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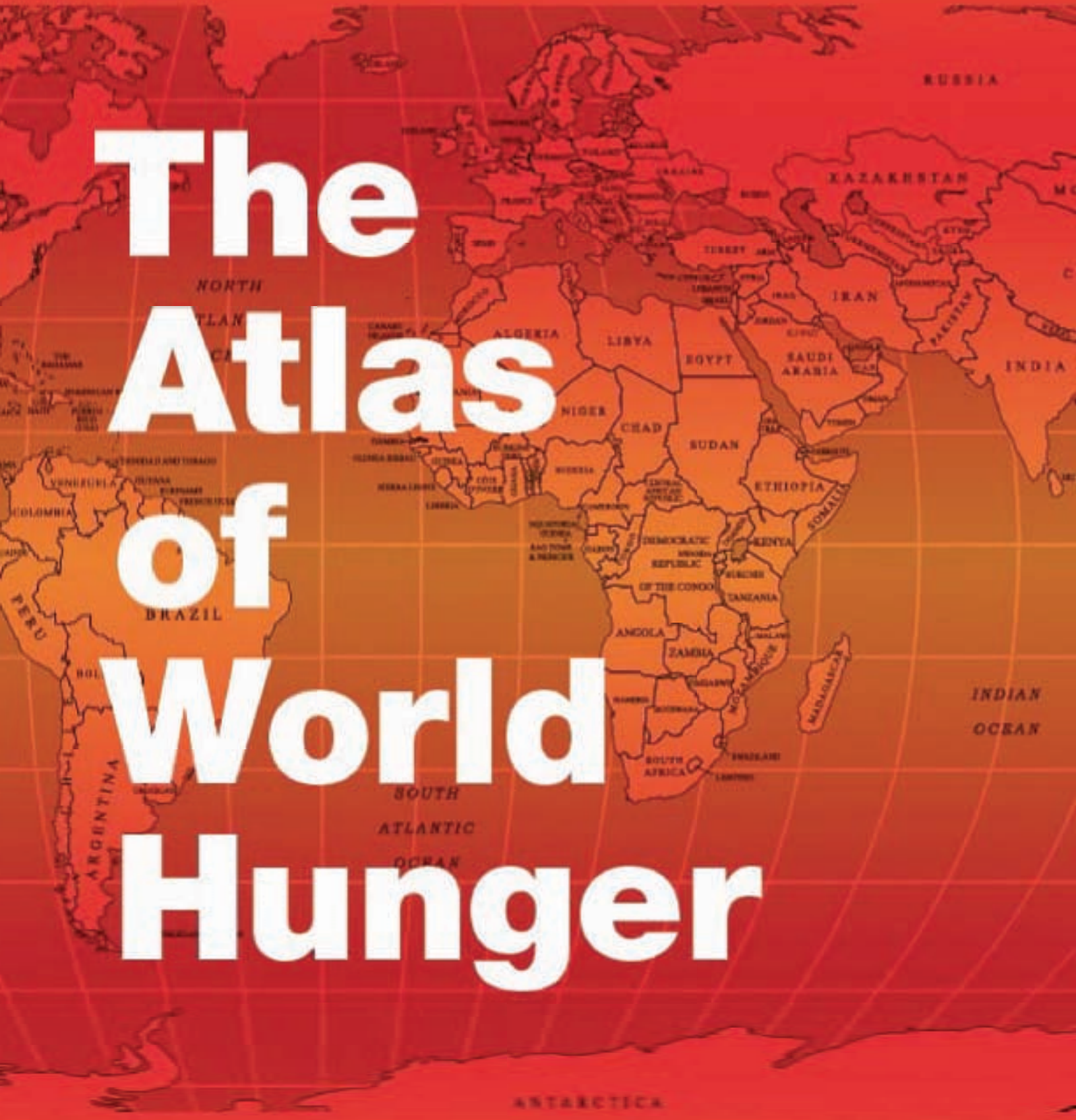
The Atlas of World Hunger



