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# Linking Nutrition and Health: Progress and Opportunities

by Rebecca J. Vander Meulen, M.P.H. and Noreen Mucha, M.P.A.

UN Photo/Kibae Park

## Key Points

- Good nutrition, particularly in early childhood, is critical to positive health outcomes and achieving the U.N. Millennium Development Goals, particularly Goals 4, 5, and 6. Studies indicate that children who survive undernutrition during the 1,000 days between pregnancy and age two are more vulnerable to disease. Undernutrition undermines the effectiveness of life-saving medicines.
- A new global consensus on high-impact, evidence-based, and cost-effective nutrition interventions has been supported by high-level U.S. and global political commitment to scale up nutrition.
- The U.S. Global Health Initiative offers an important opportunity to increase and leverage health investments to support country-owned strategies to improve nutrition outcomes. Scaling up nutrition interventions through health programs can multiply the impact of investments in priority areas such as HIV/AIDS, malaria, water, sanitation, and hygiene.

*Rebecca Vander Meulen is director of community development, Diocese of Niassa, Mozambique.*
*Noreen Mucha is a nutrition consultant with Bread for the World Insititute.*

**Bread for the World Institute** provides policy analysis on hunger and strategies to end it. The Institute educates its network, opinion leaders, policy makers and the public about hunger in the United States and abroad.

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## Abstract

In the last few years, there has been an unprecedented global effort to scale up maternal and child nutrition. The effort is prompted by increasing recognition of the devastating and largely irreversible impact of undernutrition on children in the 1,000-day window from pregnancy to age two—and by a growing consensus on a set of evidence-based, cost-effective nutrition interventions. The United States has been a leader in the global effort and has made maternal and child nutrition improvements a primary objective of its Feed the Future and Global Health initiatives.

Nutrition has been an issue neglected for far too long, so the recent attention to maternal and child nutrition creates a unique opportunity to make progress. Scaling up and making meaningful, measurable progress against malnutrition will require both additional resources and new ways of working. It will mean supporting national nutrition strategies that are country-owned and -driven, ensuring coordination across sectors to improve nutrition outcomes, and investing in human and institutional capacity to scale up at the global and country levels. Leveraging linkages among nutrition, health, and agriculture sectors can significantly increase the benefits of nutrition investments.

| Key Terms and Definitions | |
|---|---|
| **Intervention** | An intervention[1] is a purposely-planned action designed with the intent of changing a nutrition-related behavior risk factor, environmental condition, or aspect of health status for an individual, a target group, or a population at large. If implemented at scale, the intervention could significantly reduce the effects of maternal and child undernutrition. Effective interventions are available to reduce underweight, stunting, micronutrient deficiencies, and child deaths.[2] Nutrition interventions are actions within greater nutrition, health, and agriculture programs. |
| **Malnutrition** | Malnutrition is the state of being poorly nourished,[3] whether undernourished or obese. Malnutrition is not merely having too little or too much food. Malnutrition associated with hunger is caused by a combination of factors: insufficient protein, energy, and micronutrients; frequent infections or illnesses; poor care and feeding practices; inadequate health services; unsafe water and/or lack of improved sanitation. |
| **Stunting** | Stunting.[4] Low height for age or height for age more than a standard deviation of 2 below the median value of the reference (healthy) population. |
| **Wasting** | Wasting.[5] Low weight for height or weight for height more than a standard deviation of 2 below the median value of the reference (healthy) population |
| **Undernutrition** | Undernutrition[6] is the outcome of insufficient food intake and repeated infectious diseases. Being underweight for one's age, too short for one's age (stunted), dangerously thin for one's height (wasted), and/or deficient in vitamins and minerals (micronutrient malnutrition) are all classed as undernutrition. Undernutrition[7] can be identified by anthropometric indices (underweight, stunting, and wasting) and/or by the missing micronutrients in poor quality diets. |
| **Underweight** | Underweight.[8] Low weight for age or weight for age more than a standard deviation of 2 below the median value of the reference (healthy) population. |

## Global Political Momentum for Nutrition: Why Now?

For the first time in decades, there are efforts at the global level to make progress against hunger and malnutrition by scaling up proven nutrition interventions. The global food price crisis in 2007-2008 was a wake-up call to many governments, refocusing high-level political attention on hunger and food insecurity. The crisis and its aftermath present an opportunity to reverse decades of neglect of agricultural development. Continuing food price volatility has also helped keep the focus on the need for policy improvements and advocacy and for better implementation and integration of nutrition into other programs.

Several key factors led to the renewed focus on nutrition we see today:

### 1. New Evidence about the Impact of Undernutrition—Combined with a Growing Consensus on a Set of Cost-Effective Nutrition Interventions.

In January 2008, the respected British medical journal *The Lancet*[9] ran a series of articles on the consequences of maternal and child undernutrition. The series highlighted scientific evidence of the impact of undernutrition in the 1,000-day window from pregnancy to age two on child survival and on health, as well as on physical and cognitive development. The series emphasized a set of cost-effective nutrition interventions to improve the nutritional status of young children.[10] Researchers urged immediate action in the 36 "high-burden" countries[11] that are home to 90 percent of the world's stunted children. *The Lancet*'s timely contribution to the knowledge base on maternal and child malnutrition helped focus attention on the consequences of the sudden spike in food prices in 2008—the risks to vulnerable populations in general and to young children and pregnant women in particular.

A detailed economic and health outcome analysis in the Copenhagen Consensus (2008) document also underscored the importance of focusing on key cost-effective interventions to improve nutrition. These are reflected in the Essential Nutrition Actions—seven types of affordable, proven nutrition interventions that can be delivered at health facilities and communities to improve the nutritional status of women and children.[12] They include supplementation of micronutrients such as vitamin A and iron and fortification of common foods. Universal salt iodization, for example, costs only $.05 per person per year, yet protects large numbers of children from brain damage since iodine deficiency is a leading cause of intellectual disability. See Table 1 on page 16 for a complete list of evidence-based nutrition interventions highlighted in *The Lancet* series, their targeted populations, and estimated cost per intervention.

The growing body of evidence on cost-effective nutrition interventions and implementing frameworks/actions thus lays the groundwork for national scale up supported through the global and U.S. initiatives described below:

## 2. Global Action and Coordination on Nutrition

- The **Scaling Up Nutrition (SUN) Movement** builds on the momentum created by the series in *The Lancet* and the growing response to the global food price crisis. The SUN movement is a collaborative process that provides principles and direction for increased support for countries as they scale up their efforts to tackle maternal and child undernutrition across a range of sectors and stakeholders (developing countries, donors and multilateral institutions, civil society organizations, academic institutions, and the private sector). The SUN movement's main role is to empower and support action at country level by mobilizing resources, aligning efforts, and supporting leadership and advocacy at the international level. The Scaling Up Nutrition *Framework for Action*, released in April 2010, has been endorsed by more than 100 organizations. The SUN Framework[13] helped establish a consensus on how best to ensure significant and sustained reductions in undernutrition during the 1,000-day window. The Framework advocates both nutrition-sensitive and nutrition-specific interventions in addition to emphasizing the need for long-term advocacy and mobilization for action. The nutrition-sensitive interventions seek to promote adequate nutrition as the goal of national development policies in agriculture, food security, social protection, health, education, rural development, and emergency programs. Nutrition-specific interventions have nutrition improvement as their primary goal.

  The Scaling Up Nutrition Roadmap, published in September 2010, makes the case that government leaders and development partners should build political will and take action to improve nutrition. It also identifies investments that have been shown to work well when implemented within the context of nutrition-focused development policies. SUN encourages the participation of multi-sectoral stakeholders to rapidly scale up effective, evidence-based actions at the country level.[14]

- **1,000 Days Partnership:** During the U.N. summit on the Millennium Development Goals (MDGs) in September 2010, Secretary of State Hillary Clinton and her Irish counterpart launched the 1,000 Days: Change a Life, Change the Future[15] Partnership. The 1,000 Days effort is intended to catalyze action on SUN in countries that express a commitment to scale up maternal and child nutrition—with the goal of achieving measurable results during the 1,000-day period September 2010 to June 2013.

