2010

GLOBAL HUNGER INDEX

THE CHALLENGE OF HUNGER: FOCUS ON THE CRISIS OF CHILD UNDERNUTRITION

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IFPRI® INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE

CONCERN worldwide

2010

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THE CHALLENGE OF HUNGER: FOCUS ON THE CRISIS OF CHILD UNDERNUTRITION

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The causes of child hunger and undernutrition are **predictable and preventable,** and can be addressed through affordable means.

World Food Programme, 2006

FOREWORD

Global food security is currently under stress. Although the world's leaders, through the first Millennium Development Goal, adopted a goal of halving the proportion of hungry people between 1990 and 2015, we are nowhere near meeting that target. The percentage of undernourished people fell from 20 percent in 1990–92 to 16 percent in 2004–06. In recent years, however, the number of hungry people has actually been increasing. In 2009, on the heels of a global food price crisis and in the midst of worldwide recession, the number of undernourished people surpassed 1 billion, although recent estimates by the Food and Agriculture Organization of the United Nations suggest that number will have dropped to 925 million in 2010. Within this group, one population is especially vulnerable – young children. Undernutrition in the first two years of life threatens a child's life and can jeopardize physical, motor and cognitive development. For those who survive, having been undernourished during the first two years of life can cause irreversible, long-term damage. It is therefore of particular importance that we take concerted action to combat hunger, especially among young children. This is the central thematic focus of the Global Hunger Index 2010, published jointly by the International Food Policy Research Institute (IFPRI), Concern Worldwide, and Welthungerhilfe.

2010 is the fifth year that the International Food Policy Research Institute has calculated the Global Hunger Index and analyzed this multidimensional measure of global hunger. This series of reports records the state of hunger worldwide and country by country, drawing attention to the countries and regions where action is most needed. In this way, the reports support both national and international policy efforts and advocacy work.

This report offers a picture of the past, not the present. The calculation of the GHI is limited by the data collection of governments and international agencies, and up-to-the-minute data on global hunger are simply not available. The 2010 GHI incorporates the most recent data available and thus does not reflect the impact of the latest economic events.

It does, however, identify the countries and regions where hunger is most severe and persistent. Twenty-nine countries have levels of hunger that are alarming or extremely alarming. Among the world's regions, South Asia and Sub-Saharan Africa continue to suffer from the highest levels of hunger. It is important to remember that these results represent extreme suffering for millions of people.

The 2010 GHI also highlights a key component of hunger – early childhood undernutrition. Chapter 3 explains how poor nutrition among children younger than the age of two can have lifelong consequences for health, productivity, and economic performance. It argues that addressing early childhood undernutrition is urgent if improvements in reducing global hunger are to be achieved. Along these lines, Chapter 4 describes two projects, carried out by Concern Worldwide and Welthungerhilfe, designed to combat early childhood undernutrition.

We hope that this report will not only generate discussion, but also spur worldwide action to overcome hunger, especially among young children.

Dr. Wolfgang Jamann
Secretary General and
Chairperson
Welthungerhilfe

Dr. Shenggen Fan
Director General
International Food Policy
Research Institute

Tom Arnold
Chief Executive
Concern Worldwide

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SUMMARY

As the world approaches the 2015 deadline for achieving the Millennium Development Goals (MDGs) – which include a goal of reducing the proportion of hungry people by half – the 2010 Global Hunger Index (GHI) offers a useful and multidimensional overview of global hunger. The 2010 GHI shows some improvement over the 1990 GHI, falling by almost one-quarter. Nonetheless, the index for hunger in the world remains at a level characterized as "serious." This result is unsurprising given that the overall number of hungry people surpassed 1 billion people in 2009.

The highest regional GHI scores are for South Asia and Sub-Saharan Africa, but South Asia has made much more progress since 1990. In South Asia, the low nutritional, educational, and social status of women is among the major factors that contribute to a high prevalence of underweight in children under five. In contrast, in Sub-Saharan Africa, low government effectiveness, conflict, political instability, and high rates of HIV and AIDS are among the major factors that lead to high child mortality and a high proportion of people who cannot meet their calorie requirements.

Some countries achieved significant absolute progress in improving their GHI. Between the 1990 GHI and the 2010 GHI, Angola, Ethiopia, Ghana, Mozambique, Nicaragua, and Vietnam saw the largest improvements.

Twenty-nine countries still have levels of hunger that are "extremely alarming" or "alarming." The countries with "extremely alarming" 2010 GHI scores – Burundi, Chad, the Democratic Republic of Congo, and Eritrea – are in Sub-Saharan Africa. Most of the countries with "alarming" GHI scores are in Sub-Saharan Africa and South Asia. The largest deterioration in GHI scores was seen in the Democratic Republic of Congo, largely because of conflict and political instability.

Economic performance and hunger are inversely correlated. Countries with high levels of gross national income (GNI) per capita, an important measure of economic performance, tend to have low 2010 GHI scores, and countries with low levels of GNI per capita tend to have high GHI scores. These relationships do not always hold, however. Conflict, disease, inequality, poor governance, and gender discrimination are factors that can push a country's level of hunger higher than what would be expected based on its income. In contrast, pro-poor economic growth, strong agricultural performance, and increasing gender equity can reduce hunger below what would be expected based on income.

The high prevalence of child undernutrition is a major contributor to persistent hunger. Globally, the biggest contributor to the world GHI score is child underweight. Although the percentage of underweight in children under the age of five is only one of three elements in the GHI, it accounts for nearly half of the world GHI score. Child undernutrition is not spread evenly across the globe, but instead is concentrated in a few countries and regions. More than 90 percent of the world's stunted children (children whose height is low for their age) live in Africa and Asia, where rates of stunting are 40 percent and 36 percent respectively.

To improve their GHI scores, countries need to accelerate progress in reducing child undernutrition. Recent evidence shows that the window of opportunity for improving child nutrition spans the period from -9 to +24 months (that is, the 1,000 days between conception and a child's second birthday). This is the period when children are in greatest need of adequate amounts of nutritious food, preventive and curative health care, and age-appropriate care practices for healthy development and when interventions are most likely to prevent undernutrition from setting in. After age two, the effects of undernutrition are largely irreversible.

To reduce child undernutrition, governments should invest in effective nutrition interventions targeted to mothers and children during the window of opportunity. These interventions should focus on improving maternal nutrition during pregnancy and lactation, promoting sound breastfeeding and complementary feeding practices, providing essential micronutrients, and adopting salt iodization, while also ensuring appropriate immunization. Achieving high coverage of these interventions could have a rapid impact on improving early childhood nutrition. Governments should also adopt policies that deal more broadly with the underlying causes of undernutrition such as food insecurity, lack of access to health services, and poor caring and feeding practices, which are exacerbated by poverty and gender inequity. Poverty-reduction strategies focused on reducing inequities are therefore part of the solution for improving early childhood nutrition, as are policies specifically aimed at improving the health, nutrition, and social status of girls and women.

01

Undernutrition is the **main threat** to health and well-being not only in middle- and low-income countries but also globally.

United Nations Standing Committee on Nutrition, 2006

THE CONCEPT OF THE GLOBAL HUNGER INDEX

The Global Hunger Index (GHI) is a tool adapted and further developed by the International Food Policy Research Institute (IFPRI) to comprehensively measure and track global hunger.[1] The GHI incorporates three interlinked hunger-related indicators – the proportion of undernourished in the population, the prevalence of underweight in children, and the mortality rate of children (see box on pages 8 and 9 for information on how the GHI is calculated and for definitions of different concepts of hunger).[2] The GHI aims to raise awareness of regional and country differences in hunger and trigger action to eliminate hunger. Targeted at a wide range of audiences – including policymakers, donors, nongovernmental organizations, educators, the media, and the broader public – the GHI provides insights into the drivers of hunger and highlights successes and failures in hunger reduction.

This year's GHI reflects data from 2003 to 2008 – the most recent available global data on the three GHI components – and thus does not yet take account of the latest changes in hunger. For some countries suffering from moderate to severe hunger, such as Afghanistan, Iraq, Papua New Guinea, and Somalia, insufficient data are available to calculate the GHI. For a more complete and current assessment of the state of global hunger, more up-to-date and wider-coverage country data on hunger are urgently needed. Even though abundant technological tools exist to collect and assess data almost instantaneously, there are still enormous time lags when it comes to reporting vital statistics on hunger. Collecting high-quality food consumption data remains a tedious and time-consuming task that requires specialized skills.

The 2010 GHI and the 1990[3] GHI presented in this report include the latest revised data for the three components and the data used for estimating the GHI components where original source data were not available. Compared with the data in the 2009 GHI report, the child mortality component for the 1990 GHI has been revised this year to reflect the latest updates from the United Nations Children's Fund (UNICEF). In addition, revised calorie availability data from the Food and Agriculture Organization of the United Nations (FAO) were used for both the 1990 GHI and the 2010 GHI child underweight estimates. Although these enhancements in the underlying data improve the quality of the GHI, they also mean that the country, regional, and world 2010 GHI values and revised 1990 GHI values are not directly comparable to previously calculated GHI values (for more information on previous GHI calculations, see von Grebmer et al. 2009; von Grebmer et al. 2008; IFPRI/Welthungerhilfe/Concern 2007; Wiesmann 2006a, b; and Wiesmann, Weingärtner, and Schöninger 2006).

Data on the proportion of undernourished are for 2004–06 (FAO 2009); data on child mortality are for 2008 (UNICEF 2009a); and data on child underweight are for the latest year in the period 2003–08 for which data are available (WHO 2010a; UNICEF 2010; and MEASURE DHS 2010). Data for the 1990 GHI are for 1988–92. The data on the proportion of undernourished are for 1990–92 (FAO 2009); data on child mortality are for 1990 (UNICEF 2009a); and data on child underweight are for 1988–92 (WHO 2010a). See Appendix A for more detailed background information on the data sources for and calculations of the 1990 GHI and 2010 GHI.

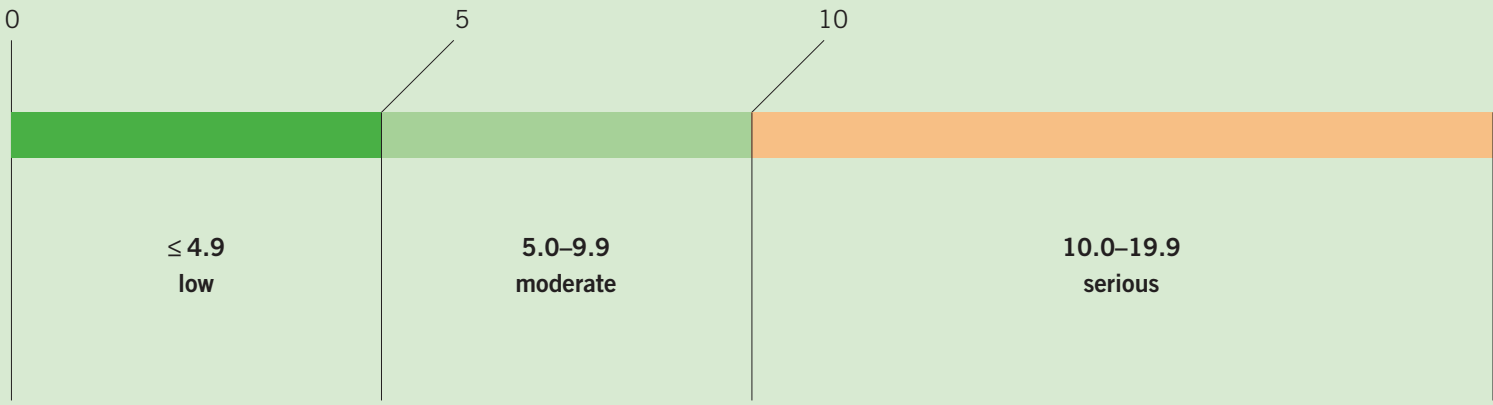
The 2010 GHI is calculated for 122 countries for which data on the three components are available and for which measuring hunger is considered most relevant (some higher-income countries are excluded from the GHI calculation because the prevalence of hunger is very low).

[1] For background information on the concept, see Wiesmann (2004) and Wiesmann, von Braun, and Feldbrügge (2000).

[2] For a multidimensional measure of poverty, see the index developed by the Oxford Poverty and Human Development Initiative (OPHI) for the United Nations Development Programme (Alkire and Santos 2010).

[3] The year 1990 was chosen for comparison because it is a reference point for achieving the Millennium Development Goals.

WHAT IS THE GLOBAL HUNGER INDEX?

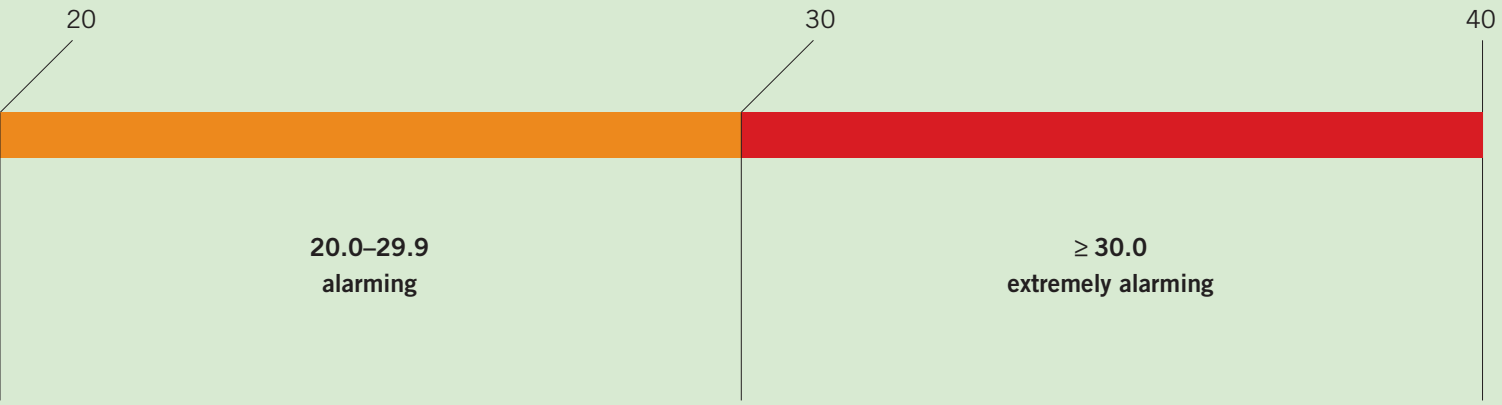


The GHI is based on a multidimensional approach to measuring and tracking hunger. It combines three equally weighted indicators:

1. The proportion of undernourished as a percentage of the population (reflecting the share of the population with insufficient dietary energy intake);
2. The prevalence of underweight in children under the age of five (indicating the proportion of children suffering from low weight for their age); and
3. The mortality rate of children under the age of five (partially reflecting the fatal synergy between inadequate dietary intake and unhealthy environments).

The multidimensional approach of the GHI offers several advantages. It captures various aspects of hunger in one index number, thereby presenting a quick overview of a complex issue. It takes account of the nutrition situation not only of the population as a whole, but also of a physiologically vulnerable group – children – for whom a lack of nutrients causes a high risk of illness, poor physical and cognitive growth, and death. In addition, by combining independently measured indicators, it reduces the effects of random measurement errors.

The index ranks countries on a 100-point scale, with 0 being the best score (no hunger) and 100 being the worst, although neither of these extremes is reached in practice. Values less than 5.0 reflect low hunger, values between 5.0 and 9.9 reflect moderate hunger, values between 10.0 and 19.9 indicate a serious problem, values between 20.0 and 29.9 are alarming, and values of 30.0 or higher are extremely alarming.



CONCEPTS OF HUNGER

The terminology used to refer to different concepts of hunger can be confusing. "Hunger" is usually understood to refer to the discomfort associated with lack of food. The FAO defines it specifically as consumption of fewer than about 1,800 kilocalories a day – the minimum that most people require to live a healthy and productive life. The term "undernutrition" signifies deficiencies in energy, protein, essential vitamins and minerals, or any or all of these (see box on page 22 for further description of child undernutrition). Undernutrition is the result of inadequate intake of food – in terms of either quantity or quality – or poor utilization of nutrients due to infections or other illnesses, or a combination of these two factors. "Malnutrition" refers more broadly to both undernutrition (problems of deficiencies) and overnutrition (problems of unbalanced diets, such as consumption of too many calories in relation to requirements with or without low intake of micronutrient-rich foods). Both conditions contribute to poor health. In this report, "hunger" refers to the index based on the three indicators described on page 8.

02

The 2010 world GHI shows some improvement over the 1990 world GHI. Nonetheless, the index for hunger in the world remains at a level characterized as **serious.**

GLOBAL, REGIONAL, AND NATIONAL TRENDS

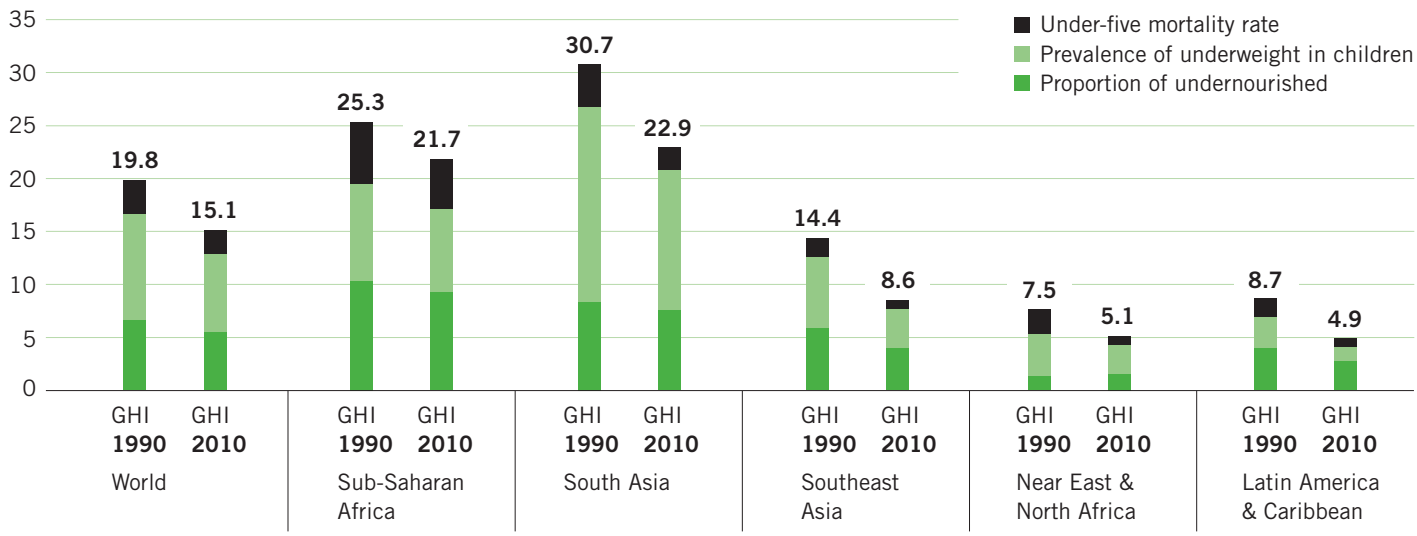
The 2010 world[1] GHI shows some improvement over the 1990 world GHI, falling from 19.8 to 15.1 or by almost one-quarter (see chart below). The contribution of the proportion of underweight children under five in the world GHI declined by 2.6 points, and the under-five mortality rate and the proportion of undernourished also improved. The index for hunger in the world, however, remains serious. In fact, the overall number of hungry people, as measured by the FAO, surpassed 1 billion people in 2009, though new estimates suggest that number will have dropped to 925 million in 2010 (FAO 2009; FAO 2010a).