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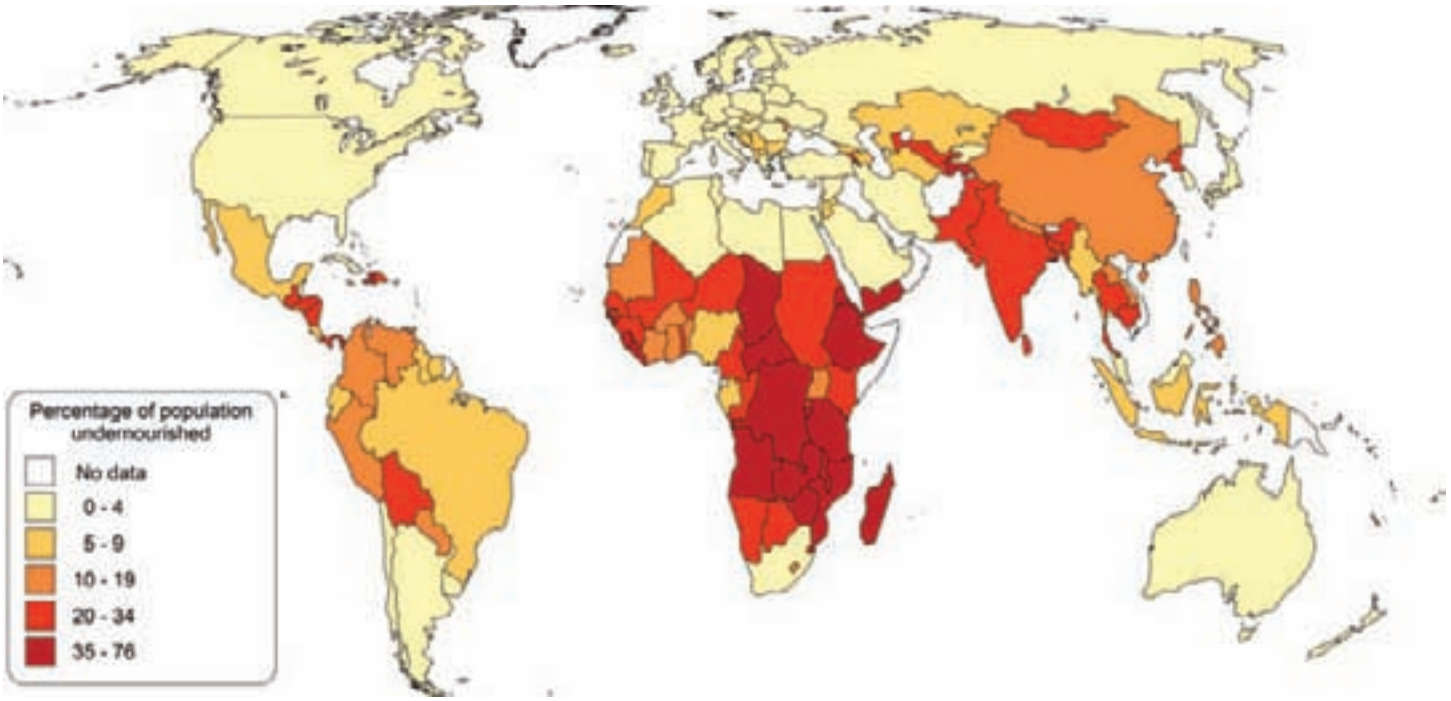
3: Prevalence of Undernourishment (POU)

The FAO is well aware of the limitations of food balance sheets as indicators of hunger in the world. It has long recognized that food availability (map 2.1) does not reveal much about differences in diet among different people and regions in a country.[7] In an attempt to better measure the frequency of hunger in national populations, the FAO constructed an indicator called the *prevalence of undernourishment* (POU). This measure is now used by many international agencies to track progress toward alleviating world hunger. The POU is calculated from three components: (1) an estimate of per capita food availability in a country; (2) an estimate of the distribution of available calories among households in the country; and (3) an estimate of the minimum daily caloric needs and caloric cutoff points below which individuals could be labeled "undernourished." With these data, the prevalence of undernourishment can be calculated based on the share of the population for which caloric availability at the household level is below the cutoff point.

Map 3.1 presents a geography of hunger based on the measured prevalence of undernourishment. As a representation of hunger, this map is clearly an improvement over map 2.1. It shows for example that hunger is present in countries like Brazil and China where we know it exists despite national food sufficiency (map 2.1). Still, the undernourishment measure is an imperfect gauge of hunger in the world. There are multiple concerns.

