

# **World Hunger Series 2006**

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## Hunger and Learning

### **Overview**



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## About the World Hunger Series

The World Hunger Series is a new annual publication from the United Nations World Food Programme. It is aimed at policymakers in developing and developed countries, and attempts to fill an important gap in existing reports on hunger. While other reports monitor trends towards international goals or serve primarily as advocacy tools, the World Hunger Series (WHS) will focus on practical strategies to end hunger. Each report in the new series will examine a key issue related to hunger – such as learning, health, markets, trade, crises and social exclusion. It will present state-of-the-art thinking on that year's theme, combined with an analysis of the practical challenges to implementing solutions. Based on this analysis, it will identify realistic steps to address hunger. This inaugural edition of the report explores one of the most promising areas for achieving lasting improvements: the relationship between hunger and learning.



### World Hunger Series 2006: Hunger and Learning

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# World Hunger Series 2006: Hunger and Learning

## Overview

When most people think about hunger, they focus on its physical manifestations: the emaciation of famine-affected populations, the small stature of chronically malnourished people. But for those who survive hunger, perhaps its most damaging impact is its legacy for learning. Hunger in childhood can lead to irreversible mental stunting, lower intelligence quotients (IQs) and reduced capacities to learn. The effects are tragic for individuals and staggering for nations. It is estimated, for example, that the average IQs of the populations in over 60 countries are 10–15 points lower than they could be, because of iodine deficiencies alone (UNICEF and Micronutrient Initiative 2004).

The impacts are especially great because hunger and learning have a two-way relationship. Hunger impairs learning at each stage of life; yet learning is an effective means of addressing hunger. A vicious cycle can be created: hungry children become damaged adults with limited opportunities and capacities, who end up having hungry children of their own. Such a cycle undermines human and economic development. But this cycle can also be reversed, with good nutrition and enhanced learning reinforcing each other through the generations and leading to long-term national development.

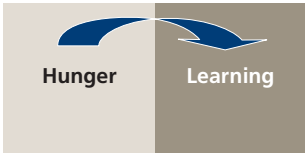
## Chapter 1: Hunger and Development

Human development can be understood as the expansion of the real opportunities that people enjoy (Sen 1999). Hunger limits those opportunities in a number of ways— by causing deaths, physical stunting and mental retardation. Each year undernutrition contributes to the deaths of nearly 6 million young children. People who have experienced (and survived) hunger in childhood may have a smaller physical stature (than their genetic potential), which can often lead to discrimination in employment for manual labour. Their minds may also have been permanently dulled, limiting their ability to analyse situations and to fully pursue their livelihoods. In all these ways, hunger narrows the opportunities available to individuals and retards human development. When aggregated over large segments of the population, it greatly impedes the economic progress of nations.

In recent decades, there has been some improvement in the global hunger situation. The proportion of undernourished people has been reduced from one-fifth to one-sixth over the past 20 years (UN Millennium Project 2005a), while the number of underweight preschool children in the developing world declined from 162.2 million to 135.5 million between 1990 and 2000 (UNSCN 2004). While this progress is important, it is not nearly enough to achieve the targets that the international community has set for itself as part of Millennium Development Goal 1: halving, between 1990 and 2015, the proportion of people who suffer from hunger. In fact, if the progress made by China is excluded, the number of undernourished people in the developing world has actually increased by 42 million since 1990 (FAO 2004).

Why is progress not on track? Part of the explanation is the increase in humanitarian crises, but by far the most important reason is the choices of political leaders. Hunger is a multi-dimensional problem that requires intersectoral interventions in relevant areas, such as health, markets, learning and emergency preparedness. But too often the necessary investments have not been made. While all these issues must be addressed in a comprehensive approach to hunger, this inaugural edition of the World Hunger Series focuses on one that offers the most promising opportunities to achieve substantial and lasting improvements: the two-way relationship between hunger and learning.

## Chapter 2: Hunger’s Impact on Learning



Understanding the relationship between hunger and learning requires a long-term perspective: what happens at one stage of life affects later stages, and what happens in one generation affects the next. Consider, first, hunger’s impact on learning.

- **Nutrition during pregnancy and the first two years of life strongly influences future mental capacity.**

Along with genetics, stimulation and socio-economic factors, the nutritional conditions during pregnancy and infancy have an important impact on the growth of the brain. After early childhood, it is still possible to improve children’s cognitive development, but their fundamental capacity has in many ways already been determined (see Figure 1).

