2nd Report on the World Nutrition Situation – Volume I: Global and regional results

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2nd Report on the World Nutrition Situation – Volume I: Global and regional results

UNITED NATIONS NATIONS UNIES

ADMINISTRATIVE COMMITTEE ON COORDINATION – SUBCOMMITTEE ON NUTRITION

A report compiled from information available to the United Nations agencies of the ACC/SCN

October 1992

Prepared in collaboration with the International Food Policy Research Institute (IFPRI), Washington D.C.

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UNITED NATIONS – ADMINISTRATIVE COMMITTEE ON COORDINATION – SUBCOMMITTEE ON NUTRITION (ACC/SCN)

The ACC/SCN is the focal point for harmonizing the policies and activities in nutrition of the United Nations system. The Administrative Committee on Coordination (ACC), which is comprised of the heads of the UN Agencies, recommended the establishment of the Sub–Committee on Nutrition in 1977, following the World Food Conference (with particular reference to Resolution V on food and nutrition). This was approved by the Economic and Social Council of the UN (ECOSOC). The role of the SCN is to serve as a coordinating mechanism, for exchange of information and technical guidance, and to act dynamically to help the UN respond to nutritional problems.

The UN members of the SCN are FAO, IAEA, IFAD, ILO, UN, UNDP, UNEP, UNESCO, UNFPA, UNHCR, UNICEF, UNRISD, UNU, WFC, WFP, WHO and the World Bank. From the outset, representatives of bilateral donor agencies have participated actively in SCN activities. The SCN is assisted by the Advisory Group on Nutrition (AGN), with six to eight experienced individuals drawn from relevant disciplines and with wide geographical representation. The Secretariat is hosted by WHO in Geneva.

The SCN undertakes a range of activities to meet its mandate. Annual meetings have representation from the concerned UN agencies, from 10 to 20 donor agencies, the AGN, as well as invitees on specific topics; these meetings begin with symposia on subjects of current importance for policy. The SCN brings certain such matters to the attention of the ACC. The SCN sponsors working groups on inter−sectoral and sector−specific topics.

The SCN compiles and disseminates information on nutrition, reflecting the shared views of the agencies concerned. Regular reports on the world nutrition situation are issued, and flows of external resources to address nutrition problems are assessed. State−of−the−Art papers are produced to summarize current knowledge on selected topics. SCN News is normally published twice per year. As decided by the Sub−Committee, initiatives are taken to promote coordinated activities – inter−agency programmes, meetings, publications – aimed at reducing malnutrition, primarily in developing countries.

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This Second Report on the World Nutrition Situation benefitted from contributions and advice from a large number of people. Contributions on specific topics, and a list of background papers, are noted in Chapter 7.

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Marito Garcia
John Mason

October 1992

FOREWORD

This Second Report on the World Nutrition Situation comes at an important time. In the near future human well–being, to which nutrition is fundamental, could improve more rapidly throughout the world; but economic adjustments and mass migration are continuing threats. The results here show steady, if slow, progress in many countries in the last few years. The future may see the needed acceleration in these. But the picture for Sub–Saharan Africa is of great concern, where a deteriorating nutritional trend needs to be turned around.

Following publication by the SCN of the First Report on the World Nutrition Situation in 1987, and the Update on the Nutrition Situation in 1989 which gave country level data, support was secured for a five–year programme, beginning in December 1990. This allowed continued monitoring of the world's nutritional problems, thus helping the SCN to meet an important part of its mandate. We must emphasize our gratitude to SIDA (Sweden), IDRC (Canada), and FAO, who provided funding to supplement the SCN budget leading to production of this report. The programme for reporting on the world nutrition situation envisaged increasing emphasis on country level data, and for the present report detailed studies have been carried out by institutions in a number of countries. Some of these have been funded by UNICEF as part of SCN's Country Programme Review, for which we are most grateful; and results will be published in 1993. We decided to issue this Second Report in two volumes. In this first volume, global and regional results are given, with highlights on certain specific important issues. This allows more space in a second volume to do justice to the detailed information at country level. The Supplement on Methods and Statistics to the First Report on the World Nutrition Situation contained most of the data that was presented in the report itself, which provided a resource for further research, widely used, and the practice will be continued here by including details of data and methods in the second volume.

As for previous reports, me main intention is to integrate data from a variety of sources. The report depends heavily therefore on the statistical and analytical work of SCN member agencies. In particular, the method development, data compilation and analysis carried out by FAO, for its forthcoming Sixth World Food Survey and for preparing for the International Conference on Nutrition, provided fundamental data on food availability and the extent of inadequate food consumption. FAO data have also been analyzed for trends in availability of certain micronutrients. Data on child growth and women's health are compiled by WHO and UNICEF, providing direct measures of nutritional outcome, and the SCN through this project has contributed to these compilations. Sharing the analytical results has ensured that the same outputs and conclusions are available on nutrition throughout the UN system. As previously, we have also depended upon data compiled, analyzed and made available by the World Bank, by the UN Population Division, ILO and, through these, from other agencies such as UNESCO.

The audience for the SCN's reports is intended to be those who have a professional concern for nutrition in developing countries, as well as in donor governments and international agencies. They aim to give up–to–date and carefully–checked information, to provide the basis for determining future action, and monitoring current progress. At the same time, experience shows that the reports are used extensively for teaching and research purposes related to nutrition, and it is hoped that this will continue.

In preparing this Second Report, recent developments in understanding of nutrition and its causes are taken into account. The concept first emphasized by UNICEF, and central to the structure of the International Conference on Nutrition as prepared by FAO and WHO, is that nutrition is an outcome of three groups of factors: household food security, health environment and health services, and care. In other words, people should be well–fed, healthy, and well–cared for. This has guided the selection of indicators. In the regional results (this volume) and country data (Volume II) the indicators are clustered into food, health, and women's role and caring capacity, treating nutrition – indicated primarily by child growth – as an outcome.

The Advisory Group on Nutrition (AGN) of the Sub–Committee has guided the process of preparing reports on the world nutrition situation. Following the First Report, it was proposed that emerging issues should receive particular attention in the future. Thus a substantial part of this first volume covers four specific and important

topics: micronutrients, women's nutritional status, diet–related non–communicable chronic diseases, and a preliminary look at projections of nutrition into the future. We would hope to continue the process of highlighting special issues, and to begin to incorporate indicators of these – for example women's nutrition – into the regular reports.

As before, this report represents a shared concern of the UN member agencies of the ACC/SCN. The last two years have seen considerable consultation, not only with UN members, but with other agencies and non–governmental organizations concerned. The preliminary results of this report were discussed at the SCN 19th Session in February 1992 as well as by the Advisory Group on Nutrition, and with those in member agencies concerned with the specific aspects of the data. We are particularly pleased to have been able to carry out this work in close collaboration with the International Food Policy Research Institute, and the many informal discussions with IFPRI have been much appreciated.

The aim of the SCN's member agencies is to promote the necessary action such that trends in nutrition improve. A particular focus for this effort is the International Conference on Nutrition (ICN), of December 1992. The indicators given in this report, while somewhat encouraging, need to show more rapid improvement in the future. They can provide a baseline, and a yardstick against which future progress can be measured. Nutritional goals have been proposed by the World Summit for Children in 1990, endorsed by the ICN, including reduction in malnutrition among under five children by half, reduction of low birth weight, virtual elimination of iodine and vitamin A deficiencies, and others; indicators of these and other such goals are included here. The report will be useful if it contributes to the planning and implementation of the necessary measures to meet such goals, and to monitoring progress along the way.

A Horwitz
Chairman, ACC/SCN

Chapter 1: Overview

Highlights

❑ Summary results for developing countries, given in Table 1.1, show that protein–energy and micro–nutrient malnutrition continue to affect large numbers of people. An estimated 20% of the population has inadequate food consumption. Growth failure affects one–third of children, and over 40% of women are underweight and/or anaemic. At least one billion people worldwide are probably affected by one or more nutritional deficiency.

❑ The current period (1990–1992) may mark one of the most severe famines in Africa. Drought and war are causing famine, often beyond control by external assistance, in Ethiopia, Somalia, and Sudan in the Horn of Africa, and in Mozambique and Liberia. These are causing massive movements of refugees into neighbouring countries. Severe drought is affecting large parts of southern and eastern Africa.

❑ Overall, the percentage of children underweight fell in the 1980s, from around 38% in 1980 to 34% in 1990. The improvement was more rapid from 1975 to 1980, from 42% to 38%. This rate of improvement in the late 1970s was just enough to reduce the total numbers of pre–school children underweight, but these are estimated to have risen again in the 1980s, from around 164 million in 1980 to 184 million in 1990.

❑ The proportion of the population in developing countries underfed – consuming dietary energy inadequate to sustain more than light activity on average – was estimated to have fallen substantially over the last 15 years, from around one in three people in 1975, to one in five in 1989. This implies a considerable reduction in the numbers so affected, from nearly 1,000 million to just below 800 mil lion. These calculations from FAO use a new indicator of low consumption, and revised methods of estimation, now including China. By this calculation, less people today are underfed than at any time in the recent past.

❑ Nutritional trends have generally deteriorated or remained static in Sub–Saharan Africa during the 1980s, in contrast to all other regions. There are indications that some African countries with extensive community–level programmes may have achieved nutritional improvement, against the trend.

❑ South Asia is estimated to be improving slowly, accordingly to recent results from India and elsewhere, at around a reduction of half a percentage point prevalence of underweight children per year. Nonetheless, the underweight prevalence in South Asia remains the highest in the world, and over half the world's underweight children are in this region. Indications are that calorie consumption remained low throughout the 1980s, with little change, although this may have improved slightly for some poorer groups such as the landless.

❑ Nutrition in South East Asia is improving rapidly in many countries, at around one percentage point of underweight prevalence reduction per year; this is in line both with considerable economic development, and with vigorous and widespread health and nutrition programmes at village level. Food consumption is relatively good, and has risen during the 1980s, along with marked success in food production to the point that a number of countries changed from net food importing to exporting.

Table 1.1 Malnutrition in Developing Countries, 1975–1990

	Percent affected		*Number (millions)*	
	1974–76	*1988–90*	*1974–76*	*1988–90*
GENERAL MALNUTRITION				
1. Population (all ages) with energy intake (kcals/caput/day) on average below 1.54 BMR over one year	33%	20%	976	786
	1975	*1990*	*1975*	*1990*
2. Children (under five years) with weight below –2 S.D. of reference	42%	34%	168	184
	1980s		*1980s*	
3. Women (15–49 years old) with weight below 45 kg.	45%		400	
MICRONUTRIENT MALNUTRITION				
4. Anaemia: women (15–49 years old) haemoglobin < 12 g/dl (non pregnant) or < 11 g/dl (pregnant)	42%		370	
5. Iodine deficiency disorders (IDD) Goiter (all ages)	5.6%		211	
6. Vitamin A deficiency: children (under five years) with xerophthalmia	2.8%		13.8	

Sources: See *Chapter 7*.

Notes:

1. Data on population with low energy intake (underfed) were calculated by FAO. The estimates are averages for 1974 to 1976 and 1988 to 1990.

2. Underweight children results are estimated by ACC/SCN, for children aged 0 through 60 months, using a cut–off of –2 S.D. of the median NCHS reference.

3. The estimate of underweight adult women is calculated from ACC/SCN's database on women's nutrition. The 45 kg cut–off is used as a basis for comparison, as that commonly reported. The prevalence estimates exclude pregnant and lactating women but these are included in the calculation of numbers.

4. Anaemia estimates are based on ACC/SCN's database on women's nutrition. The cut–off points for anaemia use the WHO reference for pregnant and non–pregnant women. See Chapters 3 and 4.

5. IDD estimates are based on WHO and ICCIDD data. See Chapter 3.

6. Vitamin A deficiency estimates are based on WHO data. See Chapter 3.

❑ Middle America and the Caribbean, and South America, saw some improvement in nutritional indicators during the 1980s, but little change in the latter part of the decade. Reductions in underweight prevalence (e.g. in Brazil, Chile), helped by such factors as improved education and lowered birth rates, as well as direct nutrition interventions, seemed surprisingly resilient to economic stress.

❑ Deficiency of vitamin A affects at least 40 countries, and blinds up to half a million preschool children each year, out of an estimated 14 million with resulting eye damage. Important recent research shows that improving vitamin A status in children in deficient populations reduces mortality among young children by around one third. Vitamin A supply in some parts of South Asia and Eastern and Southern Africa is so low that deficiency is almost inevitable. In most regions the trend in availability is upwards, except in East Africa. Trends in the deficiency itself cannot be assessed at present.

❑ Iron deficiency, one result of which is anaemia, is the only nutrition problem showing a general deterioration in many parts of the world. Prevalence is especially high in South Asia, where more than 60% of women are anaemic. In general, trends in dietary iron supply are downwards, for example in South Asia due to reduced production of legumes with the green revolution, in line with the worsening of anaemia. The main exception is Near East and North Africa, where iron supply is up and anaemia is down.

❑ Iodine deficiency remains the most common preventable cause of mental retardation, and there are estimated to be six million people with overt cretinism worldwide, and up to one billion at risk of some degree of deficiency. Programmes to control iodine deficiency are starting in many countries, and expanding in others, through fortification of salt and distribution of iodized oil.

❑ Outbreaks of scurvy, pellagra and beri–beri have occurred among populations of refugees and displaced people. These deficiency diseases (of vitamin C, niacin and thiamine respectively) had not been seen for decades. They afflict people in camps whose diets are severely restricted in variety.

❑ The extent of stunting, underweight, and wasting in women in developing countries was assessed for the first time for this report. The results show that these problems are very extensive in developing countries, particularly low body weight and thinness in Asia. Malnutrition in women is generally in line with estimates of low birth weight, and the intergenerational effects, of malnourished women having small babies who grow up to be small mothers, can readily be seen. Trends in anaemia can only be roughly estimated. Indications are that anaemia prevalences, already high, may be rising in South Asia and Sub–Saharan Africa. Maternal mortality rates are also feared to be increasing in Sub–Saharan Africa, in contrast to other regions.

❑ Assessments of premature mortality rates from chronic diseases possibly linked to diet indicate these to be falling slightly in the developing countries for which data are available, and to be generally below rates for developed countries. Dietary trends show increases in fat consumption with rising incomes in many countries. In general, the differences in fat intake between countries are explained more by food habits than by changes in incomes. However, because morbidity has not been assessed in developing countries in transition, and in the light of widespread reports of increased incidences of, for example, cardiovascular disease, it is urgent to begin to monitor the situation more closely, and to consider steps to reverse undesirable dietary trends.

❑ Projections of possible nutritional trends (using the indicator of percent underweight children) point to continued improvement in most regions except Africa; however, the rate of improvement is generally far below that needed to meet internationally accepted goals, such as those for the World Summit for Children (1990), or for the International Conference on Nutrition (1992). Nutrition in Africa is projected to possibly deteriorate. For South Asia, where the underweight prevalence is by far the highest in the world, although improvement should continue, the rate is such that many decades would pass before the problem was solved at the present rate. Southeast Asia, although improving more rapidly, would still need to have an accelerated rate of improvement to meet proposed goals. South America, if the rate returns to that of the late 1970s, might meet the goals by the year 2000.

Introduction

This *Second Report on the World Nutrition Situation,* five years after the first, describes trends in nutrition and related indicators from 1975 to the most recent year available, usually 1990. It thus updates by five years the information in the *First Report.* The report is compiled from existing data, generally as available to the UN

member agencies of the ACC/SCN. Methods and definitions in current use are adopted.

Since the publication of *First Report* in 1987, there has been a rapid rise in available national data, particularly of anthropometry. The data on underweight in children – which provide a fundamental indicator – are now calculated from around 100 national surveys carried out since 1975; this is about double the number that were available in 1987, in other words around 50 or so have been done in the last five years. Moreover, direct estimates of levels of underweight children are available for all the most populous countries, and of trends in most of these. Particular emphasis in preparing this report has been on understanding the situation in the countries with large populations *not* included in the previous reports, and a set of case studies on nutrition in Brazil, Egypt, India, Mexico, Nigeria, and Pakistan have been prepared for this purpose. These will be published in 1993, and the results are used in this report.

Following the *First Report,* the *Update on the Nutrition Situation* was published by the ACC/SCN in 1989, which gave assessment of nutritional trends in 33 countries. In preparing this *Second Report,* the major effort has again been to compile country–level data – including the six countries mentioned above – both as a basis for the estimates at regional and global level, and to continue to track country trends themselves.

Data are presented in the first instance as regional averages, primarily as a means of summarization. The regional groups used in this report are shown in Figure 1.1, in line with the groupings in common use by the UN. Country level data are given in Volume II of this report, which includes detailed information on 14 countries, these countries also being indicated in Figure 1.1.

The focus is on nutrition in developing countries, and within this considerable stress is placed on malnutrition as it affects young children. In Chapter 2, trends and possible causal factors are presented, at regional level. Deficiencies of specific micronutrients – micronutrient malnutrition – are of increasing importance, not least because of the growing prospects of effective intervention, and Chapter 3 summarizes recent information on the major deficiencies, where possible with indications of trends. The nutrition of women has been perhaps under–recognized as a problem, and recently the ACC/SCN has given regular attention to this topic. A first attempt at assembling information on what is known about malnutrition in women in developing countries led to the results given in Chapter 4.

An issue attracting increasing attention concerns the role of diet in causing chronic disease, particularly in countries in transition – nutritional, health, or demographic – from conditions of deprivation to risks of dietary imbalances or excessive consumption. In Chapter 5, preliminary information to investigate this issue in developing countries is put forward.

In the last few years, a number of specific proposals have been put forward for goals for improved nutrition in the 1990s, notably those of the World Summit for Children (UN, 1990), and the International Conference on Nutrition (FAO/WHO, 1992b). For example, the World Summit for Children proposed a halving of the prevalence of mild/moderate malnutrition in children by the year 2000. It is instructive to see how trends in the last 15 years, if projected into the future, compare with such goals. This is explored briefly in Chapter 6, which, it is hoped, will be a first step in more detailed consideration of scenarios of future nutrition situations.

