

The State of Food Insecurity in the World 2010

Technical notes

The aim of these technical notes is to provide an overview of the methodology adopted to produce the undernourishment estimates presented in *The State of Food Insecurity in the World (SOFI) 2010*. The notes are organized in three parts:

- the first part provides definitions for food security and undernourishment and explains the hunger reduction targets;
- the second part presents a brief description of the FAO methodology and its limitations (for further details see [FAO Methodology for estimating the prevalence of undernourishment](#));
- the third part explains the main revisions that have been implemented in SOFI 2010.

1. What is food security and what are the hunger reduction targets?

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life. Household food security is the application of this concept to the family level, with individuals within households as the focus of concern.

Food insecurity exists when people do not have adequate physical, social or economic access to food as defined above.

Undernourishment exists when caloric intake is below the minimum dietary energy requirement (MDER). The MDER is the amount of energy needed for light activity and to maintain a minimum acceptable weight for attained height. It varies by country and from year to year depending on the gender and age structure of the population. Throughout the *SOFI 2010* report, the words “hunger” and “undernourishment” are used interchangeably.

The **World Food Summit (WFS) goal** is to reduce, between 1990–92 and 2015, the number of undernourished people by half. The **Millennium Development Goal 1 (MDG 1)**, target 1C, is to halve, between 1990 and 2015, the proportion of people who suffer from hunger (and, more specifically, indicator 1.9 relates to the proportion of population below minimum level of dietary energy consumption).

Note: All references to MDG 1 throughout the *SOFI 2010* report refer specifically to the hunger target 1C, indicator 1.9 and not to the targets relating to poverty (1A) or employment (1B).

2. The FAO methodology and its limitations

FAO collects three sets of data for each country:

- **Data on production, imports and exports of all food commodities, along with the caloric content of each food.** These data are used to calculate total availability of calories in the country.
- **Data on population structure in terms of age and sex, as different age and sex groups have different minimum caloric requirements.** Using these data, it is possible to estimate the total caloric requirements for the entire population as an aggregate. These vary among countries and over time because of different population structures.
- **Household survey data.** These are used to estimate the country-specific distribution of calories. Some countries may have more equal distributions of calories than others, which, other things being equal, would lead to fewer people being undernourished. A log normal distribution of caloric intake is assumed.

From the total calories available, total calories needed for a given population, and the distribution of calories, FAO calculates the number of people who fall below the minimum energy requirement, and this represents the number of undernourished people. This number is then summed for all countries in the world. Thus, no account is taken of protein, vitamin or mineral intake.

Countries revise their official statistics regularly for the past as well as the most recent reported period. The same holds for population data of the United Nations ([World Population Prospects, the 2008 revision](#)¹). Whenever this happens, FAO revises its estimates of undernourishment accordingly. Therefore, users are advised to refer to changes in estimates over time only within a single edition of *SOFI* and refrain from comparing data published in editions for different years.

The latest official FAO data on undernourishment covering all countries refers to the period 2005–07. The data requirements of the FAO methodology do not permit FAO to produce more recent figures at country level. However, information on global food supply and population figures has been used to estimate undernourishment at the regional level for 2008. In order to project the number of undernourished for 2009 and 2010, respective projection factors derived from the food security model of the United States Department of Agriculture (USDA) Economic Research Service have been used.

How is food security assessed by the USDA Economic Research Service?