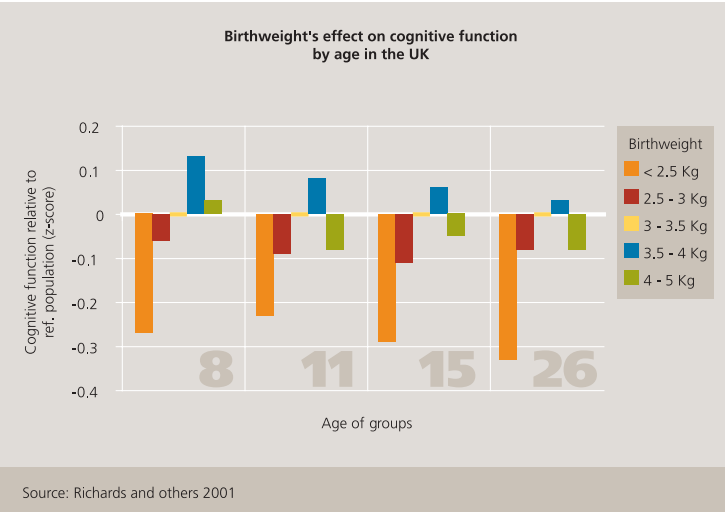
- **Hunger keeps children out of school and limits their ability to concentrate once there.**

At school age (5 to 17 years old), hunger keeps children from making the most of opportunities to learn and develop their minds. Many do not attend school, since their parents need them to stay home to help produce food or earn money to purchase it. Even when children make it to classrooms, they cannot concentrate on lessons if they are hungry.

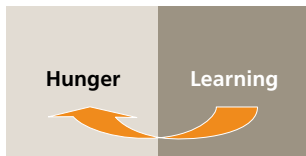
- **Hungry adults are not able to take advantage of learning opportunities and therefore transmit hunger to the next generation.**

Hunger in adulthood (18 years and older) does not have the long-term damaging impact on mental capacity that it does in earlier stages of life. But it can make it difficult to take advantage of opportunities to learn. Hungry adults have less time to focus on activities that do not have a direct payoff in improved nutrition. And they have more trouble concentrating during training. This means that they do not acquire the skills needed to address hunger for themselves and their children.

**Figure 1 — Birthweight can affect cognitive ability into adulthood**



## Chapter 3: Learning's Impact on Hunger



At each stage of life, learning can contribute to the fight against hunger.

- **Stimulation builds the basic capacity to learn in the future.**

Stimulation involves relatively simple techniques such as play, conversation, and exposure to colours or shapes. Yet it is critical to making the connections between neurons in the infant's developing brain. It does not teach any particular skills relevant to addressing hunger, but it lays the foundation for future cognitive development, allowing a person to acquire the knowledge needed to escape hunger later in life.

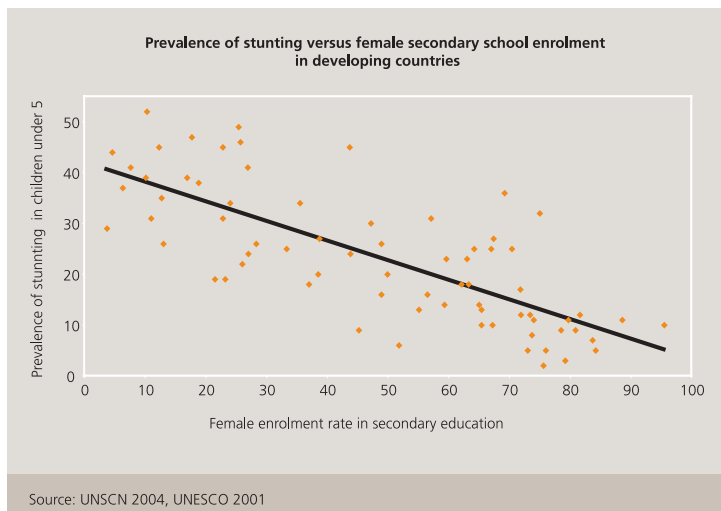
- **Schooling allows children to acquire the skills and openness necessary to address hunger at this stage of life and in the future.**

Schooling imparts a greater openness to new ideas (such as new agricultural techniques or improved hygiene) and a greater capacity to understand and apply them. A recent study demonstrated that women's level of schooling accounts for more than 40 percent of reductions in childhood malnutrition (Smith and Haddad 2000) (see also Figure 2).

- **Adults can acquire the specific skills needed to improve their nutrition — and that of the next generation.**

Microcredit programmes, agricultural extension and income-generating activities can improve production or increase the resources available to buy food. Other learning opportunities can teach better nutritional practices, such as improved hygiene and exclusive breastfeeding for the first six months. These changes in livelihoods and behaviour contribute to improvements in the nutritional status of adults — and feed back into improved prospects for their children.