First, to obtain information on the availability of food in each country, the FAO relies on its food balance sheet data. As discussed in the text relating to map 2.1, these data are not reliable when a large share of food is produced and consumed by small-scale producers, as is the case in much of Africa and Asia. Errors in estimating production are compounded by poor



Map 3.1. Prevalence of undernourishment, 2002–4.

information about postharvest losses from spoilage and waste (Blades 1980). To try to correct for errors in reported changes in food stocks, the FAO uses the average food availability for three-year periods to calculate its undernourishment figures. This averaging does not address chronically biased measurement of production or spoilage.

The FAO is sensitive to these problems and their implications for mapping food insecurity. The organization acknowledges that errors in the estimate of available food can cause dramatic differences in reported patterns of undernourishment. For example, a 20% difference in the estimated food availability would be enough to alter the calculated undernourishment in a country from 7% to 64% of the population depending on the level of national food supply and inequality in distribution (Naiken 2003). As noted in the text accompanying map 2.1, reputable analysts consider errors in the measurement of availability of 25% to be quite possible.

Aside from estimating food availability, calculating the prevalence of undernourishment requires determining an individual's minimum daily caloric needs. The FAO uses data on the age and gender mix of a population to determine the minimum caloric requirement to support light activity for a "typical" person in a given country. The caloric cutoff is then set somewhat below the average requirement on the grounds that many people who eat less than the average requirement do so because they require less food based on their personal metabolism or activity level. The lowest cutoff established by the FAO in its *Sixth World Food Survey* (FAO 1996) was 1790 calories for South Asia. The highest cutoff was 1880 calories for East and Southeast Asia. While the cutoff is based on nutritional science, there is considerable debate about whether the estimated caloric requirements accurately reflect the needs of particular populations based on their activity levels, genetic makeup, and other factors (Smith 1998; Svedberg 1999). (See box 2.1 for examples of diets in this calorie range.)

Uncertainty about the appropriate cutoff point is troubling because the estimated prevalence of undernourishment is extremely sensitive to the cutoff point used in the calculation. For Sub-Saharan Africa, the FAO estimated the average per capita caloric requirement to be 2100 calories. Based on this average requirement, the cutoff for Sub-Saharan Africa was set at 1800 calories. In 1991–92 the FAO calculated that 43% of the African population was undernourished. If the cutoff had been set 10% higher, at 1980 calories, 51% of the population would have been classified as undernourished. Had the cutoff been 10% lower, 34% of the population would have been labeled undernourished. Since existing nutritional studies could justify 10% increases or decreases in the cutoff, any estimate of undernourishment from one third to one half of Africa's population is equally valid under this method (Svedberg 1999).

Data on cutoff points and the national food supply are debated, but information on the distribution of food does not even exist in many countries. The FAO relies on a limited number of household food consumption and expenditure surveys to determine the distribution of available calories among households. It calculates the distribution of food at one point in time and assumes that distribution within countries has not changed for as long as 30 years. Some authors have noted that the method used to calculate undernourishment exaggerates the range of actual consumption levels, suggesting that some people eat unrealistically high (or low) amounts. Others contend that the method does not fully capture the degree to which poverty, as opposed to food supply, results in hunger.[8] In either case, the assumption that distribution is fixed over time means that change in food availability per person drives measured trends in undernourishment (Brown et al. 1995).

Even if there were flawless data, the FAO method of measuring undernourishment would still obscure important aspects of the hunger problem. This is because hunger may not be uniform within a household; its presence can come and go within a year; and it may exist even if sufficient calories are consumed.

Individual Hunger versus Household Undernourishment

The prevalence of undernourishment as officially measured estimates the share of households without access to enough food to meet the caloric needs of their members. It does not measure the number of undernourished people directly. To come up with such a number, the FAO converts the percentage of households with

inadequate food into estimates of the absolute number of people living in such households. But hunger is not necessarily shared equally in households. In many societies, for example, women are expected to "absorb" food shocks, and the particular nutritional needs of children are often neglected. Around the world, women are more likely to go hungry than men, while children are more likely to be undernourished than adults. Because nutrition is not uniform within households, the undernourishment calculation may be blind to many who are hungry in households that appear to have "enough."

Seasonal versus Annual Data

The poor are often rural people who rely on farming for their food needs. Such people often have plenty to eat in the months immediately after harvests, but face hunger in the weeks before the next harvest. This seasonal hunger is not due to a failure to plan ahead. It is often caused by losses of stored food due to pests and spoilage or by unfavorable swings in market prices (low prices when farmers sell staple foods at harvest but high prices when farmers buy food before the next harvest) (Ferro-Luzzi et al. 2001).

