

# 2011

## GLOBAL HUNGER INDEX

THE CHALLENGE OF HUNGER:  
TAMING PRICE SPIKES AND EXCESSIVE FOOD PRICE VOLATILITY



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THE CHALLENGE OF HUNGER:  
TAMING PRICE SPIKES AND EXCESSIVE FOOD PRICE VOLATILITY

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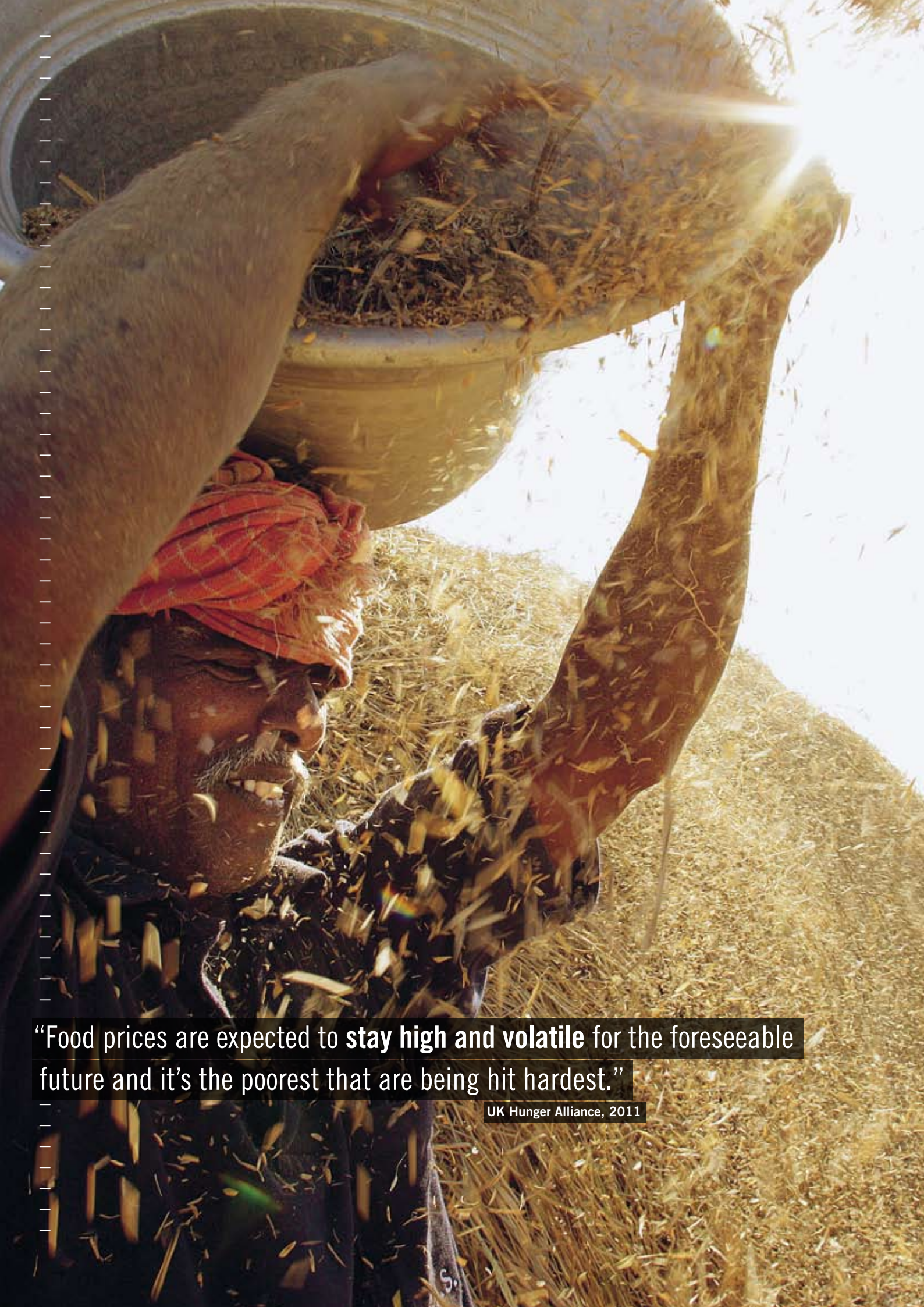
October 2011



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“Food prices are expected to **stay high and volatile** for the foreseeable future and it’s the poorest that are being hit hardest.”

UK Hunger Alliance, 2011



# FOREWORD

*The dogs of hunger are not dead: some are sleeping, others are biting.*

In mid-2011 a food emergency unfolded in the Horn of Africa. Suddenly pictures of emaciated children were back in the media. Millions of people in East Africa are facing a food crisis caused by a perfect storm of severe drought, food price spikes, and conflict, and exacerbated by the vulnerability of people and communities across the region.

Recent events in the Horn of Africa are a terrible reminder of the vulnerability of millions of poor around the world to weather and other shocks that interrupt their access to food. This humanitarian tragedy highlights two important motivations behind the Global Hunger Index (GHI) – the need for information and the need for action. Addressing the problem of hunger requires information about where and why hunger is occurring. Information will not fill people's stomachs, but policymakers and national and international agencies need it in order to take steps to ensure that people have access to sufficient and nutritious food. The broader task, though, is to take action to address the root causes of hunger and to reduce poor people's vulnerability to shocks such as drought and food price spikes in the short, medium, and long term.

The 2011 Global Hunger Index, published jointly by the International Food Policy Research Institute (IFPRI), Concern Worldwide, and Welthungerhilfe, shows that although the world has made some progress in reducing hunger, the proportion of hungry people remains too high. Of course, the absolute number of hungry people remains unacceptably high as well. This is the sixth year that IFPRI has calculated the Global Hunger Index and analyzed this multidimensional measure of global hunger. It is important to note that the GHI scores present country averages: even in countries classified as having "moderate" or "serious" hunger, there can be areas where the situation is "alarming" or "extremely alarming." Additionally, gains in hunger eradication can be eroded or even washed away by severe shocks, as evidenced by the 2011 food crisis in the Horn of Africa, when underlying vulnerabilities persist and are not adequately addressed. 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. We hope that governments and international agencies will work together to gather more timely and complete data on hunger worldwide. The report incorporates the most recent data available and thus does not reflect the impact of the latest events. It does, however, identify the countries and regions where hunger is most severe and persistent. Twenty-six 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. These results represent extreme suffering for millions of poor people.

The 2011 GHI report focuses particular attention on the issue of food price spikes and volatility, which have played a large role in the global food crises of 2007–08 and 2010–11. Many poor people already spend large shares of their incomes on food, and surges in food prices leave them unable to pay for the food, healthcare, housing, education, and other goods and services they need. In this report, IFPRI describes the factors that have contributed to the increasing and more volatile food prices of recent years and their effects on poor people in developing countries. Taming food price spikes and volatility will require that we understand the causes and address them appropriately. Concern Worldwide and Welthungerhilfe provide on-the-ground perspectives on the negative impacts of food price increases on poor people in Kenya and Tajikistan and describe the work of their organizations in helping to alleviate these impacts. Based on these research findings and experiences in the field, IFPRI, Concern Worldwide, and Welthungerhilfe propose actions to help prevent and mitigate the effects of high and volatile food prices and increase the resilience of households, communities, countries, and regions.

Recent events in the Horn of Africa remind us of an enduring truth: weather disasters and economic shocks will come, and they will strike the poor and the hungry hardest. But we have already learned a great deal about how to reduce vulnerability and how to work with people and institutions to effectively tackle poverty. It is time to apply this knowledge on a scale that will overcome hunger for all people.



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# SUMMARY

This year's Global Hunger Index (GHI) shows that global hunger has declined since 1990, but not dramatically, and remains at a level characterized as "serious." Across regions and countries, GHI scores vary greatly. The highest GHI scores occur in South Asia and Sub-Saharan Africa. South Asia reduced its GHI score substantially between 1990 and 1996, but this fast progress could not be maintained. Though Sub-Saharan Africa made less progress than South Asia after 1990, it has caught up since the turn of the millennium.

From the 1990 GHI to the 2011 GHI, 15 countries were able to reduce their scores by 50 percent or more. Nineteen countries moved out of the bottom two categories – "extremely alarming" and "alarming." In terms of absolute progress, Angola, Bangladesh, Ethiopia, Mozambique, Nicaragua, Niger, and Vietnam saw the largest improvements between the 1990 GHI and the 2011 GHI.

Twenty-six countries still have levels of hunger that are extremely alarming or alarming. The countries with extremely alarming 2011 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. Among the six countries in which the hunger situation worsened, the Democratic Republic of Congo stands out. Its GHI score rose by about 63 percent owing to conflict and political instability. (Because of time lags in the availability of data, the 2011 GHI does not reflect the impacts of the 2010–11 food price crisis or the 2011 famine in the Horn of Africa.)

In recent years world food markets have been characterized by rising and more volatile prices. This situation has serious implications for poor and hungry people, who have little capacity to adjust to price spikes and rapid shifts. Price increases and volatility have arisen for three main reasons: increasing use of food crops for biofuels, extreme weather events and climate change, and increased volume of trading in commodity futures markets. These factors are exacerbated by highly concentrated export markets that leave the world's staple food importers dependent on just a few countries, a historically low level of grain reserves, and a lack of timely information about the world food system that could help prevent overreaction to moderate shifts in supply and demand. Price increases and price volatility have been shown to cut into poor households' spending on a range of essential goods and services and to reduce the calories they consume. It can also affect poor people's nutrition by causing them to shift to cheaper, lower-quality, and less micronutrient-dense foods.

Addressing the problem of food price spikes and excessive volatility requires action to both reduce volatility and buffer the most vulnerable people from the worst effects of higher and more variable prices. It is important to address the drivers of food price volatility and price increases by revising biofuel policies, regulating financial activity on food markets, and adapting to and mitigating climate change. It is also essential to build up food reserves and share information on food markets. To build resilience to changing food prices, it is crucial to strengthen social protection systems, improve emergency preparedness, invest in sustainable small-scale agriculture, improve livelihood opportunities for both the rural and urban poor, and strengthen the provision of basic services such as education, healthcare, and sanitation.



01



By raising awareness of regional and country differences in hunger, the GHI aims to trigger **actions to reduce hunger.**



# THE CONCEPT OF THE GLOBAL HUNGER INDEX

The Global Hunger Index (GHI) is designed to comprehensively measure and track hunger globally and by country and region.<sup>1</sup> Calculated each year by the International Food Policy Research Institute (IFPRI), the GHI highlights successes and failures in hunger reduction and provides insights into the drivers of hunger. By raising awareness and understanding of regional and country differences in hunger, the GHI aims to trigger actions to reduce hunger.

A number of different indicators can be used to measure hunger (see definition on page 9). To reflect the multidimensional nature of hunger, the GHI combines three equally weighted indicators in one index number:

- 1. Undernourishment:** the proportion of undernourished as a percentage of the population (reflecting the share of the population with insufficient calorie intake);
- 2. Child underweight:** the proportion of children younger than the age of five who are underweight (low weight for age reflecting wasting, stunted growth, or both), which is one indicator of child undernutrition; and
- 3. Child mortality:** the mortality rate of children younger than the age of five (partially reflecting the fatal synergy of inadequate dietary intake and unhealthy environments).

This multidimensional approach offers several advantages. It takes into account 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 creates a high risk of illness, poor physical and cognitive development, and death. In addition, by combining independently measured indicators, it reduces the effects of random measurement errors.<sup>2</sup>

The GHI ranks countries on a 100-point scale. Zero is the best score (no hunger), and 100 is the worst, although neither of these extremes is reached in practice. The scale on the following page shows the severity of hunger – from “low” to “extremely alarming” – associated with the range of possible GHI scores. The 2011 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).

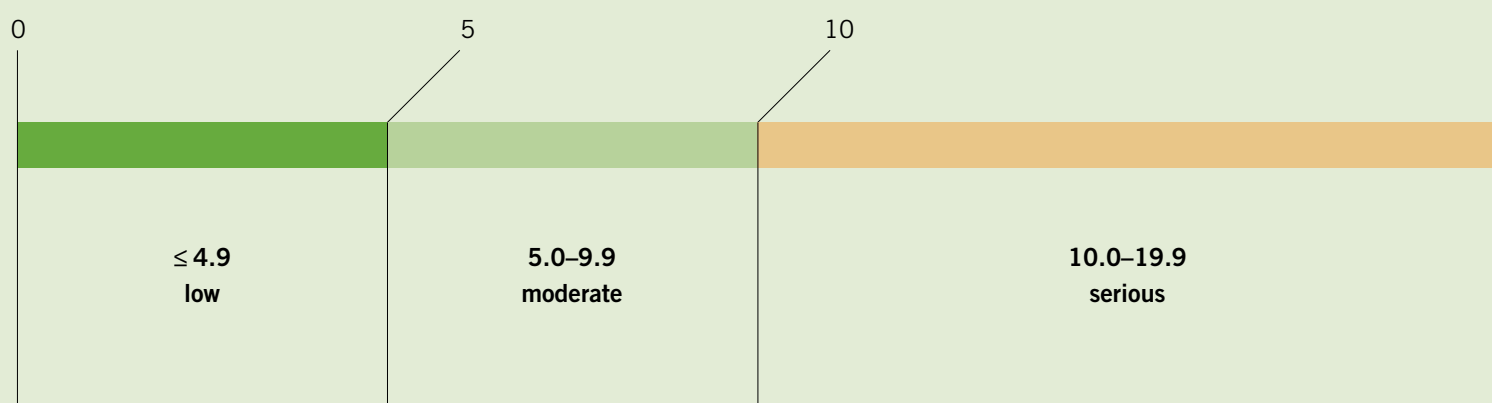
The GHI is only as current as the data for its three component indicators. This year’s GHI reflects data from 2004 to 2009 – the most recent available country-level data on the three GHI components. It is thus a snapshot not of the present, but of the recent past. For some countries, such as Afghanistan, Iraq, Papua New Guinea, and Somalia, insufficient data are available to calculate any value for the GHI at all. Even though abundant technological tools exist to collect and assess data almost instantaneously, enormous time lags persist in reporting vital statistics on hunger. More up-to-date and extensive country data on hunger are urgently needed – a situation explicitly recognized by the Group of Twenty (G20) countries in their 2011 action plan on food price volatility (G20 2011). Improvements in collecting high-quality data on hunger and food consumption will allow for a more complete and current assessment of the state of global hunger and, in turn, more effective steps to reduce hunger.

The source data on which the GHI scores are based are continually revised by the United Nations agencies responsible for compiling them, and each year’s GHI report reflects these revisions. The revisions result in improvements in the data, but they also mean that the GHI scores from different years’ GHI reports are not comparable with one another. This 2011 report, however, offers an advantage over other recent GHI reports in that it contains not only the 2011 and 1990 GHI, but also GHI scores for two other reference periods – 1996 and 2001 – that are comparable with one another, allowing for in-depth analyses of trends. In other words, comparable source data were used to calculate the GHI scores for all four reference periods in this report.

<sup>1</sup> For background information on the concept, see Wiesmann (2004) and Wiesmann, von Braun, and Feldbrügge (2000).

<sup>2</sup> 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).

## WHAT IS THE GLOBAL HUNGER INDEX?



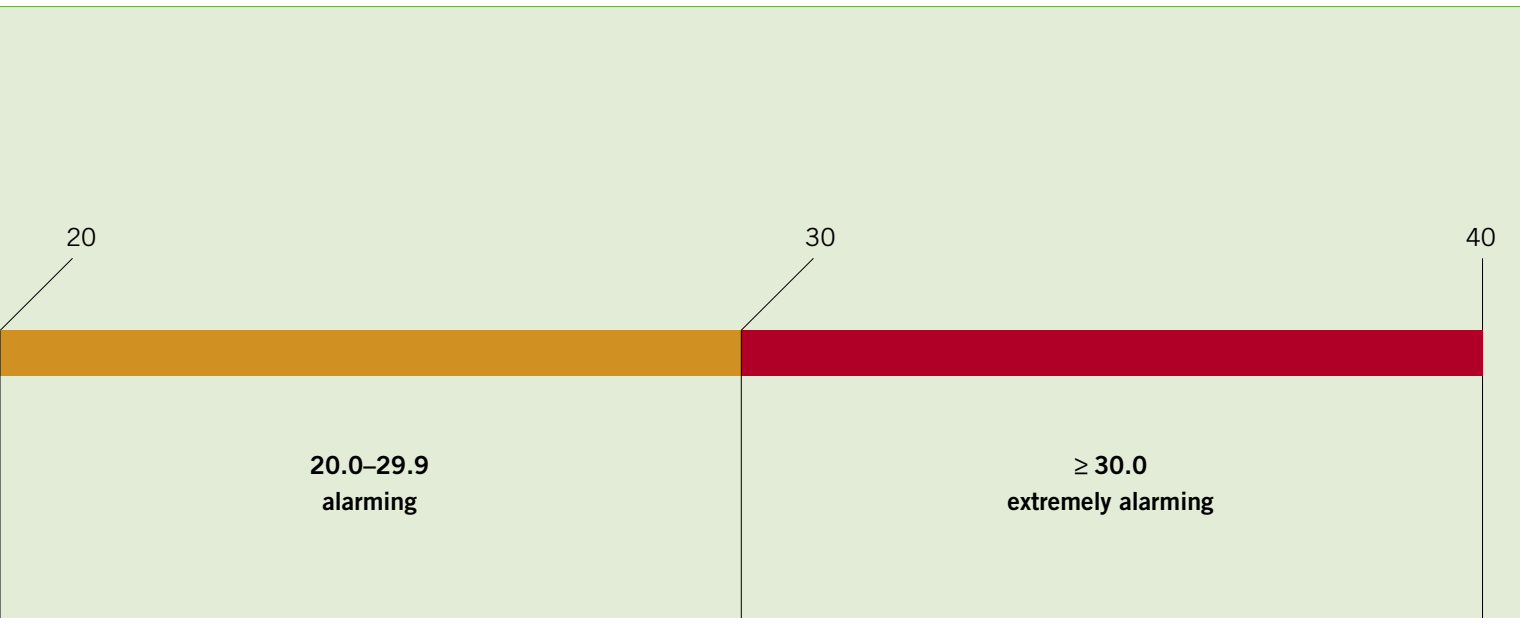
## CONSTRUCTING THE GHI: ABOUT THE DATA

The 1990, 1996, 2001, and 2011 GHI scores presented in this report reflect the latest revised data for the three components of the GHI. Where original source data were not available, estimates were made for the GHI components, based on the most recent data available. The “child mortality” component and “undernourishment” components for the 1990 GHI were revised on the basis of updated 1990 data to reflect the latest updates from the United Nations Children’s Fund (UNICEF) and the Food and Agriculture Organization of the United Nations (FAO), respectively. In addition, revised calorie data from the FAO were used for the 1990 GHI, 1996 GHI, 2001 GHI, and 2011 GHI “child underweight” estimates. The latest additions to the World Health Organization’s Global Database on Child Growth and Malnutrition were taken into account for the “child underweight” component of the four GHI scores, as were the most recent Demographic and Health Survey reports for the 2011 GHI. These enhancements in the underlying data improve the quality of the GHI. For the first time since 2006, GHI scores are presented and compared for four years, which allows for in-depth analysis of trends.

As already noted, data for the 2011 GHI span the period 2004–09. The data on the proportion of undernourished are for 2005–07 (FAO 2010; IFPRI estimates); data on child mortality are for 2009 (UNICEF 2011); and data on child underweight are for the latest year in the period 2004–09 for which data are available (WHO 2011; UNICEF 2010; MEASURE DHS 2011; authors’ estimates). See Appendixes A and B for more detailed background information on the data sources for and calculations of the 1990 GHI, 1996 GHI, 2001 GHI, and 2011 GHI.

Note: For previous GHI calculations, see von Grebmer et al. (2010); von Grebmer et al. (2009); von Grebmer et al. (2008); IFPRI/Welthungerhilfe/Concern (2007); Wiesmann (2006a, b); and Wiesmann, Weingärtner, and Schöninger (2006).





### 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. 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 (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 7.

02



Progress in Southeast Asia and Latin America and the Caribbean was particularly remarkable, with the GHI scores **decreasing by 44 percent** each.



# GLOBAL, REGIONAL, AND NATIONAL TRENDS

Global hunger has declined since 1990, but not dramatically. Although the number of undernourished people was on the rise from the mid-1990s until 2009, the proportion of undernourished people in the world has declined slightly during the past decade (FAO 2010). Because the GHI measures relative hunger – that is, it refers to the proportion of people who suffer from hunger, broadly defined – and goes beyond measuring calorie deficiency, the index shows a positive trend. The 2011 world GHI fell by 26 percent from the 1990 world GHI, from a score of 19.7 to 14.6 (see figure below).<sup>3</sup> This progress was driven mainly by reductions in the proportion of children younger than the age of five who are underweight. The largest decline in the world GHI – 3 points – occurred between 1990 and 1996 and was followed by a slow-down in progress.

Undernourishment and underweight in children improved most between 1990 and 1996, whereas progress in reducing child mortality has accelerated since 1996. The proportion of undernourished has remained almost constant at the global level since 1995–97, falling by only 1 percentage point.

All three index components have improved since 1990 and contributed to reducing the world GHI score: the proportion of children who are underweight fell by 8 percentage points, the proportion of undernourished by 4 percentage points, and the under-five mortality rate by 3 percentage points. The global hunger situation, however, remains serious.

The recent increase in the level and volatility of food prices is again, as in 2008, threatening sustained global food security and putting many poor people and vulnerable groups at risk of increased hunger, and a food emergency has struck in the Horn of Africa. Because of time lags in the availability of data, however, the 2011 GHI does not reflect the impact of these new developments.

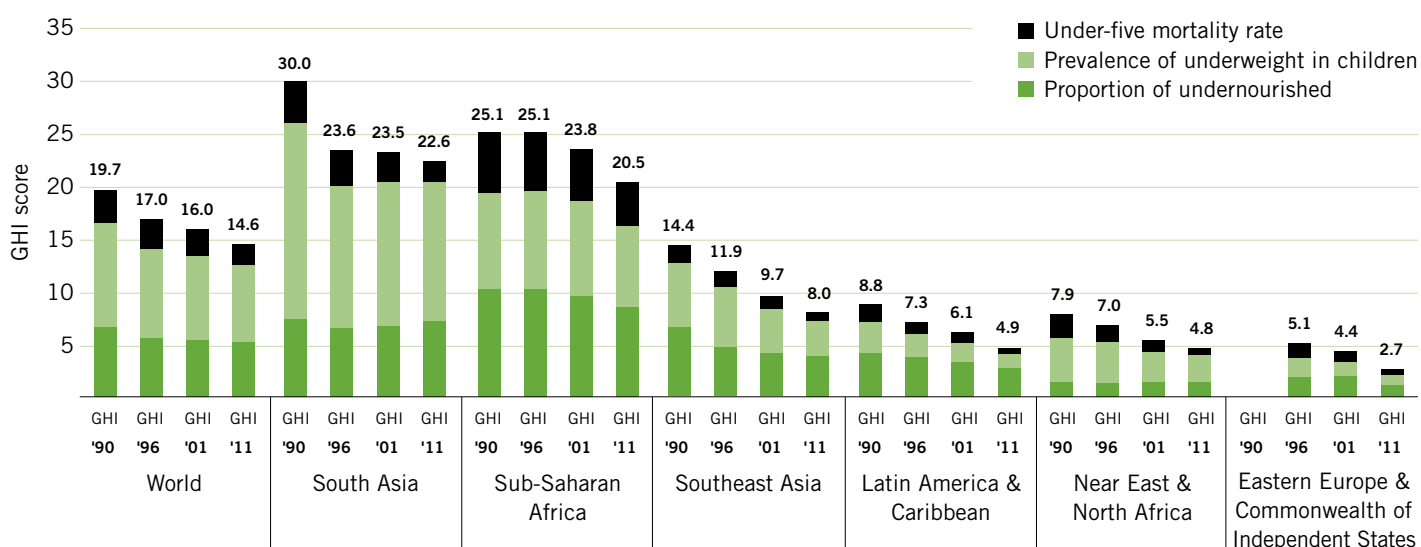
## Large Differences in Regional Trends

Global averages mask dramatic differences among regions and countries. The 2011 GHI score fell by 18 percent in Sub-Saharan Africa compared with the 1990 score, by 25 percent in South Asia, and by 39 percent in the Near East and North Africa (see figure below). Progress in Southeast Asia and Latin America and the Caribbean was particularly remarkable, with the GHI scores decreasing by 44 percent each, although the score was already low in Latin America and the Caribbean. In Eastern Europe and the Commonwealth of Independent States, the 2011 GHI score fell by 47 percent compared with the 1996 score.<sup>4</sup>

<sup>3</sup> The “world” includes all countries for which the GHI has been calculated. As noted earlier, data for some countries are not available, and most high-income countries are excluded from the GHI calculation. The year 1990 was chosen for comparison because it is a reference point for achieving the Millennium Development Goals.

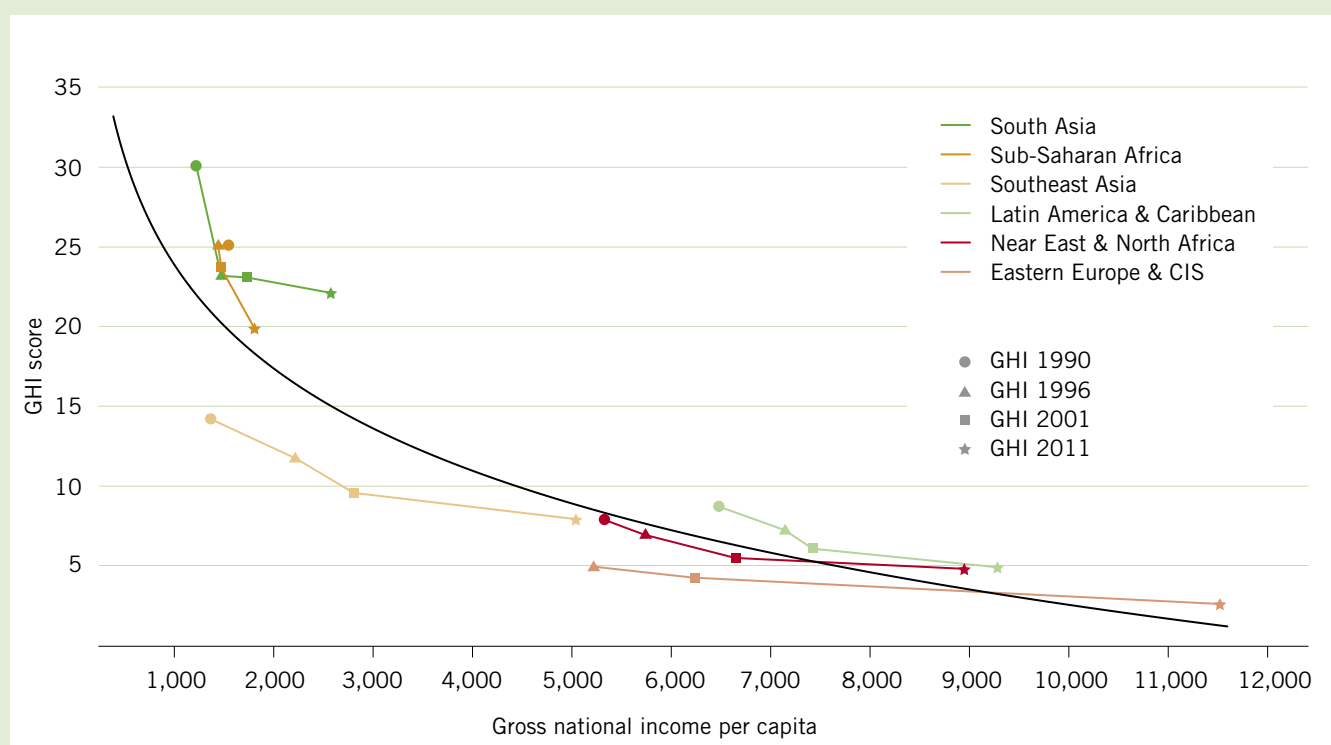
<sup>4</sup> For Eastern Europe and the Commonwealth of Independent States, the 1996 GHI score was used for comparison because data are not available to calculate the 1990 score.

## CONTRIBUTION OF COMPONENTS TO 1990 GHI, 1996 GHI, 2001 GHI, AND 2011 GHI



Notes: For the 1990 GHI, data on the proportion of undernourished are for 1990–92; data on child underweight are for the year closest to 1990 in the period 1988–92 for which data are available; and data on child mortality are for 1990. For the 1996 GHI, data on the proportion of undernourished are for 1995–97; data on child underweight are for the year closest to 1996 in the period 1994–98 for which data are available; and data on child mortality are for 1996. For the 2001 GHI, data on the proportion of undernourished are for 2000–02; data on child underweight are for the year closest to 2001 in the period 1999–2003 for which data are available; and data on child mortality are for 2001. For the 2011 GHI, data on the proportion of undernourished are for 2005–07, data on child underweight are for the latest year in the period 2004–09 for which data are available, and data on child mortality are for 2009.