Following the publication of the *First Report on the World Nutrition Situation,* a supplement providing full details of methods, data and statistics used was published. This seems to have provided a basic compilation of disaggregated data that has been found useful. For the *Second Report,* a similar process is followed, including an extensive technical section on methods and statistics in Volume II. This second volume, to be published at the end of 1992, therefore contains a first section on nutrition trends in 14 countries, and a second technical section on methods and statistics. In this first volume, Chapter 7 is included to contain an outline of methods, data sources, bibliographic references, and other details to allow the volume to be self–contained. Methods for micronutrients, assessing women's nutrition, chronic diseases, and projections are also introduced in their respective chapters.

This first overview chapter itself first lays out some of the underlying concepts concerning measurement of nutrition and its underlying causes, in part addressing questions that are commonly raised in connection with interpreting nutritional data, and introducing indicators used in Chapter 2. It then gives an overview of trends in general malnutrition, comparing and contrasting the regional data in Chapter 2.

The sources of data are given in Chapter 7, and full details are in the technical section in Volume II. It should be emphasized that the information here is derived from member agencies of the ACC/SCN, notably FAO (partly from AGROSTAT), ILO, WHO, UNICEF, UN Population Division, and the World Bank; some of the child anthropometric results, and indicators of women's nutrition, were initially compiled by the SCN and have

been shared with member agencies.

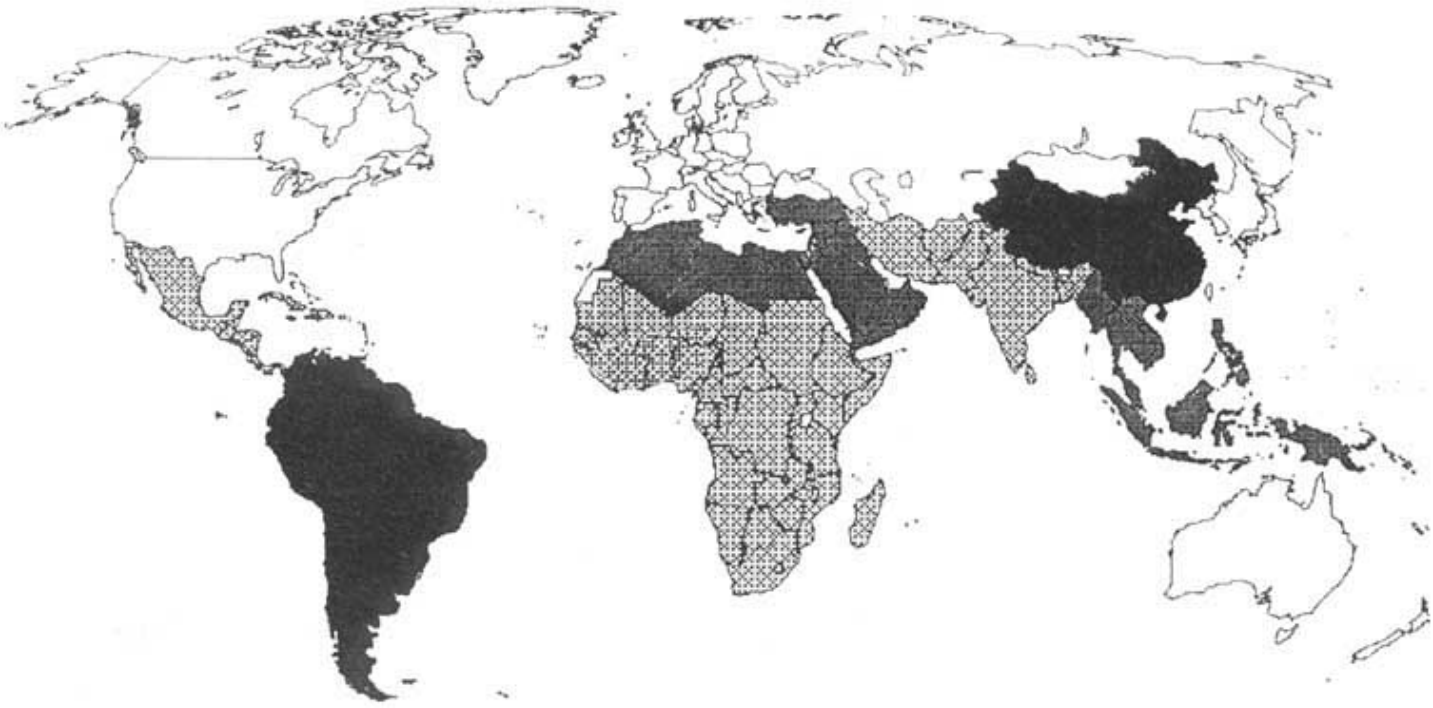


Figure 1.1 Map and listing of developing countries by country group included in this report

SUB SAHARAN AFRICA

Angola
Benin
Botswana
Burkina Faso
Burundi
Cameroon
Central African
Republic
Chad
Congo
Cote d'Ivoire
Ethiopia
Gabon
The Gambia
Ghana
Guinea
Kenya[c]
Lesotho
Liberia
Madagascar
Malawi
Mali
Mauritius
Mauritania
Mozambique
Niger
Nigeria[a,c]
Rwanda
Senegal
Sierra Leone
Somalia
Sudan

Swaziland
Tanzania[b,c]
Togo
Uganda
Zaire
Zambia
Zimbabwe[b,c]

MIDDLE AMERICA AND CARIBBEAN

Costa Rica
Cuba
Dominican Republic
El Salvador
Guatemala
Haiti
Honduras
Jamaica
Mexico[a,c]
Nicaragua
Panama
Trinidad and Tobago

SOUTH AMERICA

Argentina
Bolivia
Brazil[a,b,c]
Chile
Colombia[c]
Ecuador
Guyana
Paraguay
Peru
Uruguay
Venezuela

SOUTH ASIA

Afghanistan
Bangladesh[c]
India[a,b,c]
Iran, Islamic Republic of
Nepal
Pakistan[a,c]
Sri Lanka

NEAR EAST AND NORTH AFRICA

Algeria
Cyprus
Egypt[a,c]
Iraq
Jordan
Kuwait
Lebanon
Libyan Arab Jamahiriya
Morocco
Saudi Arabia, Kingdom of
Syrian Arab Republic
Tunisia
Turkey

United Arab Emirates
Yemen

SOUTH EAST ASIA

Indonesia[b,c]
Kampuchea, Democratic
Laos
Malaysia
Myanmar
Papua New Guinea
Philippines[c]
Thailand.[b,c]
Vietnam

CHINA

Note: The countries not listed in this report have been omitted mainly because of small population and/or missing data.

[a] Part of the ACC/SCN Six–Country Study of Nutrition Trends.

[b] Part of the ACC/SCN Country Programme Review.

[c] Countries with detailed trend analysis in Vol. II.

As will be seen, the report relies heavily on graphical presentations. Where possible, these are intended to be comparable across subjects or regions. Thus in Chapter 2 the panels show the same indicators in the same place on the page, with the same scales; a similar practice is followed in Volume II for countries. Also, maps are intended to be comparable, and the shading is intended to generally go from light (good) to dark (bad).

Concepts and Indicators

Tracking the evolution of nutrition problems in the world – the aim of the Reports on the World Nutrition Situation – relies on indicators which are comparable across countries and through time. Concepts of nutrition, causal factors, and relevant indicators are briefly introduced here.

Nutrition itself refers to physiological processes, influenced by diet and exposure to infection. For children, the outcomes are physical growth, activity, morbidity and mortality (related to immune competence, tissue integrity), and psychological development. The most readily measurable of these is child growth, thus estimating growth failure by anthropometry gives a fundamental measure. In adults, effects of inadequate nutrition are similar to those for children except for growth and psychological development, physical activity perhaps being the most affected by undernutrition. In women, reproductive success is also importantly affected.

The reasons for concern about nutrition are many. Aside from health and physical well–being, freedom from hunger is regarded as an important human right. Hunger itself is less easily and less widely measured, but approximates to the estimates of low consumption discussed later.

GROWTH FAILURE AND UNDERWEIGHT IN CHILDREN. Growth failure parallels other nutritional outcomes, such as physical activity and psychological development. It is thus an indicator of these. Growth failure itself is usually more pronounced between around six months and three years of age, and can result in both stunting (low height) and wasting (or thinness). The age band used here is up to five years, deliberately wide to capture the range of possible influences on growth failure. Using a wider age band, which errs of the safe side, does not greatly affect prevalence levels – since much of the growth failure has taken place by three years of age, an age range of up to two or three years would give roughly the same prevalences. Equally, because much of the underweight reported is due to stunting, which generally is irreversible, it should not be taken that the estimates imply that underweight children all require immediate intervention (although

many would probably benefit). It is also important to note that improved anthropometry is not necessarily the most important objective of intervention, nor indeed the best measure of its success.

Anthropometric measurements do not distinguish specific causes of malnutrition. This, however, makes them particularly useful as a general measure of nutritional outcome. They indicate whether or not there may be a problem, but not why, nor what to do about it. For this reason a number of other indicators are required.

For the purposes of this report, the specific index used is prevalence of underweight preschool children (one through 60 months of age). A child is defined as underweight when the individual's weight falls below –2 SDs of the expected weight at that age for healthy children. This index is used partly because it is the most readily available, and data are compiled by WHO from available government reports and surveys.

In sum, measures of underweight in children are given prominence for two reasons. First, they measure a problem in its own right – that of deprived children – which needs to be addressed in many ways. Second, they are an indicator of more general developmental and environmental problems in society. Moreover, child growth and welfare are intuitively well understood, independently of culture: when children are growing well, the situation cannot be too bad; when children are thin and stunted, something needs to be done. The position as described in the SCN's publication on Appropriate Uses of Anthropometric Indices in Children is given in box 1–1.

LOW DIETARY ENERGY CONSUMPTION. Direct measurement of individual food intake is difficult and expensive, and only limited amounts of such data are available. Added to this, the actual interpretation of adequacy – adequate for what? – complicates the issue still further. If they *could* be measured, estimates would be useful of the extent of hunger, of variations in physical activity (both productive and discretionary), as well as household food security in both the short–term (similar to consumption), and longer–term, which moves into me area of sustainability of livelihoods.

Further, at least some data are needed which are available for all countries, and suitable for assessing trends. The FAO Food Balance Sheet data give estimates of average dietary energy availability per caput, averaged over each year, by country. These provide one useful summary measure for assessing changes in food availability. While they can be approximately compared with average requirement for a country, and this is informative, there are particular problems of interpretation. First and better known is the issue of distribution, as some people will be consuming above the mean, others below. Second, and of considerable importance although difficult to assess, is the fact that people choose their level of calorie intake according to their needs, controlled mainly by appetite when food availability is not constraining. This means that there is an important correlation between food intake and food needs, a correlation that is exact in people who have access to adequate food (and maintain weight). This correlation breaks down as food becomes a constraint. The ability to acquire adequate food depends upon income, hence effective demand for food. The match between need and intake depends on this, and determines adequacy.

Box 1–1. Uses of anthropometry in children

The most extensive public health problem among children in many developing countries is developmental impairment. It arises from the complex of nutritional, biological and social deprivation and is manifest as ill health, wasting, and growth retardation resulting in stunting, functional disadvantages, and high mortality rates. Rates of physical growth and achieved body size mark the process of failing to grow and the state of having failed to grow respectively, and have been accepted as nonspecific *markers of* this syndrome of deprivation. Anthropometry is useful because it provides:

- a practical way of describing the problem;
- the best general proxy for constraints to human welfare of the poorest, including dietary inadequacies, infectious diseases and other environmental health risks;
- strong and feasible predictors, at individual and population levels, of subsequent ill health, functional impairment and/or mortality;
- under some circumstances, an appropriate indicator of me success or failure of interventions directed toward the many economic and environmental factors underlying the deprivation syndrome.

Anthropometric information *per se* is non–specific and does not identify the causes of growth failure. Anthropometry's usefulness stems from its close correlation with the multiple dimensions of individual health and development and their socio–economic and environmental determinants. In poor communities dietary inadequacies and infection are often major environmental determinants of growth failure. From these considerations it follows that interventions intended to avoid growth failure or to promote health may have to be directed at a number of points on the causal chain. While anthropometry may index the problem[1], it does not, by itself, identify the specific cause or indicate the specific solution. It is also true that while anthropometry may index the existence of a problem, it is not always a satisfactory index of response.

[1] Growth failure, and indeed the deprivation syndrome, have commonly been equated with "malnutrition". This has caused some misunderstanding since it has implied dietary inadequacy as necessarily a primary cause. Results of anthropometry are commonly and appropriately used as indicative of "nutritional status". It would be more accurate in this context (though perhaps less compelling) to refer to anthropometric status. The following terms are considered accurate and appropriate: underweight or overweight – for deviations of body weight from expected weight–for–age; wasted or obese – for deviations of body weight from expected weight–for–height; and stunted – for deviations of height below expected height–for–age.

Source: ACC/SCN (1990a).

Such considerations make it complicated to estimate the proportion of the population with inadequate consumption from knowledge only of the mean and distribution of consumption. However, some such estimates have been made by FAO, and with due provisos (given in more detail in the technical section in Volume II) can be used to compare regions and assess trends over time.

The population "underfed" (as referred to here for brevity) is defined as: those people whose food consumption averaged over one year is inadequate to support more than light activity, defined as 1.54 x BMR, and maintain body weight. It should be noted that this definition, and its associated calculation methods, is significantly different from that used previously, for example in the FAO's Fifth World Survey of 1987. The results, which will be given in FAO's Sixth World Food Survey, and are in ICN documents, are thus not directly comparable with earlier estimates. They have been adopted because they are considered to be more meaningful, and more readily understood, than those previously used. A major difference is that the reference time period is now one year. The results are generally in line with the relatively few estimates made by direct measurement on households, repeated over time to give yearly averages – for example the studies carried out in a number of countries in collaboration with IFPRI.

The definition of low consumption approximates to concepts of hunger, and household food insecurity, where access to food acts as a major constraint on livelihoods, productive activity, and well–being.

FOOD, HEALTH, AND CARE. Individual dietary intake and exposure to infection are two proximal causes of malnutrition, for which growth failure in children is a marker. As noted above, anthropometry is non–specific to cause, and does not distinguish these. Dietary intake is affected by food available to the household, and exposure to infection depends partly on the health environment. Both these are importantly modified by care of the individual, and there has been increasing realization of the importance of caring capacity, especially as related to women's role and status. Thus the underlying causes of malnutrition are now grouped as: household food security; maternal and child care; and health services and the health environment. It is important to identify and use indicators of these three underlying causes. Food consumption has been discussed above; here indicators of health, and women's status and caring capacity, are introduced. Again, data that are widely available, comparable, and showing trends over time are needed.

The indicators chosen to monitor health services and environment, based primarily on those available to WHO, were: immunization coverage, access to health services (defined as within one hour's travel) and to safe water, and incidence of low birth weight. For all these three, reasonable estimates were available for many countries at more than one point in time, allowing aggregation to the level of the region. Immunization itself has implications both of preventing the specific disease (measles or tetanus here) and as a measure of outreach of health services. While low birth weight incidences are somewhat unreliable because only collected from attended births, they nonetheless provide some indicator both of maternal nutrition and health, and prospects for survival of the infant.

Assessments of women's status and caring capacity, included for the first time in this report, have only relatively recently become recognized. The indicators here are less specific than would be desirable, but nonetheless give some sense of changes and differentials of the situation. Thus enrollment in secondary education (primary education is less revealing as enrollments are much higher), maternal mortality rates, and fertility rates give useable indicators.

ECONOMICS. Poverty is clearly a major determinant of nutritional outcome, and rapid economic growth has been a major solution to malnutrition for example in Southeast Asia. However, comparison of China with India shows (for example) that the former has a far lower level of malnutrition although a similar average income (although allowing for prices puts China considerably ahead); within India, the relatively low level of malnutrition in Kerala, nonetheless one of the poorer states, is parallel. Other examples include the relatively good nutrition in Zimbabwe, compared to much of the rest of Africa. The relationship between GNP and underweight is discussed in Box 1–2.

Important underlying influences drive long–term changes in nutrition, albeit interacting with economic factors, such as education levels, health infrastructure, fertility rates, and the like. These seem to provide momentum to nutritional change, which economic trends can accelerate or hold back, but may take some time to fundamentally alter.