The Economic Research Service food security model projects food consumption and access in 70 low-income developing countries: 37 in sub-Saharan Africa, 4 in North Africa, 18 in Asia (including 8 in Central Asia) and 11 in Latin America and the Caribbean. Because of the focus on lower-income developing countries, several large developing countries are not included (e.g. Argentina, Brazil, China, Mexico and South Africa). Commodities included in the model are grains, root crops and a group called “other” that encompasses all other

¹ United Nations, Department of Economic and Social Affairs, Population Division. 2009. *World Population Prospects: the 2008 revision*. New York, USA, United Nations.

foods. The three commodity groups, in total, account for 100 percent of calories consumed. The population of each country is divided into five equal groups (quintiles) according to per capita income. Food consumption varies across these groups, with the poorest consuming the least amount of food. Based on the food consumption of each quintile and the total population, the model estimates the number of people who are unable to meet their nutritional requirements of 2 100 kcal per day. For more details, please see the [Food Security Assessment 2010–20](#).²

3. Revision of FAO undernourishment estimates (SOFI 2010)

In the following sections, we illustrate the changes in undernourishment estimates reported in *SOFI 2010* resulting in the above-mentioned data updates:

Impact of population updates on undernourishment estimates

Undernourishment estimates published in this issue of *SOFI* use total population numbers and sex–age population structures from the UN’s [World Population Prospects, the 2008 revision](#). Undernourishment estimates in last year’s *SOFI* report used data from the 2006 revision. The net impact of the changes in population estimates between the 2006 and 2008 revisions, everything else being equal, was a decrease of about 8 million in the number of undernourished people in developing countries during the period 2005–07. More detail is provided immediately below.

The update of population numbers has an impact on the dietary energy supply per capita, while the update of the sex–age population structures affects MDER, as discussed below. Thus, both of these changes affect the estimate of the number of undernourished people.

Update of total population

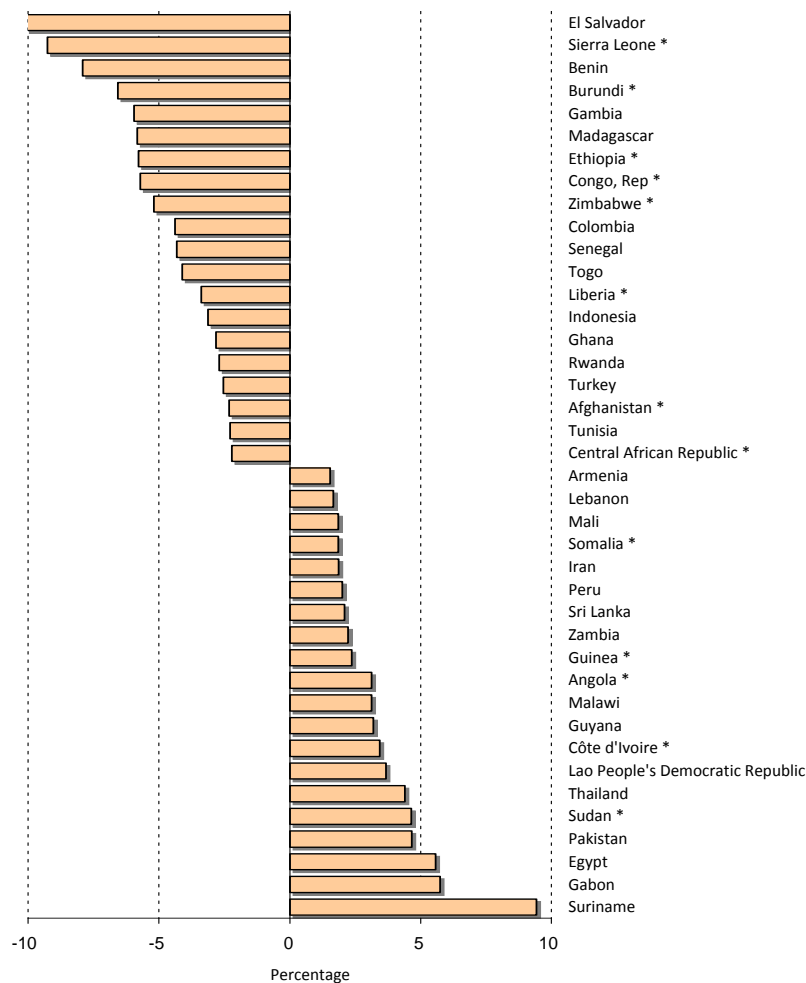
Global and regional population numbers changed very little between the 2006 and 2008 revisions (Table 1). However, the population of some countries increased while that of others decreased (Figure 1).