## REGIONAL TRENDS IN GHI SCORES AND GROSS NATIONAL INCOME PER CAPITA



Source: Based on data on per capita GNI from World Bank (2011).

Note: Data on gross national income (GNI) per capita are based on purchasing power parity and expressed in constant 2005 international dollars. The black trend line was predicted from a regression of 1990, 1996, 2001, and 2011 country-level GHI scores on GNI per capita. Data points for GHI 1990, GHI 1996, GHI 2001, and GHI 2011 correspond with GNI per capita for 1989-91, 1995-97, 2000-02, and 2007-09, respectively. Because countries' population size affects regional aggregates and the graph is used to analyze regional performance, the regression was weighted by population size. National differences are not reflected in the regional aggregates shown in this graph (for country-level trends in GHI scores, see Appendix C).

An analysis of the GHI in relation to gross national income (GNI) per capita shows that economic resources are an important determinant of hunger. The black line in the above graph was predicted from a regression of the GHI on GNI per capita and shows that hunger declines with increases in national incomes. Regions with data points above the predicted line have more hunger than would be expected given their per capita income, and regions with data points below the line have less hunger than expected.

South Asia and Sub-Saharan Africa have higher regional GHI scores than predicted, suggesting that, broadly speaking, their economic resources have not been optimal-

ly used to fight hunger. From the starting point of 1990, the orange trend line for Sub-Saharan Africa moves to the left, showing stagnation in the GHI and a small reduction in per capita income up to 1996. When economic growth resumed after 1996, GHI scores fell notably and almost in parallel with the predicted line (the 2011 crisis in the Horn of Africa is not captured in the latest GHI). The dark green trend line for South Asia follows quite a different course: during a period of growth after 1990, the GHI declined steeply, approaching the predicted line in 1996. Whereas economic growth continued and even accelerated after 2001, reductions in GHI scores were modest after 1996 and the gulf be-

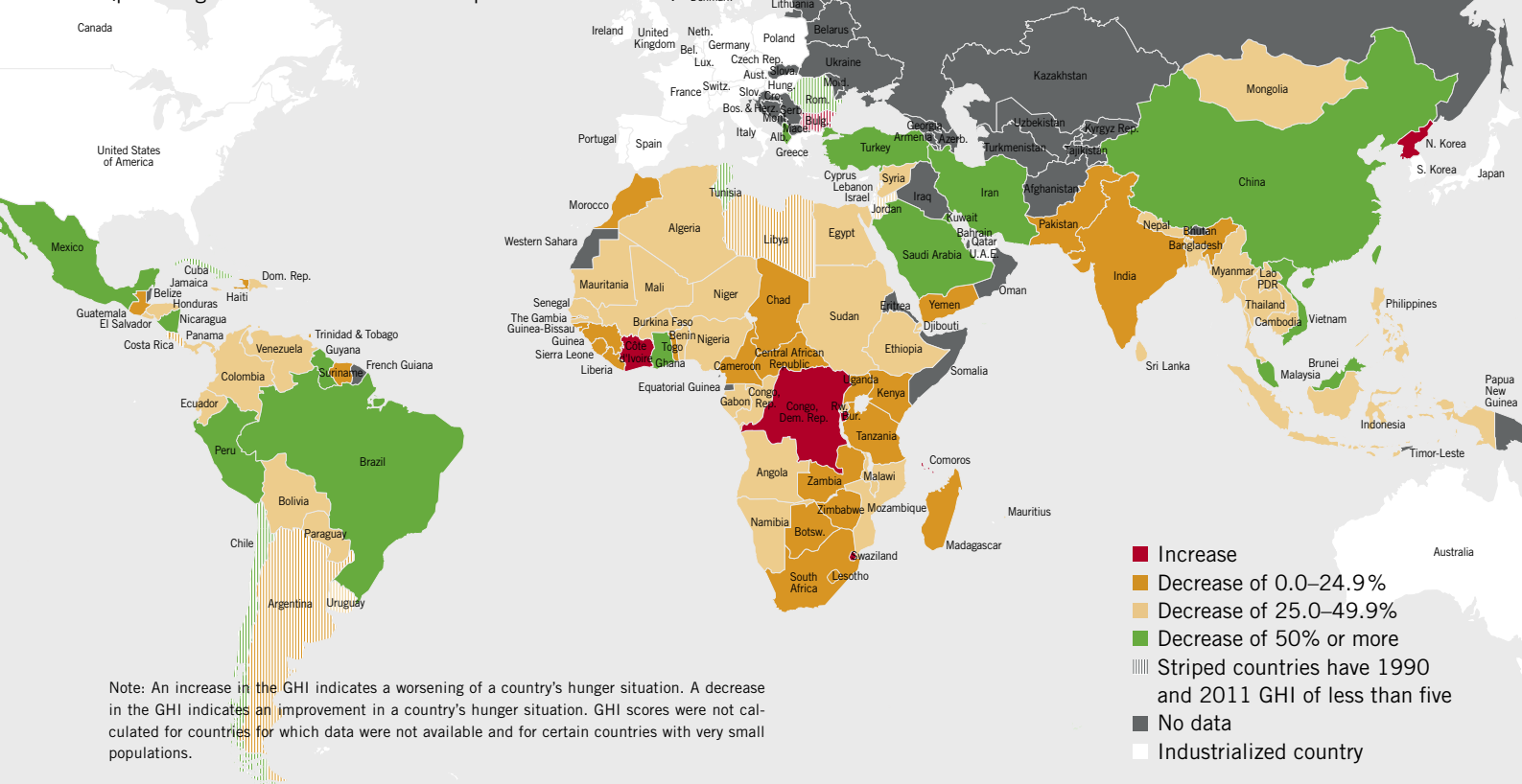
tween the trend line for South Asia and the expected GHI score widened. The low status of women in the region is one of the primary factors contributing to a persistently high prevalence of child undernutrition, which in turn has impeded progress in reducing GHI scores. India largely shapes the trend in the region because of its sheer size (see India in Appendix C).

Until recently, Southeast Asia had lower GHI scores than would have been expected given its per capita income. China made a large contribution to the favorable trend in this region by reducing hunger through sustained growth and a focus on poverty reduction, agricultural development, and provision of social services.



## COUNTRY PROGRESS IN REDUCING GHI SCORES

(percentage decrease in 2011 GHI compared with 1990 GHI)



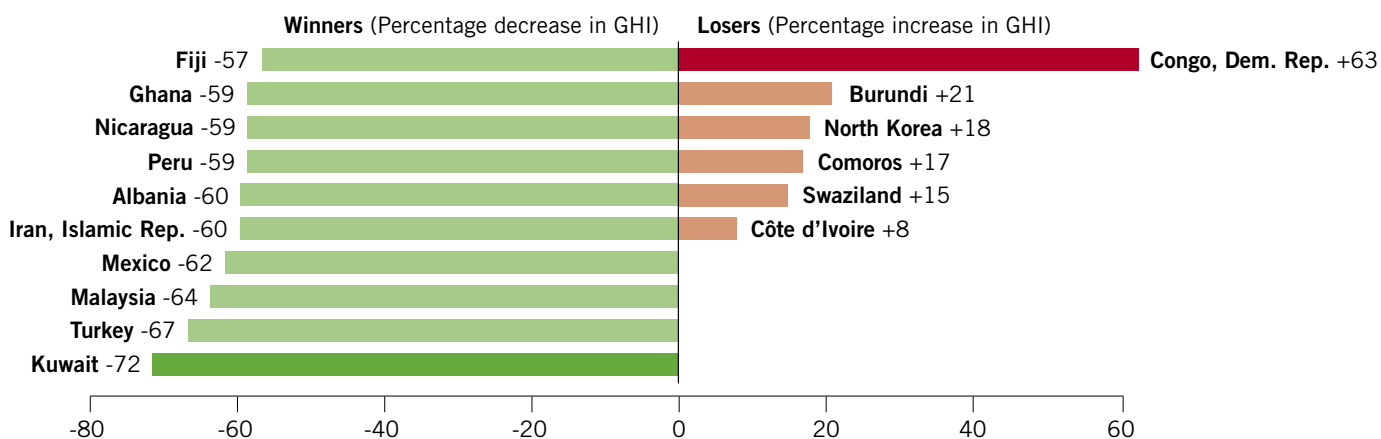
Southeast Asia, the Near East and North Africa, and Latin America and the Caribbean have witnessed a steady decline in GHI scores since 1990. In South Asia and Sub-Saharan Africa, however – the two regions with the highest GHI scores at 22.6 and 20.5 respectively – the rates of progress were uneven.

South Asia has the highest regional 2011 GHI score. The region reduced its score by more than 6 points between 1990 and 1996 – mainly through a large, 15-percentage-point decline in underweight in children – but this fast progress could not be maintained. Stagnation followed, and South Asia has lowered its GHI score by only 1 point since 2001 despite strong economic growth. The proportion of under-

nourished has even risen by 2 percentage points since 1995–97. Social inequality and the low nutritional, educational, and social status of women, which is a major cause of child undernutrition in this region, have impeded improvements in the GHI score.<sup>5</sup>

Though Sub-Saharan Africa made less progress than South Asia after 1990, it has caught up since the turn of the millennium. Because Sub-Saharan Africa had a lower 1990 GHI score to start with, its 2011 GHI score fell below that of South Asia, although the overall decline was smaller. Sub-Saharan Africa's GHI score stagnated between 1990 and 1996, fell slightly until 2001, and declined more markedly up to the period reflected in the 2011 GHI score. Large-scale civil wars

## GHI WINNERS AND LOSERS FROM 1990 GHI TO 2011 GHI



Note: Countries with both 1990 GHI and 2011 GHI scores of less than five are excluded.

of the 1990s and 2000s ended, and political stability improved in former conflict countries. Economic growth resumed on the continent, and advances in the fight against HIV and AIDS contributed to reducing child mortality in the countries most affected by the epidemic. Although the crisis in the Horn of Africa occurring at the time of writing is not reflected in the 2011 GHI, it shows that achievements in food security remain fragile in parts of Sub-Saharan Africa and that vulnerability to shocks is still high.

### Best and Worst Country-Level Results

From the 1990 GHI to the 2011 GHI, 15 countries were able to reduce their scores by 50 percent or more. More than two-fifths of the countries made modest progress, reducing their GHI scores by between 25.0 and 49.9 percent, and about one-third decreased their GHI scores by between 0.0 and 24.9 percent.<sup>6</sup> Only one country in Sub-Saharan Africa – Ghana – is among the 10 best performers in improving their GHI score since 1990 (see figure on page 13 and box below). The six best performers had moderate GHI scores in the range of 5.7 to 9.3 in 1990, and the declines were modest in absolute numbers. Kuwait's seemingly remarkable progress in reducing hunger is due mainly to its unusually high level in 1990, when Iraq invaded the country: its GHI score fell by more than 5 points (or 58 percent) up to 1996 and only slightly (by about 1 point) afterward (see country trends in Appendix C). The second-best performer, Turkey, reduced hunger through large reductions in the prevalence of child underweight by almost two-thirds and in child mortality by more than three-quarters, while levels of undernourishment

in the country remained low. Overall, between the 1990 and the 2011 GHI, 19 countries moved out of the bottom two categories – extremely alarming and alarming (see box on page 15).

Among the six countries in which the hunger situation worsened (all in Sub-Saharan Africa, except for North Korea), the Democratic Republic of Congo stands out. There, the GHI score rose by about 63 percent. Conflict and political instability have increased hunger in the country (see box on page 16), as well as in Burundi, the Comoros, and Côte d'Ivoire. With the transition toward peace and political stabilization in the Democratic Republic of Congo and Burundi around 2002–03, these two countries have begun to slowly recover from decades of economic decline. Their GHI scores rose dramatically between 1990 and 2001 and slightly decreased afterward. Hunger is, however, still extremely alarming in both countries.

In Côte d'Ivoire, conflict and political turmoil erupted after a military coup in 1999, and the GHI score has increased by 1.6 points since 2001. The GHI fell in the Comoros after a peak in 2001, but it is not yet clear if this constitutes a reversal of past trends. Both countries are vulnerable to price volatility in international agricultural markets: Côte d'Ivoire is the world's largest producer and exporter of cocoa beans and also exports significant quantities of coffee and palm oil. The Comoros depends on rice imports for its food security and on three main crops – vanilla, cloves, and ylang ylang oil – for its export income (CIA 2010).

At an estimated 26 percent in 2009, Swaziland has the highest adult HIV prevalence in the world (UNAIDS 2010). The epidemic, along

### AGRICULTURAL TRANSFORMATION AND DEMOCRATIC REFORMS IN GHANA

One of the top ten performers in tackling hunger has been Ghana, which reduced its GHI score by 59 percent from the 1990 GHI to the 2011 GHI. Ghana's success resulted from a combination of investments in agriculture, rural development, education, and health, including strong increases in the rate of immunization against common childhood diseases (GSS, GHS, and ICF Macro 2009). The government provided farmers with information, agricultural inputs such as pesticides and fertilizer, and infrastructure such as roads and storage facilities.

Former President John Kufuor, who led the country from 2001 to 2009 and is a 2011 World Food Prize laureate, explained in an essay published by IFPRI how these investments in agriculture helped improve other sectors as well: "For a country like Ghana, where more than half its people farm the land, transforming agriculture helps to transform everyone. The farmers' progress did not just result in increased exports; the government launched an ambitious program to give all kindergarten and primary school pupils a daily hot and nutritious meal made from locally pro-

duced food, which resulted in a monumental increase in school enrollment. The policy provided proper nourishment for the children and also support for the farmers" (Kufuor 2011, 5).

In addition, Kufuor noted that the country's economic, agricultural, and social policies were accompanied by reforms designed to expand democratic freedoms. Ghana officially entered the ranks of middle-income countries in 2007 and is considered one of the most politically stable, fastest-growing countries in Sub-Saharan Africa.

with the country's high income inequality, has severely undermined food security despite growth in national income. Although GHI scores increased throughout the 1990s, the negative trend has been partly reversed since 2001. Swaziland and several other African countries have made great strides in preventing mother-to-child transmission of HIV, and child mortality rates have dropped again after rising between 1990 and 2001 (UNAIDS 2010; IGME 2010). Botswana and Lesotho have also been heavily affected by HIV and AIDS and have benefited from advances in treatment and improved access to anti-retroviral drugs. They show a pattern in GHI scores similar to Swaziland, with peaks in GHI scores in 1996 and 2001, partly caused by transient increases in undernourishment.

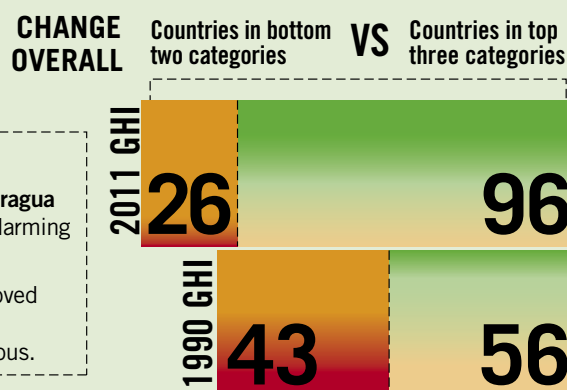
In North Korea, widespread starvation threatened in 1995 and was averted by large-scale food aid deliveries (CIA 2010). The GHI rose sharply between 1990 and 1996 and has declined only slightly since then, giving evidence of chronic food insecurity in spite of considerable international humanitarian assistance. A weak economy, high military spending, weather-related crop failures, and systemic problems in the agricultural sector have hampered progress (CIA 2010).

Some countries achieved noteworthy absolute progress in improving their GHI scores. Between the 1990 GHI and the 2011 GHI, Angola, Bangladesh, Ethiopia, Mozambique, Nicaragua, Niger, and Vietnam saw the largest improvements – with scores falling by 13 points

## HUNGER SINCE 1990

**WHO MOVED?** Since 1990, 19 countries have moved out of the bottom two categories – alarming and extremely alarming – and 10 out of the bottom. In the 2011 GHI, 26 countries remain in the two most severe GHI hunger categories, compared with 43 in the 1990 GHI.

**MOVING UP**  
 Ghana and Nicaragua improved from alarming to moderate.  
 Cambodia improved from extremely alarming to serious.



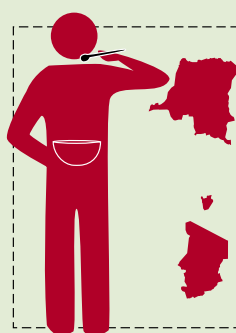
## CHANGE AMONG THE WORST OFF

### SERIOUS

Benin	Guinea	Mali	Nepal
Burkina Faso	Guinea-Bissau	Mauritania	Nigeria
Cameroon	Kenya	Myanmar	Sri Lanka
Congo, Rep.	Malawi	Namibia	Vietnam



**16** countries moved from alarming to serious



### PERSISTENT HUNGER

**DRC** was the only country to drop from alarming to extremely alarming.

**Burundi** and **Chad** are the only two countries that have not moved out of the extremely alarming category.

### ALARMING

Angola	India
Bangladesh	Mozambique
Djibouti	Niger
Ethiopia	Sierra Leone
Haiti	Yemen, Rep.



**10** countries moved from extremely alarming to alarming

### EXTREMELY ALARMING



Dem. Rep. of Congo

**1** country moved from alarming to extremely alarming

Note: This box shows only countries for which data are available to calculate 1990 and 2011 GHI scores.



## Aiah Koroma

Bo District, Sierra Leone



“During the past years, I have observed that food prices are rising steadily. But, this year the price for rice has doubled and that has not happened before. I think the price increase is related to the current scarcity of rice. Farmers have eaten their whole stock of last year’s production. Now, no rice is left in their hands and they have to buy rice from the market. This increases the price.”

“Another factor is the increasing transport and fuel costs. Traders add the transport costs to the sale prices of their goods.”

“Unfortunately, our government does nothing to influence the rice price. Costs for staple foods remain high.”

## Mary Paul

Makueni District, Kenya



“Our life has become much more difficult compared to last year. I’m always looking for work. It’s not easy now that the price of everything has increased almost three-fold. Sometimes we go to bed without having eaten anything.”

“The only people who benefit from the higher corn prices are the traders. They buy corn in Tanzania and sell it here at a higher price. We don’t grow corn here, our soil isn’t suitable.”

or more. In the Democratic Republic of Congo and Burundi, however, the GHI rose by 15.0 and 6.5 points respectively.

Twenty-six countries still have levels of hunger that are “extremely alarming” or “alarming” (see map on pages 18 and 19). The countries with extremely alarming 2011 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.

In terms of the GHI components, Burundi, the Democratic Republic of Congo, Eritrea, and Haiti currently have the highest proportion of undernourished people – more than 50 percent of the population.<sup>7</sup> Haiti, like other countries with a heavy reliance on food imports and a high GHI, is highly sensitive to the adverse impacts of food price volatility. High and volatile food prices are especially harmful for poor consumers who spend a large proportion of their income on food and have little ability to adapt quickly to steep food price increases. To cope, many poor households cut back on the quantity and quality of food consumed, responses that in turn lead to increased hunger and micronutrient deficiencies, particularly among vulnerable groups such as women and children. The GHI trends show that hunger has increased in Haiti since 2001, after a period of improvement. Bangladesh, India, and Timor-Leste have the highest prevalence of underweight in children younger than five – more than 40 percent in all three countries. Afghanistan, Chad, Democratic Republic of Congo, Guinea-Bissau, Mali, and Sierra Leone have the highest under-five mortality rates, ranging from 19 to 21 percent.

<sup>5</sup> For more on hunger and gender inequality, see the 2009 GHI report (von Grebmer et al. 2009).

<sup>6</sup> The numbers and proportions in this paragraph and the following one refer to the 88 countries for which data for the 1990 and 2011 GHI scores are available and the score is greater than 5 for the 1990 GHI score, the 2011 GHI score, or both.

<sup>7</sup> Afghanistan and Somalia, which are likely to have high proportions of undernourished people, could not be included in this comparison because of lack of data.

### AN ONGOING STRUGGLE TO ACHIEVE FOOD SECURITY IN THE DEMOCRATIC REPUBLIC OF CONGO

As in years past, the Democratic Republic of Congo has the highest proportion of undernourished people – about 70 percent of the population – and one of the highest child mortality rates in the world. The country is still recovering from the massive displacement and economic collapse that occurred during its 1998–2003 civil war and is now trying to rebuild. To climb out of its precarious food security situation, the Democratic Republic of Congo will require strong development programs that include food security, nutrition, and health components (Rossi et al. 2006).

**COUNTRY GLOBAL HUNGER INDEX SCORES BY RANK, 1990 GHI, 1996 GHI, 2001 GHI, AND 2011 GHI**

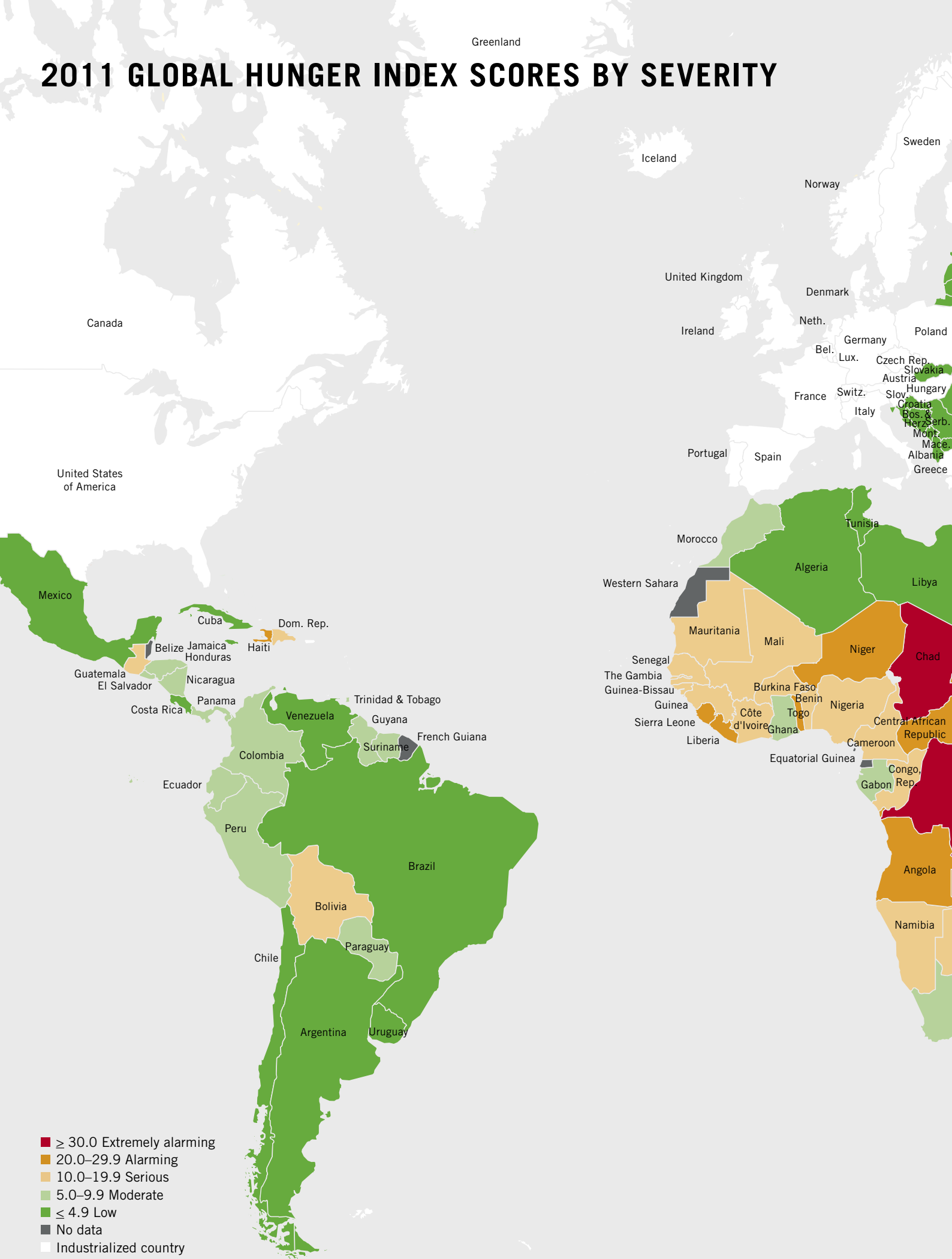
Rank	Country	1990	1996	2001	2011	Rank	Country	1990	1996	2001	2011
1	Gabon	8.4	6.8	7.3	5.2	56	Togo	26.6	22.2	23.6	20.1
2	Mauritius	8.0	7.4	6.0	5.4	57	Lao PDR	29.0	25.2	23.6	20.2
2	Paraguay	7.7	5.5	5.2	5.4	58	Tanzania	23.1	27.4	26.0	20.5
4	China	11.7	9.1	6.8	5.5	59	Pakistan	25.7	22.0	21.9	20.7
4	El Salvador	10.1	9.0	5.4	5.5	60	Rwanda	28.5	32.7	25.2	21.0
4	Kyrgyz Republic	-	9.1	8.7	5.5	61	Liberia	23.5	26.9	25.8	21.5
7	Trinidad and Tobago	6.9	7.5	6.3	5.6	61	Sudan	29.2	24.7	25.9	21.5
8	Colombia	9.1	6.8	5.8	5.7	63	Djibouti	30.8	25.8	25.3	22.5
9	Morocco	7.7	6.7	6.1	5.9	63	Madagascar	24.4	24.8	24.8	22.5
9	Peru	14.5	10.8	9.0	5.9	65	Mozambique	35.7	31.4	28.4	22.7
11	Turkmenistan	-	10.1	8.8	6.2	66	Niger	36.2	36.2	30.8	23.0
12	Uzbekistan	-	9.1	10.7	6.3	67	India	30.4	22.9	24.1	23.7
13	South Africa	7.0	6.5	7.4	6.4	68	Zambia	24.7	25.0	27.6	24.0
14	Panama	9.8	9.7	9.0	7.0	69	Angola	43.0	40.7	33.4	24.2
15	Guyana	14.4	8.9	7.8	7.1	70	Bangladesh	38.1	36.3	27.6	24.5
16	Ecuador	13.6	10.8	9.0	7.9	71	Sierra Leone	33.0	30.5	30.7	25.2
16	Honduras	13.4	13.2	10.1	7.9	72	Yemen, Rep.	30.4	27.8	27.9	25.4
18	Suriname	10.4	9.4	10.0	8.0	73	Comoros	22.3	27.1	30.1	26.2
19	Thailand	15.1	11.9	9.5	8.1	74	Central African Republic	27.6	28.6	27.7	27.0
20	Ghana	21.0	16.1	13.0	8.7	75	Timor-Leste	-	-	26.1	27.1
21	Nicaragua	22.6	17.8	12.3	9.2	76	Haiti	34.0	32.3	26.0	28.2
22	Armenia	-	14.4	11.3	9.5	77	Ethiopia	43.2	39.1	34.7	28.7
23	Dominican Republic	14.2	11.7	10.9	10.2	78	Chad	39.2	35.8	31.0	30.6
24	Swaziland	9.1	12.3	12.6	10.5	79	Eritrea	-	37.7	37.6	33.9
25	Vietnam	25.7	21.4	15.5	11.2	80	Burundi	31.4	36.3	38.5	37.9
26	Mongolia	16.3	17.7	14.8	11.4	81	Congo, Dem. Rep.	24.0	35.2	41.2	39.0
27	Philippines	19.9	17.5	14.1	11.5	<b>COUNTRIES WITH 2011 GHI SCORES LESS THAN 5</b>					
28	Lesotho	12.7	13.9	13.8	11.9						
29	Bolivia	17.0	14.6	12.5	12.2						
29	Indonesia	18.5	15.5	14.3	12.2						
31	Mauritania	22.7	16.9	16.9	12.7						
32	Botswana	13.4	15.5	15.9	13.2						
32	Congo, Rep.	23.2	24.2	16.0	13.2						
34	Senegal	18.7	19.7	19.3	13.6						
35	Namibia	20.3	18.7	16.3	13.8						
36	Guatemala	15.1	15.8	15.1	14.0						
36	Sri Lanka	20.2	17.8	14.9	14.0						
38	Benin	21.5	20.2	16.9	14.7						
39	The Gambia	15.8	20.3	16.4	15.0						
40	Nigeria	24.1	21.2	18.2	15.5						
41	Myanmar	29.2	25.4	22.5	16.3						
42	Uganda	19.0	20.4	17.7	16.7						
43	Tajikistan	-	24.4	24.5	17.0						
44	Burkina Faso	23.7	22.5	21.7	17.2						
45	Guinea	22.4	20.3	22.4	17.3						
46	Cameroon	21.9	22.4	19.4	17.7						
46	Zimbabwe	18.7	22.3	21.3	17.7						
48	Côte d'Ivoire	16.6	17.6	16.4	18.0						
49	Malawi	29.7	27.1	22.4	18.2						
50	Kenya	20.6	20.3	19.9	18.6						
51	North Korea	16.1	20.3	20.1	19.0						
52	Guinea-Bissau	21.7	22.3	22.8	19.5						
53	Mali	27.9	26.3	23.2	19.7						
54	Cambodia	31.7	31.4	26.3	19.9						
54	Nepal	27.1	24.6	23.0	19.9						

