2019

GLOBAL HUNGER INDEX

THE CHALLENGE OF HUNGER AND CLIMATE CHANGE

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Klaus von Grebmer, Jill Bernstein, Fraser Patterson, Miriam Wiemers, Réiseal Ní Chéilleachair, Connell Foley, Seth Gitter, Kierstin Ekstrom, and Heidi Fritschel

Guest Author
Rupa Mukerji, Helvetas

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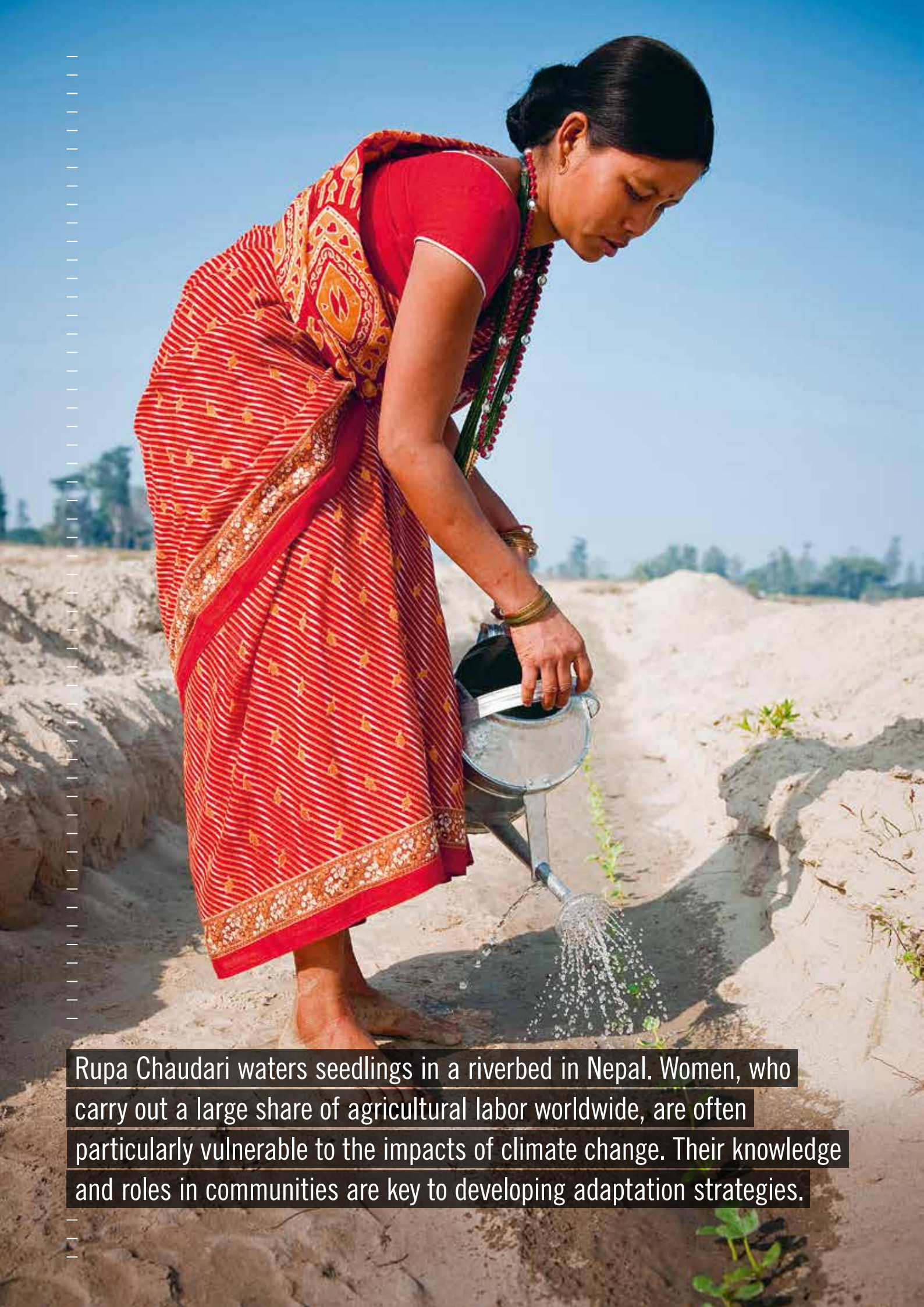


Rupa Chaudari waters seedlings in a riverbed in Nepal. Women, who carry out a large share of agricultural labor worldwide, are often particularly vulnerable to the impacts of climate change. Their knowledge and roles in communities are key to developing adaptation strategies.

CLIMATE JUSTICE: A NEW NARRATIVE FOR ACTION

Mary Robinson
Adjunct Professor of Climate Justice, Trinity College Dublin
Former UN High Commissioner for Human Rights and
Former President of Ireland

It is a terrible global indictment that after decades of sustained progress in reducing global hunger, climate change and conflict are now undermining food security in the world's most vulnerable regions.

With the number of hungry people rising from 785 million in 2015 to 822 million in 2018, we can no longer afford to regard the 2030 Agenda and the Paris Climate Agreement as voluntary and a matter for each member state to decide on its own. Instead, the full implementation of both has become imperative in order to secure a livable world for our children and grandchildren. This requires a change of mind-set at the global political level.

In the past decade, since the formation of the Climate Justice Foundation, I have had the opportunity to speak with those on the front lines of climate change: leaders of Pacific Island communities facing an immediate existential threat from rising sea levels; women in Honduras who for the first time had no access to water because of an El Niño phenomenon of unprecedented strength; herdsmen and herdswomen of the Sahel and the Lake Chad Basin whose livelihoods are evaporating with the lake itself. These people showed me how the climate breakdown is hitting those furthest behind first.

That is the greatest injustice of climate change—that those who bear the least responsibility for climate change are the ones who will suffer the most. This year's Global Hunger Index provides a timely illustration of how climate breakdown disrupts food systems, jeopardizing one of the most fundamental rights we all share as human beings—the right to adequate and sufficient food.

Climate change is an issue not only of environmental conservation, but also of justice and human rights. Because of the gender impacts stemming from the different social roles of women and men in many areas, there is a need for women's leadership on climate justice.

Climate justice is a transformative concept. It insists on a shift from a discourse on greenhouse gases and melting icecaps into a civil rights movement with the people and communities most vulnerable to climate impacts at its heart. It gives us a practical, grounded avenue through which our outrage can be channeled into action. Ensuring access to nutritious food is central to this pursuit of climate justice.

While we live in an age of great uncertainty, we are beginning to witness a greater consensus on the need for change. As we see the overlapping and compounding effects of climate change, inequality, conflict, poverty, and hunger, we must understand the inextricable connections between environmentalism, development, and social justice. With that understanding come opportunities for galvanized action and impact on an unprecedented scale.

The next generation are the activists of today. The next generation also includes those children whose health and well-being are being shaped by undernutrition, whose futures will be determined by our climate action—or our inaction.

Climate breakdown is a spotlight on the fragility of our shared existence, and we all must live up to the universal obligations that we have to each other, to our planet, and to its future.

Climate justice gives us a new narrative for action.

Patrick Ghembo stands in his maize field in Monyo Village, Malawi, his harvest destroyed by Cyclone Idai. He returned to his farm to fish in order to feed his family, who lived in a temporary camp for displaced people.

FOREWORD

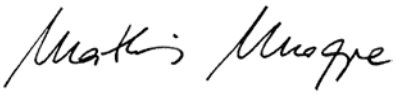
We have just a decade left. Although the commitment to reach Zero Hunger by 2030 is a fundamental ambition of the Sustainable Development Goals, our hard-won gains are now under threat or being reversed. The 2019 GHI shows that multiple countries have higher hunger levels now than in 2010, and approximately 45 countries are set to fail to achieve *low* levels of hunger by 2030. Conflict, inequality, and the effects of climate change have all contributed to persistently high levels of hunger and food insecurity around the world.

Some countries, such as Ethiopia and Rwanda, have made notable progress in reducing hunger in the past 20 years, illustrating the effects of well-targeted hunger reduction policies as well as the consequences of their emergence from periods of conflict and instability. However, this year's GHI shows that many countries still require urgent attention. *Alarming* levels of hunger exist in four countries, Chad, Madagascar, Yemen, and Zambia, while for the second year in a row, the Central African Republic is the only country where hunger is classified as *extremely alarming*. Furthermore, in many countries where we know that hunger is widespread, such as Burundi, Democratic Republic of Congo, Somalia, South Sudan, and Syria, there are insufficient data for assessment and inclusion in the GHI.

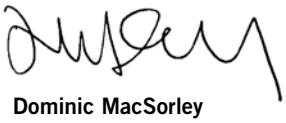
This year's report includes a closer look at hunger and undernutrition in Haiti and Niger, with an examination of the main factors contributing to hunger and the policy environment in which those factors operate. Both countries face *serious* hunger and are already being severely impacted by climate change. Although the two countries are implementing a range of programs and policies to improve people's food security and nutrition, they require additional efforts and support if they are to achieve a sustained positive impact.

With climate change radically altering the environment within which we work to eliminate hunger, the connection between climate and hunger is the focus of this year's special GHI essay by Rupa Mukerji of the Swiss development organization Helvetas. Climate change involves a painful element of injustice: its impacts are likely to be felt most severely by the poorest and most vulnerable—those who have contributed to it the least and often have the least capacity to adapt to it. Climate change is already exacerbating tensions and conflict, destroying livelihoods, driving displacement, worsening economic and gender inequalities, and undermining long-term recovery and sustainable development. This year's GHI sets out in no uncertain terms the ways in which climate change is likely to jeopardize food and nutrition security in the future.

Concern Worldwide and Welthungerhilfe share a mission to eradicate hunger, and produce the GHI every year to track hunger levels around the world, understand progress, and spotlight areas for action. This year's GHI highlights the inextricable link between hunger and climate change and the shared urgency of solving two of the world's greatest challenges. As climate breakdown accelerates, it is clear that all sections of society—nations, donors, businesses, NGOs, and communities—will have to put their shoulders to the wheel to arrest this environmental devastation and ensure we set a course for genuine global sustainability, universal food security, and Zero Hunger.

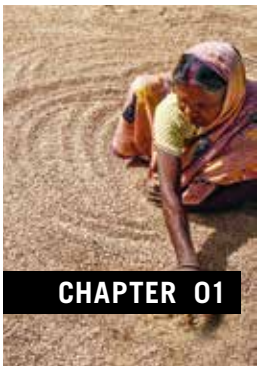


Mathias Mogge
Secretary General
Welthungerhilfe



Dominic MacSorley
Chief Executive Officer
Concern Worldwide

CONTENTS



SUMMARY

The 2019 Global Hunger Index (GHI) shows that while the world has made gradual progress in reducing hunger on a global scale since 2000, this progress has been uneven. Hunger persists in many countries, and in some instances progress is even being reversed. The GHI highlights where more action is most needed.

Global Hunger Is Moving from *Serious* to *Moderate*

With a 2019 GHI score of 20.0, the level of hunger and undernutrition worldwide is on the cusp of the *moderate* and *serious* categories. This score reflects a decline of 31 percent since 2000, when the global GHI score was 29.0 and fell into the *serious* category. Underlying this improvement are reductions in each of the four GHI indicators—the rates of undernourishment, child stunting, child wasting, and child mortality—since 2000.

Areas of Severe Hunger Remain

Extreme climatic events, violent conflicts, wars, and economic slowdowns and crises continue to drive hunger in many parts of the world. The number of people who are undernourished actually rose from 785 million in 2015 to 822 million in 2018. Nine countries in the GHI in the *moderate, serious, alarming*, or *extremely alarming* categories have higher scores today than in 2010, including the Central African Republic, Madagascar, and Yemen.

Hunger Is Highest in the Regions of South Asia and Africa South of the Sahara

South Asia and Africa South of the Sahara are the regions with the highest 2019 GHI scores, at 29.3 and 28.4 respectively, indicating *serious* levels of hunger. In South Asia this score is driven by high rates of child undernutrition; in Africa South of the Sahara the score is due to high undernourishment and child mortality rates, as well as high child undernutrition. In contrast, the 2019 GHI scores for Eastern Europe and the Commonwealth of Independent States, Latin America and the Caribbean, East and Southeast Asia, and the Near East and North Africa range from 6.6 to 13.3, indicating *low* or *moderate* hunger levels.

In Five Countries, Hunger Remains Alarming or Extremely Alarming

According to the 2019 GHI, of the countries for which data are available, one country, the Central African Republic, suffers from a level of hunger that is *extremely alarming*, while four others—Chad, Madagascar, Yemen, and Zambia—suffer from levels of hunger that are *alarming*. Out of the 117 countries that were ranked, 43 have *serious* levels of hunger. The GHI report also looks more closely at hunger in Haiti and Niger, both of which have *serious* levels of hunger and are highly vulnerable to the effects of climate change.

Data Are Missing for Some Countries of Concern

GHI scores could not be calculated for several countries because data were not available for all four GHI indicators. In nine of these countries—Burundi, Comoros, Democratic Republic of Congo, Eritrea, Libya, Papua New Guinea, Somalia, South Sudan, and Syria—hunger and undernutrition are identified as a cause for significant concern.

Addressing Hunger Means Understanding Subnational and Local Realities

Inequalities within country borders allow hunger and undernutrition to persist even in countries that appear to be doing well according to national averages. Subnational data on child stunting are invaluable for highlighting areas within a country that are losing ground, stagnating, or excelling in the fight against child undernutrition.

Climate Change Is a Threat Multiplier for Hungry and Undernourished People

Since the early 1990s, the number of extreme weather-related disasters has doubled, reducing the yields of major crops and contributing to food price hikes and income losses. These disasters have disproportionately harmed low-income people and their access to food. Looking ahead, climate models project higher average temperatures in most land and ocean regions, hot extremes in most inhabited regions, and heavy precipitation and an increasing probability of drought in some areas—all additional challenges for reducing hunger.

Reducing the Threat Requires Large-scale Action and Radical Transformation

Ending hunger and undernutrition in a changing climate demands large-scale action to address the inequities exacerbated by climate change while minimizing environmental changes that could prove catastrophic to human life. It requires us to better prepare for and respond to disasters, support resilience and adaptation among the most vulnerable groups and regions, address global inequalities, mitigate climate change without compromising food and nutrition security, make financing for climate action fair and effective, and radically transform food systems.

01

A rice producer spreads out the harvest to dry in the sun in Dudhitanr, Jharkhand, India. Rice, the main staple crop for more than half of the world's population, is highly sensitive to minor changes in temperature, making yields extremely susceptible to climate change.

THE CONCEPT OF THE GLOBAL HUNGER INDEX

The Global Hunger Index (GHI) is a tool designed to comprehensively measure and track hunger at global, regional, and national levels.[1] GHI scores are calculated each year to assess progress and setbacks in combating hunger. The GHI is designed to raise awareness and understanding of the struggle against hunger, provide a way to compare levels of hunger between countries and regions, and call attention to those areas of the world where hunger levels are highest and where the need for additional efforts to eliminate hunger is greatest.

Measuring hunger is complicated. To use the GHI information most effectively, it helps to understand how the GHI scores are calculated and what they can and cannot tell us.

Assembling the GHI

How are the GHI scores calculated?

GHI scores are calculated using a three-step process that draws on available data from various sources to capture the multidimensional nature of hunger (Figure 1.1).

First, for each country, values are determined for four indicators:

1. **UNDERNOURISHMENT:** the share of the population that is undernourished (that is, whose caloric intake is insufficient)

2. **CHILD WASTING:** the share of children under the age of five who are wasted (that is, who have low weight for their height, reflecting acute undernutrition)

3. **CHILD STUNTING:** the share of children under the age of five who are stunted (that is, who have low height for their age, reflecting chronic undernutrition)

4. **CHILD MORTALITY:** the mortality rate of children under the age of five (in part, a reflection of the fatal mix of inadequate nutrition and unhealthy environments)[2]

Second, each of the four component indicators is given a standardized score on a 100-point scale based on the highest observed level for the indicator on a global scale in recent decades.

Third, standardized scores are aggregated to calculate the GHI score for each country, with each of the three dimensions (inadequate food supply; child mortality; and child undernutrition, which is composed equally of child stunting and child wasting) given equal weight (the formula for calculating GHI scores is provided in Appendix A).

BOX 1.1 **WHAT IS MEANT BY "HUNGER"?**

The problem of hunger is complex, and different terms are used to describe its various forms.

Hunger is usually understood to refer to the distress associated with a lack of sufficient calories. The Food and Agriculture Organization of the United Nations (FAO) defines food deprivation, or undernourishment, as the consumption of too few calories to provide the minimum amount of dietary energy that each individual requires to live a healthy and productive life, given that person's sex, age, stature, and physical activity level.[3]

Undernutrition goes beyond calories and signifies deficiencies in any or all of the following: energy, protein, and/or essential vitamins and minerals. Undernutrition is the result of inadequate intake of food in terms of either quantity or quality, poor utilization of nutrients due to infections or other illnesses, or a combination of these immediate causes. These, in turn, are caused by a range of underlying factors, including household food insecurity; inadequate maternal health or childcare practices; or inadequate access to health services, safe water, and sanitation.

Malnutrition refers more broadly to both undernutrition (problems caused by deficiencies) and overnutrition (problems caused by unbalanced diets, such as consuming too many calories in relation to requirements with or without low intake of micronutrient-rich foods). Overnutrition, resulting in overweight, obesity, and noncommunicable diseases, is becoming increasingly common throughout the world, with implications for human health, government expenditures, and food systems development. While overnutrition is an important concern, the GHI focuses specifically on issues relating to undernutrition.

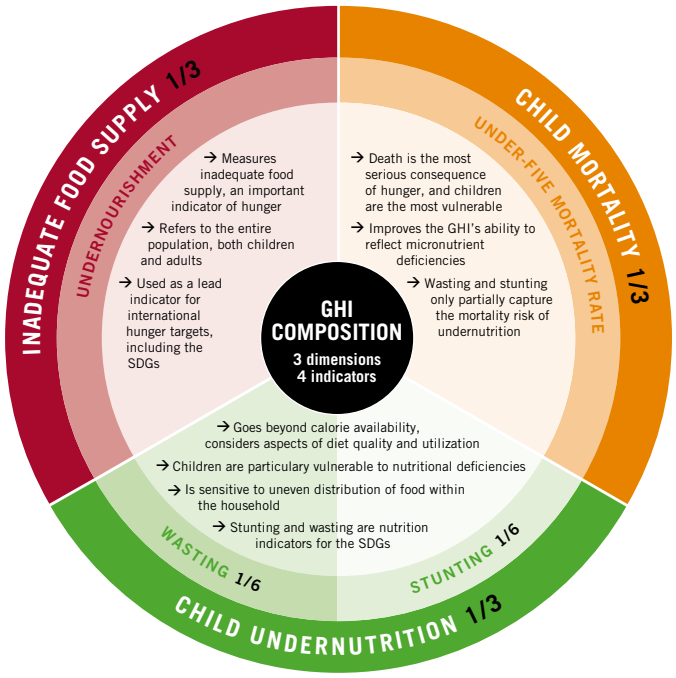
In this report, "hunger" refers to the index based on four component indicators. Taken together, the component indicators reflect deficiencies in calories as well as in micronutrients.

[1] For further background on the GHI concept, see Wiesmann (2006) and Wiesmann et al. (2015).

[2] According to Black et al. (2013), undernutrition is responsible for 45 percent of deaths among children younger than five years old.

[3] The average minimum dietary energy requirement varies by country—from about 1,650 to more than 2,000 kilocalories (commonly, albeit incorrectly, referred to as calories) per person per day for all countries with available data in 2016 (FAO 2017).

FIGURE 1.1 **COMPOSITION OF THE GLOBAL HUNGER INDEX**



Source: Wiesmann et al. (2015).

Note: The values of each of the four component indicators are standardized. See Appendix A for the complete GHI formula and Appendix B for the sources of data. SDGs = Sustainable Development Goals.

This three-step process results in GHI scores on a 100-point GHI Severity Scale, where 0 is the best score (no hunger) and 100 is the worst. In practice, neither of these extremes is reached. A value of 0 would mean that a country had no undernourished people in the population, no children younger than five years who were wasted or stunted, and no children who died before their fifth birthday. A value of 100 would signify that a country's undernourishment, child wasting, child stunting, and child mortality levels were each at approximately the highest levels observed worldwide in recent decades. The GHI Severity Scale on p. 11 shows the severity of hunger—from *low* to *extremely alarming*—associated with the range of possible GHI scores.

Why does the GHI incorporate four different indicators?

Using this combination of indicators to measure hunger offers several advantages. The indicators included in the GHI formula reflect caloric deficiencies as well as poor nutrition. The undernourishment indicator captures the hunger situation of the population as a whole, while the indicators specific to children reflect the nutrition status within a particularly vulnerable subset of the population for whom a lack of dietary energy, protein, and/or micronutrients (essential vitamins and minerals) leads to a high risk of illness, poor physical and cognitive development, and death. The inclusion of both child wasting and child stunting allows the GHI to document both acute and chronic undernutrition. By combining multiple indicators, the index reduces the effects of random measurement errors.

Where do the source data for the four indicators come from?

Data for the indicators come from data collected by various UN and other multilateral agencies. Undernourishment data are provided by the Food and Agriculture Organization of the United Nations (FAO). Child mortality data are sourced from the United Nations Interagency Group for Child Mortality Estimation (UN IGME). Child wasting and child stunting data are drawn from the joint database of UNICEF, the World Health Organization (WHO), and the World Bank, as well as from WHO's continually updated Global Database on Child Growth and Malnutrition, the most recent reports of the Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS), and statistical tables from UNICEF.

The GHI scores presented here reflect the latest revised data available for the four indicators.[4] Where original source data were unavailable, estimates for the GHI component indicators were based on the most recent available data. (Appendix B provides more detailed background information on the data sources for the 2000, 2005, 2010, and 2019 GHI scores.)

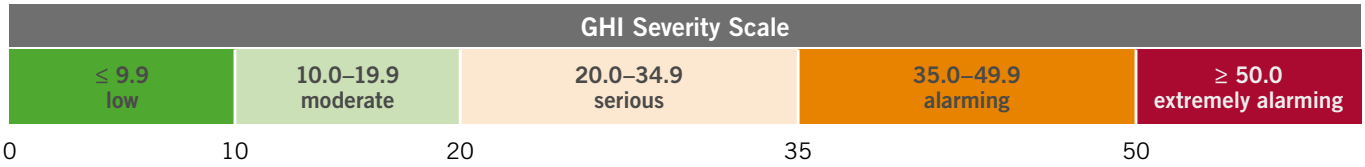
Understanding the GHI

Why is a certain country's GHI score so high (or so low)?

The key to understanding a country's GHI score lies in that country's indicator values, especially when compared with the indicator values for other countries in the report (see Appendix C for these values). For some countries, high scores are driven by high rates of undernourishment, reflecting a lack of calories for large swathes of the population. For others, high scores result from high levels of child wasting, reflecting acute undernutrition; child stunting, reflecting chronic undernutrition; and/or child mortality, reflecting children's hunger and nutrition levels, as well as other extreme challenges facing the population. Broadly speaking, then, a high GHI score can be evidence of a lack of food, a poor-quality diet, inadequate child caregiving practices, an unhealthy environment, or all of these factors.

While it is beyond the scope of this report to provide a detailed explanation of the circumstances facing each country in the index, Chapter 2 describes the circumstances in select countries. Furthermore, this report offers other avenues for examining a

[4] For previous GHI calculations, see von Grebmer et al. (2018, 2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010, 2009, 2008); IFPRI, WHH, and Concern Worldwide (2007); and Wiesmann, Weingärtner, and Schöninger (2006).



Source: Authors.

country's hunger and nutrition situation: country rankings based on 2019 GHI scores appear in Table 2.1; GHI scores for selected years for each country appear in Appendix D; and regional comparisons appear in Appendix E.

Does the 2019 GHI reflect the situation in 2019?

The GHI uses the most up-to-date data available for each of the GHI indicators, meaning that the scores are only as current as the data. For the calculation of the 2019 GHI scores, undernourishment data are from 2016–2018; child stunting and child wasting data are from 2014–2018, with the most current data from that range used for each country; and child mortality data are from 2017.

How can I compare GHI results over time?

Each report includes GHI scores and indicator data for three reference years in addition to the focus year. In this report, 2019 GHI scores can be directly compared with the GHI scores given for three reference years—2000, 2005, and 2010 (Appendix D).

Can I compare the GHI scores and indicator values in this report with results from previous reports?

No—GHI scores are comparable within each year's report, but not between different years' reports. The current and historical data on which the GHI scores are based are continually being revised and improved by the United Nations agencies that compile them, and each year's GHI report reflects these changes. Comparing scores between reports may create the impression that hunger has changed positively or negatively in a specific country from year to year, whereas in some cases the change may be partly or fully a reflection of a data revision.

Moreover, the methodology for calculating GHI scores has been revised in the past and may be revised again in the future. In 2015, for example, the GHI methodology was changed to include data on child stunting and wasting and to standardize the values (see Wiesmann et al. 2015). This change caused a major shift in the GHI scores, and the GHI Severity Scale was changed to reflect this shift. Since 2015, almost all countries have had much higher GHI scores compared with their scores from 2014 and earlier. This does not necessarily mean that their hunger levels rose in 2015—the higher scores merely reflect the revision of the methodology.

Can I compare the GHI rankings in this report to those in previous reports to understand how the situation in a country has changed over time relative to other countries?

No—like the GHI scores and indicator values, the rankings from one year's report cannot be compared to those from another. In addition to the data and methodology revisions described previously, different countries are included in the ranking every year. This is due in part to data availability—the set of countries for which sufficient data are available to calculate GHI scores varies from year to year. If a country's ranking changes from one year to the next, it may be in part because it is being compared with a different group of countries. Furthermore, the ranking system was changed in 2016 to include all of the countries in the report rather than just those with a GHI score of 5 or above. This added many countries with low scores to the ranking that had not been previously included.

Why do some countries not have a GHI score?

Because data for all four indicators in the GHI formula are not available for every country, GHI scores could not be calculated for some. Box 2.1 in Chapter 2 briefly describes conditions in the countries without GHI scores where hunger and undernutrition are cause for significant concern. Several of these countries are experiencing unrest or violent conflict, which affects the availability of data as well as the food and nutrition situation in the country. It is quite possible that one or more of these countries would have a higher GHI score than the Central African Republic—the country with the highest 2019 GHI score—if sufficient data were available.

Likewise, GHI scores are not calculated for some high-income countries where the prevalence of hunger is very low. Even though hunger and undernutrition are serious concerns for segments of the population in certain high-income countries (see p. 18), nationally representative data for child stunting and child wasting are not regularly collected in most high-income countries. In addition, although data on child mortality are usually available for these countries, child mortality does not reflect undernutrition in high-income countries to the same extent it does in low- and middle-income countries.

Finally, GHI scores are not calculated for certain countries with small populations (such as Belize) or for non-independent entities or territories (such as Western Sahara).

02

Leandro Ortega Rivas and his son, Armando Ortega Gamaura, display a sample of their quinoa harvest in the Bolivian Altiplano. Here they receive advice from a *yapuchiri*, an expert farmer who integrates traditional knowledge, new insights, and groundbreaking technologies for disaster risk reduction and climate change adaptation.

GLOBAL, REGIONAL, AND NATIONAL TRENDS

The World

The 2019 Global Hunger Index (GHI) indicates that the level of hunger and undernutrition worldwide falls on the cusp of the *moderate* and *serious* categories, at a value of 20.0 (Figure 2.1).[1] This value reflects a decline in the global GHI score in each period examined since 2000, when the global GHI score was 29.0 and fell into the *serious* category. Underlying this improvement are reductions in each of the four GHI indicators—undernourishment, child stunting, child wasting, and child mortality—since 2000.

This achievement is no small feat. It coincides with a decline in poverty at the global level from 28.6 percent in 1999 to 9.9 percent in 2015 (World Bank 2019a).[2] Poverty and hunger are closely correlated, with each influencing the other (Barrett and Lentz 2016; Headey 2013). Furthermore, the global development community and individual countries have made concerted efforts in recent years to address undernutrition, as evidenced by the increased funding for nutrition initiatives worldwide. However, current action and spending are still insufficient to reach the global nutrition targets to which countries have declared their commitment. It is estimated that an additional US$70 billion beyond current budget expectations over 10 years is needed to achieve the global targets for child stunting, anemia in women, exclusive breastfeeding, and the scaling up of treatment for severe child wasting.[3] While ambitious in some regards, this amount should be attainable considering the overwhelming benefits expected from these investments (Shekar et al. 2017).

The reduction in GHI scores at the global scale brings into sharper focus the many challenges that remain in the fight against hunger and undernutrition. Extreme climatic events, violent conflicts, wars, and economic slowdowns and crises continue to drive hunger in many parts of the world (FSIN 2019; FAO et al. 2019). Inequalities within country borders allow hunger and undernutrition to persist even in countries that appear to do well according to national averages. The prevalence of undernourishment—the percentage of the population without regular access to adequate calories—has stagnated since 2015, and the number of people who are hungry has actually risen to 822 million from 785 million in 2015 (FAO et al. 2019).