Averaging national food supply over three-year periods means that hunger that arises only every few years or seasonally each year is not captured in the undernourishment indicator. For example, a hypothetical household in Africa whose members consumed 1900 calories each day for a year would not be recorded as undernourished because their consumption exceeds the 1800-calorie cutoff (though it is under the FAO's 2100-calorie average requirement). If they continued to consume this much for two years, but then went with no food at all for 30 days, the household would still appear to have no "undernourishment." The "extra" consumption over two years would have amounted to 73,000 calories per person, which is more than 1800 calories a day for 30 days. If the household's daily consumption returned to over 1800 calories per person for the rest of the third year, the average caloric intake of the household would exceed the cutoff. The members have obviously suffered food insecurity, if not hunger-related mortality, but the measure of undernourishment would not have recorded a problem.

Malnutrition versus Undernourishment

In addition to caloric intake, people need protein and micronutrients to be well nourished. Failure to meet a threshold for caloric intake will leave a person hungry, but lack of specific nutrients such as iron, iodine, or Vitamin A can also have severe consequences for health, physical and mental development, and capacity to work. By focusing on calories, the undernourishment measure misses many forms of malnutrition. A household could enjoy food security in terms of the quantity of food consumed but lack nutrition security because of unbalanced diets (Benson 2004).

UNDERNOURISHMENT AS A MEASURE OF HUNGER

The FAO measure of undernourishment is a better gauge of hunger than national food availability, but with so many possible sources of error, undernourishment may be overstated in some places and understated elsewhere. Consider these data for India and Ethiopia. For 2002–4 the FAO reported that 20% of India's population suffered undernourishment while 46% of Ethiopians were classified as undernourished. However, when nutritional deprivation is gauged by body mass index, which uses weight and height to assess whether a person is underfed, then 41% of Indian women and only 26% of Ethiopian women would be classified as suffering hunger (WHO 2004c). Both measures reveal an intolerable degree of food deprivation, but they give opposing impressions about where hunger is more widespread. They also imply large differences in the estimated total number of hungry people.

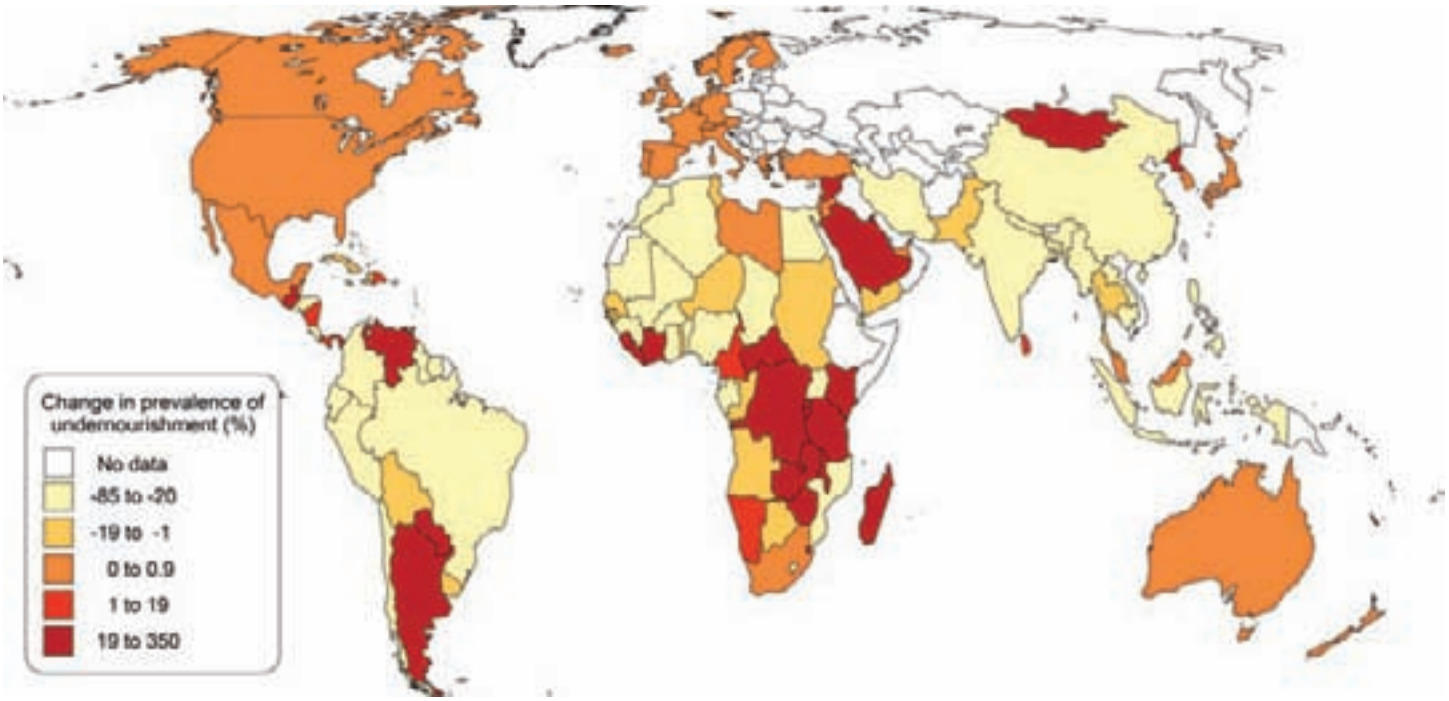
The undernourishment data are often used to indicate where hunger exists and how it is changing through time. Images like maps 3.1 and 3.2 are often presented to suggest general trends in the prevalence of hunger, progress toward meeting the Millennium Development Goals, and areas of the world that require particular attention. Since errors in measurement may not be consistent across regions, these maps may be misleading. For example, if food availability is consistently underreported in Africa, undernourishment in that region is overstated. Meanwhile, if gender discrimination causes particularly severe differences in nutrition within households in South Asia, hunger of