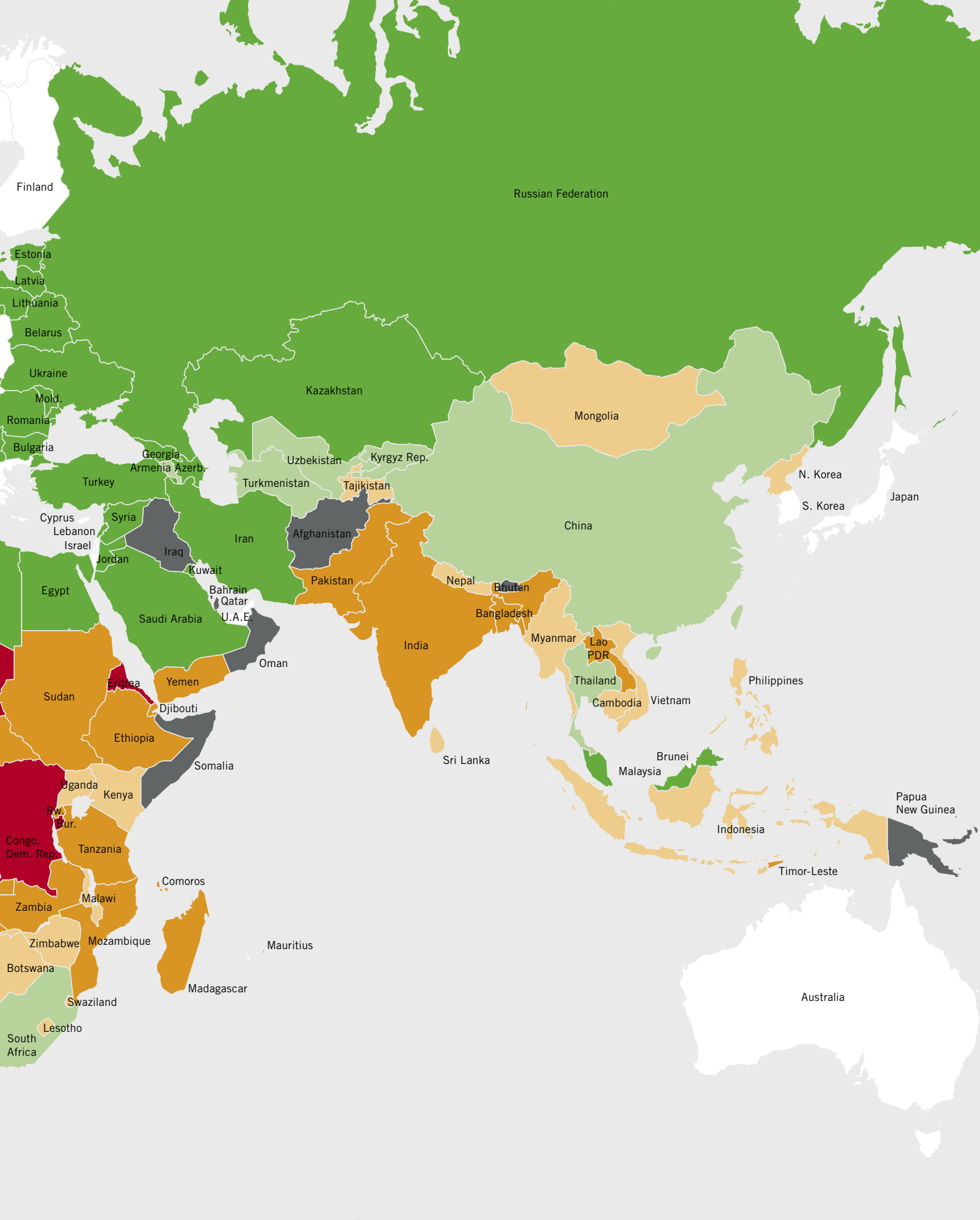
Country	'90	'96	'01	'11	Country	'90	'96	'01	'11
Albania	8.9	5.2	8.2	<5	Latvia	-	<5	<5	<5
Algeria	6.4	7.2	5.9	<5	Lebanon	<5	<5	<5	<5
Argentina	<5	<5	<5	<5	Libya	<5	<5	<5	<5
Azerbaijan	-	15.0	7.8	<5	Lithuania	-	<5	<5	<5
Belarus	-	<5	<5	<5	Macedonia, FYR	-	<5	<5	<5
Bosnia & Herz.	-	<5	<5	<5	Malaysia	9.0	6.7	6.6	<5
Brazil	7.6	6.2	5.3	<5	Mexico	7.8	<5	<5	<5
Bulgaria	<5	<5	<5	<5	Moldova	-	5.9	5.2	<5
Chile	<5	<5	<5	<5	Montenegro	-	-	-	<5
Costa Rica	<5	<5	<5	<5	Romania	<5	<5	<5	<5
Croatia	-	<5	<5	<5	Russian Federation	-	<5	<5	<5
Cuba	<5	6.5	<5	<5	Saudi Arabia	5.8	6.1	<5	<5
Egypt, Arab Rep.	7.8	6.6	<5	<5	Serbia	-	-	-	<5
Estonia	-	<5	<5	<5	Slovak Republic	-	<5	<5	<5
Fiji	6.1	<5	<5	<5	Syrian Arab Rep.	7.7	5.6	5.4	<5
Georgia	-	8.9	6.0	<5	Tunisia	<5	<5	<5	<5
Iran, Islamic Rep.	9.4	7.5	5.0	<5	Turkey	5.7	5.2	<5	<5
Jamaica	6.5	5.0	<5	<5	Ukraine	-	<5	<5	<5
Jordan	<5	<5	<5	<5	Uruguay	<5	<5	<5	<5
Kazakhstan	-	<5	5.3	<5	Venezuela, RB	6.6	7.0	6.4	<5
Kuwait	9.3	<5	<5	<5					

Note: Ranked according to 2011 GHI scores. Countries with a 2011 GHI score of less than five are not included in the ranking, and differences between their scores are minimal. Countries that have identical 2011 GHI scores are given the same ranking (for example, Mauritius and Paraguay are both ranked #2). The following countries could not be included owing to lack of data: Afghanistan, Bahrain, Bhutan, Iraq, Oman, Papua New Guinea, Qatar, and Somalia.

# 2011 GLOBAL HUNGER INDEX SCORES BY SEVERITY



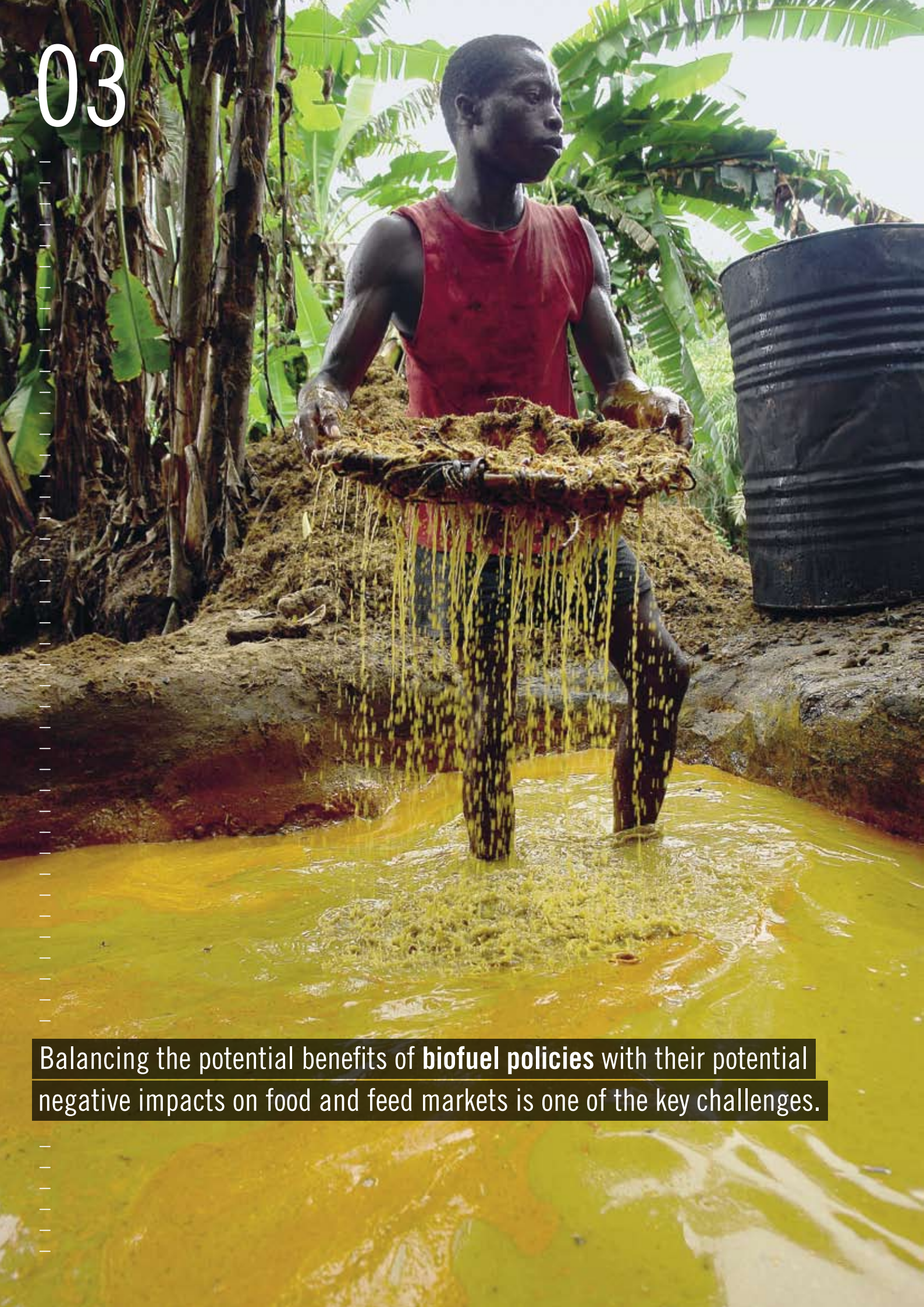




Note: For the 2011 GHI, data on the proportion of undernourished are for 2005–07, data on child underweight are for the latest year in the period 2004–09 for which data are available, and data on child mortality are for 2009. GHI scores were not calculated for countries for which data were not available and for certain countries with very small populations.



03



Balancing the potential benefits of **biofuel policies** with their potential negative impacts on food and feed markets is one of the key challenges.



# COMBATING HUNGER IN A WORLD OF HIGH AND VOLATILE FOOD PRICES

Agricultural markets and food prices are no longer stable and predictable, if they ever were. After decades of gradually falling food prices, the world is experiencing a period of spikes and rapid swings in food prices and may face more of the same in the coming years. This dramatic shift could have serious implications for the hundreds of millions of people who are already hungry or who are poor and spend a high proportion of their income on food. Efforts to reduce hunger will take place in a new global food economy.

This new reality involves both higher and more volatile prices – two different conditions with distinct implications for consumers and producers. For consumers, rising food prices may have a substantial impact on their welfare by curtailing their ability to purchase food and other necessary goods and services. For producers, higher food prices could raise their incomes – but only if these producers are net sellers of food, if increased global prices reach the markets they participate in, and if their input costs do not also rise. Many of these conditions were not present in the 2010–11 food price crisis.

Price volatility also has significant effects on producers and consumers. First, higher price volatility is associated with greater potential losses for producers because it implies large, rapid changes in prices, making it more difficult for producers to make optimal decisions about how to allocate inputs into agricultural production. In a period of high price volatility, producers may use fewer inputs like fertilizer and high-quality seeds in their production, they may become more pessimistic in their long-term planning, and they may dampen their investments in areas that improve productivity. These responses by producers reduce supply and lead to increased price levels, which in turn hurt consumers. Second, many rural households are both producers and consumers of agricultural commodities. As prices become more volatile, these households will be hit from both sides. They will find their incomes reduced because of their inability to optimally allocate inputs and their consumption decisions affected by higher prices in the markets. Finally, increased price volatility over time can also generate larger returns for investors, drawing new investors into the market for agricultural commodities. Increased price volatility may thus lead to increased – potentially speculative – trading that exacerbates price swings.

This is the situation that has prevailed in the years leading up to 2011. The food price crisis of 2007–08 saw a steep rise in food prices (see figure on page 22) that brought food security to the forefront of global attention. Then, in June 2010 food prices started rising again; between June 2010 and May 2011 the international prices of maize and wheat roughly doubled. The peak came in February 2011, according to the Food and Agriculture Organization of the United Nations (FAO), in a spike that was even more pronounced than in 2008 (see, for example, the evolution of prices for maize in the figure on page 22, which exceed 2008 price levels even when adjusting for inflation).

Moreover, recent increases in price volatility are not in line with the historical data (dating back to the late 1950s) and have particularly affected wheat and maize in recent years. For hard wheat (used for bread and flour), for example, there were 165 days of excessive price volatility between December 2001 and December 2006 (an average of 33 days a year), whereas there were 381 days of excessive price volatility between January 2007 and June 2011 (an average of 85 days a year) (see figure on the top of page 23).

Although changes in food prices in international markets do not always reach local markets (see box on following page), the 2007–08 food price crisis led to economic difficulties for a number of countries, and particularly for already poor populations. It generated social and political turmoil in many countries: Bangladesh, Côte d'Ivoire, Egypt, Haiti, Indonesia, Uzbekistan, Yemen, and 26 other countries saw violent food riots, demonstrations, or social unrest as a result of rising food prices.

In addition to their economic, social, and political impacts, food price spikes and excessive volatility worsen the problem of hunger by increasing poverty. They can lead to long-term, irreversible nutritional

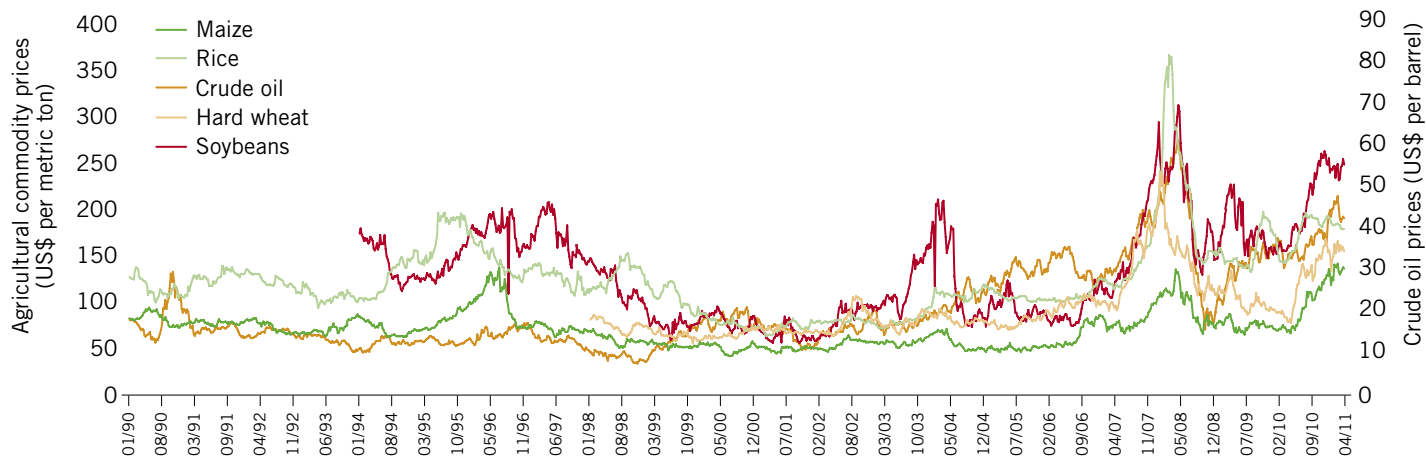
## A FEW DEFINITIONS

- **Price volatility:** Price volatility measures the relative rate at which a price of a commodity varies from one period – day, month, or year – to another. Under normal market conditions, some price volatility is expected. If the price of a commodity moves up and down rapidly over a short time period, it has high volatility. If the price almost never changes, it has low volatility. High price volatility can lead to large positive or negative returns for investors.
- **Price spike:** A large, quick, temporary rise or fall in price.
- **Excessive price volatility:** IFPRI has developed a precise definition of excessive price volatility. Using a statistical model based on price data since 1950 and updated daily, it has identified a band within which the change in price moves 95 percent of the time. When the change in price exceeds this threshold at a high frequency (defined with a statistical test) within a 60-day rolling window, price changes are considered to have reached a period of “excessive volatility.”

Note: For technical details on definitions, see Appendix D.



## INFLATION-ADJUSTED PRICES OF AGRICULTURAL COMMODITIES AND OIL, 1990–2011 (WEEKLY DATA)



Source: FAO (2011a), International Grains Council (2009), and US Energy Information Administration (2011).

Note: Prices are adjusted for inflation using a consumer price index base year of 1982–84 (that is, 1982–84 = 100). Maize is U.S. No. 2 Yellow, wheat is U.S. No. 2 Hard Red Winter, rice is White Thai A1 Super, soybeans are U.S. No. 1 Yellow, and crude oil is the spot price for West Texas Intermediate at Cushing, Oklahoma.

damage, especially among children (von Grebmer et al. 2010). For example, across several Latin American countries, simulations have shown important reductions in calorie intake at both the national level and the household level, especially among poor households with children in the critical window from conception to age two. In all of the Latin American countries studied, poorer households with consumption levels that were already below the calorie adequacy threshold showed greater reductions in calorie intake (Robles and Torero 2010). These long-term effects are especially detrimental to already vulnerable populations, such as those in countries whose GHI score is already alarming or extremely alarming. The effects of high and volatile food prices are also particularly harmful for countries with high net food imports. Because these countries purchase a large share of their food requirements on global food markets, price volatility transmits faster and more directly to the national level. Additionally, countries with high net food imports tend to have high GHI scores (see figure on the bottom of page 23), and high food inflation affects countries with large numbers of poor people such as China, India, and Indonesia.

Making headway in reducing hunger in this new environment will require an understanding of the causes of food price spikes and excessive price volatility, how these can be curtailed, and the most effective steps to minimize their harmful effects on poor people's food security and well-being.

### PRICE TRANSMISSION FROM INTERNATIONAL TO DOMESTIC PRICES

The degree to which prices are transmitted from international to domestic markets varies among regions. Several IFPRI case studies from Africa, Asia, and Latin America analyzed the transmission of food price changes from international markets to domestic markets. Researchers found that in Latin America, about 20 percent of the change in the international price of wheat is transmitted to the domestic price of bread. There was also evidence that changes in international rice prices are transmitted to domestic markets in most Latin American countries. In Asia, all three countries studied showed transmission of changes in world rice prices to domestic markets, and two out of three showed transmission of world wheat prices. In Sub-Saharan Africa, however, only 13 of 62 price series showed evidence of price transmission over the four to seven years in question. This difference partly reflects the fact that maize, the staple food in many African countries, is not widely traded. Rice prices were more likely to be linked to world prices than maize prices. On the other hand, almost all African countries studied experienced higher food prices during the 2007–08 global food crisis.

Source: For Latin America, Robles and Torero (2010); for Asia, Robles (2010); and for Africa, Minot (2010).

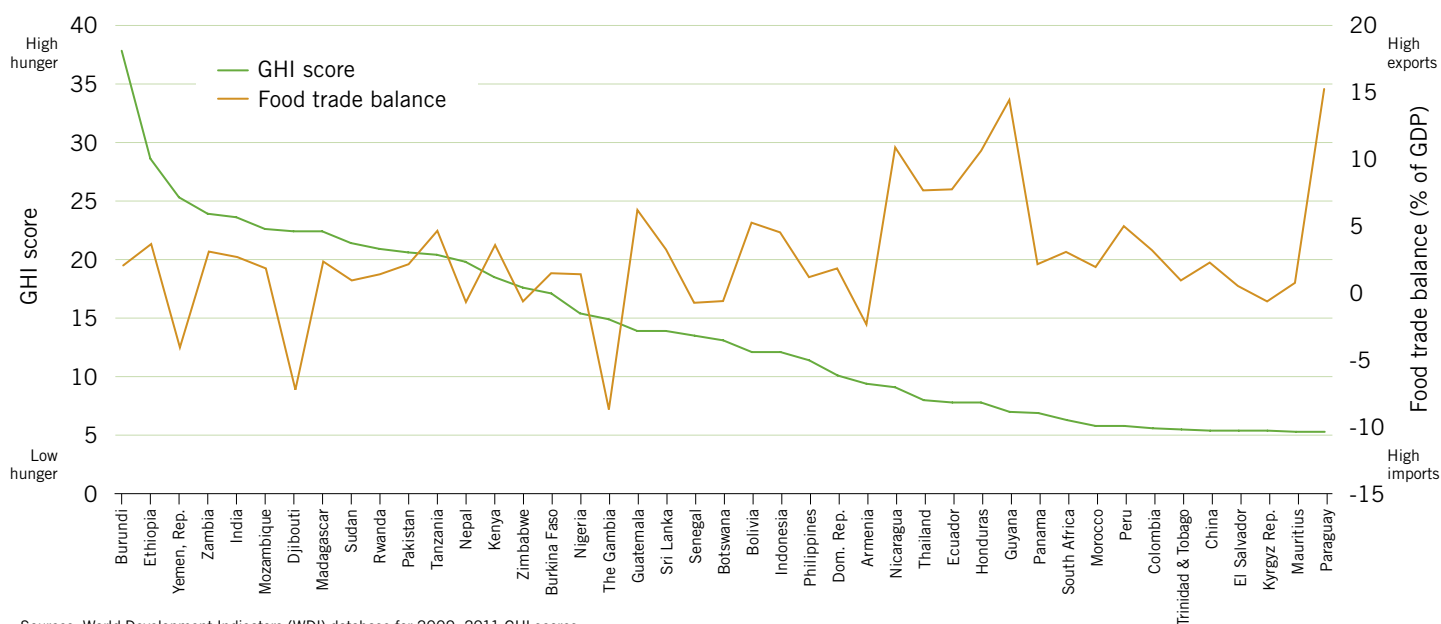
## EXCESSIVE FOOD PRICE VARIABILITY FOR HARD WHEAT



Source: Martins-Filho, Torero, and Yao (2010). See details at <http://www.foodsecurityportal.org/soft-wheat-price-volatility-alert-mechanism>.

Note: The green line is a logarithm of the observed daily return (rate of increase of prices from one day to the next) on investment. The orange line represents a level below which returns have a 95 percent probability of occurring. When the green line (return) exceeds the orange line (95th percentile), it is characterized as an excessively large return. One or two such returns do not necessarily indicate a period of excessive volatility. Periods of excessive volatility are identified based on a statistical test applied to the number of times the extreme value occurs in a window of 60 consecutive days (for details on the definition see Appendix D).

## GHI SCORES AND FOOD TRADE BALANCE



Sources: World Development Indicators (WDI) database for 2009; 2011 GHI scores.

Note: Food trade balance as a percentage of GDP is determined by calculating the total amount of food exports and imports in current US dollars, estimating the trade balance, and expressing it as a percentage of GDP in current US dollars. The correlation between the food trade balance and the GHI is  $-0.311$ , and this value is statistically significant at the 5 percent level (that is, the simultaneous change in value of GHI score and food trade balance). This figure gives estimates only for those countries with a GHI greater than 5. Thirty-six countries were dropped from the graph because they did not have information for their trade balance. Malawi and Côte d'Ivoire were also dropped from the calculations because they are outliers in terms of their positive trade balances (more exports than imports): Malawi because of its significant fertilizer subsidies in recent years, and Côte d'Ivoire because it produces 40 percent of the world's cocoa crop.

### How Did We Get Here?

The crises of 2007–08 and 2010–11 were triggered by a complex set of long- and short-term factors, including policy failures and market overreactions. The figure below shows the key factors behind the increase in prices and in price volatility; several studies have addressed the different demand- and supply-side factors that contributed to the price crises.<sup>8</sup> Of these factors, three have played the largest role in creating price volatility:

1. an increase in biofuel production through fixed mandates that made demand unresponsive to prices, even with volatile oil prices;
2. an increase in financial activity through commodity futures markets; and
3. the medium- and long-term effects of climate change.

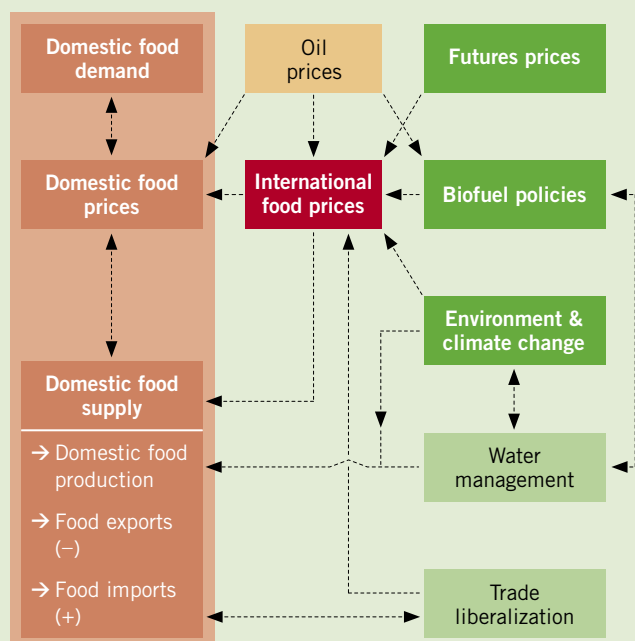
Any of these factors can also be exacerbated by policy responses such as export restrictions by major food exporters. During the 2007–08 food price crisis, 15 countries, including major producers, imposed ex-

port restrictions on agricultural commodities. These restrictions led to lower supplies on the global market and contributed to the crisis by provoking panic buying, hoarding, and more export restrictions in other countries, further increasing the amplitude of price movements. IFPRI research has shown that these trade restrictions can explain as much as 30 percent of the increase in prices in the first six months of 2008.<sup>9</sup> Export restrictions have also contributed to the price increases and general market nervousness experienced in 2010 and 2011.

**BIOFUELS ARE BOOMING.** With oil prices at an all-time high (close to US\$120 a barrel for Brent crude oil and close to US\$100 a barrel for West Texas Intermediate crude oil in July 2011) and with the United States and the European Union subsidizing and setting mandates for biofuel production, farmers have shifted their cultivation toward biofuel crops, and maize production in the United States is increasingly used to produce ethanol (see figure on page 25). Other countries, including emerging economies such as India and Peru, are also enacting biofuel mandates. This new demand for crops for fuel places new pressures on agricultural markets, which are characterized by temporal restrictions (the time it takes to increase production), limited resources (land, water, and nutrients), and growing demand driven by demographic and income increases. In addition to magnifying the tensions between supply and demand, the rigidity of biofuel mandates exacerbates price fluctuations and magnifies global price volatility. Last but not least, biofuels gradually increase the link between energy markets (which are highly volatile) and food markets (also volatile), further increasing the volatility of the latter. Traditionally, the energy and food markets have been linked through the agricultural supply channel (such as electricity for irrigation systems and petroleum for fertilizer production). Now energy and food markets are increasingly linked through a new channel – increased demand for crops for fuel even when biofuel mandates are not binding. This link is expected to be stronger as demand for biofuel expands. According to OECD/FAO (2011), biofuel production is projected to more than double from 2007–09 to 2019 and biofuel demand is expected to grow fourfold from 2008 to 2035 (IEA 2010).<sup>10</sup> In addition, biofuel support is predicted to increase from US\$20 billion in 2009 to US\$45 billion by 2020 and to US\$65 billion by 2035. At the same time, the environmental benefits of biofuel production are being questioned (Al Riffai, Dimaranan, and Laborde 2010a; Laborde 2011).

**EXTREME WEATHER AND CLIMATE CHANGE ARE PUTTING PRESSURE ON AGRICULTURAL PRICES.** Extreme weather events played a role in raising food prices and fueling price volatility in 2007–08 and in 2010. Looking ahead, various climate scenarios predict an increase in variability. Climate change could result in more intense and frequent natural disas-

### KEY FACTORS BEHIND THE INCREASE IN AGRICULTURAL COMMODITY PRICES AND PRICE VOLATILITY

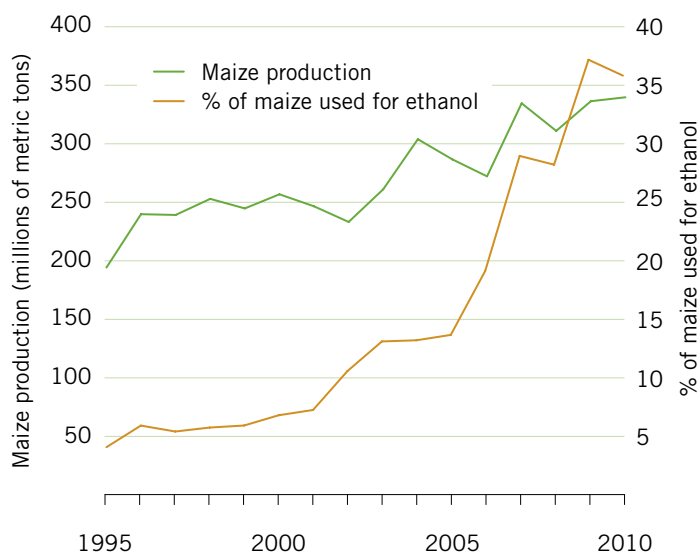


Source: Maximo Torero.