**Figure 2 — Female learning is correlated with better child nutrition**



Source: UNSCN 2004, UNESCO 2001

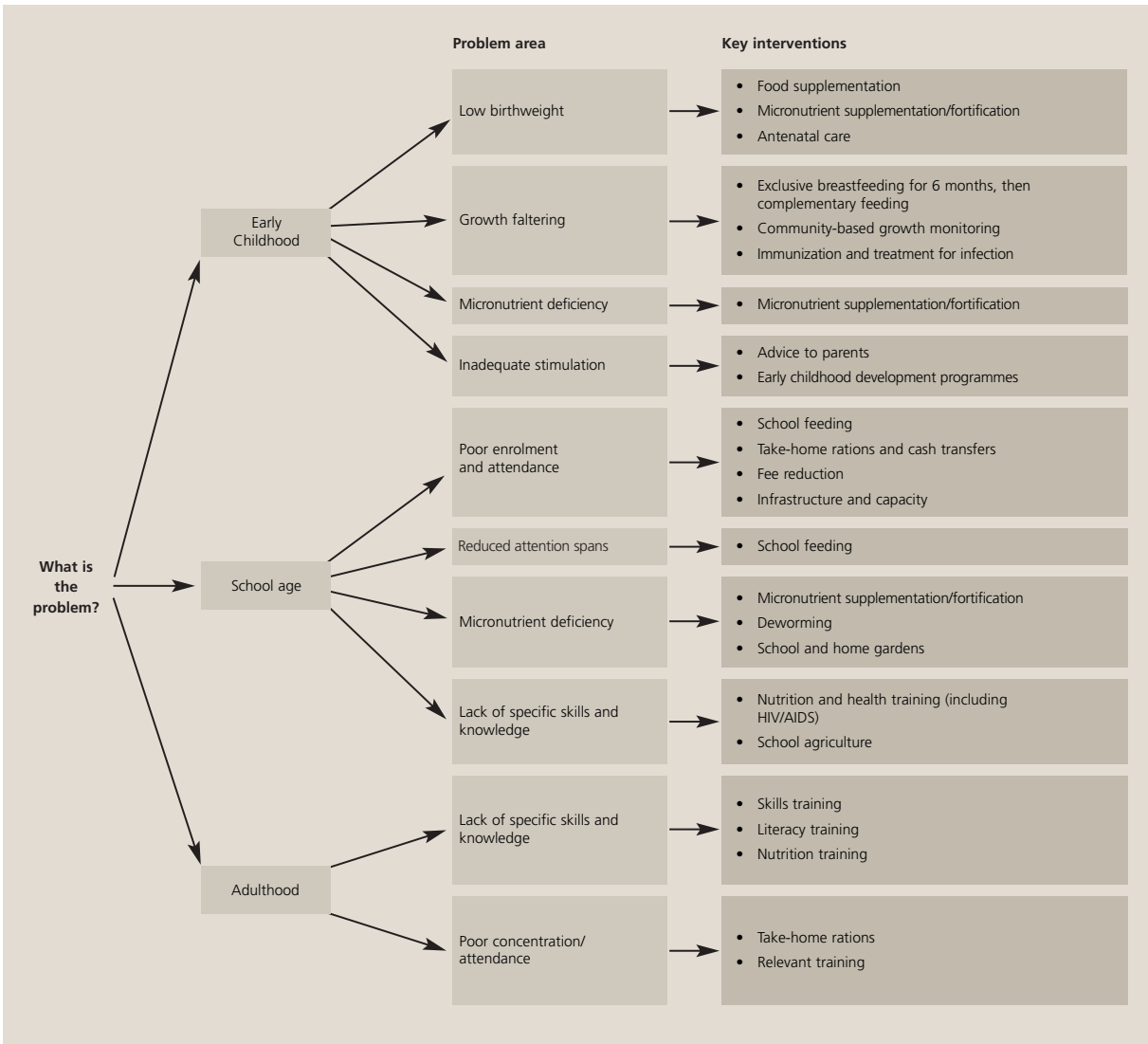
# Chapter 4: Practical Interventions

Interventions can be identified to address each of these problems — to reverse the vicious cycle of hunger and reduced learning, and create a virtuous one (see Figure 3).