Table 1
Differences in world population prospects

| | POPULATION (<i>millions</i>) | | | | DIFFERENCE IN POPULATION | | | |
|--|--------------------------------|---------|------------------|---------|--------------------------|---------|------------|---------|
| | UN 2006 revision | | UN 2008 revision | | Absolute | | Percentage | |
| | 1990–92 | 2005–07 | 1990–92 | 2005–07 | 1990–92 | 2005–07 | 1990–92 | 2005–07 |
| World | 5 357.6 | 6 560.9 | 5 353.2 | 6 559.3 | –4.4 | –1.6 | –0.1 | 0.0 |
| Developing countries | 4 161.0 | 5 287.1 | 4 158.1 | 5 283.7 | –3.0 | –3.4 | –0.1 | –0.1 |
| Developed countries | 1 196.6 | 1 273.8 | 1 195.1 | 1 275.6 | –1.4 | 1.8 | –0.1 | 0.1 |
| Sub-Saharan Africa | 493.1 | 734.7 | 491.3 | 729.6 | –1.9 | –5.1 | –0.4 | –0.7 |
| Latin America and the Caribbean | 446.1 | 558.1 | 444.2 | 556.1 | –1.8 | –1.9 | –0.4 | –0.3 |
| Asia and the Pacific | 2 899.2 | 3 558.7 | 2 899.1 | 3 558.7 | –0.1 | 0.0 | 0.0 | 0.0 |
| Near East and North Africa | 322.6 | 435.6 | 323.5 | 439.3 | 0.9 | 3.7 | 0.3 | 0.8 |

² USDA Economic Research Service. 2010. *Food Security Assessment 2010–20*. Washington, DC.

Figure 1
Countries with major changes (%) in population, 2005-07, between 2006 and 2008 revisions