Note: Because of their impact on transportation and input costs, oil prices directly affect domestic and international food prices. They also indirectly affect international food prices by altering the competitiveness of biofuel production. Similarly, biofuel policies influence water management by creating competition between biofuel production and food production for access to water.



## MAIZE PRODUCTION AND USE FOR FUEL ETHANOL IN THE UNITED STATES, 1995–2010



Source: Data from Earth Policy Institute (2011).

ters (such as droughts and floods), which could trigger significant yield losses, production cuts, and price increases and lead to higher volatility. IFPRI simulations show that prices are likely to rise as a result of climate change under both pessimistic and optimistic scenarios of population growth (see figure on page 26). A recent IFPRI study of food security and climate change (Nelson et al. 2010) suggests that in contrast to the 20th century, when real agricultural prices declined, the first half of the 21st century is likely to see increases in real agricultural prices. Food demand – driven by population and income growth – is rising faster than agricultural productivity, which is hampered by the effects of climate change. In the figure on page 26 income and demographic changes between 2010 and 2050 result in price increases that range from 20.4 percent for rice in the optimistic scenario to 52.4 percent for maize in the pessimistic scenario. These substantial increases show the underlying pressures on the world food system, even in the unlikely event that perfect mitigation is achieved. With climate change, total price increases will range from 31.2 percent for rice in the optimistic scenario to 106.3 percent for maize in the pessimistic scenario.

**COMMODITY FUTURES TRADING IS UP.** Since 2008, one indication of higher price volatility has been the significant increase in the volume of agricultural commodity futures traded on the Chicago Board of Trade (CBOT), a leading agricultural futures exchange. From 2005 to 2006, the aver-



### Marruf Jalloh

Bo District, Sierra Leone

“I usually sell most of my palm oil to traders in the town and not to middlemen at the nearby periodic market. I have a mobile and call my sister in the town for price information. This allows me to plan my sales trips and to receive a better income for my products. Then, I am buying imported rice for my family. In the town, the prices for imported rice are lower compared to the periodic market in the chiefdom.”



### Sajad Hussain

Muzaffargarh District, Pakistan

“We can afford two meals a day, no more. We have breakfast and then a hot meal at around 5 pm. We never have meat. At the moment, we can’t afford vegetables either apart from onions. Vegetables, in particular, have become more expensive: they’re not so plentiful any more because of the floods.”

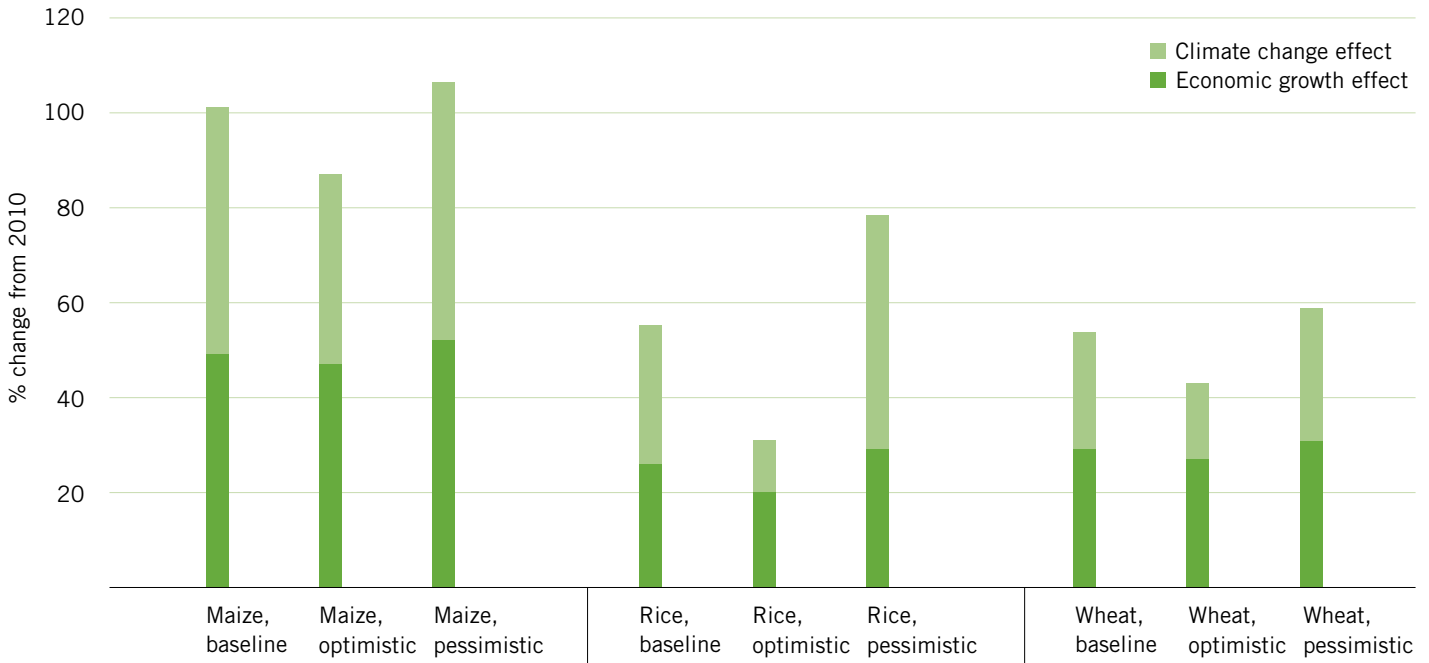


### Allen Rudlen Eliston Homphriez

Autonomous Region of the Northern Atlantic, Nicaragua

“We exchange the rice and beans we grow for other food, such as sugar, oil, and flour. Every time we have to sell off more of our products to get the same amount of goods in exchange.”

## WORLD FOOD PRICE INCREASES UNDER VARIOUS CLIMATE CHANGE SCENARIOS, 2010–50



Source: Nelson et al. (2010).

Note: The study for this graph considers three combinations of income and population growth: a baseline scenario (with moderate income and population growth), a pessimistic scenario (with low income growth and high population growth), and an optimistic scenario (with high income growth and low population growth). Each of these three income/population scenarios is then combined with four plausible climate scenarios that range from slightly to substantially wetter and hotter on average, as well as with an implausible scenario of perfect mitigation (a continuation of today's climate into the future). The climate change effect presented in the graph is the mean of the four climate change scenarios.

age monthly volume of futures for wheat and maize grew by more than 60 percent, while the volume for rice futures rose by 40 percent. In 2007, traded volumes again rose significantly for wheat, maize, rice, and soybeans – especially soybeans, whose monthly average was 40 percent higher than in 2006 (see upper Figure on following page). In all commodities, volumes continued to increase during 2010–11. Moreover, open interest has also been growing in recent years, a trend that may reflect the entry of medium- and long-term speculators into commodity futures markets (see figure on the bottom of page 27). Such speculation may have played a role in the 2007–08 food price crisis (Robles, Torero, and von Braun 2009; Welthungerhilfe 2011). Speculators normally make short-term investments; as they swarm into a market, they exacerbate the initial increase in price, and when they flee a market, they contribute to a fall in prices. In addition, agricultural commodities (including food products) have recently attracted more investment. They are regarded as a store of wealth that can protect against inflation or deflation of monetary assets, a characteristic that could explain the significant influx of money into index funds that include food commodities. Investment in such funds increased from US\$13 billion to US\$260 billion between the end of 2003 and March 2008, pushing up the prices of those commodities.

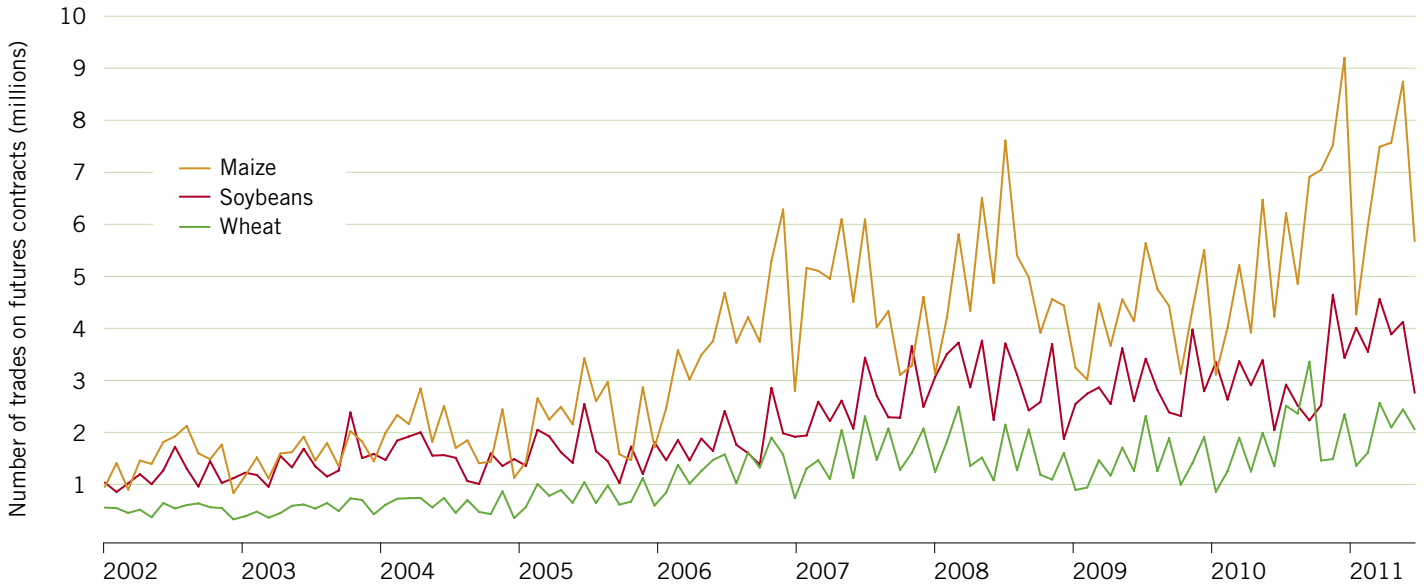
Today's agricultural markets have three key characteristics that increase price responses to the biofuels, climate change, and commodity trading challenges. First, export markets for all staple commodities – rice, maize, wheat, and soybeans – are highly concentrated in a few countries or very

### ABOUT COMMODITY FUTURES

A “futures” contract refers to an agreement between two parties to exchange a specified quantity and quality of a commodity at a specified price on a certain date in the future. Futures trading is used by agricultural producers to reduce the risk they face from changing prices and by speculators to take advantage of price shifts in commodities.

“Open interest” is the total number of outstanding futures contracts held by market participants at the end of each day – that is, contracts that have not yet been offset by an opposite futures position or fulfilled by delivery of the commodity.

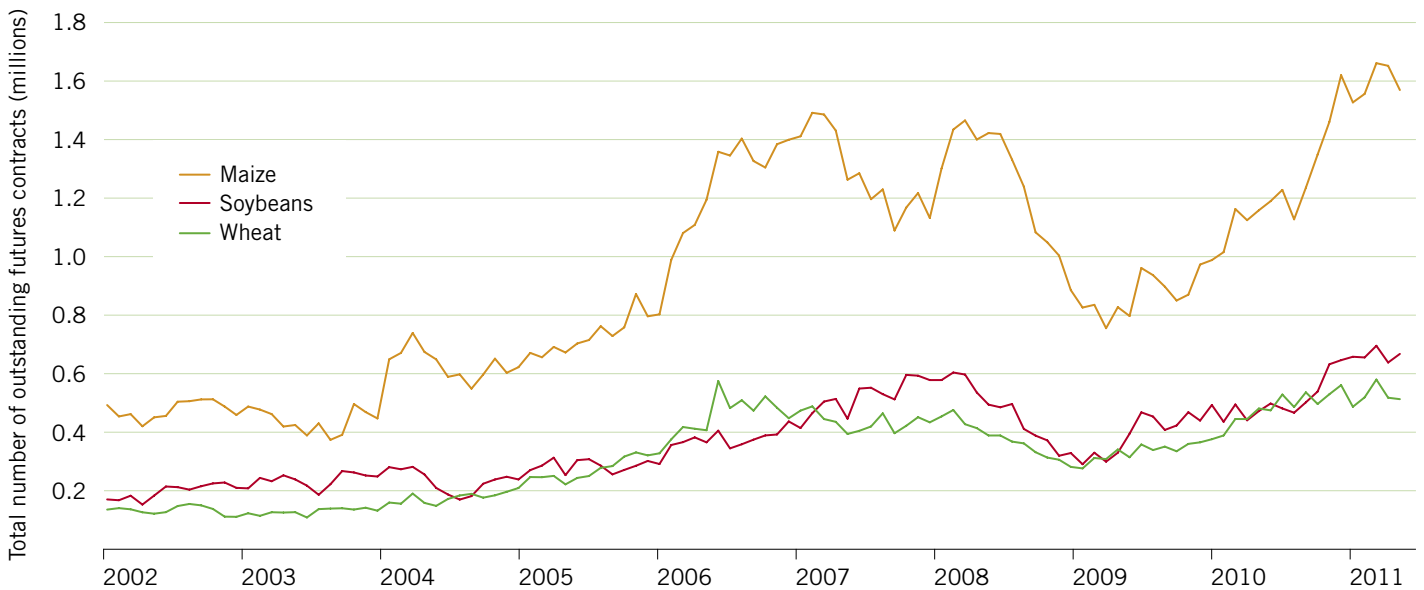
### MONTHLY VOLUME OF FUTURES TRADING, 2002–2011



Source: CBOT (2011).

Note: Rice futures are not shown because they are traded in such low numbers.

### MONTHLY VOLUME OF OPEN INTEREST, 2002–2011



Source: CBOT (2011).

Note: Rice futures are not shown because they are traded in such low numbers.



thin (that is, only a small share of production is traded). In the case of both maize and rice, the top five producers account for more than 70 percent of global production, and the top five exporters account for about 80 percent of world exports (see figure below). For wheat, the top five producers and exporters account for about 50 and 60 percent of global production and exports, respectively. The United States is by far the largest global supplier of maize, wheat, and paddy rice, as well as the fourth-largest supplier of broken rice. Argentina and France are also among the top suppliers of maize and wheat, and Brazil is among the top producers of maize and rice. China is the largest producer of wheat and paddy rice, as well as the second-largest producer of maize; however, its production is locally oriented. These high levels of concentration imply that the world's capacity for coping with geographical risk is limited. Any weather shock or exogenous shock to production in these countries will immediately have an effect on global prices and price volatility.

Second, the world's reserves for maize and restricted reserves for wheat are now at historically low levels (see figure below right). To function effectively, the market requires a minimum level of grain reserves to serve as a buffer against sudden changes in supply or demand. These reserves are needed because, in the short term, supply and demand for grain are not very responsive to price. When prices go up, for example, it is difficult for farmers to immediately produce more or for

consumers to immediately consume less. As a result, any supply shock, such as a drought or flood, can lead to price spikes and hoarding by farmers seeking to take advantage of higher prices in the future. In both 1973 and 2007 global grain stocks hit record lows, prompting global food crises. Although the difference between too few grain stocks and just enough is relatively small, a lack of sufficient stocks can lead to large price increases and a breakdown of functioning markets. In 2007–08, grain stocks were only about 60 million tons (2.7 percent of global production) less than in 2004–05. But with prices rising sharply in 2007–08, this difference in grain stocks was enough to cause serious problems in the market, especially for commodities such as rice, the production of which is concentrated in just a few countries (Timmer 2010).

Third, appropriate, timely information on food production, stock levels, and price forecasting is lacking. When this information gap leads to overreactions by policymakers, the result can be soaring prices. IFPRI has developed a way to measure this phenomenon and make it accessible as a useful tool for policymakers. In August 2010, Russia banned wheat exports in response to ongoing drought and wildfires. As the figure on page 29 (bottom left) shows, in the period in which Russia imposed the export ban, futures returns for wheat showed three days of excessive, or abnormal, returns (that is, returns exceeded the threshold they stay below 95 percent of the time) – even when supply and demand factors suggest

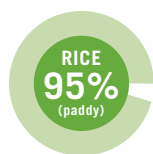
### MAJOR EXPORTERS OF MAIZE, WHEAT, AND RICE, 2008 (% OF WORLD EXPORTS)



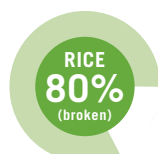
United States (53.0%)  
Argentina (15.1%)  
Brazil (6.3%)  
France (6.0%)  
India (3.5%)



United States (22.9%)  
France (12.4%)  
Canada (12.0%)  
Russian Federation (8.9%)  
Argentina (6.7%)



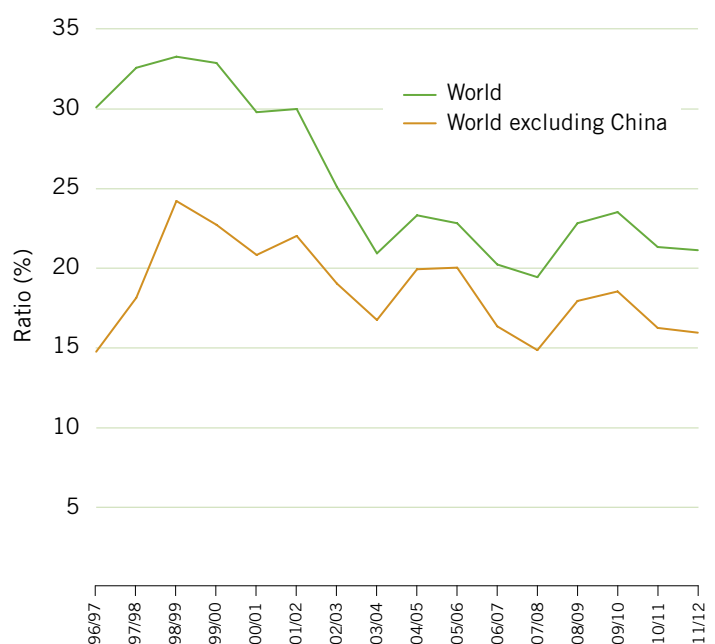
United States (90.4%)  
Paraguay (1.4%)  
France (1.2%)  
China (1.1%)  
Brazil (0.9%)



Thailand (54.8%)  
Pakistan (9.1%)  
Brazil (7.3%)  
United States (4.4%)  
Belgium (4.0%)

Source: FAO (2011a).

### RATIO OF GRAIN STOCKS TO USE, 1996/97–2011/12



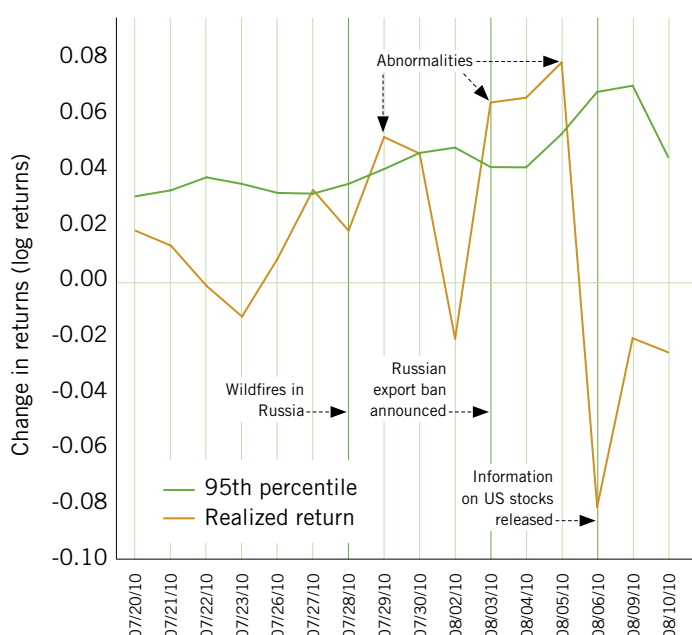
Source: FAO, *Food Outlook*, various years.

Note: World excluding China is shown because China is an outlier in terms of reserves, and there are several questions about the quality of its data reports.

they should not have done so. At that time global wheat stocks stood at around 175 million metric tons – nearly 50 million metric tons more than in 2007–08. Russia’s export ban removed less than 18 million metric tons from the market – well below the 26 million metric tons held in reserve by the United States alone. Moreover, the United States – the world’s largest wheat exporter – had enjoyed a good harvest. When information on the US harvest and existing stocks became available, prices immediately dropped, as shown in the figure below. US wheat production could easily have covered the gap in exports from Russia, and if this information had been known sooner, global wheat prices should not have increased substantially.

The media overreacted to the news of Russia’s export ban and failed to explain that global wheat production and stocks were sufficient to compensate for the loss of Russia’s wheat. Moreover, every piece of news during August through October 2010 – even the US Department of Agriculture’s better-than-expected projection that the world would harvest only 5 percent less wheat that year than the previous one – seemed to elicit a spike. The number of media articles on the price of wheat rose significantly between August and October 2010, and 57 percent of the total number of media articles with any reference to wheat prices reported that wheat prices were going to increase. This number was 93 percentage points higher than the same measure in an average quarter for 2010 (see table below).<sup>11</sup>

### ABNORMALITIES IN PRICES OF WHEAT FUTURES



Source: Martins-Filho, Torero, and Yao (2010).  
 Note: An abnormality occurs when an observed return exceeds a certain preestablished threshold. This threshold is normally taken to be a high order (95 percent) quantile – that is, a value of return that is exceeded with low probability (5 percent).

Among the major reasons for the price increases reported in the media were the fires in Russia (62 percent) and low inventories because of low production and stocks (25 percent), even though the inventories and stocks were sufficient and significantly higher than in the 2008 crisis. Only 7 percent of articles referred to policies, such as export bans, which had in fact been the major reason for the increase in prices. This lack of information on global production led governments around the world to engage in panic buying that exacerbated the situation and pushed up prices.

### The Impacts of Rising Food Prices and Excessive Volatility on the Poor

Rising food prices and excessive price volatility can affect households differently, depending on whether they are in rural or urban areas or are net consumers or net producers. Higher food prices and excessive volatility can lead to deterioration of diets, as well as significantly erode households’ purchasing power, affecting the purchase of other goods and services essential for health and welfare, including heating, lighting, water, sanitation, education, and healthcare. The coping mechanisms that poor households use will ultimately determine the severity of the impact of high food prices on their livelihoods and on the well-being of their members in the short, medium, and long term. Similarly, households’ access to social safety nets and other social protection schemes will also be a key determinant

### ANALYSIS OF MEDIA ARTICLES REFERRING TO WHEAT PRICES

Reason given for price increase	References to wheat prices going up		
	1998–2011 <sup>a</sup>	2010 <sup>b</sup>	Aug.–Oct. 2010 <sup>c</sup>
Financial	78	42	10
Inventories	222	99	40
Policies	84	37	12
Disasters and civil effects	377	159	101
<b>Total references to wheat price increases</b>	<b>761</b>	<b>337</b>	<b>163</b>
<b>Total number of articles on wheat prices</b>	<b>1,238</b>	<b>585</b>	<b>288</b>

Source: Calculations by Maximiliano Torero.

<sup>a</sup> August 1, 1998, to July 22, 2011.

<sup>b</sup> January 1, 2010, to December 31, 2010.

<sup>c</sup> August 1, 2010, to October 31, 2010.

Note: The qualifiers used in each of the categories are as follows: (a) financial: domestic food price, expectations, expected prices, futures markets, hedge, hedging, interest rate, international food price, monetary policy, rates, speculation, trade, trade barrier, trading volume; (b) inventories: corn production, domestic production, domestic supply, emergency reserves, maize production, reserves, rice production, storage, supply, surplus, and wheat production; (c) policies: export bans, export quotas, food security, import quota, import restrictions, price controls, and taxes; and (d) disasters and civil effects: drought, earthquake, famine, fire, flood, frost, hurricane, nutrition, plague, poverty, riots.

of the level of suffering they will experience because of higher food prices. Safety nets in many countries still reach only a small proportion of the poorest population. Ethiopia's government safety net program, for example, reaches 8 million people but covers only about 25 percent of the country's poor; in Bangladesh – a country where 25 percent of the population is ultra-poor – roughly 7 percent of the population has access to social protection or safety net programs (von Braun et al. 2008).

### ESTIMATING THE EFFECTS OF RISING FOOD PRICES AND EXCESSIVE VOLATILITY ON THE POOR IN BANGLADESH, PAKISTAN, AND VIETNAM

To examine how much rising food prices and increased price volatility made poor people worse off, IFPRI estimated the impact of price changes between 2006 and 2008 on the welfare of poor people in three countries—Bangladesh, Pakistan, and Vietnam:

- In both Bangladesh and Pakistan, increasing food prices left an estimated 80 percent of households worse off. In Vietnam, 51 percent of all households were likely worse off, whereas 64 percent of rural households in Vietnam may have been better off.
- Among households that were worse off, the poorest households were estimated to experience the greatest losses in spending.
- Households in Bangladesh lost an average of an estimated 11 percent of their household spending; households in Pakistan and Vietnam lost about 5 percent.
- Increasing food prices caused poverty rates in Bangladesh and Pakistan to rise by an estimated 5 and 2 percent, respectively. In contrast, higher food prices could have reduced poverty in Vietnam by 8 percent because rice producers benefited from higher prices.
- If countries were to fully compensate the poorest fifth of households for their losses stemming from higher food prices, the cost in Bangladesh would represent an estimated 1.3 percent of total national spending; in Pakistan, 0.67 percent; and in Vietnam, 0.31 percent.

Source: Robles (2010).

Note: These estimates are at the microeconomic level and incorporate first-round and substitution effects. The study simulates the real price change of the most important food items in each country between the first quarter of 2006 and the first quarter of 2008.

To understand the different impacts on households, IFPRI studied changes in (1) how much people spend and (2) how many calories they consume.

**SPENDING LEVELS.** To measure changes in households' welfare in the presence of changing food prices, IFPRI determined how much income would need to be transferred to households to keep their members at the same welfare level as they were before the change in food prices during 2007–08.<sup>12</sup> It found that in most net-importing countries, practically all households were worse off and the national poverty rate was increased because of high food prices. If one did not account for substitution of one commodity with another commodity in response to price changes, the poverty rate increased even more. In urban areas, the impact of high food prices was regressive – in other words, the poorest households in urban areas suffered the most when their losses were measured relative to their total expenditures. This clear regressive pattern did not occur in rural areas, where the negative effects were universal given that most rural residents are poor. Finally, the magnitude of the effects varied across countries and also depended on the degree to which world prices were transmitted to local prices. (For more information on the effects of rising food prices and excessive volatility for households in three countries in Asia, see box on the left.)

**CALORIE INTAKE.** Besides reducing poor people's spending, higher food prices have impacts on their calorie intake. IFPRI simulated how a food price shock would affect the quantity of food people consume. In most of the countries analyzed, it was consistently found that the lower a household's income, the greater the decline in its calorie intake. Households in poor rural areas reduced their calorie consumption as much as or more than those in urban areas. Households already at risk of consuming too few calories were most affected. In the majority of countries, large reductions in calorie consumption were found in households with children younger than two years of age – a situation that could have harmful long-term consequences for their health and well-being. At the same time, however, wealthier households increased their calorie consumption by consuming cheaper food. (For more information on the effects of rising food prices for households' calorie consumption in seven Latin American countries, see box on page 31.)

### Conclusion

Higher and more volatile prices appear to be here to stay for some time. It is clear that even though many of the world's poor live in rural areas and are engaged in agricultural production, the price spikes and volatility that have recently occurred in food markets have generally left them worse off. The poorest people bear the heaviest



## FOOD PRICES AND CALORIE CONSUMPTION IN SEVEN LATIN AMERICAN COUNTRIES

IFPRI studied seven countries in Latin America to examine the impact of food prices on nutrition. Following the 2007–08 food price shock, households reduced their calorie consumption at rates ranging from 0.95 percent to 15.1 percent, with a median reduction of 8.0 percent. The largest reductions took place in Ecuador, Haiti, Nicaragua, and Panama. In five of the seven countries (Ecuador, Haiti, Nicaragua, Panama, and Peru), households moved from above calorie adequacy levels to below those levels due to the food price shock, with the largest changes observed in Ecuador and Peru (13 and 7 percentage points, respectively). On the other hand, in all countries except Panama, the wealthiest fifth of the population consumed above the calorie adequacy level and increased their calorie consumption by more than 10 percent after the price shock. This situation also raises concerns, given the rising prevalence of overweight in Latin America.

Source: Iannotti and Robles (2011).

Note: The effects of food prices on calorie consumption were estimated using nationally representative household budget surveys and data from the ProPAN and US Department of Agriculture food composition databases.

burden from price spikes and swings. In addition to understanding the factors contributing to this situation, it is crucial to take steps to moderate food price volatility and to help the most vulnerable people achieve food and nutrition security. Recommendations for action from IFPRI, Welthungerhilfe, and Concern Worldwide appear in Chapter 5.