The picture varies greatly by region and country. The 2010 GHI score fell by 14 percent in Sub-Saharan Africa compared with the 1990 score, by about 25 percent in South Asia, and by 33 percent in the Near East and North Africa. Progress in Southeast Asia and Latin America and the Caribbean was especially great, with the GHI scores decreasing by 40 percent and more.

The highest regional GHI scores are for South Asia, at 22.9, and Sub-Saharan Africa, at 21.7, but South Asia has made much more progress since 1990 and the causes of hunger in the two regions are different. In South Asia, the low nutritional, educational, and social status of women is among the major factors that contribute to a high prevalence of underweight in children under five. In contrast, in Sub-Saharan Africa, low government effectiveness,[2] conflict, political instability, and high rates of HIV and AIDS are among the major factors that lead to high child mortality and a high proportion of people who cannot meet their calorie requirements.

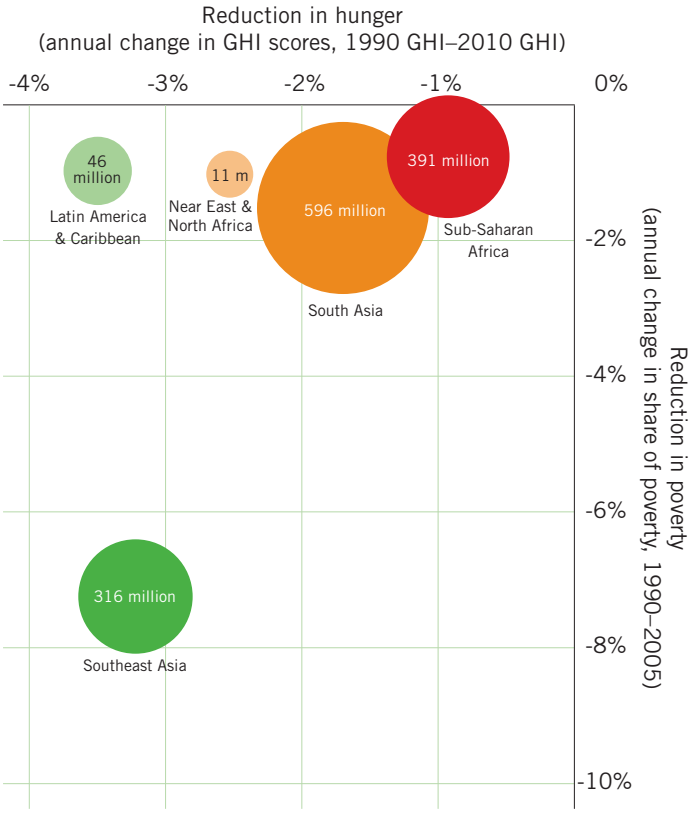
Progress in hunger reduction – measured by the annual reduction in GHI scores – often goes hand in hand with poverty reduction (see chart on the top of page 12). This finding is not surprising given that poverty is one of the key underlying causes of undernourishment, underweight in children, and child mortality. In South Asia, which is home to the largest number of poor people, poverty and hunger are slowly decreasing at about the same pace. Hunger reduction, however, sometimes outpaces poverty reduction and vice versa. In Southeast Asia, for example, poverty fell by nearly 8 percent a year while the GHI decreased by only about 3 percent. In Latin America and the Caribbean, on the other hand, poverty declined by only 1 percent while the GHI declined by 3.5 percent.

CONTRIBUTION OF COMPONENTS TO 1990 GHI (BASED ON DATA FROM 1988–92) AND 2010 GHI (BASED ON DATA FROM 2003–08)



Note: For the 1990 GHI, data on the proportion of undernourished are for 1990–92; data on child underweight are for the latest year in the period 1988–92 for which data are available; and data on child mortality are for 1990. For the 2010 GHI, data on the proportion of undernourished are for 2004–06, data on child underweight are for the latest year in the period 2003–08 for which data are available, and data on child mortality are for 2008.

HUNGER AND POVERTY REDUCTION BY REGION

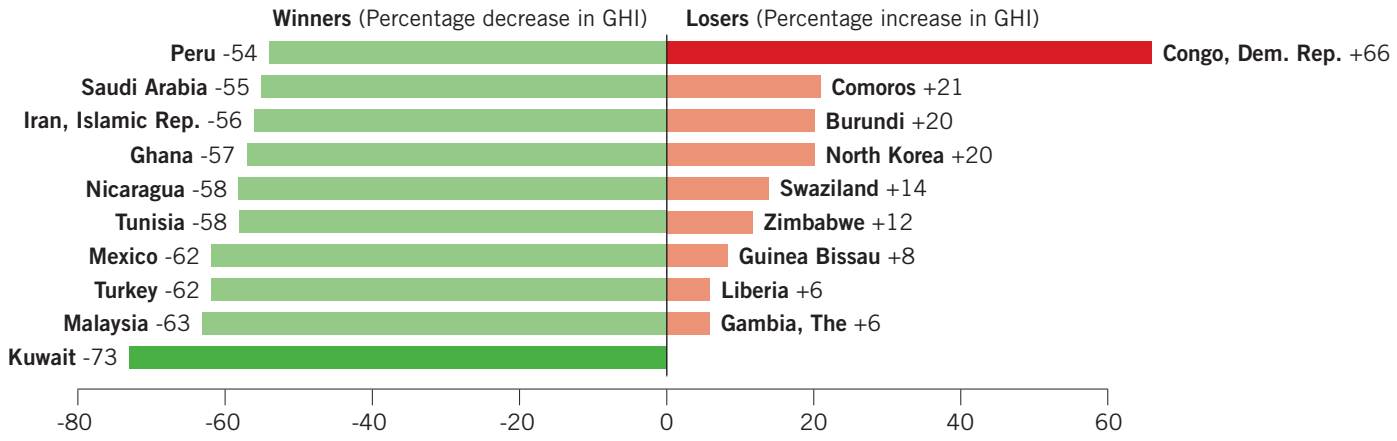


Source: Data on poverty from Chen and Ravallion (2008).
Note: The reference year used for the 2010 GHI in the annual change calculations is 2006.
The size of the bubbles represents millions of poor people in each region in 2005.

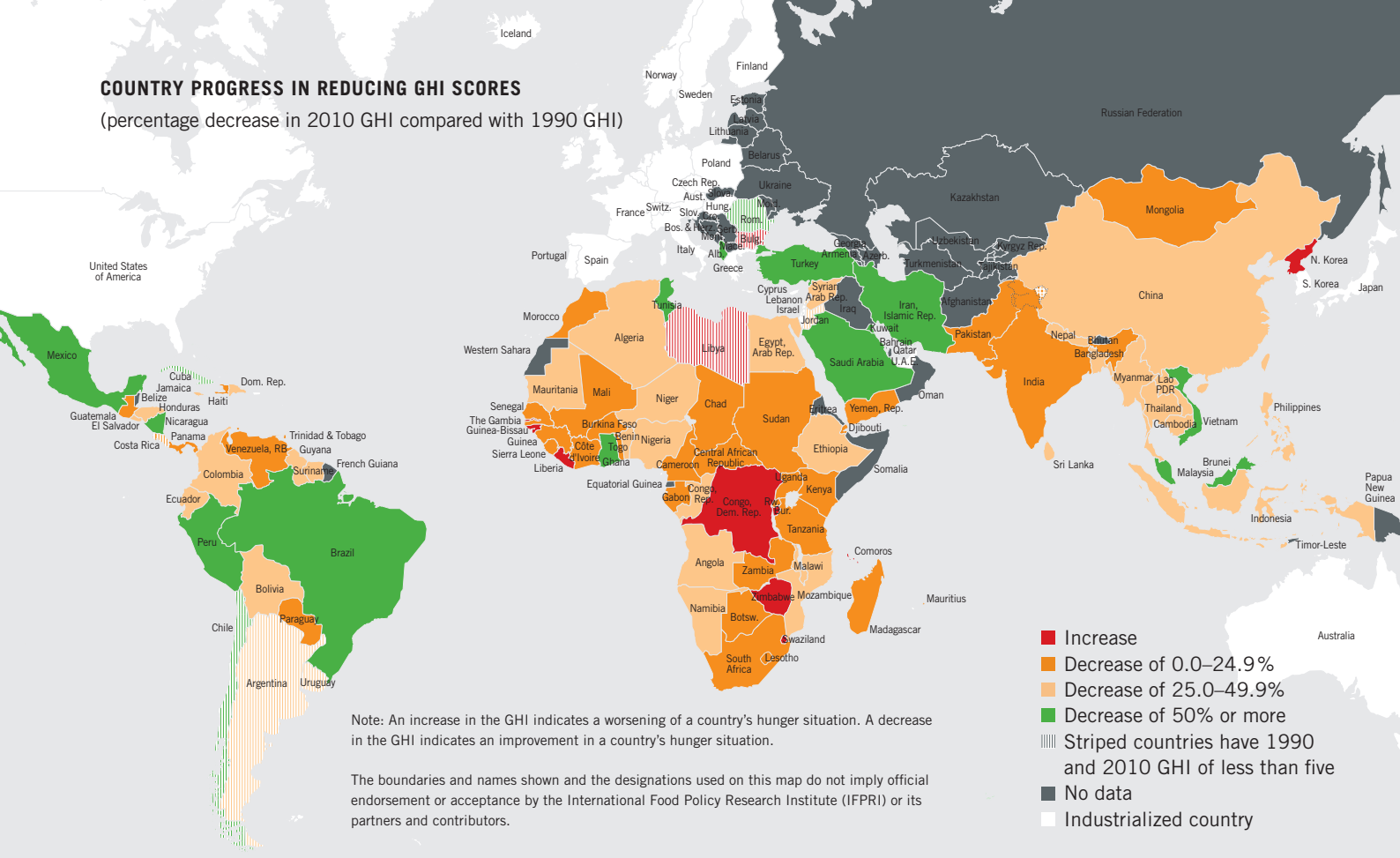
From the 1990 GHI to the 2010 GHI, not many countries were able to reduce their scores by 50 percent or more (see map on page 13). About one-third of the countries made modest progress, reducing their GHI scores by between 25 and 49.9 percent, and another third decreased their GHI scores by between 0 and 24.9 percent. Only one country in Sub-Saharan Africa – Ghana – is among the 10 best performers in improving their GHI score since 1990 (see chart below). Kuwait's seemingly remarkable progress in reducing hunger is mainly due to its unusually high level in 1990, when Iraq invaded the country. The second-best performer, Malaysia, reduced hunger through a dramatic reduction in the prevalence of child underweight (see box on page 13).

Among the nine countries in which the GHI rose (all in Sub-Saharan Africa, except for North Korea), the Democratic Republic of Congo is a clear outlier, with the GHI increasing by more than 65 percent. Conflict and political instability have increased hunger in that country (see box on page 13), as well as in Burundi, Comoros, Guinea-Bissau, and Liberia. In Swaziland, the high prevalence of HIV and AIDS, coupled with high inequality, has severely undermined food security despite higher national incomes. Negative trends in economic growth and food production in North Korea have increased rates of undernourishment. In the Gambia, undernourishment deteriorated in part due to lower social protection spending for vulnerable households. In Zimbabwe, once regarded as the breadbasket of Africa, the economic collapse has increased the proportion of underweight children and child mortality (for more information on the relationship between economic performance and hunger, see box on page 14).

GHI WINNERS AND LOSERS FROM 1990 GHI TO 2010 GHI



Note: Countries with both 1990 GHI less than five and 2010 GHI less than five are excluded.



Some countries achieved noteworthy absolute progress in improving their GHI scores. Between the 1990 GHI and the 2010 GHI, Angola, Ethiopia, Ghana, Mozambique, Nicaragua, and Vietnam saw the largest improvements – by more than 13 points – in their scores. In the Democratic Republic of Congo and Burundi, however, the GHI rose by 16 and 7 points respectively.

Twenty-nine countries still have levels of hunger that are "extremely alarming" or "alarming" (see map on pages 18 and 19). The countries with extremely alarming 2010 GHI scores – Burundi, Chad, the Democratic Republic of Congo, and Eritrea – are in Sub-Saharan Africa. Most of the countries with alarming GHI scores are in Sub-Saharan Africa and South Asia.

MALAYSIA'S RAPID IMPROVEMENTS IN NUTRITION

Malaysia's prevalence of undernourishment and child mortality rate have been low for several decades, but the prevalence of underweight in children under five has been considerably higher. Yet from 1990 to 2005, the proportion of underweight in children markedly decreased, from 22.1 to 7.0 percent. This impressive reduction in child underweight can be attributed to rapid economic growth as well as government and nongovernment nutrition interventions targeted to women and young children. Historically, nutrition and health have been priorities for the government, and more recently, the country has put in place comprehensive national plans for nutrition. Major nutrition interventions include food aid for the families of poor and malnourished children, supplementary feeding programs for preschool and primary school children, micronutrient supplements for pregnant mothers, and nutrition education activities (Khor 2005).

ACUTE AND PERSISTENT FOOD INSECURITY IN THE DEMOCRATIC REPUBLIC OF CONGO

The Democratic Republic of Congo has the highest proportion of undernourished people – three-quarters of the population – and one of the highest child mortality rates in the world. Since 1990, undernourishment has worsened significantly in the country. Protracted civil conflict since the late 1990s led to an economic collapse, massive displacements of people, and a chronic state of food insecurity. Food availability and access deteriorated as food production levels dropped, and remote areas became even more isolated as a consequence of very poor infrastructure. The Democratic Republic of Congo is now seeking to rebuild and recover. If the country is supported mostly by emergency assistance that does little to build long-term sustainability, however, it will continue to be in a precarious food security situation (FAO 2010b). Programs with strong development components, integrating food security, nutrition, and health, need to be scaled up and made standard practice (Rossi et al. 2006).

ECONOMIC PERFORMANCE AND HUNGER

Economic performance and hunger levels are inversely correlated. Countries with high levels of gross national income (GNI) per capita – an important measure of economic performance – tend to have low 2010 GHI scores, and countries with low levels of GNI per capita tend to have high GHI scores (see graphs on pages 15 and 16).

Many countries, however, deviate from the 2010 GHI scores predicted by their income levels. Countries with GHI scores above the predicted line (based on data from 119 countries) perform worse than their income levels suggest; countries with GHI scores below the predicted line perform better than their income levels suggest. In Sub-Saharan Africa, many countries have considerably higher 2010 GHI scores than their GNI per capita would suggest; some examples are Angola, Botswana, Burundi, the Democratic Republic of Congo, Djibouti, and Eritrea (see graph on top of page 15). In all of these countries except for Botswana, war and conflict account, at least in part, for their relatively poor scores. In Botswana, high inequality and HIV and AIDS rates have caused high levels of hunger relative to GNI per capita. Other countries, such as Ghana and Uganda, have 2010 GHI scores that are lower than the scores one would expect based on their GNI per capita. In the past two decades, both countries have reduced hunger in part through pro-poor economic growth and improvements in agricultural production owing to scaled-up investments.

In South and Southeast Asia, Bangladesh, India, Pakistan, and Timor-Leste are among the countries with hunger levels considerably higher than their GNI per capita would suggest, and China, Fiji, and Vietnam are among the countries with considerably lower hunger levels (see graph on bottom of page 15). In India, for example, high 2010 GHI scores are driven by high levels of child underweight resulting from the low nutritional and social status of women in the country. In Latin America and the Caribbean, Haiti stands out as a country with a GHI score even higher than the score predicted by its low income per capita (see graph on top of page 16). Even before the major earthquake in early 2010, which pushed even more people into food insecurity, Haiti suffered from factors that exacerbate poverty and hunger such as political instability, poor governance, and poor social service provision. On the other hand, Guyana, Honduras, Nicaragua, and Paraguay, for example, have lower hunger levels than suggested by their GNI. Finally, in the Near East and North Africa, all countries except Yemen have lower hunger levels than expected, and in Libya, hunger is as expected (see graph on bottom of page 16). In Yemen, hunger is particularly high because of large rural–urban inequalities, an oil-dependent economic structure, inefficient social protection, and high population growth.

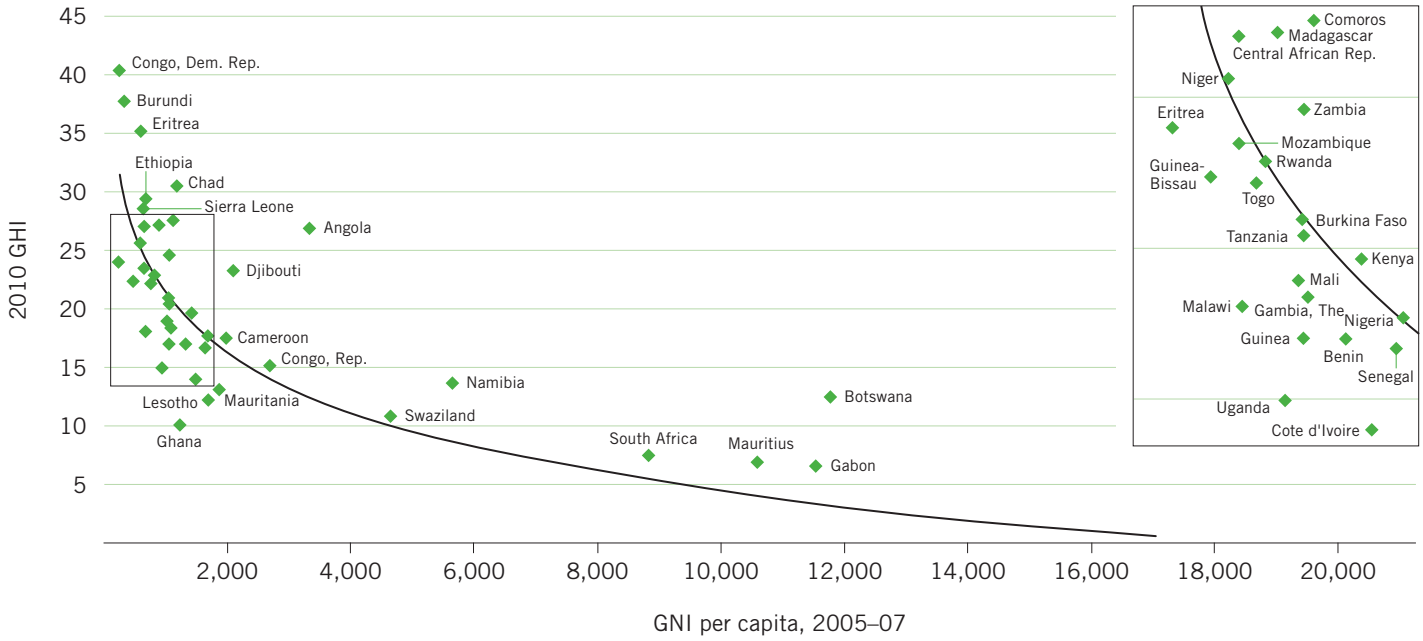
In terms of the index components, Burundi, Comoros, the Democratic Republic of Congo, Eritrea, and Haiti currently have the highest proportion of undernourished people – more than 50 percent of the population. Bangladesh, India, Timor-Leste, and Yemen have the highest prevalence of underweight in children under five – more than 40 percent in all four countries. Afghanistan, Angola, Chad, and Somalia have the highest under-five mortality rate – 20 percent or more.