• **Early childhood**

To ensure that children reach the proper birthweight and are adequately nourished in infancy, a range of interventions can be considered: food supplements; micronutrient fortification and supplementation; antenatal care (including health services and advice); exclusive breastfeeding for six months; and postnatal care (including immunizations and advice). The importance of stimulation also needs to be emphasized at postnatal clinics and in early childhood development programmes.

Figure 3 — Knowledge tree: Identifying the right interventions for hunger and learning



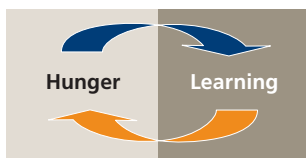
- **School age**

At this stage of life, interventions need to alter parents' calculations about the value of schooling. There are several ways to offset the opportunity costs of sending children to school, depending on the context: school feeding, take-home rations, cash transfers and reduced fees (combined with investments in educational infrastructure and capacity). School feeding can also help children concentrate once there. Children in school will become adults with greater openness and cognitive ability. And, even while in school, they can acquire skills and knowledge about hunger-related issues, such as HIV/AIDS, sanitation and hygiene.

- **Adulthood**

Learning at this stage creates opportunities to acquire and apply skills and knowledge that lead to increased agricultural production, higher incomes, better nutritional practices, and improved health and sanitation. This knowledge feeds back into improved conditions for the next generation. Adults can be motivated to take advantage of opportunities by offering economically-relevant training and, in some cases, by providing take-home rations.

## Chapter 5: Hunger, Learning and National Development



This relationship between hunger and learning affects more than the potential of individuals or households; it also helps determine the prospects for nations.

- **Human development**

Improved nutrition and learning are associated with new possibilities — to take on more fulfilling and productive work, to be able to read books, to participate in local council meetings, to protect loved ones from infections, to choose more nutritious foods, to enjoy an evening free from worry. These returns improve prospects for the next generation, which grows up less hungry and more knowledgeable and has even greater potential to secure a better future for their own children. At an aggregate level, these improvements in nutrition and learning expand opportunities and choices for millions of people — national development, in the truest sense.

- **Economic growth**

The relationship between hunger and learning shapes a nation's economic growth in two ways. First, improved nutrition leads to a better-educated workforce that has a higher level of talents and skills, or human capital. High quality human capital is a critical factor in economic development (Barro 1998; Lucas 1988; Lucas 1990; Romer 1986; Romer 1993). The talents and skills create a productive workforce more capable of generating high-value outputs. By contrast, the economic burdens and human capital losses due to illiteracy and ill-health can drain a government of resources. Second, greater learning contributes to a better-nourished, stronger workforce. As a result, more people are able to actively participate in the economy, and the effectiveness and efficiency of those who are already engaged increases dramatically (Fogel 2004).

A developed society often has more capacity to put resources back into addressing hunger and inadequate learning at the start of the lifecycle. Economic development leads to the potential for a greater tax base. At the same time, broad indicators of social development such as fertility rates and infant mortality also tend to improve in societies that have addressed hunger and learning issues. These changes help to reduce the burden of population growth and ill-health. The nation is better able to support the next generation, and the cycle is renewed and reinforced. Development, then, is a process, requiring a long-term vision informed by an understanding of how these relationships help to sustain it.

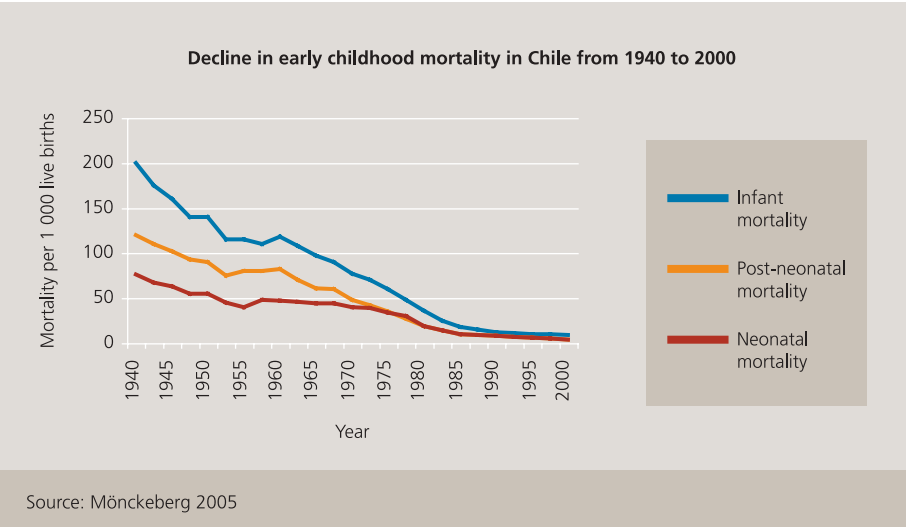
## Chapter 6: Political Choices

It is easy to identify potential interventions and to point out the critical importance of action for national development. But a concerned policymaker will immediately respond with a barrage of legitimate queries: How can we create political support for these interventions? How can we pay for them? How do they relate to other initiatives? The answers are critical to successful interventions in the real world. Lessons from a number of countries offer some suggestions (see Figure 4).