<sup>8</sup> These studies include Sommer and Gilbert (2006); Bakary (2008); Brahmabhatt and Christiaensen (2008); OECD (2008); OECD/FAO (2011); UNCTAD (2008); von Braun (2008a,b,c); von Braun et al. (2008); World Agricultural Outlook Board (2008); Headey and Fan (2010); and HM Government (2010).

<sup>9</sup> IFPRI researchers made this finding using the MIRAGE global trade model.

<sup>10</sup> Although biofuel policies are now under some pressure in both Europe and the United States, mandates remain in effect.

<sup>11</sup> Analysis of the media articles was conducted using Sophic Intelligence Software, which is built on the Biomax BioXMä Knowledge Management Suite. Each day, global food- and commodity-related news articles are loaded into Sophic Intel for linguistic analysis and semantic object network mapping. Sophic Intel generates wiki reports and heat maps based on terms and phrases found in press articles that influence commodity price volatility and food security. The average quarter for 2010 had 84 articles mentioning that wheat prices were increasing, whereas the quarter from August to October 2010 had 163 articles – an increase of 73 percent.

<sup>12</sup> Our estimates depend on the availability of general consumption and production data, as well as estimates of how households substitute or reallocate their consumption and production decisions in response to price changes.



## Maria Beltran Boveda

Santiago de Cuba, Cuba

“We sell our produce to state collection and distribution centers which we are bound to by contract. We can’t sell wherever we want.”

“We can’t set the prices ourselves either, they’re determined by the state. But the prices we get for our products are not adequate, because the production costs have doubled.”

“We don’t store our products before they’re sold so that we get better prices. Everything we produce is sold immediately.”



## Florence Muoki

Makueni District, Kenya

“Life is hard and food has become very expensive. We’ve got even less money to support our children with.”

“We plant trees and vegetables that we sell so that we have money to buy food and send our children to school. But now that everything is so expensive, they don’t go to school any more because they have to help grow vegetables at home.”

“We’re totally dependent on rain, but it doesn’t rain regularly any more. As soon as we can grow and sell things, we can send our children to school again. But without rain, we have nothing to eat and no money.”

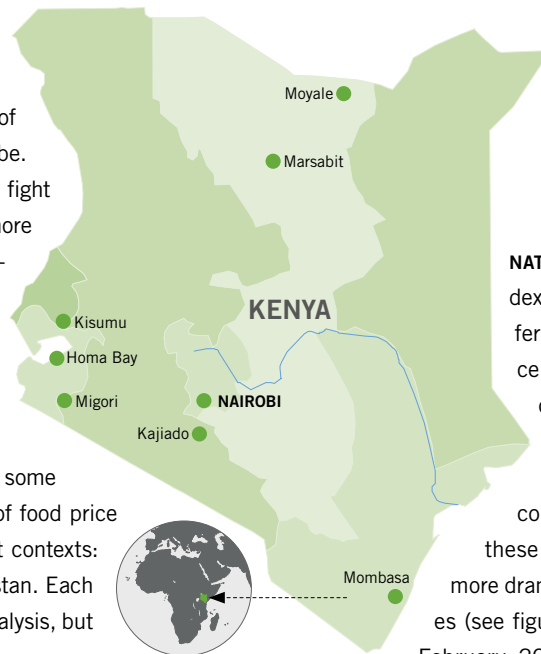


**Nonfarm income opportunities and livelihood options, as well as pro-poor agricultural growth, need to be supported and improved.**



# THE IMPACTS OF FOOD PRICE SPIKES AND VOLATILITY AT LOCAL LEVELS

Concern Worldwide and Welthungerhilfe see first hand the severe and sustained impact of food price volatility and spikes across the globe. Both organizations are engaged daily in the fight against hunger – a fight that has become more intense as food prices have increased and become more volatile. In summer 2011, that intensity was clearest in the haunting images from the Horn of Africa, where the first famine of the 21<sup>st</sup> century became a reality for millions of people. The following case studies by Concern and Welthungerhilfe give some insight into the real and insidious impacts of food price increases and volatility in two very different contexts: the slums of Nairobi and the farms of Tajikistan. Each study not only provides facts, figures, and analysis, but also illustrates human reality and resilience.



● Concern Program Areas

**NATIONAL PRICE TRENDS.** The consumer price index, a composite measure of the prices of 15 different goods indexes, has increased by 30 percent in the past three years (KNBS 2011).<sup>13</sup> This overall increase has been accompanied by substantial price fluctuations and volatility over time. The wholesale prices of two key commodities, white maize and beans, show these fluctuations clearly (see figure below). Even more dramatic are the changes in month-to-month prices (see figure on the bottom left of page 34). Between February 2010 and May 2011, month-to-month price changes ranged from 0 to 29 percent for maize, and from 0 to 42 percent for beans (not shown in figure).

## How Food Price Spikes and Volatility Affect the Urban Poor: Evidence from Nairobi, Kenya

Despite significant economic growth in the past decade, hunger remains a painful daily reality for millions of Kenyans. Ranked 50<sup>th</sup> out of 81 countries in the 2011 GHI, Kenya was – even before the most recent food crisis hit the region – classified as having a serious hunger problem. Between January and May 2011 in Nairobi, admissions to hospitals and community centers for treatment of severe acute malnutrition in young children increased by 62 percent. At the time of writing, the crisis in the wider region is putting even greater pressure on national health systems and services, with famine declared in regions of neighboring Somalia and thousands of refugees flowing into the country daily. Kenya is not on track to meet the Millennium Development Goal related to undernutrition, and the food crisis in the wider Horn of Africa will exert further pressure on any progress toward this goal.

Like many other countries in Sub-Saharan Africa, Kenya has seen significant increases in food prices since 2007. The drivers of these increases are both internal and external. The violence that spread across Kenya following the disputed presidential election in 2007 caused crop destruction, abandonment of farms, and destruction of stores that led to a 30 percent reduction in national food production (Höfller and Owuor Ochieng 2009). Droughts in 2008 and 2011 took a toll on food production in the central and western regions and severely reduced food security, particularly in arid and semiarid pastoralist areas. Kenya is also highly dependent on imports, even in years of good harvest. It is therefore especially sensitive to increases and volatility in international food and fuel prices.

**TRANSMISSION OF VOLATILITY TO LOCAL LEVELS.** As Kenya's largest urban center, Nairobi is home to more than 3 million people, 60 percent of whom live in informal settlements scattered throughout the city. Ur-

## MAIZE AND BEAN PRICES, NAIROBI, 2007–2011



Source: FAO (2011b).

ban populations are highly dependent on markets for basic needs including food, shelter, water, and cooking and heating fuel. The urban poor generally buy goods on a day-to-day basis. For this reason, they can end up paying higher per-unit prices than their wealthier urban counterparts.

To better understand the extent to which price volatility at the national level is passed on to the local level, monthly price data on staple foods and key nonfood items were collected in three slums in Nairobi (Korogocho, Mukuru Kwa Njenga, and Mukuru Kwa Reuben). Prices varied significantly between markets, and when prices were averaged across the three markets (see figure below right), the data show that from January 2010 to May 2011 slum dwellers faced high levels of price fluctuation across time. Comparing month-to-month price changes at national and local levels, it is clear that significant volatility exists at both national and local levels and that local prices can fluctuate substantially even at times of stable national prices (figure below left).

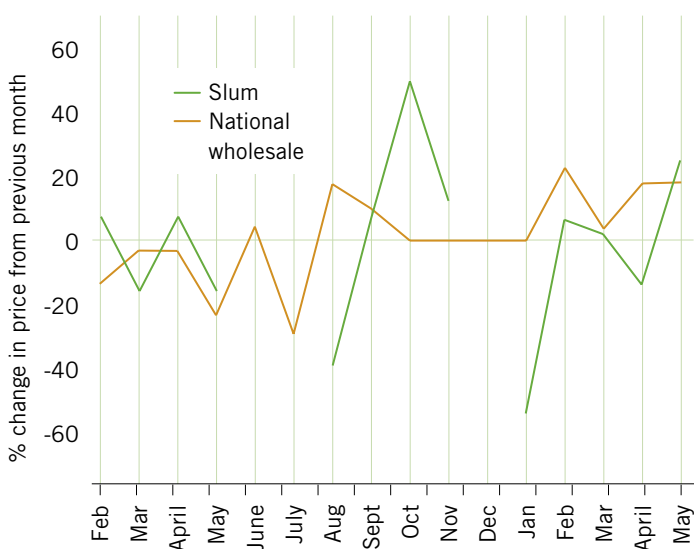
Local factors also contribute to volatility. Between November 2010 and January 2011, while prices at the national level remained stable, price changes in slum markets oscillated between 10 and 50 percent. Local factors contributing to this volatility include increased insecurity around the holiday period and greater demand as urban dwellers purchased larger quantities of goods and then traveled up-country for the festivities.

In addition to fluctuations over time, prices in local markets also vary spatially. In May 2011, the price of 1 kilogram of maize flour ranged from 44 to 46 Kenyan shillings (KSh) – which is about US\$0.49 to \$0.52 – across four markets within Viwandani, a slum in Nairobi’s industrial area that covers less than 1 square kilometer. Although 2KSh (US\$0.02) may not seem like a significant fluctuation, for households that spend between 40 and 60 percent of their household income on food, even such minor fluctuations have major impacts on household consumption and well-being. Part of this spatial variation seems to be linked to location and convenience: markets with shops located in the interior of the slum charge higher prices than those along main roads and in the main open-air markets. The supplier used and quantity purchased also affect price variation; some traders are able to buy in larger quantities from wholesalers, and others can buy only smaller amounts at higher unit prices. Supplier location affects transport costs too, which are in turn passed on to the consumer.

Average daily wages in this area are 178KSh (US\$1.99). This income must cover food, water, rent, toilets (which are paid for daily on a per-use basis), transport, school fees, and all other basic needs. As Teresia’s story demonstrates (see page 35), slum dwellers expend significant effort in seeking the cheapest prices each day in order to make the most of their food budgets.

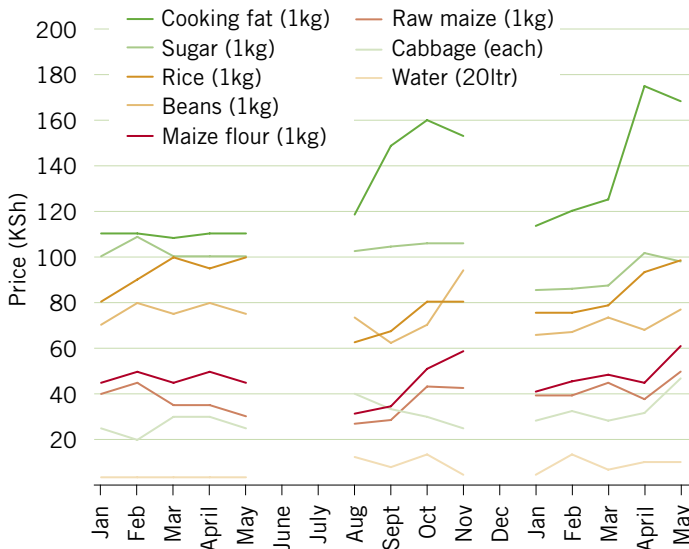
When household budgets do not meet household needs, it is often food intake that suffers because food consumption is a more flex-

**MAIZE PRICES AT NATIONAL WHOLESALE LEVEL AND LOCAL SLUM MARKETS, FEBRUARY 2010–MAY 2011, KENYA**



Source: Data collected by a partner in Concern’s urban nutrition surveillance project. Note: Prices for slum markets are taken from three markets in Korogocho, Mukuru Kwa Njenga, and Mukuru Kwa Reuben. National wholesale data are from the FAO food security portal. Data collection in the slums was disrupted in June, July, and December of 2010 because of staffing gaps.

**PRICES FOR KEY COMMODITIES AVERAGED ACROSS THREE NAIROBI SLUM MARKETS, JANUARY 2010–MAY 2011**



Source: Data collected by a partner in Concern’s urban nutrition surveillance project. Note: The three markets were in three Nairobi slums: Korogocho, Mukuru Kwa Njenga, and Mukuru Kwa Reuben. Data collection in the slums was disrupted in June, July, and December of 2010 because of staffing gaps.



## TERESIA: STRUGGLING TO GET BY IN A NAIROBI SLUM



Teresia Wangari lives in Korogocho, a slum in central Nairobi that borders the main city dump and is home to more than 200,000 people. In addition to caring for her own two children, who are one and five years old, Teresia took charge of her sister's two young children, who are six and seven years old, following her sister's death. To make ends meet, she sews and sells petticoats and slips in the neighborhoods around Korogocho through a business she developed with a grant from Concern's livelihood development program. For each slip she sells at 100KSh (US\$1.12), she makes 10KSh (US\$0.11) profit. Her small profits must cover all her household needs, from food and water to rent, access to toilets, and school fees for the children.

In the past year, Teresia has seen significant increases in the prices she pays for essential goods such as food, cooking fuel, water, and transport: "The prices have gone up very much; particularly in the last month [June 2011], it has increased very much."

Teresia buys food daily in small quantities. Prices in the local shops fluctuate from day to day, and she must go to several shops

before finding the one with the best price. This task cuts into the time she has for sewing her slips, fetching water, and caring for her children. "The shop with the lowest price changes from day to day. It will not be the same shop each day. It depends on where they went to buy. The prices have gone up, so they pass this on to the customer," she says.

Price changes have become larger and more erratic in the past year, and this change has affected Teresia's household: "200 [KSh] used to get food to last for several days, and now you don't even get change back [when you go to buy basic goods for one day]." She has also seen changes in her business in recent months as people have less disposable income. "People didn't used to bargain," she says. "I would sell straight at 100. But now more people are bargaining, and sometimes I don't sell anything."

Teresia expects prices to remain high and has developed strategies to meet her family's basic needs. She changes the type of foods her family eats. Rather than consuming meat or fish a few times a week,

the family now relies on *ugali* (maize flour) and vegetables. This diet lacks many nutrients essential for the growth of her young children. Interviews with several families in Korogocho revealed that many people reduced the number of meals they eat in addition to changing the types of food they eat.

To generate income, Teresia plans to increase the price of her slips to 150KSh (US\$1.68) and travel into better-off neighborhoods, where she may be able to get a higher price. Although this plan may increase her income, her travel will mean less time with her children, increased transport costs, and greater insecurity because she will come home later in the evening.

Teresia, like many of her neighbors, is struggling to protect her family's health and well-being in the face of increasing costs, increasing price volatility, and diminishing livelihood options. Unless the root causes are adequately addressed at the local, national, and international levels, Teresia and many like her will be forced to compromise their long-term well-being in order to meet immediate basic needs.

ible expenditure than rent, school fees, and transport. Households will reduce quantity, quality, and variety of foods to make up for shortfalls in the household budget. The effects of such coping mechanisms can be devastating and lead to increasing numbers of children suffering from severe acute malnutrition. The work of Concern and its partners has begun to address these effects.

**CONCERN'S RESPONSES: CASH TRANSFERS, LIVELIHOOD DEVELOPMENT, AND URBAN NUTRITION.** The urban poor face many barriers to improving their livelihoods, health, and food security. High price volatility is just one. To help extremely vulnerable households build their resilience and plan for the future, price volatility must be not only mitigated and dampened at the national and regional levels but also addressed at the local level.

Concern's urban nutrition program (launched in 2007) and its urban livelihoods and social protection program (launched in response to the post-election violence and the food price crisis of 2007–08) seek to address the acute needs of thousands of people like Teresia, who live in the slums of Kenya and whose lives are further threatened by pervasive and ongoing price volatility.

In November 2009, as part of its urban livelihoods and social protection program, Concern launched a cash transfer pilot program the aim of which was to protect the food security and well-being of extremely poor and vulnerable people living in the Korogocho slum and to test modalities for a broader national social protection scheme. The initial evaluation shows that participating households were able to significantly improve their food security and dietary diversity and reduce negative coping strategies. The average number of meals per day increased from 1.6 at the beginning of the program to 2.5 at the endline in October 2010. Over the same period, the proportion of households classified as severely food insecure dropped from 97.4 percent to 73.7 percent.<sup>14</sup> The use of negative coping strategies also fell significantly. The practice of trading sex for money or food declined from 21.9 to 9 percent, and engagement in child labor dropped from 38.5 to 12.2 percent.<sup>15</sup> It is hoped that these improvements can be enhanced through ongoing and more innovative work to help poor urban households break the cycle of poverty, food insecurity, and vulnerability. The possibility of a national social protection scheme is still under discussion with the government and other stakeholders.

To help poor families build more resilient livelihoods, Concern has also introduced a livelihood development approach. Between late 2009 and May 2011, 700 households in Korogocho, Nairobi, and 300 in Nyalenda, Kisumu (a city in western Kenya), received skills training while 1,461 individuals received small business grants to start a new business or invest in an existing business. Market analysis in both slums had previously identified sectors and areas offering employment and business opportunities. Through local partners, Con-

cern also facilitates links to other services, including health, micro-finance, and home-based care.

Finally, Concern implements an urban nutrition program. It works with nine partners, including the Government of Kenya, to mitigate the impacts of poor household food security on young children and to improve feeding and care during the critical thousand days between conception and a child's second birthday. Since its inception in 2007, the urban nutrition program has treated more than 8,000 children in Nairobi and more than 3,000 children in Kisumu for severe acute malnutrition. Mothers' support groups in Korogocho have supported 599 mothers in properly breastfeeding their children and introducing nutrient-rich complementary foods once children reach six months of age. The program has trained 300 health workers in infant and young child feeding and developed new counseling tools specifically for the urban environment.

In the face of increasing urbanization and population growth, climate change, and increasing demands on food production, this work must be continued and scaled up in order to ensure that poor urban dwellers can build and strengthen their own defenses against the insidious impact of food price increases and price volatility.

#### How Food Price Spikes and Volatility Affect Poor Smallholders: Evidence from Rural Tajikistan

Shortly after global food prices reached a historic peak in February 2011, food prices in Tajikistan also climbed to record levels: In May 2011, prices were at their highest level since food-price monitoring started after the country's civil war in the 1990s. The price of wheat – the country's main staple food – increased by 60 to 70 percent compared with the same period a year before (WFP 2011). Wheat accounts for nearly three-fifths of total calorie intake in Tajikistan; bread is generally eaten at every meal.

The significant increase in food prices is not the only concern for many people in Tajikistan, the poorest and most food insecure of all the countries in the Commonwealth of Independent States (with a GHI score of 17.0, its hunger level is categorized as serious). Price fluctuations have also become more pronounced. Food-price monitoring data suggest that both the 2007–08 and the 2010–11 global food price crises were transmitted to the national level (see figure on page 37). However, in between the two crises prices in Tajikistan did not drop as international prices did.

The major reason for this global-to-national transmission is Tajikistan's dependence on global food markets: the country imports about 58 percent of its food consumption requirements. The Russian Federation's decision to place a ban on wheat exports in summer 2010 (see chapter 3, page 29) may have contributed indirectly to upward pressure on wheat price levels in Tajikistan. Although very little wheat was exported from Russia to Central Asian markets, in the months following the

ban, prices for wheat in Kazakhstan – from which Tajikistan imports 90 percent of all imported wheat and flour – rose steeply.

Tajikistan's vulnerability to world market prices is exacerbated by geopolitical factors. Because Tajikistan is landlocked, most goods must pass through neighboring Uzbekistan. In spring 2011 political tension between the two countries increased, and rail tariffs for transit of Tajikistan cargoes rose by 15 to 74 percent. Moreover, Tajikistan is dependent on petrol and diesel imports from Russia. Following Russia's decision to impose export duties on top of increased tariffs for oil in June 2011, prices for fuel in Tajikistan reached record levels. When fuel prices are high, the inadequate infrastructure in this extremely mountainous country (more than half of the country lies higher than 3,000 meters) further increases transportation costs and consequently pushes up food prices. In addition, market structures do not favor consumers; import markets for some food commodities, in particular wheat flour, are concentrated in the hands of a few large, influential firms, fostering the risk of price collusion (see, for example, WFP 2005).<sup>16</sup>

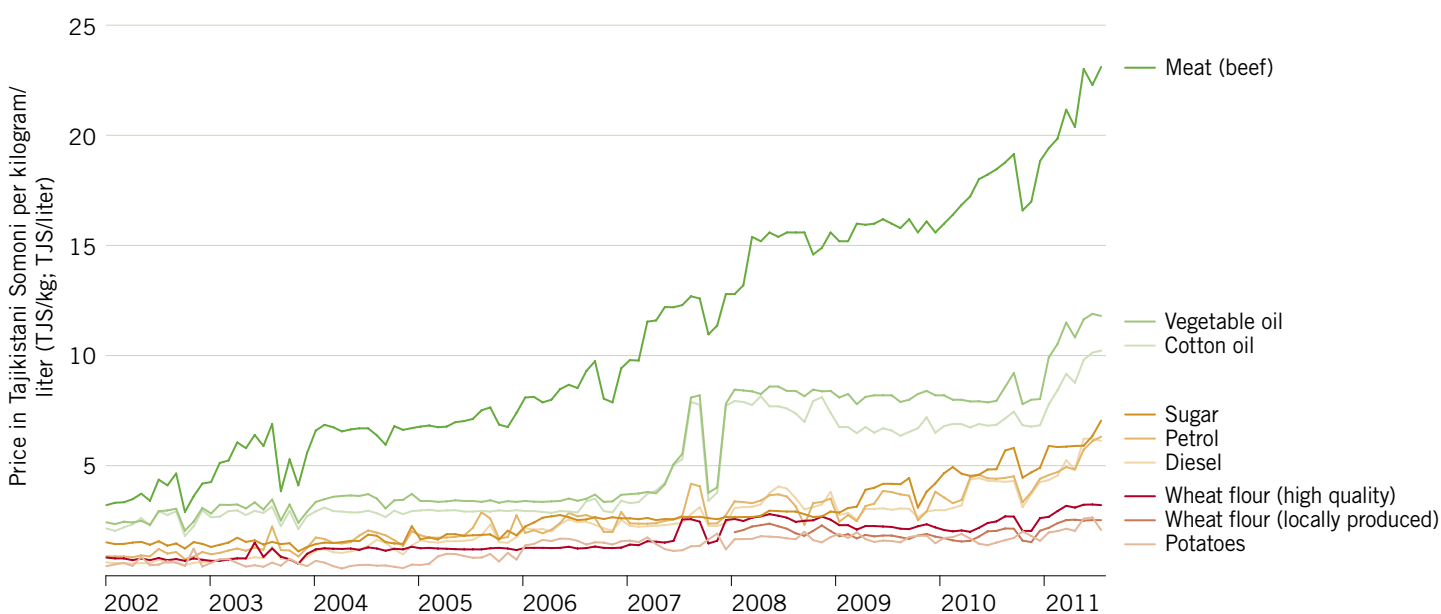


**RURAL POPULATIONS SUFFER FROM FOOD PRICE FLUCTUATIONS.**

Compared with their urban counterparts, large segments of the rural population in developing countries are less integrated in day-to-day market dynamics. This is the case in Tajikistan, where many rural areas are remote and even inaccessible during certain periods of the year. In those areas, agriculture is the main source of income, and family farmers meet at least some of their consumption requirements through their own production. In many villages, bartering is common.

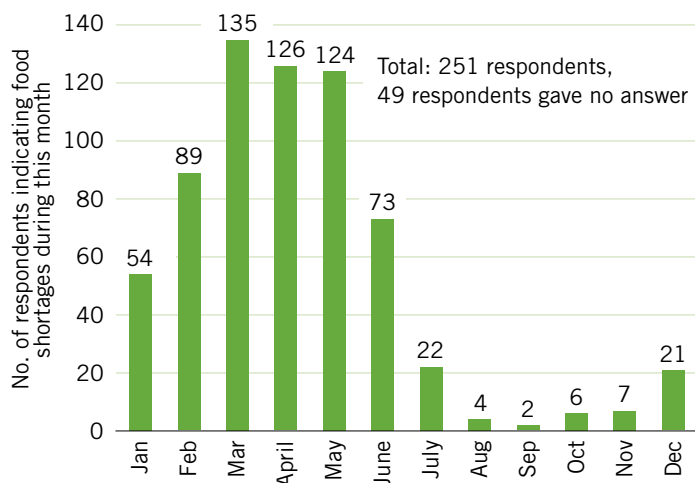
Wheat accounts for almost half of Tajikistan's irrigated production and almost two-thirds of its rainfed production. However, the country's prime irrigated land is devoted mostly to growing cotton, and nearly all smallholder wheat producers rely on rainfed cultivation. In May and June 2011 Welthungerhilfe asked 300 smallholder wheat farmers in the Khatlon region of south Tajikistan – the country's leading wheat-

**FOOD AND FUEL PRICE DEVELOPMENTS IN TAJIKISTAN (AVERAGED ACROSS FIVE MARKETS), JANUARY 2002 – JULY 2011**



Source: World Food Programme, Tajikistan.  
 Note: WFP Tajikistan monitors weekly food and fuel prices in the five main markets of Tajikistan: Dushanbe, Kurgan-Tuybe, Khujand, Gharm, and Khorog. Welthungerhilfe is very grateful to WFP Tajikistan for the support received and for the permission to use this data.

## MONTHS OF FOOD SHORTAGES AT THE HOUSEHOLD LEVEL



Source: Data collected by the Tajik NGO Advisory Information Network (AIN) in collaboration with Welthungerhilfe.

Note: Multiple choice answers possible.

producing area – two questions: Does the reduced level of market integration buffer the effects of food price spikes in the region? And, do increasing food prices represent challenges or opportunities?<sup>17</sup>

Smallholder wheat farmers reported that price fluctuations are common and tend to follow a seasonal pattern: prices are usually lower during harvest time and increase during lean periods. Smaller spikes in prices were reported during festive seasons, such as Ramadan. Three-quarters of farmers stated that they had never before seen price increases similar to those experienced in spring 2011. Despite the commonality of upward and downward trends, smallholders are not necessarily well equipped to deal with such dramatic price movements as either producers or consumers of food.

As producers, most smallholders do not have the means to strategically interact with market dynamics. Some reportedly produce only for subsistence and rely on other sources for income, such as remittances, social transfer payments, irregular labor, or a combination of those sources. Farmers who do sell their produce enjoy only limited market access because of a lack of transportation, long distances, and inadequate infrastructure. Smallholders have very few potential buyers, restricting their bargaining power. Though farmers are usually well informed about market prices, half of all farmers reported that they often do not get a profitable sales price. One-third said they cannot negotiate over price at all.

Even though half of the smallholders reported having storage facilities, the vast majority said they sell their surplus produce soon after harvest to earn income, repay debts, and buy those foods they do not grow themselves (such as sugar and oil). At the time of the inter-

views, in May and June 2011, no farmer had remaining surplus stocks that could be sold for the record prices then prevailing.

Most of the farmers (83 percent) believed that commodity prices will remain high or increase further, but only a few smallholders (3.3 percent) saw this as an opportunity. By contrast, more than two-thirds disapproved of high prices. The most likely explanation for this response is that many smallholder wheat farmers are actually net consumers. Even record prices for wheat will not provide them with enough income to purchase other foods equally affected by price increases.

## HIGH PRICES DURING THE LEAN PERIOD INCREASE BURDEN ON NET-CONSUMING FARM HOUSEHOLDS.

As consumers, farmers reported that even in periods of seasonal (“normal”) price volatility, they regularly experience food shortages. For many, the hungry period starts in February and March – when stocks are depleted – and ends with the new harvest at the end of June (see figure on the left).

The 2011 food price escalation coincided with the lean period in rural Tajikistan. Poor rural households were hit particularly hard: more than half of all farmers stated that they had no more food in stock, nearly all households (94 percent) had exhausted their cash income, and more than half of all households had already acquired debts. In this situation, smallholders were forced to buy at record prices. In general, “increasing food prices” was the second most important reason given for current food insecurity at household levels (after “lack of money”).

Evidence suggests that food price increases in village shops and with mobile traders were even more pronounced than at the nearest bazaar. High fuel prices pushed up transportation costs and thus end-consumer prices in rural, often isolated, villages.

Farmers themselves identified “high transport/benzin costs” as one of the three main drivers of price increases. An almost equally high



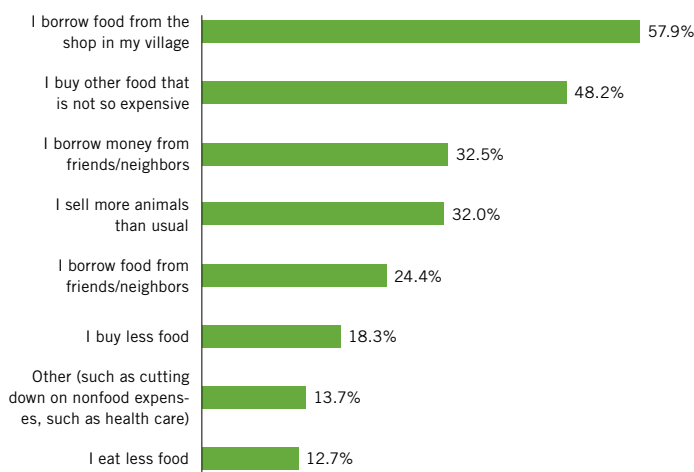
## Odinamo Amirshojeva

Dektur Village, Baljuvon, Tajikistan

“Currently, the price for a [50-kilogram] bag of wheat at the bazaar is 120 to 130 somoni [US\$26.50]; when the trader comes to our village the cost for one bag is 140 to 150 somoni [US\$30.70]. He [the trader] says it is because fuel got so expensive.”