[1] The "world" includes all countries in regions for which both the 2010 and 1990 GHI have been calculated. As noted earlier, data for some countries are not available, and most high-income countries are excluded from the GHI calculation.

[2] According to the World Bank, "government effectiveness measures the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies" (World Bank 2009).

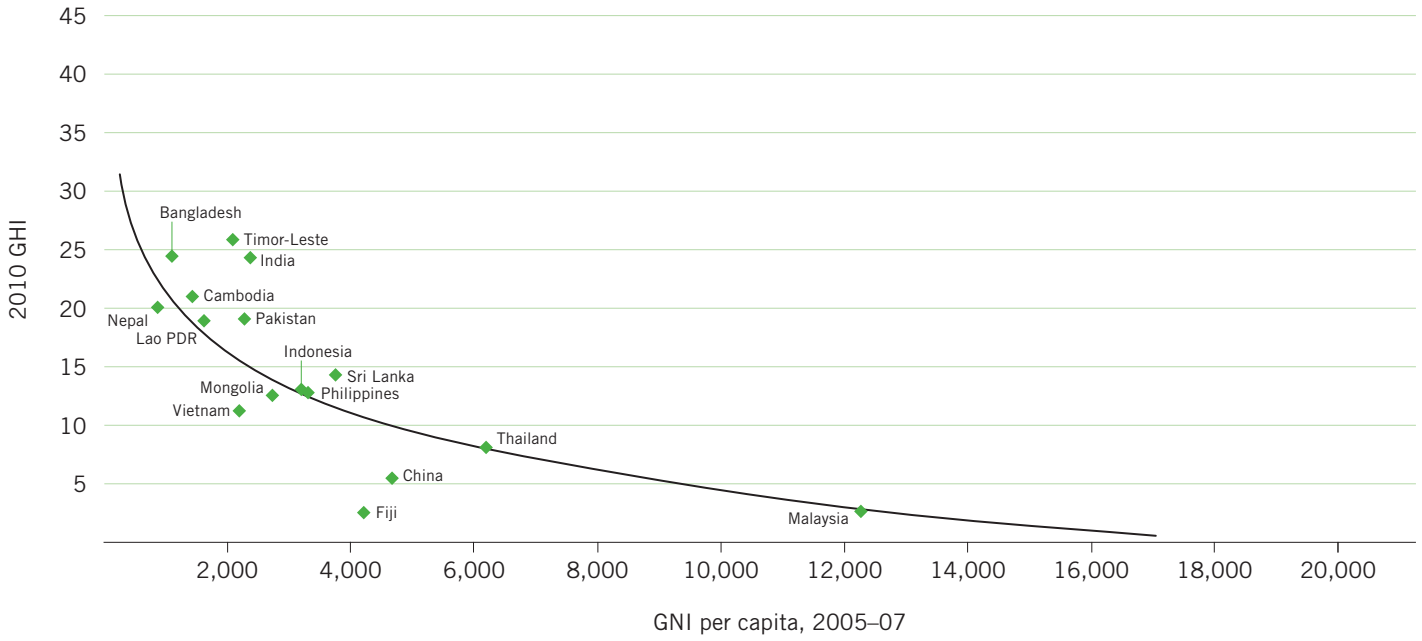
GNI PER CAPITA AND THE GLOBAL HUNGER INDEX

SUB-SAHARAN AFRICA



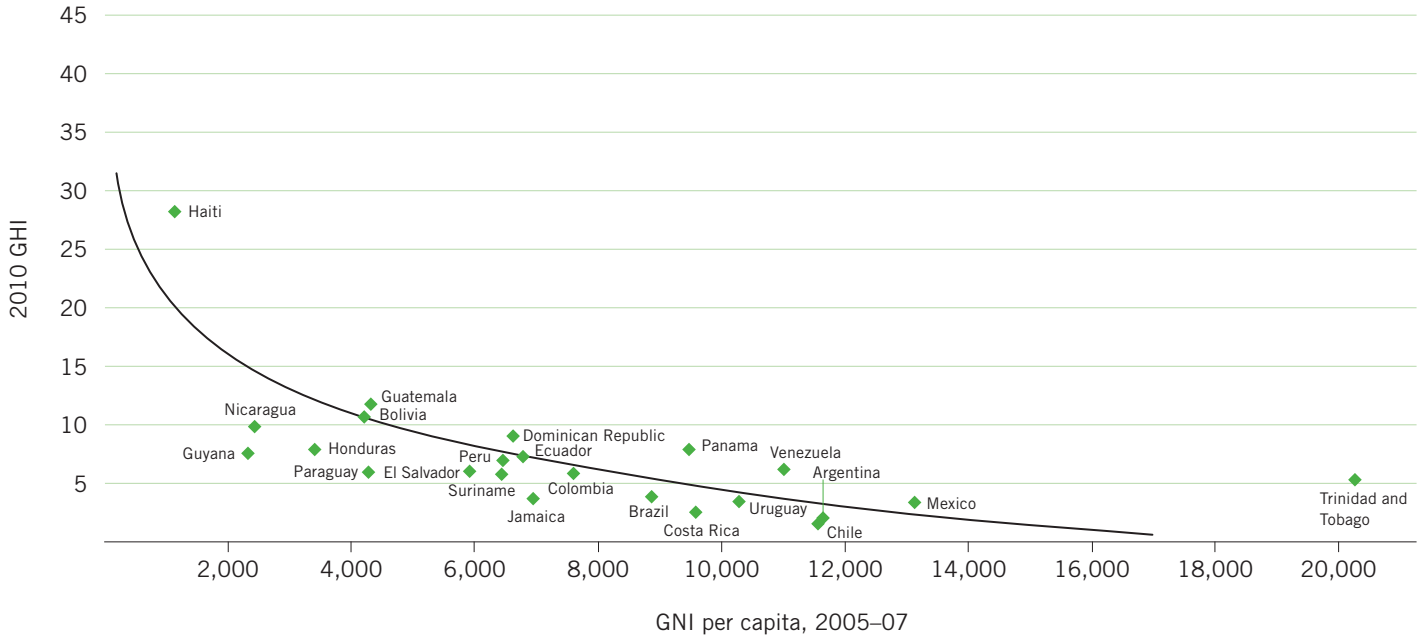
Source: Data for GNI per capita are from the World Bank (2010). Note: The black trend line represents the predicted GHI values for all countries in all regions for which both 2010 GHI and 2005–07 GNI per capita data are available. GNI per capita refers to the average GNI per capita in current international dollars based on purchasing power parity (PPP) from 2005 to 2007.

SOUTH AND SOUTHEAST ASIA



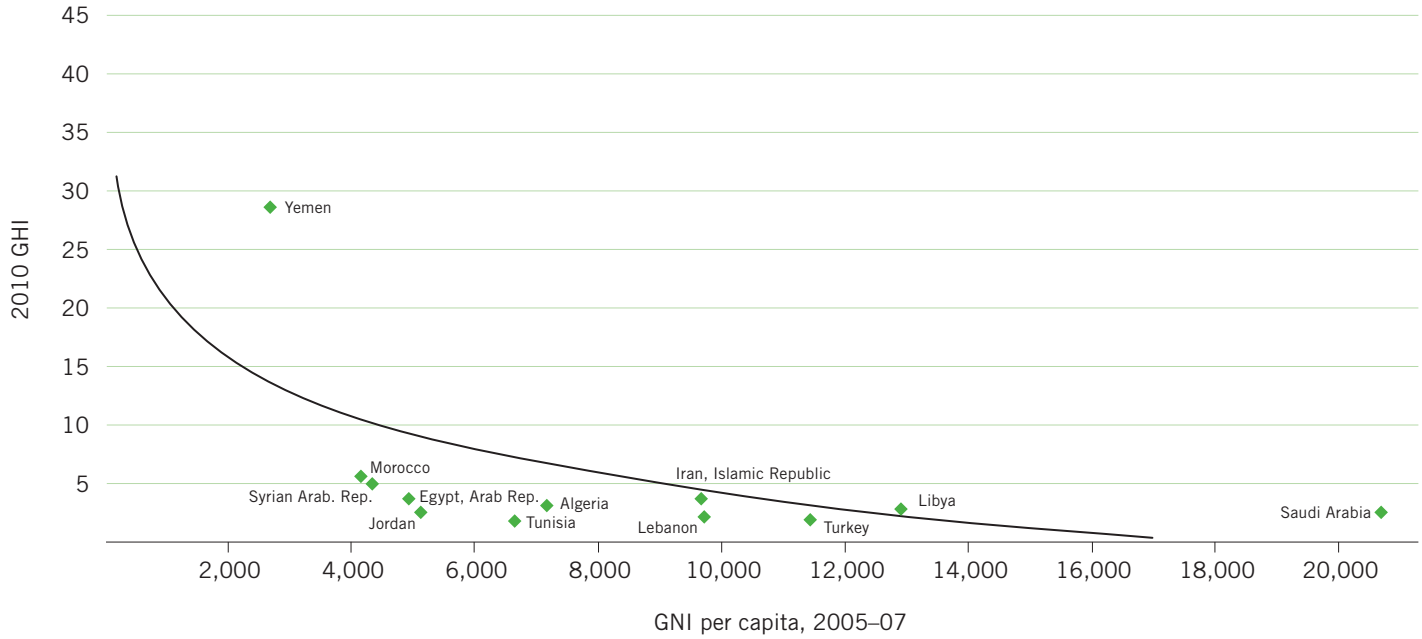
Source: Data for GNI per capita are from the World Bank (2010). Note: The black trend line represents the predicted GHI values for all countries in all regions for which both 2010 GHI and 2005–07 GNI per capita data are available. GNI per capita refers to the average GNI per capita in current international dollars based on purchasing power parity (PPP) from 2005 to 2007.

LATIN AMERICA AND THE CARIBBEAN



Source: Data for GNI per capita are from the World Bank (2010). Note: The black trend line represents the predicted GHI values for all countries in all regions for which both 2010 GHI and 2005–07 GNI per capita data are available. GNI per capita refers to the average GNI per capita in current international dollars based on purchasing power parity (PPP) from 2005 to 2007.

NEAR EAST AND NORTH AFRICA



Source: Data for GNI per capita are from the World Bank (2010). Note: The black trend line represents the predicted GHI values for all countries in all regions for which both 2010 GHI and 2005–07 GNI per capita data are available. GNI per capita refers to the average GNI per capita in current international dollars based on purchasing power parity (PPP) from 2005 to 2007.