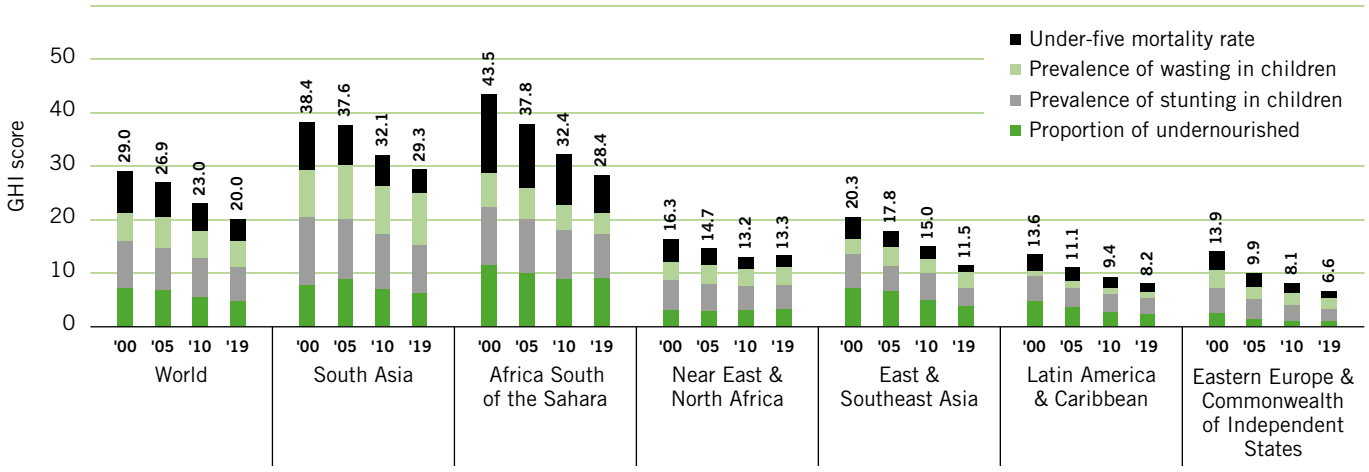
There is still much work to be done before hunger and undernutrition can be eradicated for good. This chapter provides an overview of the current situation at regional, national, and subnational levels. The essay in Chapter 3 complements this overview by describing the effects of climate change on food and nutrition security now and in

[1] The worldwide estimates in this paragraph include the 117 countries in this report with 2019 GHI scores plus 15 countries for which some but not all of the GHI indicator data or estimates were available.

[2] The poverty rates expressed here are poverty headcount ratios at $1.90 per day (2011 purchasing power parity).

[3] This estimate was based on the additional financing that would be needed between 2016 and 2025. The global nutrition targets discussed here and analyzed by Shekar et al. (2017) are four of the six targets established by the World Health Assembly in 2012.

FIGURE 2.1 **GLOBAL AND REGIONAL 2000, 2005, 2010, AND 2019 GLOBAL HUNGER INDEX SCORES, WITH CONTRIBUTION OF COMPONENTS**



Source: Authors.

Note: See Appendix B for data sources. The regional and global GHI scores are calculated using regional and global aggregates for each indicator and the formula described in Appendix A. The regional and global aggregates for each indicator are calculated as population-weighted averages, using the indicator values reported in Appendix C. For countries lacking undernourishment data, provisional estimates provided by the Food and Agriculture Organization of the United Nations (FAO) were used in the calculation of aggregates only, but are not reported in Appendix C.

the future. To address the current challenges while also preparing to sustainably feed a world population expected to number about 10 billion by 2050, monumental changes to the global food system are needed (Willett et al. 2019). The reduction in GHI scores since 2000 demonstrates that hunger and undernutrition are not immutable problems and serves as cause for cautious optimism. In many countries, however, progress is too slow to be able to achieve the second Sustainable Development Goal—known in short as Zero Hunger—by 2030. At the current pace, approximately 45 countries will fail even to reach *low* hunger as defined by the GHI Severity Scale by 2030.[4] It is now essential to double down on the task of reducing hunger and undernutrition in the many parts of the world that are faltering.

The Regions

At the regional level, South Asia and Africa South of the Sahara have the highest 2019 GHI scores in the world, at 29.3 and 28.4, respectively (Figure 2.1). These scores indicate *serious* levels of hunger according to the GHI Severity Scale. In contrast, the 2019 GHI scores of Eastern Europe and the Commonwealth of Independent States, Latin America and the Caribbean, East and Southeast Asia, and the Near East and North Africa range from 6.6 to 13.3, indicating *low* or *moderate* hunger levels.

South Asia's high GHI score is driven by its high rates of child undernutrition. The child stunting rate for the region is 37.6 percent, and the child wasting rate is 17.5 percent; both are the highest levels of any region in this report. In South Asia, the key factors that contribute to stunting are poor infant and young child feeding practices, poor nutrition among women before and during pregnancy, and poor sanitation practices (Smith and Haddad 2015). A study of six South Asian countries found that a lower maternal body mass index was significantly associated with child wasting in five of the six countries. Inadequate access to improved water sources and low family wealth were also associated with child wasting in some countries, but not systematically so. Because a reduction in poverty does not necessarily imply adequate access to improved water sources and sanitation, poverty alleviation policies may not be sufficient to reduce child wasting (Harding, Aguayo, and Webb 2018).

Because of its large population, India's GHI indicator values have an outsized impact on the indicator values for the region. India's child wasting rate is extremely high at 20.8 percent—the highest wasting rate of any country in this report for which data or estimates were available. Its child stunting rate, 37.9 percent, is also categorized as very high in terms of its public health significance (de Onis et al. 2019). In India, just 9.6 percent of all children between 6 and 23 months of age are fed a minimum acceptable diet.[5] As of 2015–2016, 90 percent of Indian households used an improved drinking water source while 39 percent of households had no sanitation facilities (IIPS and ICF 2017). In 2014 the prime minister instituted the "Clean India" campaign to end open defecation and ensure that all households had latrines. Even with new latrine construction, however, open defecation is still practiced. This situation jeopardizes the population's health and consequently children's growth and development as their ability to absorb nutrients is compromised (Ngure et al. 2014; Caruso et al. 2019).

Outside of India, two countries in South Asia have made significant advances in child nutrition, and their experiences are instructive. A 2015 study sought to identify the reasons behind the decline in stunting in Bangladesh at the national level from 58.5 percent in 1997 to 40.2 percent in 2011 (Headey et al. 2015). The study attributed the decrease primarily to rising household wealth associated with pro-poor economic growth and gains in parental education, as well as health, sanitation, and demographic factors reflecting decreased fertility rates. The authors conclude that success in this area can be achieved with robust economic growth and attention to "nutrition-sensitive" sectors such as education, sanitation, and health. Nepal's remarkable reduction in child stunting from 56.6 percent in 2001 to 40.1 percent in 2011 is associated with, and likely attributable to, increased household assets (a proxy for household wealth), increased maternal education, improved sanitation, and implementation and use of health and nutrition programs, including antenatal and neonatal care (Headey and Hoddinott 2015).

In Africa South of the Sahara, the region's high GHI score is driven up by its undernourishment and child mortality rates, which are the highest of any region, at 22.3 and 7.5 percent, respectively. Meanwhile, its child stunting rate, 34.6 percent, is nearly as high as that of South Asia. Perhaps most troubling is that while the prevalence of undernourishment consistently declined between 1999–2001 and 2013–15, it has since reversed course and begun to rise (FAO 2019b).

Africa South of the Sahara is the region of the world with the highest percentage of the population employed in agriculture, at 55 percent, yet agriculture in the region faces enormous challenges (World Bank 2019a). Governments invest too little in agriculture: most countries fail to meet the Comprehensive Africa Agriculture Development Programme target of directing 10 percent of government spending to agriculture (Shimeles, Verdier-Chouchane, and Boly 2018). Farmers' use of agricultural inputs is inadequate—fertilizer

[4] The 2030 projections are linear projections based on the existing 2000, 2005, 2010, and 2019 GHI scores for each country. These projections are not comparable to projections from previous reports owing to changes in data availability and revisions of the existing data.

[5] A "minimum acceptable diet" is a standard that combines minimum dietary diversity and minimum meal frequency, with different recommendations for breastfed and non-breastfed children, who need to receive milk or milk products as a substitute for breast milk.

TABLE 2.1 **GLOBAL HUNGER INDEX SCORES BY 2019 GHI RANK**

Rank[1]	Country	2000	2005	2010	2019
2019 GHI scores less than 5, collectively ranked 1–17.[2]	Belarus	<5	<5	<5	<5
	Bosnia & Herzegovina	9.8	7.2	5.1	<5
	Bulgaria	8.2	7.8	6.9	<5
	Chile	<5	<5	<5	<5
	Costa Rica	6.2	5.5	5.0	<5
	Croatia	6.1	<5	<5	<5
	Cuba	5.3	<5	<5	<5
	Estonia	5.6	<5	<5	<5
	Kuwait	<5	<5	<5	<5
	Latvia	6.0	<5	<5	<5
	Lithuania	<5	<5	<5	<5
	Montenegro	—	—	<5	<5
	Romania	8.3	6.4	5.6	<5
	Slovak Republic	7.3	6.0	<5	<5
	Turkey	10.2	7.3	5.4	<5
	Ukraine	13.7	<5	<5	<5
	Uruguay	7.7	8.1	5.4	<5
18	Brazil	12.0	7.0	5.4	5.3
19	Argentina	6.6	6.2	5.9	5.4
20	Kazakhstan	11.0	12.4	8.6	5.5
21	North Macedonia	7.7	8.5	7.0	5.6
22	Russian Federation	10.3	7.5	6.4	5.8
23	Mexico	10.6	9.1	7.7	6.2
23	Tunisia	10.7	8.6	7.9	6.2
25	China	15.8	13.0	10.0	6.5
25	Serbia	—	—	6.7	6.5
27	Colombia	11.3	10.8	9.9	6.7
28	Albania	21.5	16.6	15.1	7.0
29	Azerbaijan	27.5	17.3	12.1	7.4
30	Armenia	18.3	12.7	11.3	7.8
31	Iran	13.5	9.4	8.2	7.9
32	Jamaica	8.6	8.6	9.7	8.2
33	Paraguay	14.0	12.6	11.6	8.3
34	Saudi Arabia	11.5	13.7	9.2	8.5
35	Kyrgyz Republic	19.3	14.0	12.4	8.8
35	Peru	20.9	18.2	12.5	8.8
37	Fiji	9.9	9.3	8.6	8.9
38	Trinidad & Tobago	12.1	12.9	12.7	9.1
39	Dominican Republic	18.3	17.2	12.8	9.2
39	Georgia	14.5	10.4	8.4	9.2
39	Panama	20.2	18.3	12.6	9.2
42	Morocco	15.8	17.7	10.0	9.4
43	El Salvador	16.3	13.3	12.8	9.6
43	Mauritius	15.3	14.0	12.2	9.6
45	Mongolia	31.8	25.0	15.8	9.7
45	Thailand	18.3	13.2	12.7	9.7
47	Algeria	15.6	12.9	10.6	10.3
48	Jordan	12.1	8.7	8.3	10.5
49	Uzbekistan	23.6	17.8	14.7	10.7
50	Suriname	16.0	12.5	11.0	10.8
51	Ecuador	18.6	17.0	13.2	11.3
52	Oman	13.7	15.6	9.8	11.4
53	Lebanon	9.1	10.3	8.0	11.6
54	Turkmenistan	21.8	17.1	15.0	11.8
55	Guyana	18.0	16.8	16.0	12.6
56	Honduras	20.9	17.8	14.8	12.9
57	Malaysia	15.5	13.1	11.9	13.1
58	Nicaragua	24.6	17.6	16.2	13.3
59	Ghana	28.7	22.0	18.3	14.0
59	South Africa	19.2	22.7	16.6	14.0
61	Egypt	16.3	14.3	16.3	14.6
62	Viet Nam	28.2	23.8	18.8	15.3
63	Bolivia	30.3	27.1	21.6	15.4
64	Gabon	20.8	18.9	16.4	15.8
65	Venezuela	15.2	12.7	8.4	16.9
66	Sri Lanka	22.4	21.2	18.0	17.1
67	Senegal	36.3	27.5	23.6	17.9
68	Iraq	26.4	24.8	23.8	18.7
69	Myanmar	44.4	36.4	25.9	19.8
70	Indonesia	25.8	26.8	24.9	20.1
70	Philippines	25.8	21.4	20.5	20.1
72	Guatemala	27.7	24.1	22.0	20.6
73	Nepal	36.8	31.3	24.5	20.8
74	Eswatini	29.6	27.9	26.5	20.9
75	Gambia	27.5	26.3	22.5	21.8
76	Cameroon	39.7	33.7	26.2	22.6
77	Cambodia	43.6	29.4	27.6	22.8
78	Malawi	44.5	37.7	31.1	23.0
79	Lesotho	33.1	30.4	26.2	23.2
80	Botswana	33.4	31.5	28.1	23.6
81	Togo	39.3	37.0	27.2	23.9
82	Benin	36.7	33.3	28.3	24.0
83	Mali	44.2	38.4	27.4	24.1
84	Côte d'Ivoire	33.8	35.3	30.9	24.9
84	Namibia	30.7	28.4	30.6	24.9
86	Kenya	36.9	32.7	27.6	25.2
87	Lao PDR	47.7	35.9	30.5	25.7
88	Bangladesh	36.1	30.7	30.3	25.8
88	Burkina Faso	46.3	48.1	36.8	25.8
90	Mauritania	33.4	30.6	24.9	26.7
91	Guinea	43.6	36.8	30.7	27.4
92	North Korea	40.3	32.9	30.9	27.7
93	Nigeria	40.8	34.2	29.9	27.9
94	Pakistan	38.3	37.0	35.9	28.5
95	Tanzania	42.2	35.9	34.1	28.6
96	Mozambique	49.9	42.3	35.3	28.8
97	Ethiopia	55.9	46.0	37.4	28.9
98	Rwanda	56.6	44.0	32.4	29.1
99	Guinea-Bissau	42.1	40.3	31.0	29.6
100	Angola	65.1	50.3	38.6	29.8
101	Niger	52.1	42.4	36.6	30.2
102	India	38.8	38.9	32.0	30.3
103	Sierra Leone	53.6	51.1	40.8	30.4
104	Uganda	38.9	33.0	30.8	30.6
105	Djibouti	46.9	43.9	36.6	30.9
106	Congo, Rep.	37.3	37.1	32.0	31.0
107	Sudan	—	—	—	32.8
108	Afghanistan	52.1	43.2	34.3	33.8
109	Zimbabwe	39.1	39.6	35.8	34.4
110	Timor-Leste	—	41.8	42.3	34.5
111	Haiti	42.7	45.1	48.8	34.7
112	Liberia	48.6	42.4	36.0	34.9
113	Zambia	52.3	46.0	42.8	38.1
114	Madagascar	43.2	43.4	36.2	41.5
115	Chad	51.5	52.1	50.9	44.2
116	Yemen	43.2	41.7	34.5	45.9
117	Central African Republic	50.7	49.5	42.0	53.6

— = Data are not available or not presented. Some countries did not exist in their present borders in the given year or reference period.

Note: Rankings and index scores from this table cannot be accurately compared to rankings and index scores from previous reports (see Chapter 1). Colors correspond to GHI Severity Scale in Chapter 1.

[1] Ranked according to 2019 GHI scores. Countries that have identical 2019 scores are given the same ranking (for example, Mexico and Tunisia are both ranked 23rd). The following countries could not be included because of lack of data: Bahrain, Bhutan, Burundi, Comoros, the Democratic Republic of Congo, Equatorial Guinea, Eritrea, Libya, Moldova, Papua New Guinea, Qatar, Somalia, South Sudan, the Syrian Arab Republic, and Tajikistan.

[2] The 17 countries with 2019 GHI scores of less than 5 are not assigned individual ranks, but rather are collectively ranked 1–17. Differences between their scores are minimal.

use, for example, is lower in Africa South of the Sahara than in any other region (World Bank 2019b). Use of irrigation is very low, and most farmers are dependent on rainfed agriculture, leaving them extremely vulnerable to drought and changing rain patterns. Access to and use of tractors and mechanization are also extremely limited (Sheahan and Barrett 2018). Because of these and other factors, Africa South of the Sahara has the world's lowest agricultural productivity, as measured by cereal output per hectare (World Bank 2019b). Low productivity combined with high levels of poverty means that households' access to food is constrained in terms of both their own production and their ability to purchase food in the market. Compounding the ongoing challenges facing agriculture and food production in Africa South of the Sahara, extreme climate events such as the 2015–2016 El Niño drought and ongoing violent conflicts in many countries have intensified food insecurity in the region.

While hunger, in the sense of insufficient access to calories, is a pressing concern in Africa South of the Sahara, it has the potential to overshadow key nutritional concerns, including child undernutrition. Of 43 countries in the region with data or estimates on stunting for 2014–2018, 21 have stunting rates over 30 percent (considered very high in terms of public health significance) and an additional 19 countries have stunting rates between 20 and 30 percent (high). Two countries, Sudan and Djibouti, have wasting levels exceeding 15 percent (very high), 6 countries have wasting rates between 10 and 15 percent (high), and an additional 21 countries have wasting rates between 5 and 10 percent (medium) (de Onis et al. 2019).

The Countries

According to the 2019 GHI, of the countries for which data are available, four suffer from levels of hunger that are *alarming*, and one country, the Central African Republic, suffers from a level that is *extremely alarming*. The four countries with *alarming* levels of hunger are Chad, Madagascar, Yemen, and Zambia. Forty-three countries out of 117 countries that were ranked have *serious* levels of hunger.

It is critical to understand that GHI scores for several countries could not be calculated because data were not available for all four GHI indicators. However, the hunger and undernutrition situations in nine of these countries—Burundi, Comoros, Democratic Republic of Congo, Eritrea, Libya, Papua New Guinea, Somalia, South Sudan, and Syria—are identified as cause for significant concern (Box 2.1). In some cases, the hunger levels might be higher than in the countries for which GHI scores were calculated.

To understand how the countries included in the GHI compare with each other, Table 2.1 shows the numerical ranking, from lowest to highest hunger levels, for each country with a 2019 GHI score. Appendix E shows how countries compare with others within their regions and how each country's GHI score has changed over time. Appendix C shows the values of the GHI indicators—the prevalence of undernourishment, child wasting, child stunting, and child mortality—for each country, including their historic values. An examination of the individual indicators provides a useful glimpse into the nature of hunger and undernutrition in each country and how it has changed over time.

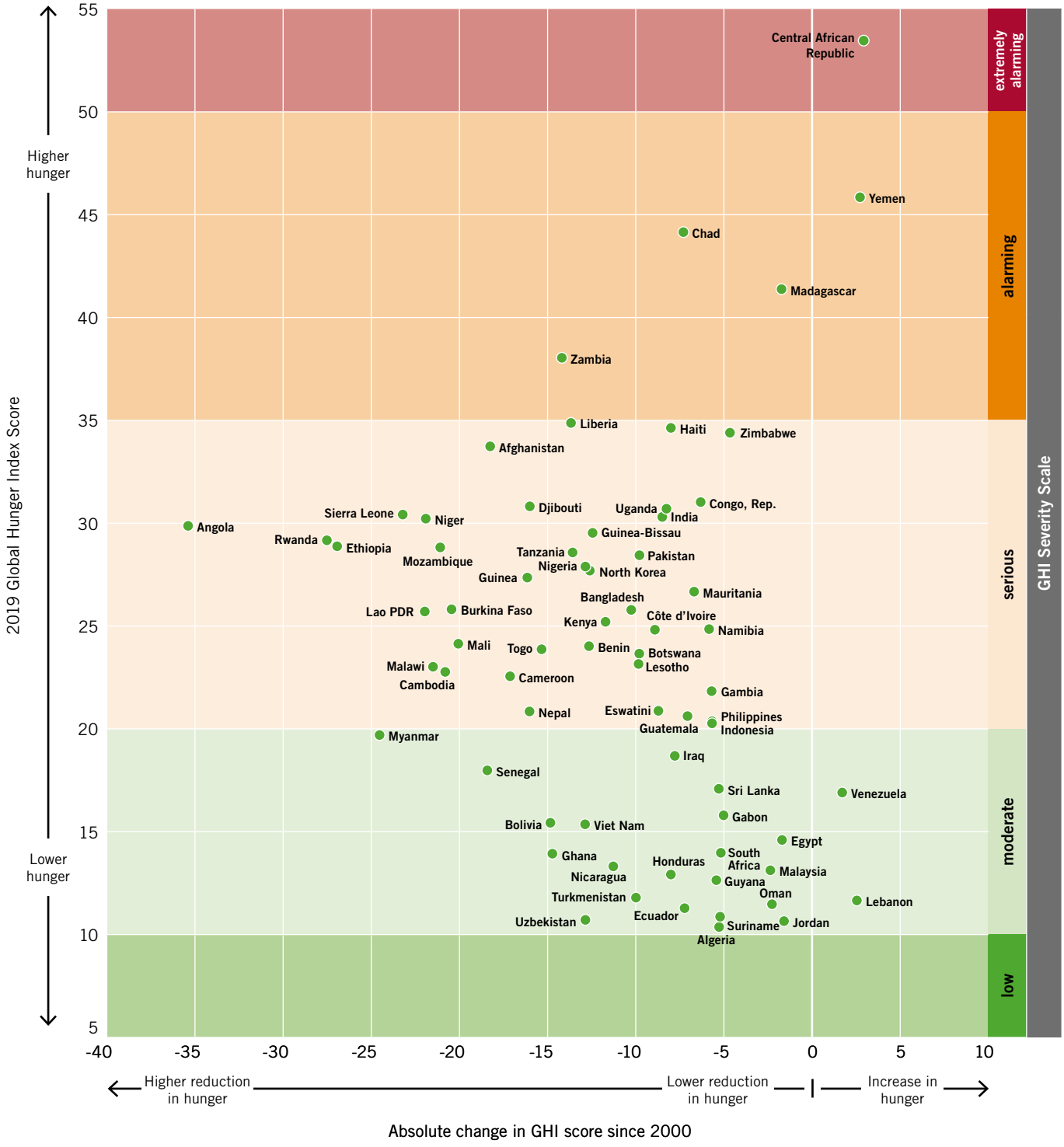
For nine countries with GHI scores in the *moderate, serious, alarming,* or *extremely alarming* categories, their 2019 GHI scores are higher than their scores for 2010, which is the most recent historical reference period in this year's report. These nine countries are the Central African Republic, Jordan, Lebanon, Madagascar, Malaysia, Mauritania, Oman, Venezuela, and Yemen.[6] Venezuela's GHI score has doubled since 2010, reflecting the severe food shortages and the economic and political crises that have gripped the country in recent years. Hyperinflation, a rapidly contracting GDP, overdependence on oil revenues coupled with falling oil production, and poor governance characterized by rampant corruption and growing autocracy have all contributed to the situation (Labrador 2019). Venezuela's GHI score could quite possibly be higher in future years when more up-to-date data on child nutrition become available.

The Central African Republic has the highest 2019 GHI score in this report—53.6—and is the only country that falls into the *extremely alarming* category of the countries with sufficient data for calculating their GHI scores. Nearly half of all children in the Central African Republic are stunted, and 60 percent of the population is undernourished. Since 2012 the country has been embroiled in a civil war, contributing to a crisis of hunger and undernutrition. As of June 2019, 605,000 refugees had left the country and an additional 655,000 people were internally displaced out of a population of just 4.7 million (UNHCR 2019d; UN DESA 2019). More than half of the population is in need of humanitarian assistance in 2019, although security concerns often prevent aid agencies from reaching those in need (USAID 2019a). A peace agreement was signed between the government and warring factions in February 2019, but violations of the terms threaten to undermine the agreement (Schlein 2019). The situation in the Central African Republic clearly demonstrates the role that conflict plays in worsening hunger and undernutrition.

At 45.9, Yemen's GHI score is the second highest in this year's report and falls into the *alarming* category. Its child stunting and wasting rates are estimated to be 61.1 and 17.9 percent, respectively. The country has been affected by civil war since 2014, although there are in fact multiple conflicts at play whose roots go as far back as the 1990s (Ahram 2019). In November 2018 UNICEF's regional director

[6] Countries are not included in this trend analysis if their hunger level is still considered *low* even if it has increased since 2010.

FIGURE 2.2 **2019 GHI SCORES AND PROGRESS SINCE 2000**



Source: Authors.

Note: **This figure illustrates the change in GHI scores since 2000 in absolute values.** This figure features countries where data are available to calculate 2000 and 2019 GHI scores and where 2019 GHI scores show *moderate, serious, alarming,* or *extremely alarming* hunger levels. Some likely poor performers may not appear due to missing data.

for the Middle East and North Africa, Geert Cappelaere, warned that the war and ongoing economic crisis have had dire impacts on the children of Yemen, including extreme hardship, elevated rates of malnutrition and disease, and increased mortality (Cappelaere 2018). The warring factions signed the Stockholm Agreement in December 2018 to ease the conflict and humanitarian crisis, but as of June 2019 the agreement had still not been fully implemented and some civilians and communities in need were still blocked from receiving humanitarian aid (UN 2019b). It is estimated that 17 million people out of a population of 28 million (World Bank 2019a) will face crisis-level food insecurity or worse through early 2020, with some areas in the west of the country facing emergency-level food crises.[7] If the security situation deteriorates, the country is at risk of famine (FEWS NET 2019a).

Chad has the third-worst GHI score according to this year's ranking; at 44.2, it is considered *alarming*. Chad's child mortality rate is 12.3 percent, the second-highest rate in this report. Chad ranks 186th out of 189 countries in the Human Development Index, with only South Sudan, the Central African Republic, and Niger ranking worse (UNDP 2018). In recent years Chad has also experienced an influx of refugees, primarily from South Sudan, the Central African Republic, and Nigeria. By the end of 2018 the number of refugees exceeded 450,000, with more arriving in 2019, putting a strain on resources in the host communities (UNHCR 2019f; UN 2019a). In the Lake Chad basin, incursions of armed groups into Chad from neighboring Nigeria have increased insecurity and disrupted livelihoods, access to markets, and trade (UN OCHA 2019a).

In addition to considering countries' GHI scores and rankings, it is useful to compare countries' individual GHI component indicators:

- → Haiti, Zimbabwe, and the Central African Republic have the highest rates of undernourishment, ranging between 49.3 and 59.6 percent.
- → Stunting rates are highest in Madagascar, Burundi, and Yemen, where data or estimates show that more than half of all children under five suffer from stunting.
- → Wasting is most prevalent in Yemen, Djibouti, and India, ranging from 17.9 to 20.8 percent.
- → The highest under-five mortality rates are in the Central African Republic (12.2 percent), Chad (12.3 percent), and Somalia (12.7 percent).

The situation is more positive in many countries in terms of both their GHI scores and their progress in reducing hunger and undernutrition over time. This year's GHI includes 23 countries with *moderate* levels of hunger and 46 countries with *low* levels of hunger. Of the countries with *moderate* levels of hunger, two—Myanmar and Senegal—had *alarming* hunger levels as recently as 2000. Of the countries with *low* levels of hunger, five had *serious* hunger levels as recently as 2000: Albania, Azerbaijan, Mongolia, Panama, and Peru.

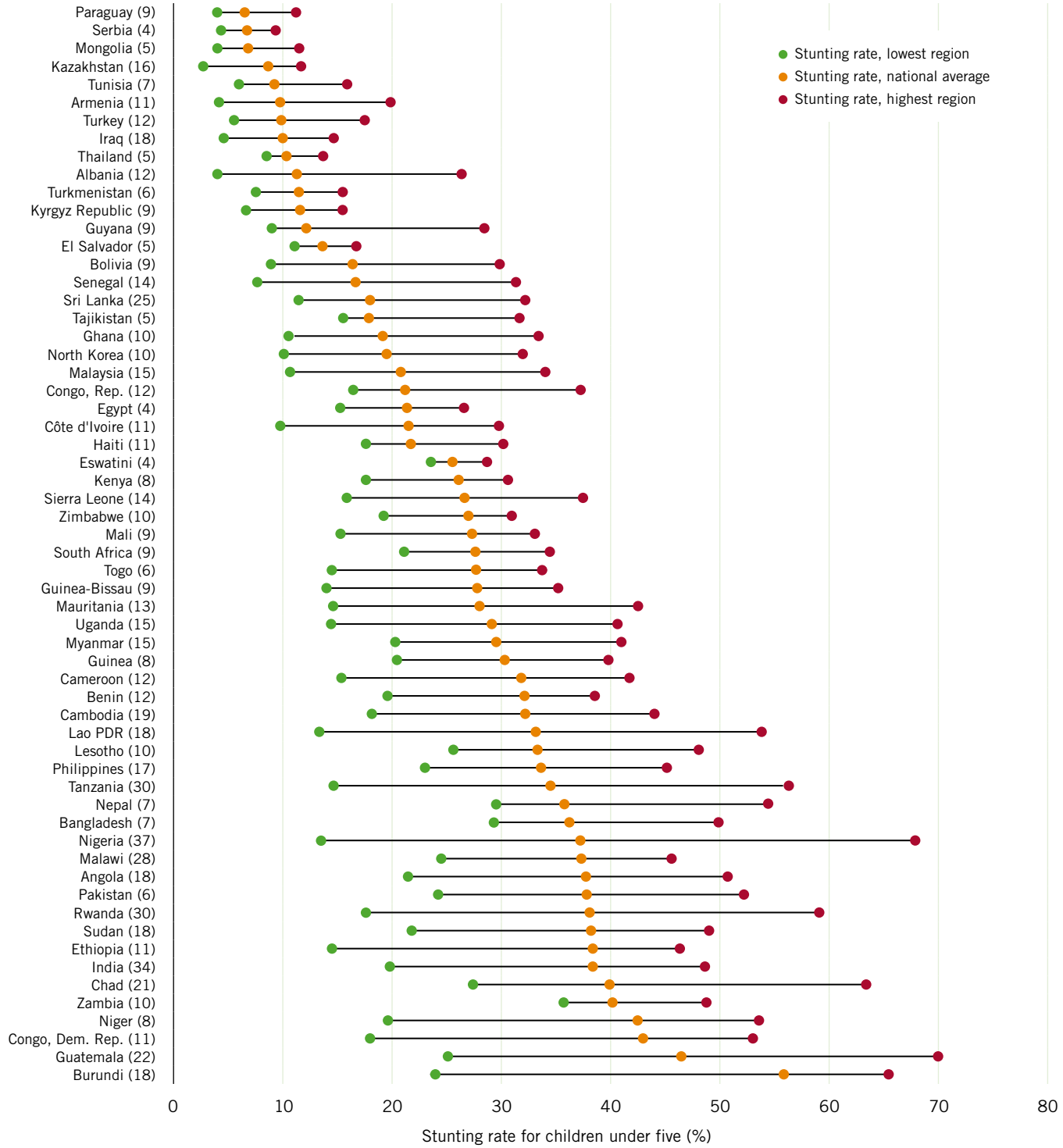
Figure 2.2 shows the progress countries have made since 2000, along with their 2019 GHI scores. Perhaps most informative is the dramatic improvement in GHI scores for the countries on the left-hand side of the figure, particularly Angola, Rwanda, and Ethiopia. These countries each had GHI scores in the *extremely alarming* category in 2000, largely as a result of civil wars. As is evident throughout this report, violent conflict and war are strong drivers of hunger and undernutrition, yet it is important to realize that even the worst situations can improve with the return of peace and stability.

