AFRICA HUMAN DEVELOPMENT SERIES

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An Evidence-Based Approach for Sustained Results

Andrew Sunil Rajkumar, Christopher Gaukler, and Jessica Tilahun

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Foreword

Historically overlooked and underfunded, malnutrition has emerged in recent years as a critical challenge on the global development agenda. It is now recognized as a major obstacle in the way of achieving some of the targets under the first Millennium Development Goal (MDG)—to eradicate extreme poverty and hunger—in many countries. At the spring meetings of the World Bank and International Monetary Fund in 2010, the governments of Canada and Japan, the U.S. Agency for International Development, and the World Bank co-hosted a high-level meeting on "Scaling Up Nutrition." Robert B. Zoellick, president of the World Bank Group, spoke about nutrition as a "forgotten MDG" and noted that it was "the critical multiplier MDG, because if you fell short on nutrition, it was going to hurt every one of the other goals."

We know that nutrition interventions are among those with the highest potential impact in the developing world for each dollar spent. Three years ago, in January 2008, *The Lancet* issued a special five-part series on nutrition. The series filled a long-standing gap by marshaling systematic evidence of the impact of malnutrition on infant and child mortality and the largely irreversible long-term effects on health and on cognitive and physical development. *The Lancet* highlighted a set of nutrition interventions that have been shown in a range of studies to be extremely cost-effective, with high returns to cognitive development, individual earnings, and economic growth. Yet resources to tackle malnutrition still fall far short of what is needed.

In Ethiopia, malnutrition indicators are among the worst in the world, and the country is one of the 36 that together account for about 90 percent of the world's stunted children. But there has been significant recent progress in Ethiopia, and the problem of malnutrition

has been addressed with a different approach in recent years. In 2008, for the first time, Ethiopia developed a National Nutrition Strategy and launched the National Nutrition Program to implement it. The International Development Association has contributed US$30 million so far toward this program, which is also funded by the government and a range of other partners.

In this context, the book makes a valuable contribution. It provides the analytical underpinnings for implementation of the National Nutrition Program and more broadly for the efforts of the government and development partners to address malnutrition in Ethiopia in the short and medium term. The findings of the book are based on the authors' detailed analysis of data from several different sources, including household surveys and program data specific to Ethiopia. The book is intentionally pragmatic—its recommendations are based not just on technical analysis but also on practical considerations and delivery structures on the ground in Ethiopia.

Key findings include the need for a multisectoral approach to combat malnutrition that goes beyond addressing food insecurity alone and the high benefit-cost ratios of nutrition interventions in general—although some are identified as being of higher priority for introduction or scaling up. Ways to enhance effectiveness are also suggested, including improved program targeting, enhanced coordination among programs, and the establishment of an effective nutrition information and surveillance system.

I would like to extend special recognition and thanks to the Ethiopian partners who made this book possible, in particular Dr. Kesetebirhan Admasu, state minister of health; Dr. Shiferaw Teklemariam, former state minister of health and current minister of federal affairs; Dr. Tsehaynesh Messele, director general of the Ethiopia Health and Nutrition Research Institute; Dr. Cherinet Abuye, director of the Food Science and Nutrition Research Directorate, Ethiopia Health and Nutrition Research Institute; and Dr. Belaynesh Yifru, officer at the Dire Dawa case team, Urban Health Promotion and Disease Prevention Directorate, Ministry of Health. They have played an instrumental role in establishing and implementing the National Nutrition Program, along with Dr. Tewodros Adhanom, minister of health; Dr. Kebede Worku, state minister of health; Dr. Neghist Tesfaye, director of the Urban Health Promotion and Disease Prevention Directorate; and Dr. Ferew Lemma, senior nutrition adviser, Federal Ministry of Health.

The challenges in addressing malnutrition in Ethiopia are enormous, and sustained efforts as well as adequate financing will be needed over

several years. If this is accomplished, Ethiopia may eventually be one of the leaders in addressing malnutrition in Sub-Saharan Africa and more generally in low-income countries. I believe that the insights offered in this book will support the policy dialogue and program implementation efforts that will be needed in order to make this happen.

Ritva Reinikka
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Human Development
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Acknowledgments

This book was prepared by the authors Andrew Sunil Rajkumar (senior economist at the World Bank and team leader), Christopher Gaukler (social protection consultant at the World Bank), and Jessica Tilahun (nutrition adviser at the U.S. Agency for International Development), with contributions from Eskender Tesfaye (World Bank consultant), Jack Fiedler (World Bank consultant), David Lawson (Institute for Development Policy and Management), Hailay Teklehaimanot (Center for National Health Development), Yemane Yihdego (Center for National Health Development), Caroline Poeschl (World Bank consultant), and Rishi Mediratta (World Bank consultant).

