Introduction

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The Fifth World Food Survey reviewed the world food situation up to the early 1980s. Since then, much has changed on the world economic scene. With the collapse of communism, the so-called transition economies have emerged in Eastern Europe and the former USSR; a group of newly industrializing countries has begun to emerge in East and Southeast Asia; and many countries in Latin America and the Caribbean and Africa have been through a difficult period owing to a combination of debt crises, falling commodity prices, the rigours of stabilization and structural adjustment programmes and, in many cases, drought and war. At the same time, the spate of new breakthroughs that were being made in agricultural technology in the 1960s and 1970s appear to have waned in the 1980s, while environmental degradation has emerged as a major concern. All these changes have potential consequences for the supply and distribution of food around the world, with implications for the nutritional well-being of its inhabitants.

The Sixth World Food Survey attempts to review the emerging situation of food and nutrition in the world as a whole and in its various regions. The latest period assessed is the triennium 1990-92 but, where possible, comparisons are made with earlier periods – specifically, the triennia 1969-71 and 1979-81 – in order to analyse the pattern of change over time. Three major issues are covered in this survey: i) trends in the availability, regional distribution and composition of food supply in the world; ii) trends in the nutrition situation of the developing countries as assessed by different measures of food inadequacy; and iii) the anthropometric assessment of the nutritional status of people in the developing countries.

This introductory chapter gives a brief outline of the structure and contents of the survey before clarifying certain concepts that figure prominently in later chapters, which refer to estimates of food inadequacy, undernutrition and the assessment of nutritional status. These terms relate to the food and nutrition situation of a population, and an attempt is made here to explain what they mean and how they relate to or differ from each other, so as to help readers interpret the numerical estimates offered in this report.

As indicated above, the latest period of assessment in this survey is 1990-92 and the analyses focus on the long-term changes that occurred during the previous two decades. In the future it is planned to issue world food survey updates on a regular basis so as to reflect new data and short-term changes in food supply levels and the prevalence of food inadequacy or undernutrition.

SURVEY STRUCTURE

Chapter 1 covers the trends in the availability, regional distribution and composition of aggregate food supplies. It presents an analysis of how the per caput availability of dietary energy supply, proteins and fats evolved in the two decades preceding 1990-92. The analysis is made for the world as a whole as well as for separate regions and leads to a discussion of the distribution of food supplies among different regions of the world, including how this distribution has been changing over time. Finally, changes in the food supply composition are discussed, involving issues such as the relative importance of different food groups (i.e. vegetable products and animal products) in total food supplies, the nature of diversification in food consumption patterns and the changing importance of staple foods.

Chapter 2 presents estimates of food inadequacy in the world and its different regions. By comparing the distribution of dietary energy supply (DES) with per caput energy requirements in different countries, two types of food inadequacy measures are provided, namely the *prevalence* and the *intensity* of food inadequacy. The prevalence measure is concerned with the proportion and number of people who have inadequate access to food, i.e. those whose access falls short of a specified cutoff point. The previous world food surveys also presented prevalence estimates for earlier periods but the present survey offers, for the first time, estimates of the intensity of food inadequacy. The objective of this new measure is to assess by how far access to food falls short of requirements. This shortfall is measured from two different perspectives: in terms of the underfed and in terms of the country as a whole. The former perspective indicates the extent of deprivation of the underfed or undernourished population; the latter is meant to shed light on the seriousness of the challenge facing a country if all its people are to have adequate access to food.

Chapter 3 complements the analysis of Chapter 2 by presenting anthropometric assessments of nutritional status. The nature of available data on the distribution of food supplies is such that the food inadequacy approach can only deal with populations as a whole and not specific population groups such as children, adolescents and adults. Information on specific population groups is also of interest but requires a different approach; hence nutrition anthropometry is used for this purpose in Chapter 3. The coverage of developing countries is not as complete as in the preceding chapters. Global estimates of undernutrition, as assessed by anthropometry, can only be provided for children under five years of age and for a limited number of developing countries, as the source drawn on was the World Health Organization's Global Database on Child Growth. For adults and adolescents, the coverage is even more limited. Nonetheless, an advance is made by presenting some estimates for adults who were

typically left out of past anthropometric assessments. Nutritionists and others have recently begun to accept the so-called body mass index (BMI) as a satisfactory indicator for adults, while a growing number of anthropometric studies are generating data on adult height and weight measurements. This has made it possible to present more systematic evidence on adult nutritional status in parts of the developing world.