As noted in Chapter 1, GHI scores are not calculated for some high-income countries where the prevalence of hunger tends to be very low. This gap occurs mainly for two reasons: (1) not all GHI indicators are appropriate for assessing hunger in these countries and (2) some data are unavailable because they are not regularly collected there. Nonetheless, the high-income countries that are not included in the GHI are not immune to food insecurity.

High-income countries show variable, non-negligible rates of food insecurity as measured by locally adapted household food security scales that yield comparable results: 5 percent of households were food insecure in South Korea in 2008, 7 percent in Canada in 2011–2012, 12 percent in the United States in 2017, and 17 percent in Portugal in 2005–2006 (Kim et al. 2011; Tarasuk, Mitchell, and Dachner 2014; Coleman-Jensen et al. 2018; Álvares and Amaral 2014). In the United States, 16 percent of households with children under age 18 were food insecure in 2017 at some point during the year (Coleman-Jensen et al. 2018), and a UNICEF study regarding food insecurity in the 28 countries of the European Union found that 18 percent of households with children under age 15 experience moderate or severe food insecurity based on the Food Insecurity Experience Scale (Pereira, Handa, and Holmqvist 2017). The experience-based concept of the household food security scale and measures such as the Food Insecurity Experience Scale should not be confused with the measurement approach of the undernourishment indicator, which reflects shortfalls in calorie intake; the prevalence

[7] This is according to the Acute Food Insecurity Phases of the Integrated Food Security Phase Classification: Phase 1 (minimal), Phase 2 (stressed), Phase 3 (crisis), Phase 4 (emergency), and Phase 5 (famine) (IPC 2017).

FIGURE 2.3 **SUBNATIONAL INEQUALITY OF CHILD STUNTING**



Source: Authors. Based on surveys included in UNICEF/WHO/World Bank (2019), WHO (2019a), UNICEF (2019), and MEASURE DHS (2019) from 2014–2018. Countries included are those with subnational stunting data available for 2014–2018. If more than one survey has been completed for a country during this period, that with the most recent subnational values is used.
Note: The number in parentheses following each country name indicates the number of subnational units into which the country was divided for the sake of the survey, which can influence the degree of disparity that is revealed. All stunting values in this figure are taken directly from original survey reports. The national averages may vary slightly from those used for GHI calculations, which in some cases underwent additional analysis before inclusion in UNICEF/WHO/World Bank (2019) and WHO (2019a).

BOX 2.1 **COUNTRIES WITH INSUFFICIENT DATA, YET SIGNIFICANT CONCERNS**

In the case of 15 countries assessed for this report, data were unavailable for one or more indicators used in the GHI formula, preventing the calculation of their 2019 GHI scores. In some cases, data are unavailable as a result of violent conflict or political unrest. These contexts are causal factors and strong predictors of hunger and undernutrition, so the countries with missing data may be the ones with citizens in the greatest distress due to hunger. Based on the available data that we have assessed and information from international organizations that specialize in combating hunger and undernutrition, we have determined that nine of the countries with missing data are cause for significant concern. The following is a brief explanation of what is known about the hunger and nutrition situation in each of the nine countries; the table below shows the existing GHI indicator values for these countries.

BURUNDI: At 55.9 percent, Burundi's child stunting level is the second highest of all countries covered in this report, 5.1 percent of children in Burundi experience wasting, and 6.1 percent die before the age of five. Approximately 1.7 million Burundians out of a population of 11 million were estimated to face crisis or emergency levels of food insecurity in 2018 (FSIN 2019). Burundi is ranked 185th out of 189 countries on the 2018 Human Development Index (UNDP 2018), and its rate of poverty is extremely high at over 70 percent (World Bank 2019a). More than 340,000 refugees have fled Burundi in recent years, most since 2015 (UNHCR 2019b). Climate shocks, political instability, and structural economic issues all contribute to food insecurity, while poor child feeding practices, food insecurity, a high burden of disease, and inadequate water, sanitation, and health facilities all contribute to poor child nutrition (FSIN 2019).

COMOROS: Densely populated and heavily reliant on agriculture, the Comoros suffers from poor environmental management and has limited resources to support its growing population. A low-lying island nation in the Indian Ocean, the Comoros is vulnerable to the effects of climate change and has been repeatedly hit by natural disasters (Burak and Meddeb 2012). A Category 4 hurricane struck the Comoros in April 2019, damaging hospitals, water supplies, agriculture, and livestock, and this damage has in turn worsened food insecurity and child undernutrition (WHO 2019b). An estimated 39.9 percent of children are stunted, 9.2 percent are wasted, and 6.9 percent die before the age of five.

DEMOCRATIC REPUBLIC OF CONGO (DRC): In the DRC 42.7 percent of children under age five are stunted, 8.1 percent are wasted, and 9.1 percent do not live to the age of five. The DRC has been beset by ongoing conflict and far-reaching poverty in recent decades. These factors, along with the deterioration of infrastructure and productive assets, high food prices, and a decline in agricultural production, have worsened food security (WFP 2015; FAO 2019a). As of December 2018, about 3.1 million people were internally displaced (IDMC 2019a) and more than 800,000 refugees from the DRC had fled to neighboring countries. More than 500,000 refugees, mainly from Burundi, Central African Republic, and South Sudan, had come to the DRC as of February 2019 (UNHCR 2019c). According to the latest data, 13 million people in the DRC—approximately a quarter of the population—face crisis or emergency levels of food insecurity (USAID 2019b). In North Kivu province, food insecurity is compounded by the current Ebola outbreak, resulting in a spiraling confluence of hunger and disease for the affected families (Norwegian Refugee Council 2019).

EXISTING GHI INDICATOR VALUES

Country	**Undernourishment** Prevalence of undernourishment 2016–2018 (%)	**Child stunting** Prevalence of stunting in children under five 2014–2018 (%)	**Child wasting** Prevalence of wasting in children under five 2014–2018 (%)	**Child mortality** Under-five mortality 2017 (%)
Burundi	—	55.9	5.1	6.1
Comoros	—	39.9*	9.2*	6.9
Congo, Dem. Rep.	—	42.7	8.1	9.1
Eritrea	—	—	—	4.3
Libya	—	22.4*	8.0*	1.2
Papua New Guinea	—	39.9*	7.1*	5.3
Somalia	—	—	—	12.7
South Sudan	—	—	—	9.6
Syrian Arab Republic	—	—	—	1.7

Source: Authors. See Appendix B for a list of data sources.
Note: — = not available. *indicates authors' estimates.

ERITREA: Data from Eritrea are extremely limited, with the latest child nutrition data from 2010 showing the stunting rate to be excessively high, at 52.0 percent, and the wasting rate to be 15.3 percent. Undernutrition in Eritrea is related to the challenges of food production that result from limited arable land, water shortages, and frequent droughts. Severe poverty also curtails people's ability to buy food (UNICEF 2015a). As of December 2018, over half a million refugees were displaced from Eritrea, making it one of the 10 largest refugee-producing countries in the world (UNHCR 2019e). A peace agreement signed between Eritrea and Ethiopia in 2018 officially ended hostilities that had been ongoing between the two countries since 1998, creating the possibility for economic and social reforms (Otieno 2018).

LIBYA: Since 2011 Libya has undergone a period of unrest, including ongoing conflict between rival groups over control of the country (WFP 2019a). As of December 2018, approximately 1.1 million people in Libya were in need of humanitarian assistance, including 270,000 internally displaced people (IDPs), IDP returnees, refugees, and asylum seekers—all groups particularly vulnerable to food insecurity (UNHCR 2019a; FAO GIEWS 2019). Food insecurity in Libya is driven primarily by people's inability to access food rather than a lack of food availability. However, instability has led some farmers to abandon agricultural activities, while others report that the conflict has limited their ability to obtain inputs and decreased their productivity (FAO GIEWS 2019).

PAPUA NEW GUINEA: As even Papua New Guinea's National Food Security Policy acknowledges, data on food security in the country are extremely limited, hampering decision making and policy evaluation (GoPNG 2018). A recent survey conducted in four rural areas of the country found that on average, individuals in poor households in all four areas did not meet minimum calorie requirements and that average protein consumption among individuals in both poor and nonpoor households was insufficient in three out of four areas (Schmidt et al. 2019). Previous research supports the finding that protein consumption in the country is insufficient (Omot 2012). Climate change and frequent natural disasters—including most recently the El Niño–induced drought in 2015/2016 and an earthquake and volcanic activity in 2018—are also key challenges that jeopardize food security (FAO 2018c).

SOMALIA: In 2016/2017 Somalia experienced a severe drought that brought the country to the brink of famine. Consequently, households in some parts of the country still have smaller livestock herds and lower food security (FEWS NET 2017a, 2019b). A delayed start to the rainy season in April and May 2019 has resulted in another drought and is predicted to negatively impact agricultural production and food security later this year, putting up to 2.2 million people in crisis or emergency levels of food insecurity by September. Armed conflict in parts of the country also disrupts access to food (FEWS NET 2019b). Over 2.6 million people of a total population of about 15 million are internally displaced in the country owing to conflict, flooding, drought, and food insecurity (IDMC 2019b; UN DESA 2019). Somalia's child mortality rate, at 12.7 percent, is the highest among all the countries included in this report.

SOUTH SUDAN: A civil war that began in 2013 has plunged South Sudan into crisis. In some parts of the country there is ongoing violence and disruption of trade routes, farming, and key livelihood activities (FEWS NET 2019c). Nearly 2 million people within the country are displaced (IDMC 2019c). Almost 7 million people of a population of 12.5 million were expected to face crisis-level food insecurity or worse as of July 2019, with the threat of famine looming (USAID 2019c). Furthermore, 860,000 children from 6 to 59 months of age were expected to suffer from moderate or severe acute malnutrition in 2019 (IPC 2019). The child mortality rate is 9.6 percent; data and estimates for the other GHI indicators are not available.

SYRIAN ARAB REPUBLIC: Since the onset of the Syrian civil war in 2011, the country has faced widespread food insecurity, ongoing violence, and massive human displacement, including 5.7 million refugees who have fled the country and 6.2 million people who are internally displaced (WFP 2019b; CFR 2019). As of May 2019, 6.5 million people out of a population of 18 million were considered unable to meet their basic food needs owing to spiking food prices, diminished agricultural production, and loss of livelihoods (WFP 2019b). Additionally, Syria's important role in regional agricultural trade means that the crisis has negatively affected food security in neighboring countries (Fathallah 2019).

estimates that result from these two types of measures are not comparable (Ballard, Kepple, and Cafiero 2013).

Within Country Borders

Inequality in varying degrees is ubiquitous throughout the world. Disparities can fall along geographic, ethnic, racial, gender, or other lines. Examining hunger and undernutrition at the national level inevitably misses important distinctions between groups within the country and risks overlooking populations that fare worse than average, perhaps critically so.

This section examines child stunting data for subnational geographic units, such as states, departments, or regions depending on the country. Childhood stunting is a key indicator because it can result from a wide range of factors—not just inadequate consumption of calories, but insufficient intake of micronutrients, failure to absorb micronutrients because of broader physical health problems, and recurrent diseases that affect child growth. Child stunting is highlighted here because subnational data for this indicator are available for a wide range of countries and because, unlike child wasting, child stunting is not subject to seasonal variation to a significant degree.

Figure 2.3 illustrates the subnational disparities in child stunting rates for children under the age of five in 60 countries. For each country with available data, this figure shows the stunting rates for the states or areas with the highest and lowest stunting levels, as well as the national average. In addition to inequality in nutrition and health, several other factors influence the size of the within-country gap in stunting levels, such as the number of subnational units into which a country is split for the sake of the survey, national population size and land area, and the average national stunting level.

Remarkably, even in those regions of the world with the lowest GHI scores in this report—Eastern Europe and the Commonwealth of Independent States, Latin America and the Caribbean, and East and Southeast Asia—some countries have subpopulations with stunting levels well above 30 percent, the threshold at which stunting is considered "very high" in terms of its public health significance (de Onis et al. 2019). For example, in the Commonwealth of Independent States, the highest stunting rate in Tajikistan is 31.9 percent in the Gorno-Badakhshan Autonomous Oblast, whereas the rate in the Districts of Republican Subordination is just 15.3 percent. In Latin America the highest stunting rate in Guatemala is extraordinarily high, at 70.0 percent, in Totonicapán department, while its lowest rate is 25.3 percent in Guatemala department. In Southeast Asia, stunting rates in the Philippines range from 45.2 percent in the Autonomous Region of Muslim Mindanao to 23.1 percent in the Central Luzon region.

An examination of subnational stunting data and, where possible, the change in stunting rates over time for particular states or departments can call attention to areas within a country that are losing ground, stagnating, or excelling in the fight against child undernutrition. This is invaluable information for local government authorities charged with addressing malnutrition. It can also point donors, policy makers, and nongovernmental organizations to areas that need additional resources and help identify success stories that can serve as models for other areas.

An example of remarkable improvement is in Kirehe district in Rwanda. According to the 2010 Rwanda Demographic and Health Survey, the stunting rate in Kirehe was 50.7 percent that year. By the next survey round in 2014–2015, its stunting rate had dropped to 29.4 percent. By contrast, at the national level, stunting fell more modestly in that period, from 44.2 to 37.9 percent. The success in Kirehe was possible because of a combination of factors. Kirehe district leaders were strongly committed to reducing undernutrition, particularly after the Rwandan president visited the district in 2009. They instituted the District Plan to Eliminate Malnutrition, which was implemented and monitored by a multisectoral committee. That plan and institutional structure were replicated at smaller levels down to local villages. Community health workers were trained and empowered to play a critical role in implementing community-based nutrition interventions. Several development organizations provided funding and support for the efforts in Kirehe (World Bank 2018).

Bolivia reduced its child stunting rate from 27.1 percent in 2008 to 16.9 percent in 2016. The reduction was broad based, with reductions in stunting rates between 2008 and 2016 for each department for which valid measurements were available. Potosí department had the highest stunting rate of any department in 2008, at 43.7 percent. In 2016, it still had the highest rate, but it was substantially lower at 29.8 percent. Approximately two-thirds of the population of Potosí is indigenous, and the state has one of the highest levels of poverty (Gigler 2009). The government has recognized the diverse ethnic, cultural, and linguistic identities within the country and acknowledged that its indigenous groups often face the greatest food insecurity and undernutrition. Bolivia's success is attributed in part to the implementation of the Family Community Intercultural Health Program, which included policies to ensure that health workers were sensitive to cultural beliefs and traditions in the communities where they worked. The government also implemented the Desnutrición Cero (Malnutrition Zero) program, which included evidence-based interventions recommended by the *Lancet* Series on Maternal and Child Nutrition (Weisstaub, Aguilar, and Uauy 2014).

Cambodia's child stunting rate declined from 39.9 to 32.4 percent between 2010 and 2014; 17 of its 19 provinces experienced declines

in their rates during that period. The two provinces of Kampong Chhnang and Svay Rieng, however, experienced increases in stunting rates between 2010 and 2014. Stunting in Kampong Chhnang rose from 40.3 to 42.8 percent, while in Svay Rieng, the stunting rate went from 31.2 to 32.8 percent. Neither are dramatic increases, yet the lack of progress in the context of national improvements is troubling. In both provinces there was also an increase in the proportion of households classified in the lowest (poorest) wealth quintile between 2010 and 2014.

It is, of course, important to consider disaggregated hunger and nutrition indicators other than child stunting. When formulating policies and interventions to address undernutrition, the key is to use these and other data as tools for both diagnosing the problem and devising solutions to address existing shortcomings.

Chapter 4 provides a more detailed look at two countries, Niger and Haiti, ranked 101st and 111th out of 117 countries, respectively. The analysis provides an overview of the context for each country and considers how and why their GHI scores and the underlying indicator values have changed over time.

Conclusion

This year's GHI simultaneously demonstrates cause for a degree of optimism, reasons for concern, a dose of realism, and, perhaps most of all, a large degree of uncertainty.

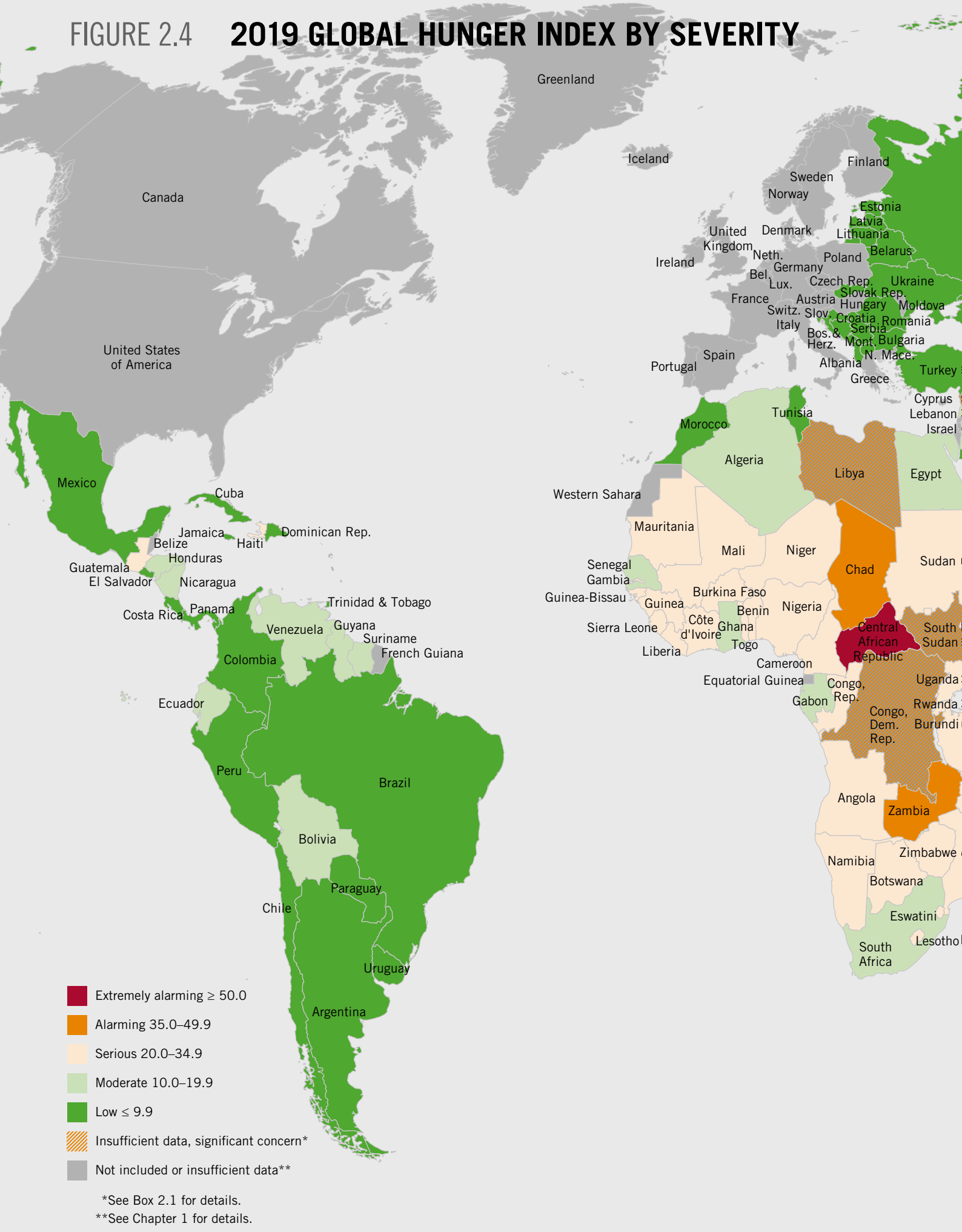
It is reasonable to view the progress made globally in reducing hunger and undernutrition over almost 20 years and find grounds to believe that the world can and will continue to make progress in the quest to eliminate these maladies. Good governance, smart investments, and solid sustained programming show results and protect human rights, prosperity, and equality. Maintaining a degree of optimism is important, particularly if it serves as motivation to continue with the hard work that is required.

At the same time, there are many reasons for concern. The number of undernourished people in the world is increasing. Extreme weather events are jeopardizing food production and food security and are only expected to increase in number and severity in conjunction with global climate change. Too many countries are in the midst of violent conflicts that have precipitously increased their hunger levels.

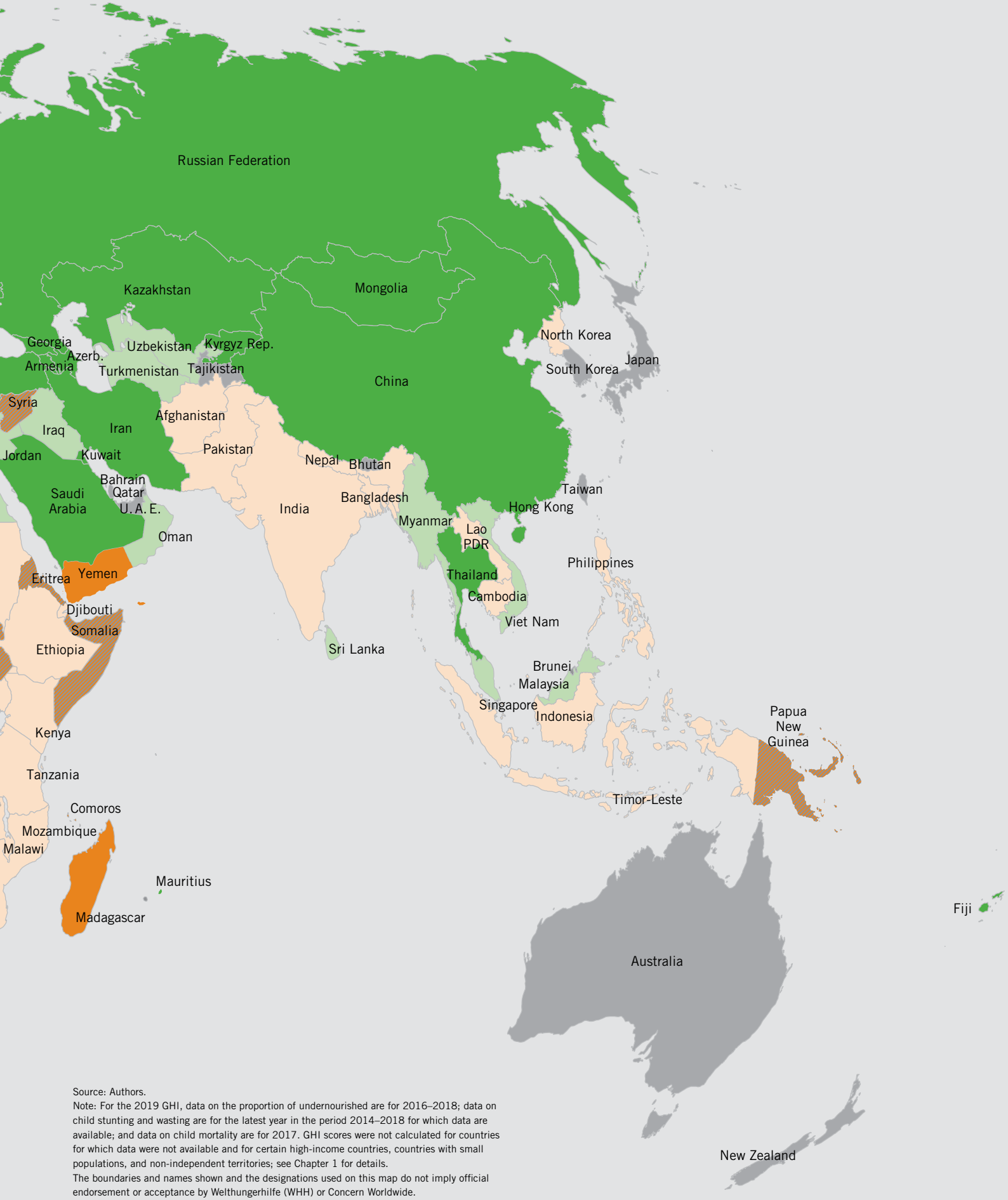
Inequalities in child nutrition at the subnational level and ongoing food insecurity even in high-income countries provide a dose of realism. Even in countries that may seem, on the surface, to have succeeded in reducing hunger and undernutrition, problems remain. There will always be a need to monitor the food security situation even in thriving economies and to provide support in these societies to those who struggle to access adequate nutritious food.

Lastly, in the case of climate change, there is a tremendous degree of uncertainty. As discussed in the following chapter, we know many of the actions we must take to mitigate, prepare for, and adapt to climate change, but we have no global-scale experience to look back on as a guide or a guarantor of success. It will take humanity's ingenuity, dedication, and perseverance to ensure that we collectively achieve Zero Hunger while tackling the unprecedented challenge of climate change.

FIGURE 2.4 2019 GLOBAL HUNGER INDEX BY SEVERITY



*See Box 2.1 for details.
**See Chapter 1 for details.



Source: Authors.
Note: For the 2019 GHI, data on the proportion of undernourished are for 2016–2018; data on child stunting and wasting are for the latest year in the period 2014–2018 for which data are available; and data on child mortality are for 2017. GHI scores were not calculated for countries for which data were not available and for certain high-income countries, countries with small populations, and non-independent territories; see Chapter 1 for details.
The boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by Welthungerhilfe (WHH) or Concern Worldwide.
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03

A storm strikes on the island of Buthony, Unity State, South Sudan. The country's problems with hunger due to prolonged conflict and displacement are exacerbated by severe recurring droughts and extreme rainy seasons.

CLIMATE CHANGE AND HUNGER

Rupa Mukerji
Helvetas

Human actions have created a world in which it is becoming ever more difficult to adequately and sustainably feed and nourish the human population. A 150-year run of rapid economic growth and a consequent rise in greenhouse gas emissions have pushed average global temperatures to 1°C above preindustrial levels. Experts agree that with the current rate of emissions, the increase in average global temperatures will likely reach 1.5°C between 2030 and 2052. Climate models project higher average temperatures in most land and ocean regions, hot extremes in the majority of inhabited regions, and heavy precipitation and ever-greater probability of drought in some areas (IPCC 2018a).

These changes will increasingly affect human systems—including food systems—across the world on a large scale. In South Asia and Africa South of the Sahara—regions currently with high concentrations of poverty and hunger—agriculture is highly dependent on rainfall and susceptible to even small changes in temperature. Large populations (up to 80 percent of rural households in some countries) depend on agriculture for their livelihoods, and it is the regions in which these populations reside that are most at risk of climate change–induced hunger and food insecurity.

For the world's hungry and undernourished people, climate change is an increasingly relevant threat multiplier. Almost 822 million people remain undernourished, and 149 million children are stunted because of undernutrition (FAO et al. 2019). In addition, more than 2 billion people suffer from deficiencies of one or more micronutrients (von Grebmer et al. 2014). Previously on the decline, the number of hungry people has been rising since 2015, a shift that the Food and Agriculture Organization has attributed to persistent instability in conflict-ridden regions, economic slowdowns in more peaceful regions, and adverse climate events (FAO 2018b). For example, the El Niño weather event of 2015–2016—which was exacerbated by higher sea surface temperatures, among other factors—led to widespread food insecurity and hunger in multiple countries. Since the early 1990s, the number of extreme weather–related disasters has doubled, affecting the productivity of major crops and causing food price hikes and income losses (FAO et al. 2018). These disasters have had a disproportionate negative impact on people living in poverty and their access to food.

One of the major blind spots in climate change decision making has been the framing of climate change as a biophysical challenge—that is, one driven by carbon emissions privileges, carbon sequestration capacity, and emissions reduction—rather than as an outcome of consumption, economic growth, and societal choices (Pelling, O'Brien, and Matyas 2014). In reality, the risks posed by climate change are the result of a range of underlying causes driven by societal values and behaviors, including production and consumption patterns, and human population. Only in recent years have discussions about climate change been reframed to focus on human lifestyles and consumption choices, equity of responsibility, associated impacts, and climate justice. This shift is a necessary step toward building societal consensus for the sweeping changes needed in current economic, consumption, and value systems, especially in high-income countries, to avoid the resulting catastrophic outcomes, including worsening hunger and undernutrition, of a significantly warmer world in the near future.

The Threat Posed by Climate Change to Food Security

Human-caused factors, including the global food system, are raising average global temperatures by 0.2°C per decade (IPCC 2018a). Extreme weather events, such as storms, fires, floods, and droughts, have increased in frequency and intensity. Globally, the average sea level has risen by 16–21 centimeters since 1900 (IPCC 2014). All of these manifestations of climate change have direct and indirect negative impacts on food security and hunger through changes in food production and availability, access, quality, utilization, and stability of food systems.

