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INTERNATIONAL FOOD  
POLICY RESEARCH INSTITUTE  
*sustainable solutions for ending hunger and poverty*

# ENDING HUNGER BY 2050

## Crucial Investments and Policies

C. Ford Runge, Benjamin Senauer, Philip G. Pardey, and Mark W. Rosegrant

**H**uman endeavor has realized countless feats that once seemed pure fantasy.

We can talk to each other on small, portable phones whether we're stranded in traffic or on a remote mountaintop. We can send electronic mail messages anywhere in the world in seconds. We can propel ourselves far off into space to explore the earth's solar system. But we cannot seem to solve the problem of human hunger.

### ENDING HUNGER IN OUR LIFETIME

FOOD SECURITY AND GLOBALIZATION



C. FORD RUNGE, BENJAMIN SENAUER,  
PHILIP G. PARDEY, MARK W. ROSEGRANT



Roughly 800 million people are chronically undernourished today—three times the population of the United States (Figure 1). Despite our dispiriting track record, research gives us reason to expect a more just future.

By following a challenging prescription for concrete actions and policy changes, outlined in *Ending Hunger in Our Lifetime: Food Security and Globalization*, a new book from IFPRI and The Johns Hopkins University Press, world hunger could be substantially reduced by 2025 and chronic, mass hunger ended by 2050.

To end hunger and prevent the recurrence of famine and starvation, we need to take the following steps:

- invest in public health, child nutrition, education, women's and girls' social status, and other components of human capital;
- reform public institutions and create innovative funding and partnership arrangements;
- change government policies at all levels to be both pro-poor and pro-growth;
- increase funding for scientific and technological research to boost agricultural production and efficiency; and
- develop specific policies and institutions to deal with environmental degradation caused by population growth.

The international community, national governments, nongovernmental organizations (NGOs), and the private sector must cooperate to bring about these changes, which reach beyond redistribution programs, narrowly focused market-oriented solutions, or campaigns based solely on local self-reliance.

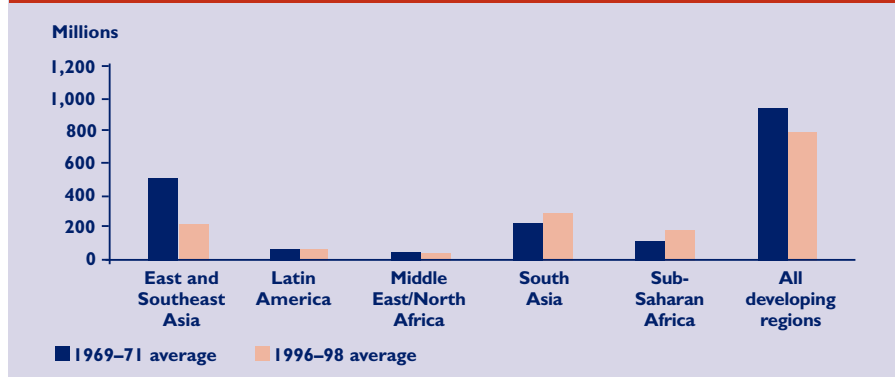
## THE CHALLENGE

### Hunger in a Prosperous World

Today's supply of food is more than enough for everyone. Yet hunger is not solely a distribution problem because no mechanism exists—nor is it ever likely to—to continuously redistribute massive amounts of food worldwide. People lack access to food largely because of poverty, political disadvantage, or war. These causes of hunger are reinforced by other unequal outcomes, such as the lopsided distribution of economic gains from globalization.

As the world's population continues to grow, shortages and degradation of both land and water will challenge the sustainability of the global food system. How can we face these environmental pressures, while still responding to the food needs of poor people, who consume more as they emerge from poverty? In this daunting context, the key environmental issues facing policymakers are:

Figure 1 Number of hungry people



Source: FAO and World Bank.