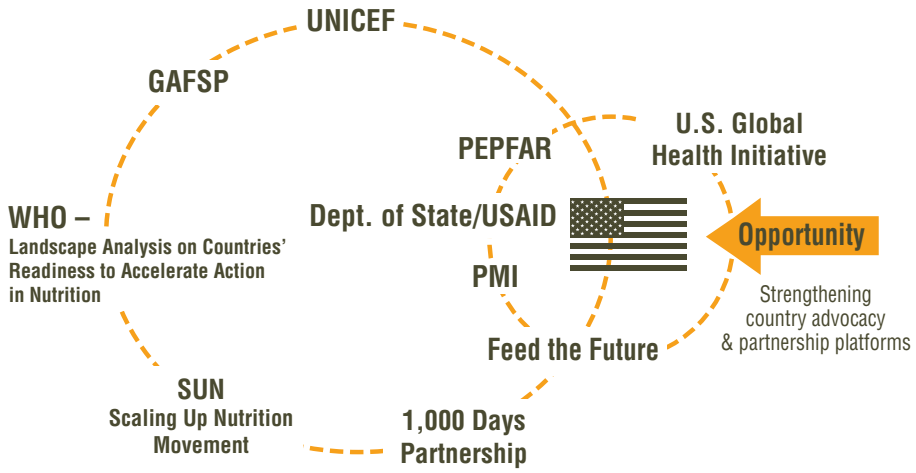
- **Leadership at the country level:** As of December 2011, 22 countries, including a majority of the 36 nations with the highest rates of childhood stunting, had identified themselves as SUN countries.[16] SUN countries have begun to develop individual national nutrition strategies that include nutrition-specific and nutrition-sensitive action items. Each government has appointed a high-level representative to coordinate the implementation of the strategy across ministries. In addition, countries are establishing working groups to coordinate actions among key stakeholders, including representatives of the government, donors, development banks, international organizations, civil society, and business. Malawi and Ghana have now launched formal SUN and 1,000 Days initiatives.

## 3. Political Will and Commitment to Prioritize Maternal and Child Nutrition in U.S. Foreign Assistance Programs

Over the past three years, the U.S. government has provided high-level political support and pledged additional resources for nutrition. These efforts include using U.S. leadership to leverage resources from other donors, integrating nutrition into other sectors, and confronting some of the key barriers to scaling up as needed to achieve the MDGs.

In 2009, an early priority for the Obama administration was responding to the significant rise in hunger caused by

Figure 1 **Building Country Scale-Up Platforms for Nutrition through Global Initiatives**




**An Opportune Time for U.S. Government (USG) Nutrition Scale Up:** The significant increase in global multi-lateral nutrition efforts is an opportune time for the USG to concentrate resources and efforts for integrated, country-owned nutrition programs at scale.

Margaret W. Nea

rapid spikes in the prices of staple foods. In addition to increasing U.S. development assistance for agriculture, the administration was instrumental in forging an agreement to launch a global food security initiative at the G-8 Summit in L'Aquila, Italy. The L'Aquila Food Security Initiative[17] is a three-year commitment of $22 billion by the G-8 countries to increase investment in smallholder agriculture and food security.

In a 2010 speech[18] at CARE's annual conference, Secretary of State Hillary Rodham Clinton made a strong case for increasing U.S. government investments in maternal and child nutrition:

*"More than 3 million children and 100,000 mothers die every year from causes related to under-nutrition, which weakens immune systems, makes people susceptible to other health problems such as anemia, which is a leading contributor of maternal mortality, and pneumonia, which is the leading cause of death for children worldwide.*

*Under-nutrition impairs the effectiveness of life-saving medications, including the antiretrovirals needed by people living with HIV and AIDS. And the effects of under-nutrition linger for generations. Girls stunted by under-nutrition grow up to be women who are more likely to endure, if they survive, difficult pregnancies. And then their children, too, come into life undernourished....*

*Nutrition plays the most critical role in a person's life during a narrow window of time–the 1,000 days that begin at the start of a pregnancy and continue through the second year of life. The quality of nutrition during those 1,000 days can help determine whether a mother and child survive pregnancy and whether a child will contract a common childhood disease, experience enough brain development to go to school and hold a job as an adult.*

*The science of nutrition points to a strategy. If we target that brief critical period during which nutrition has the biggest impact and focus on improving nutrition for expectant mothers, new mothers, and young children, we can accomplish several things at once. We can save lives, we can help children start life on a better path, and we can bolster economic development and learning down the road."*

Improving maternal and child nutrition are primary objectives of the U.S. government's Global Hunger and Food Security–Feed the Future (FTF) initiative–and Global Health Initiative (GHI). Both initiatives include nutrition indicators as measures of progress.

- The Global Health Initiative supports partner countries in strengthening their health systems to better fight infectious disease and improve nutrition, maternal and child health, and access to safe water, with a particular focus on improving the health of women, newborns, and children. GHI is a multi-sectoral initiative that encompasses integrated interagency programming in health; it complements more specialized efforts such as the President's Emergency Plan for AIDS Relief (PEPFAR), Feed the Future, the President's Malaria Initiative, and Maternal and Child Health (MCH) programs. Among the goals of GHI is reducing child malnutrition by 30 percent in its target countries, to be accomplished by scaling up immediate high-impact nutrition interventions, expanding medium-term interventions, and tackling longer-term systems issues. The U.S. Agency for International Development (USAID) has identified 17 core countries where 80 percent of the Global Health & Child Survival funding mechanism nutrition resources will be invested. Finally, in line with the SUN Framework and Roadmap, the United States has identified "early riser" countries[19] for improved joint donor collaboration and financing mechanisms.
- The launch in 2010 of Feed the Future demonstrates renewed commitment to agricultural development and food security–and offers an opportunity to supplement existing programs with new resources through a more integrated nutrition approach. FTF focuses on reducing global poverty and hunger through fostering sustainable growth in the agricultural sector and improving the nutritional status of women and children in the focus countries.[20] The focus countries were chosen on the basis of their burden of malnutrition, prevalence and characteristics of poverty, commitment to improving nutrition, and opportunities for agriculture-led growth.

Table 2 (page 17) lists important recent milestones in global efforts to devote more attention and resources to nutrition.

## 4. Advancing the Millennium Development Goals by Improving Nutrition

Meeting the MDGs requires immediate coordinated nutrition intervention implementation at scale. Malnutrition remains the single largest cause of child mortality—an estimated 35 percent of child deaths are due to malnutrition.[21,22] If all children under the age of five were well nourished, seven fewer children would die every minute.[23] Since nutrition and health are fundamentally linked, efforts on **MDG 1: Eradicate extreme hunger and poverty** contributes to achieving **MDG 4: Reduce child mortality**. Figure 2 below outlines how the MDGs relate to the burden of undernutrition.

It is an ideal time to take action on nutrition. The push to make progress on the MDGs by 2015 and the political leadership and conditions that have created momentum to scale up nutrition make this a unique moment. It is critical that all stakeholders work together to ensure that this opportunity leads to improved nutrition around the world, especially for pregnant women, mothers, and young children in the 36 high-burden countries. This will require new partnerships and new ways of working together. The effort will also require additional resources to scale up cost-effective multisectoral nutrition programs—particularly in the health and agriculture sectors.

## Opportunities: Key Areas of Integration for Nutrition

Agriculture, nutrition, and health are linked in important ways, but the three sectors rarely work together toward their common goals. The agriculture, water, sanitation, and education sectors have the potential to serve alongside health sector services as important platforms for the delivery of nutrition education and efforts to promote good nutrition practices. One of the key lessons learned from decades of work in nutrition is that improving undernutrition on a large scale requires a comprehensive effort that involves all sectors. This is the approach the Global Health Initiative and Feed the Future are pursuing.

Figure 2 **Impact of Undernutrition Interventions on Millennium Development Goals**

*(Adapted from Scaling-Up Nutrition: A Framework for Action—September 2010)*


**Eradicate Extreme Poverty and Hunger**

Reducing "prevalence of underweight children under five years of age" is an agreed target for MDG 1. Reducing undernutrition boosts economic growth.


**Achieve Universal Primary Education**

Reducing undernutrition promotes individuals' cognitive development, contributes to learning, and raises school completion rates.


**Promote Gender Equality and Empower Women**

Promoting better nutrition practices contributes to empowering women and to reducing discrimination against girls when food is allocated through family feeding decisions.


**Reduce Child Mortality**

Lower undernutrition levels have an enormous impact on child mortality.