Impacts on food production

Food production is likely to fall in response to higher temperatures, water scarcity, greater CO_2 concentrations in the atmosphere, and extreme events such as heat waves, droughts, and floods. Already, yields of major food crops such as maize and wheat are declining owing to extreme events, epidemics of plant diseases, and declining water resources. In semi-arid regions, 80 percent or more of year-to-year variation in cereal production can be attributed to climate variability (FAO et al. 2018). In Africa, the relationship between production and various aspects of climate, such as rainfall patterns or temperature, is much more complex, showing high regional variation and demanding location-specific adaptation measures. Sea-level rise poses a particular risk to food security on small islands, in low-lying coastal areas, and in river deltas. Not only are large populations exposed, but given the high productivity of deltas, such as the Mekong Delta, which accounts for 50 percent of Viet Nam's national rice production, any change in production patterns would have a substantial impact on food availability and the national economy (Gommes et al. 1998). Rice, a staple crop consumed by half the world's population, is highly sensitive to minor changes in temperature and water salinity, making yields extremely susceptible to climate impacts in important growing regions such as the Mekong Delta (FAO 2018b). Data are lacking on how climate change affects other nutritionally important

crops such as millet, lentils, fruits, and vegetables. Furthermore, the aggregate national impacts on production do not reflect the range of impacts at the subnational and local levels that result from variations in climate conditions and production systems.

Given that projected impacts vary across crops, regions, and adaptation scenarios, farmers will need to apply location-specific adaptation measures. For example, model projections by the Agricultural Model Intercomparison and Improvement Project (AgMIP), an international collaboration to improve agricultural modeling, show yield reductions in all study locations in the maize-growing regions of Kenya. Although 50–70 percent of farms are vulnerable to the impacts of climate change, the exact impact varies widely between regions, and adaptation potentials differ (AgMIP n.d.).

Climate change will also increasingly affect water resources for food production as it alters the rates of precipitation and evaporation as well as groundwater levels. At present, 1.8 billion people—just under one-quarter of the world population—live in water-stressed areas, and this number is expected to grow to about half of the world population by 2030 (IPCC 2014).

Climate-related disasters, namely droughts, floods, and storms, account for 80 percent of all internationally reported disasters. Over the period 2011–2016, large parts of the world were affected by severe droughts, leading to crisis-level food insecurity for 124 million people in 51 countries (FAO 2018b). As a result of the El Niño event of 2015–2016, which was exacerbated by climate variability, the dry corridor of El Salvador, Guatemala, and Honduras experienced one of the worst droughts in the past 10 years, affecting 50–90 percent of the crop harvest (FAO 2016). The longer a drought lasts, the more difficult it is for people to cope with its impacts. Recurrent extreme events, such as the cycle of floods and cyclones that hit Pakistan over the period 2007–2010, had a devastating effect on the agricultural sector, with cumulative losses estimated at four times the government investment in the sector over the period 2008–2011 (FAO 2015). To cope with these disasters, people may, generally speaking, reduce their food consumption, consume lower-quality food, sell their assets, change their livelihoods, migrate, or pursue several of these strategies at once. Whatever they decide, each has its own links to hunger and food insecurity (von Grebmer et al. 2018). Climate impacts particularly affect women, who are often responsible not only for producing food but also for managing and distributing it within families and communities.

In addition, climate change exacerbates tensions, especially in vulnerable and food-insecure regions. Climate crises and armed conflict create a double vulnerability for communities, which are pushed beyond their ability to cope (ICRC 2019b). The combined impact of conflict and climate change destroys livelihoods, drives displacement, widens economic and gender inequalities, and undermines long-term recovery and sustainable development. Addressing the multidimensional impacts of conflict on food security requires a genuinely integrated approach to prevention. Such an approach must prioritize investment in innovative agricultural development, adequately consider the natural environment, and reinforce community resilience to complex shocks while supporting community-level systems to manage resources equitably and sustainably (Concern Worldwide 2018).

Impacts on food access

Weather anomalies and climate change, particularly extreme events, can affect food prices and consequently food access. The poorest households—rural net food buyers and the urban poor—are the most exposed to food price spikes, with the urban poor spending up to 75 percent of their total expenditure on food. Given the high degree of cross-connectedness between global food systems, more frequent and extreme events in one region have the potential to disrupt the entire global food system. While many key production areas experienced climate-driven impacts on yields, food price spikes have been accentuated by a combination of national policy responses. In this volatile and uncertain situation, low-income countries are understandably deeply concerned about their food security and their capacity to adapt to climate change, especially given that low-income countries and vulnerable people cannot easily absorb or adjust to sudden shocks.

Impacts on nutrition

Climate variability and extremes can also affect nutrition and food safety in several ways. In some low-income and marginal areas, patterns of food consumption are highly seasonal, with people's food security and nutrition being adversely affected during the lean season before the harvest. Climate change may reduce production and thus reduce food availability even further. Alternatively, it may extend the lean season, thus exacerbating the negative effects on people's nutrition.

In addition, climate change can worsen the nutritional value of the food that is cultivated. Recent studies show that higher CO_2 concentrations reduce the protein, zinc, and iron content of crops. As a result, by 2050 an estimated additional 175 million people could be deficient in zinc and an additional 122 million people could experience protein deficiencies. These impacts will be felt most keenly by people living in poverty, who depend heavily on plant sources for their nutrition. Poor people in Africa, the Middle East, and South and Southeast Asia are most at risk from the combination of these

deficiencies and poor public health systems that may be unable to cope with the impacts (Smith and Myers 2018).

Climate change will also affect other crops and food sources that are essential for good nutrition and food security. In terms of food crops, much of the information on climate change impacts covers only the four major staple crops—wheat, rice, maize, and soybeans—even though a range of other crops are essential for nutrition and food security. It is already clear, however, that changes in agricultural production, pasturelands, temperature, and water will affect animal production. FAO studies show that droughts are the most damaging climate-related disaster, with the livestock sector accounting for the second-highest amount of losses (36 percent) after crops (49 percent of all reported losses). These livestock losses have a direct impact on food availability and access (FAO 2018b). Fish, another important source of food and nutrition for large populations, are similarly highly vulnerable to temperature changes and climate extremes.

Finally, erratic rainfall and higher temperatures affect the quality and safety of food. Higher rainfall intensity leads mold to grow on field crops, with some strains producing toxins, such as aflatoxins, that can lead to stunting among children (Lombard 2014). Inadequate post-harvest management practices as the result of changing growing conditions lead not only to loss of food in terms of quantity but to a degradation in quality, including its nutritional value.

Impacts on the food value chain

A changing climate may worsen food losses in a global food system in which massive amounts of food are already lost or wasted. In low- and middle-income countries, about one-third of the food that farmers produce is lost between the field and the market, and in high-income countries a similar percentage of food is wasted at various points from the market to the table (FAO 2011). Given that the current food system contributes 21–37 percent of total net anthropogenic emissions (IPCC 2019), these losses exacerbate climate change without contributing to improved food security or nutrition (IPCC 2018b). In fact, besides being a huge burden on scarce environmental resources, food losses of this magnitude are a factor in the persistence of food insecurity. Climate change and weather extremes can exacerbate this situation in low- and middle-income countries: crops that endure drought in the field and high humidity during storage—an increasingly common pattern owing to changing rainfall patterns—are more vulnerable to pests and fungal infections, leading to losses in both food quantity and quality.

Addressing the Threats Posed by Climate Change to Food Security

Current actions are inadequate for the scale of the threat that climate change poses to food security. The international mechanism for confronting this challenge is the Paris Agreement, which was negotiated in 2015 and opened for signature in 2016. So far, 185 countries have signed the agreement (UNFCCC 2019), which sets a goal of limiting warming to well below 2°C. At the heart of the Paris Agreement are countries' own pledges to reduce greenhouse gas emissions, known as nationally determined contributions (NDCs). Unfortunately, current mitigation actions as defined in countries' NDCs are collectively expected to result in a warming of 3–4°C over preindustrial averages by 2100 (IPCC 2018b). This is a massive overshoot of both the 1.5°C and 2°C targets and will lead to substantial impacts on food and nutrition security. To bridge the gap, countries have agreed to a system of five-year cycles for reporting, assessing progress, and setting new, more ambitious NDCs.

It is clear that more ambitious actions are required in order to reduce the risks of climate change (mitigation) and to cope with its impacts (adaptation) on food and nutrition security. It is worth noting that climate change raises the challenge of four key inequities:

1. the degree of responsibility for causing climate change
2. the intergenerational impacts of climate change
3. the impacts of climate change on poorer people in the Global South
4. the ability and capacity to deal with climate change impacts

All of these inequities play out at the interface of climate change and food security, posing ethical and existential challenges. The areas and populations most affected by climate change have contributed the least to the factors that lead to climate change and potentially have the least capacity to deal with its impacts (see Box 3.1 on countries' vulnerability and readiness). The consumption patterns of the current generation in middle- and high-income countries place the food security of future generations at risk, restricting the options and choices available to them. By delaying action and limiting the scale of that action, we reduce the "safe space" for future generations (Raworth 2012).

Small or incremental changes will not deliver the scale or pace of change needed to remain within the 2°C warming threshold as defined by the Paris Agreement. Transformation—a fundamental change in the attributes of human and natural systems—is now recognized as central to climate-resilient development pathways that address the goals of Agenda 2030, particularly the Sustainable Development

BOX 3.1 **HUNGER AND CLIMATE CHANGE: VULNERABILITY AND READINESS**

Seth Gitter and Kierstin Ekstrom

For global climate change, as for hunger, the countries that experience the worst problems have the fewest resources to address them. Moreover, the negative effects of climate change on natural resources and food production interact with each other, creating an increase in conflict, migration, and political instablity that can exacerbate hunger and undernutrition (Scheffran et al. 2012).

Comparing data on hunger based on the GHI Severity Scale with countries' vulnerability to and readiness for climate change illustrates the links between these factors. The Notre Dame Global Adaptation Initative (ND-GAIN) evaluates countries based on their vulnerability to and readiness for climate change. The ND-GAIN defines vulnerability as the "propensity or predisposition of human societies to be negatively impacted by climate hazards," which it examines across six sectors: food, water, health, ecosystem services, human habitat, and infrastructure (Chen et al. 2015, 3).[1] It defines readiness as the ability to leverage investments and convert them to adaptation actions (Chen et al. 2015) and considers three components of readiness: economic, governance, and social.

Countries are scored using a scale from 0 (least vulnerable) to 1 (most vulnerable). Among countries with a GHI score in 2019, Niger is the most vulnerable (0.67) and Russia is the least (0.33). Countries with higher GHI scores are more vulnerable, as shown by a strong positive correlation between the two scores (0.88). Countries are also scored based on their readiness, which is measured on a scale from 0 to 1, from least to most prepared. The Central African Republic is the least prepared (0.13) and Estonia (0.62) is the most prepared among countries with a GHI score. Countries with higher GHI scores have lower readiness scores, with a correlation of -0.75 between the two measures. Higher-income countries that are not scored on the GHI index are ranked as the most ready (Singapore and New Zealand both have a readiness score of 0.80). Switzerland (0.27) is the least vulnerable.

In the figure on the facing page, countries' vulnerability to climate change is plotted against their readiness, with countries identified by their status on the GHI Severity Scale. It clearly shows that the countries with *extremely alarming* or *alarming* GHI scores (35 or higher) are the most vulnerable and least ready, while those countries with *low* GHI scores (below 10) are the least vulnerable and most ready (see Table 2.1 on p. 15 for the full list of countries' GHI scores).

At the extreme end of the upper-left quadrant, representing countries that are both vulnerable to and unprepared for climate change, are the Central African Republic and Chad. These countries have 2 of the 3 highest GHI scores, they are 2 of the 10 highest ND-GAIN vulnerability scores, and both have very high projected population growth rates, which will exacerbate the negative effects of climate change (Nugent 2019). Climate change has already had negative impacts on the Lake Chad region—including Chad and neighboring Niger, with the highest vulnerability score of any GHI country—decreasing food production there and exacerbating hunger and conflict (Ruppel and Funteh 2019). Similar combinations of climate change, conflict, and poor harvests have affected the Central African Republic.

Myanmar is an outlier in terms of the relationship between hunger and climate change vulnerability and readiness. It has a *moderate* level of hunger, but it is one of the countries most likely to be affected by natural disasters from climate change and it has only limited plans and capacity to address climate change issues (Leckie, Butta, and Maung 2018). Zambia is an outlier in terms of readiness given its high GHI, though its vulnerability is similar to other countries with similar GHI scores. Specifically, Zambia has the greatest readiness among countries with an *alarming* level of hunger. It has taken increasing legislative action in relation to climate change, identifying climate change funds and drafting climate change policy (Watson, van Rooji, and Nakhoodi 2013).

In the upper-right quadrant, Rwanda and Timor-Leste are above average on readiness though still vulnerable. Rwanda is a land-locked agriculturally dependent country and Timor-Leste a small island nation, making them both more vulnerable to climatic shocks. Rwanda's readiness can be attributed to its growing economy and its already-operational climate action plan (USAID 2019d). Timor-Leste benefits from a petroleum fund with an almost US$17 billion reserve in a country of just over 1 million people (Timor-Leste Ministry of Finance 2018).

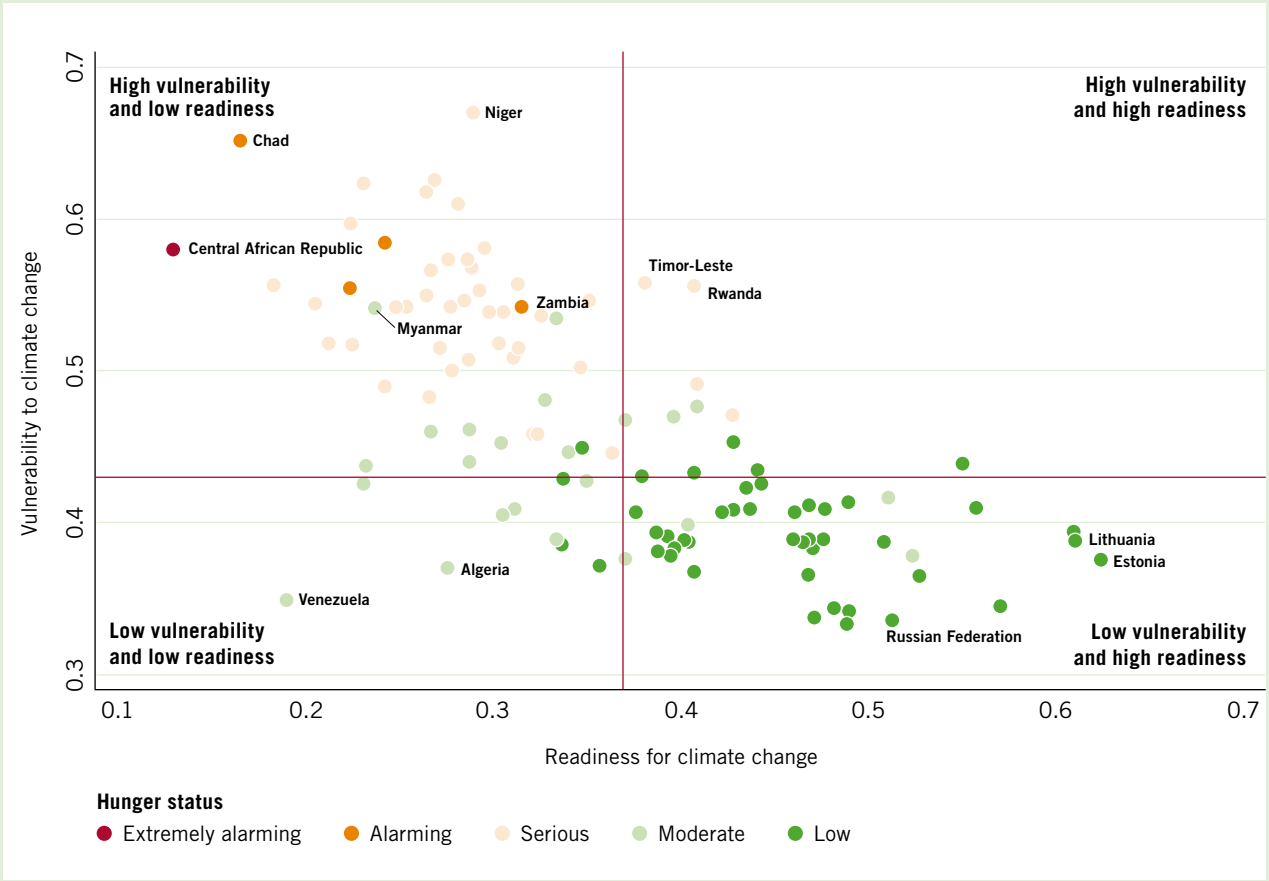
Venezuela and Algeria, in the lower-left quadrant, show relatively low readiness given their vulnerability. Venezuela's

[1] The GHI and the ND-GAIN vulnerability index share only one indicator—child wasting—and given the numerous indicators used in the calculation of the vulnerability index, any positive correlation between the two indexes is not a trivial matter.

current economic and political crisis is well known, and with the government's inability to provide many basic services, it is unlikely to be effective at combating issues of climate change. Algeria's problems, though less severe, are similar. The decline of Algeria's petroleum export–based economy and lack of government capacity mean that the country has been unable to ready itself for climate change (Green Climate Fund 2017). Finally, relatively well-off Eastern European countries, such as Estonia and Lithuania, are among the least vulnerable to climate change and the most ready because they have more stable political environments and greater economic resources than other countries with GHI scores.

This comparison of the GHI and the two components of the ND-GAIN Index, which shows substantial geographical overlap in the issues of climate change and hunger, clearly highlights the dual threat faced by some of the most vulnerable countries in the world and points to where action is most strongly needed.

FIGURE 3.2 **CLIMATE CHANGE VULNERABILITY AND READINESS ACCORDING TO GHI SEVERITY SCALE**



Source: Seth Gitter and Kierstin Ekstrom.

Note: Scores for vulnerability to climate change and readiness for climate change are from the Notre Dame Global Adaptation Initiative (ND-GAIN 2017; Chen et al. 2015). Countries are scored on a scale from 0 to 1. On the x-axis, 0 = least prepared and 1 = most prepared. On the y-axis, 0 = least vulnerable and 1 = most vulnerable. Classifications according to the GHI Severity Scale are based on authors' calculations from this report. In the legend, *extremely alarming* = GHI score ≥ 50.0; *alarming* = 35.0–49.9; *serious* = 20.0–34.9; *moderate* = 10.0–19.9; *low* = ≤ 9.9.

Goal 2 of Zero Hunger, and the Paris Agreement. These pathways must include actions for mitigation, adaptation, and sustainable development. More broadly, they demand a profound and deliberate shift toward sustainability, facilitated by changes in individual and collective values and behaviors and a fairer balance of political, cultural, and institutional power in society (IPCC 2018b). Frequently in such efforts, concerns about equity are sidelined through an assumption that a growing economy, for example, creates opportunities for all. History shows, however, that pathways that are positive for a majority of people still have significant impacts and impose considerable costs, especially for people who are marginalized and vulnerable (Hickel 2019).

Recognizing that the global food system plays a central role in such a pathway, the EAT-*Lancet* Commission calls for a radical transformation to be implemented (Willett et al. 2019). It rightly postulates that without large-scale action, we risk missing both the goals of Agenda 2030 and the Paris Agreement. While it is a laudable first attempt to set universal scientific targets for the food system, including for food waste reduction, the targets cannot be universally applied as there are major differences in global food consumption patterns. Northern Americans, for instance, consume 6.5 times the recommended amount of red meat, whereas South Asians consume only half the recommended quantity.[1] Dietary recommendations thus cannot be globally imposed but must be differentiated and locally adapted.

Mitigation measures and impacts on food security

Efforts to remain within the "safe space" for society must include mitigation actions—that is, measures to reduce or prevent the emission of greenhouse gases or to enhance the absorption of those already emitted in order to limit the magnitude of future warming. Agriculture and forestry play an important role in mitigation, as photosynthesis can be used to convert atmospheric CO_2 into carbohydrates and oxygen.

Mitigation measures can offer synergies with efforts to improve agricultural production. Sustainable agricultural practices can enhance soil quality, thereby increasing productivity and other ecosystem services, such as regulating water quality. By improving land and fertilizer management, applying biochar (charcoal produced from plant matter and stored in the soil as a means of removing CO_2 from the atmosphere), breeding for deeper root systems, managing manure more effectively, adopting improved feeding practices for animals, and applying better grazing land management, farmers can both sequester CO_2 and enhance productivity. From a technical point of view, agroforestry offers huge mitigation potential.

To achieve the goal of limiting global warming to 1.5°C, mitigation strategies need to be deployed rapidly, which potentially raises negative trade-offs with development goals and food security. For example, the large-scale deployment of intensive bioenergy plantations, including monocultures, could help sequester carbon and replace fossil fuels. At the same time, however, they could replace natural forests and subsistence farmlands, reduce biodiversity, threaten food and water security, endanger local livelihoods, and intensify social conflict (Brondizio et al. 2019). In addition to relying on natural ecosystems for food, more than 2 billion people rely on wood fuel to meet their primary energy needs, 4 billion people rely primarily on natural medicines for health care, and up to 70 percent of drugs globally contain natural or synthetic products inspired by nature (Brondizio et al. 2019). Changes in access to these resources would disproportionately affect women, who rely more on common pool resources. All climate models that place us on the path to achieving the Paris Agreement goals assume large-scale deployment of these types of bioenergy with carbon capture and storage measures. Land governance will play a key role in ensuring that the most vulnerable are not further marginalized through such mitigation strategies.

The promise and the limits of adaptation

Adaptation measures are those that help to manage both the adverse impacts of climate change and the opportunities that may arise from a changing climate. Sustainable agricultural practices, such as agroecological processes and multifunctional landscape planning, can fulfill multiple objectives, including food security and biodiversity protection. Such practices need to be context specific and based on the knowledge of indigenous and local practitioners, scientists, consumers, and private sector value chain actors who are willing to transform supply chains. Still, trade-offs may arise between adaptation, development, and mitigation that are difficult for local communities to anticipate and manage.

Defining adaptation pathways is one of the most serious challenges. Because adaptation actions are context specific, the necessary actions are often outside the current experiences of the actors involved. Carrying out these actions requires supportive policies and measures from actors at multiple levels, all of whom must share the same vision and have the right incentives in place. Adaptation strategies also require redistributive measures, such as providing access to affordable and nutritious food or renewable energy to those who are likely to be adversely impacted by the adaptation measures.

[1] Ruminant livestock (cattle, sheep, and goats) account for about half of agriculture's production-related greenhouse gas emissions (WRI 2019).

Adaptation pathways are thus challenging to communicate, plan, finance, implement, and monitor.

A wide variety of adaptation actions are underway around the world. They range from autonomous adaptation, where human and natural systems continually adjust to the actual climate and its effects; to incremental adaptation, where changes are made within a system but do not affect its essence and integrity; to transformational adaptation, which seeks to change the fundamental attributes of a socioecological system in anticipation of climate change and its impacts. Sometimes, usually as an unintended consequence, there is also maladaptation—that is, actions intended to reduce risk that may inadvertently lead to an increased risk of adverse climate-related outcomes, including through increased greenhouse gas emissions, more vulnerability to climate change, or diminished welfare, whether now or in the future (Antwi-Agyei et al. 2018).

Future food and nutrition security will depend on adapting to rapid biological evolution created by human-induced changes. With changing temperatures and precipitation rates, plant and animal diseases are spreading into new biomes. Given that it can take 20 years to breed plant and animal species that can adapt to these conditions, these investments need to be made now so that they are in place by 2040. However, because scenarios of future climate change and its interaction with plant and animal life still contain uncertainties, and because most of the earliest and most severe impacts are felt in regions marked by subsistence farming, the private sector has invested little in this type of research and plant and animal breeding. New types of partnerships need to be forged to accelerate investments in relevant R&D.

Along these lines, some initiatives focus on bringing together indigenous and community knowledge and external scientific expertise to create new knowledge and practices (see Box 3.2). These are important because adaptive capacity needs to be created close to where the impact of climate change is being felt. They also valorize the knowledge of women, who are often the managers of agrobiodiversity and the holders of traditional knowledge. Overall, enhancing communities' ability to adapt to climate change or manage climate change risks requires addressing pertinent locally identified vulnerabilities, involving stakeholders, and ensuring that adaptation initiatives are compatible with existing decision-making processes.

One important resource for future adaptation is the in situ conservation of agricultural biodiversity. In most major terrestrial biomes, the average abundance of native species has fallen by at least 20 percent (Brondizio et al. 2019). Wild relatives of crops, mammals, and birds are important for long-term food security, and reductions in the diversity of cultivated crops, their wild relatives, and domesticated breeds will mean that agroecosystems are less resilient against future climate change, pests, and pathogens. Local efforts, including those by indigenous peoples and local communities, have formed the backbone of conservation efforts so far, and these need to be enhanced and supported.

While adaptation is critical, there are limits in terms of both current knowledge systems and the availability of feasible alternatives. In the low-latitude regions of the world—primarily home to the low-income countries—even slight warming will reduce yields. While production systems can adapt to smaller changes in average global temperatures, many of the current systems would no longer be able to adapt to temperature increases of 3°C or more. This will differentially affect low-income countries and the poor within them, who lack resources and alternative livelihood options.

Finally, climate change does present opportunities and the possibility of adapting to and reaping benefits. These include longer growing periods, access to new lands in the Northern Hemisphere for food production, increased yield potentials, and access to new transportation routes and energy resources in the Arctic Circle. The rights to exploit these potentials are already being hotly contested between countries in the region, and these potential opportunities to seize resources are acting as serious impediments to climate action.

The Way Forward

Leadership, ambition, and pathways for societal change

Individuals engage in adaptation and mitigation actions if they feel they have the capacity to effect change. Ambitious leadership plays an important role in showing that an alternative future is possible and that there are indeed pathways to achieving the goals of sustainable development while remaining within planetary boundaries. The EAT-*Lancet* study was an important step in this direction, although its recommendations do need to be adapted to local contexts and cultural practices. The burden of changing practices must not be borne by those who currently have limited capacities and who have historically used few global resources, including in terms of their carbon budget.

Solidarity and safety nets

Several regions of the world, such as the small island nations, are already experiencing the impacts of climate change and related risks to food security. Global solidarity with these and other frontline communities that are the most climate vulnerable must be fostered and safety net programs designed. Climate finance must be increased

BOX 3.2 **COMBINING INDIGENOUS KNOWLEDGE AND METEOROLOGICAL DATA FOR ADAPTATION**

At least a quarter of global land area is traditionally owned, managed, used, or occupied by indigenous peoples. In addition, a diverse array of local communities—including farmers, fishers, herders, hunters, ranchers, and forest users—manage significant areas under various property and access regimes. Indigenous knowledge and community adaptation are thus important underpinnings for large-scale adaptation and mitigation actions.

While many societies use indigenous knowledge to forecast rain, increased climate variability may make these indicators less reliable. Moreover, some development programs have had a negative impact on indigenous peoples and local communities, challenging traditional management systems, preventing the transmission of indigenous and local knowledge, stunting the potential for benefit sharing, and hampering the ability of indigenous peoples and local communities to sustainably manage wild and domesticated biodiversity. However, new interventions that combine indigenous knowledge with meteorological data are leading to the creation of new experiences and knowledge, embedding it close to the locale of climate action.

Andean farmers in Bolivia have traditionally observed bioindicators—natural phenomena such as stars, wind, plants, and animals—as part of their strategy for dealing with weather-related risk and agricultural cycle planning. However, the use of these practices has declined in recent decades. From 2005 to 2018, Helvetas implemented a program for disaster risk reduction in which groups of lead farmers, or *yapuchiris*, consolidated and systematized traditional bioindicators. Through an app, these local specialist farmers, certified by the National Agricultural Early Warning System, register and share local forecasts based on bioindicators, complementing conventional meteorological information. The Bioindicator Forecast Model has significantly reduced crop losses from drought, hail, frost, and flooding. The *yapuchiris* have shared their experiences with others in the region, encouraging farmers to make use of local innovations. By complementing technological information with the knowledge of indigenous peoples, this program gives climate services a Bolivian identity.

Similarly, precipitation patterns in Mali have changed so much that traditional crop calendars and strategies have lost their validity, threatening the livelihoods of the population that is dependent on agriculture and livestock farming. Helvetas's project Nemaso, which means "humidity" in the local Bambara language, puts the national weather station and meteorological institutes into contact with the younger members of the villages, helping them understand and apply agrometeorological information in farming decisions. Simple rain gauges have been established in villages in the Ségou and Sikasso regions to monitor rainfall. The data are systematically collected and transmitted via mobile phone to the National Meteorological Service, which in turn sends back short- and long-term weather forecasts and advisories derived from long-term data and modeling. Farmers then test and validate the agrometeorological advisories, thereby reviving traditional techniques to restore degraded drylands and increase soil fertility and encouraging the implementation of new methods. In the first two years of the program, the adapted practices led to a 20 percent increase in production compared with control plots (Cooperación Suiza en Bolivia 2018).

and flow to climate-vulnerable people and regions on a significant scale and in a predictable manner. Adaptation must receive the same importance in financing as mitigation. Diverting development assistance toward climate finance erodes the basis for sustainable development and risks compromising food and nutrition security as well as adaptive capacities. Mitigation and adaptation measures must be combined with safety net policies that protect the most vulnerable, particularly women and children, from the adverse impacts of these measures, including hunger and food insecurity.