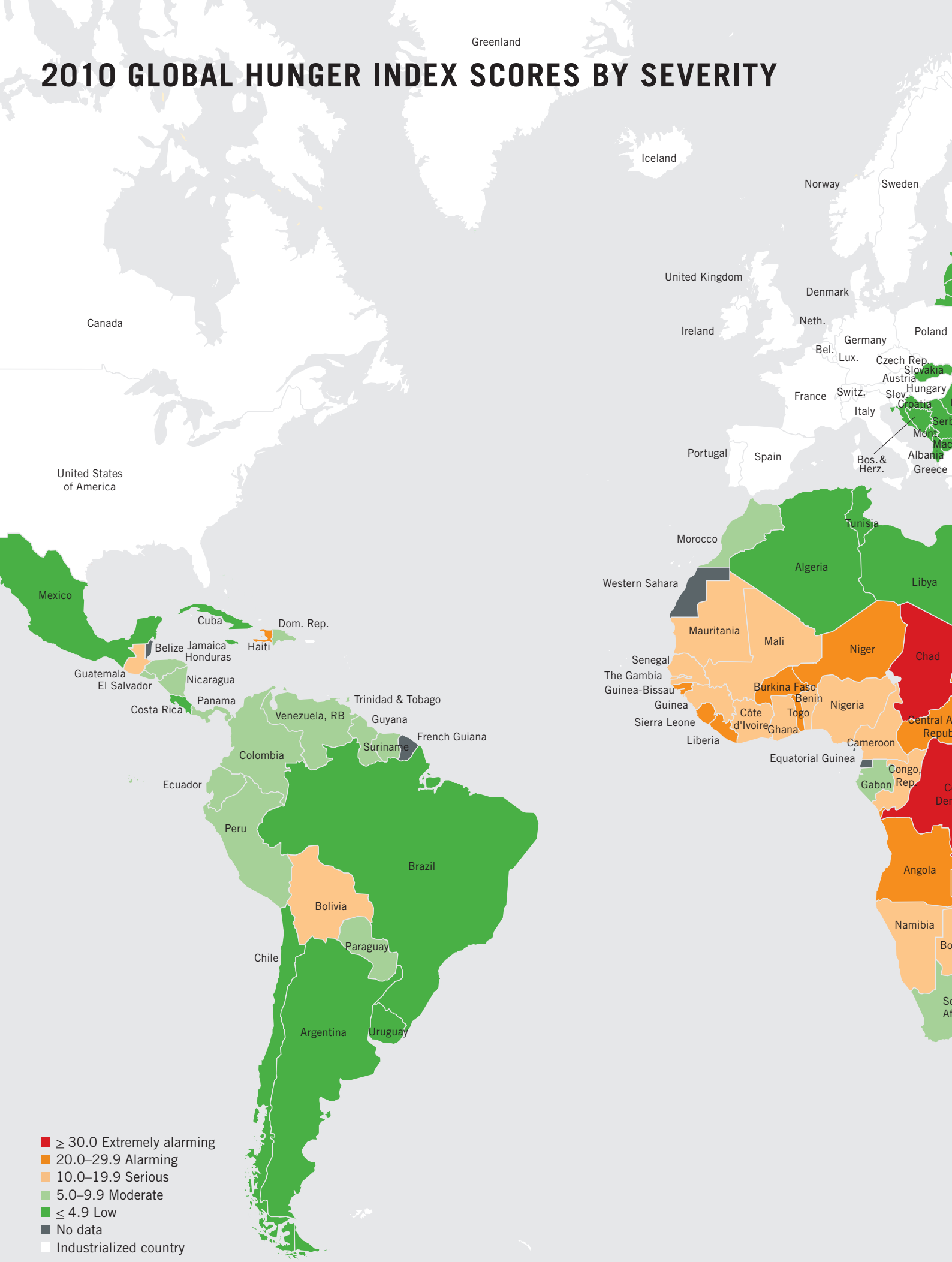
GLOBAL HUNGER INDEX SCORES BY COUNTRY, 1990 GHI AND 2010 GHI

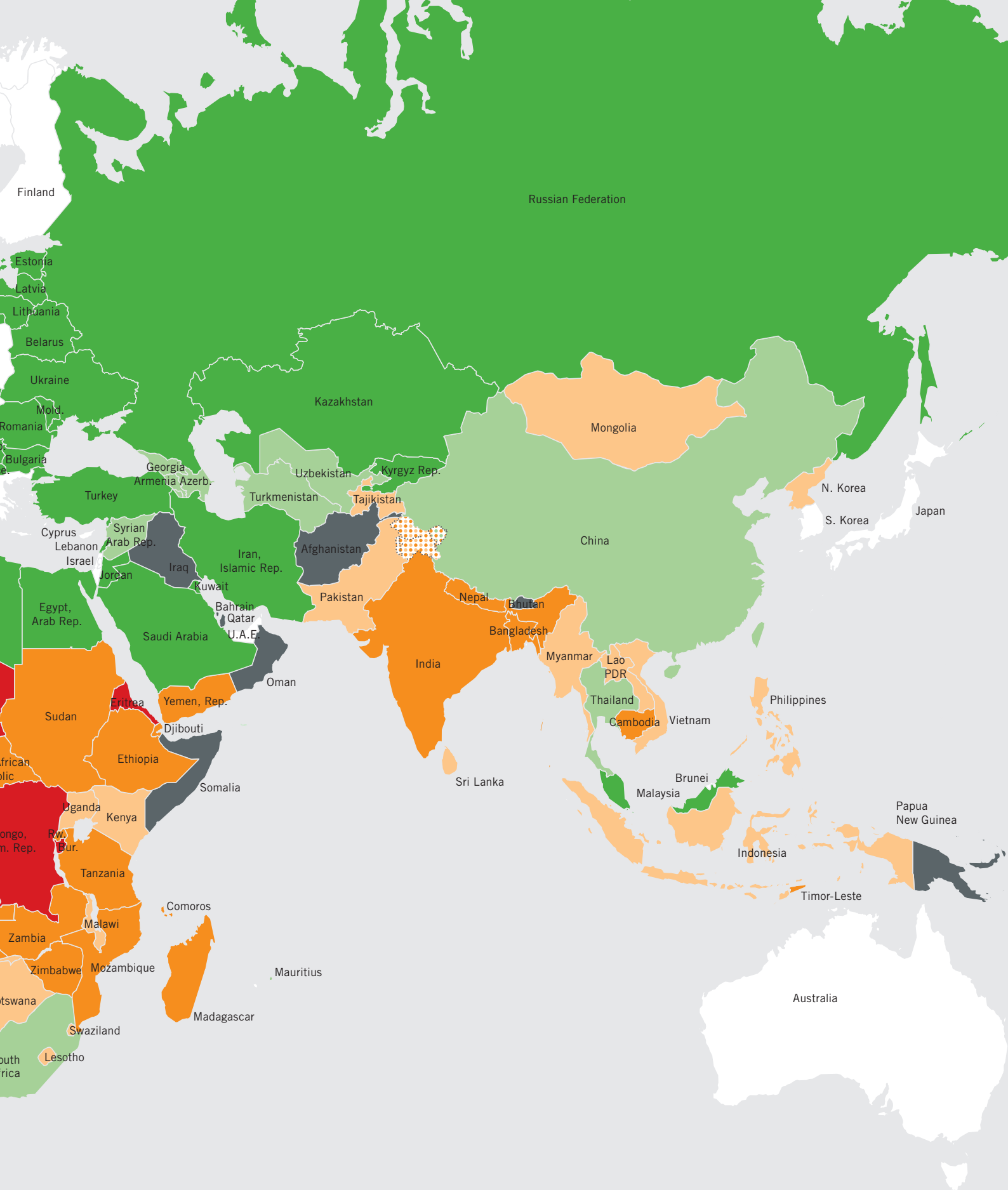
Rank	Country	1990	2010
1	Syrian Arab Republic	7.3	5.2
2	Trinidad and Tobago	6.9	5.3
3	Suriname	9.6	5.6
4	Colombia	9.1	5.7
5	Georgia	-	5.8
5	Morocco	7.3	5.8
7	El Salvador	8.8	5.9
7	Paraguay	7.7	5.9
9	China	11.6	6.0
10	Venezuela, RB	6.6	6.1
11	Turkmenistan	-	6.3
12	Gabon	7.7	6.4
13	Mauritius	7.3	6.7
14	Peru	15.0	6.9
15	Uzbekistan	-	7.1
16	Ecuador	12.9	7.2
17	South Africa	7.3	7.3
18	Guyana	14.4	7.6
19	Azerbaijan	-	7.7
20	Honduras	13.4	7.9
20	Panama	10.0	7.9
22	Thailand	16.5	8.5
23	Dominican Republic	13.9	9.2
24	Armenia	-	9.8
25	Nicaragua	23.4	9.9
26	Ghana	23.4	10.0
27	Swaziland	9.5	10.8
28	Bolivia	15.3	10.9
29	Vietnam	24.8	11.5
30	Guatemala	15.1	12.0
31	Lesotho	13.0	12.2
32	Botswana	14.3	12.5
33	Mongolia	16.9	12.8
34	Philippines	19.0	13.0
35	Mauritania	22.0	13.1
36	Indonesia	19.5	13.2
37	Namibia	19.2	13.6
38	Côte d'Ivoire	16.0	14.0
39	Sri Lanka	21.1	14.5
40	Uganda	19.1	15.0
41	Congo, Rep.	22.4	15.2
42	Tajikistan	-	15.8
43	Senegal	20.8	16.8
44	Benin	24.0	17.1
44	Guinea	21.9	17.1
46	Cameroon	22.3	17.6
47	Nigeria	24.4	17.8
48	Malawi	30.6	18.2
49	The Gambia	17.5	18.5
50	Myanmar	29.5	18.8
51	Lao PDR	29.0	18.9
52	Mali	24.2	19.1
52	Pakistan	24.7	19.1
54	North Korea	16.2	19.4
55	Kenya	20.3	19.8
56	Nepal	27.5	20.0
57	Tanzania	22.9	20.7
58	Cambodia	31.5	20.9
58	Sudan	26.4	20.9
58	Zimbabwe	18.6	20.9
61	Burkina Faso	22.7	21.1
62	Togo	27.8	22.4
63	Guinea-Bissau	20.9	22.6
64	Rwanda	28.9	23.1
65	Djibouti	30.8	23.5
66	Mozambique	37.4	23.7
67	India	31.7	24.1
68	Bangladesh	35.8	24.2
69	Liberia	22.9	24.3
70	Zambia	25.6	24.9
71	Timor-Leste	-	25.6
72	Niger	36.5	25.9
73	Angola	40.6	27.2
74	Yemen, Rep.	30.1	27.3
75	Central African Republic	30.0	27.4
76	Madagascar	28.1	27.5
77	Comoros	23.0	27.9
78	Haiti	33.5	28.0
79	Sierra Leone	32.7	28.9
80	Ethiopia	43.7	29.8
81	Chad	37.6	30.9
82	Eritrea	-	35.7
83	Burundi	31.8	38.3
84	Congo, Dem. Rep.	24.7	41.0

Country	1990	2010	Country	1990	2010
Albania	8.7	<5	Kyrgyz Republic	-	<5
Algeria	6.1	<5	Latvia	-	<5
Argentina	<5	<5	Lebanon	<5	<5
Belarus	-	<5	Libya	<5	<5
Bosnia & Herz.	-	<5	Lithuania	-	<5
Brazil	7.2	<5	Macedonia, FYR	-	<5
Bulgaria	<5	<5	Malaysia	8.6	<5
Chile	<5	<5	Mexico	7.8	<5
Costa Rica	<5	<5	Moldova	-	<5
Croatia	-	<5	Montenegro	-	<5
Cuba	<5	<5	Romania	<5	<5
Egypt, Arab Rep.	7.0	<5	Russian Federation	-	<5
Estonia	-	<5	Saudi Arabia	6.2	<5
Fiji	6.0	<5	Serbia	-	<5
Iran, Islamic Rep.	8.8	<5	Slovak Republic	-	<5
Jamaica	6.5	<5	Tunisia	5.0	<5
Jordan	<5	<5	Turkey	6.0	<5
Kazakhstan	-	<5	Ukraine	-	<5
Kuwait	9.4	<5	Uruguay	<5	<5

Note: Ranked according to 2010 GHI scores. Countries with a 2010 GHI score of less than five are not included in the ranking, and differences between their scores are minimal. Countries that have identical 2010 GHI scores are given the same ranking (for example, Georgia and Morocco are both ranked #5).

2010 GLOBAL HUNGER INDEX SCORES BY SEVERITY





Note: For the 2010 GHI, data on the proportion of undernourished are for 2004–06, data on child underweight are for the latest year in the period 2003–08 for which data are available, and data on child mortality are for 2008.

The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the International Food Policy Research Institute (IFPRI) or its partners and contributors.

Children who are undernourished during the **thousand-day window** risk experiencing lifelong damage, poor health, and even early death.

FIGHTING THE CRISIS OF EARLY CHILDHOOD UNDERNUTRITION

The Thousand-Day Window of Opportunity

As described in the previous chapter, the Global Hunger Index includes three components (proportion of undernourished, prevalence of underweight children and under-five mortality rate). The world GHI score is 15.1 (see figure on page 11): child underweight contributes up to 7.4 points, or nearly half of the score, whereas the proportion of undernourished and under five mortality contribute 5.4 and 2.2 points, respectively. In South Asia, underweight in children under five accounts for more than half of the GHI score of 22.9. In Sub-Saharan Africa, the situation is slightly different. There, the GHI score has barely improved over the past 20 years, and underweight in children under five has improved only slightly, falling from 27.2 to 23.6 percent, according to recent estimates. In order to improve their GHI scores, countries need to accelerate progress in reducing child underweight by improving childhood nutrition.

How can this be done? The first step is to focus on the age group of children that represents the window of opportunity for improving nutrition. Although past policies and programs targeted children under the age of five for nutrition interventions in many countries, recent evidence clearly shows that the window of opportunity for improving nutrition is much narrower, spanning the period from -9 to +24 months (that is, the 1,000 days between conception and a child's second birthday). This is the period not only when children are in greatest need of adequate amounts of nutritious food for healthy development, but also when interventions are most likely to prevent undernutrition from setting in. After the age of two, the effects of undernutrition are largely irreversible (Ruel 2010). Children who are undernourished during the thousand-day window risk experiencing lifelong damage, including poor physical and cognitive development, poor health, and even early death. These children are likely to grow up to be short and thin, as well as less productive and healthy than they might have been. Furthermore, when poorly nourished girls grow up, they tend to give birth to underweight babies, perpetuating the cycle of undernutrition. This means that the well-being of mothers is a critical element of the solution.

The ingredients of proper early childhood nutrition are well known: a well-nourished and empowered mother who has good nutrition and health before and during her pregnancy; who receives adequate health support and care to ensure a safe delivery for herself and her newborn baby; who breastfeeds exclusively for the first six months of the infant's life and continues breastfeeding until at least two years of age; who provides the infant with nutritious complementary foods in adequate quantities and frequency starting at six months of age; and who has access to safe water, sanitation, and preventive and curative healthcare. Yet millions of people lack these basic ingredients.

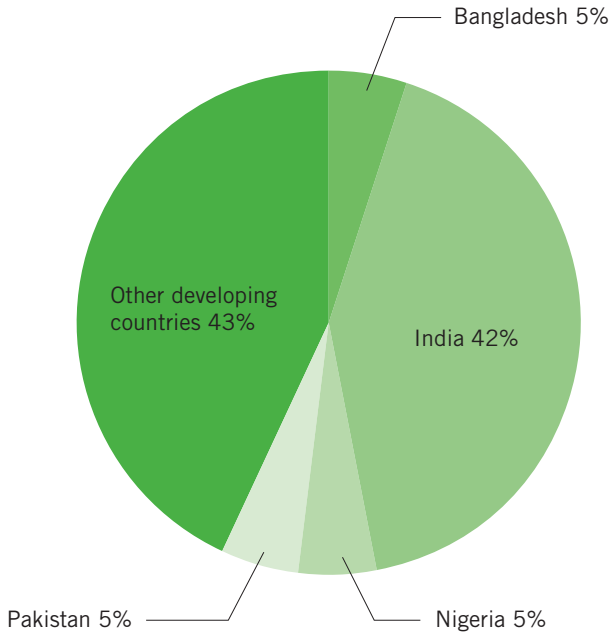
A global crisis of child undernutrition

Child undernutrition has reached epidemic proportions. Stunting affects about 195 million children under the age of five in the developing world – about one in three children. Nearly one in four children under age five – 129 million – is underweight, and one in 10 is severely underweight (UNICEF 2009b; see box on page 22).

Child undernutrition is not spread evenly across the globe but is instead concentrated in a few countries and regions. More than 90 percent of the world's stunted children live in Africa and Asia, where rates of stunting are 40 percent and 36 percent respectively (UNICEF 2009b). Indeed, more than 80 percent of the global burden of child undernutrition (as measured by stunting) occurs in just 24 countries. India alone accounts for a large share of the world's undernourished children. In 2005–06, about 44 percent of Indian children under age five were underweight and 48 percent were stunted (WHO 2010b). Because of the country's sheer size, these numbers mean that India is home to 42 percent of the world's underweight children (see figure below) and 31 percent of its stunted children (UNICEF 2009b).

High levels of child undernutrition are also found in several other South Asian and African countries. In some countries of Sub-Saharan Africa, about half of all children are stunted: 53 percent of children in

SHARE OF UNDERWEIGHT CHILDREN UNDER FIVE YEARS OF AGE



Source: UNICEF (2009b).

ALL CHILD UNDERNUTRITION IS NOT THE SAME: THE FORMS OF POOR NUTRITION

Child undernutrition can manifest itself in different ways, depending on the cause, severity, and duration. The three main measures of child undernutrition are

- **stunting** – low height for one's age,
- **wasting** – low weight for one's height, and
- **underweight** – low weight for one's age.

Stunting is a good overall indicator of undernutrition because it reflects the cumulative effects of chronic undernutrition. Wasting reflects acute undernutrition resulting from inadequate food and nutrient intake and/or repeated or severe disease. Underweight reflects either stunting or wasting, or both.

Researchers measure these indicators using Z scores. These scores reflect how much a child's weight or height deviates from the standard for healthy child growth set by the World Health Organization. The closer a child's Z score is to zero, the closer he or she is to the median of the international growth reference standard. This standard is based on the fact that children of all races and ethnicities have the capacity to reach a healthy weight and height. In 2006, the World Health Organization updated its child growth standards, showing that global child undernutrition was even more severe than previously thought. For all three indicators, undernutrition (as represented by stunting, wasting, or underweight) is defined as a Z score below -2 and severe undernutrition as a Z score below -3.

Another form of undernutrition consists of deficiencies of essential micronutrients – vitamins and minerals, especially iron, iodine, zinc and vitamin A. Deficiencies of micronutrients are also referred to as "hidden hunger" because they are often present without showing any clinical signs. In the absence of blood tests, they may remain undetected until they become very severe and life-threatening. Micronutrient deficiencies can have devastating effects in women and young children and can affect child growth, motor and cognitive development, resistance to infections and survival. In women, micronutrient deficiency can reduce their ability to have a safe pregnancy and delivery, produce breast milk in sufficient amounts and quality and remain healthy.

Burundi, Madagascar, and Malawi are stunted; in Ethiopia and Rwanda, the figure stands at 51 percent; and in Guinea-Bissau and Niger, at 47 percent (UNICEF 2009b). More than half of under-five children in Afghanistan, Guatemala, Timor-Leste, and Yemen are also stunted.

Micronutrient deficiencies, which can result in so-called hidden hunger because their effects are often not visible, are even more widespread than underweight, stunting, and wasting. Globally, about 2 billion people suffer from iodine deficiency, including 285 million children aged 6 to 12 years (de Benoist et al. 2004). Almost 50 percent of children age five and under have anemia, about half of which is caused by iron deficiency (de Benoist et al. 2008). The greatest share of preschool children suffering from anemia – 68 percent – is in Africa. Vitamin-A deficiencies affect 190 million preschool children (WHO 2009).

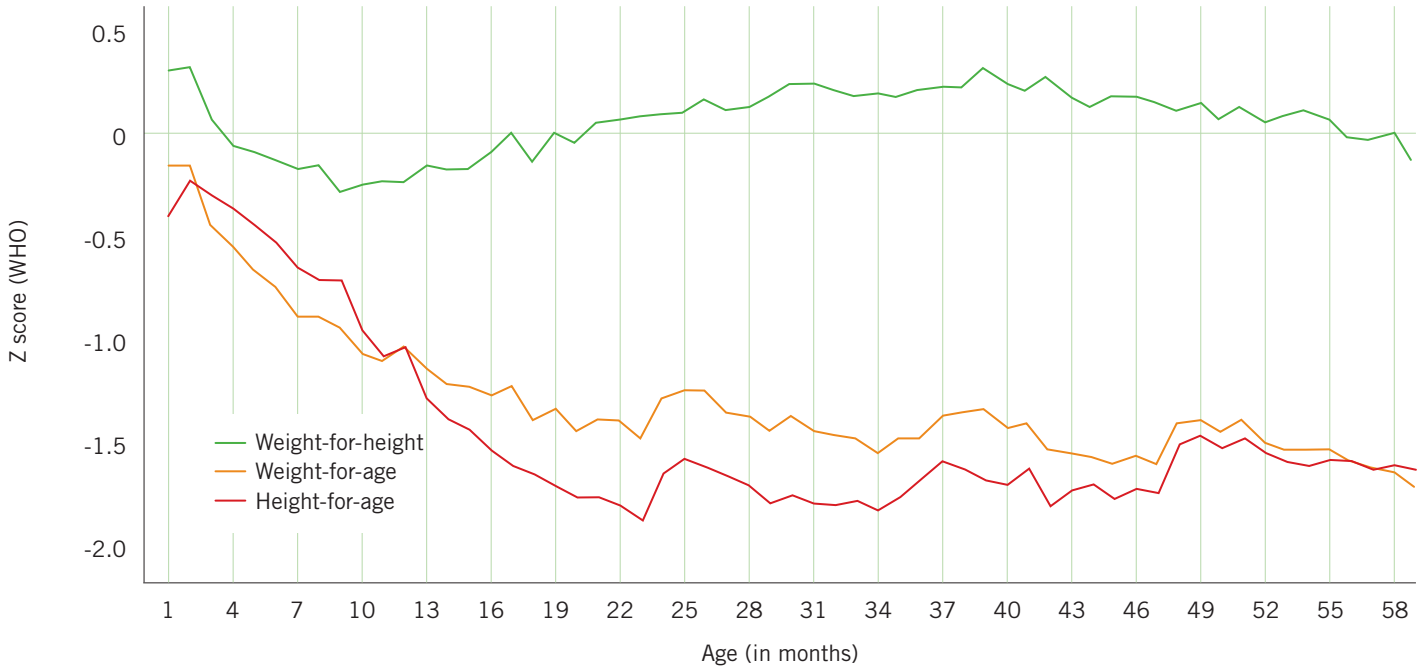
This burden of undernutrition takes a heavy toll on children's health and survival. Researchers have estimated that stunting, wasting, and intrauterine growth restriction (which causes low birth weight) together are responsible for 2.2 million deaths a year (Black et al. 2008). Vitamin-A deficiency leads to a host of health problems, including blindness in extreme cases, and increases children's risk of dying from other conditions, such as diarrhea and malaria. Zinc deficiency increases children's risk of diarrhea, pneumonia, and malaria. Iron deficiency can increase maternal mortality and lower children's cognitive capacity. Iodine deficiency during pregnancy not only threatens the outcome of the pregnancy, but also impairs the fetus's mental and motor development. Chronic iodine deficiency has a substantial impact on cognitive development.

The perilous thousand days

Many children in developing countries start to experience growth faltering during their first year of life, and indeed, even before they are born. Analyzing data from 54 countries in Africa, Asia, and Latin America, researchers found that the bulk of growth faltering – particularly stunting and underweight – occurs from birth to age two (see graph on top of page 23; Victora et al. 2010).

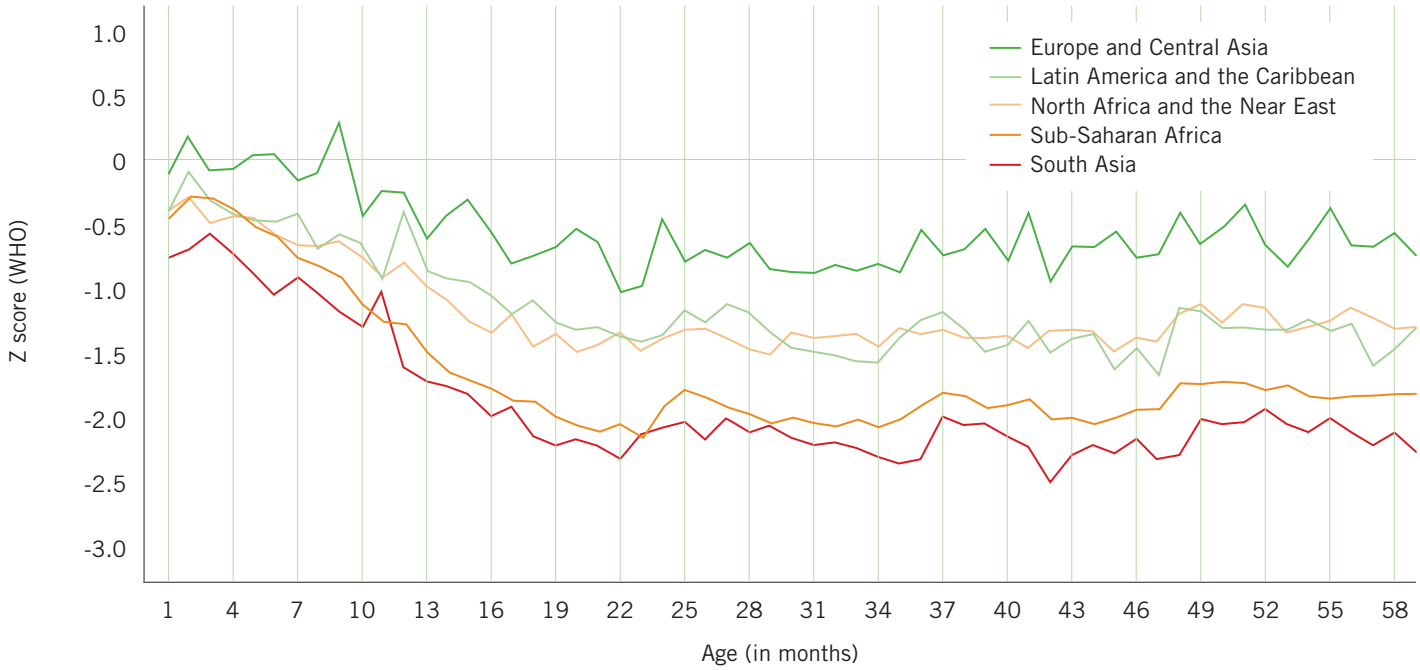
The chart on bottom of page 23 shows that children are born at a height close to the standard in most regions, but growth begins to lag after a few months and deteriorates quickly until about the age of 24 months. Children in South Asia are worst off, partly because they start at a deficit; even at birth, many infants in South Asia are already stunted. Across the world, by the age of two years, most of the damage is done. On average these children experience little or no further deterioration, and they stabilize at low levels of weight and height for their age, with children in South Asia and Sub-Saharan Africa showing the severest rates of stunting.