**Improve Maternal Health**

Maternal nutrition is improved and maternal mortality reduced through iron and folic acid supplementation and behavior change programs.


**Combat HIV/AIDS, Malaria, and Other Diseases**

Improved nutrition reduces maternal and child mortality caused by the interaction of undernutrition with HIV/AIDS and other infectious diseases.


**Ensure Environmental Sustainability**

Better nutritional practices mean more effective use of the food that is available and better adaptation to environmental stress (Target 7A), increased health benefits from improved access to water and sanitation (Target 7C), and improvement in the lives of slum dwellers (Target 7D).


**Global Partnership for Development**

Reducing hunger and malnutrition around the world is a key element of and argument for a global partnership for development. This applies particularly to the least developed countries (Target 8B), whose levels of undernutrition are highest.

The following sections highlight key areas of opportunity to integrate evidence-based nutrition interventions into GHI, FTF, and other bilateral programs, particularly in the critical 1,000-day "window of opportunity" (from pregnancy to two years old).

UN Photo/Martine Perret

"We have to do a better job of building nutrition outcomes into programs across all relevant sectors. So water, sanitation, hygiene programs, health programs and agriculture programs... should all be cross-linked."

– Dr. Rajiv Shah, Administrator, U.S. Agency for International Development, June 29, 2010, at the Statesmen's Forum, Center for Strategic and International Studies, Washington, DC

## Improving Nutrition Outcomes through the Health Sector

Integrating targeted nutrition interventions into maternal and child health programs is essential. Good maternal health and nutrition are important contributors to the survival of both mother and child and promote women's overall health, productivity, and well-being. Maternal and child undernutrition contributes to more child deaths—3.5 million—every year than any other cause. More than a third of child deaths—and 11 percent of the total global burden of disease—are due to maternal and child undernutrition.[24] Thus, nutrition is essential to reaching **MDG 4: Reduce Child Mortality** and **MDG 5: Improve Maternal Health**. The health sector—through prenatal/postnatal care and community-based integrated management of childhood illnesses—is currently the main platform used to deliver nutrition services. A number of factors can lead to missed opportunities to integrate and mainstream nutrition in facility-based and community health services. Barriers include a lack of national nutrition standards, protocols, and training curricula; insufficient staff with up-to-date training and inadequate access to appropriate education materials.

### Improving Maternal Nutrition Status

Malnutrition in a mother hampers her baby's nutrition and health. Nutrition in children under five years old depends critically on the nutritional status of their mothers during pregnancy and lactation. Pregnant women need an additional 500-700 calories a day[25] as well as extra protein and vitamins. Women who are underweight before pregnancy and who gain little weight during pregnancy are particularly likely to give birth to babies with low birth weight, who are more likely to die as newborns than babies born at a healthy weight. Improving maternal nutritional status throughout the reproductive life cycle shows the most promise for reducing child deaths and future disease burden. Interventions include nutrition education, breastfeeding promotion, and micronutrient interventions including iron folate, vitamin A, and zinc supplementation—all of which can be integrated into existing health programs. Integrating nutrition counseling into health service delivery is cited as an essential action for postnatal care.[26]

### Micronutrient Malnutrition

Micronutrient malnutrition, also known as "hidden hunger," is a growing public health problem in developing countries caused by a lack of essential vitamins and minerals (e.g., vitamin A, zinc, iron, iodine) in the diet.[27, 28] As food prices continue to rise and people are forced to reduce their food consumption, particularly of more nutritious foods, micronutrient malnutrition will undoubtedly increase. The body needs vitamins and minerals in small quantities to conduct and regulate various functions and processes, but micronutrient deficiencies are not usually obvious. Many times, people who have them may not experience any discomfort or hunger. However, the consequences of micronutrient malnutrition are serious if it is not treated. Both mothers and babies benefit from interventions that treat malnutrition and correct nutritional deficiencies during pregnancy. Micronutrient interventions at scale are essential to reduce mortal-

"Of available interventions, counseling about breastfeeding and fortification or supplementation with vitamin A and zinc have the greatest potential to reduce the burden of child morbidity and mortality."

– *The Lancet* Series on Maternal and Child Undernutrition, 2008

ity and morbidity in developing countries and achieve the MDGs where micronutrient deficiencies are common.

- **Vitamin A Deficiency—Prevention and Control in Women and Children**

Vitamin A is necessary for good immune function and for better recovery from diseases such as malaria and measles.[29] Vitamin A deficiency is a major contributor to the mortality of children under five; vitamin A supplementation enhances children's resistance to disease and can reduce mortality from all causes by approximately 23 percent.[30] Yet globally, more than a third of preschool-age children are vitamin A deficient.[31] Prevention and control of such deficiencies improve a child's chances of survival, reduce the severity of childhood illnesses, ease the strains on health systems and hospitals, and contribute to the well-being of children and their families and communities. Children at risk should receive at least one high-dose vitamin A supplement between the ages of 6–59 months.[32] Evidence suggests that vitamin A supplementation is a good strategy for children living in malaria-endemic regions.[33] Malaria prevention and control efforts such as the U.S. President's Malaria Initiative should integrate campaigns to distribute vitamin A supplements and strengthen links with agriculture programs to promote the production and consumption of crops rich in vitamin A (such as orange-flesh sweet potatoes).

The United Nations Children's Fund (UNICEF) and the World Health Organization (WHO) also recommend high-dose vitamin A supplementation for women in the immediate post-partum period, coupled with exclusive breastfeeding, so that all infants receive the necessary immune-boosting protection of vitamin A in the first six months of life.[34] These postnatal supplement also help replenish the mother's own stores of vitamin A, which are depleted during pregnancy and lactation. MCH services and platforms such as postpartum and neonatal care, family planning, and preventing mother-to-child transmission of HIV should be leveraged for opportunities to counsel women on the importance of vitamin A supplementation and distribute the supplements.

Vitamin A efforts can be integrated into maternal and child health services by providing supplements during routine expanded programs on immunization every six months for children ages 6–59 months and by targeting for supplementation people in the following categories: pregnant women and children with night blindness, measles, or acute diarrhea lasting more than 14 days; children older than 24 months with either severe or moderate acute malnutrition. To complement these targeted efforts, mass fortification of sugar and vegetable oil with vitamin A is also very effective.

Khaled Sadiq/Photoshare

**A young boy receives a Vitamin A application during National Immunisation Days in Mazar-i-Sharif, Balkh province, Afghanistan.**

- **Zinc Supplementation**

Zinc supplementation is another highly cost-effective nutrition intervention. It improves children's ability to recover from conditions such as diarrhea, pneumonia, malaria, and respiratory infections and boosts their general immunity and growth.[35] Promoting—and, further, institutionalizing—preventative and therapeutic zinc supplementation can reduce both child mortality and stunting. Since zinc deficiencies put children at increased risk of illness or death, it is natural to integrate zinc supplementation into the management of child illnesses. Zinc supplementation for diarrhea in children should be paired with distribution of oral rehydration salts within maternal and child health services as well as services for orphans and vulnerable children. Strong donor support and advocacy is needed to encourage national governments to adopt national zinc supplementation policies and persuade Ministries of Health to include zinc in their diarrhea management policies. Once a government categorizes zinc as an essential medicine, the country may also need substantial support to procure sufficient quantities of zinc locally.

- **Iron Deficiency Anemia Prevention and Control**

Micronutrient deficiencies are a major contributor to high rates of maternal anemia—and to maternal mortality. Anemia[36] is a condition in which a person's blood contains too few red blood cells. One of the primary

causes of anemia—affecting about a quarter of women and children[37] worldwide—is iron deficiency. Iron deficiency is also the most common micronutrient deficiency and a common form of undernutrition. It affects cognition and a person's ability to maintain attention. Anemia disrupts children's intellectual development; scores on intelligence tests have been shown to decrease along with red blood cell levels.[38]

Preventing iron deficiency anemia requires early, routine iron supplementation for pregnant and postpartum women, children under two, and preterm or low birth weight babies. It also includes promoting consumption of iron-rich foods and iron-fortified foods and explaining how to avoid consuming foods that inhibit iron absorption (such as coffee and tea). Maternal anemia can be reduced through maternal iron and folic acid supplementation campaigns.[39] To help control anemia, women should receive de-worming medication during routine prenatal visits and children should begin treatment at 12 months.