Governance and capacity building

Adaptation and mitigation actions need to be negotiated, coordinated, and implemented at multiple levels. For example, a country's nationally determined contributions toward global mitigation objectives can compromise food security at the local level. Actors at all levels need to be able to negotiate and define common priorities and protective measures to ensure that marginalized people do not bear the burden of national mitigation commitments to a globally set goal. Good governance, participatory planning, and downward accountability are essential elements that will help people and institutions negotiate and define measures that are fair and sustainable. Essential to

this will be a shift from existing project-based short-term funding to programmatic, long-term investments for adaptation that are clearly aligned and integrated with national budgets. As many countries at the front line of climate impacts are also fragile states, the challenge of creating the necessary policy frameworks and building the capacity to implement them is enormous. It demands enhanced collaboration between global and national civil society, the private sector, governments, and communities on a massive scale. Institutions and system actors need to be strengthened to avoid scenarios of mass distress and forced migration. By providing support for broad-based and gender-balanced local leaders, it may be possible to implement adaptation and mitigation actions on a large scale.

Conclusion

Climate change is affecting the global food system in ways that increase the threats to those who currently already suffer from hunger and undernutrition. In this context, ending hunger and undernutrition demands large-scale action that seeks to address the inequities raised by climate change while staying within planetary boundaries. It requires ambitious leadership showing that an alternative future, including adaptation and mitigation actions on a broad scale, is possible. Global solidarity with the most climate-vulnerable communities and countries must be fostered, and high-income countries must take responsibility for mitigating causes and supporting low- and middle-income countries in adapting to these changes. Both mitigation and adaptation measures need to be combined with safety net policies that protect the most vulnerable people from hunger, food insecurity, and other adverse impacts of these measures. Furthermore, good governance, capacity building, participatory planning, and downward accountability are essential to help people and institutions negotiate and define measures that are fair and sustainable. Achieving these goals will require a radical transformation that enables changes in both individual and collective behaviors and values and a fairer balance of political, cultural, and institutional power in society for the benefit of the food security and nutrition of all people.

04

A woman collects water at a river in Jean-Rabel, Nord-Ouest Department, Haiti. In recent decades Haiti has been hit by several natural disasters, with severe impacts on food and nutrition security. Crop failures have led to increased food prices, food insecurity, and political instability.

A CLOSER LOOK AT HUNGER AND UNDERNUTRITION: NIGER AND HAITI

Niger

Niger is a landlocked West African country with a population of 21.5 million people (World Bank 2019a). It gained independence from France in 1960, and after decades of single-party military rule it was established as a multiparty democracy in 1991. Since then it has experienced multiple coups and continuous instability, switching between democratic and military regimes, with the current president having held office since 2011 (Thurston 2017). Niger has also struggled with terrorism and armed conflict, including rebellions by the Tuareg people[1] in 2007–2009 and around 2013 and incursions by Boko Haram fighters from northern Nigeria into the country's southeast starting in early 2015 (Elischer and Mueller 2018; UNHCR 2019g). The Tillabéri and Tahoua regions in the southwest have also experienced a recent uptick in attacks by militant groups, forcing more than 50,000 Nigeriens to flee their homes (UNHCR 2018).

As of 2014, 44.5 percent of Niger's population lived in poverty, down from 74.9 percent in 2005.[2] GDP per capita was just $378 in current US dollars as of 2017, the third lowest in the world among all countries with available data after Burundi and Malawi (World Bank 2019a). Niger ranks last of all countries in the Human Development Index at 189th out of 189 countries (UNDP 2018). Seventy-six percent of employment is in agriculture, while 8 percent is in industry and 16 percent is in services. Forty percent of GDP comes from agriculture, 16 percent from industry, and 38 percent from services (World Bank 2019a).

Niger—and its agricultural sector in particular—is highly exposed to risks, including drought, locust outbreaks, livestock diseases, food price spikes, and political instability (World Bank 2013). According to the vulnerability component of the World Risk Index, it is the third most vulnerable country in the world, meaning that Niger is particularly susceptible to and unable to cope with the risks it faces (Heintze et al. 2018).[3] Approximately three-fourths of Niger's landmass consists of arid land in the Sahara Desert that receives limited rainfall, has low levels of irrigation, and has a population reliant on livestock keeping and limited crop production (World Bank 2013). Increasing temperatures and the risk of rising variability in rainfall due to climate change are putting additional pressure on Niger's resource base and creating tension over resources among the population (ICRC 2019a).

[1] The Tuareg are an ethnic group comprising about 11 percent of Niger's population (Minority Rights Group International 2019).

[2] The poverty rates expressed here are poverty headcount ratios at $1.90 per day (2011 purchasing power parity).

[3] Niger ranks 175th out of 181 countries in the Notre Dame Global Adaptation Initiative (ND-GAIN) index, which takes into account countries' vulnerability and readiness to adapt to climate change (ND-GAIN 2019).

FIGURE 4.1 **MAP OF NIGER**

Note: Niger is divided into seven regions and the Niamey Capital District.

Agricultural productivity in Niger is low, with crop yields of staples, including millet and sorghum, below regional averages (FEWS NET 2017b). Niger's agricultural sector is claimed to be constrained in part by limited financing, with most farmers having no access to credit or bank accounts (Cancino 2018).

Hunger and Undernutrition in Niger

Niger ranks 101st out of 117 countries according to the 2019 Global Hunger Index, with a 2019 GHI score of 30.2, considered *serious,* down from 52.1 in 2000, considered *extremely alarming*. Underlying this improvement are reductions in the values of each of the four indicators used to calculate the GHI scores (Figure 4.2). The prevalence of undernourishment—indicating the percentage of the population with insufficient access to calories—fell between 1999–2001 and 2013–2015. Since 2014–2016, however, it has risen again, driven up by low agricultural production, conflict, population displacement, and increased cereal prices (FAO 2019b; FEWS NET 2016, 2017c). The number of refugees and internally displaced persons in Niger has increased dramatically since 2015 (UNHCR 2017). In Niger's Diffa region in particular, conflict and population displacement have worsened food insecurity (FAO and WFP 2019).

Niger's mortality rate for children under age five declined significantly from 22.4 percent in 2000 to 8.5 percent in 2017. An analysis of the reduction in child mortality in Niger between 1998 and 2009 showed that the improvement could be attributed largely to increased

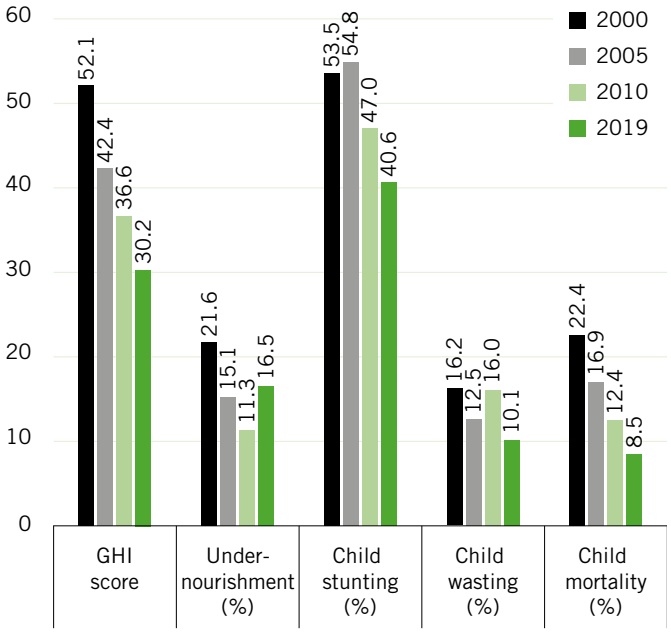
access to primary health care services for women and children, mass campaigns focusing on vaccinations and insecticide-treated bed nets, and improved nutrition programming. While the country did indeed experience food insecurity during this period, the government and other organizations were able to provide relief that prevented backsliding on child nutrition (Amouzou et al. 2012).[4]

Niger's rates of child stunting, an indicator of chronic undernutrition, were 53.5 and 54.8 percent, respectively, in 2000 and 2006. The most recent data, from 2016, show the child stunting rate at 40.6 percent, which is still considered "very high" (de Onis et al. 2019). Niger's child wasting rate, indicating acute undernutrition, has shown some fluctuation; in 2016 it was 10.1 percent (considered "high" according to de Onis et al. 2019) compared with 16.2 percent in 2000. Child undernutrition rates vary substantially by region. Stunting levels are at or above 50 percent in Zinder and Maradi, and the highest wasting rates are in Agadez and Maradi, both of which are at 12.9 percent (Table 4.1).

Many Nigeriens have poor diets, including low dietary diversity and a high reliance on staple foods (FEWS NET 2017b). Millet and sorghum constitute a large portion of the calories consumed by Nigeriens, particularly among rural people living in poverty (Cheng and Larochelle 2016). A study of pregnant and lactating women in Zinder found that only about one in six women reported meeting a standard measure of minimum dietary diversity (Wessells et al. 2019). Diets of Nigerien infants and young children are woefully inadequate: just 23.3 percent of infants under 6 months of age are exclusively breastfed, and only 5.6 percent of children ages 6–23 months consume a minimum acceptable diet (INS and ICF International 2013).[5]

Exceptionally challenging socioeconomic conditions in Niger create a difficult environment for food and nutrition security. Niger has one of the lowest levels of educational attainment and literacy of any country in the world. Nigeriens average just two years of schooling, and the adult literacy rate is only 31 percent. The situation is even more dire for women than for men (UNDP 2018; World Bank 2019a), which has implications for child nutrition. Parental education at the secondary level and beyond, especially maternal education, is associated with lower levels of child stunting, including in Niger (Alderman and Headey 2017). Niger also has one of the highest population growth rates, at 3.8 percent annually. It has the highest rate of child marriage in the world, with approximately three-fourths of girls marrying before the age of 18 (World Bank 2019a; Shepherd 2018). Households in Niger in which the woman was married at an early age have higher levels of food insecurity in terms of both dietary diversity and subjective self-assessments of food security (Steinhaus and Kes 2018).

FIGURE 4.2 **NIGER'S GLOBAL HUNGER INDEX SCORES AND INDICATOR VALUES, 2000, 2005, 2010, AND 2019**



Source: Authors.

Note: Undernourishment values refer to the prevalence of undernourishment for the country's population as a whole; child stunting, child wasting, and child mortality refer to the rates for each indicator for children under the age of five. Data for GHI scores, child stunting, and child wasting are from 1998–2002 (2000), 2003–2007 (2005), 2008–2012 (2010), and 2014–2018 (2019). Data for undernourishment are from 1999–2001 (2000), 2004–2006 (2005), 2009–2011 (2010), and 2016–2018 (2019). Data for child mortality are from 2000, 2005, 2010, and 2017 (2019). See Appendix A for the formula for calculating GHI scores and Appendix B for the sources from which the data are compiled.

What Has Worked in Addressing Food Insecurity and Undernutrition

Various types of interventions have the potential to improve food security and nutrition in low- and lower-middle-income countries, including nutrition-specific interventions such as supplementation and nutrition education programs, and nutrition-sensitive interventions such as agriculture and cash transfer programs. Research has shown, however, that the effectiveness of a given approach depends on the context in which it is implemented, which can vary from country to country and within country borders. A selection of the impact evaluation literature presents some of the available evidence on what has been effective in Niger.

While ready-to-use therapeutic food (RUTF) was developed to treat child undernutrition, in Niger it has also been shown to be

[4] Globally, undernutrition is responsible for 45 percent of deaths among children under the age of five (Black et al. 2013). For a detailed explanation of child mortality's inclusion in the GHI, see Wiesmann et al. (2015).

[5] A "minimum acceptable diet" is a standard that combines minimum dietary diversity and minimum meal frequency, with different recommendations for breastfed and non-breastfed children, who need to receive milk or milk products as a substitute for breast milk.

effective as a preventative strategy (Grais 2016). A three-month trial that included the distribution of daily packets of RUTF to children succeeded in reducing wasting and mortality among the participants (Isanaka et al. 2009). Additional trials have found that distribution of ready-to-use supplementary food (RUSF), which has lower levels of energy and micronutrients than RUTF and is intended for consumption along with other complementary foods, can also protect against child wasting and mortality in certain contexts in Niger (Isanaka et al. 2010; Grellety et al. 2012).

Cash transfer programs are used widely in low-income countries. A program in the Zinder region of Niger initiated by the World Food Programme in 2011 provided beneficiaries with either a cash transfer or a food transfer, including grains, legumes, and oil, during the lean season. Those who received the cash transfer were more likely to buy inexpensive staple foods, whereas those who received the food transfer consumed the food that was provided and increased their dietary diversity. These findings suggest that if the goal is to improve diet quality, food transfers with a mix of food items may be preferable to cash, although the results do depend on contextual factors such as proximity of and access to food markets and preferences for food quantity versus food quality. Also, in cases such as this, where food transfers are more costly to distribute than cash transfers, food transfers may reach fewer beneficiaries (Hoddinott, Sandström, and Upton 2018).

An intervention implemented by Forum Santé Niger and Médecins Sans Frontières in the Maradi region of Niger in 2011 was intended to determine whether cash transfers, distribution of supplementary foods, or a combination of these interventions was most effective at preventing moderate and severe acute undernutrition of children during the lean season in Niger. Results showed that the group that received both cash and supplementary foods fared best—even when the group that exclusively received cash received a higher cash allotment to offset the lack of food. This result may have been due to the low availability of nutritious foods in the market. The authors suggest that in high-burden contexts such as Niger, it may be optimal to distribute nutritious foods to all children under two years of age, while also providing cash transfers to the most vulnerable households (Langendorf et al. 2014).

In 2010 Concern Worldwide implemented an unconditional cash transfer program in Niger in response to the 2009–2010 drought and food crisis. The program included three different program designs: (1) provision of cash via envelope; (2) provision of cash via mobile phone as well as provision of a mobile phone; and (3) provision of cash via envelope as well as provision of a mobile phone. The second group bought more types of food items and had higher dietary diversity than the other groups, possibly because receiving the mobile transfer was more flexible and less time consuming for the recipients. However, providing cash via mobile phone does present challenges: beneficiaries have to be instructed on how to use the phone, and a sufficient number of mobile money agents must be available in the program area (Aker et al. 2016).

TABLE 4.1 **STUNTING AND WASTING RATES BY REGION, NIGER**

Region	Child stunting (%)	Child wasting (%)
Agadez	33.7	12.9
Dosso	38.8	7.4
Diffa	31.9	11.4
Maradi	53.8	12.9
Tahoua	39.0	7.7
Tillabéri	33.1	9.3
Zinder	50.1	11.7
Niamey	19.2	8.2
Total	**42.2**	**10.3**

Source: INS-Niger, WFP, and UNICEF (2016).

Note: All indicators are for children under five years of age. Undernourishment values at the regional level are not currently available for Niger. Recent child mortality values at the regional level are reported separately for urban and rural areas only, not for each region as a whole (INS-Niger, WFP, and UNICEF 2016). The national child stunting and wasting estimates here and in Figure 4.2 differ because INS-Niger, WFP, and UNICEF (2016), which contains subnational values, is cited here, while UNICEF, WHO, and World Bank (2019), cited in Figure 4.2, includes minor revisions to INS-Niger, WFP, and UNICEF (2016) and is used to calculate the GHI scores.

Agricultural interventions can also improve food security and nutrition. Beginning in the 1980s, Nigerien farmers developed a technique known as farmer-managed natural regeneration (FMNR) to grow and reproduce trees and shrubs that can be used for livestock fodder, fuel, and food. The trees also reduce wind speed, erosion, and evaporation in nearby agricultural fields and improve soil fertility. Over time, FMNR is estimated to have enabled the production of 500,000 additional tons of cereals per year in Niger, boosting Nigeriens' food security (WRI et al. 2008; Reij, Tappan, and Smale 2009).

Existing Policies and Government Measures Affecting Food Security and Nutrition

→ The goal of Niger's Economic and Social Development Plan (PDES, 2017–2021) is "to help build a peaceful, well-governed country with an emerging and sustainable economy, and a society based on the values of equity and sharing the fruits of progress." It identifies eight major challenges that need to be addressed, one of which is to strengthen food and nutrition security (GoN 2017b, 1).

→ The Nigeriens Nourishing Nigeriens (3N) initiative is a food security and agricultural development strategy designed to address in a sustainable manner the structural causes of vulnerability to food and nutrition insecurity. Adopting a multisectoral and multi-agency approach, it is an important component of Niger's Economic and Social Development Plan (GoN 2015).

→ The multisectoral National Nutrition Security Policy (PNSN, 2016–2025) establishes the roles and responsibilities of all actors involved in nutrition action, while the associated multisectoral plan establishes the budget for nutrition activities (NIPN 2017). The PNSN positions nutrition programs as contributing to development and resilience building in the country, rather than exclusively as emergency response actions (SUN 2018b).

→ The objective of Niger's Agriculture Policy (Politique Agricole, 2016) is to contribute to the growth of the economy and ensure food and nutrition security (GoN 2016). Furthermore, in 2019 the government adopted the National Strategy for Agricultural Research, Training, and Innovation, which is intended to strengthen governance of agricultural research and increase the diversification and resilience of agricultural production systems (ANP 2019).

→ The Education and Training Sector Plan (PSEF, 2014–2024) describes the government's commitment to education, including its intention to improve the quality of basic education, increase the enrollment and retention of girls in school, and increase literacy rates (GoN 2013). While this plan does not address nutrition directly, it is relevant because inadequate household access to education is a basic cause of undernutrition (UNICEF 2015b).

→ Niger's high fertility rate and rapid population growth put pressure on households as well as public services. The 2012–2020 Action Plan for Family Planning in Niger seeks to manage the country's population growth and increase the availability of and demand for family planning services (GoN 2012).

Policy Recommendations for Moving Forward

→ Niger is a signatory to the African Union's Maputo Declaration of 2003 and Malabo Declaration of 2014, which set targets for agricultural growth and transformation. By signing these declarations, Niger committed itself to allocating at least 10 percent of its public expenditure to agriculture and to do its part to end hunger in Africa by 2025 (AU 2014). As of 2017, however, Niger was not on track to meet its Malabo commitments, either overall or specifically in terms of its public expenditure on agriculture (AU 2018). It is important that Niger increase its budgetary allocation to agriculture and meet this commitment. Key priorities for the agricultural sector include increasing farmers' use of inputs, expanding the amount of land under irrigation, improving the productivity of the livestock subsector, and promoting climate-smart agricultural practices (World Bank 2017b).

→ Although the Nigerien government has committed to taking multisectoral action on nutrition, more work is needed to incorporate nutrition into the agendas of various government ministries and encourage them to implement nutrition-sensitive programming. These ministries will also need more funding for capacity building to enable them to develop such programming (SUN 2018b). To help ensure that nutrition is prioritized, all relevant sectors should include appropriate nutrition-related indicators in their monitoring and evaluation processes.

→ Increased emphasis on breastfeeding and proper infant and young child feeding practices is required. For example, more resources and support are needed to meet the criteria of the Baby Friendly Hospital Initiative, which seeks to promote breastfeeding practices in hospitals after childbirth (UNICEF 2018).

→ Niger is formulating a National Strategy for Disaster Risk Reduction but has not yet finalized it (GoN 2017a). Given Niger's high vulnerability to crises and natural disasters, it is essential that this strategy and its related programs be finalized, implemented, and given robust financing soon. It is critical to respond to crises in the form of interventions that not only address short-term needs but also increase resilience and promote long-term development.

→ The high rates at which teen girls are married and begin childbearing in Niger worsen nutrition both directly through inadequate nutrition of young mothers and children and indirectly through negative impacts on girls' schooling and poverty levels. Continued government support for family planning practices and efforts to reduce early marriage and childbearing are needed. As no clear consensus has yet been reached on which strategies are most effective for reducing early marriage in Niger, this effort will require the existing evidence to be reviewed and may necessitate additional research and analysis (Shepherd 2018).

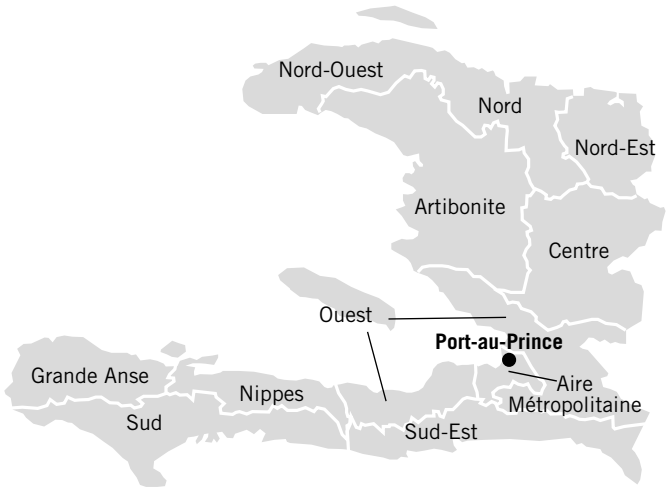
→ Improving the rates of literacy and educational attainment in Niger—particularly for women and girls—is important for decreasing poverty and undernutrition in the country. In addition to the

existing Education and Training Sector Plan and the promise made by President Mahamadou Issoufou that schooling for children up to age 16 will be free and compulsory, Niger is drafting a policy to improve the quality of learning by providing more support for teachers in primary, secondary, vocational, and technical schools (Theirworld 2018; UNESCO 2018). The finalization and implementation of this policy will help to move Niger in the right direction on education.

→ While a basic social protection plan is in place in Niger, the number of beneficiary households is low and the program needs to be expanded (Shepherd 2018). In the case of cash transfers, Niger should consider the costs and benefits of a mobile money approach to limit the time demands on program recipients and improve their food and nutrition security outcomes. Moreover, it would be preferable to combine cash transfers with the provision of nutritious foods where possible and economically viable. This approach would likely require increased donor support to cover the associated expenses.

Haiti

FIGURE 4.3 **MAP OF HAITI**



Note: Haiti is divided into 10 departments. Aire Métropolitaine, which contains the capital, Port-au-Prince, as well as other urban areas, is part of Ouest department.

Haiti, located on the western side of Hispaniola Island, which it shares with the Dominican Republic in the Caribbean Sea, has experienced substantial challenges in recent decades, including multiple coups, devastating natural disasters, and persistent poverty (Taft-Morales 2017). Haiti has a poverty rate of 25 percent according to the most recent official statistics, which date from 2012.[6] Its GDP per capita was just $766 as of 2017—less than one-tenth of the average for Latin America and the Caribbean—and has grown at a rate of less than 0.5 percent a year on average since 2010 (World Bank 2019a).[7] The country has undergone rapid urbanization since the 1950s, yet its cities are beset by high levels of poverty and lack the infrastructure and services to successfully accommodate their growing populations (Lozano-Gracia and Lozano 2017).

Agriculture plays an important role in the Haitian economy, representing half of total employment, while 40 percent of employment is in services and 10 percent in industry. Agriculture contributes 18 percent of GDP, services 23 percent, and industry 57 percent (World Bank 2019a). The majority of farmers operate small-scale subsistence farms and have access to less than two hectares of land (FEWS NET 2015). The agricultural sector is important for Haitians' livelihoods and food and nutrition security, but it is plagued by environmental degradation, soil erosion, underinvestment, and low productivity (Duvivier and Fontin 2017). Women play a critical role in Haitian agriculture, yet they experience inequitable treatment; for example, they lack the same land inheritance rights as men and receive lower wages for agricultural work (Tandon 2012).

Haiti is extremely vulnerable to the effects of climate change and is poorly equipped to implement solutions to adapt to these effects.[8] Like other small island developing states, Haiti is particularly vulnerable to rising sea levels, extreme weather events such as hurricanes, and storm surges (UNDP 2017; Gallagher et al. 2019). Haiti's urban and rural areas face distinct challenges and circumstances as the result of climate change. The positioning of Haiti's cities—on the coast, on riverbeds, and on hillsides—increases their vulnerability to flooding and landslides, while deforestation and poor soil quality leave the Haitian countryside ill prepared to deal with worsening climatic conditions (Rubenstein 2012). In both urban and rural areas, poverty, low levels of education and literacy, and inadequate infrastructure exacerbate the population's vulnerability to the impacts of climate change (CAF 2014).

In the past 10 years, Haiti has been affected by multiple catastrophic disasters. In 2010, a 7.0-magnitude earthquake hit near its capital, Port-au-Prince, killing 230,000 people, injuring 300,000, and causing massive damage to infrastructure (Dupuy 2010). Later that year, a large-scale cholera epidemic spread throughout the country. Still not completely eradicated, cholera infected 819,000 people and resulted in nearly 10,000 deaths between 2010 and 2018 (UN OCHA 2019b). Hurricane Sandy in 2012 and Hurricane Matthew in 2016 further damaged the country, including the agricultural sector (FAO 2019c). In 2018, drought conditions in the north of the country delayed the harvest and exacerbated food insecurity (CARE International 2019). In 2019, political unrest, substantial inflation, and continued drought in some parts of the country have magnified the ongoing threats the population is facing (ACF 2019).

Cumulatively, these challenges amount to a massive humanitarian crisis, with 2.6 million Haitians out of a population of approximately 11 million estimated to be in need of humanitarian assistance in 2019 (CARE International 2019; World Bank 2019a). Even so, the situation has gone largely unnoticed, earning it the distinctions of being the most underfunded and the most underreported humanitarian crisis in 2018 (CARE International 2019; UN OCHA 2019c).

[6] This rate reflects the share of the population living on less than $1.90 a day (based on 2011 purchasing power parity).

[7] GDP per capita is expressed in current US dollars.

[8] Haiti ranks 173rd out of 181 countries on the Notre Dame Global Adaptation Initiative (ND-GAIN) index, which summarizes countries' vulnerability to climate change in combination with their readiness to improve their resilience (ND-GAIN 2019).

Hunger and Undernutrition in Haiti

Since 2000, Haiti's progress on reducing hunger and undernutrition has been uneven. Its 2005 GHI score was higher than that from 2000, and its 2010 score was higher still, indicating an increase in hunger and undernutrition, yet its 2019 score declined to 34.7, the lowest value observed in the time series since 2000.[9] This latest score, however, is still at the very high end of the *serious* category on the GHI Severity Scale and is the seventh-highest 2019 GHI score among all countries in this report for which adequate data are available to calculate scores.

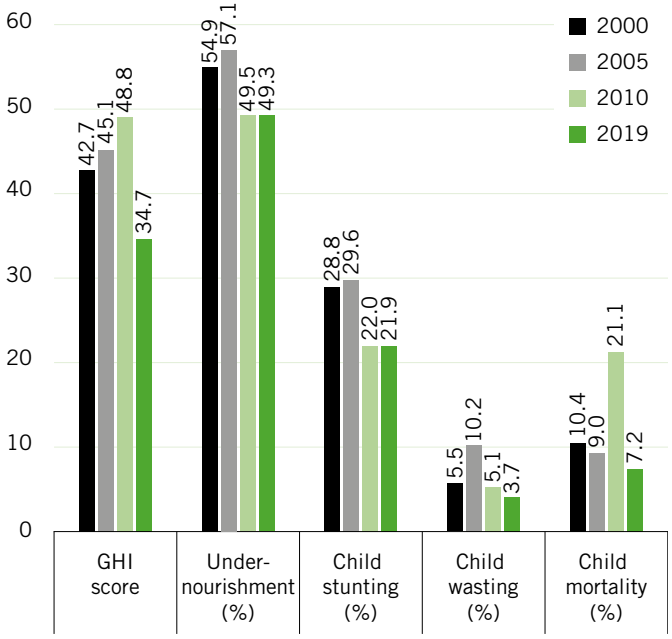
Haiti's high score is driven mainly by its undernourishment rate, which is the third-highest value in this year's report (see Appendix C).[10] At 49.3 percent, Haiti's 2016–2018 undernourishment rate is nearly the same as it was in 2009–2011 (49.5 percent), showing that approximately half of the population is not able to meet its minimum calorie requirements on a regular basis (Figure 4.4). Key contributors to food insecurity in Haiti include a high poverty rate and low agricultural productivity, which, in turn, results from frequent natural disasters, a high level of environmental degradation, and heavy reliance on rain-fed agriculture (USAID 2017).

Many Haitians consume poor-quality diets with low dietary diversity. According to a countrywide assessment, iron-rich foods were lacking in the diets of half of households, and at least one in four households had deficits in the consumption of foods rich in protein and vitamin A (WFP 2016). A small-scale study in southwestern Haiti found that fish, meat, dairy, and eggs, which are rich in protein and micronutrients, were the least frequently consumed food groups. Pulses and nuts, which are also good sources of protein and micronutrients, were more frequently consumed, but more than one-third of households had not consumed any fruits or vegetables the previous day (Pauzé et al. 2016). Rice, maize, wheat, and sorghum are the most highly consumed cereals. Haitians also regularly consume roots and tubers (mainly sweet potatoes, cassava, and yams), plantains, beans, and peas. The country is dependent on imports of rice, wheat, and edible oils. Rice consumption and a dependence on rice imports have increased considerably since the 1980s, when Haiti dramatically reduced its tariffs on imported rice (FEWS NET 2018).

Haiti experienced a steady decline in its child mortality rate for decades before 2010, when the rate spiked dramatically owing to deaths by injury from the earthquake that occurred in that year (Liu et al. 2012). In 2011, the rate went back to its previous trajectory and continued to decline. Nonetheless, at 7.2 percent, Haiti's child mortality rate is still the highest in the Western Hemisphere (UN IGME 2018). Although a comprehensive explanation for the decline in child mortality is not available, recent factors have likely included the Soins Obstétricaux Gratuits and Soins Infantiles Gratuits programs—introduced in 2008 and 2010, respectively—which provide free access to health care for pregnant women and newborns and for children under the age of five (Amibor 2013).

The most recent data show Haiti's child stunting rate at 21.9 percent, which is considered high in terms of its public health significance, while its child wasting rate, at 3.7 percent, is considered low (IHE and ICF 2018; de Onis et al. 2019). There is some variation at the subnational level, with the highest stunting rate in the Centre department, recorded at 30.1 percent, and the highest wasting rate in Aire Métropolitaine, the greater Port-au-Prince metropolitan area,

FIGURE 4.4 **HAITI'S GLOBAL HUNGER INDEX SCORES AND INDICATOR VALUES, 2000, 2005, 2010, AND 2019**



Source: Authors.