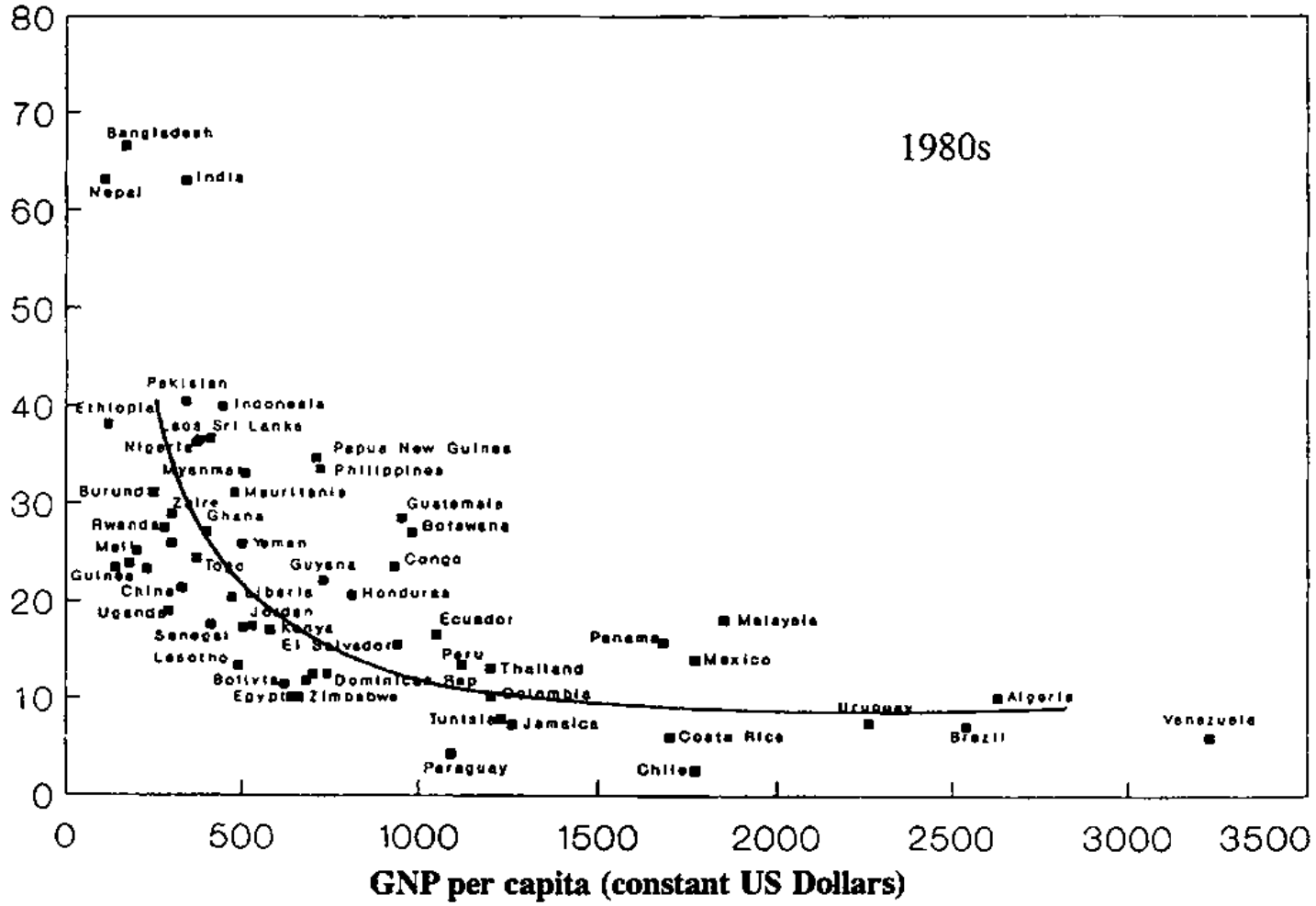
One conclusion from this is that while economic growth is essential, it is not necessary to wait for development in order to try to improve nutrition. For example, community programmes in countries such as Tanzania and Zimbabwe in Africa seem likely to have had an effect; in China, a range of explanations exists for the better nutrition, including community organization, and the relatively high level of food availability. These factors are discussed further in the country reports in Volume II, and are the main objective of a separate study undertaken by the SCN due to be published in mid–1993. For the present purposes, these considerations stress that indicators should be examined in combination, in understanding nutritional trends.

INTERPRETING INDICATORS. The indicators shown in this report, especially those for regional level in Chapter 2, are primarily intended to be descriptive, mat is to give an assessment of trends in nutritional problems, and of possible causal factors, but not extensively to link these. The presentation is intended for easy comparison between regions in Chapter 2 (the same indicator is shown in the same place in each panel, with the same scales), and a similar approach will be taken in Volume II at country level. The text aims to provide some interpretation, but it is left also to the reader to draw conclusions. In the chapters on micronutrients, women's nutritional status, and non–communicable diseases, the approach is more selective, in part because of less extensive availability of data.

Box 1–2. GNP, malnutrition and public action

The general relationship between the prevalence of underweight children and GNP per capita is clearly illustrated in th graph. Anthropometric data based on surveys in the 1980s indicate a strong relationship in the range between US$200–900 per capita. A regression analysis (details given in Vol. II Methods and Statistics) indicates that the incom effect is strongest at the lower end of the range. Increasing GNP per capita from around $300 to $600 is associated w a decline in the prevalence of underweight children from around 34% to 17%, or a reduction of about 50%. Beyond the $900 income per capita level, the effect of increasing incomes on malnutrition diminishes. Countries in South Asia (Inc Nepal, Bangladesh and Pakistan) generally have higher prevalence of underweight children. However, the causes of child malnutrition in that region and its interpretation may have some differences from elsewhere.

As seen from the fitted regression line, there were countries which performed better than expected given their level of income. One of the explanations is the significant role of public expenditures for social support. In Chile, Jamaica, Cos Rica, Zimbabwe and Egypt, social support expenditures (health, education and social welfare budget) as a proportion the GNP in 1987 ranged from 13% to 19%, which contrast to Mexico or Indonesia which had much lower social suppo expenditures of 4% and 3% of GNP respectively.



Notes: Data on prevalence of underweight children are based on actual surveys (latest available). GNP per capita is given for the same year that each country's anthropometric survey was undertaken.

Overview of Trends in Malnutrition

Between 1975 and 1990, the total prevalence of underweight children (percent below –2 standard deviations from the mean weight–for–age, zero through five years) for developing countries is estimated to have fallen by 7.3 percentage points, approximately from 42% to 34%. Data by region are plotted in Figure 1.2, and given in Table 1.2. The rate of improvement overall was higher in the late 1970s than during the 1980s, and this was generally true for most regions. In China and the Americas, the improvements in the late 1980s were less than the early 1980s. Nutrition in Sub–Saharan Africa probably deteriorated on average during the 1980s.

The relative prevalences of underweight children estimated in 1990 by country are mapped in Figure 1.3. Changes in the prevalence between 1985 and 1990 have been estimated, and results are shown in Figure 1.4. A rate of improvement of two percentage points in five years (i.e. about 0.4 percentage points per year) seems to represent significant improvement – for example India had around this level during the 1980s. Thus, arbitrarily, "no change" is scored as +/–0.4 percentage points per year, and increasing or decreasing prevalences on either side of this. The map shows the relatively static situation in the Americas during 1985 to 1990, and the improvement in South Asia and Southeast Asia. It also shows countries in the Sahel recovering from the droughts in the early 1980s. Ethiopia, Sudan, and Mozambique are highlighted as relatively unchanged, but with acute problems.

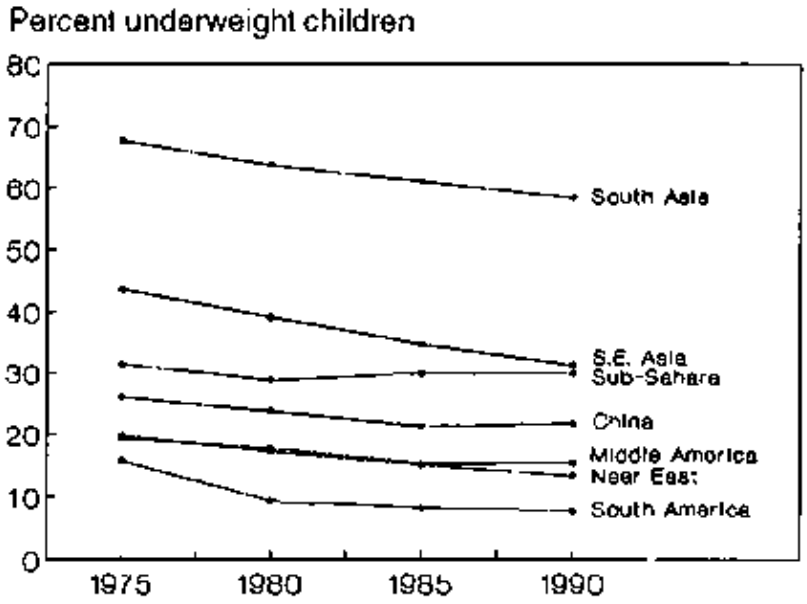


Figure 1.2 Trends in prevalence of underweight children, 1975–1990

The general trend of improving prevalences in most parts of the world, calculated partly by indirect methods as shown in Figure 1.4, is confirmed by direct comparisons between surveys where these have been repeated in the same countries. A listing of those countries with repeated national anthropometric surveys is given in Table 1.3, and scanning the right–hand column indicates the general trend by region. It can be seen that most surveys show an improving prevalence, except in Africa.

Prevalences and numbers of underweight children by region, for 1980 and 1990, are also illustrated as shown in Figure 1.5. This display puts the percentage underweight of the vertical axis, and the horizontal axis is the total child population. Prevalences can be directly compared across regions for 1980 and 1990 (the same data shown in Figure 1.2). The area of the box for each region then represents the numbers of children underweight, being the product of the proportion underweight and the total child population. Comparing the upper and lower parts of the figure gives an impression of how the relative numbers are changing. These can be seen to be rising in South Asia, proportionally more so in Sub–Saharan Africa, and decreasing in South East Asia. Numbers are also rising in China, although the prevalence is decreasing. The relatively fewer underweight children in the Americas and Near East/North Africa can be seen to be due to both lower prevalences and smaller populations.

Table 1.2 Regional prevalence and numbers of underweight preschool children[1] in developing countries, 1975–1990

	Percent underweight				*Numbers underweight*			
Region	*1975*	*1980*	*1985*	*1990*	*1975*	*1980*	*1985*	7990
	percent				*in millions*			
Sub–Saharan Africa	31.4	28.9	29.9	29.9	18.5	19.9	24.1	28.2
Near East/North Africa	19.8	17.2	15.1	13.4	5.2	5.0	5.0	4.8
South Asia	67.7	63.7	61.1	58.5	90.6	89.9	100.1	101.2
South East Asia	43.6	39.1	34.7	31.3	24.3	22.8	21.7	19.9
China	26.1	23.8	21.3	21.8	20.8	20.5	21.1	23.6
Middle America/Caribbean	19.3	17.7	15.2	15.4	3.4	3.1	2.8	3.0
South America	15.7	9.3	8.2	7.7	4.8	3.1	2.9	2.8
Global Total	41.6	37.8	36.1	34.3	168	164	178	184
					402	434	493	536

Total 0–4 Child Population in Developing Countries								

[1] Includes all children 0 through 60 months.

Table 1.3 Countries with repeated national anthropometric surveys

Country	*Year*	*Most recent estimate (Percent below –2 s.d. weight–for–age)*	*Apparent trend in prevalence of underweight children*
Sub–Saharan Africa			
Kenya	1977,1979, 1982, 1987	17.0	Falling
Lesotho	1976,1981	13.3	Falling
Rwanda	1976,1985	27.5	Static
Sierra Leone	1975,1978	23.2	Falling
Togo	1977,1988	24.4	Rising
Zambia	1985,1988	25.8	Rising
Zimbabwe	1984,1988	10.0	Falling
Near East/North Africa			
Egypt	1978,1988	10.0	Falling
Tunisia	1975,1988	7.8	Falling
South Asia			
Bangladesh	1981,1985,1990	66.5	Same, then falling
India	1977,1989	63.0	Falling
Pakistan	1977,1987,1990	40.4	Falling
Sri Lanka	1976,1980,1987	36.6	Falling
South East Asia			
Indonesia	1978,1987	39.9	Falling
Malaysia	1983,1986	17.6	Falling
Myanmar	1982,1987,1990	33.0	Same, then falling
Philippines	1978, 1982, 1987,1990	33.5	Falling, then static
Thailand	1981,1987,1990	13.0	Falling
Vietnam	1987,1990	41.9	Falling
Middle America/Caribbean			
Costa Rica	1978,1982	6.0	Falling
El Salvador	1975,1988	15.5	Falling
Jamaica	1978,1985, 1989	7.2	Falling

Trinidad/Tobago	1976,1987	5.9	Falling
South America			
Bolivia	1981,1989	11.4	Falling
Brazil	1975,1989	7.1	Falling
Chile	1978,1982,1986	2.5	Static
Colombia	1980,1986, 1989	10.1	Falling, then static
Peru	1975,1984	13.4	Falling
Venezuela	1982,1987	5.9	Falling

Notes: Specific country sources are given in *Vol. II: Methods and Statistics.*

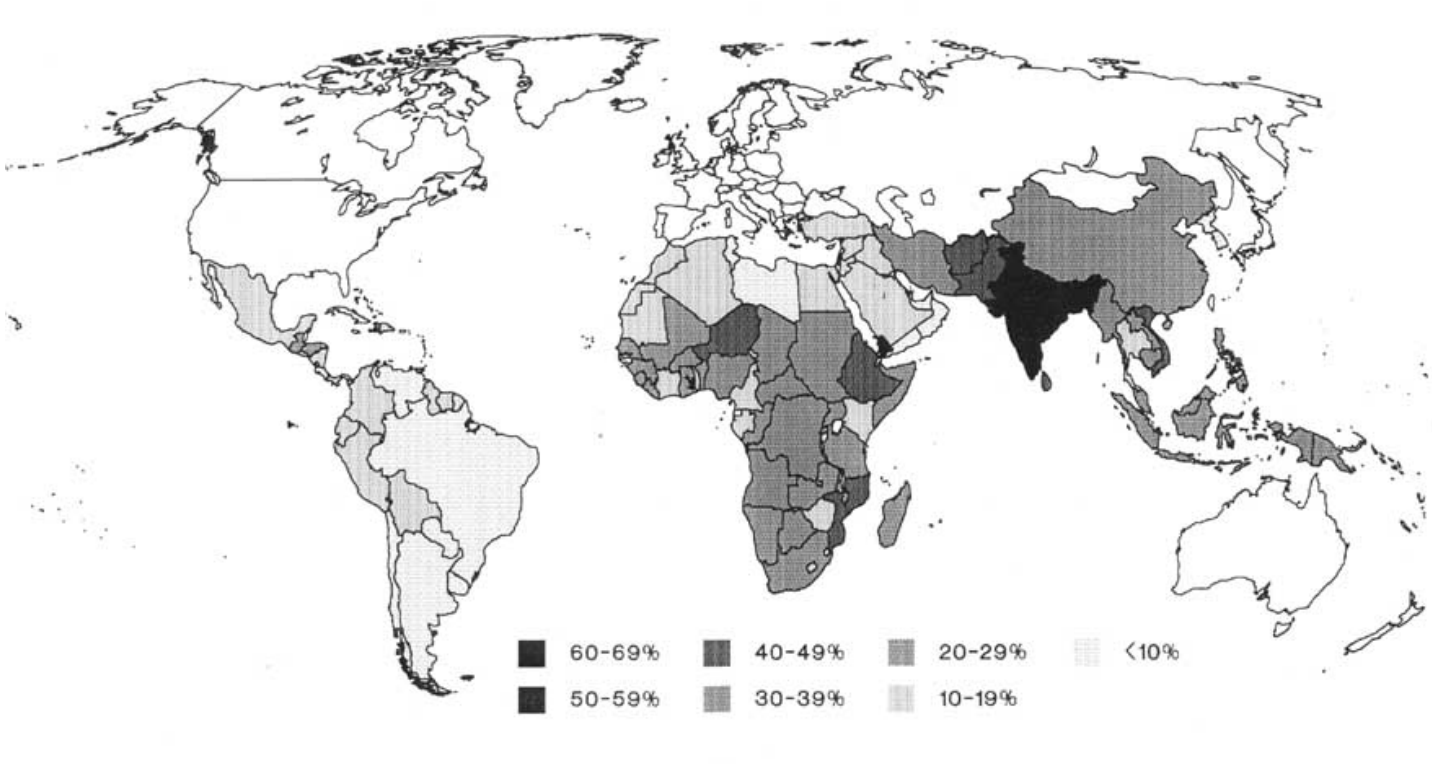


Figure 1.3 Prevalence of underweight preschool children in developing countries (1990)

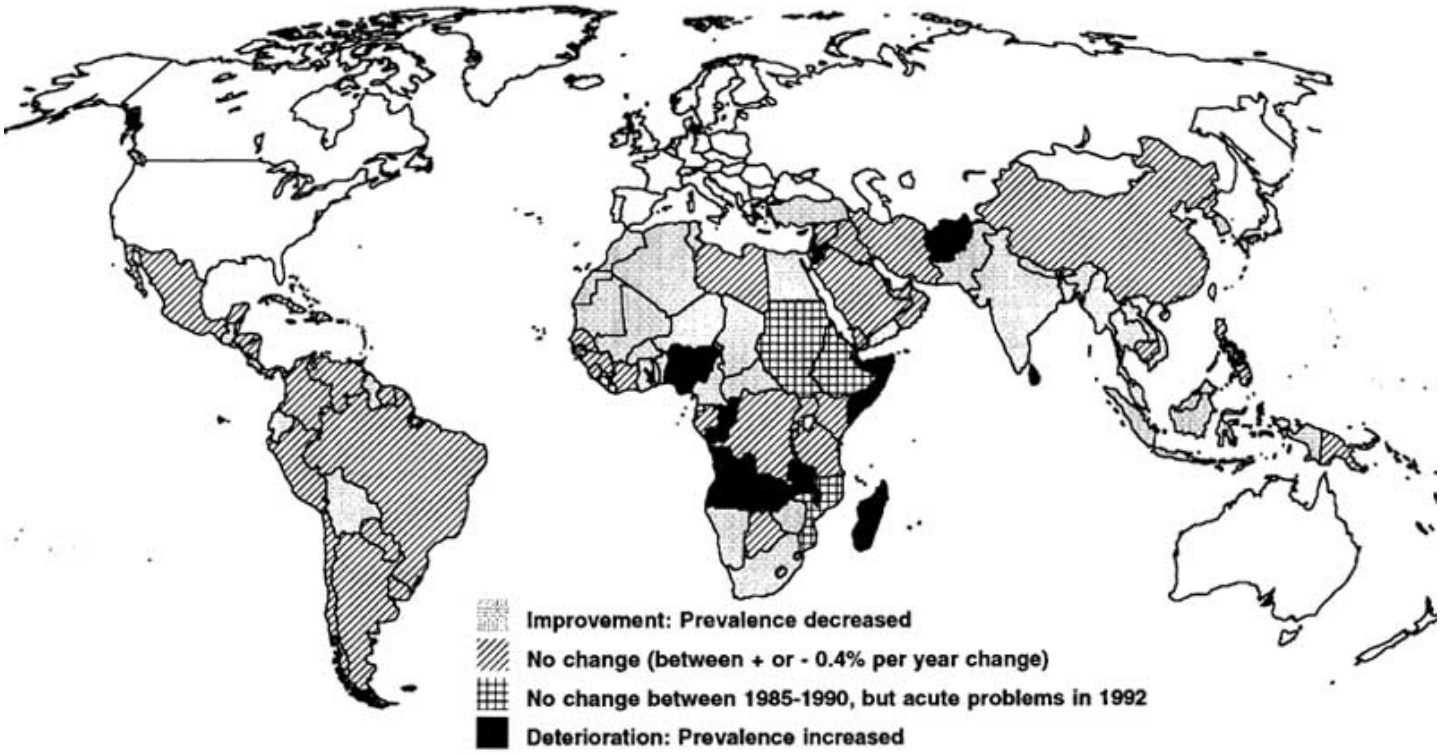


Figure 1.4 Changes in the prevalence of underweight preschool children from 1985 to 1990