- **Iodine Deficiency and Universal Salt Iodization**

A third top-priority Copenhagen Consensus cost-effective nutrition intervention is micronutrient fortification—primarily iodizing salt and fortifying basic food items with iron.[40] Iodine is required for the production of thyroid hormones, which are essential for normal brain development. Inadequate levels of iodine during pregnancy, particularly in the earliest stages of pregnancy, causes irreversible brain damage,[41] often severe, in the child. Communities with chronic iodine deficiency show a significant population-wide loss of intelligence quotient points.[42] Severe iodine deficiency may have visible signs such as thyroid goiter; however, many people suffer from iodine deficiency without exhibiting such signs. When goiter is observed in a population, it's likely to be the "tip of the iceberg," suggesting community-wide iodine deficiency.

Iodine deficiency tends to be concentrated in geographic areas where there is little iodine in the diet—typically remote inland areas where no marine foods are eaten. Iodine deficiency can be prevented through mass fortification and distribution of iodized salt or iodine supplements to pregnant and lactating women as part of routine maternal and child health services in targeted regions. Strong evidence indicates that universal salt iodization[43] is a feasible and highly cost-effective intervention to control iodine deficiency.[44] Small local salt farmers can contribute effectively to the iodization effort; it is also important to support national-level systems to ensure that sufficient high-quality iodized salt is produced and distributed.

Sara A. Holtz/Photoshare

**A woman sells salt at a weekly market in Affem Boussou, Togo. Universal salt iodization is a cost-effective intervention to control iodine deficiency.**

## Promoting Optimal Infant and Young Child Feeding

Optimal infant and young child feeding is an effort that begins during pregnancy and continues through at least the first two years of life. Although breast milk is low-cost, the "gold standard" in infant nutrition, and available to nearly all newborns, many mothers do not breastfeed exclusively (giving no other food or drink). In fact, only 37 percent of the world's babies are exclusively breastfed for the recommended first six months.[45] Yet exclusive breastfeeding is critically important—partial or no breastfeeding is associated with a more than doubled risk of death[46] in the first few months of life. Efforts to promote breastfeeding and appropriate complementary foods (for older babies) have well-established effects on child survival and nutritional status.[47] Education, counseling, and behavior change campaigns should support exclusive breastfeeding for the first six months, continued breastfeeding for two years or more, and feeding of nutritionally adequate, safe soft, semi-solid, and then solid foods starting in the sixth month. The period from 6-12 months, when breast milk provides only about half the nutrients that a baby needs, is often when babies stop growing adequately.[48] All

maternal and child health services as well as community services that target women should incorporate support for optimal infant and young child feeding.

The Baby Friendly Community Initiative is a cost-effective effort[49] to help ensure that all maternity wards, whether free-standing or in a hospital, become centers of breastfeeding support.[50] The initiative can be integrated into health services to offer 10 easy steps for successful breastfeeding that promote child growth and maternal nutrition and reduce morbidity. It emphasizes proper nutrition using locally available high-nutrient foods, active feeding especially when a child is ill, and maternal micronutrient supplementation when necessary.

Optimal breastfeeding requires accurate knowledge of infant nutritional needs. Effective education and messages on breastfeeding and safe complementary foods can be integrated into maternal and child health services. In some parts of the world, there is a misperception that breast milk alone is not enough in the first few months, while in many developing countries, complementary foods are porridges with little nutritional value.[51] Families may also be unable to ensure that foods are prepared with safe water. Many studies report that the incidence of diarrheal diseases is especially high after weaning is initiated; these illnesses can be the result of preparing weaning foods under unhygienic conditions.[52] Of course, effective breastfeeding also requires access—if a mother works far from home, her baby will not be able to nurse as needed.

Richard Lord

**Optimal infant and young child feeding practices are important in the 1,000-day window of opportunity to prevent irreversible damage from malnutrition.**

## Management of Moderate Acute Malnutrition (MAM) and Severe Acute Malnutrition (SAM)[53]

As mentioned earlier, malnutrition is the single largest cause of child mortality, responsible for an estimated 35 percent of childhood deaths.[54, 55] Child survival efforts in developing countries have focused disproportionately on managing infectious diseases rather than eliminating malnutrition.[56] While prevention of maternal and child malnutrition is extremely important, as discussed in the previous sections, early treatment of children with moderate (MAM) or severe (SAM) acute malnutrition is also essential. MAM is defined as weight for height between two and three standard deviations below the median WHO growth standards. SAM[57] is defined by either a very low weight for height (more than three standard deviations below the median), visible severe wasting, or nutritional edema (an observable swelling in certain parts of the body).

Children suffering from chronic protein-energy malnutrition become "stunted"—shorter than they should be for their age. In developing countries, 32 percent of children under five years old are stunted. "Wasting" occurs when children suffer acute food shortages (as during a famine) and therefore weigh less than they should for their height. Despite improved clinical health services, many hospitals still report malnutrition mortality rates of 20 to 30 percent—similar to mortality rates of the 1950s.[58] Though the risk of death is greater for children with SAM, it is important to note that around the world, more children die from moderate malnutrition than from severe malnutrition.[59] To meet the MDG 4 indicator of cutting child mortality in half, nutrition programs must reach all clinically malnourished children, not only those with SAM.

Preventing needless deaths means that MAM and SAM must be detected and addressed early through all existing heath services—from prenatal care and maternity wards to community health programs for vulnerable households and efforts to prevent mother-to-child transmission of HIV. Scaling up training and education efforts to treat MAM and SAM must be a top priority of the child survival agenda.

## Scaling Up Nutrition Assessment, Counseling, and Support (NACS)

The successful Nutrition Assessment, Counseling, and Support (NACS) approach—originally developed as a way to

Peggy Koniz-Booher

**Assessing nutritional status with Mid-Upper Arm Circumference (MUAC) is a relatively easy and cheap way to rapidly screen/assess for acute malnutrition and a good predictor of immediate risk of death. A volunteer or health extension worker can easily use MUAC in the community and it has been proven to increase the routine assessment and nutritional categorization of clients.***

* Bergmann, Heather, and Maryanne Stone-Jiménez. 2011. NuLife—Food and Nutrition Interventions for Uganda: Nutritional Assessment, Counseling, and Support. Arlington, VA: USAID's AIDS Support and Technical Assistance Resources, AIDSTAR-One, Task Order 1.

integrate nutrition into HIV services—can be scaled up to integrate nutrition into clinical and community health services and thus, rapidly expand access to nutrition services. Screening a child's growth and nutritional status[60] and advising parents based on the results should be part of routine primary health care rather than an isolated activity. Similarly, treatment for childhood illnesses such as pneumonia or diarrhea should include not only the appropriate antibiotics but also the appropriate nutritional assessment counseling, education, and support to help the child recover quickly and avoid new infections. NACS helps detect and treat malnutrition and supports prevention practices such as optimal infant feeding and correction of micronutrient deficiencies.

The NACS approach also provides specialized food—therapeutic foods (for SAM) and supplementary foods (for MAM). These are nutritionally dense, fortified food products that treat acute malnutrition and are prescribed as medicine. Now with the availability of lipid-based ready-to-use therapeutic foods such as the peanut butter-based Plumpy'nut, which do not require preparation at home and are less susceptible to bacterial contamination than milk-based foods, children can often be treated at home. This can reduce expenses, ease overcrowding in hospitals, and lessen the strain on mothers, who must often forego income and leave their other children unattended to stay with a hospitalized child.[61, 62] Additionally, prescribing lipid-based therapeutic foods in health facilities has been proven to dramatically improve nutritional status and quality of life for patients.[63]

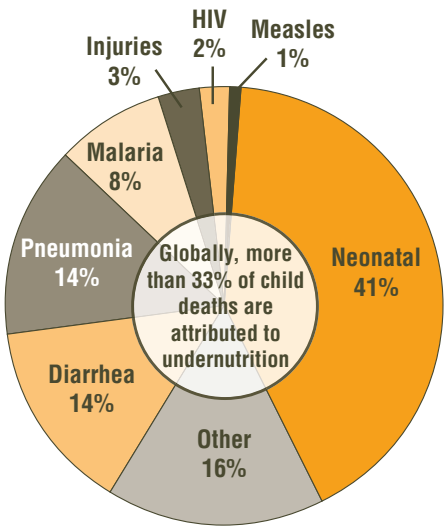
## Malnutrition, Illnesses, and Infectious Diseases

A healthy immune system protects a person from the majority of infectious diseases, but malnutrition weakens the immune system. Undernutrition increases both susceptibility to and severity of common illnesses and infectious diseases. Infectious diseases—particularly diarrhea, malaria, and respiratory illness—also contribute to stunting of children under two. Complications of seemingly minor illnesses are more common. Since malnutrition often affects the way infections manifest themselves—for example, fast breathing is a common symptom of pneumonia, but malnourished children can have pneumonia without fast breathing[64]—health workers may need specialized training to provide the correct treatments.