women will be understated there. Despite its weaknesses as a measure of the number of hungry people, the FAO measure of undernourishment contributes to our understanding of the geography of hunger. Four useful functions of the undernourishment measure are discussed below with reference to maps 3.1 through 3.4.

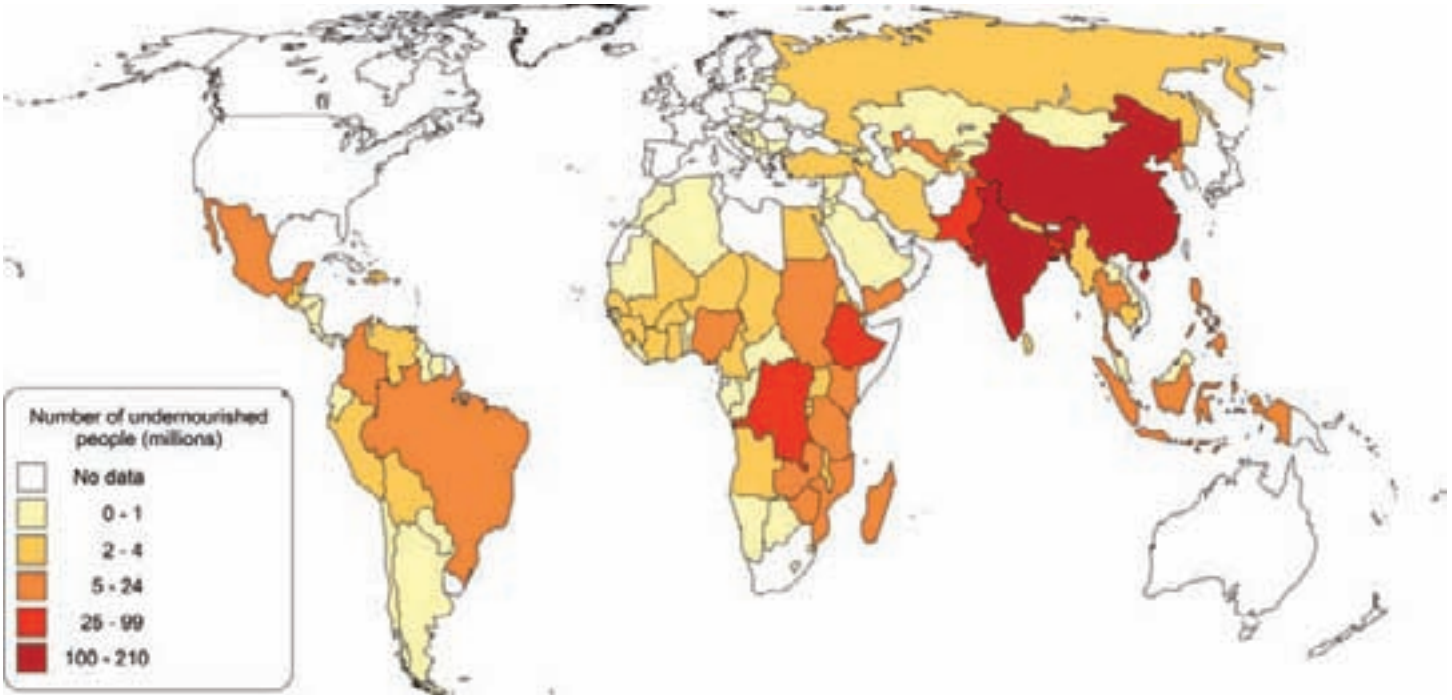
1. Identifying general, global patterns of hunger. Undernourishment data are widely and effectively used to draw attention to global hunger and progress in its alleviation. These data are frequently used to cite the proportion of people suffering hunger (map 3.1), changes in that proportion (map 3.2), the total number of undernourished people in the developing world (map 3.3), and changes in that number (map 3.4). While these figures are indicative rather than precise, they clarify some aspects about global patterns in hunger. The exact numbers associated with map 3.3 are subject to error, but the impression that a large portion of the world's hungry people are found in India, China, and Central and Eastern Africa is reasonable. Similarly, from map 3.4 it is safe to conclude that efforts to reduce the number of hungry people have had more success in China and East Asia generally than in South Asia or Central and Eastern Africa. More specific conclusions about the hunger situation are difficult to draw from the undernourishment data.