Figure 1.5 Prevalences and numbers of underweight children by region, 1980 vs. 1990

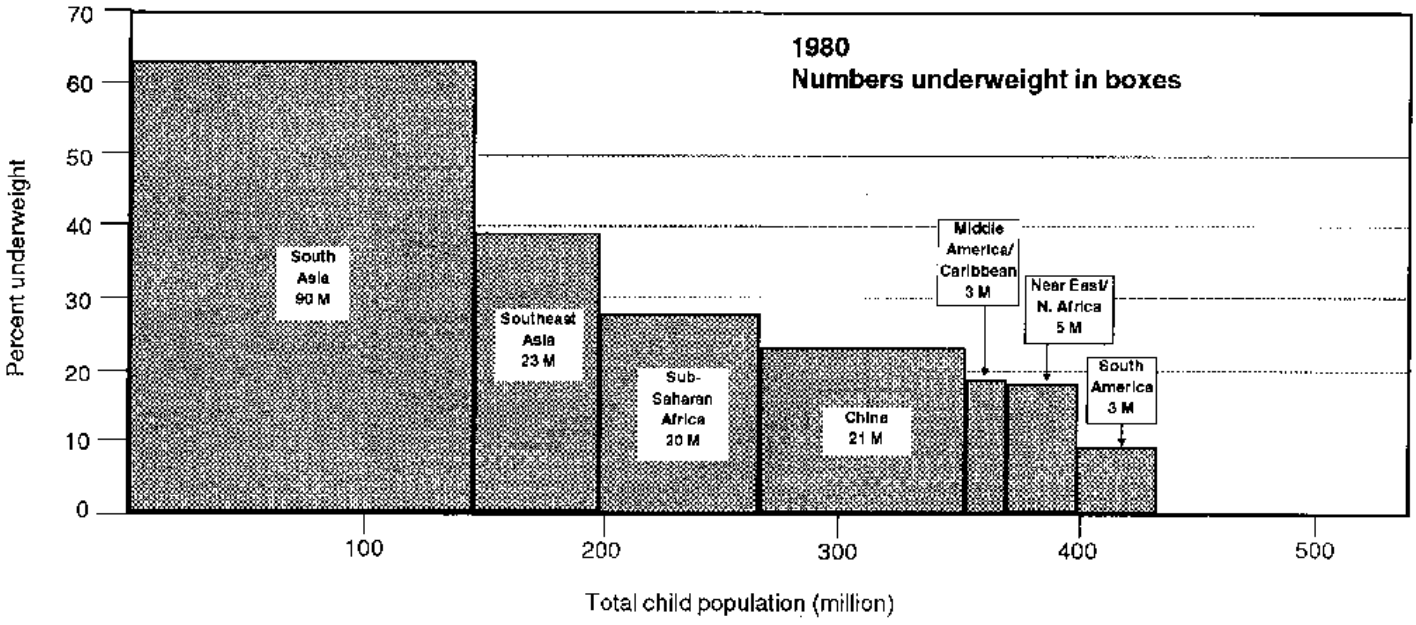


Figure – 1980

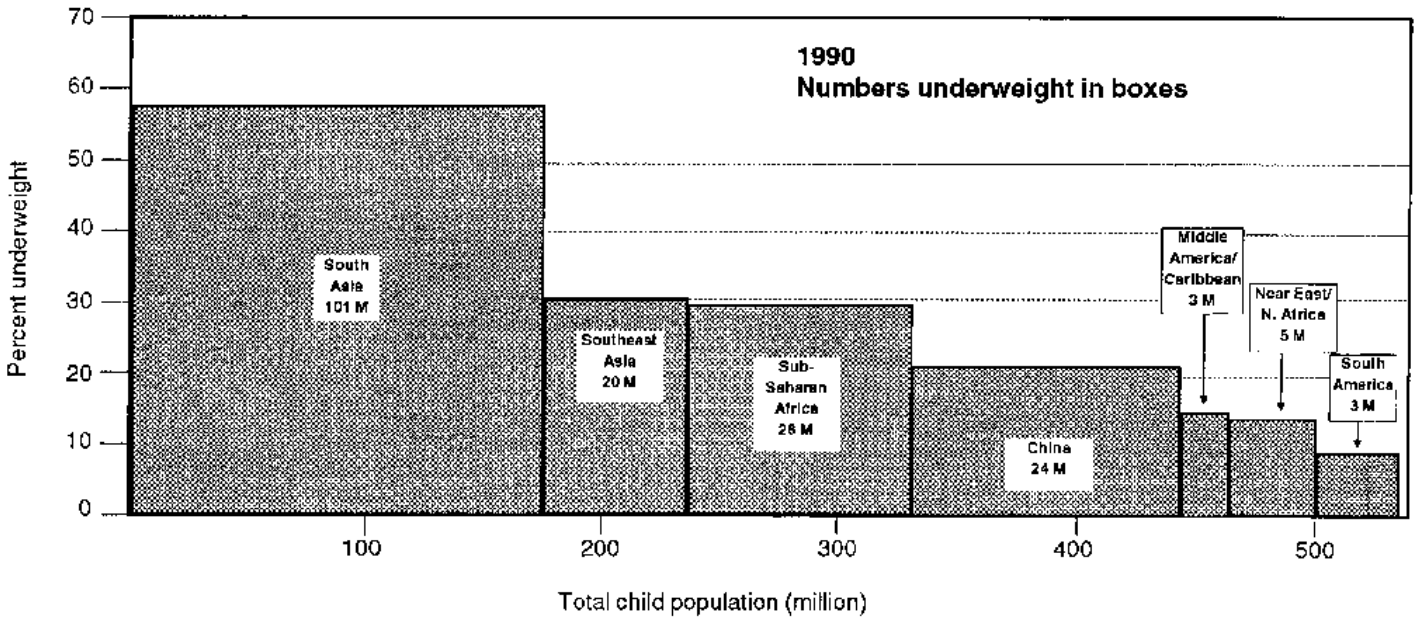


Figure – 1990

Note: The vertical axis is the prevalence; the horizontal axis is the total child population; the area thus represents the number of underweight children. This figure displays relative numbers and prevalences at each time, and population growth between 1980 and 1990. Changes over time can be seen by comparing upper and lower charts.

In terms of both prevalences and numbers, South Asia dominates the picture. This group of countries, of which India forms the major part, appeared to be less affected by recession, and results recently published by India's National Institute of Nutrition in Hyderabad are extremely important in showing that in most states there was a steady reduction in the prevalence of underweight children during the last ten years. However, comparison of South Asia with other regions presents some problems. As noted in the *First Report on the World Nutrition Situation,* South Asia has about twice the prevalence of underweight children compared with other regions such as Africa, although these have similar levels of food availability, IMR, etc. This is discussed further in the section on South Asia in Chapter 2, but the conclusion remains the same as in the *First Report,* that in terms of causes and consequences, interpretation of underweight child prevalences in South Asia may have some differences compared to elsewhere. This is not, however, to minimize (the problem: prevalences are still the highest in the world, and there are more deprived children in that region than anywhere else.

The calculation that the rates of improving prevalence in Southeast Asia and South America have been just sufficient to reduce the numbers of underweight children marks something of a watershed. This point may also almost be reached in South Asia, with hardly any increase calculated between 1985 and 1990, see Table 1.2. Indeed, it is possible that the *global* total of numbers of underweight children could begin to decline in the next five years, which really would be a turning point in world history.

Results from FAO's assessment of the dietary energy supply (DES) expressed in kcals per caput per day indicate that overall food available for human consumption has increased to a global average of 2,470 kcal/caput/day in 1988/90 for developing countries, from a level of 2,330 in 1980 and 2,120 in 1970. While the DES measure has limitations, it does give a useful picture of national level trends in food energy availability. Trends in DES by region are shown in Figure 1.6.

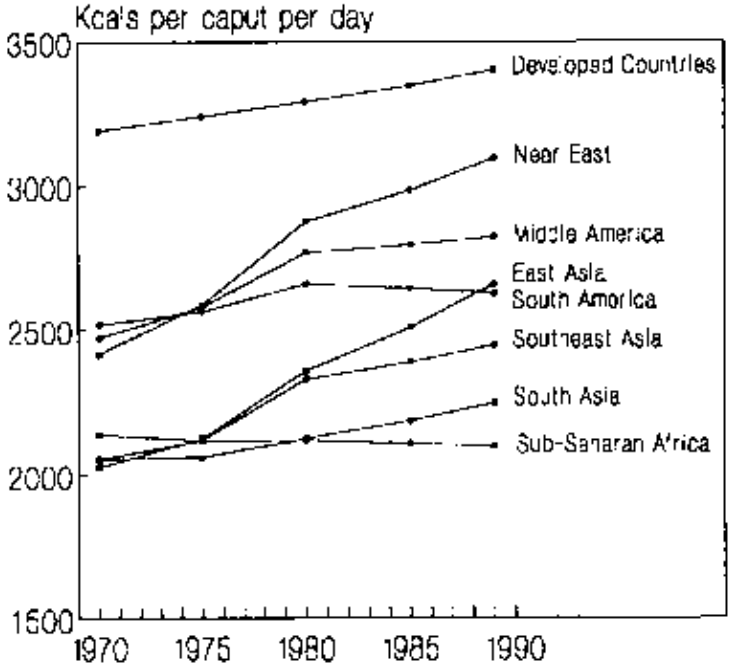


Figure 1.6 Dietary energy supply, 1970–1989

Source: FAO. see Chapter 7.

Note: East Asia is mainly China.

The rate of increase in DES per capita has been generally slow in the 1980s compared to the 1970s. The food situation in Africa is most serious, experiencing some declines in the mid–1980s as a result of drought, recovering later but remaining flat since then. In South America, the estimated average calorie supply in 1990 was slightly lower than in 1980, although still relatively high.

The dietary energy supply in China (East Asia in Figure 1.6) increased from around 2,000 kcals in 1970 – then about the lowest in the world – to more than 2,500 in 1990, similar to South America. Southeast Asia also showed important increases, although slightly less than China. In South Asia, which is strongly influenced by India, kcal availability remains very low, although increasing slightly during the last 15 years, and is now somewhat greater than Sub–Saharan Africa.

Data on dietary energy supply can be used to estimate proportions and numbers of people with inadequate dietary intake. Methods for these estimates have evolved in the last few years, since those put forward in FAO's Fifth World Survey in 1987 (as included in the *First Report on the World Nutrition Situation).* The current estimates, as noted above, are of the population with energy intake inadequate for more than light activity on average over the course of a year. They are thus closely related to DES values, but distributions can vary over time and between regions. The recent estimates are shown by region in Figure 1.7, calculated for this report by FAO. They are based on the same data as in the documentation for the International Conference on Nutrition, and will form the basis of FAO's Sixth World Food Survey.

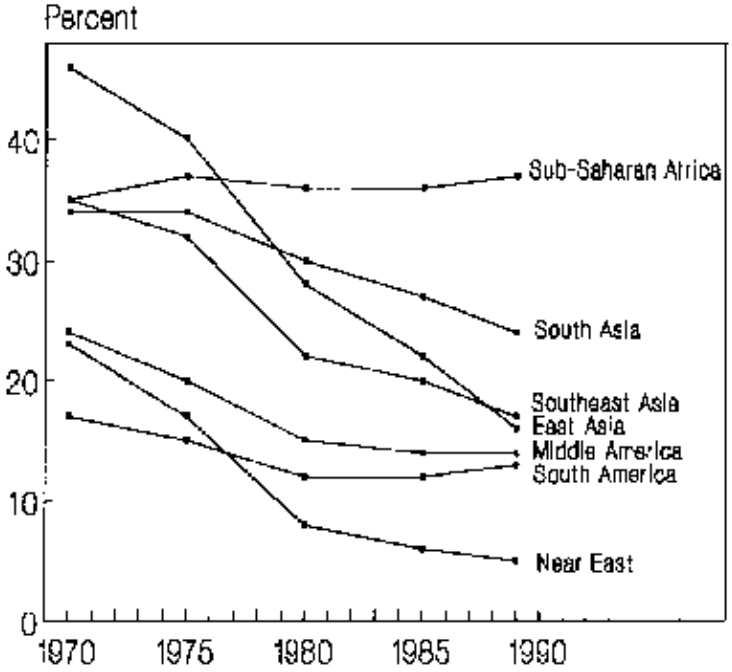


Figure 1.7 Population with dietary energy supply < 1.54 BMR, 1970–1989

Source: FAO, see Chapter 7.

Note: These estimates were provided by FAO based on DES and distributions described in Chapter 7. These results are from the same database given in the ICN document "Nutrition and Development: A Global Assessment" (FAO/WHO, 1992c) and FAO's Sixth World Food Survey (forthcoming).

The results show a substantial reduction in the proportions of people underfed, particularly in Asia, and also in the Near East/North Africa. The proportion is estimated to have risen slightly in Sub–Saharan Africa, hence the numbers here increased substantially. Overall, the decrease in proportion underfed led to a considerable drop in the numbers so affected, from nearly 1,000 million in 1974/76 to about 800 million in 1988/90 (see Table 1.1).

This estimate is considerably influenced by the improving situation in China. Excluding China (and certain other East Asian countries, such as Korea and Vietnam), a slight *increase* in numbers underfed is still estimated by FAO, from around 540 million in 1979/81 to about 580 million in 1988/90.

Other indicators are shown by region in Chapter 2, and can be contrasted between these by comparing panels.

Perhaps a global summary view would be that the nutrition situation – except in Sub–Saharan Africa – is making a fragile recovery from me slowdown in the early 1980s. The situation is poised for significant progress in the years to come in much of the developing world, if economies strengthen, and programmes are extended and focussed on the most vulnerable. But in Africa, me trend needs to be reversed.

Chapter 2: Regional Trends in Nutrition

Sub–Saharan Africa

(Panel 1)

Sub–Saharan Africa's nutrition situation is fundamentally different from other regions of the developing world: the underlying trend is deteriorating in many countries. The basic reason is the failure to develop. This is clearly true economically (see Panel ID), but also applies in contrast to most other regions in terms of health

infrastructure and education. These have shown some progress over the last 15 years – for example, they help explain the decrease in infant mortality rates – but the trend is discouraging. Compounding the difficulties, population is growing faster than anywhere else in the world, at nearly 4% per year in a number of countries – double the rate in Asia, for example. Coupled with slow development, this means that per caput indicators of production are declining significantly.

On these underlying problems are superimposed persistent or repeated crises: drought, civil wars, and economic recession and adjustment. These periodically lead to famines that still affect millions. This too is now unique to Africa, as famine has been virtually eradicated elsewhere in the world.

The long–run failure of development and short–run crises reinforce each other. The results can be seen in most of the indicators discussed here, and (as will be seen in Chapter 6) most projections into the future for Africa envisage a deteriorating or only slightly improving trend. This is in contrast to other regions, and starkly different from the goals put forward at the World Summit for Children, the International Conference on Nutrition, and every other forum that has addressed the issue.

The average prevalence of underweight children in Sub–Saharan Africa has been static at around 30% between 1980 and 1990. The results shown in Figure 2.1 attempt to capture year–to–year fluctuations, since African conditions change fast, giving more detail than Panel 1B. Results from individual countries tend to confirm by direct observation the generally static or deteriorating trend. Details of nutritional trends in four countries, Kenya, Nigeria, Tanzania, and Zimbabwe, are given in Volume II, and these will be referred to in this section. One conclusion is that where there are vigorous community–level programmes, such as in Tanzania and Zimbabwe, malnutrition in children can be contained and indeed improved. Thus, for example, it is estimated that the prevalence of underweight children in Zimbabwe came down from around 23% to around 12% between 1985 and 1990. On the other hand, indications are that the prevalence of underweight children in Nigeria is high, greater than 35%, and may well be increasing.

The overall prevalence of underweight children remaining static implies a substantial increase in the numbers, because of the population expansion. Estimates of the preschool population underweight thus rose from around 18 million in 1975 to 30 million in 1990. These levels are estimated from direct results from 24 countries in the region, and the static or deteriorating trend is generally observed in repeated surveys in six of these (see Table 1.3). For example, national surveys in Togo and Zambia showed increasing prevalence, while this probably stayed much the same in Rwanda. Improving trends were, however, observed in Lesotho and Zimbabwe, and on average in Kenya.