- **Creating political will**

Several strategies exist. One is to identify champions — high-ranking officials who understand the importance of the issues and can move them up the political agenda. Another strategy is to engage the support and interest of the media, used in both Chile and Thailand to raise awareness about the severity of the nutritional problem — and to mobilize action. Perhaps the most effective way to ensure attention to hunger and learning issues over the long run is to have relevant programmes legally mandated and therefore protected.

Figure 4 — Political choices reduced early childhood mortality in Chile





- **Overcoming resource constraints**

Resource concerns sometimes arise from a misunderstanding about costs and benefits. Nutrition interventions for early childhood, for instance, have long-term benefits that far exceed the initial costs. In some cases, programmes such as school feeding can be made more affordable through cost-saving measures. It is important to remember that a number of countries (including Chile, Indonesia and Thailand) have made these investments in nutrition and learning while they were still relatively poor; their economic growth was more a result than a cause of these investments, at least at the outset.

- **Promoting intersectoral work**

Consideration must go, in the first place, to sequencing interventions. Training hungry adults, for instance, on income-generating activities or literacy will have limited value if no opportunities yet exist to apply that knowledge to improve livelihoods and reduce hunger. Once a sequenced strategy is developed, the challenge is to find ways to involve all the necessary ministries for intersectoral interventions. Champions for a programme need to ensure that different ministries (e.g. education, health and agriculture) recognize the value of the interventions for achieving their own goals.

## Chapter 7: The Way Forward

It may be possible to overcome the challenges, but how do policymakers begin to address the problems of hunger and inadequate learning? Five basic steps are required to implement effective strategies: situation analysis, strategy formulation, resource mobilization, implementation, and monitoring and accountability. Both national governments and the international community need to be involved.

- **Situation analysis**

At the national level, a situation analysis involves assessing the current conditions related to hunger and learning in the country. The analysis must determine where hunger and inadequate learning — and future vulnerability — exist at the subnational level. Mapping tools that show the geographic locations of problems have been successfully used in many countries. At the international level, the amount of progress on the two indicators for the Hunger Target of Millennium Development Goal 1 can be used to identify countries that need particular assistance (see Figure 5).

- **Strategy formulation**

National level strategies usually exist, but they often need to be modified to take hunger and inadequate learning issues into greater consideration. There are several principles that should be kept in mind in developing effective strategies. For instance, it is important to take a lifecycle approach, but priority should be given to early interventions. Having clear objectives, sequencing programmes, scaling them up, and looking at them in the broader context are also all essential to a successful strategy. At the international level, intervention strategies can be tailored for low, medium and high need countries based on their performance on the Hunger Target indicators.

• Resource mobilization

There are three basic funding sources at the national level: domestic government (and private) resources; external finance, or donor assistance; and out-of-pocket expenditures by beneficiaries. While all can be drawn on, governments must take the lead in funding efforts to address hunger and learning. The international community must also mobilize to support governments, considering innovative financing mechanisms and providing assistance in ways that offer countries more decision-making power.

