-global-food-security-programs/ and https://www.agrilinks.org/post/feed-the-future-mel-webinar-series.

[61] Bhutta, Z.A., et al. "Evidence-based Interventions for Improvement of Maternal and Child Nutrition: What Can be Done and at What Cost?" The Lancet, Maternal and Child Health Series 382(9890):452-477, 2013; Black, R.E., et al. "Maternal and Child Undernutrition: Global and Regional Exposures and Health Consequences." The Lancet, Maternal and Child Health Series, 371(9608):243–260l, 2008; Black, R.E., et al. "Maternal and Child Undernutrition and Overweight in Low-income and Middle-income Countries." The Lancet, 382(9890):427-451, 2013.

[62] USAID. "Multi-Sectoral Nutrition Strategy 2014-2025." Washington, D.C.: USAID, May 2014, https://www.usaid.gov/nutrition-strategy. (DEC # pbaaa257); Access supplementary technical guidance briefs at: https://www.usaid.gov/global-health/health-areas/nutrition/technical-areas.

[63] U.S. Government. "U.S. Government Global Nutrition Coordination Plan 2016–2021." Washington, DC: USAID, 2016. (DEC # pbaae570)

[64] Figures are based on increases to the Women's Dietary Diversity Score, the average number of food groups, out of 10 possible, in the diets of women over the previous 24 hours. The 10-category score was validated by FANTA's 10-year Women's Dietary Diversity Project using nine data sets from six countries to relate different scoring systems to the adequacy of micronutrient intake.

[65] SPRING Project. "Cohort Study: Sustainability of Improved Practices Following Graduation from the SPRING Farmer Nutrition Schools in Bangladesh." Arlington, Va.: JSI Research & Training Institute, Inc., Strengthening Results, Partnerships, and Innovations in Nutrition Globally (SPRING) Project (forthcoming).

[66] Hargreaves, J.A., A. Hossain, and M. Islam. "Final Performance Evaluation Final Report Aquaculture for Income and Nutrition." Vienna, Va.: International Business & Technical Consultants, Inc., February 3, 2017. (DEC # pa00mv3p)

[67] Save the Children. "Improving Nutrition in Nepal: The Suaahara Experience." Final Report, Kathmandu, Nepal: Save the Children, 2016.

[68] Cunningham, K., A. Singh, P.P. Rana, L. Brye, et al. "Suaahara in Nepal: An At-scale, Multi-sectoral Nutrition Program Influences Knowledge and Practices While Enhancing Equity." Maternal and Child Nutrition, 13(4), October 2017, https://doi.org/10.1111/mcn.12415.

[69] Levinson and Balarajan 2013, op. cit.

[70] Save the Children. "Improving Nutrition through Multi-sectoral Support: The ENGINE Experience. Final Report 2011–2016." Fairfield, Conn.: Save the Children, Empowering New Generations with Improved Nutrition and Economic Opportunities (ENGINE), 2016. (DEC # pa00swsd)

CHAPTER 6: RESEARCH AND MEASUREMENT FOR UNDERSTANDING AND REDUCING MALNUTRITION

[1] Criteria for selecting USAID's research and measurement contributions to highlight were adapted from those used in USAID's agriculture history methodology, p. xi: USAID Bureau for Food Security. "USAID's Legacy in Agricultural Development; 50 Years of Progress." Washington, D.C.: USAID, 2016. (DEC # pbaah661). The criteria are: 1) importance or proven impact in more than one country, 2) catalytic, systemic or transformative results in more than one country, 3) changed policy or programming guidelines toward increased nutritional impact, 4) scale and replicability [has been replicated in large programs], and 5) sustainability.

[2] Mozaffarian, D., and N. Forouhi. "Dietary Guidelines and Health – Is Nutrition Science up to the Task?" BMJ, 360:k822, doi: 10.1136/bmj.k822, March 16, 2018.

[3] Undernutrition is used here to include stunting, underweight, wasting and micronutrient deficiencies.

[4] USAID, Office of Nutrition. "Summary of A.I.D,'s Nutrition Programs." Washington, D.C.: USAID, 1979. (DEC # pbaaj170); The organizational location within the NAS was the Committee on International Nutrition Programs, Food and Nutrition Board, Commission on Life Sciences, National Research Council.