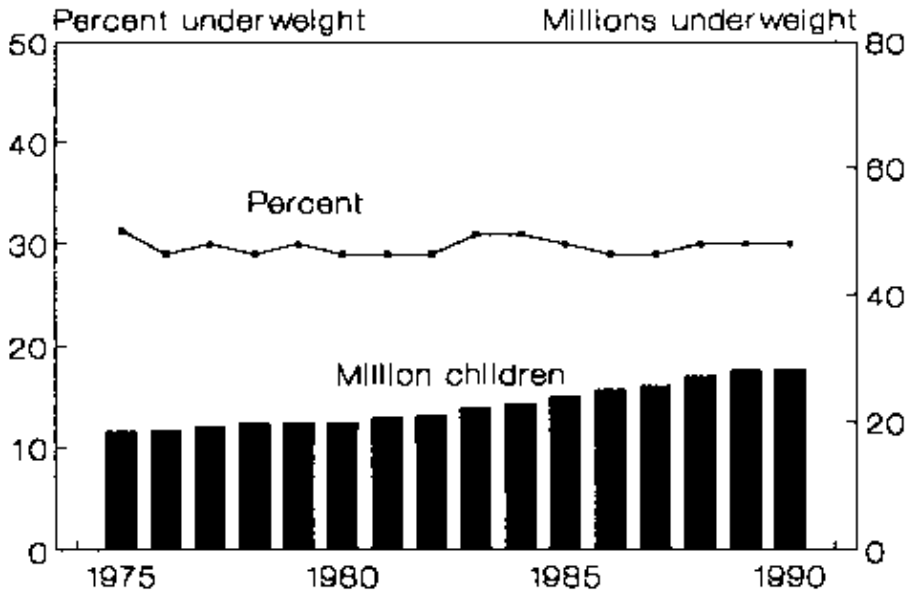


Figure 2.1 Sub–Saharan Africa: Underweight preschool children, 1975–1990 (Below –2 s.d. weight–for–age)

Famine now worsens these problems. The horrors of Somalia vividly demonstrate that the poor and children suffer most during anarchy. Civil wars have devastated large areas in the Horn of Africa, including Ethiopia and Sudan, as well as Somalia, for several years. Nobody knows the extent of malnutrition and death, but it must be enormous. At the same time, population movements lead to heightened malnutrition amongst refugees, notably in northern Kenya from the troubles in the Horn. As if nature were conspiring with man,

much of this region has suffered recently from an unusual drought. A somewhat parallel situation exists in southern Africa, particularly in Mozambique. Here, drought has added to the devastation of civil war and led to large numbers of refugees, many malnourished, in Malawi, Zimbabwe, and South Africa. In West Africa, fighting has caused large–scale destruction of resources and population movements, centered on Liberia, again exacerbating malnutrition.

The drought of 1983–84 was one of the worst for many years. That which is now affecting southern Africa and parts of East Africa is even more severe – in southern Africa, probably the worst in living memory. In Zimbabwe and South Africa, for example, the issue is not only in providing food, but in supplying water itself to sustain life and prevent people dying of thirst. Nonetheless, although the import requirements are enormous and logistical problems appear insuperable – for example, the transport capability for grain cannot keep up with need in Zimbabwe – there are some hopes that concerted action may reduce or even prevent the deaths from famine which would otherwise be inevitable.

Infant and child mortality rates have continued to fall during the period, although (in contrast to other regions) not rapidly enough to bring about a decline in the total number of infants and children dying. The IMR is estimated to have fallen from around 135 per 1,000 live births in 1975 to approximately 120 in the early 1980s, and to 105 in 1990. Over this period, numbers of infants dying rose from approximately 1.5 million in 1975 to 2 million in 1990. The fall in IMR may be ascribed to improved outreach of health services and, notably, immunization of mothers against tetanus which WHO reported to have covered 46% of mothers in 1991 compared to 12% in 1983.

The average income as estimated by GNP per capita has also declined since 1981, and is now back to around the levels experienced in the 1970s, of around US$300 per year. The improvement of the late 1970s was sharply reversed around the beginning of the 1980s, primarily due to the twin effects of drought and recession. At the same time, the debt burden rose rapidly – for example, typical debt service was around 5% of export earnings in the 1970s, rising from 20% to 30% in the latter part of the 1980s. The average indebtedness overall is around US$280 per caput, not far different from the average annual GNP per caput. Servicing this debt takes, on average, around 25% of export earnings.

Food production per caput has been declining during the last 20 years, especially in the drought years of 1984 and 1991/92. At the same time, food consumption has increased in the first part of the period, the gap being made up by imports and food aid. With the current drought (1991/92), food production is no doubt showing a continued fall, and, indeed, the calorie supply per caput will be hard pressed to maintain the relatively low level of approximately 2,100 kcals per day. This usual level is, itself, no better than that experienced ten years ago on average (see Panel IF).

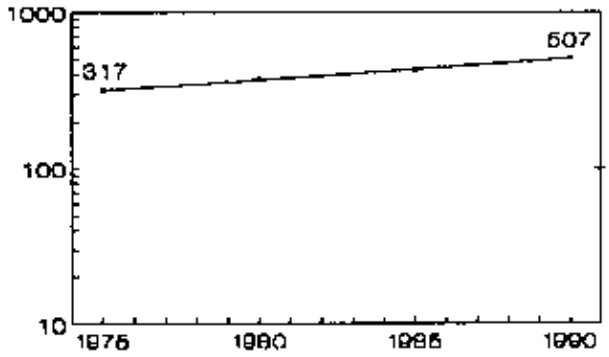
The proportion and numbers of people estimated not to be eating adequate food, on average, to maintain productive activity parallel the estimates of calorie availability, since the distribution is not thought to have changed. It is now estimated that around one–third of the population of Sub–Saharan Africa is not consuming adequate calories, so mat the numbers of people underfed rose rapidly in the last 15 years, from around 130 million in 1980 to around 170 million in 1990 (Panel 1G). This proportion of “food insecure” people is now by far the highest in the world, and indeed the rapidly rising trend in numbers so affected is in contrast to other regions.

One factor that importantly protects child nutrition in most of Africa is the almost universal practice of breastfeeding, certainly in rural areas, although this is under threat with urbanization. Moreover, there is some evidence that promotional campaigns may be having an effect. For example, in Kenya, the mean duration of breastfeeding amongst educated women has actually increased over the last 15 years. Similar results have been observed in Ghana. It is obviously of enormous importance to protect the practice of breastfeeding, which is as extensive in African countries, or more so, than anywhere else. At the same time, as will be discussed further in Chapter 4, there is a relatively low incidence of low birth weight in Africa, probably related, in turn, to the fact that African mothers are relatively well–built, compared with women of similar poverty in, for example, Asia.

The economic crisis in many African countries has led to rapid increases in consumer prices. As examples, the consumer price index tripled in Zimbabwe between 1980 and 1987; it rose by nearly ten rimes during a similar period in Tanzania; and around six times in Nigeria. Fortunately, the food price index did not rise any faster than the consumer price index in most countries (Tanzania is an exception), as it is generally observed that the ratio of FPI/CPI is more closely related to underconsumption and malnutrition than the consumer price index itself. In other words, at least food did not preferentially become more expensive.

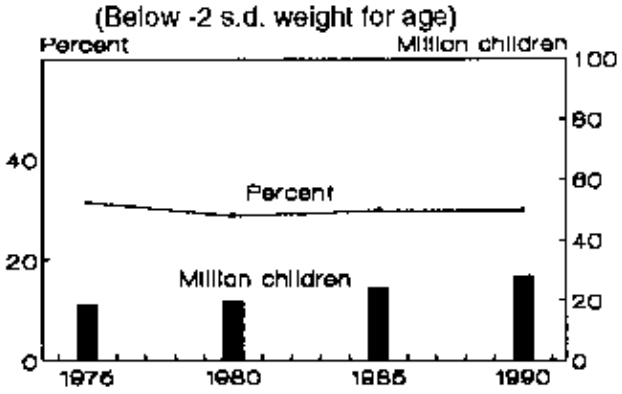
Panel 1 SUB–SAHARAN AFRICA

POPULATION

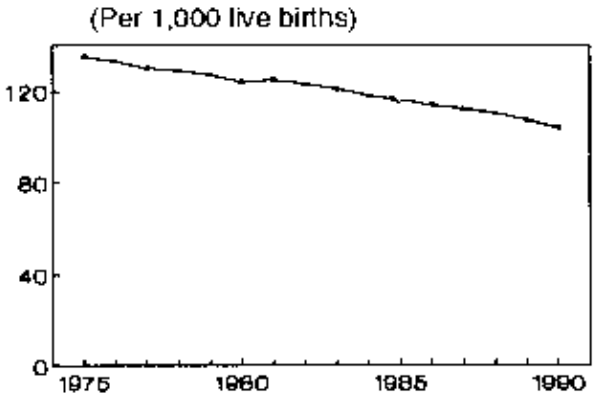


A. Million, log scale

CHILD GROWTH AND SURVIVAL

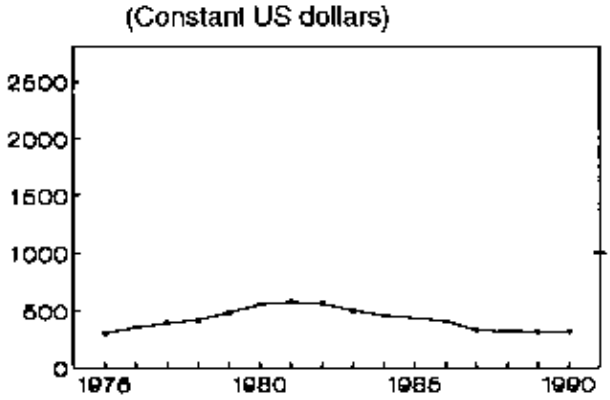


B. Underweight preschool children



C. Infant mortality rate

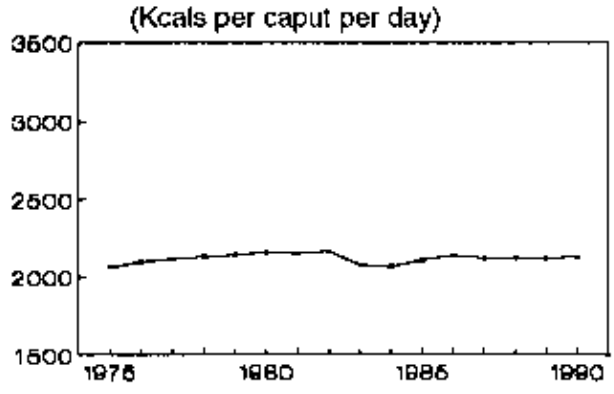
ECONOMICS



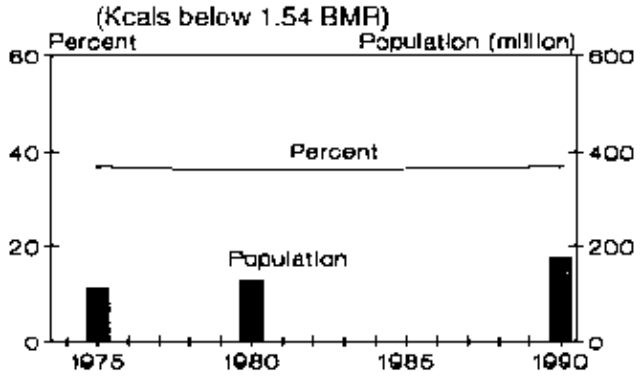
D. GNP per capita

E. Debt service ratio

FOOD

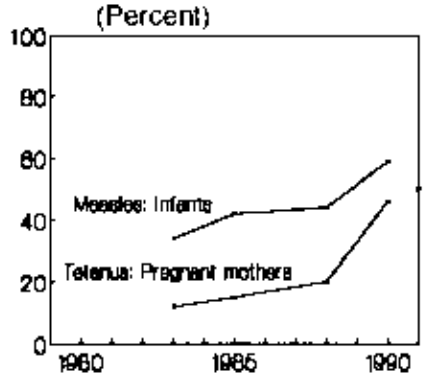


F. Dietary energy supply

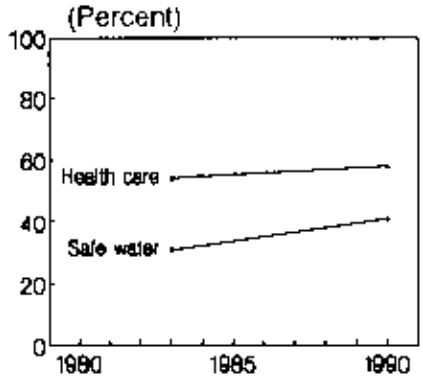


G. Underfed population

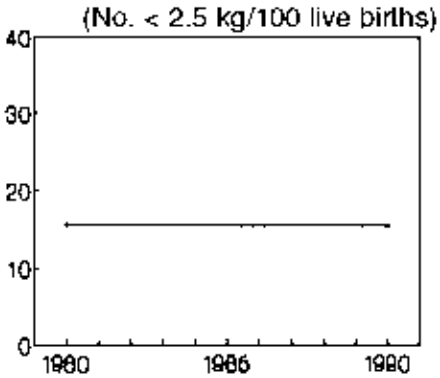
HEALTH



H. Immunization coverage

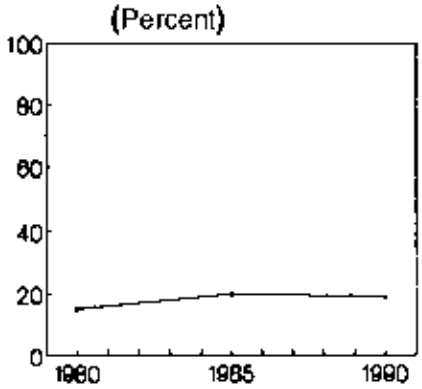


I. Access to health services and potable water

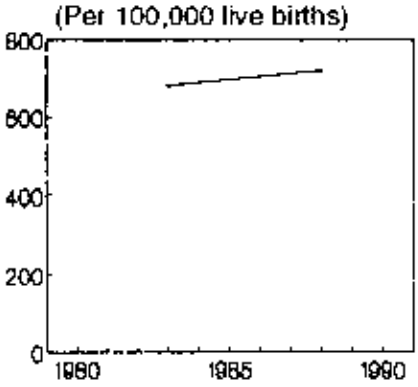


J. Low birth weight

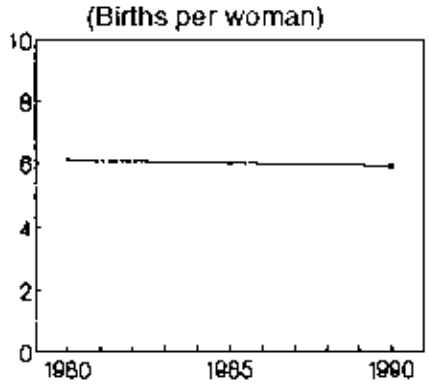
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

The economic crisis in most countries led to programmes of structural adjustment, with significant cutbacks in public expenditure in the social sectors, such as health and education. Indicators such as enrollment in secondary school, which, on average, declined slightly during the latter part of the 1980s, reflect this. Individual country data (see Volume II) will show that expenditures on health and education tended to decline from the mid–1980s, both as a percentage of the government budget and in absolute terms – this was certainly the case in Nigeria and Tanzania, and for health in Kenya; Zimbabwe managed to protect its expenditures, as did Kenya, on education, up to 1988.

On the positive side, improvements in infant and child mortality rates (if not numbers) are linked to effective campaigns for immunization, notably for neonatal tetanus and measles, and some improvements in access to health services and sanitation overall. For example, it is now estimated that nearly 60% of the population have some access to local health care (defined as access to treatment within one hour's walk or travel), and that 30% to 40% of the population have access to sanitation and/or clean water, up by around 10 percentage points between 1984 and 1990 (Panel II).

Indicators of the situation of women are scarce, but not encouraging. For example, the enrollment of girls in secondary school increased significantly between around 1975 and 1985, but appears to have declined since then, from 20% in 1985 to 16% in 1990 (Panel 1K). While this may reflect the rapidly increasing population of this age, it also shows that the facilities have not kept up. Maternal mortality remains among the highest in the

world – and the latest statistics from WHO show evidence of deterioration (Panel 1C). Between 1983 and 1988, maternal mortality rates per 100,000 live births increased to 680 from 660 in East African countries, to 710 from 690 in Middle African countries, and to 760 from 710 in West Africa. The incidence of low birth weight is difficult to estimate because of low coverage of attended births, but such evidence as there is tends to demonstrate virtually no improvement in the last decade.

The nutrition situation in Africa is expected to become increasingly serious as the end of the century approaches. Projections to the year 2000 suggest that filling the projected gap in basic staples in the region would require more than twice the 1.7% annual growth in production which occurred from the 1960s to 1980s. Among the sub–regions, the major concern in this respect is West Africa, where growth in food output is still very slow and the population is expected to increase by more than 3% annually in the 1990s. Africa's agricultural production potentials are far from being fully utilized. Roots and tubers, for example, have yet to benefit from technological breakthroughs. The concern of governments for food self–sufficiency, however, should not deviate attention from the primary objective of household food security, which is mainly a question of household income.

Unless a great deal of change occurs and soon, the people of the continent could suffer even more chronic and acute hunger. It is important to distinguish the situation in war areas, from those where there is a chance of stability. It is absolutely essential that the civil wars, such as in the Horn of Africa, cease, as is vividly demonstrated by the situation in Somalia. All that follows depends on peace.

Refugees and displaced people, when they reach an area where relief can be provided, must have their needs for food and health, at a minimum, met – and usually this will require external assistance. Nutritional needs must be better borne in mind in the future, not the least ensuring adequate quality of diet, preventing epidemics of micronutrient deficiency diseases.

But the underlying situation throughout most of the continent has to be of grave concern. If economies continue to decline, population continues to increase, and the health situation (including AIDS) deteriorates further, much of Africa could become a disaster area. On the other hand, with stability established, there are real prospects for technological change in rural and urban areas beginning to turn the situation around. Pressure on cultivatable land is high, but still less than many other parts of the world, and if "green revolution" technologies can be developed and adapted, these could begin to transform rural areas and help economic growth. Equally, the tradition of community organization could be built on, and the successes already seen in community–level programmes could become more widespread. Sub–Saharan Africa has a long way to go in developing health and education infrastructure, but the positive side of this is that there is clear potential for widespread improvement. There are basic resources of land and people, but time is running out to reverse deteriorating trends.

Near East and North Africa

(Panel 2)

The region has three different groups of countries: the high–income oil–exporting countries of Kuwait, Saudi Arabia, United Arab Emirates, and Libya; the middle–income group of Iraq, Cyprus, and Algeria; and the low–income countries with per capita GNP below US$2,000, including Egypt, Jordan, Morocco, Syria, Tunisia, Turkey, and Yemen.