## COPING STRATEGIES IN VIEW OF INCREASING FOOD PRICES



Source: Data collected by the Tajik NGO Advisory Information Network (AIN) in collaboration with Welthungerhilfe.

Note: Multiple choice answers possible.

number, however, assumed that “traders’ collusions and monopolies” were behind the price bubble. Respondents saw greater regulation of traders as the most effective means of stabilizing prices.

**RURAL HOUSEHOLDS SHIFT TO HARMFUL COPING STRATEGIES.** Smallholders already have strategies in place to cope with cyclic food shortages. In particular, seasonal job migration (predominantly to Russia) is common, and many households rely on remittances to support their food security. During the early 2011 food price spike however, households took further steps to tackle food shortages (see figure above).

Although delaying payment for food is not unusual, many smallholders reported that households’ debts increased as a result of higher food and fuel prices. This response is likely to further restrict their opportunities to participate in markets and reduce their resilience to future shocks. Worryingly, more than two-thirds of all farmers said that they expect the 2011 harvest to be worse than the year before (a “normal” year). In July 2011, the FAO/Ministry of Agriculture winter wheat crop assessment had not yet been released, but the 2010–11 wet season could be described as inadequate: Between September and June, the cumulative rainfall in Khatlon was 73 percent below the five-year average (FEWSNET 2011).

Other coping strategies, such as buying cheaper food, may have severe nutritional impacts, as seen in almost half of all farmers’ responses that their households had not consumed meat even once during the past week. A survey undertaken in selected districts of Khatlon and neighboring regions in March 2011 found that more than 40 percent of children were already showing signs of acute malnutrition (Walker and Lynch 2011).

**NATIONAL POLICY RESPONSES DO NOT REACH RURAL SMALLHOLDERS.** The findings of the interviews suggest that poor rural farm households will have little room to maneuver in working their way out of poverty and food insecurity. Given this picture, it will likely be difficult for most poor rural households to respond to the repeated appeal of Tajik President Emomali Rahmon to hoard basic food items for the next two years in the face of continued economic hardship (Central Asia Economy News-wire 2011).

In general, government efforts to tackle food price spikes and their impacts seem to have bypassed rural smallholders. In February 2011 the Tajik government decided to use its strategic grain reserves to temporarily reduce market grain prices by 15 percent. Ninety percent of all farmers interviewed had not heard about this initiative; only a dozen smallholders (4 percent) said they had benefited from it. The reserves were sold in major markets, and price relief could have trickled down to rural areas, but anecdotal evidence suggests that traders tend not to pass on lower urban prices to rural consumers. In April 2011 the government released 3,000 metric tons of subsidized diesel fuel to buffer the effects of spiraling input costs. According to the Ministry of Economy, however, the fuel was intended not for local food growers, but for larger farms producing cotton for export. The Tajik government announced that it would set aside funds to help poor families cope with price inflation, but in July 2011 it was not yet clear who would actually benefit from such payments.

In May 2011 some city administrations set a cap on the prices market traders charge for flour and meat. Although some traders were detained for defying the instructions, other traders simply closed their businesses, saying the artificially low prices would leave them unable to cover their expenses, let alone make any profit. Apparently this



### Malik Alimovich Zakirov

Revomurtk Village,  
Kuhistoni Mastchoh,  
Sughd Province, Tajikistan

“To curtail price spikes, it would be good if the government controlled the village shops. In the shop in our village, prices are still high even if prices at the bazaar in Khujand [closest city] have already been lower for a month. Prices in the village shop are much higher than at the bazaar. Bazaar means price control.”

policy of “subsidies without subsidies” served as a measure to influence public debate rather than addressing the reasons behind the drastic price increases.

The government’s stronger focus on the urban poor than on the rural poor may be explained by a perceived threat of destabilization stemming from metropolitan areas. On February 15, 2011, World Bank President Robert Zoellick stated that global food prices had reached “dangerous levels,” cautioning that this could negatively affect Central Asia: “[T]here is a real stress point that could have social and political implications” (Wroughton 2011).

In the medium to longer term, the recently approved Tajik food security law may redirect attention to local food producers. The law, adopted by Parliament in late December 2010, calls for reaching 80 percent self-sufficiency in food supplies. The adoption provides some indication of the government’s acknowledgment that it has only limited ability to withstand the pressure of increasing and volatile global food prices.

**WELTHUNGERHILFE’S RESPONSE: REDUCING VULNERABILITY TO GLOBAL FOOD PRICE SPIKES BY SUPPORTING SUSTAINABLE SMALLHOLDER AGRICULTURE AND FOSTERING NONFARM INCOME OPPORTUNITIES IN RURAL AREAS.** The recent food price spike in Tajikistan occurred against a background of multiple existing vulnerabilities. Economic hardship and erratic weather had already threatened smallholders’ production capacities and access to adequate food, and climate change is expected to exacerbate the challenges faced by poor food producers.

The many production constraints confronted by rural households in Tajikistan are coupled with a lack of knowledge about sustainable methods of land use and cost-effective means to increase yields. Tapping the potential of rural smallholders can reduce the vulnerabilities of poor farm households while raising the supply of food in local markets, improving incomes, and driving wider rural development.

Welthungerhilfe is working with farmers in the Khatlon and Sughd Provinces to help them increase agricultural production in ways that are sustainable and resilient to climate change, through measures such as soil protection practices, crop rotation, limited plowing, and more efficient water use. Welthungerhilfe also supports farmer associations to improve farmers’ access to inputs and foster the exchange of newly acquired knowledge. A special focus is put on low-cost approaches to allow easy replication of measures. In recent years Welthungerhilfe’s various projects in the Khatlon Province have increased agricultural productivity by up to 50 percent (depending on the measures applied, but especially through the combination of high-quality seeds and organic manure). These projects have also decreased the livelihood expenditures of the targeted rural households in the region by up to 30 percent through energy-saving measures.

But there are limitations to agriculture in Tajikistan: Only about 7 percent of Tajikistan’s land base is arable. The country already has one of the highest population density levels in the world, with an average of 0.14 hectare of arable land per person. Clearly, more diverse livelihood opportunities are needed in rural areas. To promote the creation of nonfarm income opportunities, in 2007 Welthungerhilfe began supporting the emerging tourism sector, which has considerable potential. Currently, Welthungerhilfe is engaged in revitalizing community-based systems of eco- and agrotourism in the Zerafshan Valley ([www.ztda-tourism.tj/en](http://www.ztda-tourism.tj/en)). As a first step, a network of community-based service providers was established. Today, the project mainly aims to improve service quality in tourism. These activities are part of a larger effort of Welthungerhilfe, the European Center for Eco- and Agro-Tourism, and the Aga Khan Foundation to boost tourism in Tajikistan as a whole. Ultimately, the project Strengthening Tourism Business for Sustainable Development in Tajikistan expects to generate higher revenues for inhabitants of rural and mountainous areas and to lead to the adoption of tourism practices that combine economic, social, and environmental sustainability. Some of the service providers who received start-up assistance (for example, homestay owners, guides, drivers, cooks, and porters) generated additional income of up to €1,800 (about US\$2,500) in 2010, making them less dependent on income from agriculture and less vulnerable to economic or weather-related shocks.

In view of widespread food insecurity in rural areas, the anticipated effects of climate change, and continuing high rates of popu-



**Skyrocketing food prices hit newspaper headlines in May and June 2011. To address people’s growing anger, the office of the Dushanbe mayor set a cap on the prices market traders can charge for flour and meat.**



In Tajikistan's rural areas wheat flour is usually sold in 50-kilogram bags. An average family of seven consumes approximately two bags of wheat flour in a month. Food price increases of 30 percent over six months have led to rising poverty levels. People can either buy wheat flour at the local bazaar for a slightly better price and arrange transport to their village or buy flour in the local village shop, where it is more expensive.

lation growth, it is important not only to support smallholder agriculture to achieve sustainable production gains, but also to create further nonfarm income opportunities.

### Conclusion

The vulnerability of poor urban and rural dwellers to shocks that threaten their livelihoods, health, and well-being is clear. Addressing this vulnerability and increasing the resilience of these communities requires concerted and holistic action on the part of governments with the support of nongovernmental organizations, the United Nations, and other key stakeholders. Kenya and Tajikistan face different geological and sociopolitical challenges and opportunities, but both countries confront increasingly frequent shocks, in-

cluding drought and price spikes. Chapter 5 sets out those measures necessary to address the causes and effects of food price spikes and volatility.

<sup>13</sup> The food price index accounts for 36 percent of the total consumer price index.

<sup>14</sup> Households were classified according to the Household Food Insecurity Access Scale. See Coates, Swindale, and Billinsky (2007).

<sup>15</sup> These findings are based on a random longitudinal survey of 156 households that received the cash transfer; they were measured at baseline (November 2009) and again at endline (October 2010).

<sup>16</sup> A recent study suggests that market concentration is less apparent today than it was a few years ago. It is argued that higher volatility in the markets during the past several years seems to have resulted in more traders hoping to earn a profit from wheat (Chabot and Tondel 2011).

<sup>17</sup> The interviews were conducted by the Tajik nongovernmental organization Advisory Information Network among randomly selected wheat-producing households in three districts of Khatlon Province (Baljuvon, Temurmaliq, and Vakhsh). Interviews were conducted in all villages of the selected districts proportionally to the size of the village.





“There is **no silver bullet** to resolving the potent combination of rising and volatile food prices, but food security is now a global security issue.”

Robert Zoellick, World Bank, 2011



# POLICY RECOMMENDATIONS

## Taming Price Spikes and Excessive Volatility and Building Resilience to Future Shocks

Food prices will always fluctuate in response to shifts in supply and demand, but excessive volatility in food prices greatly complicates efforts to reduce hunger among the world's poorest people and among food producers themselves. Food price spikes lead to economic difficulties for the poor, generate political turmoil in many countries, and can have severe effects on confidence in global grain markets, thereby hampering market performance in responding to fundamental changes in supply, demand, and production costs. Most important, excessive price fluctuations can harm the poor and result in long-term damage, especially among young children (for whom poor nutrition during the thousand days between conception and the child's second birthday can have irreversible consequences) and pregnant and lactating women. A global solution that prevents price spikes and excessive price volatility in food markets may be costly, but given the human cost of food price crises, it will have large positive net returns.

To address the problem of price spikes and excessive volatility and its impacts on those living in poverty, a range of actions is required of different actors and at different levels. The key drivers of food price volatility – increased biofuel production, increased speculation, and climate change – must be tackled comprehensively. Conditions that exacerbate volatility – concentrated export markets, low grain reserves, and lack of market information – must also be addressed. Last but not least, those living the reality of poverty and hunger on a daily basis must be buffered from the effects of volatility. Their resilience to future volatility must be both strengthened and sustained.

### Addressing the Drivers of Price Spikes and Food Price Volatility

**REVISE BIOFUEL POLICIES.** The recent dramatic increase in pro-biofuel policies throughout the developed and developing world poses a major challenge. Balancing the potential benefits of biofuel policies with their potential negative impacts on food and feed markets, as well as in relation to indirect land use change, will be crucial as more countries adopt and expand biofuel mandates. Two key recommendations should be moved forward. First, particularly in the United States and Europe, all distortive policies should be removed or minimized. This means that biofuel subsidies should be curtailed in order to minimize biofuels' contribution to volatility in food markets. It also means that biofuel mandates should be removed to avoid policy-driven conflicts between food and nonfood use of natural resources for agricultural commodities.<sup>18</sup> At the very least, mandate levels should be made flexible so that they are negatively correlated with observed gaps between supply and demand.<sup>19</sup> Second, the focus of policies should shift toward promoting small-scale production and use of second-generation biofuels at the community level as well as the use of by-products from existing industries to provide electricity for off-grid villages given their current lack of access.

**REGULATE FINANCIAL ACTIVITY IN FOOD MARKETS.** More transparency in futures commodity markets is needed to help clarify the degree to which the increasing involvement of financial market players (who are largely nontraditional actors in the markets for derivatives based on food commodities) is responsible for raising food price volatility. To reduce incentives for excessive speculation in food commodities three measures should be introduced: (1) improved documentation through strengthened reporting obligations for commodity exchange, index trading, and over-the-counter transactions (including information about market players, their products, and their scale), (2) increased capital deposit requirements (margins) when each futures transaction is made, to deter momentum-based speculators, and (3) stricter position and price limits (and phasing out of existing position limit waivers for index traders). The recommended measures would reduce the speed of transactions and simultaneously increase the transparency of the market. Price volatility spills over between exchanges in different regions of the world (see Hernandez, Ibarra, and Trupkin 2011), and given the high level of interactions between markets, localized regulation will have limited effects. Within the context of the G8 and G20, the governments of major agricultural trading countries must coordinate regulatory schemes across exchanges.

**ADAPT TO AND MITIGATE EXTREME WEATHER AND CLIMATE CHANGE.** Adverse weather events (drought, excessive rain, flood, windstorm, frost, hail, snow, and fire) can significantly disturb production and deplete farmers' assets. Therefore, there is a need for innovative responses to the policy problem of safeguarding smallholders against weather-related income shocks (for example, a new generation of weather insurance systems). National governments must also invest in climate change adaptation and mitigation techniques, optimizing the full potential of agriculture. To mitigate the effects of climate change, governments, particularly those in industrial countries and emerging economies, must elaborate and implement low-carbon – or better yet, zero-carbon – development strategies. Furthermore, it is imperative that an international climate agreement is reached, and additional money is allocated, to help developing countries adopt adaptation and mitigation initiatives.

### Tackling Global Market Characteristics Affecting Volatility and Price Spikes

**BALANCE GLOBAL EXPORT MARKET STRUCTURES THROUGH THE PROMOTION OF PRO-POOR AGRICULTURAL GROWTH.** It is essential to increase and diversify global productivity and production in order to raise the number of countries that export staple foods. Increased agricultural production in developing countries and regional market integration have the potential to balance global market structures. Even if current food

## Mohan Kumar Kumal

Sankhuwasabha District, Nepal



“Very few people are available to work on the farms, and most of the young people are migrating to foreign countries to search for a job. That is why agricultural labor is not sufficient and some of the farm land is going to be barren land. The result is that agricultural production is lower than before and therefore prices are rising.”

“In this year, I have taken a loan from my neighbors to purchase food like rice and dal. My wife has also started to work in my neighbor’s farm to minimize the interest rate of the loan.”

“I don’t know so much about government responses on food prices but I think that our government hasn’t got any concrete response to address the food price system.”

## Mamy Kallon

Bo District, Sierra Leone



“Prices for local products are determined by traders. Traders are strong and insist on their price. Since I can’t afford to return home with my products from the market again, I prefer to sell the products even at a lower price than expected.”

“In my opinion, government should keep the food prices low, import rice, and limit the influence of the few private licensed rice importers.”

insecurity is not primarily a matter of insufficient supplies at the global level, the poor suffer from the effects of export markets that are highly concentrated. However, production gains and food exports must not be achieved at the expense of local food security. In recent years the amount of foreign direct investment in agriculture in developing countries has increased. The social, economic, and ecological risks of such investments are substantial (see, for example, Deininger et al. 2011). Efforts to increase production must be compatible with governments’ obligation to ensure the progressive realization of the right to food, carry out national food security and development strategies, and pursue ecological sustainability. There are a number of hurdles to overcome in increasing agricultural production, including land and water constraints, underinvestment in agricultural innovation, deficient agricultural banking, extreme weather events and climate change, and declining investment in agricultural research in recent decades. Overcoming these hurdles requires research and innovation, increased yields, and guaranteed access to markets. Concern’s experience with conservation agriculture in Zimbabwe as well as Welthungerhilfe’s experience in Tajikistan shows that farm yields can double or even triple in a few years, and there are also substantial gains to be made by applying modern adapted seeds, irrigation, and fertilizers, particularly when combined with assured access to markets by farmers. Favorable weather and growing agricultural production in the coming years could overcome the acute price crisis and allow for some rebuilding of stocks. It is also possible, however, for production to increase so rapidly that it causes excessively low prices, and arrangements should be made to help stabilize food markets in this situation.

Trade is and will continue to be an essential component of any food security strategy, especially as climate change affects the number and severity of extreme weather events around the world. Consequently, it is important to avoid a new wave of restrictions on food exports and to work to reduce import barriers, trade-distorting domestic support, and all forms of export subsidies.

This problem cannot be addressed country by country, as governments have the legitimate right to care for their own citizens first. However, if trade is to work for development, it needs to give developing countries more flexibility to support agriculture, at least in the short to medium term.

**BUILD UP FOOD RESERVES.** Well-coordinated international food reserves (typically held by exporting countries) can effectively mitigate price spikes and volatility by making stocks available when supplies are tight and ensuring that small and net-importing countries can get access to food. In addition, national food reserves (typically held by importing countries) can act as an emergency mechanism to satisfy the needs of the most vulnerable through safety net programs or alternative target-

ing mechanisms that minimize market distortions. The most appropriate decisions about the levels and types of reserves will depend on the type of commodity. Such decisions and effective management of reserves also requires accurate supply information and forecasting.

**SHARE INFORMATION ON FOOD MARKETS.** Information on the current situation and outlook for global agriculture shapes expectations about future prices and allows markets to function more efficiently. A lack of reliable and up-to-date information regarding crop supply, demand, stocks, and export availability have contributed to recent price volatility. A few successful efforts, such as the Famine Early Warning Systems Network, have increased the availability of information for governments and market participants at a regional level (mainly in Africa, but also in Haiti, Afghanistan, and some Central American countries). Several observers have proposed other mechanisms for improving information in order to increase market confidence and relieve temporary disruptions in supply.<sup>20</sup> The G20 has clearly understood this need and in June 2011 agreed to launch the Agricultural Market Information System (AMIS) to encourage major players in global agrifood markets to share data, enhance existing information systems, promote greater understanding of food price developments, and advance policy dialogue and cooperation. AMIS could, if properly linked to existing global, regional, or national early warning systems for food security and vulnerability, substantially improve countries' capacity to make appropriate decisions regarding food security matters and help reduce price volatility. However, as the UN Special Representative on the Right to Food, Olivier De Shutter, has already pointed out, without the full participation of the private sector, the information will be incomplete. So far, private companies are merely urged to participate in AMIS. Support should be provided to build national and regional capacity to develop and implement transparent and publicly accessible food security monitoring and information systems.

#### Buffering the Effects of Price Spikes and Volatility: Building Resilience for the Future

**ESTABLISH NATIONAL SOCIAL PROTECTION SYSTEMS.** As long as the extreme poor face the prospect of recurrent devastating shocks with little protection, they will continue to be excluded from sustainable development and to employ corrosive coping mechanisms in times of stress: reducing food intake; removing children from school; engaging in risky livelihoods such as commercial sex work, crime, and scavenging; and sending away household members because of lack of resources. These coping strategies meet immediate needs but erode households' long-term capital and expose them further to the effects of shocks as well as to disease, violence, social exclusion, and ultimately mortality.



## Buntavi Duang Manisone

Nong District, Laos

“Prices have increased not only because of the food itself but because of the higher price of petrol. This has made transportation more expensive.”

“In the rainy season, farmers have to buy rice. This means the price remains high because demand is so high. In the capital of the province rice is cheaper. The goods don't have to be transported so far there. The dealers are basically the people who determine the prices: they buy slightly cheaper rice in towns and sell it at a higher price in the countryside. They know the people there depend on it.”

“A lot of men have to work elsewhere, for example on plantations, where they often only get work as day laborers. Sometimes, the work is dangerous if they have to spray herbicides. Women and children are left to do all the field work and everything else on their own.”

“There is generally less land available to grow food because food production competes with the big rubber and eucalyptus plantations.”



## Julio Beljou

Cap Haïtien, Haiti

“Price fluctuations have increased in the last few years. It's difficult to predict how food prices will be tomorrow or in the coming months. Sometimes I get enough money for my products, at other times it's not enough. That makes it more difficult to satisfy the needs of my family.”

Sustainable protection of the poorest against income shocks requires the development of nationally owned and institutionalized social protection systems. Today some of the world's poorest countries are providing the extreme poor with long-term, reliable, and predictable support that is proven to enhance food security, reduce the depth of poverty, and provide a buffer against future shocks. Such systems should be expanded, with resources prioritized for regions and groups with the greatest vulnerability – particularly extremely poor households that are labor constrained, including woman- and child-headed households and households that include the elderly, the chronically sick, and the disabled.

Social protection has the potential to support improvements in maternal and early childhood nutrition, especially when linked with complementary services, and such programs should be strengthened. Nongovernmental organizations and civil society organizations have an important role to play in these activities. Social protection can also go beyond protecting consumption. When social protection systems are of sufficient duration and value, and especially when they are linked to complementary services such as skills development and financial services, they can promote improved livelihoods and enable participants to invest in productive assets and in livelihood strategies with greater returns.

**IMPROVE EMERGENCY PREPAREDNESS.** National governments and international agencies must adopt policies to protect the most vulnerable populations. Emergency agencies typically respond to natural disasters and complex humanitarian emergencies, but not to slow-onset

disasters such as food price crises. This situation needs to change. The G20 has proposed studying the feasibility of a global humanitarian emergency reserve. Global, regional, and national agencies need to be fully engaged, establish triggers that will activate responses under crises, invest more in preparedness, and mobilize their capabilities to monitor and assist the most vulnerable people. Given the nature of food price crises, differentiated focus is needed on the urban and rural poor.

**INVEST IN SMALLHOLDER FARMERS AND SUSTAINABLE AND CLIMATE-ADAPTIVE AGRICULTURE.** After serious neglect in past decades, both national governments and international donors need to increase investments in agriculture. Corresponding agricultural development strategies should recognize the role that smallholders – in particular women smallholders – play in achieving national food and nutrition security and look to reduce their vulnerability to shocks and tap their potential. The United Nations estimates that 50 percent of the world's hungry people are smallholder farmers. To improve resilience, farmers need access to inputs backed by appropriate financing channels, knowledge transfer through extension services, support for crop diversification, natural resource management, and improved rural and regional market infrastructure. This infrastructure should include not only traditional hard infrastructure (such as water, sewerage, roads, electricity, and telecommunications), but also postharvest infrastructure (such as processing equipment for home and market, and storage, market, certification, and sanitation facilities) because of the key role they can play in market development and poverty reduction. In view of the ongoing overuse

## CASH VERSUS FOOD TRANSFERS

In the past five years traditional in-kind humanitarian responses to food insecurity have increasingly been replaced with cash transfers. Where these are feasible and appropriate – where markets are functioning and security risks are acceptable – cash transfers can be effective at enabling households to protect their consumption in a way that offers choice and dignity to recipients while also often increasing dietary diversity (DFID 2011). In the right setting, regular cash income provided to poor households can increase their purchasing power and re-

move the barrier to food access. If transfers are of sufficient value, they can act as a buffer against small-scale price volatility. Programs can be designed to further control for this, through such measures as linking the value of the transfer to market prices of commodities. However, in periods of severe food shortage or if food transfers include micronutrient-fortified foods not commonly available locally, food transfers may be more effective at improving household food security and dietary diversity. In some instances a mixture of cash and food may

be most appropriate; in Ethiopia's safety net program many households switched from cash to food in the face of extreme hikes in prices of staples in 2007–08. Where markets are not functioning – when food availability is the main issue and supply cannot increase to meet demand – a cash transfer risks simply inflating prices further. Market assessments are therefore critical in order to understand the drivers of food price volatility in each context and choose the most efficient and effective intervention.



of natural resources, land degradation, and the effects of climate change, the introduction of locally adapted agricultural approaches that are resilient to climate change is vital.

**FOSTER AND SUPPORT NONFARM INCOME OPPORTUNITIES IN RURAL AREAS, AND IMPROVE LIVELIHOOD OPTIONS FOR THE POOR IN URBAN AREAS.**

Support to agriculture needs to be embedded in broader rural development efforts: Farmers producing solely for subsistence without additional income opportunities will remain vulnerable to weather and economic shocks (such as high and volatile food prices). Improving resilience also involves fostering nonfarm income opportunities in rural areas and establishing the corresponding enabling environment (such as access to credit for small- and medium-sized enterprises). By contrast, most people living in urban informal settlements work in some capacity in formal and informal industries. With little or no technical training, these people are often absorbed as casual workers and paid less than the minimum wage. For them, enhancing access to training in sectors that offer employment opportunities increases their chances of increased wages.

**STRENGTHEN BASIC SERVICE PROVISION AT ALL LEVELS.** The human capital of those living in poverty – whether urban slum dwellers or rural smallholder farmers – is dangerously compromised by poor access to basic services, including healthcare, education, sanitation, and potable water. The Millennium Development Goals prescribe the minimum obligations of governments, but it is clear that in many countries and contexts these goals remain out of reach. In times of food price volatility, as coping mechanisms are stretched to the limit, it is critical that basic service provision is prioritized and strengthened. These services are not just the right of individuals, but the means of building their capacity to pursue sustainable livelihoods.

<sup>18</sup> Despite some loss of political support for biofuel subsidies and mandates in Europe and the United States, as of this writing, these policies remain in effect.

<sup>19</sup> For further details see Al-Riffai, Dimaranan, and Laborde (2010a,b), Laborde (2011), and Laborde et al. (2011).

<sup>20</sup> See, for example, Wright (2008, 2009) and Evans (2009) on an international food agency and Martins-Filho, Torero, and Yao (2010) on an early warning mechanism to identify price abnormalities.

### Data Sources and Calculation of the 1990, 1996, 2001, and 2011 Global Hunger Index Scores

All three index components are expressed in percentages and weighted equally. Higher GHI values indicate more hunger. The Index varies between a minimum of zero 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 younger than five were underweight. The minimum value of zero would mean that a country had no undernourished people in the population, no children younger than 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:

$$\text{GHI} = (\text{PUN} + \text{CUW} + \text{CM})/3$$

with **GHI:** Global Hunger Index

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

**CUW:** prevalence of underweight in children younger than five (in %)

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

#### GLOBAL HUNGER INDEX COMPONENTS, 1990 GHI, 1996 GHI, 2001 GHI, AND 2011 GHI

GHI	Number of countries with GHI	Indicators	Reference years	Data sources
1990	99	Percentage of undernourished in the population <sup>a</sup>	1990–92 <sup>b</sup>	FAO 2010; and IFPRI estimates
		Percentage of underweight in children under five	1988–92 <sup>c</sup>	WHO 2011; and IFPRI estimates
		Under-five mortality	1990	UNICEF 2011
1996	119	Percentage of undernourished in the population <sup>a</sup>	1995–97 <sup>b</sup>	FAO 2010; and IFPRI estimates
		Percentage of underweight in children under five	1994–98 <sup>d</sup>	WHO 2011; and IFPRI estimates
		Under-five mortality	1996	IGME 2010
2001	120	Percentage of undernourished in the population <sup>a</sup>	2000–02 <sup>b</sup>	FAO 2010; and IFPRI estimates
		Percentage of underweight in children under five	1999–03 <sup>e</sup>	WHO 2011; and IFPRI estimates
		Under-five mortality	2001	IGME 2010
2011	122	Percentage of undernourished in the population <sup>a</sup>	2005–07 <sup>b</sup>	FAO 2010; and IFPRI estimates
		Percentage of underweight in children under five	2004–09 <sup>f</sup>	WHO 2011; UNICEF 2010; MEASURE DHS 2011 <sup>g</sup> ; and IFPRI estimates
		Under-five mortality	2009	UNICEF 2011

<sup>a</sup> Proportion of the population with calorie deficiency.

<sup>b</sup> Average over a three-year period.

<sup>c</sup> 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 IFPRI estimates are for 1990.

<sup>d</sup> Data collected from the year closest to 1996; where data for 1994 and 1998, or 1995 and 1997, were available, an average was used. The IFPRI estimates are for 1996.

<sup>e</sup> Data collected from the year closest to 2001; where data for 1999 and 2003, or 2000 and 2002, were available, an average was used. The IFPRI estimates are for 2001.

<sup>f</sup> The latest data gathered in this period.

<sup>g</sup> WHO 2011 data are the primary data source, and UNICEF 2010 and MEASURE DHS 2011 are secondary data sources.