Note: Undernourishment values refer to the prevalence of undernourishment for the country's population as a whole; child stunting, child wasting, and child mortality refer to the rates for each indicator for children under the age of five. Data for GHI scores, child stunting, and child wasting are from 1998–2002 (2000), 2003–2007 (2005), 2008–2012 (2010), and 2014–2018 (2019). Data for undernourishment are from 1999–2001 (2000), 2004–2006 (2005), 2009–2011 (2010), and 2016–2018 (2019). Data for child mortality are from 2000, 2005, 2010, and 2017 (2019). See Appendix A for the formula for calculating GHI scores and Appendix B for the sources from which the data are compiled.

[9] The high 2010 score can be attributed in part to the abnormally high child mortality rate that year, resulting largely from the 2010 earthquake (Liu et al. 2012).

[10] There are 22 countries with higher child mortality rates in this report, 55 countries with higher stunting rates, and 71 countries with higher wasting rates (see Appendix C).

TABLE 4.2 **GHI INDICATOR VALUES BY DEPARTMENT, HAITI**

Department	Child stunting (%)	Child wasting (%)	Child mortality (%)
Aire Métropolitaine[a]	20.2	5.9	8.9
Ouest[b]	22.5	3.6	11.2
Sud-Est	20.0	2.5	7.6
Nord	20.0	3.6	5.4
Nord-Est	21.0	1.5	7.7
Artibonite	22.4	4.3	8.4
Centre	30.1	2.9	9.0
Sud	22.0	2.9	6.2
Grande Anse	21.6	3.4	5.3
Nord-Ouest	20.3	2.4	5.8
Nippes	17.2	3.6	9.0
Total	**21.9**	**3.7**	**8.3**

Source: IHE and ICF (2018).

Note: All indicators are for children under five years of age. Undernourishment values at the subnational level are not currently available for Haiti. The national child mortality estimates here and in Figure 4.4 differ because IHE and ICF (2018), which contains subnational values for the 10 years preceding the survey in 2016–2017, is cited here and was used by the authors to calculate the national total, while UN IGME (2018), which includes estimates for individual calendar years, is cited in Figure 4.4 and is used to calculate the GHI scores.

a Aire Métropolitaine consists of the urban areas of six municipalities in Ouest department: Port-au-Prince, Tabarre, Cité Soleil, Carrefour, Delmas, and Pétion-Ville.

b The values given here are for the Ouest department outside of Aire Métropolitaine.

recorded at 5.9 percent (Table 4.2). Remarkably, according to survey data from 2012 and 2016–2017, Haiti's child undernutrition levels are lower than they were in 2005–2006, before the 2010 earthquake. This result likely reflects the extensive humanitarian efforts undertaken after the earthquake, including various strategies designed specifically to combat child undernutrition (Ayoya et al. 2013). Still, additional efforts are needed to improve children's diets and nutritional status. In Haiti just 40 percent of children under 6 months of age are exclusively breastfed, and just 11 percent of children ages 6 to 23 months received a minimum acceptable diet (IHE and ICF 2018). A study conducted in an informal urban settlement in Haiti found that poverty, household food insecurity, time constraints, women's employment, and limited social support were associated with low rates of exclusive breastfeeding (Lesorogol et al. 2018).

There is evidence that poor water, sanitation, and hygiene conditions compromise children's nutritional status, most likely through negative impacts on their health and their ability to properly absorb nutrients (Fink, Günther, and Hill 2011; Ngure et al. 2014). Children in Haiti with access to an improved water source and sanitation services are less likely to be stunted than children with comparable diets and care who do not have the same access to water and sanitation (World Bank 2017a). In Haiti just 31 percent of households have access to improved toilet facilities, while an additional 24 percent have access to facilities that would be considered improved if they were not shared, and 25 percent of households have no toilet facilities at all. In surveyed households where the location most commonly used for hand washing was observed, 60 percent did not contain water, soap, or other hand-washing products. Meanwhile, 74 percent of households have access to improved drinking water sources (IHE and ICF 2018).

HIV/AIDS, which affected approximately 2 percent of the Haitian population aged 15–49 years as of 2017 (CDC 2019), is associated with food insecurity and undernutrition. The links go two ways: HIV/AIDS can worsen food security and nutrition status, and low food security and poor nutrition can, in turn, worsen the effects of HIV/AIDS (Ivers et al. 2010). A study of HIV-positive adults in rural areas of Artibonite department in 2010/2011 found that 51 percent of those surveyed were severely food insecure, an additional 38 percent were moderately food insecure, and the severely food insecure had particularly low dietary diversity (Rebick et al. 2016).

Interventions That Affect Food Insecurity and Undernutrition

Researchers have conducted a range of studies to assess the effectiveness of efforts to reduce hunger and undernutrition. The following is a selection of studies demonstrating the types of interventions that have been shown to reduce hunger, undernutrition, or both in the context of Haiti. Unlike many countries for which there is a substantial body of research documenting the impacts of nutrition-sensitive interventions, such as agriculture or cash transfer programs, the existing literature for Haiti is primarily focused on nutrition-specific interventions, such as providing nutritional supplements to children or food assistance to adults.[11] Additional research is needed to determine which types of nutrition-sensitive programs are effective in Haiti and which ones could successfully be implemented at scale.

A maternal and child health and nutrition program implemented in the Central Plateau of Haiti provided preventative health services and food assistance to pregnant and lactating women and children and behavior change communication to mothers. Monthly food rations for children and behavior change communication to mothers of young children were provided either on a preventative basis (targeted to all children aged 6–23 months) or recuperative basis (targeted to children aged 6–59 months who were determined to be already

[11] Studies were considered for inclusion in this section if they evaluated the effect of an intervention on diet or nutrition using a suitable control group for comparison.

undernourished). In the preventative program, behavior change communication included child feeding and care practices to prevent undernutrition; in the recuperative program, it included causes of undernutrition, nutritious recipes, feeding during illness, and hygiene in food preparation, handling, and storage. Children in both program groups had lower stunting rates than children in a matched control group (Donegan et al. 2010), while the preventative approach was more effective at reducing child stunting, wasting, and underweight than the recuperative approach (Ruel et al. 2008). Another evaluation stemming from the same program compared methods for treating anemia in young children aged 9–24 months. One group of children received an iron-fortified wheat-soy blend ration, and the other group received the same ration plus a supply of micronutrient Sprinkles—sachets containing micronutrients in powdered form that can be added to common foods—over a period of two months. In the group that received the Sprinkles, anemia prevalence fell by more than half (from 54 to 24 percent), whereas in the other group anemia prevalence increased slightly, showing that the iron-fortified wheat-soy blend alone was insufficient to reduce anemia in anemic young children (Menon et al. 2007).

In 2011–2012 children aged 6–11 months living in an informal urban settlement in Cap-Haïtien were given a daily lipid-based nutrient supplement for a duration of either three or six months. Those who received the supplement for six months experienced greater linear growth than the control group, which received no supplementation until after the study period (Iannotti et al. 2013). A related study implemented in 2013—also in Cap Haïtien—evaluated a school feeding program for children aged 3–13 years that was implemented over a period of 100 days. Students received either a fortified peanut butter paste, a nonfortified cereal bar, or no supplementation at all during the trial. Relative to the other groups, those who received the fortified paste had a lower risk of developing anemia and showed increased body mass index and fat mass—a positive result given that thinness was common among these Haitian schoolchildren (Iannotti et al. 2015).

Several studies have explored food and nutrition interventions targeted at the population living with HIV/AIDS. A study of a Partners in Health program implemented in central Haiti showed that combining food assistance with comprehensive healthcare improved food security, increased body mass index, and strengthened adherence to clinic visits among patients with HIV more so than healthcare alone (Ivers et al. 2010). Further experimentation showed that there was no statistically significant difference in these outcomes whether the beneficiaries received a ready-to-use supplementary food (fortified peanut paste) or a less expensive fortified corn-soybean blend (Ivers et al. 2014). A study implemented in Port-au-Prince in 2008–2009 as part of a prevention of mother-to-child transmission (PMTCT) program provided nutrition support to HIV-exposed, uninfected, non-breastfed children aged 6–12 months with HIV-positive mothers over the course of 24 weeks. Program components included a lipid-based nutrient supplement for the children; behavior change education regarding infant feeding, hygiene, and diarrhea treatment; promotion of existing clinical services; and social support. The children in the program had lower stunting and underweight rates than children in a comparable control group (Heidkamp et al. 2012).

The types of interventions covered by these impact evaluations may not perfectly reflect the full scope of the programs that have been implemented in Haiti. However, the focus on child nutrition programs in the literature, combined with Haiti's extraordinarily high undernourishment rate and more moderate child stunting and wasting rates, suggests that food production and food access have received less attention than children's nutrition in recent years. The Haitian government and the international community must increase resources and interventions to focus on persistent shortcomings related to children's diets and nutrition while also addressing broader societal issues that are currently limiting food and nutrition security for the population as a whole.

Existing Policies and Government Measures Affecting Food Security and Nutrition

→ The Constitution of Haiti (1987) establishes the right to food as fundamental: "The State recognizes the right of every citizen to decent housing, education, food and social security" (GoH 1987).

→ The Ministry of Agriculture, Natural Resources and Rural Development is the primary institution responsible for improving food and nutrition security, while the Ministry of Public Health and Population is principally tasked with nutrition-related services (Duvivier and Fontin 2017). However, the abolition of the National Commission for Hunger and Malnutrition in 2014 weakened the perceived position of food and nutrition security on the political agenda (SUN 2017a).

→ Haiti's Strategic Development Plan (2012–2030; Plan Stratégique de Développement d'Haïti, PSDH) acknowledges that the level of food insecurity is high and that action must be taken in multiple areas to address the problem (GoH 2012).

→ The National Nutrition Policy (2012; Politique Nationale de Nutrition, PNN) aims to improve the nutrition and health status of the population and of vulnerable groups, including pregnant

women, lactating women, and children under five years of age (Duvivier and Fontin 2017).

→ The Nutrition Strategic Plan (2013–2018) sought to improve the health and nutritional status of the population, including vulnerable groups, by prioritizing the following areas: preventing malnutrition, addressing nutrition-related diseases, protecting nutrition in case of emergencies, improving information systems for nutrition, improving intersectoral and intra- and inter-ministerial coordination, and providing applied research and training in the field of nutrition (GoH 2013; FNSP 2019).

→ The Food Security and Nutrition Programme, launched in 2019, is a collaboration between the Government of Haiti and the European Union. Focused on the Nord-Ouest, Haut Artibonite, and Grande Anse departments, the program aims to sustainably improve the food security and nutrition of the most vulnerable populations and develop their resilience and capacity to resist and overcome shocks and crises (SUN 2019).

→ Haiti ratified the Paris Agreement and introduced the National Climate Change Policy (Politique Nationale de Lutte contre les Changements Climatiques, PNCC) in 2017. The vision of the PNCC is to reduce Haiti's vulnerability to climate change by adopting and implementing appropriate adaptation and mitigation measures (NAP-GSP 2018). Haiti has also developed a National Action Plan on Climate Change Adaptation (FAO 2019c).

→ The general objective of the Agricultural Development Policy (2010–2025) is to sustainably satisfy the food needs of the population and contribute to the social and economic development of the country. Specific long-term goals include reducing the dependence on food imports and meeting the national demand for food predominantly from domestic production, creating employment opportunities in rural areas to curb migration to the cities, increasing the contribution of the agricultural sector to foreign currency earnings, and reducing environmental vulnerability (GoH 2011).

Policy and Institutional Recommendations for Moving Forward

→ Increased investment in agriculture is needed to raise productivity, increase domestic food production, and improve food and nutrition security. Additional emphasis on nutrition is required to ensure that the agricultural sector not only increases its levels of food production, but also maximizes its contribution to meeting the population's nutrition needs. Furthermore, given the important role that women play in agriculture in Haiti, additional efforts are needed to ensure that they have access to agricultural services such as extension and financing (Duvivier and Fontin 2017).

→ Given Haiti's extraordinarily high level of deforestation and its resulting vulnerability to flooding, landslides, and erosion, reforestation initiatives must be prioritized. Reforestation is currently underfunded, even among donor-financed climate change mitigation and adaptation initiatives. To reduce the incidence of tree cutting to meet household energy needs, increased access to alternative fuel sources is vital (FAO 2018a; Gallagher et al. 2019).

→ Improvements to the water, sanitation, and hygiene environment are necessary. Current public investments in water and sanitation services disproportionately benefit wealthy residents in urban areas. A shift of resources to benefit the poor in both urban and rural areas is therefore critical. Moreover, with the private sector providing a large proportion of water and sanitation services, increased and improved government regulation of private entities is needed (World Bank 2017a).

→ Further action is needed to improve breastfeeding practices and infant and young child feeding practices. For example, Haiti has not implemented the International Code of Marketing of Breast-milk Substitutes, which incorporates legal measures to protect the public from aggressive marketing of breast-milk substitutes. Adopting such measures is an important step the government should take, just as other countries in the region and around the world have done (SUN 2018a). Improved messaging is also necessary to correct several common misunderstandings regarding breastfeeding and complementary feeding for infants and young children (Laterra et al. 2014). In addition, the provision of childcare at or near women's workplaces could support mothers' ability to breastfeed, while economic support such as cash transfers could reduce the need for mothers to work outside the home during the first six months—the period when exclusive breastfeeding is recommended (Lesorogol et al. 2018).

→ While considerable international funds have been invested in climate-specific or climate-related projects, multiple areas that have been prioritized by the Haitian government remain unfunded or underfunded, such as coastal resilience and coastal zone management, agricultural adaptation, and institutional strengthening and capacity building. To maximize scarce resources, the government and international donors are advised to mainstream climate change action into development strategies and disaster risk reduction activities (Gallagher et al. 2019). Investments are desperately needed to strengthen resilience and to help communities adapt their livelihoods and withstand weather- and climate-related shocks.

05

Women prepare meals at an agricultural school in Bangui, Central African Republic. While the hunger situation in the country is classified as extremely alarming, providing nutritious meals in schools can help improve child nutrition.

POLICY RECOMMENDATIONS

Prioritize resilience and adaptation among the most vulnerable groups and regions

→ Governments and donors must invest in vulnerable communities in the Global South, such as small-scale farmers, to develop and carry out context-specific adaptation strategies that will strengthen food and nutrition security and food sovereignty. Actions can include supporting and diversifying agricultural production; improving farmers' access to extension services, resources, and markets; and creating non-agricultural jobs in rural areas.

→ Governments must facilitate public participation in climate decision making and policy making. Adaptation strategies should be developed together with affected communities based on local needs. These strategies should integrate indigenous and traditional knowledge—particularly of women—and be supported with access to additional research, new technologies, and agricultural and meteorological data.

Better prepare for and respond to disasters

→ Donors and governments must increase investments in disaster prevention and disaster risk reduction, especially in vulnerable regions prone to extreme weather events. This includes investing in early warning and response systems, forecast-based financing mechanisms, and adapted infrastructure. Donors must make rapidly dispersible and flexible funding available to tackle food crises and respond to disasters when they occur.

→ Because climate change poses risks to peace and stability, governments and donors must invest in resilience building to prevent conflicts related to the use of natural resources, such as water and land, in fragile contexts.

Transform food systems and address global inequalities

→ A radical transformation of production and consumption patterns, especially in high-income countries, is crucial to reduce emissions and ensure that all people have access to healthy and sustainable diets. Governments must promote sustainable production systems, consumption of nutritious foods, and reduction of food loss and waste.

→ Measures to reduce poverty and existing inequalities are key to building resilience to the effects of climate change among the most vulnerable people. Therefore, governments and donors must significantly increase investments in rural development, social protection, health services, and education.

→ As climate change increases competition for natural resources, governments must secure the land and water rights, including customary rights, of indigenous peoples and rural communities—for example, by following frameworks such as the Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security (VGGT).

→ Governments must enact and enforce regulatory frameworks and set standards to ensure that production of globally traded agricultural commodities does not impede the right to food or infringe on land rights in areas where those commodities are produced. Private companies must act in compliance with these regulations and adhere to international guidelines such as the UN Guiding Principles on Business and Human Rights.

Take action to mitigate climate change without compromising food and nutrition security

→ All countries, particularly high-income countries, must urgently meet their commitments to Agenda 2030 and the Paris Agreement. They must implement progressively more ambitious measures, such as decarbonizing their energy sector, increasing their use of renewable energies, building green infrastructure, and boosting carbon sequestration.

→ Countries must harmonize climate policy with food and trade policies to prevent mitigation and CO_2 removal measures—such as the use of scarce agricultural land for bioenergy production—from harming people's food and nutrition security.

Commit to fair financing

→ Governments must increase their financial support to the most vulnerable people and regions, for example through existing mechanisms and funds. Financing for climate change adaptation needs to receive the same importance as mitigation.

→ Financing for climate change mitigation and adaptation must especially support least-developed countries (LDCs) and must be in addition to official development assistance (ODA) to ensure that resources for sustainable development are not reduced.

A

APPENDIXES

FORMULA FOR CALCULATION OF GLOBAL HUNGER INDEX SCORES

GHI scores are calculated using a three-step process:

First, values for the four component indicators are determined from the available data for each country. The indicators are

- → the percentage of the population that is undernourished,
- → the percentage of children under five years old who suffer from wasting (low weight-for-height),
- → the percentage of children under five years old who suffer from stunting (low height-for-age), and
- → the percentage of children who die before the age of five (child mortality).

STEP 1 Determine values for each of the component indicators:

PUN: proportion of the population that is undernourished (in %)
CWA: prevalence of wasting in children under five years old (in %)
CST: prevalence of stunting in children under five years old (in %)
CM: proportion of children dying before the age of five (in %)

Second, each of the four component indicators is given a standardized score based on thresholds set slightly above the highest country-level values observed worldwide for that indicator between 1988 and 2013.[1] For example, the highest value for undernourishment estimated in this period is 76.5 percent, so the threshold for standardization was set a bit higher, at 80 percent.[2] In a given year, if a country has an undernourishment prevalence of 40 percent, its *standardized* undernourishment score for that year is 50. In other words, that country is approximately halfway between having no undernourishment and reaching the maximum observed levels.

STEP 2 Standardize component indicators:

$$\text{Standardized PUN} = \frac{\text{PUN}}{80} \times 100$$

$$\text{Standardized CWA} = \frac{\text{CWA}}{30} \times 100$$

$$\text{Standardized CST} = \frac{\text{CST}}{70} \times 100$$

$$\text{Standardized CM} = \frac{\text{CM}}{35} \times 100$$

Third, the standardized scores are aggregated to calculate the GHI score for each country. Undernourishment and child mortality each contribute one-third of the GHI score, while the child undernutrition indicators—child wasting and child stunting—each contribute one-sixth of the score.

STEP 3 Aggregate component indicators:

$$\begin{aligned} &\tfrac{1}{3} \times \text{Standardized PUN} \\ +\ &\tfrac{1}{6} \times \text{Standardized CWA} \\ +\ &\tfrac{1}{6} \times \text{Standardized CST} \\ +\ &\tfrac{1}{3} \times \text{Standardized CM} \\ \hline =\ &\text{GHI score} \end{aligned}$$

This calculation results in GHI scores on a 100-point scale, where 0 is the best score (no hunger) and 100 is the worst. In practice, neither of these extremes is reached. A value of 100 would signify that a country's undernourishment, child wasting, child stunting, and child mortality levels each exactly meets the thresholds set slightly above the highest levels observed worldwide in recent decades. A value of 0 would mean that a country had no undernourished people in the population, no children younger than five who were wasted or stunted, and no children who died before their fifth birthday.

[1] The thresholds for standardization are set slightly above the highest observed values to allow for the possibility that these values could be exceeded in the future.

[2] The threshold for undernourishment is 80, based on the observed maximum of 76.5 percent; the threshold for child wasting is 30, based on the observed maximum of 26.0 percent; the threshold for child stunting is 70, based on the observed maximum of 68.2 percent; and the threshold for child mortality is 35, based on the observed maximum of 32.6 percent.

DATA SOURCES FOR THE GLOBAL HUNGER INDEX COMPONENTS, 2000, 2005, 2010, AND 2019

GHI	Number of countries with GHI	Indicators	Reference years	Data sources
2000	113	Percentage of undernourished in the population[a]	1999–2001[b]	FAO 2019b
		Percentage of wasting in children under five	1998–2002[c]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Percentage of stunting in children under five	1998–2002[c]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Under-five mortality	2000	UN IGME 2018
2005	114	Percentage of undernourished in the population[a]	2004–2006[b]	FAO 2019b
		Percentage of wasting in children under five	2003–2007[e]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Percentage of stunting in children under five	2003–2007[e]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Under-five mortality	2005	UN IGME 2018
2010	116	Percentage of undernourished in the population[a]	2009–2011[b]	FAO 2019b
		Percentage of wasting in children under five	2008–2012[f]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Percentage of stunting in children under five	2008–2012[f]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Under-five mortality	2010	UN IGME 2018
2019	117	Percentage of undernourished in the population[a]	2016–2018[b]	FAO 2019b
		Percentage of wasting in children under five	2014–2018[g]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Percentage of stunting in children under five	2014–2018[g]	UNICEF/WHO/World Bank 2019; WHO 2019a;[d] and authors' estimates
		Under-five mortality	2017	UN IGME 2018

[a] Proportion of the population with chronic calorie deficiency.
[b] Average over a three-year period.
[c] Data collected from the years closest to 2000; where data from 1998 and 2002 or 1999 and 2001 were available, an average was used.
[d] UNICEF/WHO/World Bank 2019 is the primary data source, and WHO 2019a; UNICEF 2019, 2013 and 2009; and MEASURE DHS 2019 are complementary data sources.
[e] Data collected from the years closest to 2005; where data from 2003 and 2007 or 2004 and 2006 were available, an average was used.
[f] Data collected from the years closest to 2010; where data from 2008 and 2012 or 2009 and 2011 were available, an average was used.
[g] The latest data gathered in this period.

C

DATA UNDERLYING THE CALCULATION OF THE 2000, 2005, 2010, AND 2019 GLOBAL HUNGER INDEX SCORES

Country	Proportion of undernourished in the population (%)				Prevalence of wasting in children under five years (%)				Prevalence of stunting in children under five years (%)				Under-five mortality rate (%)			
	'99–'01	'04–'06	'09–'11	'16–'18	'98–'02	'03–'07	'08–'12	'14–'18	'98–'02	'03–'07	'08–'12	'14–'18	2000	2005	2010	2017
Afghanistan	46.1	33.2	22.1	29.8	14.0 *	8.6	8.5 *	8.1 *	54.0 *	59.3	49.5 *	43.6 *	12.9	11.0	9.0	6.8
Albania	7.2	10.9	7.4	6.2	12.2	7.3	9.6	1.6	39.2	26.7	23.2	11.3	2.5	1.7	1.2	0.9
Algeria	10.7	8.8	6.3	3.9	3.1	4.0	4.2 *	5.0 *	23.6	15.9	12.8 *	15.3 *	4.0	3.4	2.7	2.4
Angola	71.5	54.8	40.4	25.0	11.9 *	8.2	7.2 *	4.9	38.2 *	29.2	26.2 *	37.6	20.6	16.8	12.1	8.1
Argentina	3.5	4.7	4.0	4.6	1.7 *	1.2	1.6 *	1.5 *	9.6 *	8.2	7.9 *	7.3 *	2.0	1.7	1.5	1.0
Armenia	23.8	7.8	5.5	4.3	2.5	5.4	4.1	4.5	17.3	17.9	20.9	9.4	3.0	2.3	1.8	1.3
Azerbaijan	23.0	5.5	<2.5	<2.5	9.0	6.8	6.6	3.6 *	24.2	26.5	16.4	11.3 *	7.5	5.2	3.7	2.3
Bahrain	—	—	—	—	3.2 *	2.7 *	2.3 *	2.0 *	2.3 *	2.0 *	1.7 *	2.3 *	1.3	1.1	0.9	0.7
Bangladesh	20.8	16.6	16.9	14.7	12.5	11.8	15.7	14.4	51.1	45.9	41.3	36.2	8.7	6.6	4.9	3.2
Belarus	<2.5	3.0	<2.5	<2.5	2.2 *	2.2	1.9 *	1.7 *	6.2 *	4.5	3.7 *	2.8 *	1.3	0.9	0.6	0.4
Benin	22.7	15.4	11.8	10.1	9.0	8.5	7.3 *	5.0	36.2	43.4	35.5 *	32.2	14.3	12.4	11.4	9.8
Bhutan	—	—	—	—	2.5	6.1 *	5.9	4.4 *	47.7	41.3 *	33.5	26.5 *	7.8	5.8	4.3	3.1
Bolivia	33.4	30.3	26.5	17.1	1.6	1.7	1.5	2.0	33.2	32.4	22.6	16.1	8.0	6.1	4.6	3.5
Bosnia & Herzegovina	4.4	3.2	<2.5	<2.5	7.4	4.0	2.3	2.8 *	12.1	11.8	8.9	8.5 *	1.0	0.9	0.7	0.6
Botswana	35.7	31.9	28.5	26.4	5.9	8.1 *	7.2	5.7 *	29.1	28.8 *	31.4	24.3 *	8.7	7.2	5.0	3.8
Brazil	11.9	4.6	<2.5	<2.5	2.4 *	1.8	1.8 *	2.1 *	9.9 *	7.0	7.4 *	8.0 *	3.5	2.5	1.9	1.5
Bulgaria	4.8	6.5	5.6	3.6	3.4 *	3.2	3.1 *	2.5 *	10.7 *	8.8	7.4 *	5.3 *	1.8	1.3	1.1	0.8
Burkina Faso	25.4	24.9	21.2	20.0	15.6	24.4	15.5	8.6	41.4	40.0	34.7	21.1	18.0	15.4	11.6	8.1
Burundi	—	—	—	—	9.9	9.0	6.0	5.1	64.0	57.7	57.6	55.9	15.7	12.5	9.1	6.1
Cambodia	29.3	20.0	18.8	16.4	17.1	8.5	11.0	9.8	49.0	42.7	39.8	32.4	10.7	6.5	4.4	2.9
Cameroon	30.8	20.3	11.5	9.9	6.2	7.2	5.7	5.2	38.2	36.3	32.6	31.7	15.0	13.2	11.0	8.4
Central African Republic	42.5	39.5	32.0	59.6	10.4	12.6	8.3	10.6 *	44.4	43.1	40.7	47.4 *	17.5	16.6	15.1	12.2
Chad	40.1	39.2	40.0	37.5	13.9	16.2	19.4	13.3	38.9	44.4	38.7	39.8	18.7	17.0	15.0	12.3
Chile	4.7	3.9	4.2	2.7	0.5	0.5	0.3	0.3	3.0	2.3	2.0	1.8	1.1	0.9	0.9	0.7
China	15.9	15.2	11.8	8.5	2.5	2.9	2.3	1.6 *	17.8	11.7	9.4	5.2 *	3.7	2.4	1.6	0.9
Colombia	9.7	9.7	11.1	4.8	1.0	1.6	0.9	1.0 *	18.2	16.0	12.6	11.6 *	2.5	2.2	1.9	1.5
Comoros	—	—	—	—	13.3	9.6	11.3	9.2 *	46.9	49.8	31.1	39.9 *	10.1	9.7	8.5	6.9
Congo, Dem. Rep.	—	—	—	—	20.9	10.4	10.7	8.1	44.4	45.8	43.4	42.7	16.1	13.8	11.6	9.1
Congo, Rep.	36.8	40.2	40.5	40.3	8.3 *	8.0	6.0	8.2	27.3 *	31.2	24.4	21.2	11.4	8.9	6.3	4.8
Costa Rica	5.1	5.4	5.2	4.8	1.7 *	1.4 *	1.0	1.3 *	8.1 *	6.0 *	5.6	4.8 *	1.3	1.1	1.0	0.9
Côte d'Ivoire	20.4	20.0	21.9	19.0	6.9	9.0	7.6	6.1	31.2	40.5	29.9	21.6	14.7	12.9	11.0	8.9
Croatia	10.4	2.9	2.5	<2.5	1.3 *	1.1 *	1.1 *	1.1 *	1.3 *	1.2 *	1.1 *	0.9 *	0.8	0.7	0.6	0.5
Cuba	3.7	<2.5	<2.5	<2.5	2.4	2.7	2.2 *	2.0 *	7.0	7.5	5.5 *	4.7 *	0.8	0.7	0.6	0.5
Djibouti	48.1	32.2	22.3	18.9	19.4	25.4	21.6	18.4 *	26.8	33.0	33.5	28.9 *	10.2	8.9	7.7	6.2
Dominican Republic	28.1	24.4	16.5	9.5	1.5	1.9	1.7 *	1.5 *	7.7	10.5	7.5 *	6.4 *	4.1	3.7	3.4	3.0
Ecuador	18.5	17.0	10.7	7.9	2.7	2.1	2.1 *	1.6	27.9	27.6	24.8 *	23.9	2.9	2.3	1.8	1.5
Egypt	5.2	5.4	4.5	4.5	7.0	5.3	7.9	9.5	24.4	23.9	30.7	22.3	4.7	3.6	2.9	2.2
El Salvador	11.0	10.5	12.4	9.0	1.5	1.3	1.6	2.1	32.3	24.6	20.8	13.6	3.3	2.5	1.9	1.5
Equatorial Guinea	—	—	—	—	9.2	2.8	3.1	3.7 *	42.6	35.0	26.2	29.5 *	15.6	13.5	11.4	9.0
Eritrea	—	—	—	—	15.0	12.8 *	15.3	—	43.0	46.5 *	52.0	—	8.8	6.9	5.5	4.3
Estonia	5.6	4.2	2.6	2.9	2.4 *	2.2 *	2.0 *	2.4 *	3.6 *	3.0 *	2.9 *	3.4 *	1.1	0.7	0.5	0.3
Eswatini	19.2	17.0	23.2	20.6	1.7	2.9	1.1	2.0	36.5	29.2	30.9	25.5	12.6	12.9	9.3	5.4
Ethiopia	52.0	39.7	32.1	20.6	12.4	12.4	9.8	10.0	57.6	50.4	44.4	38.4	14.3	11.1	8.4	5.9
Fiji	4.8	4.3	4.5	3.7	7.9 *	6.3	6.3 *	7.1 *	5.7 *	7.5	3.9 *	4.4 *	2.3	2.3	2.4	2.5
Gabon	10.5	10.9	10.8	10.5	4.2	3.7 *	3.4	3.6 *	25.9	21.7 *	17.0	20.2 *	8.3	7.5	6.3	4.8
Gambia	13.1	15.1	9.3	10.2	9.1	7.4	9.7	9.4 *	24.1	27.7	23.4	26.0 *	11.8	9.8	8.1	6.4
Georgia	13.5	7.2	7.7	7.9	3.1	3.0	1.6	4.3 *	16.1	14.6	11.3	10.5 *	3.5	2.4	1.7	1.1
Ghana	15.6	9.3	5.3	5.5	9.9	6.0	6.9	4.7	30.6	27.9	22.8	18.8	9.9	8.6	7.2	4.9
Guatemala	20.5	15.8	15.8	15.2	3.7	2.1 *	1.1	0.8	51.0	51.4 *	48.0	46.7	5.2	4.3	3.5	2.8
Guinea	26.3	21.3	17.6	16.5	10.3	11.0	7.9	9.2	46.9	39.2	36.3	30.3	16.5	13.1	10.9	8.6
Guinea-Bissau	25.7	24.4	22.2	28.0	11.8	8.8	5.8	6.0	33.8	47.7	32.2	27.6	17.6	14.6	11.4	8.4
Guyana	8.3	9.4	11.2	8.1	12.1	8.3	5.6	6.4	13.9	17.9	19.3	11.3	4.7	4.2	3.8	3.1
Haiti	54.9	57.1	49.5	49.3	5.5	10.2	5.1	3.7	28.8	29.6	22.0	21.9	10.4	9.0	21.1	7.2
Honduras	19.6	17.0	15.2	12.9	1.3	1.4	1.4	1.5 *	35.5	29.8	22.6	21.1 *	3.7	3.0	2.4	1.8
India	18.2	22.2	17.5	14.5	17.1	20.0	16.5 *	20.8	54.2	47.8	42.0 *	37.9	9.2	7.5	5.8	3.9
Indonesia	18.5	19.4	13.3	8.3	5.5	14.4	12.3	11.7 *	42.4	28.6	39.2	32.7 *	5.2	4.1	3.3	2.5
Iran	4.9	6.1	5.8	4.9	6.1	4.8	4.0	4.9 *	20.4	7.1	6.8	7.2 *	3.4	2.6	2.0	1.5
Iraq	28.3	28.2	27.3	29.0	6.6	6.3	6.5	2.5	28.1	23.7	22.1	9.9	4.5	4.1	3.7	3.0
Jamaica	7.4	7.0	8.8	8.0	3.0	4.1	5.0	3.6	7.2	6.2	6.0	6.0	2.2	2.0	1.9	1.5
Jordan	12.6	6.6	8.2	12.2	2.5	2.3 *	1.6	2.4 *	11.6	10.2 *	8.2	10.3 *	2.8	2.4	2.1	1.7
Kazakhstan	5.8	5.9	3.1	<2.5	2.5	4.9	4.1	3.1	13.2	17.5	13.1	8.0	4.3	3.2	2.0	1.0
Kenya	31.3	28.2	23.5	29.4	7.4	6.9	6.9	4.2	40.8	40.2	35.5	26.2	10.5	7.9	5.8	4.6
Kuwait	<2.5	<2.5	<2.5	2.8	2.2	3.3	2.4	3.1	4.0	4.5	4.1	4.9	1.3	1.2	1.1	0.8
Kyrgyz Republic	16.3	9.7	8.3	7.1	3.6 *	3.4	1.3	2.0	24.3 *	18.1	22.6	11.8	5.0	4.0	3.0	2.0
Lao PDR	37.7	27.0	21.1	16.5	17.5	7.4	6.4	9.0	48.2	47.7	44.2	33.0	11.3	9.6	8.0	6.3
Latvia	5.3	<2.5	<2.5	<2.5	2.7 *	2.2 *	2.1 *	2.6 *	4.1 *	3.3 *	3.0 *	4.0 *	1.4	1.1	0.8	0.4
Lebanon	<2.5	3.4	4.5	11.0	4.7 *	6.6	4.1 *	4.7 *	15.7 *	16.5	12.0 *	15.3 *	2.0	1.4	1.0	0.8