PATTERNS OF UNDERNUTRITION BY AGE FOR CHILDREN IN 54 DEVELOPING COUNTRIES



Source: Victora et al. (2010).

HEIGHT-FOR-AGE BY REGION



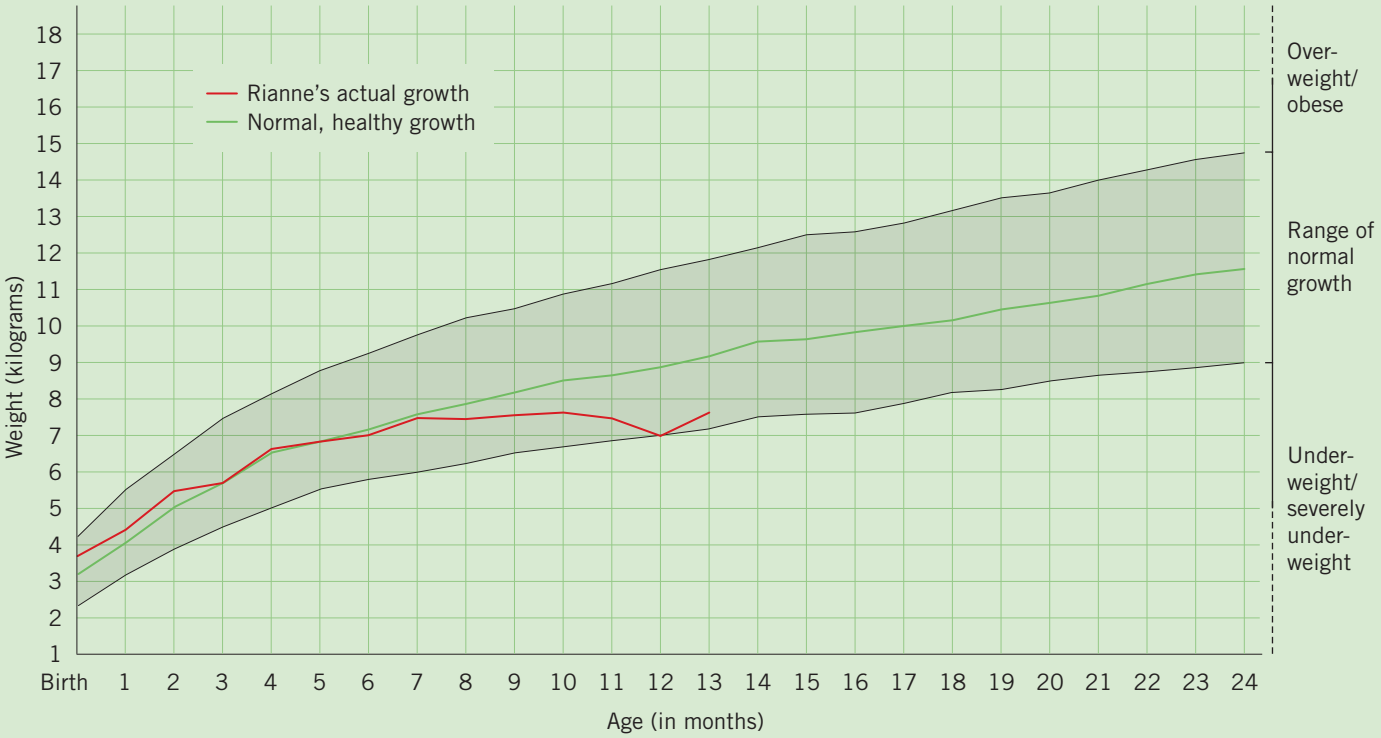
Source: Victora et al. (2010).

FEEDING PRACTICES: A CRUCIAL INGREDIENT IN EARLY CHILDHOOD NUTRITION

Rianne is a 14-month-old Indonesian girl who seemed to get off to a good start in life. In contrast to millions of children in poor countries, she was born at a normal, healthy weight, and for her first four months, Rianne grew well (see figure below). By about five months of age, however, Rianne started to gain weight more slowly than expected, and in some months she even lost weight. With each passing month, Rianne fell farther and farther below a healthy growth level. By 13 months of age, she reached the weight-for-age that officially classified her as underweight. Rianne's experience is typical of that of millions of children in the developing world whose growth starts to falter during the first 24 months of life. There are a host of reasons for these setbacks in children's growth, including household poverty and lack of access to food, poor hygiene, and illnesses. Another important factor is poor feeding practices. Rianne's mother followed the feeding practices typical in her area, which included feeding Rianne a watery rice porridge twice a day.

A nutrition project soon changed the way Rianne's mother fed her daughter, however. Through radio messages and counseling from a community nutrition worker, Rianne's family received instructions on the best way to feed young children and on how to prepare a nutritious rice porridge appropriate for this age group. As a consequence, Rianne's mother began to feed her a new homemade porridge "enriched" with locally available foods and gave it to Rianne three times a day rather than two. (Young children have small stomachs and need to be fed more often than adults in order to be able to consume the amount of food they need.) This improvement in her nutrition before age two means that Rianne's chances of growing up to be healthy and productive – and of having healthy babies herself – are significantly greater.

RIANNE'S GROWTH BEFORE PARTICIPATION IN A NUTRITION INTERVENTION



Source: Marcia Griffiths, "Focusing on improving household practices and strengthening community support," presentation at the Bread for the World's National Gathering, American University, Washington, DC, June 2009.

Why is the period from conception to age two so critical from a nutritional point of view? To begin with, if a mother has poor nutrition before and during pregnancy, a baby is likely to be born small. Poor maternal nutrition is a particularly severe problem in Asia. In some countries in South Asia, more than 10 percent of women are shorter than 145 centimeters, a threshold that puts women at risk of having complications during delivery and of having small babies. In most countries of South and Southeast Asia, as well as in Sub-Saharan Africa and in Yemen, more than 20 percent of women have a low body mass index (Black et al. 2008). In many of these countries, women also have low social status; they are often the last in the household to eat, and they do not receive the care they need, particularly in their childbearing years. Poor nutrition in women throughout their own life cycle thus extends through the generations: Undernourished girls become short women, and short women give birth to smaller children. This vicious circle is perpetuated by women's low social status.

After birth, many infants may not be exclusively breastfed. Mothers may find it difficult to breastfeed exclusively because they are poorly nourished themselves or because they have a heavy workload; many are simply unaware that breast milk is all a young infant needs. Often, infants are given water, tea, or other drinks in addition to breast milk – practices that can increase a child's risk of acquiring infections and lead to inadequate nutrient intake because they displace breast milk. At six months, the child should be given nutritious complementary foods, but this may happen too early or too late; in some countries, children are given complementary foods at one week or one month of age (Tontisirin and Winichagoon 1999). In other countries, food is introduced well beyond the recommended age of six months. In addition, the complementary foods may be of poor nutritional quality or given too infrequently (see box on page 24). Other families may simply not have access to enough nutritious food for their young children. Moreover, health issues can take a heavy toll on children's nutritional status. Where there is no access to sanitation and clean water, children may suffer from repeated infections, which can lead to lack of appetite; loss of nutrients stemming from fever, diarrhea, and vomiting; and poor absorption of nutrients. In these environments, children are also unlikely to get their immunizations and regular health check-ups.

The lifelong costs of poor nutrition in early childhood

Nutrition deficits early in life have both short-term and long-term effects that last into adulthood. Children who are undernourished in utero, during their first two years, or both are more likely to become shorter adults, complete fewer years of schooling, earn less income, and have children with lower birth weights. Developing countries can experience GDP losses of up to 2–3 percent per annum as a result of undernutrition, rising to as high as 6 percent (CEPAL/PMA 2007). One study found that Zimbabwean children who were stunted as preschoolers started school sev-

Yat Samath

Ratanakiri Province, Cambodia

"The district health center gave me iron tablets twice (around 40 tablets in total). I took all iron tablets, also after some pregnant ladies from the village advised me not to take them. They feared that the fetus will be fat and difficult to deliver."

"During my pregnancy I didn't eat turtles and all kinds of snakes, because I was afraid that if I ate these kinds of animals, my children will become turtles."

"During the first two days, my infant had extra milk to drink but it was not enough. Also I have given my breast to her, but it was dry, and she sucked without getting milk. I drank some traditional medicine to produce more milk, named 'MemayKounMouy'."

Dr. Kyawt Thazin Oo

Nutritionist,
Irawadi-Division, Myanmar

"The majority of mothers usually starts supplementary feeding before six months. The majority of supplementary food is rice and soft fruits."

"Children are served similar food as the adults in the family. Staple meals in the Ayerwaddy delta consist mainly of rice and traditional fish paste made of fermented fish and prawns. For very young children, mothers first chew food and then feed it to children who have not developed a full set of teeth."

en months later than comparable children who were not stunted, and they lost an average of 0.7 grades of schooling (Alderman, Hoddinott, and Kinsey 2003). These delays and losses in schooling translated into a 12-percent reduction in lifetime earnings. Undernutrition in early childhood can also increase the risks of obesity and chronic diseases in adulthood. Undernourished children who gain weight rapidly in later childhood and adolescence are at higher risk of nutrition-related illnesses such as diabetes and cardiovascular diseases as adults than children who are well nourished during early childhood. Overall, it has been estimated that 11 percent of the total global disease burden is related to undernutrition (Black et al. 2008).

The economic benefits of addressing undernutrition

The interventions, both direct and indirect, that can effectively combat undernutrition are largely known. Moreover, investing in the fight against undernutrition brings high returns. In Guatemala, boys who participated in an early childhood intervention that improved their nutrition during their first two to three years of life had 46 percent higher wages in adulthood than those who did not participate in the intervention (Hoddinott et al. 2008). As part of the Copenhagen Consensus 2008, a panel of experts consisting of eight leading economists critically examined and ranked the world's biggest problems and concluded that the greatest development good would come from a nutrition intervention (the provision of micronutrient supplements for children – vitamin A every four to six months for children six months to five years old and therapeutic zinc supplementation for diarrhea). They calculated that investments in micronutrient supplements for children yield returns of between $14 (zinc) and $17 (vitamin A) for every $1 spent (Horton et al. 2008).

Preventing early childhood undernutrition

After the age of two years, the effects of undernutrition are largely irreversible. Missing the "window of opportunity" – the thousand-day period from conception to two years of age – to improve nutrition can result in long-term permanent damage (Victora et al. 2008). It is therefore critical that programs to prevent undernutrition reach mothers and young children during this period. For children who are exposed to severe conflict, shocks, or emergency situations after the age of two or for those who have not been reached by preventive nutrition interventions, addressing severe acute malnutrition and hunger beyond the age of two years is also critical and requires carefully targeted interventions focused on recuperation and treatment. However, research has shown that it is more effective to prevent child undernutrition than to treat it (Ruel et al. 2008), and therefore investments aimed at improving nutrition should focus on the thousand-day period. There is a clear window of opportunity for addressing nutrition, and after age two, this window closes rapidly.

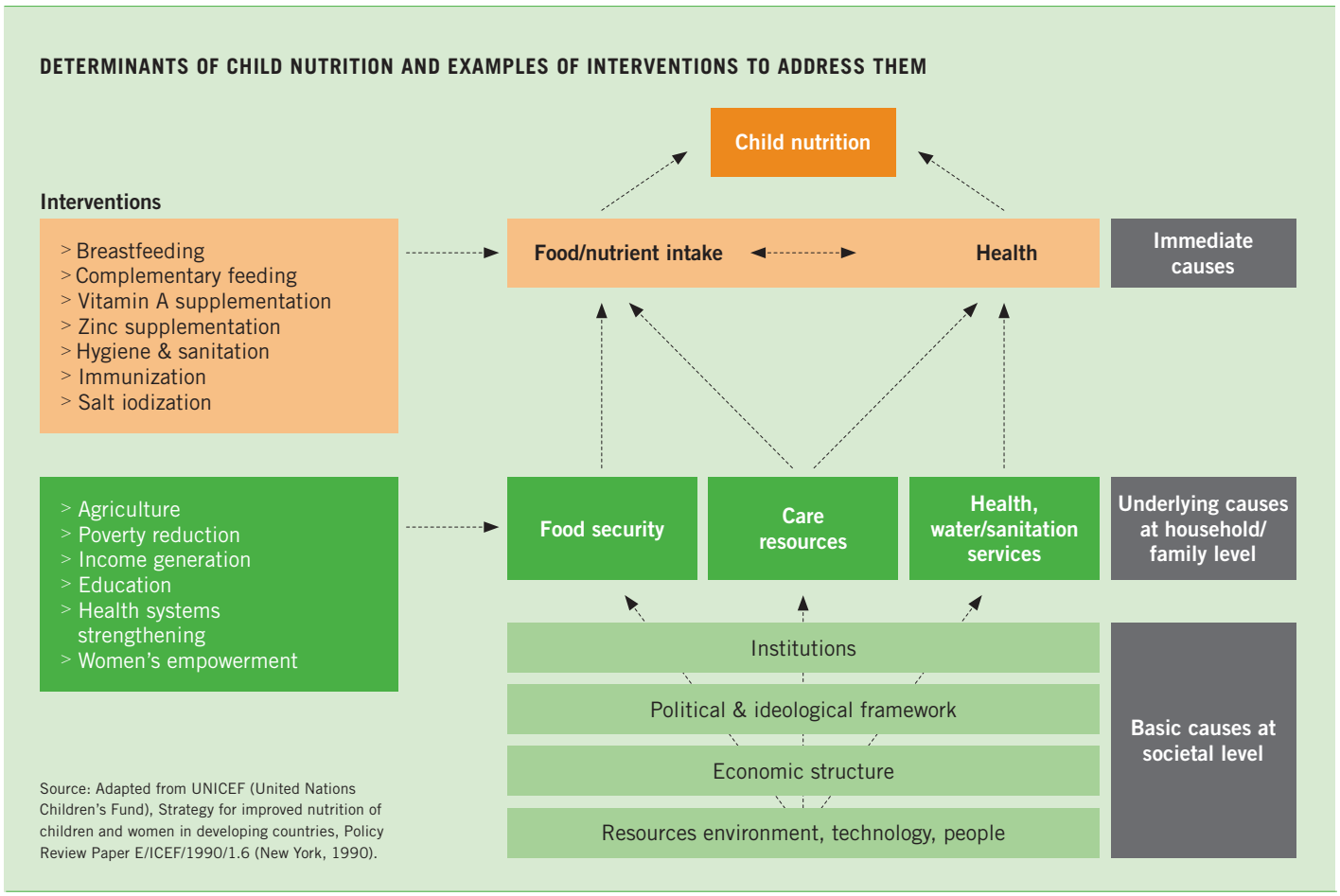
Improving the health and well-being of millions of people in developing countries requires taking advantage of the window of opportunity – in other words, focusing interventions on addressing undernutrition in adolescent girls, women of childbearing age, and children under the age of two. Indeed, universal coverage of preventive health and nutrition interventions for children under the age of two and their mothers could reduce the burden of childhood undernutrition by 25–36 percent, improving the health and survival chances of millions of children (Bhutta et al. 2008).

To begin with, governments should invest in targeted nutrition interventions that will have a rapid impact on early childhood undernutrition. These interventions should focus on improving maternal nutrition during pregnancy and lactation, promoting sound breastfeeding and complementary feeding practices, if necessary providing micronutrient supplements (such as vitamin A supplementation and therapeutic zinc), and adopting universal salt iodization. Childhood immunization programs and the promotion of optimal hygiene and sanitation practices are also essential. In addition, parents must be taught about the appropriate feeding and care of children exposed to HIV and AIDS. These interventions will address the immediate causes of undernutrition (see chart on page 27).

Poor child nutrition stems from underlying causes related to the overall environment in which children are born and raised. Consequently, policies that deal more broadly with problems such as poverty; food insecurity; lack of education; the low status of women; and lack of access to water, sanitation, and health services are also needed in order for there to be a profound and sustained improvement in child nutrition. The importance of these broader factors is clear from the progress made in reducing undernutrition in Brazil, China, Thailand, and Vietnam. One promising approach is to integrate nutrition interventions into multisectoral programs that alleviate poverty, enhance food security, and improve gender equity. Programs that cross sectors, like conditional cash transfers (which provide households with cash transfers in exchange for children's attendance at school and use of health facilities), have shown significant potential to improve early childhood nutrition during the window of opportunity (Leroy, Ruel, and Verhofstadt 2009). Programs that promote household production and consumption of nutritious fruits, vegetables, and animal source foods have also been shown to substantially raise the quality and diversity of the diets of all household members (World Bank 2007).

Striking successes

For many countries, the goal of improving early child nutrition has not yet made it onto the policy agenda, but a few countries have been able to quickly and effectively reduce child undernutrition. Although each country must design policies and programs to fit its own context, these countries' experiences point to policy options and offer useful lessons.



Source: Adapted from UNICEF (United Nations Children's Fund), Strategy for improved nutrition of children and women in developing countries, Policy Review Paper E/ICEF/1990/1.6 (New York, 1990).

Thailand, for example, halved child malnutrition from 50 to 25 percent in less than a decade during the 1980s. The country achieved this remarkable success by using targeted nutrition interventions to eliminate severe malnutrition and by creating a widespread network of community volunteers to help change people's behavior to prevent mild to moderate malnutrition. These volunteers, who reached a ratio of 1 for every 20 households throughout Thailand, received extensive training so that they could monitor children's growth, educate caregivers about the best ways to breastfeed and conduct complementary feeding, offer prenatal care, and provide other basic health services. The Thai government took the view that investments in nutrition are not welfare, but rather investments in development, and it integrated nutrition into its National Economic and Social Development Plan (Tontisirin and Winichagoon 1999). At the same time, it invested heavily in health, sanitation, and education during this period.