Many different types of infections (e.g., bacterial, viral, intestinal) make the body less able to absorb nutrients. Studies have shown that children with diarrhea can absorb as much as 40 percent less of the protein they consume than healthy children.[65] Poor absorption leads to malnutrition, which in turn increases a child's susceptibility to infection.[66, 67, 68, 69, 70, 71] This vicious cycle generally cannot be broken through diet alone; medical treatment of the infection is also needed. In addition, more and more research is showing that even if a child survives very early malnutrition, his or her risk of non-infectious diseases is higher later in life. For example, children who are malnourished in the first two years of life and put on weight rapidly later are at high risk of chronic diet-related diseases.[72] Figure 3 shows that more than one-third of child deaths are attributable to undernutrition.

Figure 4 shows that the relative odds of death from diarrhea, pneumonia, malaria, and measles are higher

Figure 3 **Major Causes of Death in Children Under Five and the Contribution of Malnutrition (2008)**



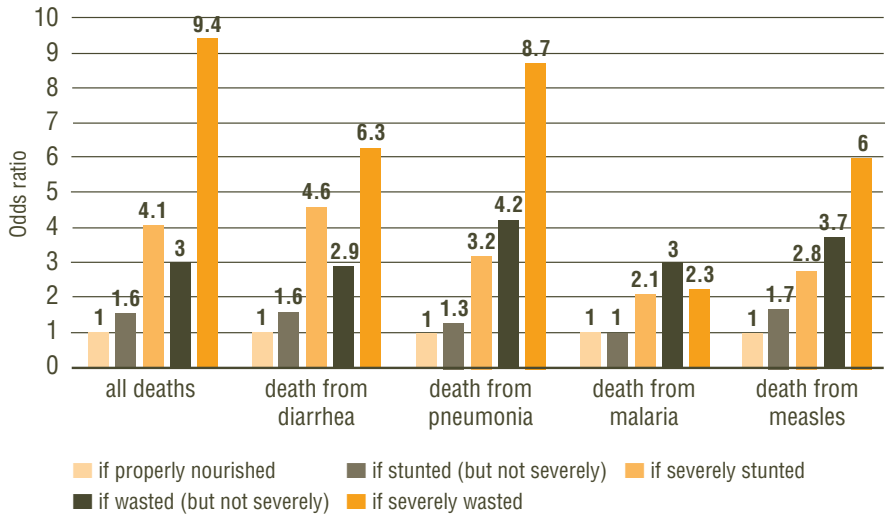

Source: WHO/Child Health Epidemiology Reference Group (CHERG) estimates presented in *The Lancet*, June 2010.

NOTES: The major causes of under-five mortality include common preventable or treatable diseases such as malaria, measles, diarrhea, and pneumonia. Malnutrition increases children's vulnerabillity to these conditions.

for children under five who are malnourished than for those who are not.[73] Thus, improving early childhood nutrition can also help meet **MDG 6: Combat HIV/AIDS, Malaria, and Other Diseases.**

People's ability to fight diseases and infections such as HIV and malaria is also influenced by their nutritional status. Infections and malnutrition exacerbate each other, potentially creating a vicious spiral into ill health and ultimately death.[74] Good nutrition, on the other hand, may contribute to slowing the progression of diseases and can optimize the benefits of drugs used to treat the diseases. For those who are living with HIV—especially small children—good nutrition is key to recovery from opportunistic infections.[75]

Figure 4 **Relative Odds of Death for Children Under Age 5, Based on Nutritional Status**




Source: *The Lancet* (2008).

## Parasite Control

Parasitic infections exacerbate undernutrition, and vice versa. For example, intestinal worms can cause iron-deficiency anemia by feeding directly on the blood of their host.[76] Controlling parasites requires measures such as preventing malaria and providing education on preventing hookworms, as well as more direct treatment of parasitic infections. Vaccination campaigns and community outreach health services provide platforms to deliver deworming treatments.

Pregnant women should benefit from active parasite prevention—especially malaria prevention—since malaria during pregnancy contributes to infant mortality. Malaria prevention and control programs should prioritize correct diagnosis and treatment of malaria according to national protocols and ensure availability and adherence to anti-malarial medications for all pregnant women. For example, Intermittent Preventive Treatment is a full therapeutic dose of an anti-malarial drug given to pregnant women at specified intervals in the second and third trimesters. Insecticide-treated nets should be promoted and distributed for increased access and use, especially by pregnant women and young children.

## Water, Sanitation, and Hygiene

Water, sanitation, and hygiene programs are key to preventing intestinal parasites and other diseases associated with contaminated water or poor hygiene. Malnutrition-associated diarrheal infection can be addressed by integrating such programs with health and nutrition programs. Facilities providing potable water and good sanitation can dramatically improve nutrition. However, such improvements are significantly undercut when individual households are unable to store water safely. *The Lancet* series on maternal and child undernutrition found that sanitation and hygiene interventions that reached a high proportion of the target populations reduced the prevalence of diarrhea and, in turn, stunting. Diarrheal diseases and related malnutrition account for virtually all of the deaths and nearly 90 percent of the overall disease burden associated with unsafe water supplies and inadequate sanitation and hygiene.

# Agriculture, Health, and Nutrition Linkages

Volatile food prices, increased food insecurity, and hunger emergencies—including famines—have led to an increased focus on global agriculture interventions. Developing countries generally face seasonal variations in food availability—"hunger seasons" are common in some areas. Hunger or risk of hunger is linked, of course, to physical and emotional suffering. Food insecurity compromises dietary quality and nutritional status. Hunger and food insecurity disproportionately affect vulnerable populations such as women, children, and people living with HIV/AIDS. The damage to children from food insecurity is particularly worrisome since adequate nutrition is vital to children's physical and cognitive health and development.

USAID defines food security[77] as: "When all people at all times have both physical and economic access to sufficient food to meet their dietary needs in order to lead a healthy and productive life." This definition of food security has three components—food must be available, accessible, and actually consumed. Food security can only be achieved if a

UNHCR/H. Caux

The high-prevalence of child malnutrition is one of the most significant pieces of evidence available that food insecurity has been a sustained problem.

wide variety of foods are available in local markets or fields, people have enough money or assets to purchase a variety of foods (access), and food is eaten in an environment that has clean water and good sanitation and health services (utilization).

The fact that good nutrition and health outcomes are inextricably linked with access, utilization, and consumption of food means that nutrition and health initiatives must work more effectively with the agriculture sector. While Feed the Future and the GHI both seek to improve children's nutritional status, GHI's nutrition goals depend on Feed the Future programs' success in making sufficient nutritious food more available and accessible. Agriculture interventions themselves are essential but not sufficient to improve nutrition. Rather, Feed the Future and GHI must integrate their programs with these interventions to achieve common goals and improve nutritional outcomes in food security and agriculture programs.

### Food Fortification

Micronutrient food fortification is fortification of staple foods with vitamins and minerals. This includes community interventions such as salt iodization at the point of production as well as mass food fortification programs aimed at producing fortified maize flour, wheat flour, and cooking oil and larger-scale universal salt iodization initiatives. Mass food fortification has proven to significantly reduce anemia with measurable impacts on micronutrient status and outcomes.

Food fortification is being introduced in more and more countries and holds great hope for long-term control of vitamin A deficiency. Multiple products currently serve as vehicles for vitamin A: sugar, oil, milk, margarine, infant foods, and various types of flour are among the most common. Yet in most cases, fortification efforts can take several years to initiate and longer still to reach all at-risk children and their families. Mass micronutrient supplementation campaigns have limited impact if not accompanied by healthy in-home feeding practices, while improvements in agricultural productivity have limited impact if young children are not eating more of the right foods, at the right times, in the right amounts.