[5] Berg, A., personal communication, August 17, 2018.

[6] Kramer, M.S., and R. Kakuma. "The Optimal Duration of Exclusive Breastfeeding: A Systematic Review." Geneva: WHO, 2002, http://www.who.int/nutrition/publications/infantfeeding/WHO_NHD_01.08/en/.

[7] Less than 80 percent Harvard Standard median weight-for-age.

[8] Kielmann, A.A., and C. McCord. "Weight-for-age as an Index of Risk of Death in Children." The Lancet, June 10: 1247-50, 1978.

[9] Martorell, R. "The INCAP Follow-up Study." Journal of Nutrition, 125 (Supp 4), 1995, doi: 10.1093/jn/125.suppl_4.1127S.

[10] Calloway, D.H., et al. "Village Nutrition in Egypt, Kenya, and Mexico: Looking across the CRSP Projects." Berkeley, Calif., 1992. (DEC # pnabn873). In 1977, the Collaborative Research Support Programs (CRSPs) were created by USAID under a 1975 amendment to the Foreign Assistance Act, Title XII: Famine Prevention and Freedom from Hunger. The CRSPs are networks of mainly U.S. land grant universities charged with advancing agricultural development and food security (including nutrition), in partnership with USAID and host country universities and institutions. The Nutrition CRSP on the functional implications of malnutrition was carried out in follow-up to the 1974 World Food Conference, and was the highest priority nutrition research recommendation of the 1977 World Food and Nutrition Study of the National Academy of Sciences (see DEC # pnaad532). The University of California at Berkeley was the management entity for the Nutrition CRSP. Other U.S. university implementers of this CRSP were Purdue, Kansas, Arizona, UCLA and Connecticut.

[11] Allen, L. "The Nutrition CRSP: What is Marginal Malnutrition, and Does it Affect Human Function?" Nutrition Reviews, 31(9):255-267, 1993.

[12] Allen, L. "Malnutrition and Human Function: A Comparison of Conclusions from the INCAP and Nutrition CRSP Studies." Journal of Nutrition, 1225:1119-26s, 1995.

[13] Allen 1993, op. cit.

[14] Martorell, R., et al. "Reversibility of Stunting: Epidemiological Findings in Children from Developing Countries." European Journal of Clinical Nutrition, 48:S45–57, 1994.

[15] Hoddinott, J., J.A. Maluccio, J.R. Behrman, R. Flores, et al. "Effect of a Nutrition Intervention during Early Childhood on Economic Productivity in Guatemalan Adults." The Lancet, 371(9610):411-6, 2008.

[16] See DEC #s pnacg662 and pnaca435

[17] Smith, L.C., and L. Haddad. "Reducing Child Undernutrition: Past Drivers land Priorities for the Post-MDG Era." World Development, 68:180-204, 2015.

[18] USAID. "Multi-Sectoral Nutrition Strategy 2014-2025." USAID: Washington D.C., 2014. (DEC # pbaaa257)

[19] The Feed the Future Innovation Lab for Nutrition is led by Tufts University and was created under the Title XII CRSP mechanism. It was previously known as the Collaborative Research Support Program for Nutrition (Nutrition CRSP). In 2013, the CRSPs were renamed Feed the Future Innovation Labs to better align them with the U.S. Government's global hunger and food security initiative (Feed the Future was established in 2010).

[20] Lamstein, S., A. Pomeroy-Stevens, P. Webb, and E. Kennedy. "Optimizing the Multisectoral Nutrition Policy Cycle: a Systems Perspective." Food and Nutrition Bulletin, 37(4):S107-14, 2016.

[21] Rogers, B.L., and J. Coates. "Sustaining Development: a Synthesis of Results from a Four-Country Study of Sustainability and Exit Strategies among Development Food Assistance Projects, Executive Summary." Washington, D.C.: FHI 360, Food and Nutrition Technical Assistance III (FANTA III) Project, 2016. (DEC # pa00md73)

[22] Marquez, L., et al. "Final Report of the Latin America and Caribbean Health and Nutrition Sustainability Contract." University Research Co., International Science and Technology Institute, Bethesda, Md., 1996. (DEC # pdabn507)

[23] Sanghvi. T.G. "Improving the Cost-effectiveness of Breastfeeding Promotion in Maternity Services: Summary of the USAID/LAC HNS Study in Latin America 1992-95." (DEC # pnabx653)

[24] Phillips, M., T.G. Sanghvi, R. Suarez, J. McKigney, et al. "The Costs of Three Vitamin A Interventions in Guatemala." Working Paper No. 2, Nutrition Cost Effectiveness Studies, Washington D.C.: University Research Co. LLC, 1994.