2. Contrasting rates of undernourishment and numbers of undernourished. Measuring hunger through "undernourishment" provides estimates of both the share of the population that is undernourished and the number of people in this condition.[9] Reference to both the prevalence and the total number of undernourished can be especially revealing in part because the two forms of the data sometimes leave very different impressions of progress. Presenting both the frequency of undernourishment and the total population that is undernourished can provide a nuanced view of the problem, but presenting one or the other can be misleading.

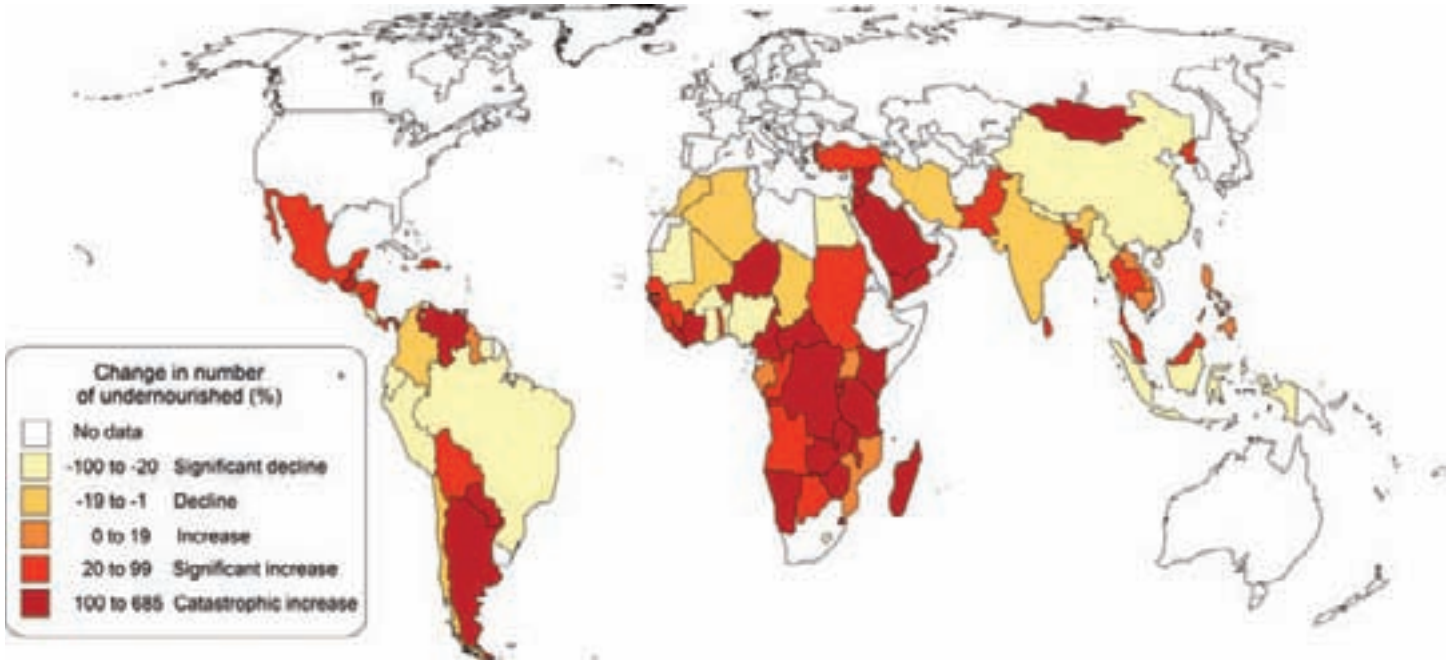
Because populations are growing, it is possible for the share of the population that is undernourished to fall (map 3.2), while the absolute number of people suffering undernourishment rises (map 3.4). For example, between 1980 and 2004, the estimated number of undernourished people in Bangladesh rose by about 11 million, from 33 to 44 million. Since the population of Bangladesh rose from 86 to 135 million, the share of the population that was undernourished fell from 39% to 30%. Table 3.1 and figure 3.1 give additional examples of countries that have experienced increasing numbers