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The book was prepared under the overall guidance of Laura Frigenti and Eva Jarawan (former and current sector managers, respectively, in charge of health for Ethiopia at the World Bank), as well as Kenichi Ohashi (country director for Ethiopia at the World Bank). Invaluable comments and input for the book were received from a range of people in the World Bank and outside, including the peer reviewers Meera Shekar and Menno Mulder-Sibanda, as well as Harold Alderman, Marito Garcia, Trina Haque, Ziauddin Hyder, Yuki Isogai, Frew Tekabe, Lisa Saldanha, Iqbal Kabir, Wendmsyamregne Mekasha, Sylvie Chamois, Teshome Desta, Abebe Hailemariam, Mathewos Tamiru, and Jakob Mikkelsen. Useful insights were also obtained from various members of the World Bank Ethiopia country team.

Abbreviations

AIDS	acquired immune deficiency syndrome
CBN	Community-Based Nutrition
CBRHA	Community-Based Reproductive Health Agent
CGP	Child Growth Promotion
ENCU	Emergency Nutrition Coordination Unit
EOS	Enhanced Outreach Strategy for Child Survival
EEOS	Extended EOS
ESHE	Essential Services for Health in Ethiopia
EWRD	Early Warning and Response Directorate
GDP	gross domestic product
HEP	Health Extension Program
HIV	human immunodeficiency virus
IFHP	Integrated Family Health Program
MDG	Millennium Development Goal
MERET	Managing Environmental Resources to Enable Transitions to More Sustainable Livelihoods (World Food Programme)
MUAC	mid-upper arm circumference
NCHS	National Center for Health Statistics
NGO	nongovernmental organization
SNNP	Southern Nations, Nationalities, and Peoples
TSFP	Targeted Supplementary Food Program
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WASH	Water, Sanitation, and Hygiene

Glossary

Anemia. Low level of hemoglobin in the blood leading to reduced capacity to carry oxygen to tissues and organs. Anemia can have various causes, but, most commonly, it is a consequence of iron deficiency. Symptoms are decreased energy, decreased mental capacity, and increased maternal mortality.

Body mass index. An index of fatness. It is calculated by dividing weight in kilograms by height in meters squared. Both high and low indexes are associated with poor health. The normal range for a healthy adult is 18.5 to 24.9. A BMI below 18.5 is considered too lean, while one above 25 is considered overweight. A BMI greater than 30 is considered obese, and one greater than 40 is considered morbidly obese.

Complementary foods. Formerly called "weaning foods." Complementary foods are introduced while a child continues to breast-feed. It is recommended that complementary foods be started at six months of life and be provided two to three times a day with increasing consistency as the child grows.

Exclusive breast-feeding. When an infant is fed only breast milk and is not fed water, tea, gruel, or other animal milk. Exclusive breast-feeding is recommended for the first six months of life.

Food security. Availability, access, and use of sufficient food by all people at all times for an active, healthy life (Benson 2006). See also *nutrition security.*

Gini coefficient. A measure of income inequality ranging from 0 (perfect equality) to 1 (perfect inequality).

Infant mortality rate. The number of infants out of every 1,000 live births who are expected to die at the age of exactly one year or less.

Iodine deficiency disorder. Disorder caused by a deficiency of iodine in the diet. The spectrum of disorders includes goiter, hypothyroidism,

impaired mental function, stillbirths, abortions, congenital abnormalities, and neurological cretinism.

Kebele. A neighbourhood association or community in Ethiopia.

Low birthweight. An infant born weighing less than 2,500 grams (5.5 pounds). In rural areas, this is estimated by the infant's "relative size" to other babies, as assessed by the birth attendant or mother.

Malnutrition. An imbalance between the body's needs and its use and intake of nutrients. The imbalance can be caused by poor or lacking diet, poor hygiene, disease states, lack of knowledge, and cultural practices, among others. Underweight, stunting, wasting, obesity, and vitamin and mineral deficiencies are all forms of malnutrition.

Mid-upper arm circumference (MUAC). One of the anthropometric measures used in assessing nutritional status. It is always measured on the left arm. Measuring MUAC is easier and faster to use and train for than measuring weight and height.

Moderate malnutrition. A common benchmark used in health and nutrition studies that can be defined in more than one way. In this book, unless stated otherwise, "moderate malnutrition" refers to a child with a MUAC between 11 and 12 centimeters.

Neonatal mortality rate. The number of infants out of every 1,000 live births who are expected to die during the first 28 days of life.

Nutrition security. When a household attains secure access to food coupled with a sanitary environment, adequate health services, and knowledgeable care (Benson 2006). See also *food security.*

Severe acute malnutrition. A common benchmark used in health and nutrition studies. It refers to a child who has visible severe wasting or nutritional edema. In Ethiopia, children with a MUAC less than 11 centimeters are considered to have severe acute malnutrition.