- **Continued population growth**—According to the United Nations, the current world population of just over 6 billion is expected to reach 7.9 billion by 2050 under a low-fertility scenario. All of this increase is expected to occur in the developing world, deepening poverty and susceptibility to hunger and increasing pressure on natural resources.
- **Creation of “dead zones” in our precious waterways**—Research by David Tilman and colleagues at the University of Minnesota projects that increased use of fertilizers needed to increase food production will starve lakes and rivers of oxygen, thereby limiting biodiversity and changing species composition.
- **Accumulation of agricultural pesticides in the food chain**—Global pesticide use is projected to increase by 170 percent over current levels by 2050. Agricultural pesticides accumulate in the human food chain and can adversely affect human and animal health.
- **Loss of biodiversity**—Forests, grasslands, and other natural systems are being converted to agricultural land use, which is expected to increase by 18 percent by 2050. The consequent loss of biodiversity will be particularly acute in Latin America and Sub-Saharan Africa.
- **Water scarcity**—Lack of water is the most serious environmental constraint on global food production. Increased demand for nonagricultural water use, in addition to underinvestment in water supplies and management, will further complicate the situation.

These problems make the task of ending hunger even more complex.

# THE SOLUTIONS

## Priorities, Investments, and Innovation

### INVESTING IN PEOPLE

Investing in human capital is a strategy that puts people first. Investments should focus on education, health, and children's nutrition.

Education is often the link that breaks the pattern of low income and no assets—a self-reinforcing cycle that is passed from generation to generation. The need for education is critical for women and girls. Investments in female education have high payoffs in terms of economic productivity, lower fertility rates, and women's ability to improve the health and nutrition of their children. Research also shows that when women have more education, they use their increased earnings to pay for more and better food and schooling for their children. Women's education is the most significant factor in reducing child malnutrition, along with food availability (Figure 2).

Sickness can lead to loss of household income and reduced child caring. On a large scale, it can significantly decrease gross domestic product (GDP). Preventative health programs are the most cost-effective approach to better health, especially for children. Proactive measures include school-based health services, immunizations, and access to safe drinking water.

In Africa, and perhaps in Asia in the near future, fighting HIV/AIDS is imperative in confronting hunger and poverty. By killing young adults, who comprise the majority of the workforce and are the primary earners of nonfarm income, HIV/AIDS dramatically reduces household income, food, goods, and services. HIV/AIDS has created exorbitant healthcare costs, labor shortages, a declining asset base, downgraded crops, and loss of livestock, all of which contribute to food insecurity.

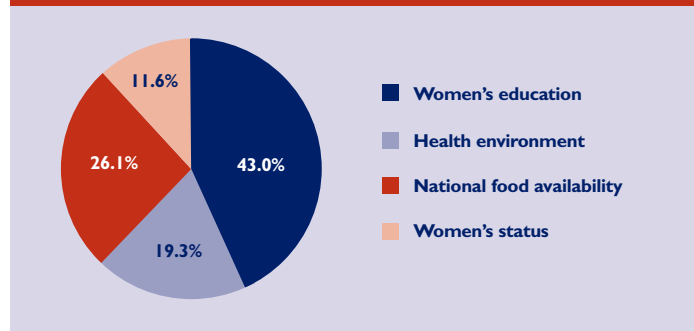
### INVESTING IN SCIENCE

New technology is a major force behind increased agricultural productivity. A study of 35 countries by C. Peter Timmer found that a 1 percent increase in agricultural GDP led to a 1.6 percent increase in the per capita incomes of the poorest people. Agricultural productivity gains brought about by research and new technology lead directly to higher incomes for peasant farming and landless rural households, the two groups that make up the majority of the poor.

Research and technology also help prevent environmental degradation. New pest-resistant biotechnologies, for example, may stabilize or reduce pesticide use. Higher crop yields due to improved farming systems can limit the expansion of agricultural production to forests and the loss of biodiversity (Figure 3).

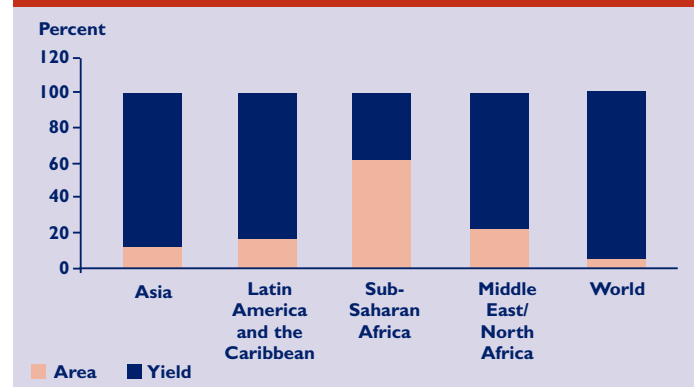
The core components of a sustainable agricultural growth strategy

**Figure 2** Share of reduction in child malnutrition attributed to underlying variables, 1970–95



Source: Smith and Haddad, *Overcoming Child Malnutrition in Developing Countries* (IFPRI, 2000).