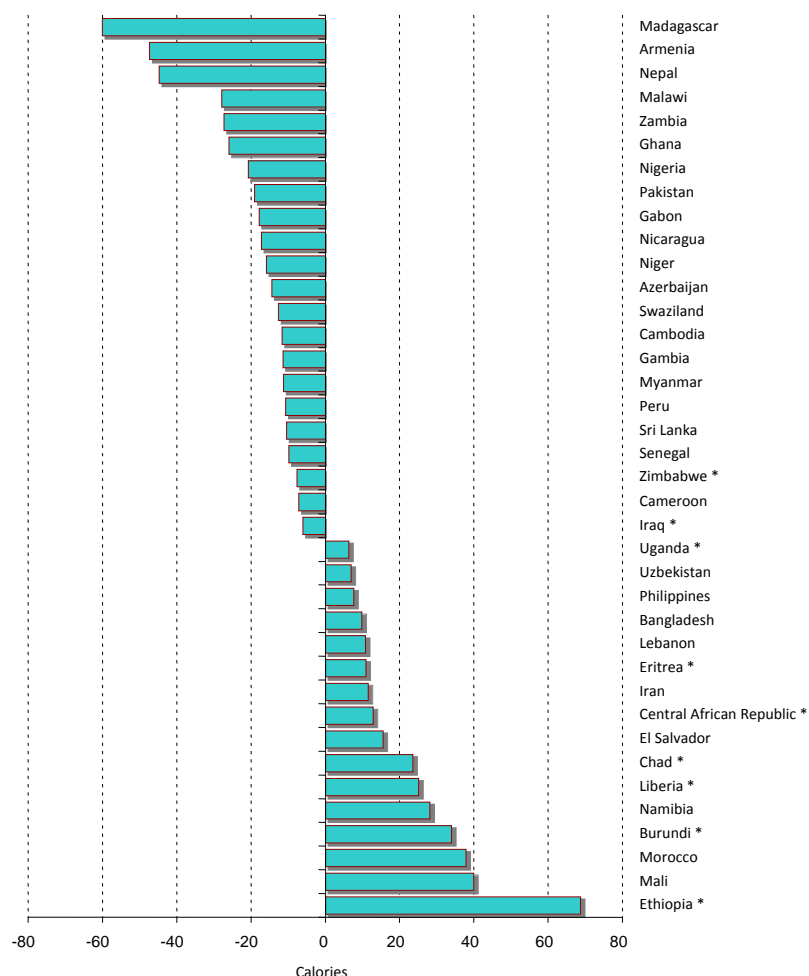


Source: United Nations, Department of Economic and Social Affairs, Population Division. 2009. *World Population Prospects: the 2008 revision*. New York, USA, United Nations...

Update of minimum dietary energy requirement (MDER)

The MDERs of individual countries are estimated using the countries' sex-age group height data together with their corresponding sex-age population structure. The updated attained heights were derived from data collected in Demographic and Health Survey (DHS) for 26 developing countries, and the changes are small compared with previous data. Changes in the sex-age population structure resulted in higher MDERs in some countries and lower MDERs in others (Figure 2).

Figure 2
Countries with major changes (kcal) in MDER, 2005–07, between 2006 and 2008 revisions



* Countries with changes due to updated attained heights while the rest are due to changes in sex-age population structure only

Impact of the Indian data updates on FAO undernourishment estimates

India is home to more than a quarter of the world’s undernourished people.³ Given the importance of India in the global estimates of undernourishment, the Indian Government and FAO have jointly revised estimates of the inequality in food access using the Indian Consumer Expenditure Surveys (ICES) conducted by the National Sample Survey Office (NSSO) from 1988 to 2005.

Inequality in food access, as indicated by the coefficient of variation (CV) of dietary energy consumption derived from the ICES of 1993–94 and 2004–05, is lower than the estimates used previously by FAO. In contrast, the MDER has increased by 25 kcal due to changes in the age–sex structure of the population during the same period.

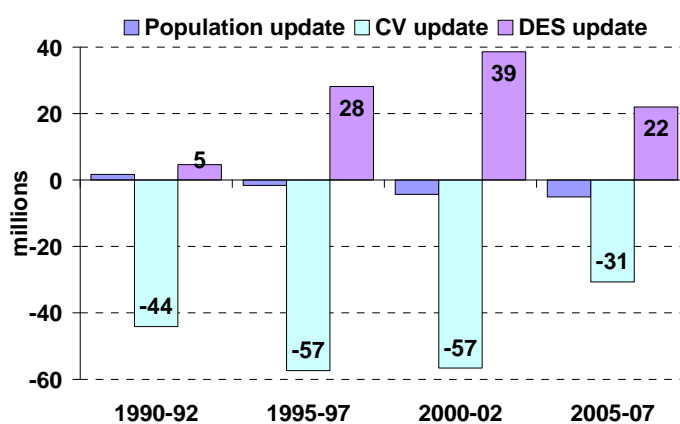
³ FAO and WFP. 2009. *The State of Food Insecurity in the World 2009*. Rome, FAO.

The dietary energy supply (DES) for human consumption, which is the other parameter needed to estimate undernourishment, is derived from data on production, trade, stock changes, seed, feed and waste. The DES, so calculated, includes both private and public consumption, such as consumption in hospitals, army barracks, prisons and hotels. The dietary energy consumption derived from ICES data was not used because it refers only to *private* consumption in households.

The impacts of updating the CV of dietary energy consumption, the dietary energy supply (DES) for human consumption and the population and sex-age structure from the UN Population Revision 2008 are illustrated in Figure 3.

Figure 3

Impact of updating parameters on the number of undernourished in India



In all the reference periods, DES updates result in an increase in the estimate of the number of undernourished, while CV and population updates tend to result in a reduction, except in 1990–92, when the population updates showed an increase. The net change was to decrease the number of undernourished in all periods reported.