Severe stunting, wasting, or underweight rate. A common benchmark used in health and nutrition studies. It is technically defined as the percentage of children under five years of age who suffer from severe stunting, wasting, or underweight, defined, respectively, as having a height-for-age, weight-for-height, or weight-for-age value that is equal to or smaller than the value corresponding to three standard deviations below the median of the global reference population—that is, the value corresponding to –3 Z-scores with respect to the global reference population (see also the definitions of stunting, wasting, and underweight).

Stunting. When a child has low stature compared to other children his or her age because of inadequate nutrition, care, and environment. A proxy measure for long-term malnutrition, it is defined as height-for-age that

is equal to the value corresponding to or smaller than two standard deviations below the median of the global reference population—that is, the value corresponding to –2 Z-scores with respect to the global reference population (a population with a distribution of height-for-age values that is considered normal by international standards).

Total stunting, wasting, or underweight rate. Also referred to as the "stunting, wasting, or underweight rate." A common benchmark used in health and nutrition studies, it is technically defined as the percentage of children under five years of age who suffer from stunting, wasting, or underweight (see definitions of stunting, wasting, and underweight).

Under-five mortality rate. The number of children out of every 1,000 live births who are expected to die at the age of exactly five years or less.

Undernutrition. Failure to get enough nutrients for a healthy body. Undernutrition can result from low intake, malabsorption during disease, or extreme losses, such as during bouts of diarrhea.

Underweight. When a child has low weight compared to other children his or her age. "Underweight" is one way to measure acute malnutrition. It is defined as weight-for-age that is equal to or smaller than the value corresponding to two standard deviations below the median of the global reference population—that is, the value corresponding to –2 Z-scores with respect to the global reference population (a population with a distribution of weight-for-age values that is considered normal by international standards).

Vitamin A deficiency. A form of malnutrition resulting from inadequate intake or high loss of vitamin A. Symptoms include growth retardation, night blindness in mild deficiency, and xerophthalmia (drying of the cornea), which leads to complete blindness.

Wasting. When a child has a low weight for his or her current height. Wasting is used as a proxy measure of acute malnutrition. It is defined as weight-for-height that is equal to or less than the value corresponding to two standard deviations below the median of the global reference population—that is, the value corresponding to –2 Z-scores with respect to the global reference population (a population with a distribution of weight-for-height values that is considered normal by international standards).

Woreda. District with local government in the Ethiopian system.

Z-score. A unit of measure often used in the nutrition and health field. It is the deviation of an individual's value from the median value of the global reference population, divided by the standard deviation of the global reference population. The Z-score indicates where one

observation lies in reference to the global population. A Z-score of −2 or less (that is, equal to or smaller than two standard deviations below the median of the global reference population) is considered low. (The global reference population is a population with a distribution of heights, weights, ages, or related measures that is considered normal by international standards.) The Z-score criteria always yield a greater prevalence of malnutrition than the percent-of-median criteria because the former takes into account variations in the standard deviation of weight at different heights, thereby making it more statistically valid. The World Health Organization recommends the use of Z-scores, because they are the most age-independent method of presenting indexes. In addition, individuals with indexes below the extreme percentiles can be classified more accurately.

Executive Summary

Malnutrition can be transient like an acute disease. More often, it is chronic—a lifelong, intergenerational condition beginning early in life and continuing into old age. Most undernutrition starts during pregnancy and the first two years of life. After a child reaches 24 months of age, damage from early malnutrition is irreversible.

Various indicators are commonly used to measure and monitor malnutrition, including rates of stunting, wasting, and underweight among children under five years of age (see the glossary for definitions and explanations). Stunting is a measure of long-term, chronic malnutrition. Wasting is a measure of more transient, acute, but reversible malnutrition. These two measures are often not highly correlated. Underweight is a composite index of stunting and wasting; an underweight child can be stunted, wasted, or both.

Successive Welfare Monitoring Surveys indicate a substantial decrease in the rate of stunting in urban and rural areas from 1996 to 2004. The national trend for wasting has been more mixed in the medium term, but the prevalence of underweight among children has declined steadily. Despite encouraging improvements, stunting rates in Ethiopia remain very high by developing country and regional standards. About half of all Ethiopian children are stunted. Wasting rates, however, are not especially high by regional and Sub-Saharan African standards.

The national estimates of child stunting and wasting prevalence mask significant urban-rural and regional variations. Perhaps the largest and most persistent disparities exist between rural and urban areas. Gender-based disparities are relatively small in Ethiopia, as in other countries.