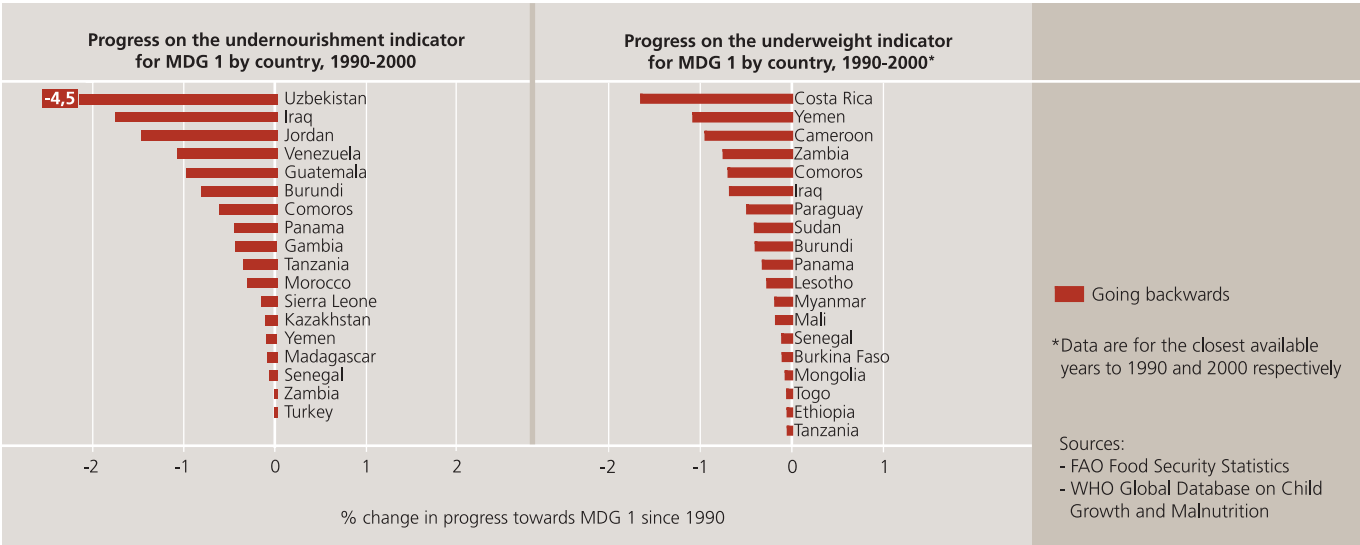
• Implementation

National level implementation involves identifying key partners, developing an institutional framework, creating an action plan, and learning from past experiences. At the international level, a global partnership is required. Actions might include assisting governments to mainstream hunger reduction and improved learning, and providing technical support for interventions.

• Monitoring and accountability

Careful monitoring and evaluation at the national level is key to assessing the effectiveness, efficiency and continued relevance of the strategy — and to making any needed changes in approach. At the end of an implementation phase, the monitoring and evaluation data make it possible to conduct a new situation analysis and begin the steps again. The strategies have a far greater chance of succeeding if there is genuine accountability, usually in the form of democratic institutions and a strong civil society. At the international level, mechanisms must also be put in place to ensure that donor countries fulfil their pledges in support of the Hunger Target of Millennium Development Goal 1.

Figure 5 — Undernourishment and underweight indicators are actually worsening in some developing countries



## Conclusion

This report argues that understanding the relationship between hunger and learning is critical for achieving both individual and national development. Several key messages emerge:

- Hungry children must be reached as early as possible: hunger has its most damaging and long-lasting impacts on learning when it occurs in early childhood and, to a lesser extent, at school age.
- To be sustainable, targeted interventions in nutrition and learning are needed at appropriate points throughout life, creating a virtuous cycle of good nutrition and learning through the generations.
- There are challenges to implementing these programmes, but solutions can be found in the positive experiences of many countries.
- National governments must take the lead, but they require the full support of the international community.

In the end, the decision to act is political. Where these investments have been made, the improvements in human and economic terms have been enormous. But these actions required far-sighted leaders who recognized that the greatest returns would be seen 10 or 20 years in the future — and that these benefits would be more than commensurate with the patience and commitment of the effort.

### What is hunger?

Most people intuitively understand the physical sensation of being hungry. But specialists who work on hunger issues have developed a range of technical terms and concepts to help them better describe and address the problem. Unfortunately, there is some disagreement on what these terms mean and how they relate to each other. These pages provide a short glossary of how these terms and concepts are used in this report. It cannot claim to be the only 'correct' usage, but it does offer a relatively clear and consistent way of understanding the issues.

**Hunger.** A condition in which people lack the required nutrients (protein, energy, and vitamins and minerals) for fully productive, active and healthy lives. Hunger can be a short-term phenomenon, or a longer-term chronic problem. And it can have a range of severities from mild to clinical. It can result from people not taking in sufficient nutrients or their bodies not being able to absorb the required nutrients.

**Malnutrition.** A clinical condition in which people experience either nutritional deficiencies (undernutrition) or an excess of certain nutrients (overnutrition).

**Undernutrition.** The clinical form of hunger that results from serious deficiencies in one or a number of nutrients (protein, energy, and vitamins and minerals). The deficiencies impair a person from maintaining adequate bodily processes, such as growth, pregnancy, lactation, physical work, cognitive function, and resisting and recovering from disease.

**Undernourishment.** The condition of people whose dietary energy consumption is continuously below a minimum requirement for fully productive, active and healthy lives. It is determined using a proxy indicator that estimates whether the food available in a country is sufficient to meet the energy (but not the protein, vitamin and mineral) requirements of the population. Unlike undernutrition, the indicator does not measure an actual outcome.