### Improved Household Dietary Diversity

As previously mentioned, "hidden hunger" means that people's diets lack enough nutritious foods and diversity to supply needed protein, minerals, and vitamins. Therefore, dietary diversity—particularly consumption of more micronutrient-rich foods—becomes a very important key linkage between the agriculture sector and nutrition interventions. The nutritional status of school-aged children and their households can be improved by efforts to promote household dietary diversity and increase year-round access to and consumption of diversified high-quality, high-nutrient meals. Such efforts require support for integrated, food-based approaches that promote dietary quality and diversity rather than vertical, nutrient-specific supplementation programs.

Working to improve nutrition outcomes from within the agricultural sector offers an important opportunity to assess and measure household dietary diversity (especially for children 6 – 23 months). Demographic Health Survey data from Feed the Future countries show that, on average, only 17 percent of children in this age group are eating a minimum acceptable diet. Both Feed the Future and Global Health Initiative programs need to integrate and coordinate their communication messaging to help provide the knowledge and motivation needed for families to improve the variety and nutritional value of their diets.

## Education, Health, and Nutrition Linkages

Education ideally provides children a safe, structured environment with supervision and support by adults as well as a forum to develop social networks. Multiple extended studies have shown that proper early nutrition affects lifelong opportunities by shaping a child's cognitive and physical development. Better child nutrition prevents cognitive impairments that make children less likely to succeed in school.[78] Stunting is also inversely related to a mother's educational level; data indicates that children born to mothers with no education are more likely to be stunted.[79]

Thus, in addition to reducing child mortality, good nutrition in early childhood helps reach **MDG 2: Achieve**

**universal primary education.** Ensuring that girls receive the nutrients needed to do well in school and promoting better nutrition practices helps achieve **MDG 3: Promote gender equality and empower women.** Well-designed primary school nutrition interventions improve the food security of children and their families and provide nutrition education and health care. Community (including school) nutrition education is a highly cost-effective nutrition intervention.[80]

## Community and School Growth Monitoring and Promotion

Growth monitoring (assessing a child's growth pattern) is the process of following the growth rate of a child in comparison to a standard by periodic, frequent anthropometric measurements in order to assess growth adequacy and identify early growth faltering.[81] Due to lack of nutrients or lack of adequate access to healthy food, more than one in five of the world's children under age five are underweight for their age.[82] Simple strategies such as closer growth monitoring can help prevent early childhood malnutrition.

Although programs like the McGovern-Dole school feeding program play a critical role in helping children attend and stay in school and also help boost their nutrition by sending food home with them, more could be done through these programs to educate mothers on the importance of the 1,000-day "window of opportunity."[83] School and community staff and volunteers also need more training in interpreting health records and recognizing potential danger signs. Making growth-monitoring data available to communities for decision-making can help create a sense of local ownership and make it easier to identify priority needs. Finally, caregivers must be empowered to take children to be weighed regularly and understand what growth charts mean.

Jim Stipe

**These kindergarten children in India receive a nutritious lunch every day.**

## Collaborating and Coordinating: Multilateral Efforts

The global community is mobilized around improving nutrition as part of a comprehensive food security agenda. We have recent documented evidence of the highest impact interventions (*Lancet*) and what it will cost to achieve high coverage (World Bank). We know what to do and we now have global commitment to do it at scale. Scaling up nutrition needs to be coordinated among donor, multilateral, U.N. and nongovernmental (NGO) organizations. To boost the impact, it is critical that all these efforts support national nutrition plans and are coordinated at the country level.

UNICEF[84] focuses its nutrition efforts on children under five in 24 high-burden countries. The United Nations Standing Committee on Nutrition[85] promotes cooperation among U.N. agencies and partner organizations to end malnutrition. An important milestone was reached in 2009, when basic principles to guide nutrition programs and elevate nutrition on donors' agendas were established.[86] These efforts[87] introduced concrete steps towards better governance on nutrition at the global and country levels, including agreement on initiation of country-level action plans and roadmaps.

After a 2008 internal assessment found its engagement in nutrition to be limited, the World Bank made a commitment to scale up its nutrition commitments, particularly focusing on addressing malnutrition and micronutrient deficiencies as a key poverty reduction strategy. The World Bank administers the Global Agriculture and Food Security Program, a multilateral effort to help implement the G-8 pledges made at the 2009 L'Aquila summit. It has both public and private sector windows. The World Bank also supports countries in developing food quality and safety standards.

The U.N. World Food Program (WFP) analyzes food security conditions in depth and makes its findings and recommendations available to the governments involved, donors, NGOs, and other stakeholders. WFP supports both emergency humanitarian actions[88] (for disaster survivors and other refugees) and community food security programs.

U.N. agencies, including the Food and Agriculture Organization, the World Health Organization, UNICEF, and the World Food Program, are working together to improve donor coordination in an effort called Renewed Efforts to End Child Hunger (REACH). REACH provides countries with

help in mapping current nutrition efforts by government agencies and international donors and using this information to set priorities for scaling up as effectively as possible.

In 2010, the World Health Organization's World Health Assembly adopted resolution 62.23 on maternal, infant and young child nutrition.[89] The World Health Organization supports Landscape Analysis, a process that assesses countries' readiness to accelerate their nutrition programs, with a focus on the 36 high-burden countries where 90 percent of the world's stunted children live. Landscape Analysis[90] country assessments study successes and failures in implementing large-scale nutrition programs, draw lessons for future programs, and help countries identify their specific top-priority needs.

## Looking Forward: A Call to Action

To build on global momentum to scale up maternal and child nutrition efforts, nutrition stakeholders need to work cooperatively with people in health, agriculture, and other sectors to promote better nutrition. Feed the Future and the Global Health Initiative recognize the long-term consequences of undernutrition to individuals and to societies. They share the goal of improved well-being and quality of life. Both initiatives have specific nutrition components, but these are often presented as complementary to their other goals. Instead, nutrition needs to be integrated into all development sectors and programs to maximize effectiveness and efficiency. Making the best use of the various global initiatives to improve nutrition results and integrate nutrition programs will require increased investments in coordination mechanisms and country ownership.


Alliance to End Hunger

**The Guatemalan Alliance to End Hunger works with the Ministry of Public Health to distribute a fortified drink mix to families at risk of malnutrition.**

Success factors for cost-effective, integrated strategies to scale up and implement effective nutrition interventions include:

### 1. Host Country Ownership and Government Leadership

Recent research by InterAction on the administration's Feed the Future initiative[91] and its consultation processes indicated that, despite the emphasis in many key documents on the importance of engaging local civil society, there is a clear "engagement gap." Reports indicate that the consultation process often provides limited opportunities for participation. The result is wide variations in the quality and scope of stakeholder participation. The research highlights the need for clear operational guidance and offers an illustrative list of consultation benchmarks to strengthen participation.

Global nutrition advocacy efforts and initiatives such as SUN, 1,000 Days, REACH, and the WHO Landscape Analysis, along with additional resources, can help foster host government leadership and participation from the outset. Such leadership is essential to build the strong political support that is needed both to create an environment conducive to multi-sectoral and inter-ministerial nutrition integration, and to recruit nutrition champions with the authority and will to restructure how services are delivered.

It is important that the momentum from global initiatives be directed toward strengthening a country-led approach. Targeted countries need resources to bring stakeholders together across sectors to support integrated nutrition plans, ensuring that financial and technical resources are accessible, coordinated, and ready to go to scale. Scaling up efforts will require substantial resources to enable host country governments to strengthen their institutions and management capabilities in the nutrition sector.

### 2. Strengthened Systems for Nutrition: Stakeholder Coordination

Given an environment of limited funding, maximizing resources and preventing duplication of effort require high levels of collaboration and coordination among stakeholders working to develop and implement nutrition programs. There is growing recognition that substantial investments to identify effective nutrition interventions are unlikely to reduce the burden of undernutrition unless systemic capacity constraints are also addressed, with an emphasis

initially on strategic and management capacities (human and organizational) from the national to frontline levels.[92] Effective country strategies and implementation to scale up depend on coordinated joint planning of initiatives. Ideally this will include coordinated planning with clear technical guidance and assistance, high-level advocacy, and innovative partnerships to increase the effectiveness of existing initiatives and programs. It is important to support national leadership and the participation of a wide range of stakeholders so that nutrition efforts have broad ownership and shared responsibility for results.