Map 3.2. Change in share of population that is undernourished, 1980–2004.



Map 3.3. Estimated number of undernourished people, 2002–4.



Map 3.4. Change in number of undernourished people, 1980–2004.

of undernourished people, despite declining rates of undernourishment. One lesson from the FAO measure of undernourishment is that consumers of data about hunger must think carefully about both rates and absolute numbers. Reductions in the prevalence of undernourishment are certainly better than increases, but the goal of ending hunger requires a reduction in the absolute number of hungry people.

3. Identifying hunger that is not caused by national food shortages. Comparing the map of food availability

Table 3.1. Undernourishment: Number (in millions) and Prevalence

	Number undernourished		Change in number (%)	Percentage undernourished		Change in percentage (%)
	1979–81	2002–4		1979–81	2002–4	
Bangladesh	33.3	44.0	32	39	30	–23
Pakistan	23.6	37.5	59	29	24	–17
Cambodia	4.0	4.6	15	60	33	–45
Laos	1.0	1.1	10	33	19	–42
Philippines	12.9	14.6	13	27	18	–33
Yemen	3.2	7.6	138	39	38	–3
Uganda	4.1	4.8	17	33	19	–42
Guinea	1.5	2.0	33	32	24	–25
Togo	0.8	1.2	50	30	24	–20
Sudan	5.7	8.7	53	29	26	–10
Mozambique	7.1	8.3	17	59	44	–25
Honduras	1.1	1.6	45	31	23	–26
Bolivia	1.4	2.0	43	26	23	–12

Source: FAO 2008a, preliminary data for 2002–4.