## DATA UNDERLYING THE CALCULATION OF THE 1990, 1996, 2001, AND 2011 GLOBAL HUNGER INDEX SCORES

Country	Proportion of undernourished in the population (%)				Prevalence of underweight in children under five years (%)				Under-five mortality rate (%)				GHI			
	90-92	95-97	00-02	05-07	88-92	94-98	99-03	04-09	1990	1996	2001	2009	1990 (with data from 88-92)	1996 (with data from 94-98)	2001 (with data from 99-03)	2011 (with data from 04-09)
Afghanistan	-	-	-	-	-	44.9	33.8 *	32.8	25.0	23.3	21.9	19.9	-	-	-	-
Albania	11 *	5 *	5 *	4 *	10.5 *	7.1	17.0	5.2	5.1	3.5	2.6	1.5	8.9	5.2	8.2	<5
Algeria	4 *	5	5	4 *	9.2	11.3	8.3	3.0	6.1	5.4	4.4	3.2	6.4	7.2	5.9	<5
Angola	67	61	52	41	36.1 *	37.0	27.5	15.5	25.8	24.1	20.6	16.1	43.0	40.7	33.4	24.2
Argentina	1 *	1 *	1 *	2 *	3.5 *	4.7	2.3 *	2.3	2.8	2.5	2.0	1.4	<5	<5	<5	<5
Armenia	-	36	28	22	5.2 *	2.7	2.6	4.2	5.6	4.6	3.4	2.2	-	14.4	11.3	9.5
Azerbaijan	-	27	11	3 *	11.6 *	8.8	5.9	8.4	9.8	9.3	6.4	3.4	-	15.0	7.8	<5
Bahrain	-	-	-	-	6.3	7.6	6.3 *	5.5 *	1.6	1.3	1.3	1.2	-	-	-	-
Bangladesh	38	41	29	27	61.5	56.7	45.4	41.3	14.8	11.3	8.4	5.2	38.1	36.3	27.6	24.5
Belarus	-	1 *	2 *	2 *	3.1 *	1.7 *	1.5 *	1.3	2.4	2.1	1.7	1.2	-	<5	<5	<5
Benin	20	18	15	12	26.0 *	26.8	21.5	20.2	18.4	15.8	14.1	11.8	21.5	20.2	16.9	14.7
Bhutan	-	-	-	-	34.0	25.0 *	14.1	12.0	14.8	12.1	10.3	7.9	-	-	-	-
Bolivia	29	24	22	27	9.7	9.3	7.4 *	4.5	12.2	10.5	8.1	5.1	17.0	14.6	12.5	12.2
Bosnia & Herzegovina	-	4 *	4 *	2 *	4.7 *	4.2 *	4.2	1.6	2.3	2.0	1.7	1.4	-	<5	<5	<5
Botswana	19	23	27	25	15.3 *	15.1	10.7	8.9 *	6.0	8.3	9.9	5.7	13.4	15.5	15.9	13.2
Brazil	11	10	9	6	6.1 *	4.5	3.7	2.2	5.6	4.2	3.2	2.1	7.6	6.2	5.3	<5
Bulgaria	4 *	9 *	9 *	10 *	2.6 *	2.8 *	2.5 *	2.2	1.8	1.9	1.7	1.0	<5	<5	<5	<5
Burkina Faso	14	12	12	9	36.9 *	35.8 *	34.5	26.0	20.1	19.8	18.5	16.6	23.7	22.5	21.7	17.2
Burundi	44	56	59	62	31.2 *	34.5 *	38.9	35.0	18.9	18.3	17.6	16.6	31.4	36.3	38.5	37.9
Cambodia	38	40	29	22	45.4 *	42.6	39.5	28.8	11.7	11.6	10.4	8.8	31.7	31.4	26.3	19.9
Cameroon	33	34	26	21	18.0	17.8	16.5 *	16.6	14.8	15.4	15.6	15.4	21.9	22.4	19.4	17.7
Central African Rep.	44	47	43	40	21.3 *	20.4	21.8	24.0	17.5	18.4	18.3	17.1	27.6	28.6	27.7	27.0
Chad	60	53	43	37	37.4 *	34.3	29.4	33.9	20.1	20.2	20.6	20.9	39.2	35.8	31.0	30.6
Chile	7	4 *	3 *	2 *	1.0 *	0.7	0.7	0.5	2.2	1.5	1.1	0.9	<5	<5	<5	<5
China	18	12	10	10	12.6	10.7	7.1	4.5	4.6	4.5	3.4	1.9	11.7	9.1	6.8	5.5
Colombia	15	11	10	10	8.8	6.3	4.9	5.1	3.5	3.0	2.5	1.9	9.1	6.8	5.8	5.7
Comoros	38	47	54	46	16.2	22.3	25.0	22.1	12.8	11.9	11.3	10.4	22.3	27.1	30.1	26.2
Congo, Dem. Rep.	26	55	70	69	26.1 *	30.7	33.6	28.2	19.9	19.9	19.9	19.9	24.0	35.2	41.2	39.0
Congo, Rep.	42	41	20	15	17.3 *	20.4 *	16.3 *	11.8	10.4	11.1	11.7	12.8	23.2	24.2	16.0	13.2
Costa Rica	3 *	4 *	4 *	4 *	2.5	1.9	1.4 *	0.9 *	1.8	1.4	1.3	1.1	<5	<5	<5	<5
Côte d'Ivoire	15	17	17	14	19.5 *	20.9	18.2	28.2	15.2	15.0	13.9	11.9	16.6	17.6	16.4	18.0
Croatia	-	13 *	9 *	3 *	0.6 *	0.5	0.4 *	0.2 *	1.3	1.0	0.8	0.5	-	<5	<5	<5
Cuba	6	14	2 *	1 *	3.6 *	4.6 *	3.4	3.5	1.4	1.0	0.8	0.6	<5	6.5	<5	<5
Djibouti	60	50	40	28	20.2	16.0	25.4	30.1	12.3	11.3	10.5	9.4	30.8	25.8	25.3	22.5
Dominican Republic	28	26	25	24	8.4	4.7	3.9	3.4	6.2	4.3	3.9	3.2	14.2	11.7	10.9	10.2
Ecuador	23	16	17	15	12.4 *	12.5	6.7 *	6.2	5.3	4.0	3.3	2.4	13.6	10.8	9.0	7.9
Egypt, Arab Rep.	4 *	3 *	3 *	4 *	10.5	10.8	4.3	6.8	9.0	6.1	4.3	2.1	7.8	6.6	<5	<5
El Salvador	13	12	7	9	11.1	10.3	6.1	5.8	6.2	4.6	3.1	1.7	10.1	9.0	5.4	5.5
Eritrea	-	64	70	64	-	38.3	34.5	32.1 *	15.0	10.9	8.4	5.5	-	37.7	37.6	33.9
Estonia	-	5 *	5 *	4 *	2.4 *	1.0 *	0.7 *	0.6 *	1.7	1.5	1.0	0.6	-	<5	<5	<5
Ethiopia	69	62	48	41	39.6 *	38.1 *	42.0	34.6	21.0	17.3	14.2	10.4	43.2	39.1	34.7	28.7
Fiji	8	5	3 *	2 *	8.0 *	6.0 *	5.1 *	4.0 *	2.2	1.9	1.8	1.8	6.1	<5	<5	<5
Gabon	6	5 *	5 *	4 *	10.0 *	6.7 *	8.8	4.8 *	9.3	8.7	8.2	6.9	8.4	6.8	7.3	5.2
Gambia, The	14	23	21	19	18.2 *	23.2	15.4	15.8	15.3	14.6	12.8	10.3	15.8	20.3	16.4	15.0
Georgia	-	19	12	4 *	2.7 *	3.7 *	2.7	2.3	4.7	3.9	3.4	2.9	-	8.9	6.0	<5
Ghana	27	12	9	5	24.1	25.1	19.6	14.3	12.0	11.1	10.3	6.9	21.0	16.1	13.0	8.7
Guatemala	15	20	22	21	22.8 *	21.7	18.7	16.9 *	7.6	5.6	4.7	4.0	15.1	15.8	15.1	14.0
Guinea	20	19	20	17	24.0 *	21.2	29.1	20.8	23.1	20.6	18.0	14.2	22.4	20.3	22.4	17.3
Guinea-Bissau	22	26	25	22	19.0 *	17.7 *	21.9	17.2	24.0	23.1	21.5	19.3	21.7	22.3	22.8	19.5
Guyana	20	11	7	7	17.2 *	10.3	11.9	10.8	6.1	5.3	4.4	3.5	14.4	8.9	7.8	7.1
Haiti	63	60	53	57	23.7	24.0	13.9	18.9	15.2	12.8	11.0	8.7	34.0	32.3	26.0	28.2
Honduras	19	16	14	12	15.8	19.2	12.5	8.6	5.5	4.4	3.9	3.0	13.4	13.2	10.1	7.9
India	20	17	19	21	59.5	41.1	44.4	43.5	11.8	10.6	8.9	6.6	30.4	22.9	24.1	23.7
Indonesia	16	11	15	13	31.0	28.9	22.5	19.6	8.6	6.5	5.4	3.9	18.5	15.5	14.3	12.2
Iran, Islamic Rep.	3 *	3 *	4 *	4 *	17.9 *	13.8	6.6 *	4.4	7.3	5.8	4.5	3.1	9.4	7.5	5.0	<5
Iraq	-	-	-	-	10.4	-	12.9	7.1	5.3	4.8	4.7	4.4	-	-	-	-
Jamaica	11	6	5	5	5.2	5.6	4.1	2.2	3.3	3.3	3.2	3.1	6.5	5.0	<5	<5
Jordan	3 *	5	5	3 *	4.8	3.8	3.6	1.9	3.9	3.2	2.9	2.5	<5	<5	<5	<5
Kazakhstan	-	1 *	8	1 *	6.1 *	6.7	3.8	4.9	6.0	5.4	4.2	2.9	-	<5	5.3	<5
Kenya	33	31	32	31	18.8 *	18.7	17.5	16.4	9.9	11.2	10.2	8.4	20.6	20.3	19.9	18.6
Kuwait	20	5	6	5	6.1 *	5.4	2.2	1.7	1.7	1.4	1.2	1.0	9.3	<5	<5	<5
Kyrgyz Republic	-	13	17	10	5.3 *	8.2	4.2 *	2.7	7.5	6.0	4.9	3.7	-	9.1	8.7	5.5
Lao PDR	31	29	26	23	40.3 *	35.9	36.4	31.6	15.7	10.6	8.3	5.9	29.0	25.2	23.6	20.2
Latvia	-	3 *	4 *	3 *	2.3 *	0.9 *	0.8 *	0.6 *	1.6	1.9	1.3	0.8	-	<5	<5	<5
Lebanon	3 *	3 *	3 *	2 *	6.2 *	3.5	3.9 *	4.2	4.0	3.2	2.2	1.2	<5	<5	<5	<5

Note: \* indicates IFPRI estimates.



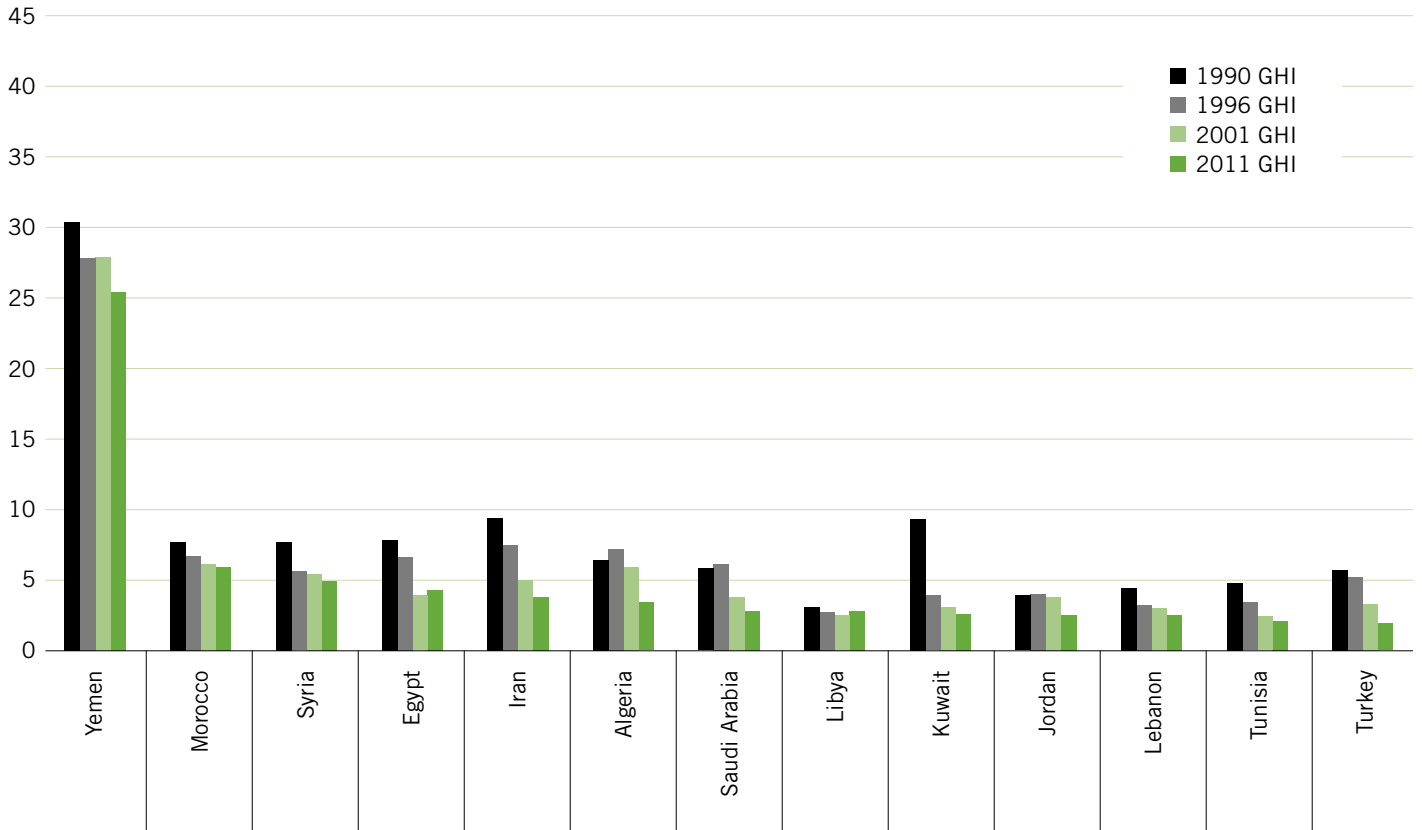
## DATA UNDERLYING THE CALCULATION OF THE 1990, 1996, 2001, AND 2011 GLOBAL HUNGER INDEX SCORES

Country	Proportion of undernourished in the population (%)				Prevalence of underweight in children under five years (%)				Under-five mortality rate (%)				GHI			
	90-92	95-97	00-02	05-07	88-92	94-98	99-03	04-09	1990	1996	2001	2009	1990 (with data from 88-92)	1996 (with data from 94-98)	2001 (with data from 99-03)	2011 (with data from 04-09)
Lesotho	15	16	14	14	13.8	15.0 *	15.0	13.2	9.3	10.7	12.3	8.4	12.7	13.9	13.8	11.9
Liberia	30	32	36	33	15.8 *	23.3 *	22.8	20.4	24.7	25.5	18.6	11.2	23.5	26.9	25.8	21.5
Libya	1 *	1 *	1 *	1 *	4.8 *	4.3	4.2 *	5.6	3.6	2.9	2.4	1.9	<5	<5	<5	<5
Lithuania	-	2 *	1 *	1 *	2.6 *	1.1 *	0.8 *	0.5 *	1.5	1.4	1.0	0.6	-	<5	<5	<5
Macedonia, FYR	-	9 *	6 *	3 *	3.1 *	2.7 *	1.9	2.0	3.6	2.4	1.8	1.1	-	<5	<5	<5
Madagascar	21	26	28	25	35.5	35.5	37.0 *	36.8	16.7	12.8	9.4	5.8	24.4	24.8	24.8	22.5
Malawi	43	36	30	28	24.4	26.5	21.5	15.5	21.8	18.9	15.8	11.0	29.7	27.1	22.4	18.2
Malaysia	3 *	1 *	2 *	2 *	22.1	17.7	16.7	7.0	1.8	1.3	1.0	0.6	9.0	6.7	6.6	<5
Mali	27	25	18	12	31.7 *	31.0	30.1	27.9	25.0	23.0	21.4	19.1	27.9	26.3	23.2	19.7
Mauritania	12	9	8	7	43.3	29.1 *	30.4	19.4	12.9	12.5	12.2	11.7	22.7	16.9	16.9	12.7
Mauritius	7	7	5	5	14.7 *	13.0	11.2 *	9.6 *	2.4	2.1	1.8	1.7	8.0	7.4	6.0	5.4
Mexico	5 *	5 *	4 *	4 *	13.9	5.9 *	6.0	3.4	4.5	3.4	2.5	1.7	7.8	<5	<5	<5
Moldova	-	10 *	9 *	5 *	4.6 *	4.8 *	4.4 *	3.2	3.7	2.9	2.3	1.7	-	5.9	5.2	<5
Mongolia	28	33	27	26	10.8	12.1 *	11.6	5.3	10.1	7.9	5.8	2.9	16.3	17.7	14.8	11.4
Montenegro	-	-	-	7 *	-	-	-	2.2	1.7	1.5	1.3	0.9	-	-	-	<5
Morocco	6	6	6	4 *	8.1	7.7	7.1 *	9.9	8.9	6.5	5.3	3.8	7.7	6.7	6.1	5.9
Mozambique	59	48	46	38	24.8 *	26.0	21.2	15.8	23.2	20.2	17.9	14.2	35.7	31.4	28.4	22.7
Myanmar	47	35	29	16	28.8	31.9	30.1	25.9 *	11.8	9.3	8.3	7.1	29.2	25.4	22.5	16.3
Namibia	32	30	21	19	21.5	19.1 *	20.3	17.5	7.3	7.1	7.7	4.8	20.3	18.7	16.3	13.8
Nepal	21	20	18	16	46.0 *	42.9	43.0	38.8	14.2	11.0	8.0	4.8	27.1	24.6	23.0	19.9
Nicaragua	50	38	25	19	10.9 *	10.2	7.8	6.0	6.8	5.2	4.0	2.6	22.6	17.8	12.3	9.2
Niger	37	37	27	20	41.0	45.0	43.6	32.9	30.5	26.5	21.8	16.0	36.2	36.2	30.8	23.0
Nigeria	16	10	9	6	35.1	32.4 *	27.3	26.7	21.2	21.1	18.3	13.8	24.1	21.2	18.2	15.5
North Korea	21	30	34	33	22.9 *	23.1 *	21.3	20.6	4.5	7.8	4.9	3.3	16.1	20.3	20.1	19.0
Oman	-	-	-	-	21.4	10.0	11.3	8.6	4.8	3.0	2.1	1.2	-	-	-	-
Pakistan	25	20	24	26	39.0	34.2	31.3	27.5 *	13.0	11.8	10.5	8.7	25.7	22.0	21.9	20.7
Panama	18	20	19	15	8.4 *	6.3	5.5 *	3.8 *	3.1	2.8	2.6	2.3	9.8	9.7	9.0	7.0
Papua New Guinea	-	-	-	-	18.3 *	17.5 *	18.2 *	18.0	9.1	8.1	7.6	6.8	-	-	-	-
Paraguay	16	10	10	11	2.8	3.1 *	2.6 *	3.0	4.2	3.4	2.9	2.3	7.7	5.5	5.2	5.4
Peru	27	21	18	15	8.8	5.7	5.2	0.6	7.8	5.7	3.7	2.1	14.5	10.8	9.0	5.9
Philippines	24	20	18	15	29.9	28.3	20.7	16.3 *	5.9	4.3	3.7	3.3	19.9	17.5	14.1	11.5
Qatar	-	-	-	-	-	4.8	-	-	1.9	1.6	1.4	1.1	-	-	-	-
Romania	2 *	2 *	1 *	0 *	5.0	5.0 *	3.8	2.5 *	3.2	2.6	2.2	1.2	<5	<5	<5	<5
Russian Federation	-	4 *	3 *	1 *	2.3 *	1.0 *	0.8 *	0.5 *	2.7	2.7	2.3	1.2	-	<5	<5	<5
Rwanda	44	53	38	34	24.3	24.2	20.3	18.0	17.1	20.9	17.2	11.1	28.5	32.7	25.2	21.0
Saudi Arabia	2 *	2 *	1 *	1 *	11.2 *	13.5	8.2 *	5.3	4.3	2.9	2.3	2.1	5.8	6.1	<5	<5
Senegal	22	26	26	17	19.0	19.6	20.3	14.5	15.1	13.4	11.6	9.3	18.7	19.7	19.3	13.6
Serbia	-	-	-	7 *	-	-	-	1.8	2.9	1.8	1.2	0.7	-	-	-	<5
Sierra Leone	45	39	43	35	25.4	25.3 *	24.7	21.3	28.5	27.3	24.3	19.2	33.0	30.5	30.7	25.2
Slovak Republic	-	3 *	5 *	4 *	3.8 *	1.3 *	1.1 *	0.8 *	1.5	1.1	0.9	0.7	-	<5	<5	<5
Somalia	-	-	-	-	-	-	22.8	32.8	18.0	18.0	18.0	18.0	-	-	-	-
South Africa	5 *	5 *	4 *	4 *	9.8 *	8.0	10.1	8.9 *	6.2	6.5	8.0	6.2	7.0	6.5	7.4	6.4
Sri Lanka	28	25	20	19	29.9 *	26.1 *	22.8	21.6	2.8	2.4	2.0	1.5	20.2	17.8	14.9	14.0
Sudan	39	29	28	22	36.1 *	33.3 *	38.4	31.7	12.4	11.8	11.4	10.8	29.2	24.7	25.9	21.5
Suriname	14	13	15	14	12.0 *	10.8 *	11.4	7.5	5.1	4.5	3.7	2.6	10.4	9.4	10.0	8.0
Swaziland	12	21	18	18	6.0 *	6.4 *	9.1	6.1	9.2	9.4	10.7	7.3	9.1	12.3	12.6	10.5
Syrian Arab Republic	4 *	3 *	3 *	3 *	15.5 *	11.3	11.1	10.0	3.6	2.6	2.1	1.6	7.7	5.6	5.4	<5
Tajikistan	-	42	46	30	14.4 *	20.1 *	18.6 *	15.0	11.7	11.2	9.0	6.1	-	24.4	24.5	17.0
Tanzania	28	40	39	34	25.1	26.9	25.3	16.7	16.2	15.2	13.6	10.8	23.1	27.4	26.0	20.5
Thailand	26	18	18	16	16.1 *	15.4	8.5 *	7.0	3.2	2.4	1.9	1.4	15.1	11.9	9.5	8.1
Timor-Leste	39	32	28	31	-	-	40.6	44.7	18.4	14.4	9.7	5.6	-	-	26.1	27.1
Togo	43	36	36	30	21.7	16.7	22.8 *	20.5	15.0	13.8	12.1	9.8	26.6	22.2	23.6	20.1
Trinidad & Tobago	11	14	11	11	6.2 *	5.0 *	4.4	2.2 *	3.4	3.4	3.5	3.5	6.9	7.5	6.3	5.6
Tunisia	1 *	1 *	1 *	1 *	8.5	5.7	3.5	3.3	5.0	3.4	2.6	2.1	<5	<5	<5	<5
Turkey	1 *	1 *	1 *	1 *	7.6 *	9.0	5.2 *	2.6	8.4	5.7	3.8	2.0	5.7	5.2	<5	<5
Turkmenistan	-	9	9	6	10.5 *	12.9 *	10.5	8.0	9.9	8.5	6.8	4.5	-	10.1	8.8	6.2
Uganda	19	23	19	21	19.7	21.5	19.0	16.4	18.4	16.8	15.1	12.8	19.0	20.4	17.7	16.7
Ukraine	-	4 *	2 *	1 *	2.2 *	2.3 *	2.5	0.6 *	2.1	2.1	1.9	1.5	-	<5	<5	<5
Uruguay	5	4 *	3 *	3 *	7.2 *	5.6 *	5.4	6.0	2.4	2.1	1.8	1.3	<5	<5	<5	<5
Uzbekistan	-	5	19	11	9.9 *	15.3	7.1	4.4	7.4	7.0	5.9	3.6	-	9.1	10.7	6.3
Venezuela, RB	10	14	13	8	6.7	4.4	3.9	3.7	3.2	2.6	2.3	1.8	6.6	7.0	6.4	<5
Vietnam	31	22	17	11	40.7	38.2	26.7	20.2	5.5	4.0	2.9	2.4	25.7	21.4	15.5	11.2
Yemen, Rep.	30	31	31	31	48.6 *	40.9	43.1	38.6 *	12.5	11.6	9.6	6.6	30.4	27.8	27.9	25.4
Zambia	35	38	43	43	21.2	19.6	23.3	14.9	17.9	17.4	16.4	14.1	24.7	25.0	27.6	24.0
Zimbabwe	40	44	41	30	8.0	11.7	11.5	14.0	8.1	11.1	11.4	9.0	18.7	22.3	21.3	17.7

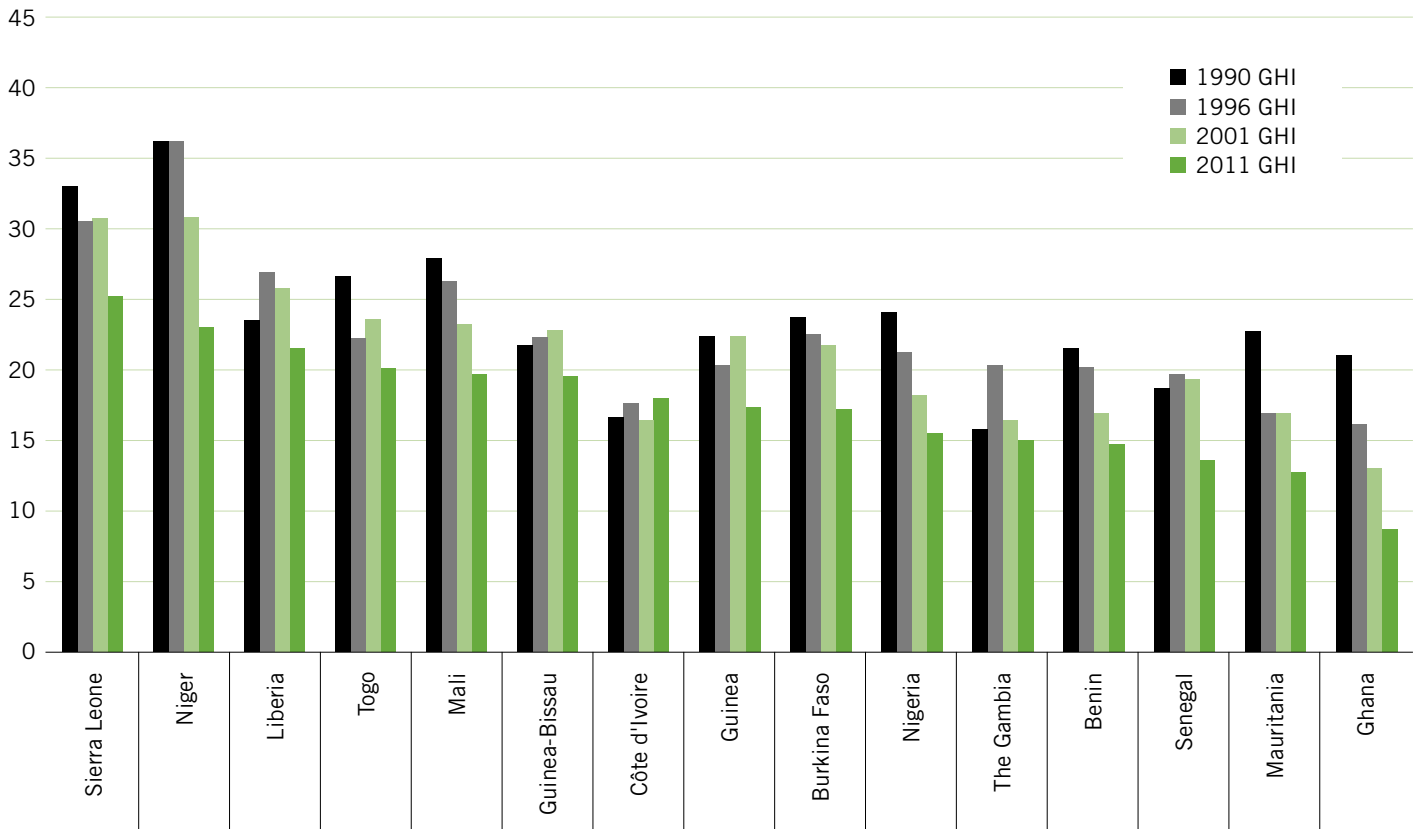
Note: \* indicates IFPRI estimates.