In the last five years, nutrition in the region as a whole improved. Prevalence of underweight preschool children was estimated at around 15% in 1985, declining to around 13% in 1990 (Panel 2B). The numbers of underweight children also fell marginally over the period – from 5 million to around 4.8 million. Direct assessments from surveys in Egypt and Tunisia showed improving trends (see Table 1.3). Data for the period since the Gulf War (early 1991) are scarce. However, it is likely that receipts from workers' remittances have been affected (e.g., for Egypt, Syria, and Turkey) hence possibly consumption. From Iraq, there have been several reports indicating deteriorating health, food availability, and nutrition.

The incidence of low birth weight, anyway reasonably low in the region, is estimated by WHO/UNICEF to have fallen slightly on average during the 1980s, from around 12% to around 11% (Panel 2J). Specific country results are, for example, 7% in 1985 in Saudi Arabia, and about 12% in Algeria, with most countries falling in between these values. Contributing to the relatively adequate birth weight is the high percentage of women receiving antenatal care. Nearly universal coverage has been achieved in, for example, Cyprus and Kuwait; it

is estimated to be above 75% for Jordan, Libya, and Saudi Arabia, although lower in countries such as Egypt and Morocco.

Breastfeeding, fortunately, remains the almost universal practice in most countries. The percentage ever breastfed is 90–95%, for example, in Egypt, Morocco, and Tunisia, slightly higher in rural than urban areas. This proportion has held fairly steady over the last ten years. According to World Fertility Survey (1970s) and Demographic and Health Survey (1980s) results in Egypt and Morocco, breastfeeding initiation is now higher in educated women than earlier, and the median duration of breastfeeding slightly longer. This encouraging finding indicates that promotional programmes may succeed; moreover, as the proportion educated increases anyway, breastfeeding may be further supported.

The trends in the price of oil dictated, to a large degree, the movement in the economies of the region, including those countries which were not net exporters of petroleum products such as Egypt, which, nonetheless, benefitted from workers' remittances from the oil exporting countries. The regional GNP per caput rose from around US$1,100 in 1975 at the start of the first oil crisis to around US$2,600 in 1982, but falling sharply thereafter with the decline in the price of oil. The 1990 regional weighted GNP per capita figure is estimated at US$1,900, back to where it was in 1980 (see Panel 2E). However, other indicators show some improvement through the 1980s, and since so much of GNP is from oil here, the indicator may not well reflect changes in actual income for much of the population. Egypt, the most populous country, had rising per caput GNP in the 1980s (see Volume II).

With very little arable land and largely dependent on rainfed agriculture, nearly half the food supply in the 1980s came from imports, as well as from food aid for the less well–off countries. In Egypt, Morocco, Tunisia, and Algeria in 1990, for example, out of the 39 million metric tons of cereal supply, 18 million metric tons were from external sources (15.8 million from commercial imports and 2.2 million from food aid receipts). At the same time, food consumption patterns are changing, particularly in the middle income class. Meat consumption per capita has increased, resulting in increased demand for grains for livestock. In 1981, 17% of the total cereal supply was used for animal feed, increasing to 34% in 1990, which accounted for much of the increase in total cereal supply.

Consumer food subsidies are very important in several countries. Egypt has one of the largest food subsidy schemes in the world, covering 93% of the population; per capita food availability is above 3,000 kcal – similar to developed countries. Overall, the trends of per capita calorie availability in the region have been upward, from around 2,650 in the mid–1970s to 3,100 in 1990 (Panel 2F). Marked increases occurred in Algeria, Saudi Arabia, and Tunisia, but at a lesser rate in Cyprus, Yemen, Turkey, and Jordan. Egypt, while not the richest country in the region, achieved the highest level of calorie availability per capita of 3,336 by deliberate policy, although at a high foreign exchange cost. Imports of cereals in Egypt for the 1990–91 crop year reached 6.7 million metric tons while 1.7 million tons of food aid (mainly wheat from the United States) were received. Such policies of subsidies and imports did lead to fiscal problems, for instance, in Egypt and Morocco.

FAO data show that the proportion of the population considered to be "underfed" fell from 8% in 1980 to 5% in 1990. In absolute numbers, this implies 15 million people in 1980 compared to 12 million in 1990 (Panel 2G).

Many countries in the region adopted stabilization and adjustment programmes designed to correct their external imbalances and credit worthiness. Morocco, Algeria, and Tunisia, in particular, pursued aggressive reforms aimed at strengthening the balance of payments and promoting economic efficiency. Egypt's total debt increased nearly tenfold over a 15–year period – from US$4.7 billion in 1975 to US$40 billion in 1990, implying a per capita debt of about US$800 in 1990. Rapid increases in debt were also experienced by Turkey, Morocco, and Algeria. The debt service ratio in the region hit a maximum of around 35% in 1986 to 1989. In 1992, substantial debt relief was provided to Egypt following the Gulf War of 1991.

Future food security is closely tied to the ability to import cereals. Domestic production capability is limited by the scarcity of arable land and irrigation. Agricultural production, mainly rainfed, has been unstable due to erratic rainfall patterns. Egypt's irrigation capability has been threatened recently by the unstable supply of upstream water from the Nile – including drought in Ethiopia, reducing water in the Aswan Dam.

On the positive side, reforms in agriculture in Egypt, Morocco, and Tunisia in the second half of the 1980s helped to increase overall agricultural output to record levels in 1990–91. Agricultural policies in Egypt have aimed to increase production of cotton to generate foreign exchange and thus help to pay for food imports.

The improvements in nutrition in the region are also tied to developments in the health situation. In most countries, local health care coverage has been very high compared to other regions of the developing world.

The proportion of the population with access to health care (defined as being within one hour's travel) increased from 83% in 1983–85 to 89% in 1988–91 (Panel 21). Access to clean water supply increased from 75% to 86% over the same period, although the proportions of those with sanitary facilities remained at around 75%. Immunization coverage against measles has increased, doubling between 1983 and 1991, to around 80% (Panel 2H). The proportion of pregnant women immunized against tetanus increased from only 5% in 1983 to 56% in 1991. Programmes such as diarrhoea control were successfully implemented – and in Egypt, in particular, where access to ORT reached 83% of the population in 1989. These developments in health care coverage no doubt contributed to the decline in IMR.

Female literacy is on the rise, although the levels in various countries vary widely. Cyprus, Lebanon, Libya, and Kuwait, for instance, report over two–thirds of school–aged females are enrolled in schools, and with a rising trend. Saudi Arabia, Morocco, Yemen, and Tunisia, on the other hand, have female literacy rates below 40%, which are half the rates of males in the same countries. For the region as a whole, female enrollment in the secondary level increased from 32% to 52% between 1975 and 1990. Recent surveys in Egypt and Morocco have re–emphasized the relevance to nutrition: they found that women with at least primary schooling are only half as likely to have underweight children as those women without schooling at all.

Maternal mortality rates overall are estimated by WHO to have dropped to 360 per 100,000 live births in 1991 from a high of 500 per 1,000 in 1983. Improvements were observed particularly in Egypt and Morocco. No trends in coverage in antenatal care and delivery by trained personnel are available. However, the levels reported in 1988 of proportions of deliveries by trained personnel were relatively high – for example 75% in Jordan and 83% in Turkey.

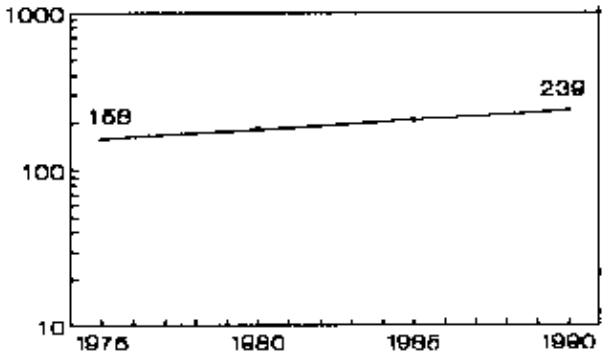
The child underweight prevalence is expected to drop further from 13% in 1990 to less than 10% by 2000. The rate of improvement will, however, be somewhat dampened by the increasing food import bill. This will be felt more seriously by the non–oil producing countries in the region. As population increases, total demand for food will rise. The increasing fiscal cost of food subsidies (particularly for the non–oil producing countries in the region) will put a strain on the government budget. Reliance on domestic sources for food is limited by the lack of arable lands, and the fragile situation of irrigation in Egypt. The impact of re–targeting subsidies to the poorest would be cost–effective, but involves political risks. Rising incomes and changing food habits in the region have tended to shift the focus of the debate to diet–related chronic diseases. In Egypt, several regional studies indicate a rising trend in obesity among school children – 11% were above 120% of weight–forage in 1962, and around 23% in 1987.

The prospects are for continued improvement of nutrition, particularly if economic recovery continues, and per caput incomes increase again. A number of trends are in the right direction. Fertility rates are falling, and access to health and potable water are improving, to the point where they will soon be universal. Immunization is equally going to reach complete coverage before long. The trend in malnutrition is downwards, although indicators such as IMR still have a considerable distance to go. Food availability is relatively high, and provided imports can be maintained, is likely to remain so.

Threats to the continuation of these encouraging prospects include rising population density and urbanization, linked to increased strain on productive and social resources. Nonetheless, as discussed further in Chapter 6, with accelerated programmatic efforts, there are prospects that nutrition in the Near East and North Africa will continue to improve, and could even begin to meet internationally agreed goals.

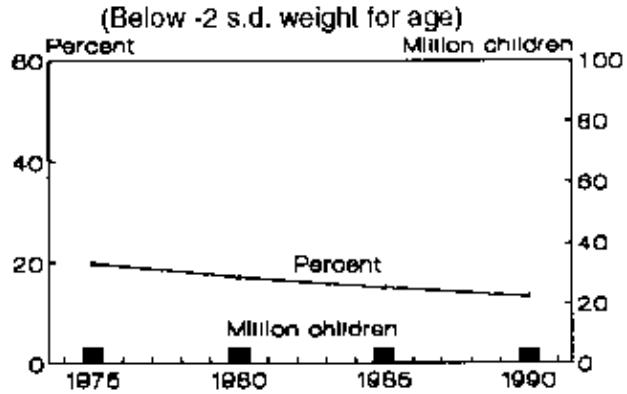
Panel 2 NEAR EAST AND NORTH AFRICA

POPULATION

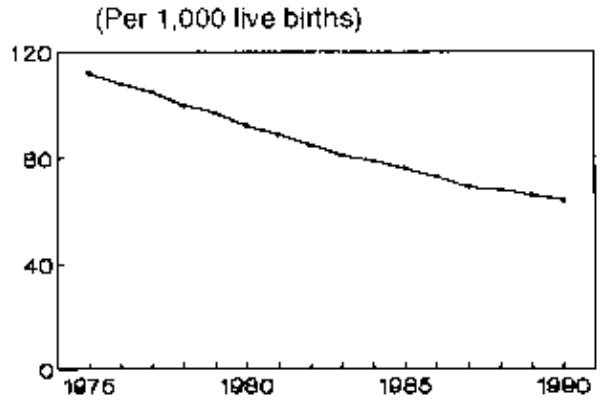


A. Million, log scale

CHILD GROWTH AND SURVIVAL

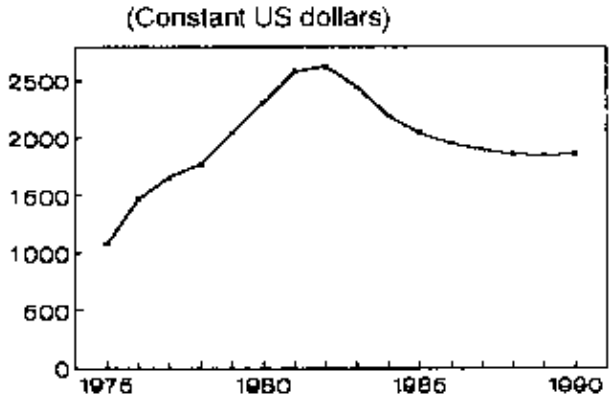


B. Underweight preschool children

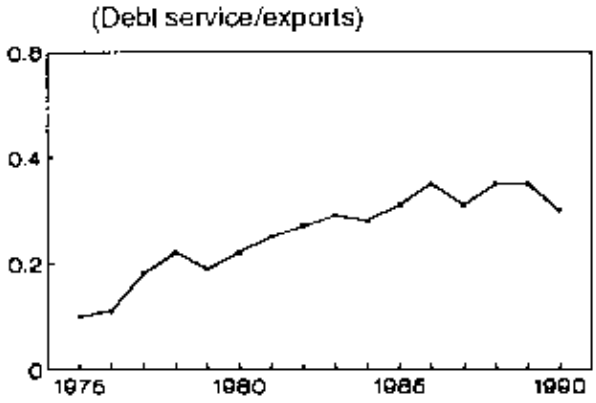


C. Infant mortality rate

ECONOMICS

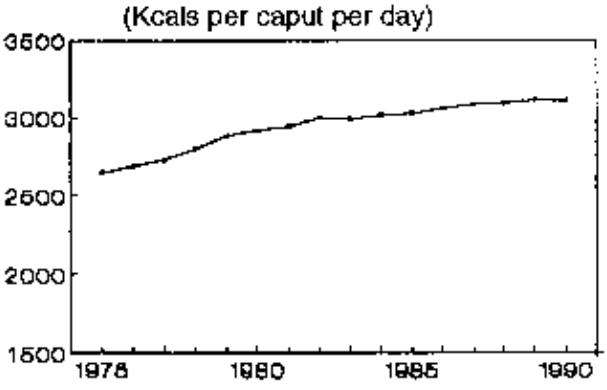


D. GNP per capita

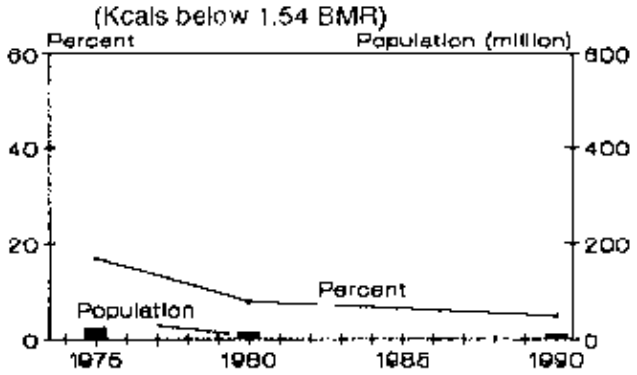


E. Debt service ratio

FOOD

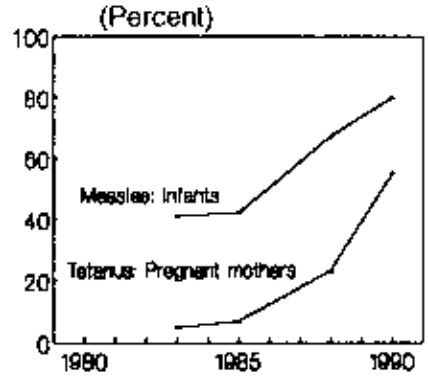


F. Dietary energy supply

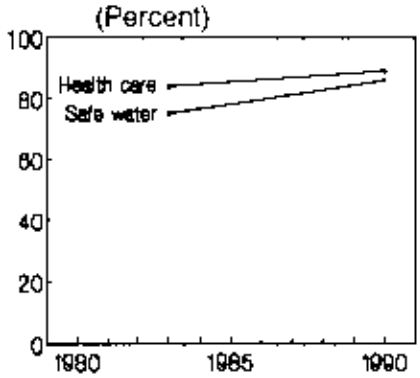


G. Underfed population

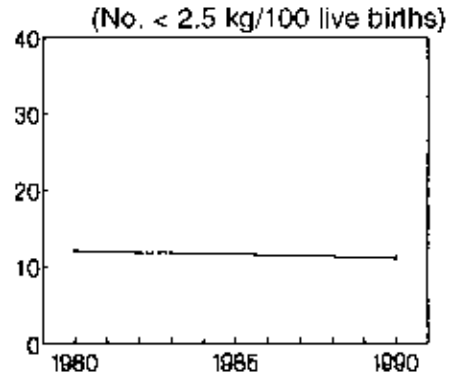
HEALTH



H. Immunization coverage

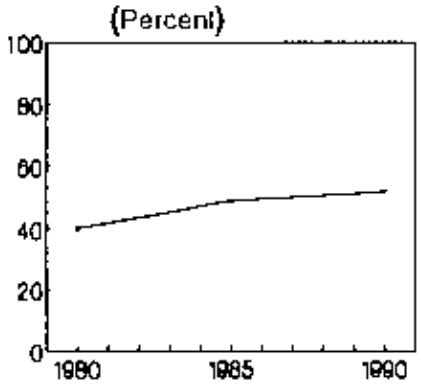


I. Access to health services and potable water

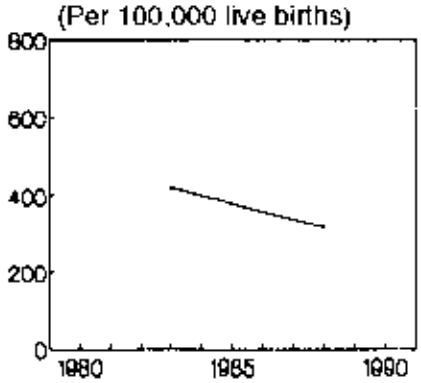


J. Low birth weight

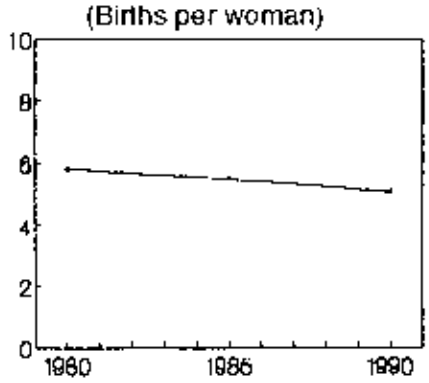
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

South Asia

(Panel 3)

In South Asia, the proportion of underweight children is nearly double that of elsewhere in the world. This is in line with some related indicators, such as low birth weight; however, others, such as infant mortality rate, on the one hand, or income, on the other, are similar to Africa where the underweight prevalence is substantially lower. That healthy well–fed children from South Asia grow at the same rate as children everywhere else is well established; the growth failure is undoubtedly environmental and preventable.