Between 1990 and 2002, China also reduced child malnutrition by more than half, from 25 to 8 percent, with a highly successful poverty alleviation strategy; effective large-scale health, nutrition, and family-planning interventions; and increased spending on water, sanitation, and education (Ruel 2008). These investments appear to have helped improve a number of factors that are root causes of child undernutrition, including mothers' nutritional status, the birth weight of children, maternal literacy and access to healthcare, and reduce fertility rates and poverty (Svedberg 2007).

Another success story recently unfolded in Brazil, where the prevalence of child stunting fell from 37 percent in 1974–75 to 7 percent in 2006–07. The country had a period of rapid economic growth and poverty reduction from 1970 to 1980, but the improvements in child malnutrition did not take place immediately. In the late 1970s and 1980s, however, Brazil's social spending rose significantly, including spending on food and nutrition programs, health, and education. Coverage of safe water and child immunizations also increased dramatically (Ruel 2008). From 1996 to 2007, much of the improvement in child nutrition was due to more maternal schooling, greater family incomes, improvements in maternal and child

Francisca Champi Condena

Pisco Province, Peru

"When I have a lot of work in the fields I rarely cook. Sometimes we don't have enough money to buy milk, cheese, and eggs. The harvest suffices to provide our families with enough food, but the food isn't well balanced anymore. Vegetables, for example, we only have during the rainy season."

"We were taught that feeding our children cheese would cause problems with learning to speak. But I don't care about this warning. In the trainings they told us that we can feed them cheese regularly. I did so and my children are able to speak."

Tatiana Medina Sánchez

Cajamarca Province, Peru

"Little by little the nutrition of children is improving due to the interventions of NGOs and municipalities. But some families don't improve their nutrition practices, because they dedicate more time to commercializing their agriculture or other activities. Others still aren't used to the consumption of some particular foods."

"The inhabitants of some communities don't consider child malnutrition a priority problem. Their requests for the participative budget show that they don't focus on tackling malnutrition."

healthcare, and better coverage of water supply and sanitation services. Brazil's conditional cash transfer program (Bolsa Familia) is one example of a successful poverty-alleviation program that integrates nutrition, health and education goals and interventions (Leroy, Ruel, and Verhofstadt 2009). This program and other Brazilian Government policies have also done a great deal to reduce inequality, with the result that the nutritional status of poor children has rapidly approached that of wealthier children (Monteiro et al. 2009; Monteiro et al. 2010).

At the local level too, programs have succeeded in addressing both the immediate and the underlying causes of child undernutrition: examples include gender-focused programs promoting homestead food production in Bangladesh (Iannotti, Cunningham, and Ruel 2009). Many of these programs not only incorporate direct nutrition interventions, but also work to alleviate poverty and food insecurity and to reduce gender inequality by providing women with training and resources.

Addressing the crisis

The importance of nutrition is being increasingly acknowledged. It is at last inching its way up the international development agenda. The Millennium Development Goals (MDGs) have drawn attention to nutrition by focusing on halving the proportion of hungry people. The Copenhagen Consensus in 2008 declared that investments in nutrition initiatives were the most effective development investments in terms of cost and benefit. Several new initiatives are focusing specifically on nutrition from multiple perspectives. A group of nutrition actors, representing a range of stakeholders, has issued a set of recommendations for global and national action called "Scaling Up Nutrition: A Framework for Action" (Bezanson and Isenman 2010). This document endorses a package of nutrition interventions targeted toward the window of opportunity and estimates the costs of scaling up these interventions from current levels to the levels needed to achieve rapid reductions in undernutrition. In addition, based on discussions following the global food, fuel, and financial crises, the Group of Eight industrial countries agreed through the L'Aquila Joint Statement on Global Food Security to place new emphasis on food security and nutrition in poor countries. Building on this statement, multiple donors have contributed to the Global Agriculture and Food Security Program (GAFSP), which will help countries develop comprehensive plans to address agriculture and food security – two underlying factors that must be addressed in order to improve household resources for addressing child undernutrition. The Committee on World Food Security (CFS) underwent a reform process throughout 2009. The reform document sets forth its commitment to broader participation by food security stakeholders

and also unequivocally states that nutrition is integral to the concept of food security and to the work of the CFS. Finally, the United States Agency for International Development recently announced its Feed the Future initiative, which merges agriculture, health, and nutrition efforts and will spend at least US$3.5 billion to support countries such as Ethiopia, Guatemala, Nepal, and Rwanda in developing country investment plans for improving agriculture, reducing poverty, and improving nutrition. The United Kingdom Department for International Development also recently launched its new nutrition strategy that sets out to tackle the "neglected crisis of undernutrition" by focusing on a set of immediate and long-term actions to reach children during the critical 1,000 days from conception to two years of age (DFID 2010). The Hunger Task Force Report, which lays out the Government of Ireland's priorities for reducing and eliminating hunger, also includes as one of its three focus areas the implementation of programs focused on maternal and infant undernutrition. The other two focus areas involve increasing the productivity of smallholder farmers – mainly women – in Africa and ensuring real political commitment at all levels to give hunger the absolute priority it deserves (Government of Ireland 2008).

Taken together, these new global efforts are a good beginning. Nonetheless, for global efforts to reach vulnerable populations and achieve the ultimate goal of well-nourished children, decisive and large-scale policy actions must ultimately be taken at national and subnational levels. Despite the scientific consensus on the importance of early childhood nutrition, the translation of research findings into actual policy and practice has been slow in many countries. Developing country policymakers, even those concerned with devising policies to improve the well-being of their citizens, often neglect the nutrition of young children – their country's future. The successes of countries that have made concerted efforts to prioritize nutrition should set an example for others that lag behind. The success stories, although diverse in the specific modalities and instruments used to tackle undernutrition, rely on a few common principles: strong government action coordinated across sectors and at central, state, and local levels; strengthening of existing health systems; significant scaling up of public spending; leadership and commitment at all levels; focus on and empowerment of vulnerable populations, households, and age groups; and a strong monitoring and evaluation culture that provides a basis for incentives and correction of policy actions in the context of implementation (von Braun, Ruel, and Gulati 2008).

By doing too little to address the crisis of undernutrition, policymakers are missing an opportunity to greatly improve the life prospects of millions of their citizens and thereby contribute to meeting broader policy goals on hunger, poverty, and economic growth.

Haja Adam Mohamed

North Dafur, Sudan

"We would like to feed our children better, but because of lack of income and high prices of cereals, we don't have the possibility to do it. Sometimes even the lactating and pregnant women don't have enough kilocalories as to produce enough breast milk for their babies."

Phorn Moern

Ratanakiri Province, Cambodia

"I eat only mashed chili with salt and bamboo shoots. Sometimes, when we have money we buy some fruit, chicken eggs, duck eggs, and meat from the market. To get the food we have to walk one hour, because around our village food from the forest is disappearing."

Rodine Norosea

Nutrition technician,
Fianarantsoa Province, Madagascar

"The usual food consists of too many carbohydrates because of the abundance of rice they are eating. Frequently it's not possible for people to follow our recommendations and recipes, because the required food isn't available or they don't have enough money to buy it."

"Single mothers with many children and not enough food very often favor their older children when distributing food so that there is little left for the youngest."

04

Concerted and ongoing effort is **necessary at every level** if child undernutrition is to be comprehensively tackled and ultimately eliminated.

COMMUNITY PERSPECTIVES ON EARLY CHILDHOOD UNDERNUTRITION

"Now We See It Is a Problem and We Know How to Address It"

Concern Worldwide and Welthungerhilfe share a strong commitment to the fight against hunger and undernutrition. Working in a variety of contexts across Africa, Asia, and Latin America and the Caribbean, the two agencies have tested and scaled up a wide range of effective community-based approaches to tackling childhood malnutrition. They are attacking the problem directly and addressing the three underlying causes of undernutrition: food insecurity, insufficient care for women and children, and limited access to healthcare and a healthy environment (see chart on page 27). Both organizations seek to operate within existing community systems and structures, employing methods with the greatest potential to sustain positive results over the longer term.

The following case studies provide insights into two projects in rural Mali (Welthungerhilfe) and urban Bangladesh (Concern), including reflections from project participants gathered during recent visits.[1] These reflections, gathered in preparation for the Global Hunger Index, are from people who are directly affected by child malnutrition: mothers, community workers, and local leaders. They give voice to those who face the daily challenges of trying to ensure good nutrition for mothers and children.

Welthungerhilfe's Program for the Promotion of Best Practices in Agriculture, Nutrition, and Health

Welthungerhilfe has worked in Mali since 1968. It currently supports the Program for the Promotion of Best Practices in Agriculture, Nutrition, and Health[2] in 100 particularly food-insecure villages in the two districts of Nioro du Sahel and Diema, in the Kayes region near the border with Mauritania. The four-year program, which runs from 2008 to 2011, is designed to benefit approximately 125,000 people. Its overall aim is to contribute to improving the nutritional status of children under five and pregnant and lactating women and to enhance the food security of vulnerable populations. Specifically, the project aims to reduce the prevalence of chronic childhood undernutrition in the area by 50 percent (see box below).

A representative baseline survey (using a clustered random sampling method) was conducted in the intervention area before project activities commenced (March–May 2008). The survey showed that stunting levels in the target area (37 percent) were very close to those seen nationally. The survey also showed that health and nutri-

CHILD NUTRITION IN MALI

More than one-third (34 percent) of Mali's children are stunted, and one in 10 (11 percent) suffers from wasting. Even more stark is the fact that there has been no improvement in either statistic over the past decade and a half – stunting levels were basically the same in 1996 (33 percent) as they are now, and since then the prevalence of wasting has more than doubled (from 5 percent in 1996) (UNICEF 2003–08).

Mali, a landlocked country in West Africa with an estimated population of 13.5 million (Samaké 2007), is one of the poorest countries in the world. In 2006, more than half of the population was living on less than US$1.25 a day and more than 70 percent on less than US$2 a day. More than two-thirds of the population lives in rural areas, and the vast majority of the population (approximately 80 percent) works in agriculture (République du Mali 2005).

As in much of the Sahel, depending on agriculture for one's primary livelihood is a risky endeavor in Mali. In the absence of irrigation systems, most crops are dependent solely on rainfall. That rainfall is generally limited and inconsistent. As a result, dramatic fluctuations in annual agricultural production are the norm, and families, particularly children, are at risk of suffering as a result of these shortfalls. Seasonal locust and granivore infestations compound the effects of drought, and the result can be crippling for the average farming household. Such was the case in 2004, when poor harvests across the country led to a severe food crisis in 2005. A similar crisis unfolded in northern Mali in early 2010 following unusually low rainfall the year before. A drought appeal was launched, and the emergency response continued throughout 2010 although some would argue such emergency measures are often "too little, too late."

The underlying causes of undernutrition all exist in Mali. Pervasive poverty and high food insecurity exist alongside limited access to healthcare, water, and sanitation services, and maternal and child caring practices are suboptimal in many areas. In a national survey in 2006, the majority of rural women (72 percent) cited major barriers to gaining access to healthcare, the most common being a lack of money (59 percent), followed by distance to health centers (48.2 percent) and lack of transportation (42 percent) (Samaké 2007).

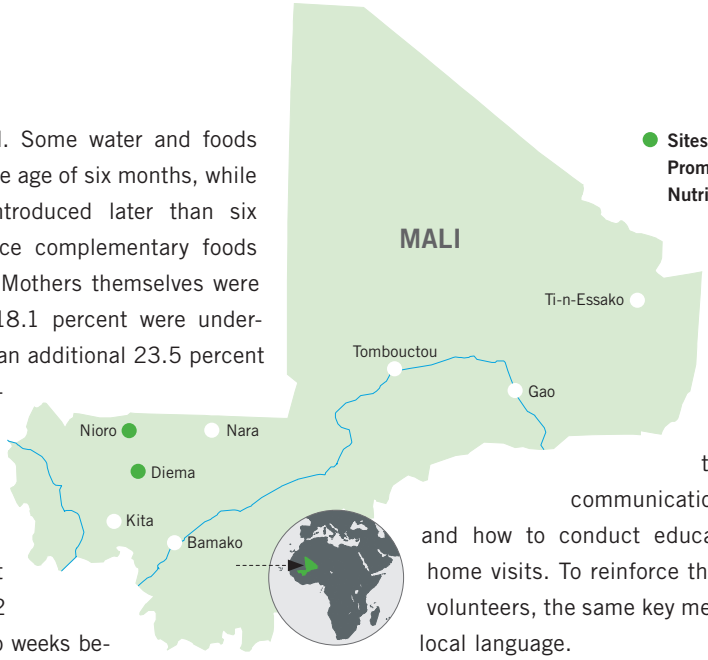
tion practices were suboptimal. Some water and foods were being introduced before the age of six months, while complementary foods were introduced later than six months; feeding frequency once complementary foods were introduced was also low. Mothers themselves were found to be undernourished (18.1 percent were underweight with a BMI < 18.5, and an additional 23.5 percent were at risk of being underweight with a BMI < 20) with a low level of education (1.4 percent were literate; 67.9 percent had no education).

It was also found that children were frequently ill; 32 percent were sick during the two weeks before the survey and 32 percent of children surveyed drank regularly from unprotected water sources. Access to health services was limited, and it was found that more than half (55 percent) of pregnant women had not had any sort of antenatal visit.

There is a seasonal "hunger gap" that begins once the annual harvest is consumed and before the next arrives. Yearly rainfall averages between 300 and 550 millimeters and usually comes in a concentrated stretch between July and October, followed by a long, dry postharvest season. Millet and sorghum are the main crops, with some farmers growing smaller plots of groundnuts and cowpeas.

Welthungerhilfe initiated its project to address these problems in an integrated manner, fostering improved health and nutritional knowledge and practice while supporting increased agricultural productivity and enhancing the capacity of existing communal structures to manage and maintain those improvements.

After two years of implementation, communities in the program area noted changes that, in recent discussions, were attributed to the project.



Sites of Welthungerhilfe's Program for the Promotion of Best Practices in Agriculture, Nutrition, and Health

Improving care for women and children

Initial assessments determined that health promotion at the community level was weak but that some dormant community health volunteers did exist. While a cadre of volunteers had been trained previously, most were no longer active because of lack of follow-up support. Building on this existing capacity, the project identified and reactivated these volunteers by providing refresher training on a wide range of nutrition- and health-related topics and providing supportive supervision through the project's health advisers.

Changing feeding habits in northwest Mali is a challenge. Families have strong traditional beliefs that babies should be fed animal milk, and women have a very low level of education. In this context, it proved critical to train community health volunteers not only in the key messages, but also in how to speak with people. All volunteers received training in interpersonal communication, the qualities of a good facilitator, and how to conduct educational discussions, counseling, and home visits. To reinforce the messages of the community health volunteers, the same key messages were broadcast by radio in the local language.

There are indications that mothers in the project area are adopting improved practices based on the messages and counseling they are receiving from volunteers. One mother said she had abandoned the traditional practice of discarding the mother's first milk, the nutrient-dense colostrum, and had moved toward exclusively breastfeeding and improved complementary feeding for her most recent child: "Now for the first six months we only give breast milk. Before, the first milk given to a newborn was goat's milk; now we give mother's milk first. The volunteer has explained that if we look at animals, such as goats, cows, and horses, we see that they give the first milk to their newborns. If other animals give the first milk, it must not be poison. … Before, we did not know how to make appropriate foods with locally available products; when we were eating we would just give a portion [from the adult's plate] to our child. I have seen a change from the birth of my [youngest] child until now since I was counseled. She received breast milk for the first six months and was fed appropriately after that. I can see a difference from my previous child. Since her birth my youngest child has not fallen sick."

The volunteers also conducted cooking presentations using recipes based on locally available foods, providing for a balanced diet.

Improving access to healthcare

Increasing the knowledge of health volunteers was the first step toward ensuring that undernourished children receive the appropriate treatment, as one of the project's health advisers explained: "In the training we showed pictures of children with different types of malnutrition, including kwashiorkor, marasmus, and edema. We used pictures of children from the area. They had never seen pictures of malnourished children before. At first volunteers did not believe they were malnourished or did not believe the children were from the area."

Members of a women's garden association irrigating the beds.

And a volunteer confirms: "We did not know the signs. Now we see that it is a problem, and we know how to address it."

In order to ensure that mothers of malnourished children can overcome barriers to gaining access to healthcare, community nutrition funds were established from money contributed by households and matched by the project. The fund is managed by a community committee and is kept in a local banking facility. One mother spoke about the fund in her village: "We now have a community nutrition fund. If a child is sick and the community health staff refers him to the center in Nioro, we take money from the fund for the transportation of the child."

By January 2010, community nutrition funds had been established in 48 villages, and 1,583,075 CFA francs (about US$3,130) had been raised. The staff at the public health centers confirmed that more community members are using the centers, with a particular increase in the number of undernourished children being referred. This suggests that more children are being treated.

Improving access to quality foods

Increased knowledge of feeding practices and healthy diets can make a difference only if there is sufficient access to food. The initial baseline study identified inconsistent rain, poor soil quality, erosion, and poor quality of seeds as key barriers to ensuring levels of agricultural production that would close the seasonal "hunger gap."

Based on a further study that looked at the needs and available resources in each village, a variety of food security, agriculture, and community capacity-building activities were implemented in the program area.[3] Training was carried out for heads of households on erosion control methods including construction of check dams, seed improvement, and seed multiplication. The aims were to maximize production of rainfed plots and to encourage diversification of crops. These activities were combined with training in correct storage, especially during the dry season. The project also supported the formation of women's garden associations and the construction of wells.

Though initially skeptical, farmers were soon convinced by the early successes and began to engage in further program activities. "In the first year, we only sowed a small portion of the new seeds. We saw how much better it worked and did larger amounts in the second year...."

"Now this year there are some that are only using the new seeds. The new seeds produce around 500 kilos for every 1 kilo of seeds. The old seeds only produced around 300 kilos...."

"Before, the level of production of beans was so low that we only had enough for part of the year. Now households have enough beans to last the whole year."

This initial trust and confidence are critical to the next step, which is to work with farmers to expand replication of their own and improved seed varieties to replenish their stocks.

EXAMPLE OF INSTRUCTION CARDS FOR THE PROMOTION OF "BEST PRACTICES IN AGRICULTURE, NUTRITION AND HEALTH" IN THE TWO DISTRICTS OF NIORO DU SAHEL AND DIEMA

Promotion of breastfeeding

Medical supply

Training for the members of the garden associations led to increased diversity of food produced, eaten, and sold. One village woman reported: "We grow a wide variety of vegetables including onions, cabbage, tomatoes, carrots, and eggplant. Before, we only knew about lettuce and onions.... The first portion that we harvest is eaten, but if the production is large, then we sell a proportion to add to our savings. The project built one large well and two small wells in our village. We do not have to go to the neighboring village to get water anymore. Even now in June, there are some that are still gardening."

After two years of implementation, 289 women gardeners had been trained in vegetable drying and conservation techniques in order to improve access to diversified foods throughout the "hunger gap" period.