Ansem Ansari/Photoshare

**A grandmother helps attend to her granddaughter's infant in Bangladesh. This baby was the first born in the MINIMAT study cohort in Matlab, Bangladesh. Four thousand mothers were followed through their pregnancies with targeted nutritional interventions to prevent low birth weight.**

### 3. Strengthened Systems for Nutrition: Appropriate Human Resources for Nutrition

Insufficient numbers of trained healthcare providers in developing countries—particularly in rural areas—make it more difficult to carry out effective nutrition programs. Providers, community extension workers, and volunteers alike need sufficient training, resources, and time to be able to commit to integrated service delivery. Practitioners need skills to assess, counsel, and educate individuals as well as skills to treat and manage moderate and severe acute malnutrition and maternal anemia. Countries need technical assistance and resources to prepare and carry out practical plans to develop the needed human resources for nutrition. Plans should emphasize recruitment, hiring, training, retention, and human resource management. Plans should include options for hiring more staff qualified in nutrition or for integrating nutrition into the existing training curricula of clinical and community service providers.

Support also needs to be given to countries to improve representation of nutrition stakeholders at the national and sub-national levels, elevating their voices and participation in decision-making. National nutrition needs can be more accurately mapped out and costs estimated using the results of the WHO Landscape Analysis and recommendations from consultations with stakeholders.

### 4. National Guidance, Data Use, and Monitoring Systems for Nutrition

Increased investment in country nutrition information systems, integration of nutrition indicators, and improved coordination of technical nutrition guidance are needed for successful efforts to scale up. Planning itself requires resources to develop and disseminate national policy guidelines, protocols, and appropriate training and tools for health facilities and communities to offer effective nutrition assessment, counseling, education, and support.

Scaling up to achieve the MDGs requires decision-making and advocacy based on evidence. Obtaining the needed high-quality data on nutrition and food security, in turn, requires additional resources. The capacity of local governments and civil societies will need to be significantly strengthened so that they can use nutrition and food security data to deliver services effectively and integrate local data into the national system. For example, the contribution of SAM to child mortality rates is not always clearly recognized because in some health data systems, it is not listed separately as a cause of death. Ensuring that all deaths from SAM are reported as such would focus attention on the scope of the problem. Strong nutrition monitoring systems will need to be developed. They should have appropriate indicators, data gathering, and information systems that use their results to inform nutrition and food security interventions.

## Table 1: Evidence-Based, High-Impact Nutrition Interventions

| No. | Evidence-Based Nutrition Intervention (adapted from *The Lancet* Series on maternal and child undernutrition | Targeted Population | Cost Calculation cost/person/year) |
|---|---|---|---|
| 1 | Micronutrient Supplementation- Vitamin A Supplementation[1] (+) (ENA) * ^$ ✹ (6-59 months); Neonatal (-) | Infants and children | $0.20 |
| 2 | Micronutrient Supplementation- Zinc Supplementation[2] (+) * ^ (including home fortification[3]) | Infants and children | $1.20 (4 months) |
| 3 | Micronutrient Supplementation: Zinc for management of diarrhea (+) * ^ ✹ | Infants and children | $0.47 (10 days |
| 4 | Micronutrient Supplementation-Iron (+) * ^ ✹ (for pregnant women[4]) | Maternal, infants and children | $10-$50 |
| 5 | Micronutrient Fortification: Universal Salt Iodization (+) * ^ $ ✹ | Maternal, children and birth outcomes | $0.05 |
| 6 | Micronutrient Fortification: Iron Fortification[5] (-) (ENA) * ^ $ ✹ (including iron home fortification) | Infants and children | $0.10-0.12 ($1.20; (4 months) |
| 7 | Micronutrient Fortification: Folate Fortification (+) (ENA) * ^ $ | Maternal and birth outcomes | $0.01 |
| 8 | Breastfeeding Promotion[6] /Infant and Young Child Feeding (+) (ENA) * ^ $ (individual and group counseling) (Baby-Friendly Hospital Initiative[7]) | Newborn babies | $0.30-0.40 to $3.00-$4.00/birth |
| 9 | Behavior Change Communication for Improved Complementary Feeding (+) (ENA) $ | Infants and children | Not available |
| 10 | Conditional cash transfer programs (with nutritional education) (-) | Infants and children | Not available |
| 11 | Food Supplementation in Pregnancy (Maternal balanced energy-protein supplementation) | Maternal and birth outcomes | Not available |
| 12 | Interventions to Improve Hygiene including Hand Washing (+) | Infants and children | Not available |
| 13 | Malaria Prevention: Intermittent Preventive Treatment for Malaria (-) | Maternal and birth outcomes | Not available |
| 14 | Malaria Prevention using Insecticide-Treated Nets (ITNs) (-) | Maternal and birth outcomes | Not available |
| 15 | Treatment of Severe Acute Malnutrition (SAM) in children under five (+) (ENA) ^ $ | Infants and children | Not available |
| **Additional Cost-Effective Nutrition Interventions** | | | |
| 16 | Biofortification[8] | Maternal, children and birth outcomes | $500,000-$1M/Country/Year |
| 17 | Deworming via antihelminthics drugs [9, 10] (-) (ENA) ^ ✹ | Maternal and birth outcomes, Infants and children | $0.32-$0.50 |
| 18 | Community Nutrition Education[11] | Maternal, children and birth outcomes | $5.00-$10.00 |

Notes:

- The prevention of undernutrition in the 1,000-day window from pregnancy to 24 months and the treatment of undernutrition in children under five years of age are critical.
- Interventions in ORANGE signify highly cost-effective interventions that involve or are similar to primary health interventions and that largely involve behavior changes that address undernutrition. These cost-effective interventions have been ranked by a group of world-renowned economists (through the Copenhagen Consensus Project), who examined the nutrition interventions set forth in *The Lancet*'s 2008 series on maternal and child undernutrition.
- Cost Calculation (Cost/Person/Year) is based on the authors' Copenhagen Consensus 2008 Challenge Paper: Hunger and Malnutrition. Sue Horton, Harold Alderman, and Juan A. Rivera. 2008 calculation; recalculates prevalence estimate using data and references from Horton (2006), to obtain incidence-based estimate. Copenhagen Consensus 2008 Challenge Paper Hunger and Malnutrition. Sue Horton, Harold Alderman, and Juan A. Rivera. 2008.
- (+) Denotes sufficient evidence for implementation in all 36 high-burden countries (based on *The Lancet*'s series)

*Notes continued on next page*

| Table 2: Recent Global Nutrition Milestones | | |
|---|---|---|
| **Year** | **Milestone** | **Significance** |
| **2006** | **Copenhagen Consensus** | • Determines that nutrition is one of the most cost-effective buys in development investments. |
| | **Ending Child Hunger and Undernutrition Initiative: Global Framework for Action** | • Recognizes the need for a renewed global effort to address hunger and undernutrition. |
| **2008** | ***The Lancet*'s Series on Maternal and Child Undernutrition** | • Helps forge consensus on effective high-impact nutrition-related interventions and policies in developing countries, and on related evidence-based actions proven to accelerate progress on maternal/child malnutrition. |
| | **Copenhagen Consensus on Malnutrition and Hunger[1]** | • Highlights cost-effective interventions for improving nutrition as identified by a group of world-renowned economists. These researchers list micronutrient supplements for child survival as the top international development priority of more than 40 interventions considered.<br>• Emphasizes good nutrition for young children, especially nutrients that children under two need for growth[2] |
| **2009** | **U.S. Global Health Initiative[3]** | • Designates nutrition as one of the eight core areas of integration (a key GHI principle) and prioritizes scaling up[4] proven, evidence-based nutrition approaches.<br>• Sets goal of reducing child undernutrition by 30 percent in food-insecure countries (in conjunction with Feed the Future). |
| **2010** | **Feed the Future, the U.S. Government's Global Hunger and Food Security Initiative** | • Designates improved nutrition as one of six focus areas and supports country-owned programs for undernutrition, especially for children under five. |
| | **1,000 Days/Scaling Up Nutrition Partnership Launch** | • Works to jump-start the implementation of the Scaling Up Nutrition (SUN) Framework and Roadmap to help end undernutrition during pregnancy and early childhood.<br>• Emphasizes a "window of opportunity" (from pregnancy to two years old) for a high priority package of evidence-based and cost-effective health and nutrition interventions to reduce death and disease. If implemented at scale and supported by appropriate policies, these effective interventions can significantly improve nutrition for the most vulnerable groups—undernourished mothers and children. |