Although it is uncertain how far the causes and consequences are directly comparable with other populations, the high underweight prevalence levels undoubtedly indicate an extensive problem, and the huge numbers so affected constitute probably the biggest nutritional problem in the world. The trends over time can be interpreted more straightforwardly and compared with those in other regions.

Direct estimates of levels and trends in the prevalences of underweight preschool children are available from India (eight states), Pakistan, Sri Lanka, and Bangladesh. Regional averages are obviously dependent largely on India, because of its population size. During the 1980s, the prevalence fell overall for the region, from an

estimated 64% to 59% (Panel 3B). This change, only recently established notably from results in India, is of great importance in assessing world nutrition. The rate of improvement in India, of around one–half percentage point per year, probably occurred also in Pakistan and Bangladesh.

The rates of improvement were, however, lower than the population growth rate and consequently the total number of underweight preschool children increased, from 90 to 101 million children in the last ten years. South Asia has the highest prevalence of underweight young children in the world, while *the* absolute number accounts for over half of the entire world total.

Substantial differences exist in prevalences between countries, although all are high. In the 1980s, India, Bangladesh, and Nepal had underweight prevalences above 60%, with Pakistan and Sri Lanka around 40%. Within India, there is only limited variation on average between states, aside from Kerala. Using the National Institution of Nutrition's indicator (75% of NCHS standards) for 1988–90, Kerala had 35% underweight one to five–year–olds; Tamil Nadu was next lowest at 50%, Gujarat being the highest at 59%. Improvements varied by state – for example, in Kerala and Maharasthra, the underweight prevalence dropped significantly more than in Madhya Pradesh and Gujarat.

In Pakistan, the national survey by DHS in 1990/91 confirmed that the rates declined from the previous decade. As discussed in the Vol. II, the correction of early survey data for age–misreporting was necessary for this conclusion. In Bangladesh, the proportion of underweight children was reduced to 65% in 1990 from a level of 70% in 1985 and 84% in 1975 – but Bangladesh continues to have the highest rate in the world.

The infant mortality rate, estimated as 112 per 1,000 live births for the region in 1983, fell to 91 in 1990. These improvements are estimated to have taken place in all countries in the region, except Afghanistan, where the IMR is not thought to have changed from the extremely high value of 182 per 1,000 live births in 1983, up to the present.

The incidence of low birth weight is extremely high in the region, averaging around 30% of live births (Panel 3J). There is some evidence that this has fallen slightly, on average, according to available information. In general, during the last five years, the rates were around 33% in India, and 25% in Pakistan and Sri Lanka.

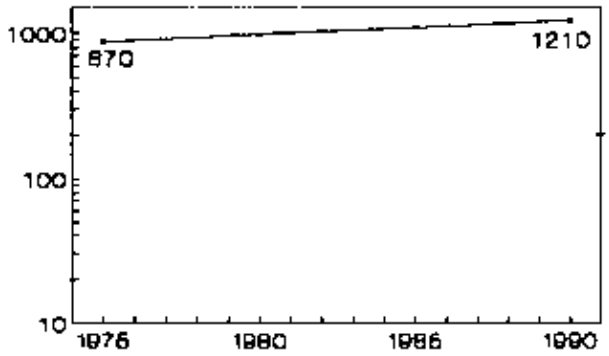
GNP per caput for the region grew at a moderate pace of 3.2% on average in the 1980s, faster than the 1.7% in the previous decade. Economic growth was more pronounced in the first half of the 1980s, slowing somewhat in the second half. South Asia was less affected by economic recession and structural adjustment than other regions. Poverty estimates point to some continuing improvements. In India, the proportion below the poverty line was estimated at 48% in 1977–78, falling to 37% in 1983–84, and further to 29% in 1987–89. National household surveys in Pakistan in 1979 and 1984–85 showed mat the proportion in poverty had declined from 34 to 28%.

Major gains in food production were achieved over the last two decades, although these were offset by high population growth rates. The trend in the per capita food production was nonetheless upwards, particularly between 1987 and 1989, following the drought in western India. In Bangladesh, the food production hit a low in 1988, but recovered in 1989–90 to the levels of the early 1980s. Agricultural production was accelerated by technological change, through the "green revolution" package of high yielding wheat and rice varieties. National cereal self–sufficiency was achieved in India, Pakistan, and Bangladesh as a result of such policies, although the gains differed regionally.

Thus, despite intermittent natural disasters such as drought in India in 1987, and intermittent flooding and cyclones that devastated many parts of Bangladesh in the late 1980s, the long–term trend in per capita calorie availability in the region was slightly upwards – from about 2,070 kcals per caput per day in 1975 to nearly 2,250 in 1990 (Panel 3F). FAO calculated that for the region as a whole, the proportion of underfed in the population declined from 30% in 1980 to 24% in 1990 (Panel 3G).

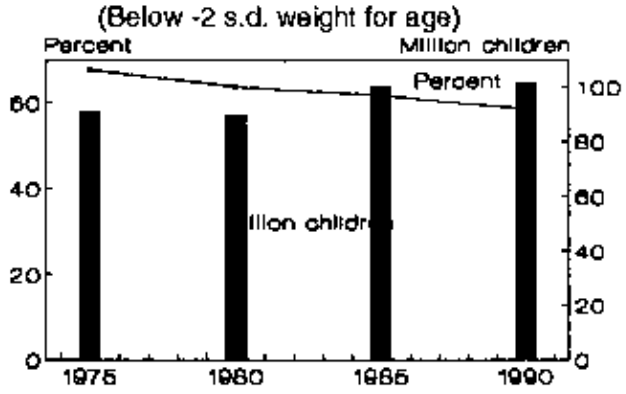
Panel 3 SOUTH ASIA

POPULATION

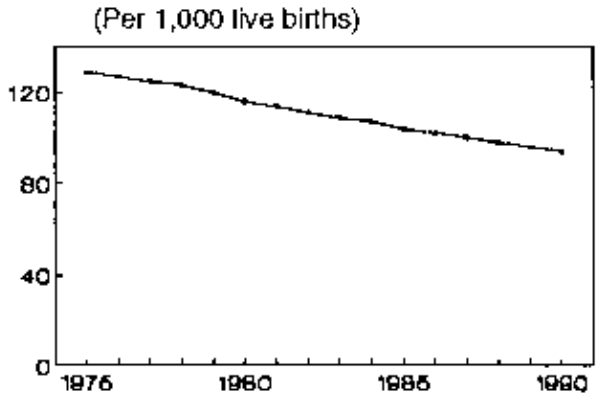


A. Million, log scale

CHILD GROWTH AND SURVIVAL

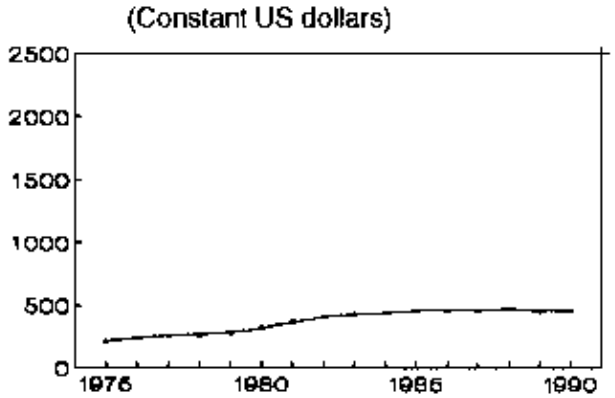


B. Underweight preschool children



C. Infant mortality rate

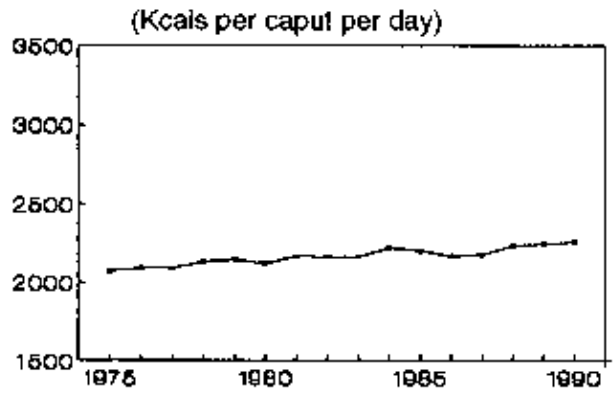
ECONOMICS



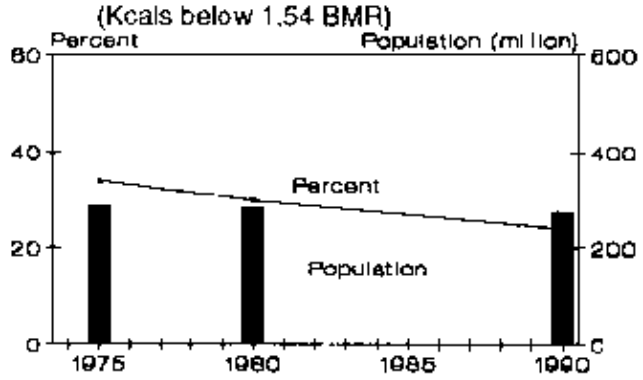
D. GNP per capita

E. Debt service ratio

FOOD

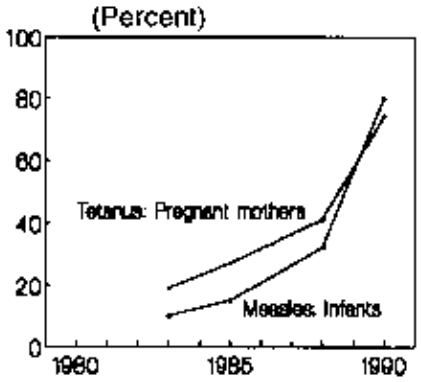


F. Dietary energy supply

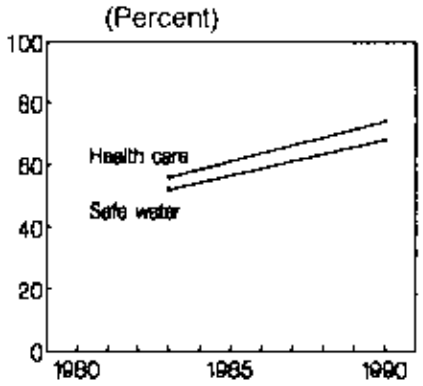


G. Underfed population

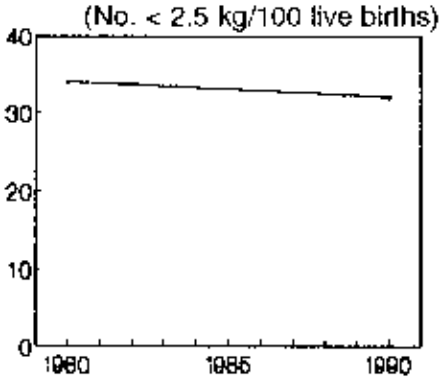
HEALTH



H. Immunization coverage

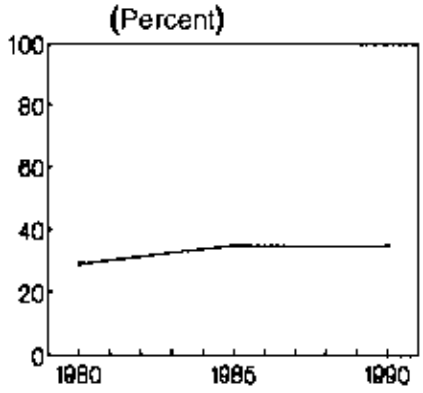


I. Access to health services and potable water

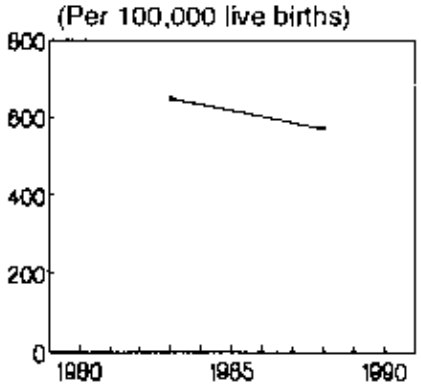


J. Low birth weight

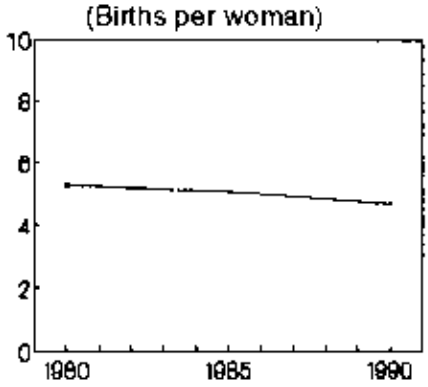
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

Famine was largely prevented throughout the region, partly through better food stock management. For example, Pakistan's food security management mechanism, using a demand/supply forecasting capability, enabled crises to be mitigated through timely actions in farm procurements, interannual price stabilization, and import and distribution in the case of deficits. In India, the Public Food Distribution System – involving the distribution of subsidized food grains via a network of fair–price food shops to the eligible poor holding ration cards – while varying by state in terms of coverage, has played a vital role in tackling food crises. Income support was provided through poverty alleviation schemes (India), and food for work and public works programmes in Bangladesh, among others. Together with price stabilization, such measures contributed to improving household food security among the poor in the region.

Fiscal pressures have led to cuts in direct public food distribution systems. Sri Lanka cut back its food stamp programme by default, by fixing the value of the food stamps while prices increased. In 1987, Pakistan eliminated the food radon shop system (principally of wheat flour) which had been in place for the past 40 years. In early 1992, Bangladesh virtually dismantled its rural food rationing system, largely as a result of the confirmation by studies of large leakages. In some cases, e.g., Pakistan, general consumer welfare may have benefitted from such policy changes. However, in Sri Lanka, the food consumption of the poor probably suffered.

Consumption surveys in India, Pakistan, and Bangladesh showed that over the last two decades, food consumption on average changed very little. Indeed, the National Nutrition Monitoring Bureau of India considered that average consumption of calories may have fallen slightly in eight states between 1975–79 and 1988–90. Per capita calorie consumption in Pakistan is also not thought to have changed much between the 1977 and 1988 survey periods. These results from direct food consumption surveys are only slightly different from conclusions from food balance sheet data and it probably is indeed the case that average consumption has largely been unchanged. However, there is evidence that the food consumption of the poor, for example, the landless, may have increased – results from India show this. This would be consistent with the steady, if slow, reduction in underweight in preschool children, of around half a percentage point per year.

Health conditions in much of the region remain severe, for example, the incidence of diarrhoea is particularly high, and there is little evidence for much change over the last two decades. Government expenditures on health care as a percentage of the national budget in Pakistan and India remain very low – 1.0% and 2.1% in 1986, respectively, compared to the average of 5.3% for the developing world. The lower health budgets in the two countries is evident even after accounting for the state and provincial health budgets in the calculations. There is, however, evidence of improvement in efficiency in health delivery systems, in terms of increased coverage of local health services in India and Pakistan, although not in Bangladesh and Nepal. In Sri Lanka, the proportion of the population having access to health care within one hour's travel remains high at 90%. Access to health services, and to safe water, are estimated by WHO to have improved during the 1980s, as shown in Panel 31.

Utilization of health services is a separate issue which needs to be addressed in the provision of health care. In Pakistan, a study in rural communities observed that while 90% of households reported access to government clinics, only 25% chose to use them, due to the irregular supply of medicines. The public health systems in these countries are also disproportionately urban – whereas the majority of people live in the rural areas. In Pakistan, for instance, almost 90% of all doctors serve the 30% of the population living in urban areas.

Large–scale direct actions in primary health care (including immunization (Panel 3H)) have been emphasized in most countries, along with nutrition and health interventions such as the Integrated Child Development Services (ICDS) and the Tamil Nadu Integrated Nutrition Project (TINP) in India, and the Triposha and school meal programmes in Sri Lanka, etc.

Sanitation is still a major problem in South Asia, with only 28% households in 1988–91 having access to adequate sanitation facilities. On the other hand, WHO reported that 70% households had access to a clean water supply in 1988–91, up significantly from 52% in 1983–85 (Panel 31).

Long–term nutrition improvements in the region are strongly associated with female educational levels. Research in Pakistan has shown that the likelihood of having an underweight child in the household where the mother has no education is three times that of the household where the mother has primary education; and this remains the case when me effect of income is removed analytically. However, only 11% of adult females in Pakistan are literate, compared with 37% for males (in 1988), which no doubt contributes to growth failure in children. The trend in the female enrollment ratio at secondary level for the whole region is upwards (24% in 1975 to 35% in 1990) but the improvement is slow.

Recent statistics from WHO indicate that maternal mortality rates in the region have fallen from 650 per 100,000 live births in 1983 to 570 in 1988. Increasing coverage of antenatal care as well as delivery by trained health personnel is likely to account for some of these improvements. Antenatal care by trained health personnel increased from 45% in 1983 to 70% in 1991 in India, 26% to 70% in Pakistan, but was still low in Nepal at 17%. The success in training traditional birth attendants has improved the proportion of deliveries by trained health workers from 60% to 70% in Pakistan, and from 32% to 60% in India. But only 7% of births in Bangladesh were delivered by trained health personnel in 1991.