[25] FANTA III. "CMAM Costing Tool." FHI 360, FANTA III Project, Washington D.C. n.d., https://www.fantaproject.org/tools/cmam-costing-tool.

[26] FANTA III. "National CMAM Scale-Up Costing Report, 2013–2017." Washington, D.C.: FHI 360, FANTA III Project, 2013, https://www.fantaproject.org/countries/ghana/cmam-scale-up-costing-report.

[27] Ministry of Health, Malawi. "National Community-based Management of Acute Malnutrition (CMAM) Operational Plan 2017–2021." Lilongwe, Malawi: MOH, 2016, https://www.fantaproject.org/node/1483.

[28] Tucker, K., et al. "Advance in Nutritional Surveillance: The Cornell Nutritional Surveillance Program 1981-1987." CFNPP Monograph 89-2, Ithaca, N.Y.: Cornell University, 1989. (DEC # pnabe873)

[29] Mason, J., J.-P. Habicht, H. Tabatabai, and V. Valverde. "Nutritional Surveillance." WHO: Geneva, 1984, http://apps.who.int/iris/handle/10665/40788.

[30] Horowitz, A., et al. "Review of the Nutrition Surveys and Surveillance Project (No. 931-1064)" Research Triangle Park, N.C.: Sigma One Corporation, 1990. (DEC # pdabb792)

[31] Friedman, G. "Review of National Nutrition Surveillance Systems." Washington, D.C.: FHI 360, FANTA III Project, 2014. (DEC # pa00jr7j)

[32] U.S. Centers for Disease Control and Prevention. "International Micronutrient Malnutrition Prevention and Control (IMMPaCt)," https://www.cdc.gov/nutrition/micronutrient-malnutrition/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fimmpact%2Findex.html.

[33] Palmieri, M. "A Nutrition Surveillance Case Study from Guatemala: Epidemiological Surveillance System in Health and Nutrition (SIVESNU) in Guatemala." Guatemala City: INCAP, 2016, http://ffinetwork.org/about/calendar/2016/documents/Nutrition_Case_Study_Guatemala.pdf.

[34] Famine Early Warning Systems Network, http://fews.net/, accessed June 28, 2018.

[35] See details and reports at "Indicators for Assessing Infant and Young Child Feeding Practices: Parts 1, 2, and 3," FANTA III Project website, https://www.fantaproject.org/monitoring-and-evaluation/iycf-indicators, accessed September 30, 2018; Reports are also available via the WHO website at http://www.who.int/maternal_child_adolescent/documents/9789241596664/en/.

[36] Cogill, B. "Anthropometric Indicators Measurement Guide: 2003 Revised Edition." Washington, D.C.: AED, FANTA Project, 2003. (DEC # pnacq756)

[37] For information on the BMI Body Wheel and related items, see: https://www.fantaproject.org/research/muac-adolescents-adults; https://www.fantaproject.org/tools/bmi-look-uptables; https://www.fantaproject.org/tools/body-mass-index-bmi-wheel; Body mass index is a measure used in children over 5 years and adults, of weight (in kilograms) divided by height (in meters) squared, to detect underweight or overweight for height.

[38] Sommerfelt, E.A., and M.K. Stewart. "Children's Nutritional Status. Demographic and Health Surveys Comparative Series No. 12." Calverton, Md.: Macro International, Inc., 1994. (DEC # pnabs203); Kothari, M.T., A. Noureddine, A. Coile, and Y. Cheng. "Nutritional Status of Women and Children." Rockville, Md.: ICF International, 2014. (DEC # pbaab842)

[39] FANTA III Project. "Malnutrition in Uganda: We've Already Paid Too High a Price." Washington: D.C.: FHI 360, FANTA III Project, 2017, https://www.fantaproject.org/sites/default/files/resources/Uganda-Health-Nutrition-FactSheet-Dec2017.pdf.