Aside from stunting and wasting, the top micronutrient deficiencies—those of iron, vitamin A, and iodine—are rife in Ethiopia. Ethiopia will lose an estimated 10 percent of gross domestic product (GDP) from 2006

to 2015 (about US$12 billion) because of iron and iodine deficiency disorders and stunting alone. Large numbers of Ethiopian children—of whom almost half are stunted and many more suffer from other forms of malnutrition—experience the lifelong consequences of malnutrition, including increased risk of mortality and future illness, impaired cognitive ability, delayed enrollment and lower attainment in school, and overall loss of productivity.

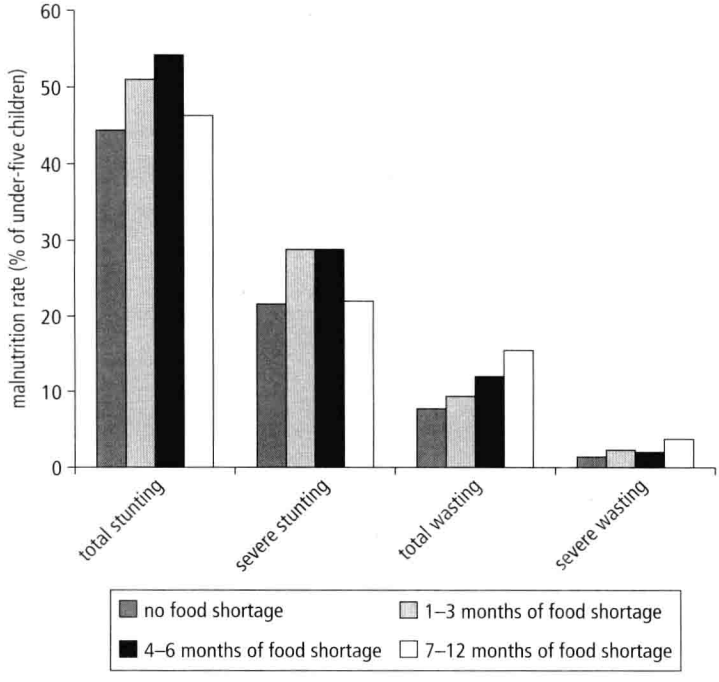
The government of Ethiopia formulated and approved the first National Nutrition Strategy in February 2008 to concentrate efforts on reducing malnutrition. The National Nutrition Program was approved in December 2008 to implement the strategy following a programmatic approach. The Ministry of Health is the lead agency overseeing the program and implementing its key aspects; other ministries and sectors are also involved in the multisectoral effort to reduce malnutrition.

NUTRITION SECURITY VERSUS FOOD SECURITY

Many mistakenly believe that malnutrition is mainly due to a lack of food and that providing food is the ultimate solution. But, in fact, although nutrition security is affected by food security, the two are only moderately related. Nutrition security is also influenced strongly by many other factors such as health status, feeding and child care practices, and water and sanitation. A regression analysis of household data from Ethiopia's 2005 Demographic and Health Survey indicates that increasing a household's welfare status—which helps to lower the risk of food insecurity—reduces child wasting to some (limited) extent, but has no discernible effect on child stunting. Economic growth and higher household income alone will not substantially reduce child malnutrition. Nutrition security cannot be achieved by focusing only on interventions targeting the income or food security of households.

Data from Ethiopia's 2004 Welfare Monitoring Survey show a clear, positive relationship between under-five child wasting rates and the extent of self-reported household food insecurity (see figure 1). Thus, adequate provision of food to food-insecure households is necessary to alleviate wasting. But the data also show that child wasting rates are still very high even in households with no food insecurity, indicating that a significant amount of wasting results from factors other than food insecurity. These must be addressed through appropriate interventions other than the provision of food. The same data show no obvious relationship between child stunting rates and household food insecurity. These findings highlight the importance of addressing nonfood factors to reduce wasting and stunting.

Figure 1 Malnutrition Rates in Under-Five Children from Households with Varying Degrees of Self-Reported Food Insecurity, 2004



Source: Authors' calculations using data from the 2004 Welfare Monitoring Survey.
Note: Total wasting refers to moderate as well as severe wasting, and total stunting refers to moderate as well as severe stunting.

Increasing evidence from various countries shows that a multisectoral approach is most effective for reducing malnutrition and that the most successful programs do more than just reduce food insecurity. Malnutrition rates can often be substantially improved by educating mothers on appropriate feeding and child care behavior, providing immunizations for common childhood illnesses, ensuring access to a safe supply of clean water, and improving a household's sanitary conditions, among others. And every one of these interventions is achievable without changing the amount of food provided.

COST-EFFECTIVE INTERVENTIONS AND RECENT PROGRESS

A significant proportion of Ethiopian women do not breast-feed their babies correctly. An estimated 50,000 infant deaths, or 18 percent of all infant deaths, each year are attributable to poor breast-feeding habits.