COUNTRY TRENDS FOR THE 1990, 1996, 2001, AND 2011 GLOBAL HUNGER INDEX SCORES

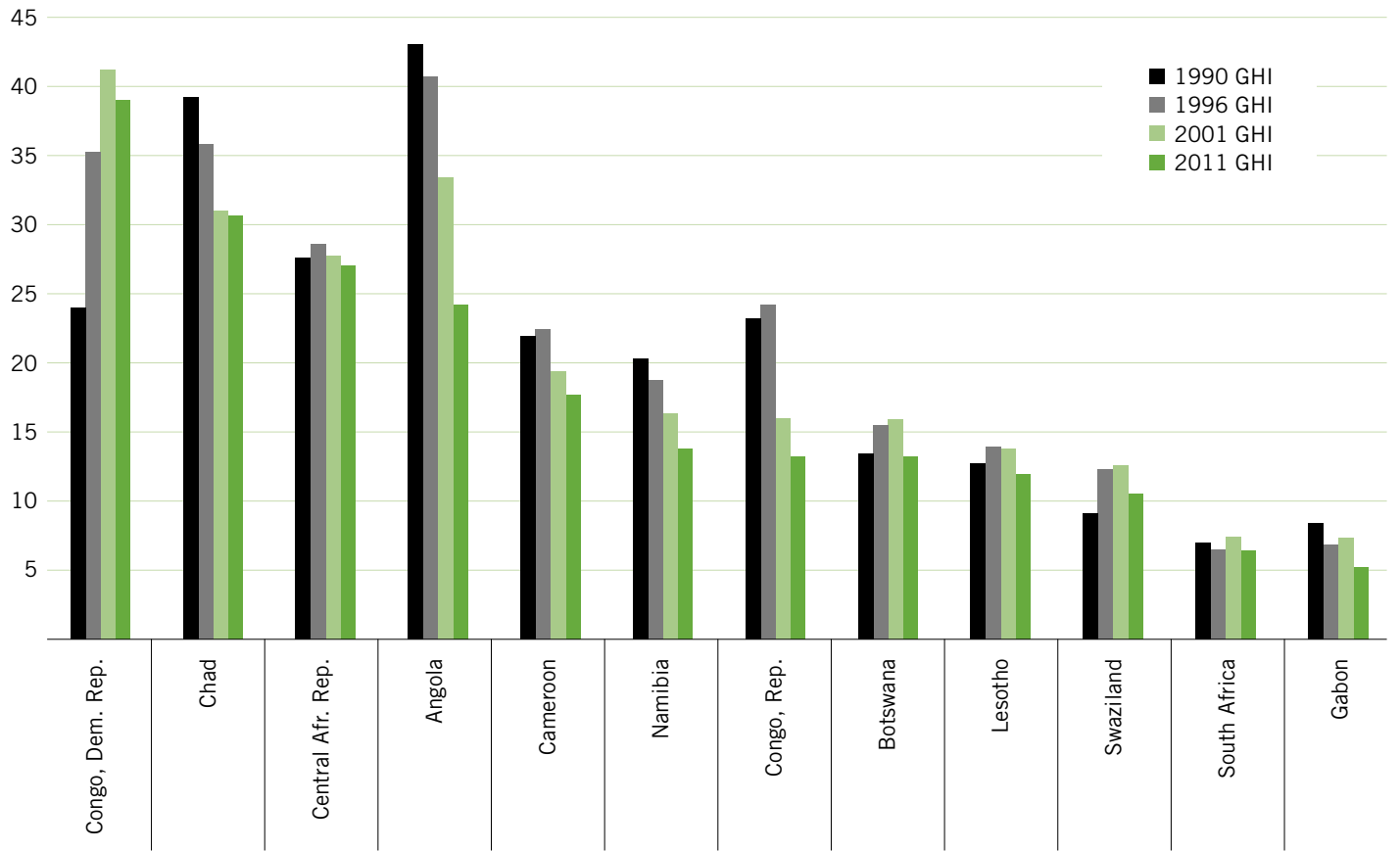
NEAR EAST AND NORTH AFRICA



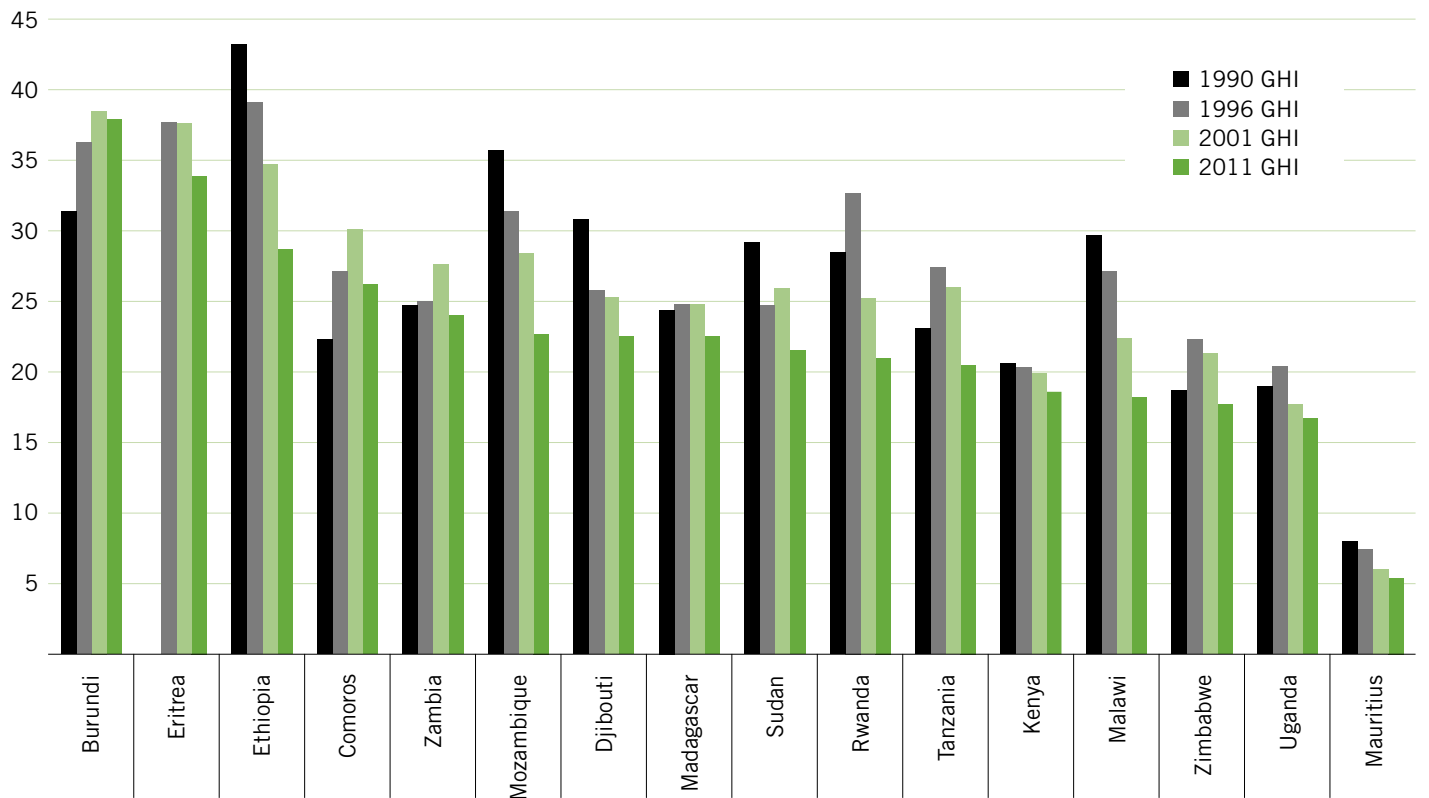
WEST AFRICA



**CENTRAL AND SOUTHERN AFRICA**

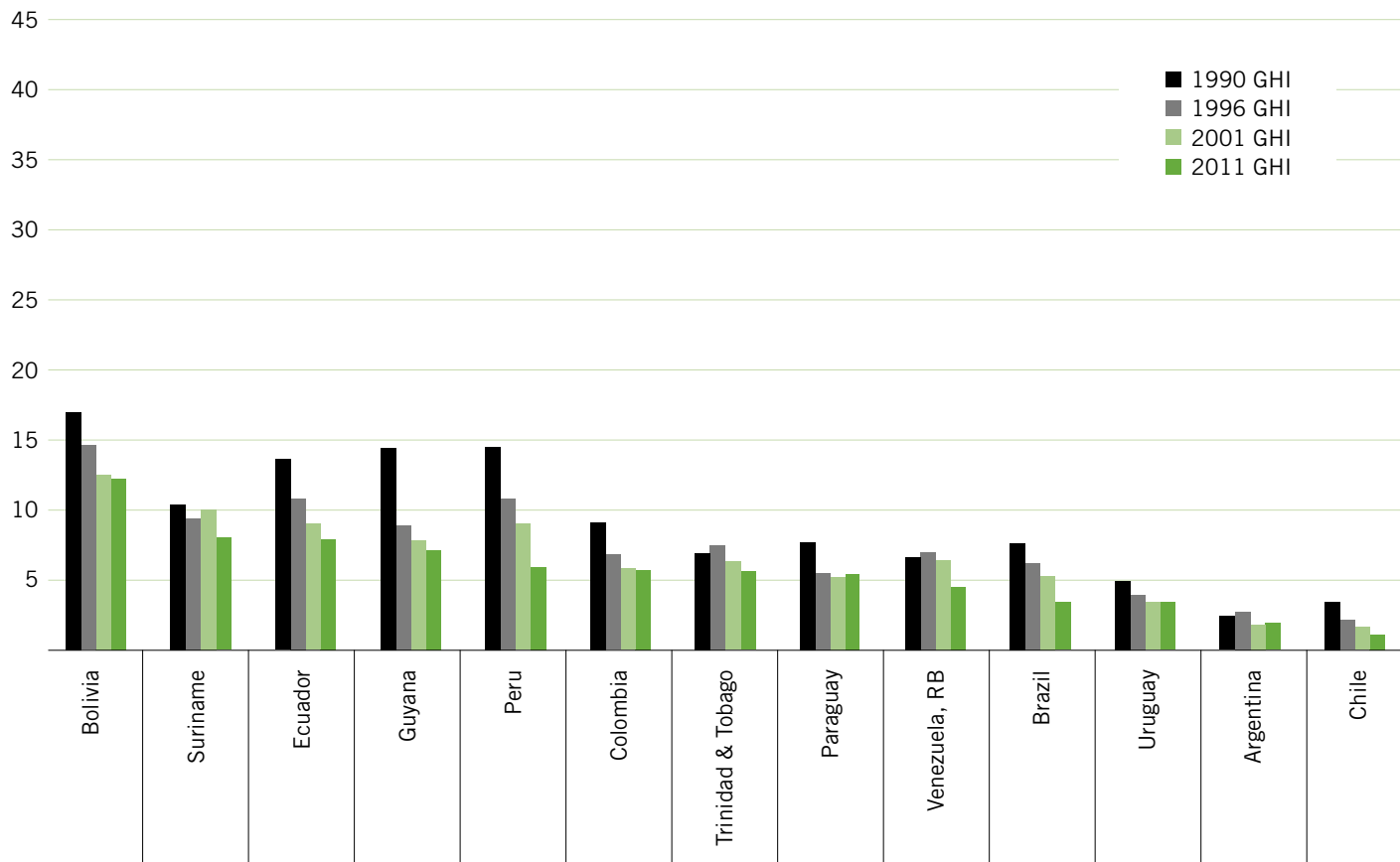


**EAST AFRICA**

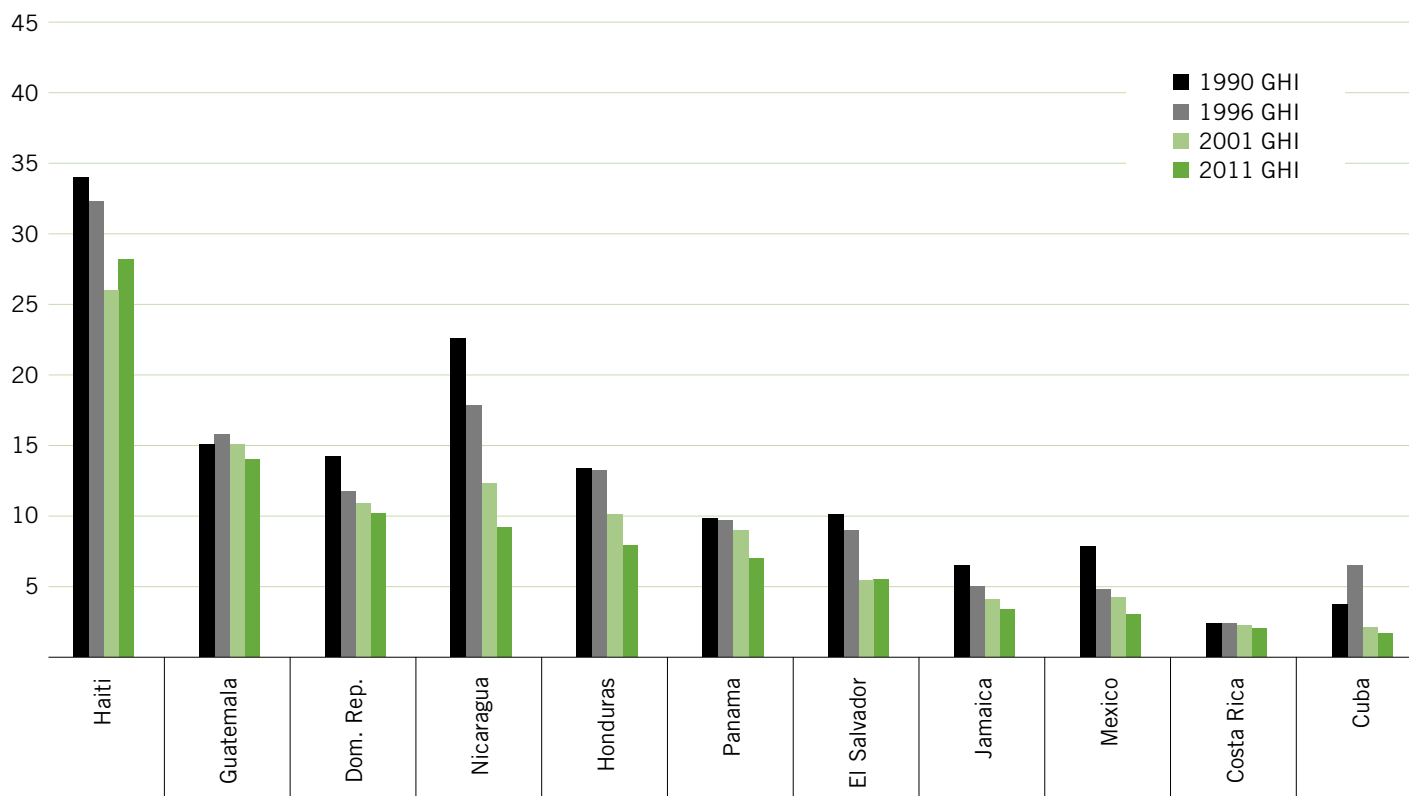




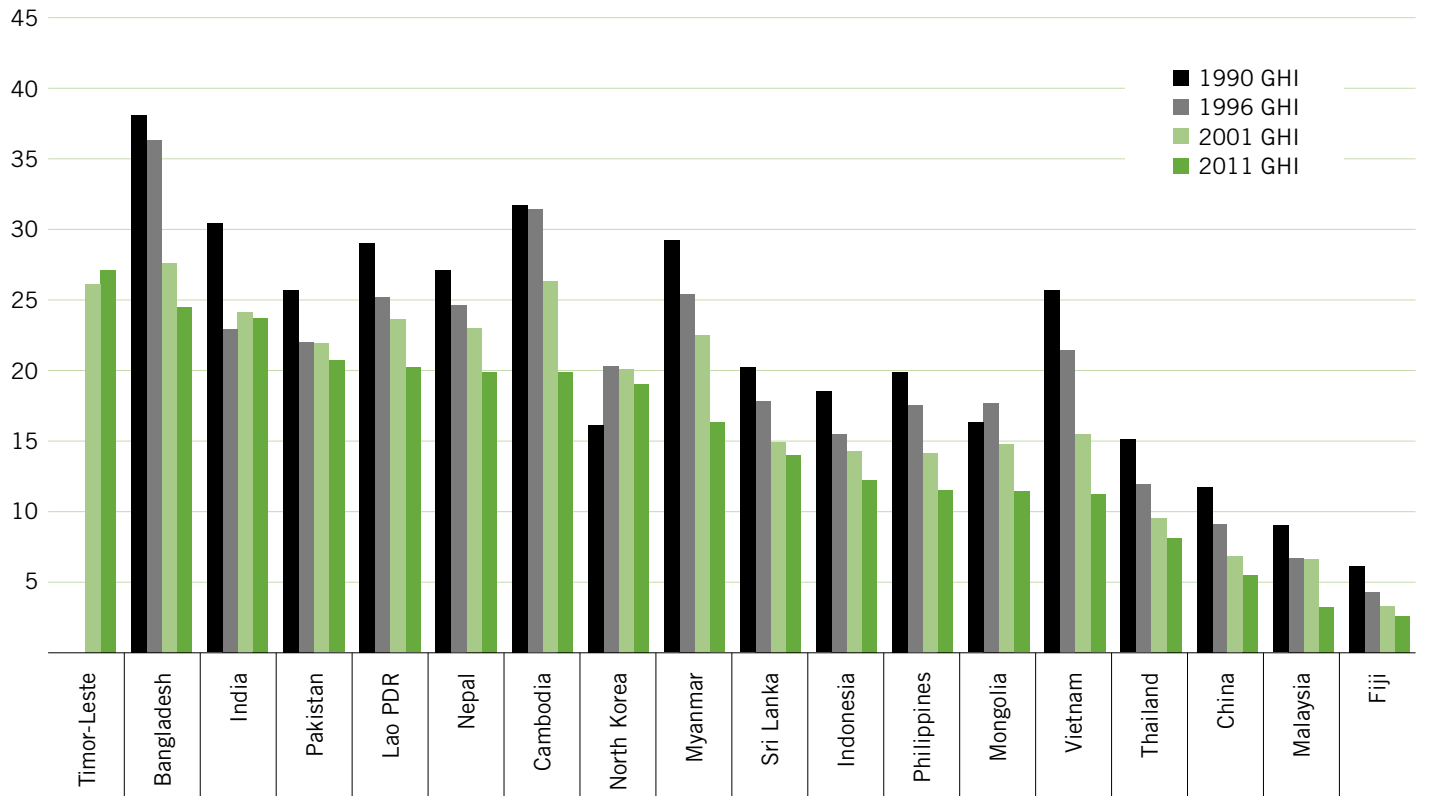
**SOUTH AMERICA**



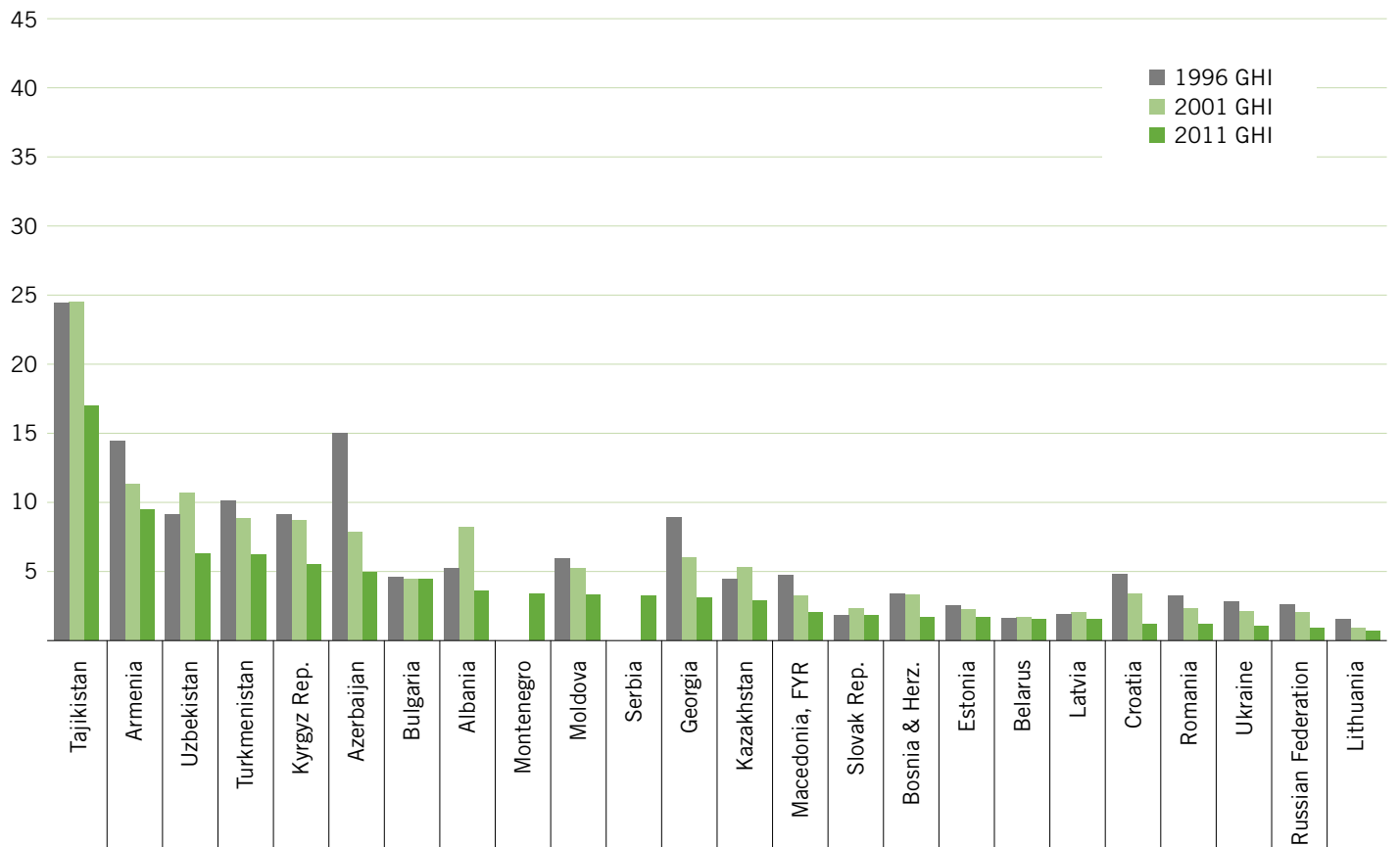
**CENTRAL AMERICA AND CARIBBEAN**



**SOUTH, EAST, AND SOUTHEAST ASIA**



**EASTERN EUROPE AND COMMONWEALTH OF INDEPENDENT STATES**



## Technical Notes on the Measurement of Excessive Food Price Volatility

### Technical Definitions

**RETURN:** Let  $P_t$  be the price of an agricultural commodity in time period  $t$  ( $t$  can represent days, months, or other time periods.) The return in time period  $t$  is defined as  $R_t = \frac{P_t - P_{t-1}}{P_{t-1}}$ .

**VOLATILITY:** Volatility is a measure of price variation from period  $t - 1$  to time period  $t$ . If there is a large price variation from period  $t - 1$  to  $t$ , then  $R_t$  is large (without regard to whether it is positive or negative), and returns or volatility can be classified as large. Hence, extreme values for returns reflect extreme price variation (volatility) and vice versa. Clearly, if there is no price variation over time (volatility), then  $P_t - P_{t-1} = 0$  and  $R_t = 0$ . Note that a period of sustained price increases (or decreases) may be characterized by low or high volatility.

**QUANTILE:** The quantile is the specific value of a variable that divides the distribution into two parts: those values greater than the quantile value and those values that are less. For instance,  $p$  percent of the values are less than the  $p$ th quantile. A higher-order quantile is, for example, the 95 or 99 percent quantile – that is, a value of return that has a low probability (5 percent or 1 percent) of being exceeded.

**LARGE OR ABNORMAL RETURN:** A large observed return is defined to be a return that exceeds a certain preestablished threshold. This threshold is normally taken to be a high order (95 or 99 percent) quantile – that is, a value of return that is exceeded with low probability (5 or 1 percent).

**A TIME PERIOD OF EXCESSIVE VOLATILITY:** A period of time characterized by extreme price variation (volatility) is one in which there are a large number of large daily returns within a window of 60 consecutive days.

### About the Price Volatility Figures in Chapter 3

The figures on pages 23 (top) and 29 show the results of a model of the dynamic evolution of daily returns based on historical data going back to 1954. (Details of the model – known as the Nonparametric Extreme Quantile [NEXQ] Model – can be found at [www.foodsecurityportal.org/excessive-food-price-variability-early-warning-system-launched](http://www.foodsecurityportal.org/excessive-food-price-variability-early-warning-system-launched) and in Martins-Filho, Torero, and Yao 2010). This model is then combined with extreme value theory to estimate higher-order quantiles of the return series, allowing for classification of any particular realized return (that is, effective return in the futures market) as extremely high or not. In the figure on page 23, any realized return (green line) that exceeds the 95 percent quantile (the higher-order return estimated by the model, shown by the orange line) is classified as a large or abnormal return. The probability of such a return occurring, relative to what can be forecast based on historical data since 1954, is extremely low (the probability is just 5 percent).

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## About IFPRI

The International Food Policy Research Institute ([www.ifpri.org](http://www.ifpri.org)) seeks sustainable solutions for reducing poverty and ending hunger and malnutrition. IFPRI's

mission is to provide policy solutions that ensure all people in developing countries, particularly the poorest people and other marginalized groups, have access to sufficient, safe, nutritious food at all times. It carries out this mission by conducting agricultural research, communicating results to policymakers and stakeholders worldwide, and building capacity within developing countries.

IFPRI was established in 1975 as one of 15 centers supported by the Consultative Group on International Agricultural Research (CGIAR), an alliance of governments, private foundations, and international and regional organizations engaged in research for sustainable development. To contribute to a world free of poverty, hunger, and malnutrition, IFPRI conducts research on a wide range of topics, including agricultural productivity, global trade and local markets, maternal and early childhood nutrition, climate change, and individual country development strategies, among others. Based in Washington, DC, IFPRI has 12 offices worldwide including regional offices in Ethiopia, India, and Senegal.



## Our identity – who we are

Concern Worldwide is Ireland's largest non-governmental organisation, dedicated to the reduction of suffering and working towards

the ultimate elimination of extreme poverty. We work in 25 of the world's poorest countries and have over 3,100 committed and talented staff.

## Our mission – what we do

Our mission is to help people living in extreme poverty achieve major improvements in their lives which last and spread without ongoing support from Concern Worldwide. To this end, Concern Worldwide will work with the poor themselves, and with local and international partners who share our vision, to create just and peaceful societies where the poor can exercise their fundamental rights. To achieve this mission we engage in long-term development work, respond to emergency situations, and seek to address the root causes of poverty through our development education and advocacy work.

## Our vision – for change

A world where no-one lives in poverty, fear or oppression; where all have access to a decent standard of living and the opportunities and choices essential to a long, healthy and creative life; a world where everyone is treated with dignity and respect.



**Our vision: all the people of this world leading their lives autonomously in dignity and justice – free from hunger and poverty.**

## Who we are

Welthungerhilfe was formed in 1962 as part of a ground-breaking global campaign – the “Freedom from Hunger Campaign”. Established under the umbrella of the UN Food and Agriculture Organisation (FAO), we are now one of Germany's largest private aid agencies. We are an independent organisation and firmly rooted in German society through our member organisations, donors and supporters. We stand for courage, a passion for life and humanity as part of our mission.

## What we want

We promote food security for all people, rural development and the preservation of natural resources. We believe in the power of dreams because dreams drive people forward. For this reason, we have increasingly been linking our partners in Germany and the project countries to a dynamic global network and are making development cooperation a reality.

## What we do

We help people in developing countries to provide for themselves now and in the future. As a large German aid agency with many years of international experience, we have been chalking up success stories in Africa, Asia and Latin America. As part of our political activities, we fight to change the conditions that lead to hunger and poverty. In Germany, we mobilise people to support and help implement our vision.

## How we work

We pursue a holistic, quality- and impact-oriented concept ranging from immediate disaster aid and reconstruction to long-term development projects. In this context, we work with the affected people on equal terms – offering competence, reliability and transparency. We support partner organisations in the project countries thereby ensuring that structures are reinforced from the bottom up and that successful project work can be secured for the long term.

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Cover photography: Thomas Lohnes/Welthungerhilfe, Ecuador, Millenniumsdorf San Andres, Angel Maiquiza (73 years) is harvesting corn. He and his wife live in absolute poverty as they earn less than one dollar per day, 2006; Page 2: Thomas Lohnes/Welthungerhilfe, India, Tamil Nadu, Farmer winnowing threshed rice on the field, 2005; Page 6: Thomas Lohnes/Welthungerhilfe, Sierra Leone, Bo District, Amie Sam (52 years) and her friend are cooking in their cooking hut, 2009; Page 10: Thomas Lohnes/Welthungerhilfe, Ecuador, Millenniumsdorf San Andres, Luz Quinde (49 years) in her field with approximately 5,000 vegetable plants, 2006; Page 20: Derek Frank/Welthungerhilfe, Liberia, Palm oil production. The boiled palm nuts are being stamped, put into holes in the ground, and dashed with boiling water, 2006; Page 32: Andreas Stedtler/Welthungerhilfe, Ethiopia, Halo/Ziway Dugda, Amane Jabaro (28 years) in her shop, financed by a microcredit program. She sells commodities for daily needs, 2006; Page 35: Lilly Schofield/Concern Worldwide, Kenya, Korogocho/Nairobi, Teresia Wangari (25 years), 2011; Page 41: Constanze von Oppeln/Welthungerhilfe, Tajikistan, Baljuvon bazaar, trader Abdulkhodir Haidarov (right) sells imported wheat from Kazakhstan, 2011; Page 42: Eva Häberle/Welthungerhilfe, Laos, Woman shaking rice to separate grains and husk, 2011; Portraits: The people's portraits were taken by Welthungerhilfe staff.

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