DATA UNDERLYING THE CALCULATION OF THE 2000, 2005, 2010, AND 2019 GLOBAL HUNGER INDEX SCORES

Country	Proportion of undernourished in the population (%)				Prevalence of wasting in children under five years (%)				Prevalence of stunting in children under five years (%)				Under-five mortality rate (%)			
	'99–'01	'04–'06	'09–'11	'16–'18	'98–'02	'03–'07	'08–'12	'14–'18	'98–'02	'03–'07	'08–'12	'14–'18	2000	2005	2010	2017
Lesotho	13.6	11.7	12.7	13.1	6.8	5.6	3.8	2.8	52.7	44.7	39.3	33.4	11.7	12.4	9.9	8.6
Liberia	38.4	39.4	36.5	37.2	7.4	7.9	2.8	5.4 *	45.3	39.6	41.8	39.0 *	18.6	12.8	9.8	7.5
Libya	—	—	—	—	7.5 *	6.5	6.3 *	8.0 *	26.6 *	21.0	19.9 *	22.4 *	2.8	2.3	1.7	1.2
Lithuania	<2.5	<2.5	<2.5	<2.5	2.8 *	2.3 *	2.1 *	2.7 *	5.5 *	4.1 *	3.4 *	5.2 *	1.1	0.9	0.6	0.4
Madagascar	34.4	35.0	31.8	44.4	10.1 *	15.2	9.5 *	10.3 *	55.0 *	52.6	49.4	54.8 *	10.7	8.2	6.2	4.4
Malawi	27.1	26.1	21.8	17.5	6.8	6.3	4.1	2.8	54.6	52.4	47.3	37.4	17.2	11.4	8.9	5.5
Malaysia	2.8	3.9	3.7	2.5	15.3	11.9 *	10.5 *	11.5	20.7	17.2	15.8 *	20.7	1.0	0.8	0.8	0.8
Mali	14.6	11.1	6.9	6.3	12.6	15.4	9.0	9.0	42.5	37.6	27.8	26.9	22.0	17.1	13.6	10.6
Mauritania	11.6	12.1	8.2	10.4	15.3	13.6	12.2	14.8	38.6	31.5	22.5	27.9	11.4	11.0	9.8	7.9
Mauritius	6.6	5.2	4.8	6.5	14.2 *	13.9 *	11.9 *	7.3 *	12.1 *	10.7 *	8.9 *	6.7 *	1.9	1.6	1.5	1.3
Mexico	4.4	5.5	4.6	3.6	2.0	2.0	1.6	2.0	21.4	15.5	13.6	10.0	2.7	2.1	1.7	1.3
Moldova	—	—	—	—	4.0 *	5.9	1.9	2.9 *	11.6 *	10.7	6.4	6.2 *	3.2	2.0	1.7	1.6
Mongolia	35.1	31.0	20.8	13.4	7.1	2.7	1.7	1.3	29.8	27.5	15.4	7.3	6.4	4.2	2.6	1.7
Montenegro	—	—	<2.5	<2.5	—	4.2	3.3 *	3.1 *	—	7.9	8.4 *	7.1 *	—	—	0.7	0.4
Morocco	6.8	5.7	5.2	3.4	4.3 *	10.8	2.3	3.4 *	24.4 *	23.1	14.9	16.6 *	5.0	4.0	3.2	2.3
Mozambique	41.1	37.0	28.5	27.9	8.1	5.4	6.1	3.7 *	50.7	46.9	42.9	34.5 *	17.0	13.4	10.3	7.2
Myanmar	48.3	32.0	16.9	10.6	10.7	10.7	7.9	6.6	40.8	40.6	35.1	29.4	9.0	7.8	6.4	4.9
Namibia	26.2	25.1	37.4	27.3	10.0	7.6	6.9 *	6.5 *	29.3	29.2	25.8 *	23.9 *	7.6	7.1	5.3	4.4
Nepal	22.0	16.0	10.1	8.7	11.3	12.7	11.2	9.6	57.1	49.2	40.5	36.0	8.2	6.2	4.7	3.4
Nicaragua	32.6	24.4	20.9	17.0	2.3	0.3	2.2	1.2 *	25.1	18.8	17.3	16.5 *	3.9	2.9	2.3	1.7
Niger	21.6	15.1	11.3	16.5	16.2	12.5	16.0	10.1	53.5	54.8	47.0	40.6	22.4	16.9	12.4	8.5
Nigeria	9.3	6.5	6.2	13.4	17.6	12.3	11.6	7.1	39.7	40.9	35.8	37.0	18.6	15.7	13.0	10.0
North Korea	37.5	35.4	41.8	47.8	12.2	8.5	5.2	2.5	51.0	43.1	32.4	19.1	6.0	3.3	3.0	1.9
North Macedonia	7.9	6.1	4.4	3.2	1.7	3.4	4.3	2.5 *	8.0	11.3	7.7	6.6 *	1.6	1.4	1.0	1.4
Oman	11.9	10.5	5.6	6.8	7.3	10.9 *	7.1	7.5	12.9	16.5 *	9.8	14.1	1.7	1.3	1.2	1.1
Pakistan	23.4	23.3	21.1	20.3	14.2	13.4 *	14.8	7.1	41.5	43.0 *	43.0	37.6	11.3	10.1	9.1	7.5
Panama	27.7	22.9	13.2	10.0	1.5 *	1.6	1.2	1.0 *	22.3 *	23.7	19.0	12.6 *	2.6	2.3	2.0	1.6
Papua New Guinea	—	—	—	—	8.2 *	4.4	14.1	7.1 *	48.0 *	43.9	49.5	39.9 *	7.8	7.4	6.6	5.3
Paraguay	12.9	11.9	12.2	10.7	2.1 *	1.1	2.6	1.0	17.6 *	17.5	10.7	5.6	3.4	3.0	2.6	2.1
Peru	21.8	19.6	11.2	9.7	1.1	1.0	0.7	0.5	31.3	29.2	23.3	12.9	3.9	2.7	2.0	1.5
Philippines	20.4	16.3	13.3	13.3	8.0	6.0	7.3	7.1	38.3	33.8	33.6	33.4	3.9	3.4	3.1	2.8
Qatar	—	—	—	—	2.7 *	2.2 *	1.6 *	1.2 *	2.1 *	1.0 *	0.7 *	0.8 *	1.3	1.0	0.9	0.8
Romania	<2.5	<2.5	<2.5	<2.5	4.3	3.0 *	3.0 *	2.6 *	12.8	11.2 *	10.1 *	6.6 *	2.2	1.8	1.2	0.8
Russian Federation	5.1	<2.5	<2.5	<2.5	4.6 *	3.9 *	3.6 *	3.9 *	16.1 *	13.2 *	12.3 *	10.7 *	1.9	1.4	1.0	0.8
Rwanda	55.5	44.5	34.0	36.8	8.7	4.9	2.9	2.1	47.9	51.4	44.3	37.6	18.1	11.0	6.4	3.8
Saudi Arabia	6.1	7.9	7.0	7.1	7.6 *	11.8	6.0 *	5.3 *	11.2 *	9.3	7.7 *	8.2 *	2.2	1.7	1.2	0.7
Senegal	28.7	21.6	13.1	11.3	10.0	8.7	9.8	9.0	26.0	19.9	26.6	16.5	13.2	9.4	6.7	4.5
Serbia	—	—	5.9	5.7	—	4.5	3.5	3.9	—	8.1	6.6	6.0	—	—	0.8	0.6
Sierra Leone	39.6	37.0	27.0	25.6	11.6	10.2	8.8	5.1	35.5	45.0	38.5	26.4	23.3	20.3	16.3	11.1
Slovak Republic	5.9	6.2	4.3	3.4	3.8 *	2.9 *	2.8 *	2.4 *	7.5 *	4.2 *	3.7 *	3.3 *	1.0	0.8	0.7	0.6
Somalia	—	—	—	—	19.3	13.3	15.0	—	29.2	42.0	25.3	—	17.3	17.3	15.9	12.7
South Africa	5.0	4.4	4.4	6.2	4.5	7.8	5.2	2.5	30.1	35.7	26.1	27.4	7.8	8.4	5.9	3.7
South Sudan	—	—	—	—	—	—	24.3	—	—	—	31.3	—	—	—	—	9.6
Sri Lanka	18.6	18.2	13.8	9.0	15.5	14.7	11.8	15.1	18.4	17.3	19.2	17.3	1.7	1.4	1.2	0.9
Sudan	—	—	—	20.1	—	—	16.3	16.8	—	—	34.1	38.2	—	—	—	6.3
Suriname	13.0	10.9	8.0	8.5	7.0	4.9	5.8	5.5 *	14.1	10.6	8.8	9.6 *	3.5	2.9	2.5	2.0
Syrian Arab Republic	—	—	—	—	4.9	10.3	11.5	—	24.3	28.7	27.6	—	2.3	1.9	1.6	1.7
Tajikistan	—	—	—	—	9.4	8.7	4.3	5.6	42.1	33.0	28.8	17.5	8.8	5.8	4.3	3.4
Tanzania	36.5	34.4	34.6	30.7	5.6	3.6	4.9	4.5	48.3	44.4	42.1	34.5	13.0	9.4	7.3	5.4
Thailand	18.8	12.5	9.2	7.8	6.4 *	4.7	6.7	5.4	20.4 *	15.7	16.4	10.5	2.2	1.7	1.3	1.0
Timor-Leste	40.4	31.3	29.2	24.9	13.7	14.3	18.9	14.4 *	55.7	54.8	57.5	48.6 *	—	8.2	6.2	4.8
Togo	31.1	26.0	21.0	16.1	12.4	16.5	5.1	6.6	33.2	29.5	29.7	27.6	12.1	10.5	9.0	7.3
Trinidad & Tobago	11.6	11.8	9.6	5.5	5.2	5.8 *	6.4	5.3 *	5.3	6.7 *	9.2	5.7 *	3.3	3.3	3.1	2.6
Tunisia	4.9	5.6	4.8	4.3	2.9	3.4	3.3	2.1	16.8	9.0	10.1	8.3	3.2	2.3	1.7	1.3
Turkey	<2.5	<2.5	<2.5	<2.5	3.0	1.1	1.0	1.9	18.8	15.2	12.5	9.9	3.9	2.8	1.9	1.2
Turkmenistan	8.2	4.8	4.8	5.4	7.1	7.1	6.3 *	4.2	28.1	18.8	16.4 *	11.5	8.1	7.0	5.9	4.7
Uganda	27.7	24.1	30.9	41.0	5.0	6.2	4.6	3.5	44.9	38.3	33.4	28.9	14.6	10.9	7.8	4.9
Ukraine	4.5	<2.5	<2.5	3.5	8.2	1.4 *	1.4 *	1.3 *	22.9	8.0 *	7.4 *	6.0 *	1.9	1.5	1.2	0.9
Uruguay	4.2	4.3	<2.5	<2.5	2.3	3.0	1.3	1.9 *	12.8	13.9	10.7	8.8 *	1.7	1.4	1.1	0.8
Uzbekistan	16.2	14.5	9.0	6.3	9.0	4.4	5.8 *	5.0 *	24.9	19.6	18.1 *	12.9 *	6.2	4.9	3.6	2.3
Venezuela	16.4	10.5	3.1	21.2	3.9	4.8	4.1	3.5 *	17.4	16.2	13.4	13.3 *	2.2	1.9	1.7	3.1
Viet Nam	24.3	18.2	13.6	9.3	9.0	10.7	7.1	6.4	42.9	33.2	29.3	24.6	3.0	2.5	2.3	2.1
Yemen	29.9	30.1	25.7	38.9	15.9 *	15.2	13.3	17.9 *	53.9 *	57.7	46.6	61.1 *	9.5	7.3	5.6	5.5
Zambia	47.4	51.1	50.0	46.7	5.0	5.6	5.3 *	6.2	59.2	45.8	47.2 *	40.0	16.5	11.2	8.2	6.0
Zimbabwe	40.2	42.2	41.9	51.3	8.3	7.3	3.5	3.3	33.8	35.3	33.6	27.1	10.2	10.0	8.8	5.0

Note: — = Data not available or not presented. Some countries did not exist in their present borders in the given year or reference period.

*GHI estimates.

D

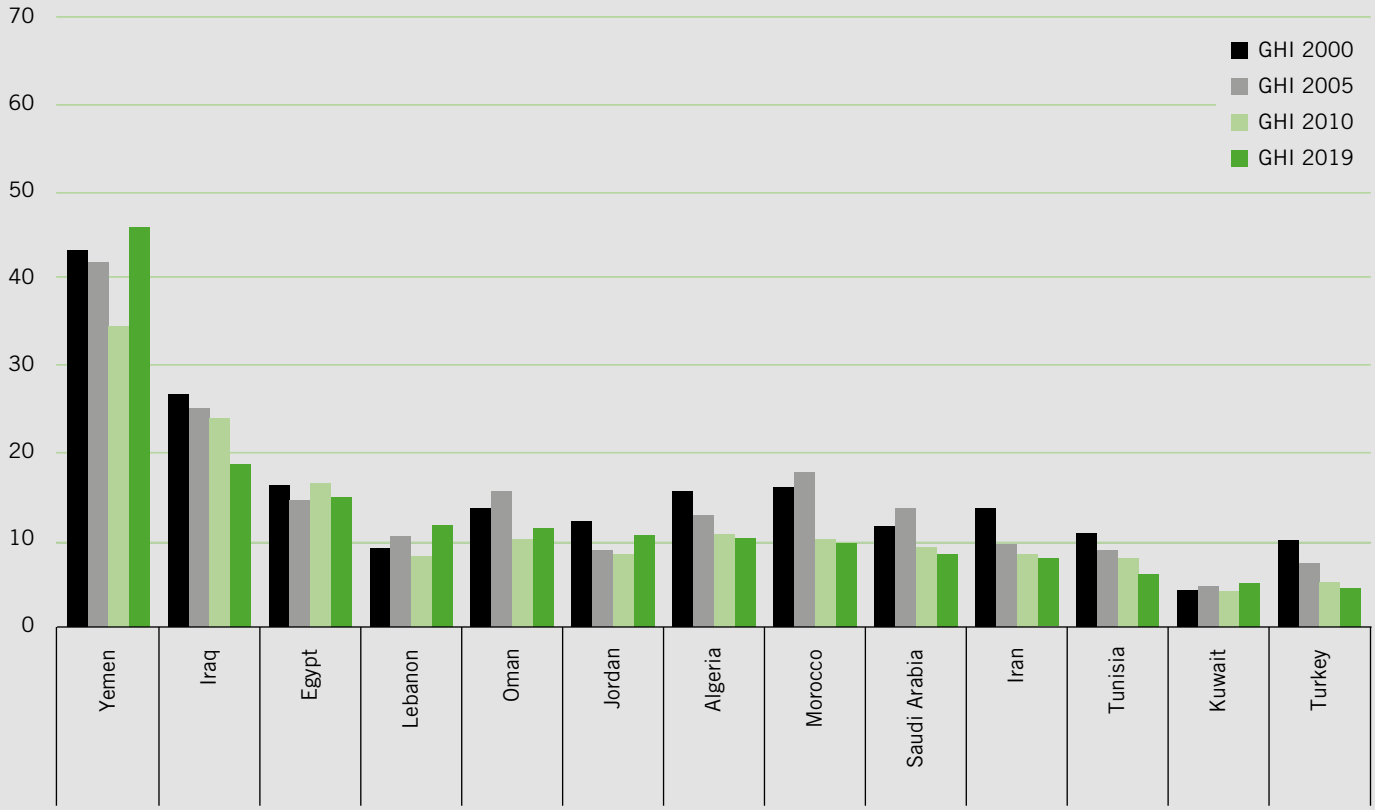
2000, 2005, 2010, AND 2019 GLOBAL HUNGER INDEX SCORES, AND CHANGE SINCE 2000

Country with data from	2000 '98–'02	2005 '03–'07	2010 '08–'12	2019 '14–'18	Absolute change since 2000	% change since 2000
Afghanistan	52.1	43.2	34.3	33.8	-18.3	-35.1
Albania	21.5	16.6	15.1	7.0	-14.5	-67.4
Algeria	15.6	12.9	10.6	10.3	-5.3	-34.0
Angola	65.1	50.3	38.6	29.8	-35.3	-54.2
Argentina	6.6	6.2	5.9	5.4	-1.2	-18.2
Armenia	18.3	12.7	11.3	7.8	-10.5	-57.4
Azerbaijan	27.5	17.3	12.1	7.4	-20.1	-73.1
Bahrain	—	—	—	—	—	—
Bangladesh	36.1	30.7	30.3	25.8	-10.3	-28.5
Belarus	<5	<5	<5	<5	—	—
Benin	36.7	33.3	28.3	24.0	-12.7	-34.6
Bhutan	—	—	—	—	—	—
Bolivia	30.3	27.1	21.6	15.4	-14.9	-49.2
Bosnia & Herzegovina	9.8	7.2	5.1	<5	—	—
Botswana	33.4	31.5	28.1	23.6	-9.8	-29.3
Brazil	12.0	7.0	5.4	5.3	-6.7	-55.8
Bulgaria	8.2	7.8	6.9	<5	—	—
Burkina Faso	46.3	48.1	36.8	25.8	-20.5	-44.3
Burundi	—	—	—	—	—	—
Cambodia	43.6	29.4	27.6	22.8	-20.8	-47.7
Cameroon	39.7	33.7	26.2	22.6	-17.1	-43.1
Central African Republic	50.7	49.5	42.0	53.6	2.9	5.7
Chad	51.5	52.1	50.9	44.2	-7.3	-14.2
Chile	<5	<5	<5	<5	—	—
China	15.8	13.0	10.0	6.5	-9.3	-58.9
Colombia	11.3	10.8	9.9	6.7	-4.6	-40.7
Comoros	—	—	—	—	—	—
Congo, Dem. Rep.	—	—	—	—	—	—
Congo, Rep.	37.3	37.1	32.0	31.0	-6.3	-16.9
Costa Rica	6.2	5.5	5.0	<5	—	—
Côte d'Ivoire	33.8	35.3	30.9	24.9	-8.9	-26.3
Croatia	6.1	<5	<5	<5	—	—
Cuba	5.3	<5	<5	<5	—	—
Djibouti	46.9	43.9	36.6	30.9	-16.0	-34.1
Dominican Republic	18.3	17.2	12.8	9.2	-9.1	-49.7
Ecuador	18.6	17.0	13.2	11.3	-7.3	-39.2
Egypt	16.3	14.3	16.3	14.6	-1.7	-10.4
El Salvador	16.3	13.3	12.8	9.6	-6.7	-41.1
Equatorial Guinea	—	—	—	—	—	—
Eritrea	—	—	—	—	—	—
Estonia	5.6	<5	<5	<5	—	—
Eswatini	29.6	27.9	26.5	20.9	-8.7	-29.4
Ethiopia	55.9	46.0	37.4	28.9	-27.0	-48.3
Fiji	9.9	9.3	8.6	8.9	-1.0	-10.1
Gabon	20.8	18.9	16.4	15.8	-5.0	-24.0
Gambia	27.5	26.3	22.5	21.8	-5.7	-20.7
Georgia	14.5	10.4	8.4	9.2	-5.3	-36.6
Ghana	28.7	22.0	18.3	14.0	-14.7	-51.2
Guatemala	27.7	24.1	22.0	20.6	-7.1	-25.6
Guinea	43.6	36.8	30.7	27.4	-16.2	-37.2
Guinea-Bissau	42.1	40.3	31.0	29.6	-12.5	-29.7
Guyana	18.0	16.8	16.0	12.6	-5.4	-30.0
Haiti	42.7	45.1	48.8	34.7	-8.0	-18.7
Honduras	20.9	17.8	14.8	12.9	-8.0	-38.3
India	38.8	38.9	32.0	30.3	-8.5	-21.9
Indonesia	25.8	26.8	24.9	20.1	-5.7	-22.1
Iran	13.5	9.4	8.2	7.9	-5.6	-41.5
Iraq	26.4	24.8	23.8	18.7	-7.7	-29.2
Jamaica	8.6	8.6	9.7	8.2	-0.4	-4.7
Jordan	12.1	8.7	8.3	10.5	-1.6	-13.2
Kazakhstan	11.0	12.4	8.6	5.5	-5.5	-50.0
Kenya	36.9	32.7	27.6	25.2	-11.7	-31.7
Kuwait	<5	<5	<5	<5	—	—
Kyrgyz Republic	19.3	14.0	12.4	8.8	-10.5	-54.4
Lao PDR	47.7	35.9	30.5	25.7	-22.0	-46.1
Latvia	6.0	<5	<5	<5	—	—
Lebanon	9.1	10.3	8.0	11.6	2.5	27.5
Lesotho	33.1	30.4	26.2	23.2	-9.9	-29.9
Liberia	48.6	42.4	36.0	34.9	-13.7	-28.2
Libya	—	—	—	—	—	—
Lithuania	<5	<5	<5	<5	—	—
Madagascar	43.2	43.4	36.2	41.5	-1.7	-3.9
Malawi	44.5	37.7	31.1	23.0	-21.5	-48.3
Malaysia	15.5	13.1	11.9	13.1	-2.4	-15.5
Mali	44.2	38.4	27.4	24.1	-20.1	-45.5
Mauritania	33.4	30.6	24.9	26.7	-6.7	-20.1
Mauritius	15.3	14.0	12.2	9.6	-5.7	-37.3
Mexico	10.6	9.1	7.7	6.2	-4.4	-41.5
Moldova	—	—	—	—	—	—
Mongolia	31.8	25.0	15.8	9.7	-22.1	-69.5
Montenegro	—	—	<5	<5	—	—
Morocco	15.8	17.7	10.0	9.4	-6.4	-40.5
Mozambique	49.9	42.3	35.3	28.8	-21.1	-42.3
Myanmar	44.4	36.4	25.9	19.8	-24.6	-55.4
Namibia	30.7	28.4	30.6	24.9	-5.8	-18.9
Nepal	36.8	31.3	24.5	20.8	-16.0	-43.5
Nicaragua	24.6	17.6	16.2	13.3	-11.3	-45.9
Niger	52.1	42.4	36.6	30.2	-21.9	-42.0
Nigeria	40.8	34.2	29.9	27.9	-12.9	-31.6
North Korea	40.3	32.9	30.9	27.7	-12.6	-31.3
North Macedonia	7.7	8.5	7.0	5.6	-2.1	-27.3
Oman	13.7	15.6	9.8	11.4	-2.3	-16.8
Pakistan	38.3	37.0	35.9	28.5	-9.8	-25.6
Panama	20.2	18.3	12.6	9.2	-11.0	-54.5
Papua New Guinea	—	—	—	—	—	—
Paraguay	14.0	12.6	11.6	8.3	-5.7	-40.7
Peru	20.9	18.2	12.5	8.8	-12.1	-57.9
Philippines	25.8	21.4	20.5	20.1	-5.7	-22.1
Qatar	—	—	—	—	—	—
Romania	8.3	6.4	5.6	<5	—	—
Russian Federation	10.3	7.5	6.4	5.8	-4.5	-43.7
Rwanda	56.6	44.0	32.4	29.1	-27.5	-48.6
Saudi Arabia	11.5	13.7	9.2	8.5	-3.0	-26.1
Senegal	36.3	27.5	23.6	17.9	-18.4	-50.7
Serbia	—	—	6.7	6.5	—	—
Sierra Leone	53.6	51.1	40.8	30.4	-23.2	-43.3
Slovak Republic	7.3	6.0	<5	<5	—	—
Somalia	—	—	—	—	—	—
South Africa	19.2	22.7	16.6	14.0	-5.2	-27.1
South Sudan	—	—	—	—	—	—
Sri Lanka	22.4	21.2	18.0	17.1	-5.3	-23.7
Sudan	—	—	—	32.8	—	—
Suriname	16.0	12.5	11.0	10.8	-5.2	-32.5
Syrian Arab Republic	—	—	—	—	—	—
Tajikistan	—	—	—	—	—	—
Tanzania	42.2	35.9	34.1	28.6	-13.6	-32.2
Thailand	18.3	13.2	12.7	9.7	-8.6	-47.0
Timor-Leste	—	41.8	42.3	34.5	—	—
Togo	39.3	37.0	27.2	23.9	-15.4	-39.2
Trinidad & Tobago	12.1	12.9	12.7	9.1	-3.0	-24.8
Tunisia	10.7	8.6	7.9	6.2	-4.5	-42.1
Turkey	10.2	7.3	5.4	<5	—	—
Turkmenistan	21.8	17.1	15.0	11.8	-10.0	-45.9
Uganda	38.9	33.0	30.8	30.6	-8.3	-21.3
Ukraine	13.7	<5	<5	<5	—	—
Uruguay	7.7	8.1	5.4	<5	—	—
Uzbekistan	23.6	17.8	14.7	10.7	-12.9	-54.7
Venezuela	15.2	12.7	8.4	16.9	1.7	11.2
Viet Nam	28.2	23.8	18.8	15.3	-12.9	-45.7
Yemen	43.2	41.7	34.5	45.9	2.7	6.2
Zambia	52.3	46.0	42.8	38.1	-14.2	-27.2
Zimbabwe	39.1	39.6	35.8	34.4	-4.7	-12.0

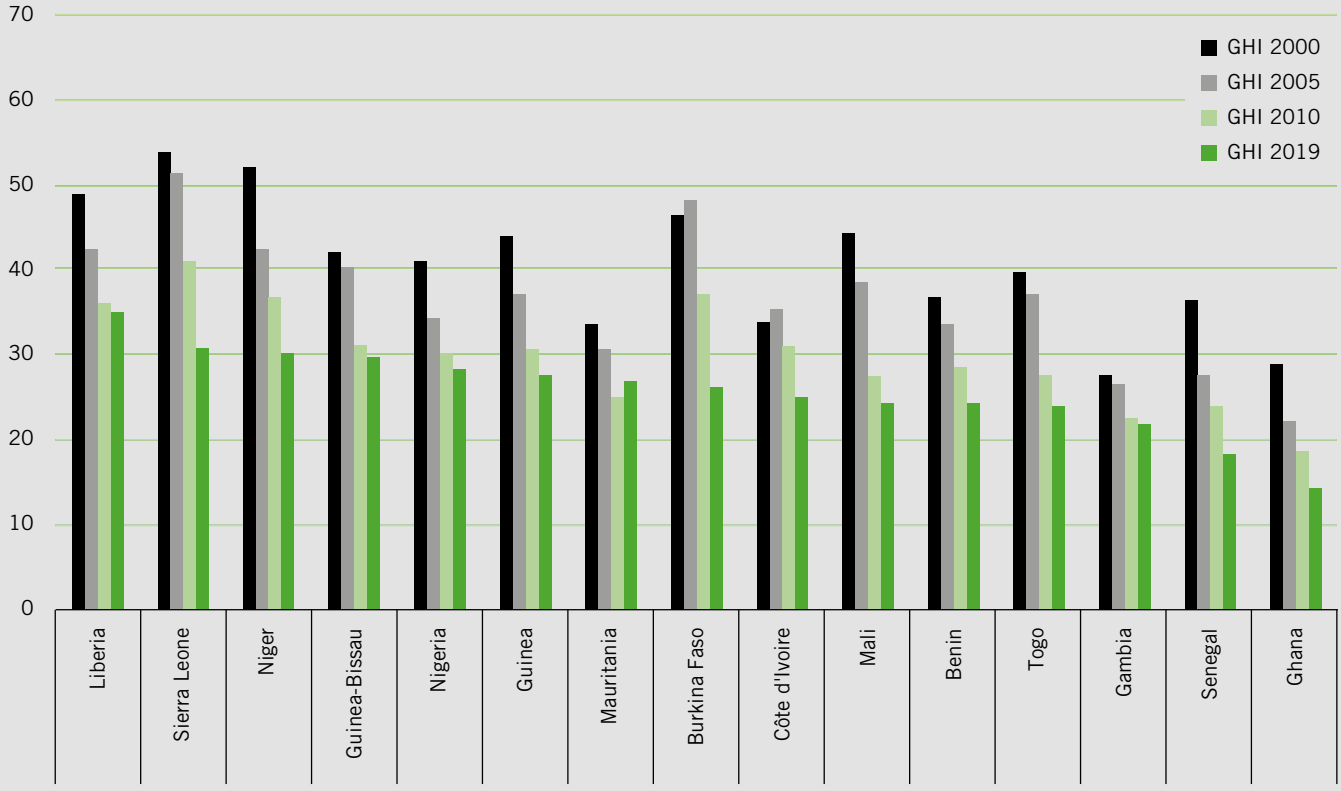
— = Data are not available or not presented. Some countries did not exist in their present borders in the given year or reference period.