**Figure 3** Sources of agricultural production growth, 1961–2000



Source: Compiled by authors based on data from FAO.

Note: Area represents area in agriculture and counts multiple cropped areas as a single unit within a cropping season.

are technological change that increases output and lowers production costs, investment in rural infrastructure (such as roads) that reduces transportation costs, widespread participation in agricultural markets by smallholding peasant producers and women farmers, and significant reforms in natural resource management.

Because technical advancement is so essential to the struggle against hunger, the slowdown in agricultural research investments worldwide must be reversed. Throughout the 1990s, budgets for agricultural research either declined or stalled. For example, the United States Agency for International Development cut grants to government agricultural research agencies by 80 percent between the mid-1980s and the mid-1990s.

In addition to reappropriating funds for research, decisions regarding how funds are disbursed, how they are used, and how long they are available are crucial. Governments must deliberately address the needs of poor farmers so that the benefits of agricultural technology development reach them because private-sector research typically does not take them into account. For R&D strategies to work optimally, nonprofit research must be revitalized, significantly more agricultural biodiversity must be preserved, and governments and civil society must be willing to confront the controversial issues of biotechnology and intellectual property.

## INNOVATIVE POLICIES AND INSTITUTIONAL REFORM

Ending hunger in our lifetime requires a multilateral response to food security—one built on the international institutions created after World War II. However, these institutions must reinvent themselves to create new, more relevant ways and means of doing business that are appropriate to the global nature of today's food security issues. The World Bank, the Food and Agriculture Organization of the United Nations, and the World Health Organization must modernize quickly to match the pace of change in the world outside them. For example, the World Bank should focus on food-insecure countries and provide direct technical support and grants to improve food security. The Bank could accomplish this by yielding the responsibility of lending to middle-income countries to the private sector. A new international organization to address the environmental dimensions of global food production is also needed.

### Key reforms include:

- new national agricultural and trade policies—such as the removal of trade barriers—that reflect growing interdependencies among nations;
- coordination among national governments to respond to transnational challenges, including a secure supply of food;
- agreement through the World Trade Organization to eliminate agricultural protectionism by wealthy countries, enabling developing countries to compete in the global market; and
- creation of a consolidated network of NGOs and a new body of private foundations dedicated to assisting poor nations, with a focus on improving food security.

## INVESTING FOR A HUNGER-FREE WORLD

To end hunger in our lifetime, a comprehensive set of investment priorities is required: education, health, agricultural research, irrigation and water management, rural infrastructure, institutional reforms, and the creation of entirely new institutions. How much funding will be needed and where will it come from? The World Bank estimates that an annual increase in aid of \$40 to \$60 billion (roughly double the current level of aid) will be required to reach the United Nations' Millennium Development Goals by 2015. That initiative seeks to cut extreme poverty in half and make substantial improvements in education and health in the developing world. The developing countries themselves will invest much of this amount. But the remaining portion will have to come from the international community. There are five primary

sources of funding for global food security:

- governments (and thereby the citizens) of developing countries;
- remittances from developing-country citizens working abroad;
- foreign assistance by the world's wealthier developed nations;
- private international capital flows in the form of targeted foreign direct investment; and
- global philanthropy.

Promoting hunger eradication as an "international public good"—an objective that benefits everyone—is key to building the will and financial support to make it happen.

## SOCIAL JUSTICE AND THE MORAL IMPERATIVE

In a world of unprecedented wealth, the persistence of widespread, chronic hunger is unacceptable. Although ending food insecurity will be an enormous task in itself, the greater challenge may be complacency, indifference, and a lack of political commitment. In the words of Amartya Sen, winner of the 1998 Nobel Prize in economics:

The contemporary age is not short of terrible and nasty happenings, but the persistence of extensive hunger in a world of unprecedented prosperity is surely one of the worst...Massive endemic hunger causes great misery in

many parts of the world...debilitating hundreds of millions and killing a sizable proportion of them with statistical regularity. What makes this widespread hunger even more of a tragedy is the way we have come to accept and tolerate it as an integral part of the modern world, as if it [were]... unpreventable.

With appropriate investments, innovations, and institutions, we can end chronic hunger in our lifetime. Widespread hunger is preventable.



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