[40] Burkhalter, B.R., et al. "PROFILES: A Data-Based Approach to Nutrition Advocacy and Policy Development." (DEC # pnacm847); FANTA III Project. "Multi-sectoral Nutrition Programming: FANTA Achievements and Lessons Learned." Washington, D.C.: FHI 360, FANTA III Project, 2017. (DEC # pa00n46w)

[41] Standardized Monitoring and Assessment of Relief and Transitions, https://smartmethodology.org/about-smart/.

[42] Daher, J., et al. "Implementation of Nutrition Surveys Using SMART Methodology in Sub-Saharan Africa." September 2018, https://www.ennonline.net/fex/58/smartmethodologyafrica, accessed October 2018.

[43] USAID Evaluation Policy, https://www.usaid.gov/evaluation/policy, accessed June 14, 2018.

[44] USAID Multi-Sectoral Nutrition Strategy 2014-2025, op. cit.

[45] USAID Multi-Sectoral Nutrition Strategy 2014-2025, op. cit.

SPOTLIGHT: CAPACITY BUILDING AND KNOWLEDGE MANAGEMENT

[1] USAID, "Report of the In-Service Workshop on Nutrition and Child Feeding." Easton, MD, May 26-29, 1969. Washington, D.C.: USAID, 1969. (DEC # pbaaj169)

[2] USAID, "Report of the Second In-Service Workshop on Nutrition and Child Feeding."Berkeley Springs, WV, June 14-17, 1971. Washington, D.C.: USAID, 1971. (DEC # pnrab606)

[3] USAID, "Report of the Third In-Service Workshop on Nutrition and Nutrition Planning."Harpers Ferry, WV, October 15-19, 1973. Washington, D.C.: USAID, 1973. (DEC # phaaa049)

[4] USAID, Office of Nutrition, "Summary of A.I.D's Nutrition Programs." Washington, DC: USAID, 1979, (DEC # pbaaj170); Seven U.S. intermediate-level nutrition planners were trained and then sent on two-year assignments to assist nutrition planning units in Bolivia, Cameroon, Dominican Republic, El Salvador, Indonesia, Tunisia and Zambia though a USAID contract with New Trans-Century Foundation. James Pines, a senior nutrition planning advisor, was their mentor. These nutrition planning fellows went on to make their careers in development with USAID or its implementing partners.

[5] Additional details: https://www.nutritioninnovationlab.org/what-we-do/human-institutional-capacity-building, accessed September 4, 2018.

[6] Scaling Up Nutrition, http://scalingupnutrition.org/, accessed August 29, 2018.

[7] USAID Office of Nutrition. "VOLAG Nutrition Capabilities Project Paper." Washington, D.C.: USAID, 1978, (DEC # pdaac477f1); op. cit. USAID, "Summary of A.I.D's Nutrition Programs," which on pages 11-13 briefly describes 16 activities the voluntary agency (VOLAG) grantees undertook with USAID support to strengthen their capabilities.

[8] "Nutrition Reference Guide" and "Nutrition Program Design Assistant: A Tool for Program Planners Vol. 2," Core Group, Nutrition Working Group. Washington, D.C.: Core Group, 2017. https://coregroup.org/resources/library/?_sft_resource-library-type=nutrition

[9] L.I.F.E. consortium members were the American Association of Cereal Chemists, American Chemical Society, American Institute of Nutrition, American Oil Chemists' Society, Institute of Food Technologists, Volunteers for International Technical Assistance, American Institute of Chemical Engineers, American Society of Agronomy, and American Institute of Agricultural Engineers. It operated until 1986.

[10] "L.I.F.E. Annual Report 1969/70." Washington, D.C.: League for International Food Education (L.I.F.E.), 1970. (DEC # pnaad038); "L.I.F.E. Annual Report 1976/77." Washington, D.C.: League for International Food Education (L.I.F.E.), 1977. (DEC # pnaad037)

[11] Gibbons, G. "Information for Action: The Clearinghouse Project" Development in Practice, 8(1): 79-85, February 1998, http://www.jstor.org/stable/4028867.

[12] Ibid.