Chapter 4 concludes the survey by reiterating salient findings of the preceding chapters and by making observations on the relationships between different indicators of deprivation. Food inadequacy and anthropometric measures both try to capture, in different ways, the phenomenon of nutritional deprivation. Both indicators are fundamentally different, as explained below, and thus cannot be expected to give similar estimates of the number of people who are nutritionally deprived. Instead, they must be seen as complementing each other. For comparisons across countries, more general indicators of deprivation, such as per caput gross domestic product (GDP) and the human development index (HDI) values are included. In countries where a large proportion of the population suffers from nutritional deprivation, one would generally expect a low level of human development.

The main body of the survey is followed by four appendixes. The first presents the country composition of the regional aggregates and economic groups used in this report. Appendix 2 comprises a main table containing relevant data on individual countries and some auxiliary tables. Appendix 3 provides a detailed discussion of the methodology underlying the estimation of food inadequacy, the results of which are presented in Chapter 2, while Appendix 4 deals with methodologies related to the anthropometric assessment of nutritional status presented in Chapter 3.

FOOD INADEQUACY AND ANTHROPOMETRY

The concern with undernutrition underpins much of this survey. Two kinds of undernutrition indicators are used: food inadequacy and physical growth and development indices. In order to interpret correctly the estimates based on these indicators, it is necessary to understand the extent to which the indicators can capture the underlying concept and how they themselves are related. With that objective in view, a discussion of the relationship between food inadequacy and anthropometry is presented here.

Undernutrition and food inadequacy

The concept of food inadequacy, as defined in this survey, is very close to the concept of undernutrition. Both refer to energy deficiency relative to requirement norms; however, they are not identical. Owing to this

conceptual difference as well as some methodological compromises enforced by the limitations of knowledge, the estimated prevalence of food inadequacy will diverge from the actual prevalence of undernutrition, even leaving aside the problem of measurement errors. Following is an explanation of some of the main reasons for this divergence.

i) The role of general health and the incidence of infectious diseases in the aetiology of undernutrition can affect the prevalence of food inadequacy. One consequence of infection is to raise the dietary energy requirements of the body. This is because extra energy is needed to fight infection and enable the body to recover from the damage done, and also because increased food losses may occur owing to malabsorption in the case of gastrointestinal diseases. Since the incidence and severity of infection vary depending on a multiplicity of factors such as the hygiene and sanitation of a particular environment, traditional practices of personal hygiene and access to both preventive and curative health care, dietary energy requirements will also vary according to the same factors.

Ideally, food adequacy should be assessed relative to different energy requirements associated with different environments of health and hygiene. In practice, this is difficult to do, as it requires a detailed knowledge of the disease environments of each region and of the effects they might have on energy requirements – such knowledge simply does not exist at present. As a result, the methodology of estimating energy requirements usually makes the simplified assumption of a satisfactory environment of health and hygiene. The present survey departs from the standard practice by allowing for recovery from frequent bouts of infection in the estimated energy requirements of children. This leaves out adolescents and adults, however, and even for children the allowance may not be adequate for particularly severe conditions. Therefore, it is very likely that the energy requirements calculated for different regions of the developing world fail to allow fully for the effects of infection. To that extent, the assessment of food inadequacy presented may well underestimate the true prevalence of undernutrition.

ii) Another reason why the presence of infection may cause a divergence between the prevalence of food inadequacy and undernutrition is that, in cases of severe infection, the body may not be able to absorb the dietary energy that is ingested as food, and sometimes (as in the case of anorexia) the infected person may already have a lower than normal food intake. Repeated infections over a long period of time will make a person undernourished even if his or her access to food is

adequate for a healthy and active life. In this event, the prevalence of food inadequacy will necessarily underestimate the prevalence of undernutrition.