*Remaining Notes from Table 1*

- (-) Denotes evidence for implementation in specific, situational contexts (based on *The Lancet*'s series).
- * Denotes UNICEF High-Impact Nutrition Interventions. Not in the table: Nutrition Security in Emergencies and Nutrition and HIV/AIDS.
- ^ Denotes UNICEF Accelerated Child Survival Interventions.
- (ENA) Denotes the Essential Nutrition Actions (ENA) framework that was developed with the support of USAID and has been implemented across Africa and Asia since 1997. It encompasses women's nutrition during pregnancy and lactation, optimal IYCF (breastfeeding and complementary feeding), nutritional care of sick and malnourished children (including zinc, vitamin A and ready-to-use therapeutic foods), and the control of anemia, vitamin A, and iodine deficiencies.
- $ Denotes what is specifically supported by USAID's research-to-use nutrition strategy; does not include providing nutritional care and support for people living with malaria, TB, HIV/AIDS, and other infectious diseases; does not include improving nutritional outcomes in food security programs.
- These solutions (ranked by cost-effectiveness) are largely consistent with a recent authoritative survey of effectiveness in *The Lancet* (Bhutta et al., 2008), which states, "Of available interventions, counseling about breastfeeding and fortification or supplementation with vitamin A and zinc have the greatest potential to reduce the burden of child morbidity and mortality." The survey concludes: "Interventions for maternal nutrition (supplements of iron, folate, multiple micronutrients, calcium, and balanced energy and protein) can improve outcomes for maternal health and births." (p. 417)
- ✹ Denotes the 10 nutrition interventions that were identified by the Scaling Up Nutrition (SUN) movement.

| Table 3 | | Multilateral Nutrition Initiatives | | | | | United States Government Bilateral and Global Initiatives with a Nutrition Component | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Country | High-Burden Stunting Countries (WHO) | REACH Focus | SUN Countries | SUN Early Riser | WHO Landscape Analysis | UNICEF Focus | BEST | GAFSP | Global Health Initiative 'Plus' | Feed The Future Focus Country | Food For Peace/ Title II (PL 480) | PEPFAR Focus Country | PMI Focus Country |
| Afghanistan | ✓ | | | | | ✓ | ✓ | | | | | | ✓ |
| Angola | ✓ | | | | | | ✓ | | | | | ✓ | |
| Bangladesh | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ |
| Benin | | | ✓ | | | | ✓ | | ✓ | | | ✓ | ✓ |
| Burkina Faso | ✓ | | ✓ | | ✓ | | | | | | ✓ | | |
| Burundi | ✓ | | | | | | | | ✓ | | ✓ | ✓ | |
| Cambodia | ✓ | | ✓ | | | | | ✓ | ✓ | ✓ | | ✓ | |
| Cameroon | ✓ | | | | | | | | | | ✓ | ✓ | |
| Côte d'Ivoire | ✓ | | | | ✓ | | | | | | ✓ | ✓ | |
| DRC | ✓ | | | | | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ |
| Egypt | ✓ | | | | | ✓ | | | | | | | |
| Ethiopia | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Gambia | | | ✓ | | | | | | | | | ✓ | |
| Ghana | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | | | ✓ | ✓ | ✓ | ✓ |
| Guatemala | ✓ | | ✓ | ✓ | ✓ | | ✓ | | ✓ | ✓ | ✓ | ✓ | |
| Haiti | | | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | |
| Honduras | | | | | | | | | | ✓ | ✓ | ✓ | |
| India | ✓ | | | | | ✓ | ✓ | | | | ✓ | ✓ | |
| Indonesia | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | | | ✓ | |
| Iraq | ✓ | | | | | | | | | | ✓ | | |
| Kenya | ✓ | | | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Laos PDR | | ✓ | ✓ | | | | | | | | ✓ | ✓ | |
| Liberia | | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Madagascar | ✓ | | | | ✓ | ✓ | ✓ | | | | ✓ | ✓ | ✓ |
| Malawi | ✓ | | ✓ | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mali | ✓ | ✓ | ✓ | | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Mauritania | | ✓ | ✓ | | | | | | | | | ✓ | |
| Mozambique | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Myanmar | ✓ | | | | | ✓ | ✓ | | | | | | |
| Namibia | | | ✓ | | | | | | ✓ | | | ✓ | |
| Niger | ✓ | ✓ | ✓ | ✓ | | ✓ | | ✓ | | | ✓ | ✓ | |
| Nigeria | ✓ | | ✓ | | | | ✓ | | ✓ | | | ✓ | ✓ |
| Nepal | ✓ | ✓ | ✓ | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | |
| Nicaragua | | | | | | | | | | ✓ | | ✓ | |
| Pakistan | ✓ | | | | | ✓ | ✓ | | | | ✓ | ✓ | |
| Philippines | ✓ | | | | | ✓ | ✓ | | ✓ | | | ✓ | |
| Peru | ✓ | | ✓ | | ✓ | | | | ✓ | | | ✓ | |
| Rwanda | | ✓ | | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Senegal | | | ✓ | | | | ✓ | | ✓ | ✓ | ✓ | ✓ | ✓ |
| South Africa | ✓ | | | | ✓ | ✓ | | | ✓ | | | ✓ | |
| Sudan | ✓ | | | | | ✓ | ✓ | | | | ✓ | ✓ | |
| Tajikistan | | | | | | | ✓ | | ✓ | | | | |
| Tanzania | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | | ✓ | ✓ | | ✓ | ✓ |
| Turkey | ✓ | | | | | | | | | | | | |
| Uganda | ✓ | ✓ | | ✓ | | ✓ | ✓ | | | ✓ | ✓ | ✓ | |
| Vietnam | ✓ | | | | ✓ | ✓ | | | ✓ | | | ✓ | |
| Yemen | ✓ | | | | | ✓ | ✓ | | | | ✓ | ✓ | |
| Zambia | | | ✓ | ✓ | | | ✓ | | | ✓ | ✓ | ✓ | |
| Zimbabwe | | | ✓ | | | | | | | | ✓ | ✓ | |

**Footnotes for the table at left:**

BEST GHI countries are countries that are developing best practices at scale in home and community facilities for smart integrated programming that draws on the latest evidence and best practices in family planning, maternal and child health, and nutrition programs. 28 countries are high-need, including: Afghanistan, Angola, Bangladesh, Benin, DR Congo, Ethiopia, Ghana, Guatemala, Haiti, India, Indonesia, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Nepal, Nigeria, Pakistan, Philippines, Rwanda, Senegal, Sudan, Tanzania, Uganda, Yemen, Zambia.

# Endnotes

[1] Lacey and Pritchett, JADA 2003;103:1061-1072.

[2] *The Lancet*'s series on maternal and child undernutrition. Executive Summary. 2008.

[3] UNICEF, 2010.

[4] World Health Organization. http://www.who.int/nutrition/topics/moderate_malnutrition/en/

[5] Ibid.

[6] UNICEF. http://www.unicef.org/progressforchildren/2006n4/undernutritiondefinition.html

[7] Copenhagen Consensus 2008 Challenge Paper: Hunger and Malnutrition. Sue Horton, Harold Alderman, and Juan A. Rivera. 2008.

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[19] Bangladesh, Ethiopia, Ghana, Guatemala, Malawi, Niger, United Republic of Tanzania, Uganda, and Zambia. Early riser countries: Any country that is developing policies and plans of action to scale up nutrition can participate in the SUN movement. Countries that are already participating in the movement have identified themselves as Early Risers; their governments have formally signaled interest in scaling up nutrition.

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## Table 1 Notes

[1] Chung et al. 2000; Fiedler 2000; Horton 1999.

[2] Robberstad et al. 2004.

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## Table 2 Notes

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President, David Beckmann | Director, Asma Lateef

425 3rd Street SW, Suite 1200, Washington, DC 20024
Tel 202.639.9400 Fax 202.639.9401
institute@bread.org www.bread.org/Institute

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