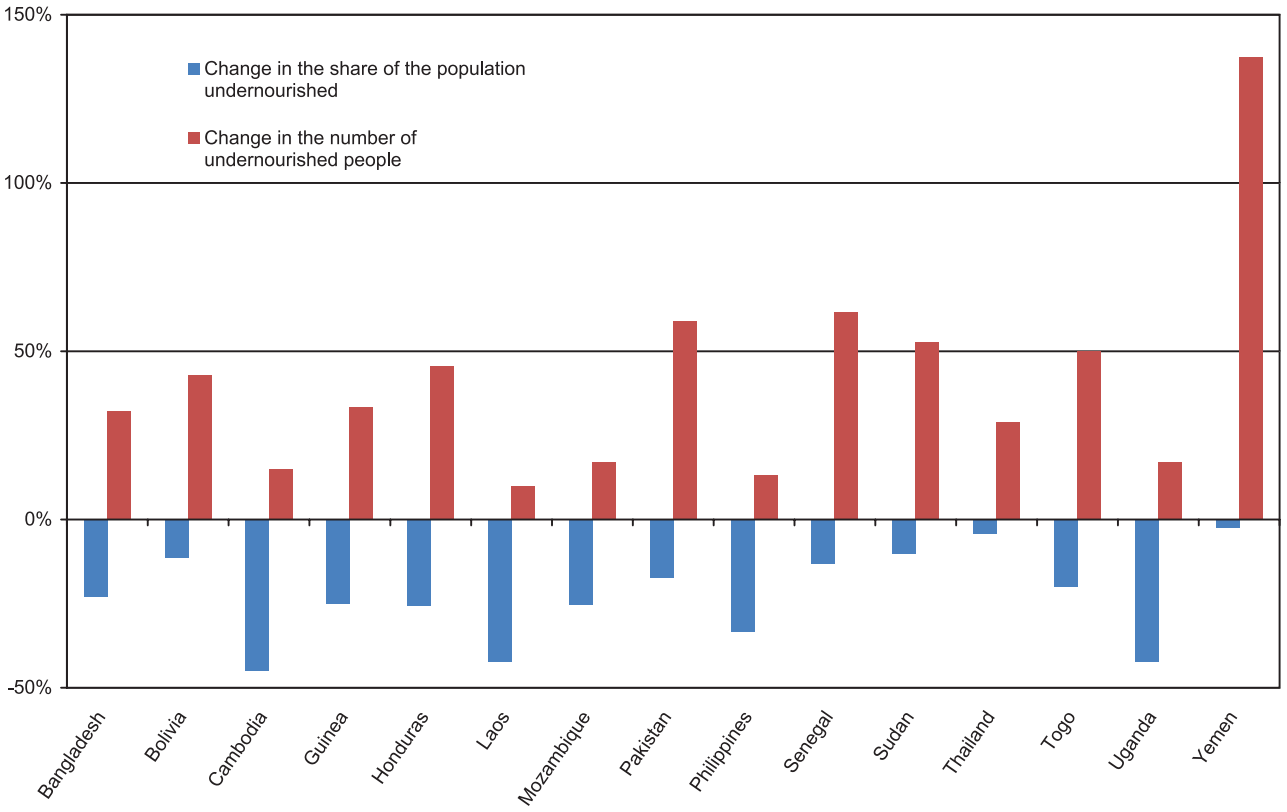


Figure 3.1. Undernourishment: change in number and change in prevalence (1979–81 to 2002–4). *Source:* FAO 2008c.

(map 2.1) with a map of undernourishment (map 3.1) suggests where food deprivation persists in the presence of abundance. We can see that the hungry in Brazil are victims of household poverty and its causes, not national food shortages. Indeed, food is more abundant in Brazil than in Uruguay, Chile, or Ecuador. But measured undernourishment is more prevalent in Brazil than in any of these other South American countries. The maps show that poverty alleviation and redistribution are more critical elements of a hunger strategy

for Brazil than are efforts to raise food availability. In Africa, Nigeria stands out as a country where calories may be abundant, but distributional inequities result in undernourishment for millions of people. In much of the rest of Africa, both low food supply and poverty may be breeding hunger.

4. Identifying worsening trends in hunger. The FAO's measure of undernourishment is widely used to chart trends in hunger across the developing world. Due to the limitations in the data on food distribution, the measure is probably more accurate in capturing worsening trends in hunger than improvements. Because distribution is assumed to be constant in the FAO calculation, increases in food availability *always* imply reductions in measured undernourishment. Thus, countries with increasing availability of food in map 2.2 all show declining rates of undernourishment in map 3.2. In reality, increases in food availability probably alter food distribution. One would not expect the wealthiest households to consume more calories when more are available, since they already consume as much as they comfortably can. On the other hand, the very poorest households are also unlikely to consume very much of the additional food, because they are usually the last ones to see their capacity to buy food rise. Factors like low education, discrimination, and isolation which contribute to their poverty and hunger also tend to keep these households from enjoying income growth. It is households that are poor, but not the poorest, that are most likely to experience increasing income and spend that income on food. If the members of these households had been consuming enough food to avoid undernourishment, their increased consumption might imply little reduction in hunger. Yet, the prevalence of undernourishment calculation suggests that hunger will fall with added food availability.

Increases in food availability may or may not bring reductions in hunger, but falling food availability probably does increase it. When average food supplies fall, the wealthy need not reduce food consumption and those who are already undernourished often cannot reduce food consumption further and survive. Thus, less food available per person probably means that reductions in food consumption are concentrated among the poor who might have previously consumed just enough to avoid undernourishment. Given reduced national food supplies, marginally nourished people become undernourished. With this in mind, examination of trends in undernourishment in map 3.2 suggests possible improvements in South Asia, where availabilities are growing, and almost certain worsening of hunger in Central and Eastern Africa, where availabilities are declining. Confirming the actual patterns in hunger over time and space requires more direct measurement of individuals.