iii) A potential source of divergence which may lead instead to an overestimation of the prevalence of undernutrition is the methodology, adopted in this survey, based on the assumption that each individual has a fixed requirement of dietary energy. If a person's access to food is consistently below this fixed level, he or she will be unable to maintain his or her body weight or physical activity. It is thus argued that, if the daily energy intake is below the optimal level required for a balance of energy or stable body weight and for sustaining a socially desirable level of activity, a person is undernourished. On the other hand, some would argue that there may be a range of variation in energy requirements, which reflect a metabolic adaptation to a lower daily energy intake at little or no cost in terms of reduced body weight and activity. In this case, a person is said to "adapt" to a low level of daily energy intake and is therefore not deemed to be undernourished. Thus, the methodology which estimates food inadequacy based on fixed energy requirements may overestimate the prevalence of undernutrition.

The magnitude of any such overestimation in the present survey is likely to be rather small. First, although the relevant knowledge is still incomplete, it is believed that the range of metabolic adaptation that entails little or no cost is probably very small. Second, the methodology adopted bases energy requirements on the *minimum* levels of body weight and physical activity observed among healthy individuals.[1] These minimum levels refer to the lower end of the range of interindividual variations (in body weight and activity) and not directly to the possibility of metabolic adaptation by a person, but it seems unlikely that individuals could adapt without any risk to health and function below these minimum levels. Consequently, if there is any overestimation of undernutrition in this survey, it is small.

Undernutrition and anthropometry

The claim of anthropometry as an indicator of undernutrition is that it can determine whether or not a person is in good health by judging his or her weight and height against the normal range of weights and heights of a healthy population.[2] Certain points need to be clarified regarding this claim.

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[1] The reason for this is explained in Appendix 3.

[2] This detailed methodology and its logic are explained in Appendix 4.

Undernutrition occurs as a result of inadequate access to and utilization of dietary energy by the body. Regardless of whether utilization is inadequate because food intake is low or because the body is unable to absorb energy owing to the effects of disease, the results of low utilization will be reflected in the dimensions of the body – in the form of either low height or low weight or both. Therefore, to the extent that weight and height measurements indicate the presence or absence of undernutrition, whether it be owing to a lack of food, to disease or both, anthropometry provides a fairly comprehensive measure of undernutrition. However, it leaves out an important dimension. Undernutrition has been defined as a state of dietary energy deficiency whereby an individual is unable to maintain good health (in the sense of being free from avoidable morbidity, risk of premature mortality, etc.) or a desirable level of physical activity. An anthropometric assessment cannot provide information on whether an individual is capable of maintaining a desirable level of physical activity. A state of dietary energy deficiency may manifest itself by keeping physical activity at a low level in order to maintain an energy balance. Anthropometry cannot capture this particular manifestation and may therefore tend to underestimate the prevalence of undernutrition. However, if people behaved in such a way that, when faced with dietary energy stress, they first allowed their physical dimensions to adjust before reducing their activity, anthropometry would correctly capture the whole set of undernourished population. Unfortunately, there is no convincing evidence that people consistently behave in this way, i.e. giving priority to physical activity over physical dimensions. Consequently, anthropometric assessments will generally underestimate the prevalence of undernutrition, and this point should be kept in mind when interpreting the anthropometric estimates of nutritional deprivation.

Food inadequacy and nutritional anthropometry

The preceding discussion suggests that neither the food inadequacy approach nor the anthropometric assessment approach can fully capture the phenomenon of undernutrition. Each captures different aspects, so estimates of undernutrition based on them will inevitably differ. It is also evident that each approach has its own strengths and weaknesses. It is therefore necessary to use them in tandem so as to allow as complete an assessment of nutritional deprivation as possible. Such is the strategy adopted in this survey.

It is also interesting to note that the two approaches have certain methodological features in common: both rely on data containing unknown measurement errors; both employ anthropometric measurements to calculate daily energy requirements, in the case of the

food adequacy approach, and to generate proxy indicators of nutritional status, in the anthropometric approach; and both apply analytical methods that essentially generate probability estimates of the number of people at risk either of having inadequate access to food or of being undernourished.