Through small steps, the project has made considerable contributions to household income and food security.

Enduring challenges

Two years into the project, Welthungerhilfe understands some of the challenges to achieving sustained impact and scaling it up and is working to find solutions based on that understanding.

One challenge results from the fact that the agricultural calendar requires labor for sowing and weeding crops just as farmers in Mali are experiencing the "hungry season." Community health volunteers, who are farmers themselves, find it difficult to carry out their responsibilities during this period. As one volunteer explained: "Everyone has a lot of work to do during the day, and at night they are tired and sleeping, making it difficult to visit households to deliver health messages and check for illness."

Thus, the monitoring of children's health and nutritional status is especially difficult during the period when it is most necessary. The program addresses this challenge by promoting compensation schemes for the volunteers, which are managed by the communities and enable the volunteers to seek assistance for the field work.

Another challenge is the longer-term sustainability of interventions. The project has successfully engaged the local population – farmers, mothers, and other communal stakeholders – and helped them identify with the intervention as they acknowledge improvement in their daily lives. Public authorities are systematically participating in the planning and monitoring of all interventions, and all project activities are integrated into communal strategies for ecological, social, and cultural development. Nevertheless, it may prove difficult for local authorities to uphold their commitments once the external support phases out, given the limited support from the regional and national levels.

The reflections provided by volunteers and community members suggest that the program has taken the right approach by comprehensively aiming to increase knowledge on health and nutrition, improving access to healthcare, and addressing issues of food availability. A final program evaluation will be undertaken to verify the extent to which the increased knowledge among volunteers and community members leads to sustainable behavioral changes and thus reductions in child undernutrition rates.

Concern Worldwide's Child Survival Program

More than 10 years ago, Concern developed a program to improve maternal and child survival in Saidpur and Parbatipur, two large upazilas (or, municipalities) in northern Bangladesh. The program set out to achieve its goal by empowering individuals and communities to understand and adopt caring practices essential to the survival of children and mothers. These practices included seeking health services such as immunization and treatment at the first sign of illness. They thus increased the demand for high-quality health services within the municipalities. At the same time, the program sought to harness the power of networks at the local level to manage and implement their own health services thereby ensuring that health services were available and accessible to those seeking them.

These efforts were undertaken within the existing policy framework, which called for the creation of municipal and community-level health committees, but these were not yet in place at the time. The program recognized this gap between policy and practice and the fact that urban slum communities had very few functioning health services. The new approach marked a bold shift from Concern's previous focus on direct provision of health services, with very specific consideration and importance given to a rights-based approach to health (see box on page 36).

Although explicitly focused on health, the program also emphasized the importance of nutrition, beginning with the recognition that child survival depended on ensuring good nutrition practices, particularly optimum breastfeeding and vitamin-A supplementation. At the same time, by working to improve access to health, water, and sanitation services, and caring practices and resources for women and children, the program tackled two of the key underlying causes of undernutrition. In this way, the program sought to extend its impact beyond basic survival to support the physical and mental development of children through improved nutrition (see box below).

Sowing the seeds: Empowering communities and improving knowledge

The first step in empowering communities was to engage municipal leaders, including mayors and councilors, in establishing municipal and ward health committees. The program achieved the buy-in and participation of community leaders – crucial to the formation of these committees – through information sessions and dialogue on the existing policy framework, which outlined the roles and responsibilities of municipal authorities in implementing and managing health services. This effort was particularly important in the urban Bangladesh context. Once recruited, committee members were oriented on how best to manage their responsibilities, to obtain central-

CHILD NUTRITION IN BANGLADESH

Over the past 25 years, Bangladesh has made significant progress in reducing its under-five mortality rate and the prevalence of both underweight and stunting. Despite improvement, 54 of 1,000 children do not survive to their fifth birthday, while a staggering 43 percent of Bangladeshi children are stunted. With a population of 160 million, Bangladesh is one of the most densely populated countries in the world. Because of its large population, the country is home to almost 4 percent of the world's stunted children (UNICEF 2009b).

The leading causes of death in the country are neonatal disorders (48 percent), followed by diarrhea (20 percent), pneumonia (15 percent), and other diseases and causes (17 percent). It is now known that maternal and child undernutrition is responsible for 35 percent of the global under-five death burden, and it is likely that Bangladesh is no exception.

Urbanization is occurring at an alarming rate. Almost 30 percent of the population now lives in urban areas. Although some statistics show that health services are more accessible in urban centers, these figures often mask the enormous chasm between higher and lower economic classes. Urban slums present particular threats to child survival, and the three underlying causes of undernutrition and child death – inadequate access to food, insufficient care for women and children, and inadequate access to healthcare and an unhealthy environment – present a constant challenge to the survival and development of the children of the urban poor.

level funding, to support and supervise volunteers, and to monitor program activities and outcomes.

Community health volunteers, in turn, were trained on key health practices, including the danger signs and management of child illness, safe motherhood, newborn care, and nutrition. Each volunteer was assigned to work with 20–25 households, encouraging and supporting mothers to adopt positive health practices, referring patients to health facilities, and collecting community-level information to monitor the program. The program also provided training to community birth attendants to refer expectant mothers at the first sign of danger and to facilitate transport to hospitals.

Results after the first five years of the program (1999–2004) showed improvements in coverage of vaccination and vitamin A supplementation as well as other indicators. Based on these positive results, the program was scaled up across a further seven municipalities between 2005 and 2009, and the two original program sites were used as learning centers. Over a decade, the program reached approximately 1 million people across nine regions.

Signs of success: Improved uptake of key health services and practices

There are strong indications that the uptake of key maternal and child health services and practices has improved across the expanded Child Survival Program area, according to the results of surveys conducted at the start (2005) and end (2009) of the program across seven municipalities (see page 38). The largest change occurred in the coverage of vitamin A supplementation for young children and postpartum mothers. Additional, though less dramatic, improvements can be seen in other indicators. Overall, the trend is positive, but the variation in results points to the fact that cultural and access-related barriers likely still need to be overcome if mothers and communities are to adopt improved practices at scale.

Lasting results: Signs of continued empowerment and improved knowledge

Sustaining positive health and nutrition outcomes over time – after the formal program period is over – is often the most challenging aspect of any intervention. One year after the formal completion of the Child

THE RIGHT TO ADEQUATE FOOD AND NUTRITIONAL HEALTH

At the World Summit on Food Security in 2009, UN Member States reaffirmed "the right of everyone to have access to safe, sufficient and nutritious food, consistent with the progressive realization of the right to adequate food in the context of national food security."

The right to adequate food is a human right laid down in international legal human rights conventions, together with other rights conducive to food security and nutritional health. The majority of UN Member States have ratified these conventions and are thereby bound to implement their content.

An increasing number of states, international organizations, and civil society have begun to explore a rights-based approach to development efforts, including activities promoting food security and nutritional health. They recognize that merely increasing food production will not end hunger and malnutrition and that those who are poor, hungry, or undernourished must get access to food. Who and where they are must first be identified, and the causes of their situation fully understood and exposed. Vulnerable and marginalized groups can then be specifically supported by agricultural programs facilitating their ability to feed themselves or social protection schemes ensuring that no individual in need is left out.

A human rights-based approach to such programs and schemes necessitates strict adherence to certain principles in their implementation. Some of those principles are already generally accepted in development language, such as transparency, empowerment, and participation, while human rights also require respect for human dignity, non-discrimination, a high request for accountability, and respect for the rule of law.

"Adequate food" entails not only sufficient quantity, but also dietary diversity to satisfy nutritional needs, food safety, and compliance with cultural food values. These attributes have traditionally not received proper attention in food security policies and programming. Hopefully new political commitments and initiatives will emerge from governments of food- and nutrition-insecure countries toward policies and programs conducive to the realization of the right to adequate food, fully supported by donors and NGOs alike. Authoritative interpretations and guidelines are available to assist interested actors in operationalizing the right to adequate food in context. See especially http://www.unhchr.ch/tbs/doc.nsf/0/3d02758c707031d58025677f003b73b9 and http://www.fao.org/righttofood/.

Source: W. B. Eide

RESULTS FROM TWO SURVEYS ON THE CHILD SURVIVAL PROGRAM, 2005 AND 2009

Indicator	Baseline (2005)	Final (2009)	% point change
Vitamin A for children (% of children aged 6–23 months who received vitamin A capsules in past six months, n = 1,405/1,520)	59	92	33
Vitamin A postpartum (% of mothers who received vitamin A within 42 days of last delivery, n = 1,499/1,513)	26	49	23
Nutrition for pregnant mothers (% of mothers who took more food than usual during last pregnancy, n = 1,499/1,513)	32	43	11
Iron folate in pregnancy (% of mothers who took iron folate at least 90 days during last pregnancy, n = 987/1,156)	42	52	10
Assisted delivery (% of mothers whose last delivery was assisted by a skilled attendant, n = 1,499/1,513)	49	58	9
Clean cord cutting (% of mothers whose cord was cut with new/clean instrument during last birth, n = 1,449/1,513)	87	96	9
Exclusively breastfeeding to 6 months (% of children aged 0–6 months reported to be exclusively breastfed, n = 600/780)	65	72	7
Optimal complementary feeding (% of children aged 6–11 months who were breastfed and received complementary food 3 or more times in past 24 hours, n = 702/733)	57	63	6
Immediate breastfeeding after birth (% of mothers who reported putting infant to breast within one hour of last birth, n = 511/230)	44	49	5
Oral rehydration therapy (ORT) (% of children aged 6–23 months with diarrhea during previous weeks who received ORT, n = 376/273)	73	75	2
Protection against tetanus (% of mothers of children aged 0–11 months who received at least 2 tetanus vaccinations during last pregnancy, n = 1,499/1,513)	64	67	3
Hand washing with soap (% of mothers of children aged 12–23 months who report washing hands with soap at the 5 critical moments, n = 1,496/1,520)	16	17	1
Active feeding during diarrhea episode (% of children aged 6–23 months with diarrhea in last 2 weeks who took the same or more food/fluids/breast milk than usual, n = 329/242)	36	28	-8

Source: Baseline (January 2005) and final (March 2009) Knowledge, Practice, and Coverage Surveys conducted for Concern Worldwide.
Note: The surveys used the lot quality assurance sampling method for the seven municipalities. The 2005 baseline was conducted by Associates for Community and Population Research, and the 2009 survey was conducted by Pathways Consulting Services Ltd, Dhaka.

Survival Program, a visit was made to the program area to talk with communities. Their reflections bring to life the legacy and the lessons of the program. Although clear signs of continued empowerment and improved knowledge among mothers, community health volunteers, and community leaders are evident, there are also some reminders of the challenges households continue to face when striving to put optimum health and nutrition behaviors into practice.

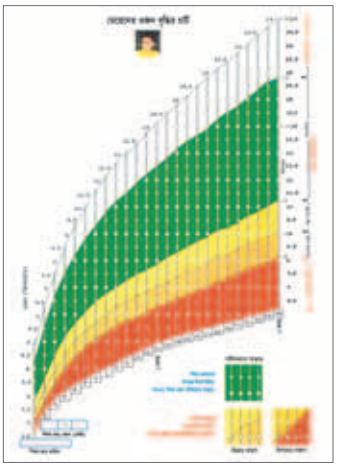
One of the mothers who took part in the program said: "We can recognize the sign of malnutrition, such as if a child loses weight, their hair or skin color changes, or they become irritable. We know about types of foods. When you come across a malnourished child, the foods should be, for energy, rice, bread, and potatoes; for protein, fish or dhal (beans). Yellow fruits and green vegetables are good sources of vitamins."

A community birth attendant explained how practices had changed: "Before we did not know how to conduct a safe delivery, we would do it on the floor with no clean surface. Now we use a clean surface and know about our own hygiene and nails. When we received training we learned many ideal practices; we could see that practices in the past were not best and that helped change our perception."

Community volunteers demonstrated their knowledge and continued role in the community after the program: "We feel proud because so many people know us and know about our social activities.... Even though the project has ended, they still know us and know that we have knowledge, and they continue to seek us out for help."

EXAMPLE OF CHILD GROWTH CARDS USED IN THE CHILD NUTRITION PROGRAMS IN BANGLADESH

Health education messages on breastfeeding, complementary feeding, home management of diarrhea, child immunization, etc.



Growth chart to identify obesity, normal weight, mild, moderate and severe malnutrition (see also example on page 24).

Improved knowledge extends to the ward health committees as well, whose members discussed appropriate feeding practices with accuracy and also spoke of their wider sense of responsibility.

"Before we were not knowledgeable, and we were not involved in anything other than national initiatives. Now we are involved, we have an exchange of information between groups, and the ward health committee is well defined. We have a ward map which shows the location of all households, of the committee members, of the volunteers, and the community birth attendants. We have a picture of our community and where the resources are, and we know how to mobilize them. Mothers now know where they can receive healthcare services; even if they cannot afford to pay, they know where there is a free clinic."

The engagement and involvement of community leaders in the program ensured a sense of ownership and common purpose with regard to improving access to healthcare. One mayor explained: "Before, the role of the municipality was [simply] facilitating immunization and overseeing birth records. Now I see my role in a different way. For example, before if a pregnant mother needed to have a Caesarean section and it was the evening or a time when Caesareans were not done, the mother had to wait, and the mother and child both suffered. We have ensured that the government facilities are now available 24/7. I have a vision that no one should die because of a lack of healthcare."

The ward health committees continue the work they began in 2005. They provide funds for those who cannot afford healthcare in case of an emergency. One committee member explained: "If a family has a health emergency, and they don't have the money, the ward health committee comes forward to support them and the volunteers or birth attendants will accompany them to the health facility."

The committees continue to organize health events, motivate and support volunteers, and collect information on their areas. Community volunteers and birth attendants refer and accompany mothers and sick children to healthcare facilities. The municipal cabinets ensure that the community health volunteers and birth attendants have easy access to hospitals and clinics and have all types of support when they refer a patient.

Volunteers and birth attendants are each issued identification cards by the municipality.

Community members trust the volunteers' knowledge because it has proven to be correct and often lifesaving over time. One volunteer said confidence in the volunteers grows when she diagnoses a child with respiratory infection, when this diagnosis is confirmed by the health facility, and when the mother sees the child recover after treatment.

The Child Survival Program began with a nonfunctioning health system that only supported national immunization days. It left in its wake a trained, motivated workforce and increased access

Mothers' meeting at the Maternity Health Ward, Rangpur, Bangladesh.

to healthcare by mothers. It is a huge step in the direction of reducing child undernutrition, and evaluations have shown a range of positive changes.

By leveraging existing resources within communities, working with governments to create a more favorable environment for healthcare, and providing the necessary education and range of support mechanisms, mothers were empowered to take better care of their infants and young children. Strong monitoring and evaluation have allowed this impact to be measured and learning to be consolidated for future programs. One community health volunteer explained: "The members of the community know us, the volunteers. They did not know Concern. Even though the project has ended, they still know us and know that we have knowledge, and they continue to seek us out for help."

In 2009, an assessment was conducted to determine the sustainability of the 2000–04 program. This assessment found that although external inputs fell to almost zero, the municipalities were able to maintain basic operations and improve many health indicators. Though the assessment identified some gaps, it more broadly confirmed the lasting value of an urban health model resting on the municipal government and ward health committees. The assessment led to a set of recommendations that were made to municipalities and stakeholders so they could focus on the areas of greatest challenge and continue to build on the foundations laid.

The results of both programs, and the reflections on them, show the changes and challenges that exist at the community level and illustrate the kinds of success and learning that are possible, and indeed necessary. Set against the backdrop of the wider analysis of the Global Hunger Index, these studies also show the concerted and ongoing effort that is necessary at every level if child undernutrition is to be comprehensively addressed and ultimately eliminated.

[1] In June 2010, Concern Worldwide and Welthungerhilfe asked Sally Newman Abbott, an external consultant, to visit the program area to interview local stakeholders on their personal views of the problem of early childhood undernutrition as well as on the changes and limitations they observe.

[2] Welthungerhilfe is grateful for the European Commission's financial support for this program.

[3] This diagnostic study was conducted by the local nongovernmental organization (NGO) partner Association pour l'Appui au Développement Global, or Association for the Support of Global Development (ADG). It consisted of a review of available literature and working sessions with a variety of stakeholders, including elected officials and villagers. Participatory tools were used. For each village, the study outlines the location, climate and vegetation, demographics, potential for and constraints of food production, existing projects, and community organizations, as well as the basic problems and constraints faced.

There is a clear window of opportunity for addressing nutrition, and after age two this window **closes rapidly.**

TACKLING EARLY CHILDHOOD UNDERNUTRITION

Policy Recommendations

A range of factors contribute to the crisis of early childhood undernutrition. Policy and program solutions, therefore, have to address the range of causes – both immediate and underlying. Based on the evidence and prior successes, we recommend the following actions:

> **Target nutrition interventions to the window of opportunity**

Governments and development agencies should scale up targeted nutrition interventions for women and children in the window of opportunity (that is, between conception and the age of two), using evidence-based and locally appropriate approaches. These interventions should focus on improving the nutrition of pregnant and lactating mothers, promoting sound breastfeeding and complementary feeding practices for young children, providing vitamin A and zinc supplements where necessary, immunizing children, ensuring universal salt iodization, improving the care of children affected by diarrhea and HIV and AIDS, and improving hygiene and sanitation practices. Universal coverage of a package of preventive nutrition interventions for children under age two could reduce the global burden of childhood undernutrition by 25–36 percent (Bhutta et al. 2008). Scaling up these interventions in poor countries will not be easy, however. It will require addressing the substantial challenges related to resources, governance, and capacity.

> **Tackle the underlying conditions that cause undernutrition**

To achieve sustainable improvements in child nutrition, decision-makers must tackle the underlying causes of undernutrition: food insecurity, insufficient care for women and children, and limited access to healthcare and a healthy environment. Nutrition-sensitive policies; protective and productive social safety-net programs; and pro-poor, pro-women, pro-nutrition agricultural policies and programs that specifically integrate nutrition goals and actions and track nutrition impacts can play a critical role in improving the overall environment in which young children grow and develop.

> **Foster gender equity**

Gender inequality and poor nutrition are intertwined (Smith and Haddad 2000; Smith et al. 2003; Ackerson and Subramanian 2008; von Grebmer et al. 2009). Therefore, in areas where women's health, nutrition, and social status are poor, these factors will compromise the impacts of interventions targeted to the window of opportunity and reduce overall household food security. Gender inequality needs to be tackled at all stages of the life cycle to prepare women for a healthy and safe reproductive life. It is particularly important to protect the health and nutrition of girls and young women before pregnancy, and this can be done by improving their access to health, nutrition, education, and social protection programs during adolescence and early adult life.