**Short-term hunger.** A transitory non-clinical form of hunger that can affect short-term physical and mental capacity. In this report, it often pertains to school children who have missed breakfast or have walked long distances to school on a relatively empty stomach.

**Food security.** A condition that exists when all people at all times are free from hunger — that is, they have sufficient nutrients (protein, energy, and vitamins and minerals) for fully productive, active and healthy lives.

#### What is the difference between hunger and undernutrition?

Undernutrition is the clinical form of hunger. It can be measured using indicators such as:

- weight-for-age (underweight);
- height-for-age (stunting); and
- weight-for-height (wasting).

However, hunger also includes milder forms that do not register clinically, but nevertheless impair physical and mental activity, often on a short-term basis.

In some cases, undernutrition can be caused by disease, which can influence the adequacy of food intake and/or its absorption in the body (and therefore the level of hunger). Disease affects

the adequacy of food intake by altering metabolism (thus increasing the requirements for the intake of nutrients) and reducing appetite (thus often lowering the amount of food ingested). At the same time, disease may cause problems of absorption through the loss of nutrients (e.g. vomiting, diarrhoea) or its interference with the body's mechanisms for absorbing them. Of course, disease often has many other serious and debilitating effects not directly related to its impact on hunger.

### What is the difference between hunger and food insecurity?

The concept of food security provides insights into the causes of hunger. Food security has four parts:

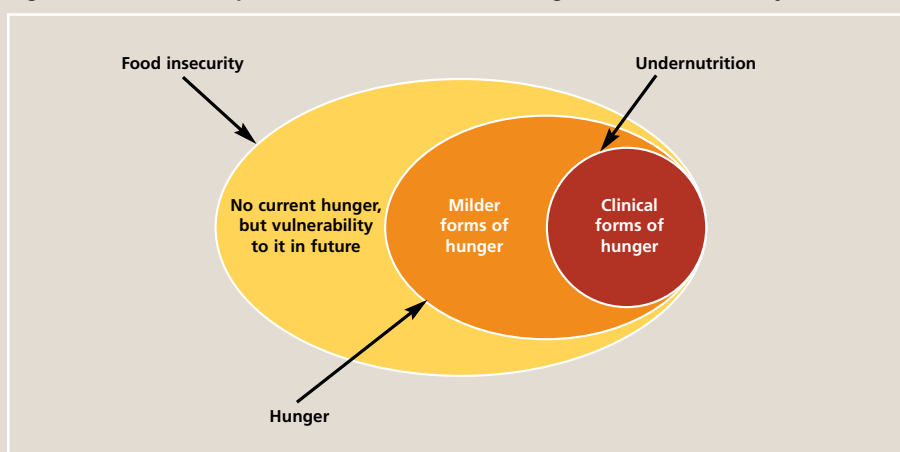
- Availability (the supply of food in an area);
- Access (a household's ability to obtain that food);
- Utilization (a person's ability to select, take in and absorb the nutrients in the food); and
- Vulnerability (the physical, environmental, economic, social and health risks that may affect availability, access and use) (WFP 2002; Webb and Rogers 2003).

Food insecurity, or the absence of food security, is a state that implies either hunger (due to problems with availability, access and use) or vulnerability to hunger in the future.