REGIONAL COMPARISONS, ORDERED FROM HIGHEST TO LOWEST 2019 GLOBAL HUNGER INDEX SCORES

NEAR EAST AND NORTH AFRICA

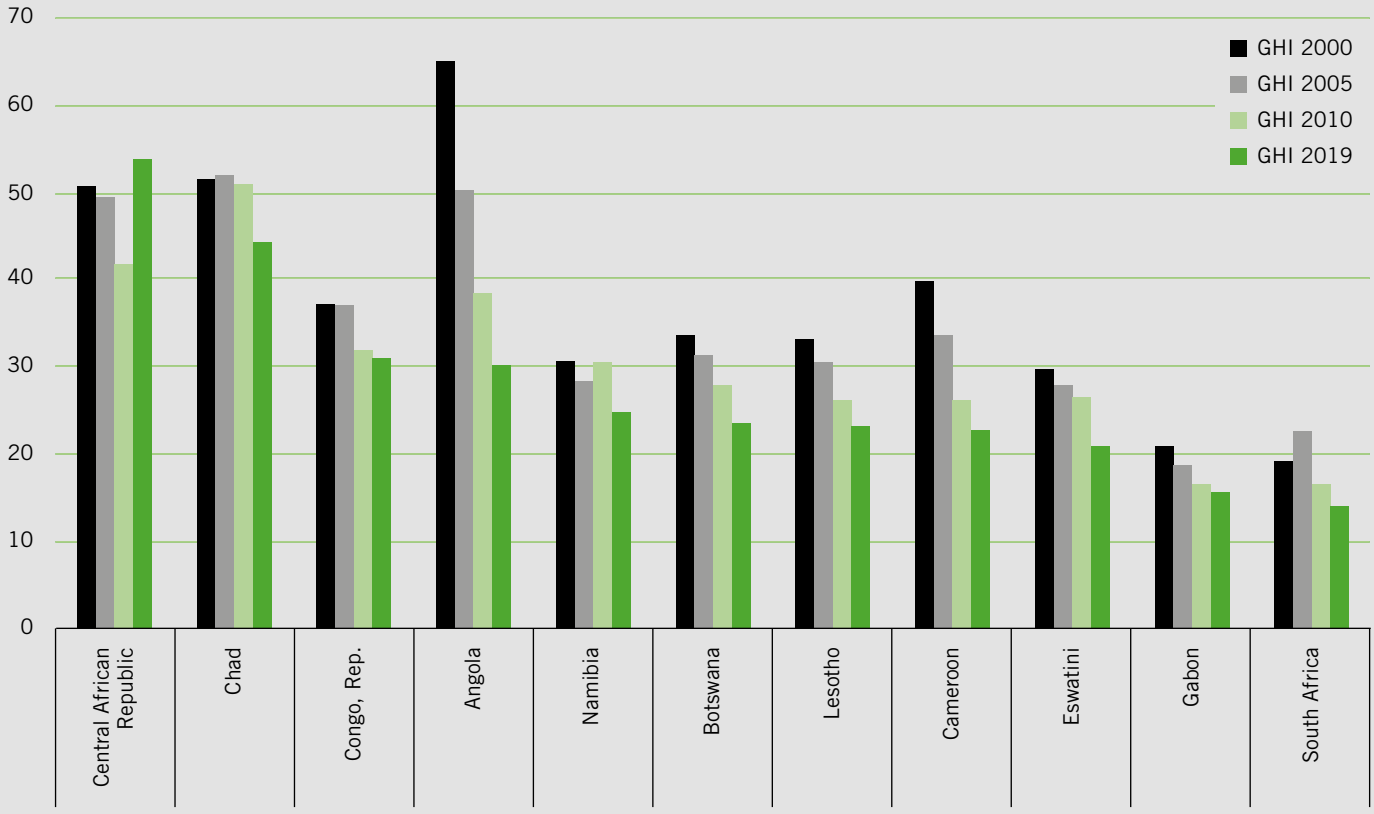


WEST AFRICA

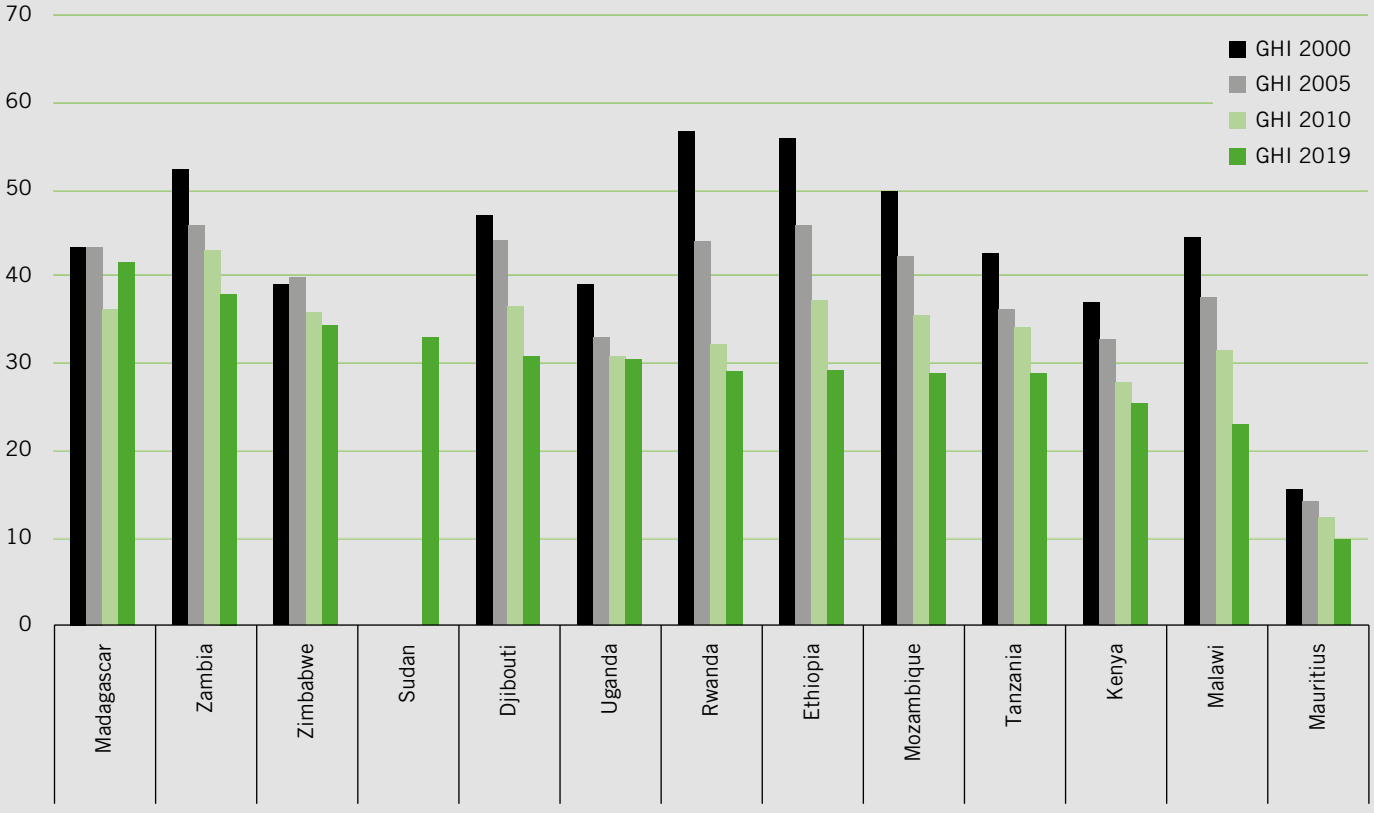


Note: Scores could not be calculated for some countries for some or all years due to insufficient data. Also, some countries did not exist in their present borders in the given year or reference period.

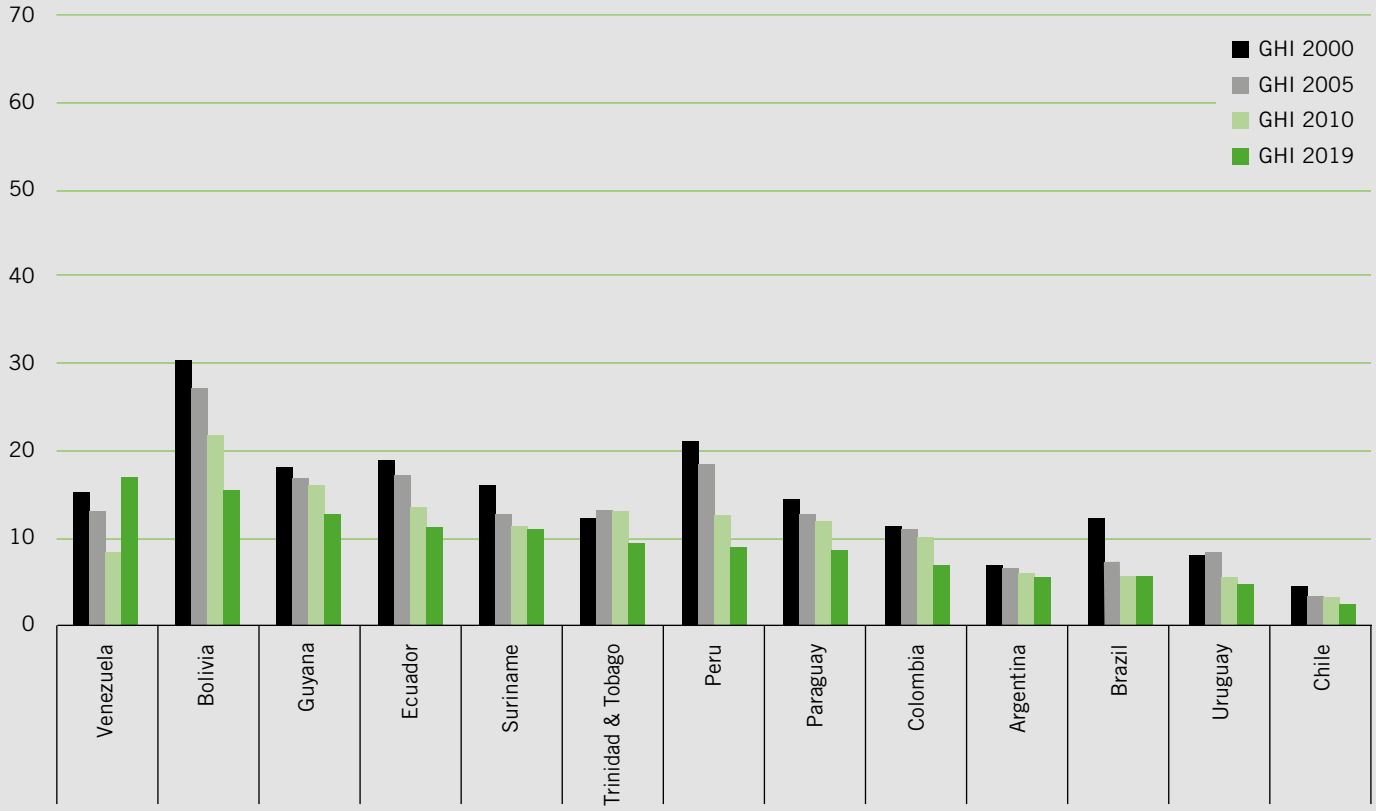
CENTRAL AND SOUTHERN AFRICA



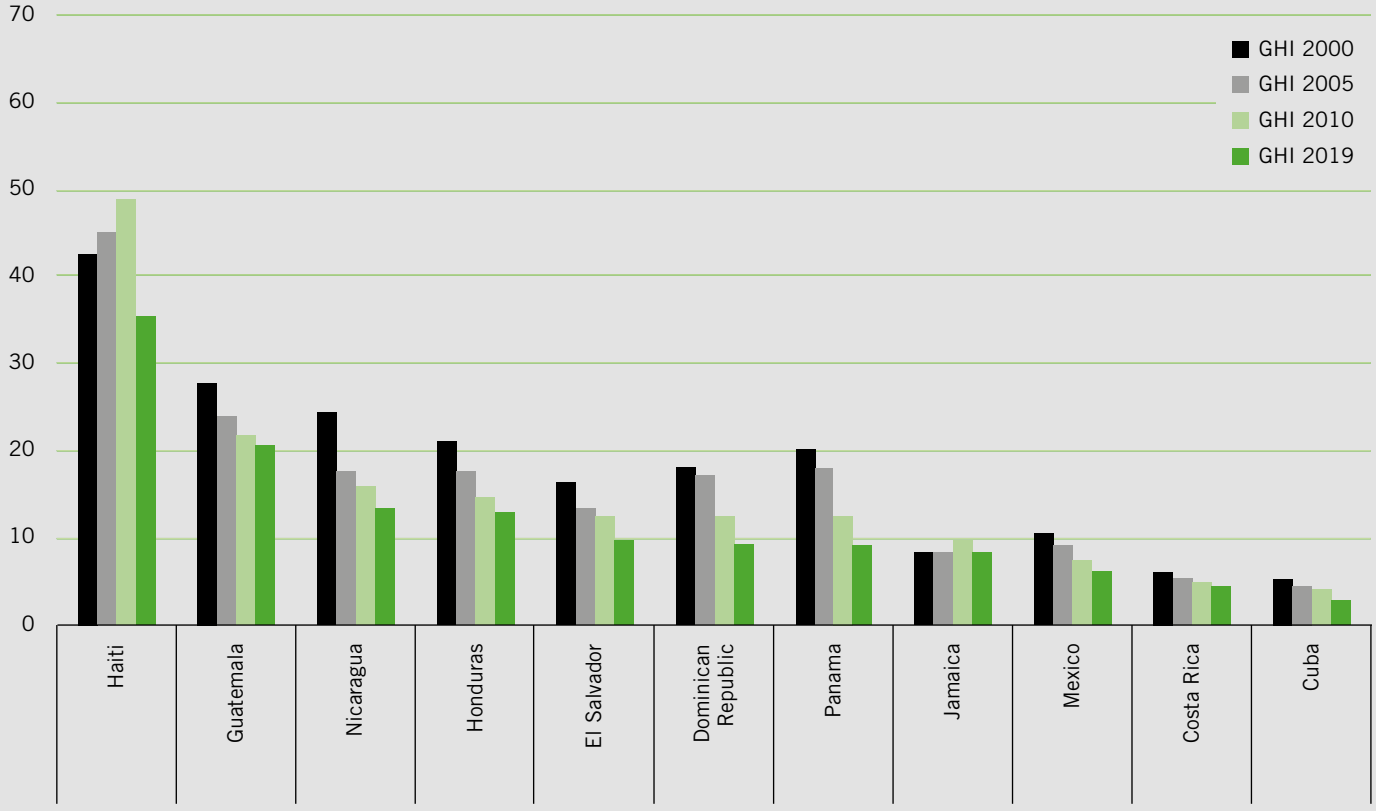
EAST AFRICA



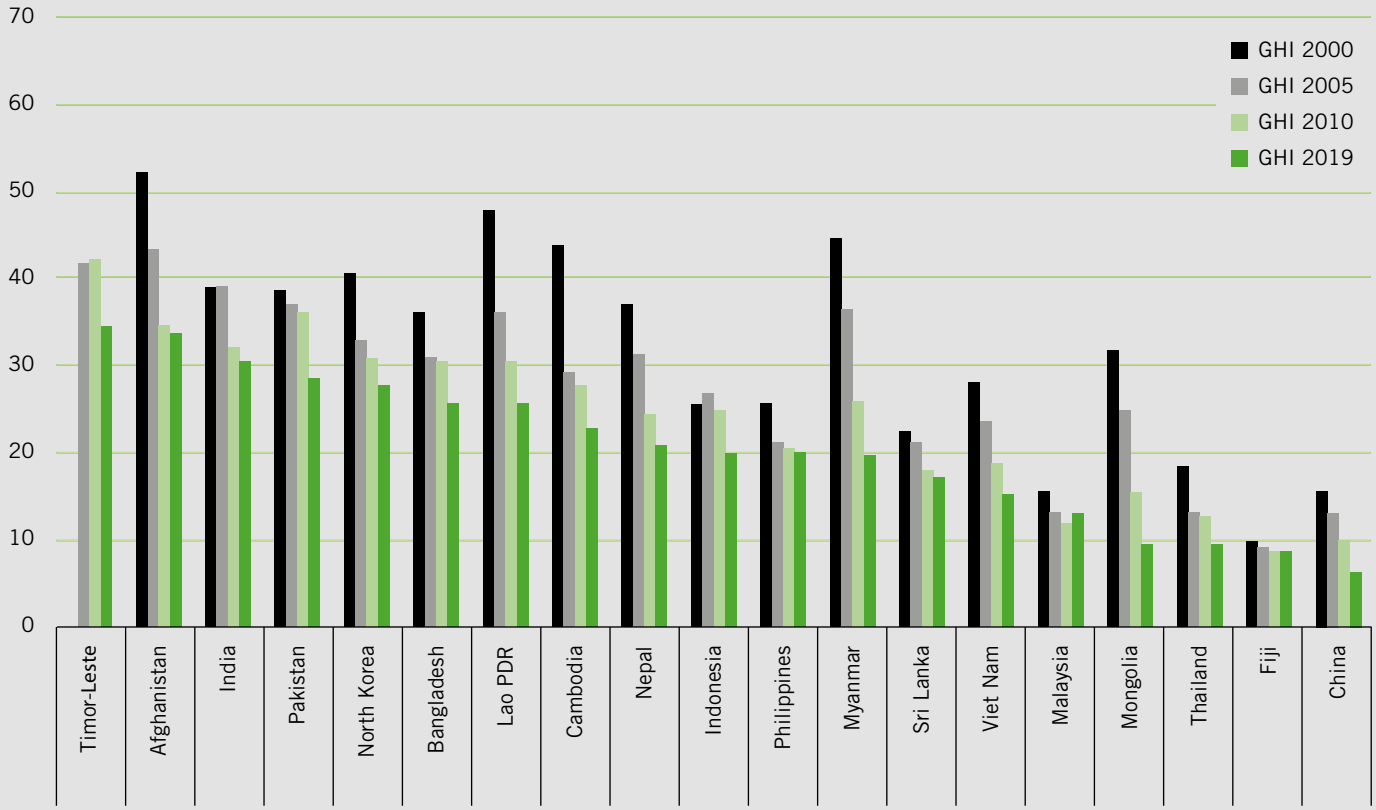
SOUTH AMERICA



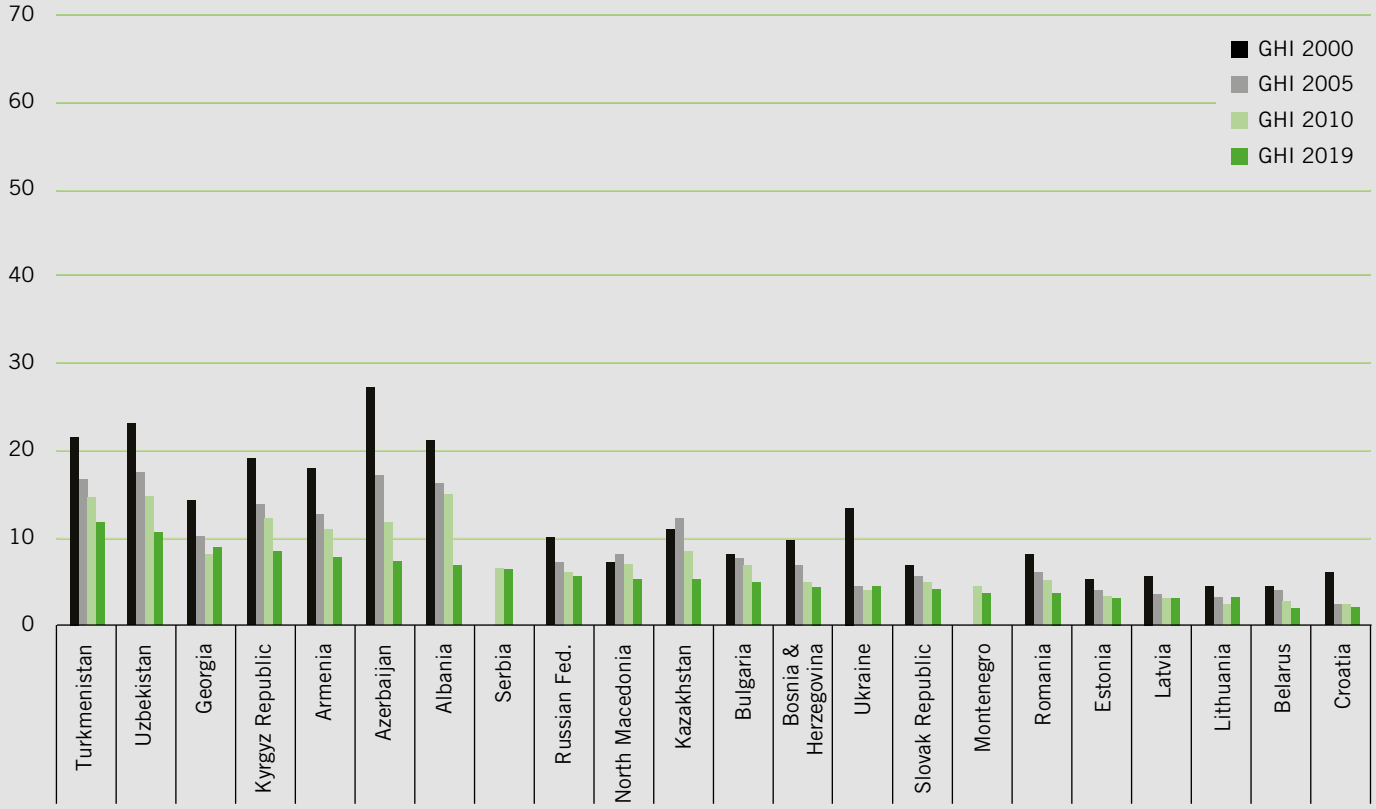
CENTRAL AMERICA AND THE CARIBBEAN



SOUTH, EAST, AND SOUTHEAST ASIA



EASTERN EUROPE AND THE COMMONWEALTH OF INDEPENDENT STATES



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PARTNERS

welt hunger hilfe

Who we are

Welthungerhilfe is one of the largest nongovernmental aid agencies in Germany. It was founded in 1962 under the umbrella of the Food and Agriculture Organization of the United Nations (FAO). At that time, it was the German section of the Freedom from Hunger Campaign, one of the first global initiatives to fight hunger.

What we do

We fight hunger and poverty. Our goal is to make ourselves redundant. We provide integrated aid, from rapid disaster aid to long-term development cooperation projects. We supported people in 37 countries through 404 overseas projects in 2018.

How we work

Help to self-help is our basic principle; it allows us to strengthen structures from the bottom up together with local partner organizations and ensures the long-term success of project work. In addition, we inform the public and take an advisory role with regard to national and international policy. This is how we fight to change the conditions that lead to hunger and poverty.

Our vision

A world in which all people can exercise their right to lead a self-determined life with dignity and justice, free from hunger and poverty.

CONCERN worldwide

ENDING EXTREME POVERTY WHATEVER IT TAKES

Who we are

Concern Worldwide is a nongovernmental, international, humanitarian organisation dedicated to the reduction of suffering and working towards the ultimate elimination of extreme poverty in the world's poorest countries.

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. To achieve this mission, we engage in long-term development work, build resilience, respond to emergency situations, and seek to address the root causes of poverty through our development education and advocacy work.

Our vision

We believe in 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; and where everyone is treated with dignity and respect.

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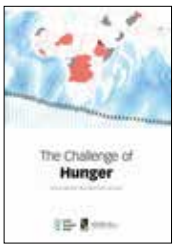

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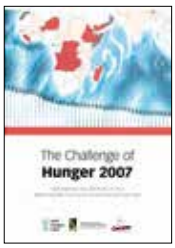

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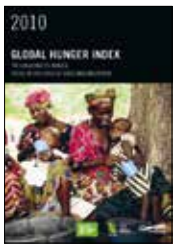

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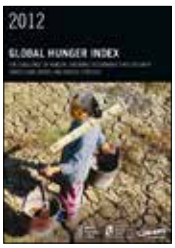

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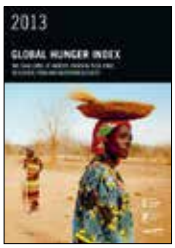

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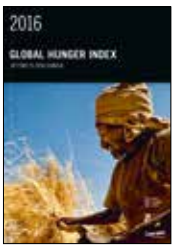
Armed Conflict and the Challenge of Hunger



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Deutsche Welthungerhilfe e.V.
Friedrich-Ebert-Straße 1
53173 Bonn, Germany
Tel. +49 228-2288-0
Fax +49 228-2288-333
www.welthungerhilfe.de

Secretary General:
Mathias Mogge

Concern Worldwide
52-55 Lower Camden Street
Dublin 2, Ireland
Tel. +353 1-417-7700
Fax +353 1-475-7362
www.concern.net

Chief Executive Officer:
Dominic MacSorley

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Authors:
Welthungerhilfe: Fraser Patterson (Policy Advisor), Miriam Wiemers (Policy and External Relations); Concern Worldwide: Réiseal Ní Chéilleachair (Head of Global Advocacy), Connell Foley (Director of Strategy, Advocacy, and Learning); Independent Consultants: Klaus von Grebmer, Jill Bernstein, Heidi Fritschel; Towson University: Seth Gitter and Kierstin Ekstrom

Guest Author:
Rupa Mukerji (Director, Advisory Services, and Senior Advisor, Adaptation to Climate Change, Helvetas)

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Deutsche Welthungerhilfe e. V.

Friedrich-Ebert-Straße 1
53173 Bonn, Germany
Tel. +49 228-2288-0
Fax +49 228-2288-333
www.welthungerhilfe.de
Member of Alliance2015

Concern Worldwide

52-55 Lower Camden Street
Dublin 2, Ireland
Tel. +353 1-417-7700
Fax +353 1-475-7362
www.concern.net
Member of Alliance2015