> **Prioritize nutrition in political and policy processes**

The process of rolling out new food security and nutrition initiatives is only beginning. The next one to two years will be crucial, and much work remains to be done to ensure that nutrition remains central in these initiatives as they are implemented. The commitment to increased emphasis on nutrition will need to be backed by additional resources. Accountability mechanisms are vital to ensure that commitments are fulfilled. In addition, for these initiatives to be effective, joint action and cooperation will be required by all stakeholders – governments, civil society, the private sector, academia, and research institutions – with each stakeholder clear about its roles and responsibilities. It is important to fight to keep nutrition high on the political agenda and central to the initiatives outlined.

> **Engage, empower, and ensure sustained support for those actors at the local and municipal levels whose capacities and skills will ensure that nutritional needs are addressed**

The case studies from Welthungerhilfe and Concern (see Chapter 4) demonstrate the complexity of tackling maternal and child undernutrition in two very different contexts and with differing project approaches. These programs and the lessons learned from them point to a number of clear principles that should underpin the process of formulating and implementing programs intended to tackle the scourge of undernutrition:

- **Build ownership of interventions by engaging all relevant stakeholders.** A "first principle" must be to ensure that mothers, health workers, local leaders, and municipal structures are each involved in planning, implementing, monitoring, and evaluating programs. Their buy-in and commitment are essential to the longer-term sustainability of any effort to effectively tackle child undernutrition.
- **Build on existing structures and capacities.** The skills and capacities of health workers and coordination committees are at the heart of successful and sustainable programs. Both their skills and their capacities should be understood, revitalized, and leveraged, and special care should be taken to support those working on a volunteer basis.
- **Build the capacity of community members and leaders.** Capacity building needs to extend beyond technical expertise to include communication skills, appropriate behavioral change

messaging, and counseling of caregivers, as well as organization, management, and monitoring of services and outcomes. The capacity to understand, engage with, and influence policy frameworks – at local or national levels – is also necessary in order to overcome the many barriers to improved nutritional outcomes.

- **Build trust and inspire investment among community members by demonstrating results.** The two case studies described in Chapter 4 highlight the importance and power of results, which were essential in convincing mothers to translate acquired knowledge into practice. They were also vital in persuading farmers to adopt seed varieties and erosion control mechanisms that were outside their previous experience.

Actions to improve early childhood nutrition have enormous potential, and the 2010 GHI helps pinpoint the countries and regions where the need for such actions is greatest. Improvements to early childhood nutrition can help create a healthy, productive population and thereby make all other development interventions more effective. Most important, such improvements will alleviate needless suffering for millions – even billions – of people worldwide. It is not only the smart thing to do, but the right thing to do.

On track for a healthy future: kindergarten children eating their lunch.

APPENDIX

Data Sources and Calculation of the 1990 and 2010 Global Hunger Indexes

All three index components are expressed in percentages and weighted equally. Higher GHI values indicate more hunger. The Index varies between a minimum of 0 and a maximum of 100, but these extremes do not occur in practice. The maximum value of 100 would be reached only if all children died before their fifth birthday, the whole population were undernourished, and all children under five were underweight. The minimum value of zero would mean that a country had no undernourished people in the population, no children under five who were underweight, and no children who died before their fifth birthday. The table below provides an overview of the data sources for the Global Hunger Index.

THE GLOBAL HUNGER INDEX IS CALCULATED AS FOLLOWS:

GHI = (PUN + CUW + CM)/3

with **GHI:** Global Hunger Index

PUN: proportion of the population that is undernourished (in %)

CUW: prevalence of underweight in children under five (in %)

CM: proportion of children dying before the age of five (in %)

GLOBAL HUNGER INDEX COMPONENTS, 1990 GHI AND 2010 GHI

GHI	Number of countries with GHI	Indicators	Reference years	Data sources
1990	99	Percentage of undernourished in the population [a]	1990–92 [b]	FAO 2009 and authors' estimates
		Percentage of underweight in children under five	1988–92 [c]	WHO 2010a and authors' estimates
		Under-five mortality	1990	UNICEF 2009b
2010	122	Percentage of undernourished in the population [a]	2004–06 [b]	FAO 2009 and authors' estimates
		Percentage of underweight in children under five	2003–08 [e]	WHO 2010a; UNICEF 2010; MEASURE DHS 2010 [d]; and authors' estimates
		Under-five mortality	2008	UNICEF 2009b

[a] Proportion of the population with calorie deficiency.
[b] Average over a three-year period.
[c] Data collected from the year closest to 1990; where data for 1988 and 1992, or 1989 and 1991, were available, an average was used. The authors' estimates are for 1990.
[d] WHO 2010a data are the primary data source, and UNICEF 2010 and MEASURE DHS 2010 are secondary.
[e] The latest data gathered in this period.

DATA UNDERLYING THE CALCULATION OF THE 1990 AND 2010 GLOBAL HUNGER INDEXES

Country	Proportion of undernourished in the population (%)		Prevalence of underweight in children under five years (%)		Under-five mortality rate (%)		GHI	
	1990–92	2004–06	1988–92	2003–08	1990	2008	1990 (with data from 1988–92)	2010 (with data from 2003–08)
Afghanistan	-	-	-	32.8 *	26.0	25.7	-	-
Albania	11.0 *	5.0 *	10.6 *	6.6	4.6	1.4	8.7	<5
Algeria	4.0 *	3.0 *	8.0	3.0	6.4	4.1	6.1	<5
Angola	66.0	44.0	29.8 *	15.5 *	26.0	22.0	40.6	27.2
Argentina	1.0 *	1.0 *	3.5 *	2.3 *	2.9	1.6	<5	<5
Armenia	-	23.0	3.7 *	4.2	5.6	2.3	-	9.8
Azerbaijan	-	11.0	10.6 *	8.4	9.8	3.6	-	7.7
Bahrain	-	-	6.3	4.5 *	1.6	1.2	-	-
Bangladesh	36.0	26.0	56.5	41.3	14.9	5.4	35.8	24.2
Belarus	-	2.0 *	2.4 *	1.3	2.4	1.3	-	<5
Benin	28.0	19.0	25.7 *	20.2	18.4	12.1	24.0	17.1
Bhutan	-	-	34.0	12.0 *	14.8	8.1	-	-
Bolivia	24.0	23.0	9.7	4.3	12.2	5.4	15.3	10.9
Bosnia & Herzegovina	-	3.0 *	3.5 *	1.6	2.3	1.5	-	<5
Botswana	20.0	26.0	18.0 *	8.4 *	5.0	3.1	14.3	12.5
Brazil	10.0	6.0	6.1	2.2	5.6	2.2	7.2	<5
Bulgaria	4.0 *	8.0 *	2.5 *	2.2 *	1.8	1.1	<5	<5
Burkina Faso	14.0	9.0	33.9 *	37.4	20.1	16.9	22.7	21.1
Burundi	44.0	63.0	32.4 *	35.0	18.9	16.8	31.8	38.3
Cambodia	38.0	25.0	44.7 *	28.8	11.7	9.0	31.5	20.9
Cameroon	34.0	23.0	18.0	16.6	14.9	13.1	22.3	17.6
Central African Rep.	47.0	41.0	25.3 *	24.0	17.8	17.3	30.0	27.4
Chad	59.0	38.0	33.8 *	33.9	20.1	20.9	37.6	30.9
Chile	7.0	2.0 *	1.1 *	0.5 *	2.2	0.9	<5	<5
China	15.0	10.0	15.3	6.0	4.6	2.1	11.6	6.0
Colombia	15.0	10.0	8.8	5.1	3.5	2.0	9.1	5.7
Comoros	40.0	51.0	16.2	22.1	12.8	10.5	23.0	27.9
Congo, Dem. Rep.	29.0	75.0	25.2 *	28.2	19.9	19.9	24.7	41.0
Congo, Rep.	40.0	21.0	16.9 *	11.8	10.4	12.7	22.4	15.2
Costa Rica	3.0 *	4.0 *	2.5	1.1 *	2.2	1.1	<5	<5
Côte d'Ivoire	15.0	14.0	18.1 *	16.7	15.0	11.4	16.0	14.0
Croatia	-	3.0 *	0.5 *	0.2 *	1.3	0.6	-	<5
Cuba	5.0	1.0 *	4.5 *	3.5	1.4	0.6	<5	<5
Djibouti	60.0	31.0	20.2	30.1	12.3	9.5	30.8	23.5
Dominican Republic	27.0	21.0	8.4	3.4	6.2	3.3	13.9	9.2
Ecuador	24.0	13.0	9.5 *	6.2	5.3	2.5	12.9	7.2
Egypt, Arab Rep.	3.0 *	3.0 *	9.1	6.8	9.0	2.3	7.0	<5
El Salvador	9.0	10.0	11.1	5.8 *	6.2	1.8	8.8	5.9
Eritrea	-	66.0	- *	35.3 *	15.0	5.8	-	35.7
Estonia	-	4.0 *	6.1 *	1.2 *	1.8	0.6	-	<5
Ethiopia	71.0	44.0	39.2	34.6	21.0	10.9	43.7	29.8
Fiji	8.0	3.0 *	7.7 *	4.4 *	2.2	1.8	6.0	<5
Gabon	5.0	3.0 *	8.8 *	8.4 *	9.2	7.7	7.7	6.4
Gambia, The	20.0	29.0	17.3 *	15.8	15.3	10.6	17.5	18.5
Georgia	-	12.0	1.6 *	2.3	4.7	3.0	-	5.8
Ghana	34.0	8.0	24.4	14.3	11.8	7.6	23.4	10.0
Guatemala	14.0	16.0	23.6 *	16.5 *	7.7	3.5	15.1	12.0
Guinea	19.0	16.0	23.7 *	20.8	23.1	14.6	21.9	17.1
Guinea-Bissau	20.0	31.0	18.6 *	17.2	24.0	19.5	20.9	22.6
Guyana	18.0	6.0	16.4 *	10.8	8.8	6.1	14.4	7.6

Note: * indicates authors' estimates.

DATA UNDERLYING THE CALCULATION OF THE 1990 AND 2010 GLOBAL HUNGER INDEXES

Country	Proportion of undernourished in the population (%)		Prevalence of underweight in children under five years (%)		Under-five mortality rate (%)		GHI	
	1990–92	2004–06	1988–92	2003–08	1990	2008	1990 (with data from 1988–92)	2010 (with data from 2003–08)
Haiti	63.0	58.0	22.5	18.9	15.1	7.2	33.5	28.0
Honduras	19.0	12.0	15.8	8.6	5.5	3.1	13.4	7.9
India	24.0	22.0	59.5	43.5	11.6	6.9	31.7	24.1
Indonesia	19.0	16.0	31.0	19.6	8.6	4.1	19.5	13.2
Iran, Islamic Rep.	3.0 *	4.0 *	16.0 *	4.4	7.3	3.2	8.8	<5
Iraq	-	-	10.4	7.1	5.3	4.4	-	-
Jamaica	11.0	5.0	5.2	2.2	3.3	3.1	6.5	<5
Jordan	3.0 *	3.0 *	4.8	3.5 *	3.8	2.0	<5	<5
Kazakhstan	-	1.0 *	2.7 *	4.9	6.0	3.0	-	<5
Kenya	33.0	30.0	17.4 *	16.5	10.5	12.8	20.3	19.8
Kuwait	20.0	4.0 *	6.8 *	2.5 *	1.5	1.1	9.4	<5
Kyrgyz Republic	-	3.0 *	4.8 *	2.7	7.5	3.8	-	<5
Lao PDR	27.0	19.0	44.4 *	31.6	15.7	6.1	29.0	18.9
Latvia	-	2.0 *	2.0 *	0.9 *	1.7	0.9	-	<5
Lebanon	3.0 *	2.0 *	4.6 *	4.2	4.0	1.3	<5	<5
Lesotho	15.0	15.0	13.8	13.6	10.1	7.9	13.0	12.2
Liberia	30.0	38.0	16.9 *	20.4	21.9	14.5	22.9	24.3
Libya	1.0 *	2.0 *	4.1 *	5.6	3.8	1.7	<5	<5
Lithuania	-	0.0 *	2.5 *	1.3 *	1.6	0.7	-	<5
Macedonia, FYR	-	4.0 *	2.8 *	2.0	3.6	1.1	-	<5
Madagascar	32.0	35.0	35.5	36.8	16.7	10.6	28.1	27.5
Malawi	45.0	29.0	24.4	15.5	22.5	10.0	30.6	18.2
Malaysia	2.0 *	2.0 *	22.1	7.0	1.8	0.6	8.6	<5
Mali	14.0	10.0	33.5 *	27.9	25.0	19.4	24.2	19.1
Mauritania	10.0	8.0	43.2	19.4 *	12.9	11.8	22.0	13.1
Mauritius	7.0	6.0	12.6 *	12.4 *	2.4	1.7	7.3	6.7
Mexico	5.0 *	4.0 *	13.9	3.4	4.5	1.7	7.8	<5
Moldova	-	6.0 *	3.6 *	3.2	3.7	1.7	-	<5
Mongolia	30.0	29.0	10.8	5.3	9.8	4.1	16.9	12.8
Montenegro	-	9.0 *	-	2.2	1.5	0.8	-	<5
Morocco	5.0	4.0 *	8.1	9.9	8.8	3.6	7.3	5.8
Mozambique	59.0	37.0	28.4 *	21.2	24.9	13.0	37.4	23.7
Myanmar	44.0	17.0	32.5	29.6	12.0	9.8	29.5	18.8
Namibia	29.0	19.0	21.5	17.5	7.2	4.2	19.2	13.6
Nepal	21.0	16.0	47.2 *	38.8	14.2	5.1	27.5	20.0
Nicaragua	52.0	21.0	11.3 *	6.0	6.8	2.7	23.4	9.9
Niger	38.0	28.0	41.0	32.9 *	30.5	16.7	36.5	25.9
Nigeria	15.0	8.0	35.1	26.7	23.0	18.6	24.4	17.8
North Korea	21.0	32.0	22.0 *	20.6 *	5.5	5.5	16.2	19.4
Oman	-	-	21.4	8.4 *	3.1	1.2	-	-
Pakistan	22.0	23.0	39.0	25.3 *	13.0	8.9	24.7	19.1
Panama	18.0	17.0	8.8 *	4.3 *	3.1	2.3	10.0	7.9
Papua New Guinea	-	-	18.0 *	18.0 *	9.1	6.9	-	-
Paraguay	16.0	12.0	2.8	3.0	4.2	2.8	7.7	5.9
Peru	28.0	13.0	8.8	5.4	8.1	2.4	15.0	6.9
Philippines	21.0	15.0	29.9	20.7	6.1	3.2	19.0	13.0
Qatar	-	-	-	-	2.0	1.0	-	-
Romania	3.0 *	0.0 *	5.0	2.8 *	3.2	1.4	<5	<5
Russian Federation	-	2.0 *	2.5 *	1.6 *	2.7	1.3	-	<5
Rwanda	45.0	40.0	24.3	18.0	17.4	11.2	28.9	23.1

Note: * indicates authors' estimates.

DATA UNDERLYING THE CALCULATION OF THE 1990 AND 2010 GLOBAL HUNGER INDEXES

Country	Proportion of undernourished in the population (%)		Prevalence of underweight in children under five years (%)		Under-five mortality rate (%)		GHI	
	1990–92	2004–06	1988–92	2003–08	1990	2008	1990 (with data from 1988–92)	2010 (with data from 2003–08)
Saudi Arabia	2.0 *	1.0 *	12.2 *	5.3	4.3	2.1	6.2	<5
Senegal	28.0	25.0	19.6	14.5	14.9	10.8	20.8	16.8
Serbia	-	9.0 *	-	1.8	2.9	0.7	-	<5
Sierra Leone	45.0	46.0	25.4	21.3	27.8	19.4	32.7	28.9
Slovak Republic	-	4.0 *	8.5 *	0.8 *	1.5	0.8	-	<5
Somalia	-	-	-	32.8	20.0	20.0	-	-
South Africa	6.0 *	5.0 *	10.3 *	10.1	5.6	6.7	7.3	7.3
Sri Lanka	27.0	21.0	33.4 *	21.1	2.9	1.5	21.1	14.5
Sudan	31.0	20.0	35.9 *	31.7	12.4	10.9	26.4	20.9
Suriname	11.0	7.0	12.6 *	7.0	5.1	2.7	9.6	5.6
Swaziland	12.0	18.0	8.1 *	6.1	8.4	8.3	9.5	10.8
Syrian Arab Republic	4.0 *	4.0 *	14.2 *	10.0	3.7	1.6	7.3	5.2
Tajikistan	-	26.0	10.0 *	15.0	11.7	6.4	-	15.8
Tanzania	28.0	35.0	25.1	16.7	15.7	10.4	22.9	20.7
Thailand	29.0	17.0	17.2 *	7.0	3.2	1.4	16.5	8.5
Timor-Leste	-	23.0	-	44.6	18.4	9.3	-	25.6
Togo	45.0	37.0	23.5	20.5	15.0	9.8	27.8	22.4
Trinidad & Tobago	11.0	10.0	6.2 *	2.4 *	3.4	3.5	6.9	5.3
Tunisia	1.0 *	1.0 *	9.1	3.3	5.0	2.1	5.0	<5
Turkey	1.0 *	2.0 *	8.6 *	2.6	8.4	2.2	6.0	<5
Turkmenistan	-	6.0	13.4 *	8.0	9.9	4.8	-	6.3
Uganda	19.0	15.0	19.7	16.4	18.6	13.5	19.1	15.0
Ukraine	-	2.0 *	1.6 *	0.6 *	2.1	1.6	-	<5
Uruguay	5.0	2.0 *	6.6 *	6.0	2.4	1.4	<5	<5
Uzbekistan	-	13.0	9.3 *	4.4	7.4	3.8	-	7.1
Venezuela, RB	10.0	12.0	6.7	4.4	3.2	1.8	6.6	6.1
Vietnam	28.0	13.0	40.7	20.2	5.6	1.4	24.8	11.5
Yemen, Rep.	30.0	32.0	47.7 *	43.1	12.7	6.9	30.1	27.3
Zambia	40.0	45.0	19.5	14.9	17.2	14.8	25.6	24.9
Zimbabwe	40.0	39.0	8.0	14.0	7.9	9.6	18.6	20.9

Note: * indicates authors' estimates.

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The International Food Policy Research Institute (IFPRI) was founded in 1975. Its mission is to provide policy solutions that reduce poverty in developing countries, achieve sustainable food security, improve health and nutrition, and promote environmentally friendly agricultural growth. To achieve these goals, the Institute focuses on research as well as capacity strengthening and policy communication. It works closely with national agricultural research and nutrition institutions and regional networks in the developing world. The Institute also engages in wide-ranging dialogue so that the new scientific insights generated by its research results can be integrated into agricultural and food policies and can raise public awareness regarding food security, poverty, and environmental protection. IFPRI is funded by governments, international and regional organizations, and private foundations, many of which are members of the Consultative Group on International Agricultural Research (www.cgiar.org). This association consists of 15 international agricultural research centers that work closely with national agricultural research systems, governments, NGOs, and the private sector. IFPRI is based in Washington D.C., with regional offices in India, China, Ethiopia, and Senegal.

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