### How are undernutrition, hunger and food insecurity related?

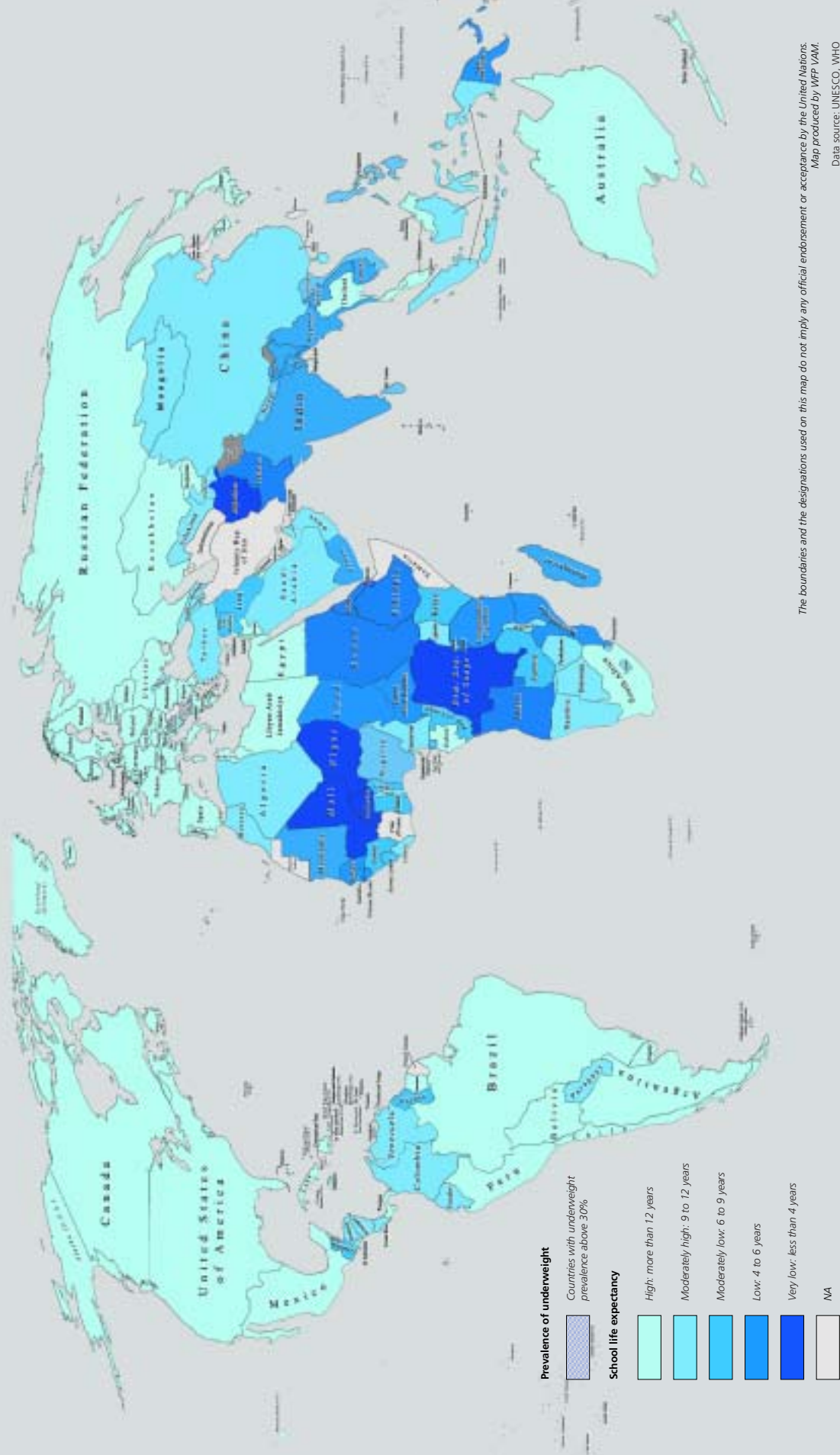
Undernutrition, hunger, and food insecurity are 'nested' concepts. Undernutrition is a subset of hunger, which in turn is a subset of food insecurity. As we have seen, hunger includes both clinical forms (undernutrition) and milder forms, while food insecurity occurs when a person is either hungry or vulnerable to hunger in the future (see Figure 6).

Figure 6 — Relationship between undernutrition, hunger and food insecurity




i This terminology is used for convenience. In fact, protein, carbohydrates and fat are all sources of energy. So, properly speaking, protein and energy should not be separate categories. However, protein is such an important source of energy (because it contains essential amino acids) that it is broken out here, with energy referring to carbohydrates and fats.

# Hunger and learning across the world



The boundaries and the designations used on this map do not imply any official endorsement or acceptance by the United Nations.  
Map produced by WFP/FAO.  
Data source: UNESCO, WHO



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“Why do so many men, women and children still go to bed hungry? It is not for a lack of evidence that hunger drains national as well as community and family resources. The physical, mental and social impacts are extensively documented. Yet hunger persists on a scale that is a global scandal.

The ‘World Hunger Series’ makes an important contribution to focusing global attention on the pressing global problem of hunger that affects so many countries and such a large segment of the world’s population.”

**Nevin S. Scrimshaw**

President, International Nutrition Foundation  
Senior Advisor, Food and Nutrition Programme, United Nations University  
World Food Prize Laureate

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“In this report, the United Nations World Food Programme has assembled the overwhelming evidence for the extent to which hunger, pre- and post-natal, damages the child’s ability to learn. Individual and national economic and personal growth are correspondingly damaged. The report is scrupulous in confining itself to evidence-based generalizations. It concludes with recommendations for action based on actual experiences.”

**Kenneth J. Arrow**

Professor of Economics (Emeritus), Stanford University  
Nobel Laureate in Economics



United Nations  
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