The prospects for future nutrition in South Asia are mixed. On the one hand, food availability remains relatively low and has not shown much improvement in the last several years. Moreover, there are no really clear prospects for increasing food availability comparable to the green revolution – yield limits are beginning to be reached, as is me availability of land suitable for irrigation. The proportion of landless people is high and increasing. It is likely that the important prospects for future improvement lie with industrialization. Underlying this is a continuing race between population growth and economic growth. Fertility is decreasing, but not yet nearly enough to reduce population growth as much as is needed,

Thus a key question, outside the scope of this report, remains how economic development can be accelerated. Nonetheless, there are a number of programmes in place mat protect nutrition mat seem well–founded. These include poverty alleviation and public works programmes, as well as food supply and price stabilization measures. Direct nutrition and health programmes, such as the Integrated Child Development Services in India, are most probably benefitting large numbers of women and children. More effective targeting of such programmes is important, and potentially could be achieved. One particular constraint which could be more energetically addressed concerns discrimination against women, common particularly in the northern part of the subcontinent.

Given the very high numbers of underweight children, and widespread inadequate consumption among a huge population, what happens to nutrition in Asia profoundly affects the overall world nutrition situation. Although the trend is in the right direction, it is far too slow to see a resolution of the problem in the foreseeable future. Both intensification of existing programmes, and new investments and ideas, are needed to accelerate improvement.

South East Asia

(Panel 4)

Among the regions of the world, South East Asia achieved the fastest rate of economic expansion in the last two decades, with annual growth rates in GDP per caput averaging 6 to 8%. GNP per capita for the nine countries included in this region more than doubled from around US$350 in 1975 to US$800 in 1990. The growth rates in farm and industrial production outstripped population expansion in the region as a whole, and this translated into improvements in real incomes and reduction in poverty in most of the countries.

Overall nutrition in the region improved at a rapid pace. The prevalence of underweight children fell rather steadily, at close to one percentage point per year, from 1975 to 1990 (Panel 4B) (Table 1.2). This rate of decrease was sufficient to bring numbers of underweight down, from 24 million in 1975, to 22 million in 1985, and to 20 million in 1990.

Rates of improvement were not the same in all countries, but direct estimates from national surveys confirmed improvements in Thailand, Myanmar, Malaysia, Vietnam, and Indonesia (Table 1.3). The largest improvements in the 1985–90 period were noted in Thailand (20% to 13%), which benefitted from a surging economic growth (above 10% annually) in the second half of the 1980s, coupled with a highly successful direct nutrition and health programme begun at the start of the decade. Consistent improvements were also seen in Indonesia, the largest country in the region, but in the Philippines, the proportion of underweight children stood at around 33% in 1990, slightly lower than 1986 at the height of the economic and political crisis. Surveys in Myanmar showed that for the under–three–year–old children, prevalence declined from 38% in 1987 to 32% in 1990.

Available data (Panel 4J) point to a marked drop in the percentage of low birth weight babies in the region as a whole, from 18% in 1983–85 to 15% in 1988–91. Marked declines were reported by WHO/UNICEF in Laos, Vietnam, Indonesia, and Thailand.

Nutritional improvements were no doubt influenced by the overall strong performance of the economies in the region. Oil exporting countries such as Indonesia and Malaysia enjoyed rapid growth rates in the 1970s followed by weaker but still high growth rates in the 1980s when the price of oil began to fall. Growth performance in the oil importing countries – such as Thailand and Vietnam – was generally robust particularly in the second half of the 1980s, but faced the adverse effects of the Gulf crisis which increased the import bill for oil. Countries with large numbers of migrant workers abroad, such as the Philippines, suffered from large declines in remittances – a significant portion of the dollar earnings. Added to these were pressures of debt servicing which were rapidly increasing in the mid–1980s, up to more than 40% average for the region by 1986 (see Panel 4E) but men falling towards the end of the decade. In 1986, debt service ratios in Myanmar reached 80%, 39% in Indonesia, 35% in the Philippines, and 30% in Thailand.

Structural adjustments were necessary in Indonesia (1983), the Philippines (1987), Malaysia (1986), and Thailand (1986). Most countries responded quite well to the shocks, although at varying degrees. Growth in the economies resumed and debt service payments were reduced in 1990 to 17% in Thailand, 21% in the Philippines, and 30% in Indonesia.

Many of the countries in the region made substantial progress in reducing poverty – in Indonesia, for example, the estimated level of absolute poverty declined from 33% in 1978 to around 17% by 1987. The far reaching economic and institutional reforms in Vietnam beginning in late 1987, where the economic system was completely restructured, provided impetus to the strong agricultural performance – increasing agricultural GDP at a rate of 4.5% in 1989. In Malaysia, poverty declined from 27% in 1980 to 15% in 1987; in the Philippines, a recovery from deteriorating poverty conditions was seen from studies comparing conditions between 1985 and 1988.

Food production gained momentum in the last five years of the 1980s, growing at an annual pace of 4.5% in 1988–89 and 3.1% in 1989–90 crop years as regional averages; generally continuing from the "green revolution" which started in the 1970s with the wide dissemination of IRRI high yielding rice varieties. Most countries achieved food self–sufficiency in the 1980s. Indonesia, one of the largest importers of rice in the post–war period, achieved self–sufficiency in 1984. Thailand, Vietnam, Myanmar, and Indonesia accounted for 43% of the global exports of rice in 1991. Thailand exported 4 million metric tons of milled rice (out of the world total exports of 12.2 million metric tons). Vietnam's liberalization in agriculture in late 1987 resulted in record harvests in 1988–90, making the country the third largest exporter of rice in the world – a big achievement for the once net importer, just a decade earlier.

Food production in the region is still vulnerable – from population growth, natural calamities such as tropical storms which are common in the region, as well as drought. Yields in rice have remained largely unchanged in the latter 1980s following the prior growth rate gains fueled by the high yielding varieties; and the expansion in cultivated land has now about covered most of the more fertile areas.

The availability of calories for the region has increased steadily, generally in line with food production (see Panel 4F). The per capita calorie supply increased from 2,400 to 2,500 from 1985 to 1990. In 1975, this figure was 2,150 per capita. These trends reflect not only growth in supply, but in demand, mainly through increasing incomes and stable prices. As a result, FAO calculated that the number of people considered underfed, or not eating adequate food to maintain light activity, fell from 101 million in 1970 to 74 million in 1990 (Panel 4G).

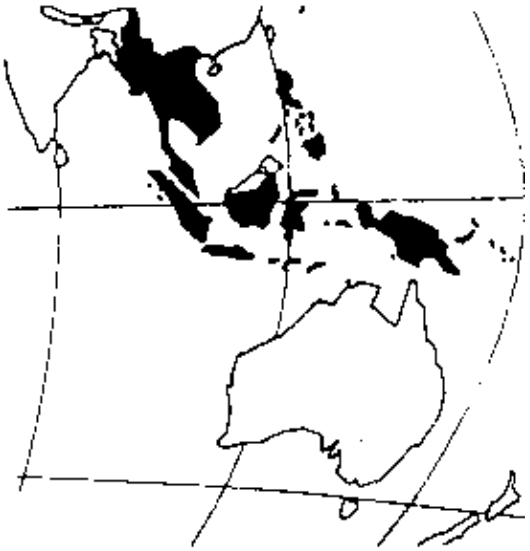
Improvements in overall nutrition could be traced partly to deliberate actions in health and nutrition programmes in the 1980s. Primary health care was emphasized in virtually all countries. The success of me nationwide nutrition and health programmes were seen clearly in Thailand and Indonesia. Here, awareness and public opinion moved policy towards nutrition goals, making these explicit in national development plans; and community intervention programmes had a big impact on malnutrition.

The proportion of the population having treatment for common diseases available within one hour's travel (according to WHO, see Panel 4I) increased from 57% to 84% between 1983 and 1991 for the region as a whole. Over mat period, the population covered by safe water supply rose from 44% to 53%. The coverage in Malaysia, the Philippines, and Thailand was over 70%. The proportion of households in the region with adequate sanitary facilities is estimated to have increased from 41% to 51% between 1983 and 1991.

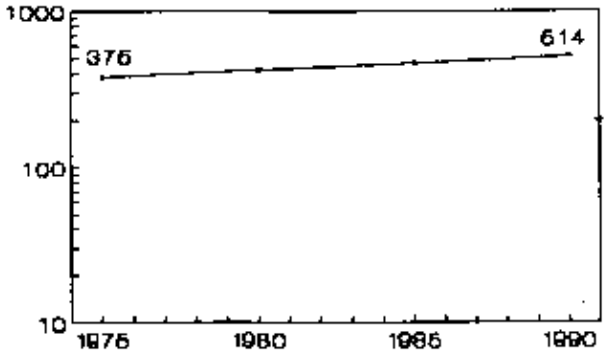
Infant mortality rates declined by nearly half – from 92 to 55 per 1,000 live births from the mid–1970s to 1990 (Panel 4C). Some of me countries have achieved remarkable improvements – Malaysia and South Korea, for example, had IMRs in the low 20s per 1,000 at the end of the 1990s (equivalent to the levels in the United States and France in 1965). This meant that in the 15–year period, the absolute number of children dying annually before their first birthday declined in the region from about 946,000 to 635,000. Many factors account for such improvements, one of which is the likely synergy of health status with the positive nutritional trend. A good part is attributed to the increase in direct actions by governments in local health services.

Compared to other developing regions of the world, South East Asian women enjoy a better overall position, in general. Female literacy has been rising – females enrolled at the secondary level rose from 29% to 46% in 1990 (71% in the Philippines, equal to the levels for males). In general, women are finding fewer barriers to their participation in the labour force, in education, and in public life.

Panel 4 SOUTHEAST ASIA

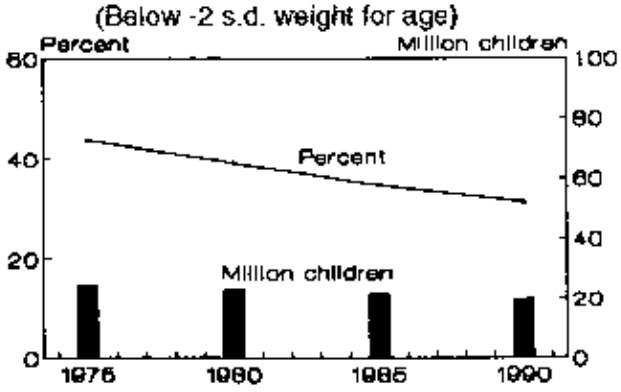


POPULATION

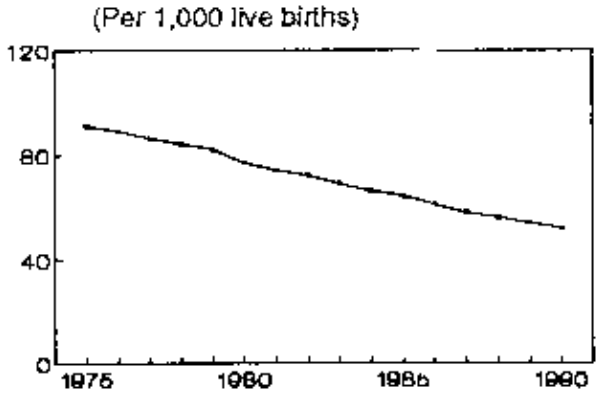


A. Million, log scale

CHILD GROWTH AND SURVIVAL

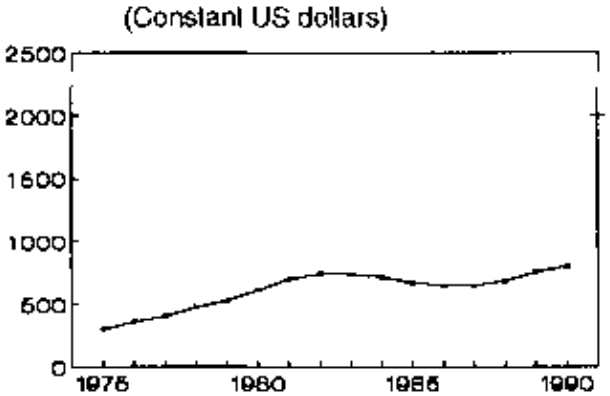


B. Underweight preschool children



C. Infant mortality rate

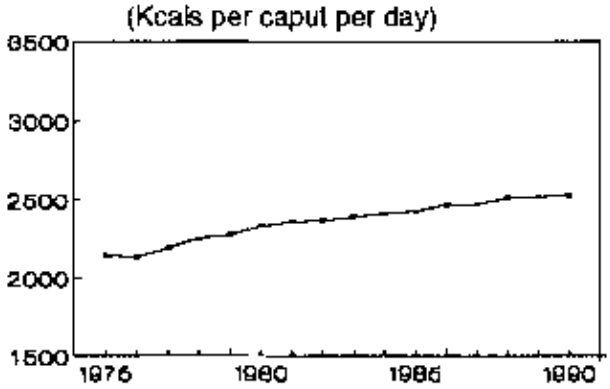
ECONOMICS



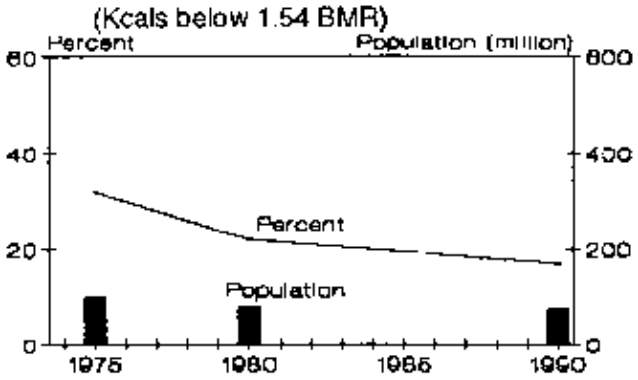
D. GNP per capita

E. Debt service ratio

FOOD

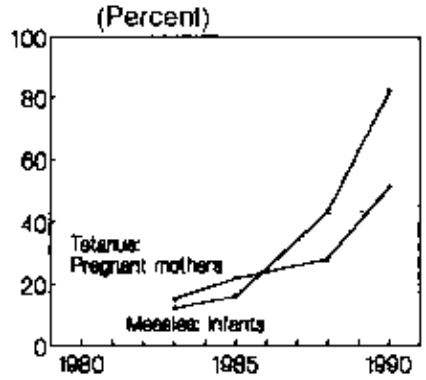


F. Dietary energy supply

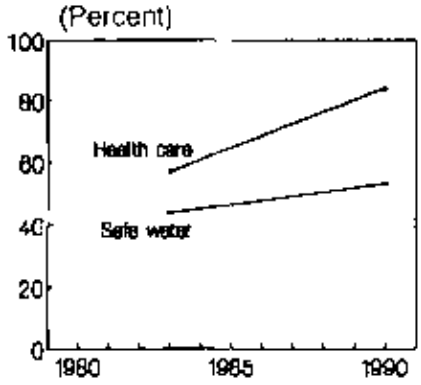


G. Underfed population

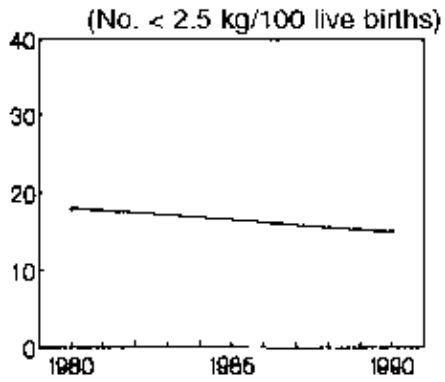
HEALTH



H. Immunization coverage

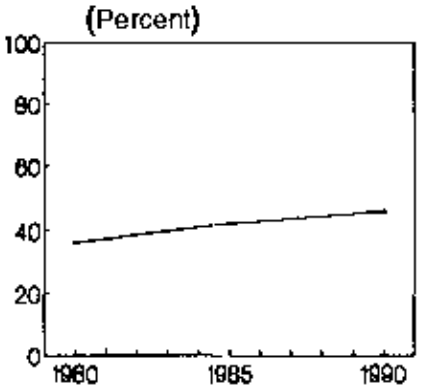


I. Access to health services and potable water

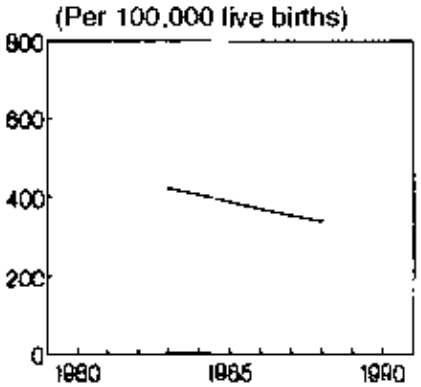


J. Low birth weight

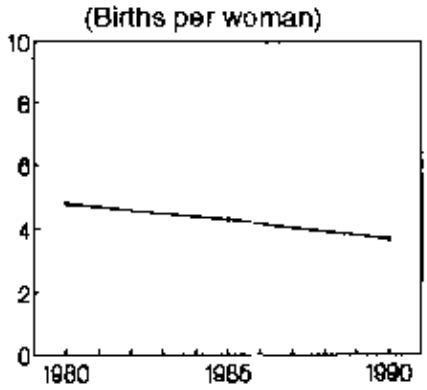
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

Maternal mortality rates have been estimated at 420 per 100,000 live births in 1983, and WHO estimated that this declined to 340 in 1988 for the region as a whole (Panel 4L). Direct estimates show improvements in maternal mortality in the Philippines and Malaysia, and declining but still at a high level in Indonesia and Laos. Both the proportions of women receiving antenatal care (e.g., from 66% in 1985 to 84% in 1991 in Malaysia, 26% to 47% in Indonesia) improved, as did the proportion who delivered babies attended by trained personnel (e.g., from 33% to 71% in Thailand in the same period).

The prospects for nutrition for the rest of the decade for the region as a whole are clearly positive. The transition into market economies in Vietnam, Laos, and Kampuchea which started in late 1980s is gaining momentum. Reforms in the agriculture sector in these countries are now reflected in increasing agriculture outputs. The Philippines and Indonesia are gearing up to become export–led economies following the success of Thailand and Malaysia in the 1980s. Increasing pressures of population and rising incomes will generally fuel increasing demand for food. If the trends in the last decade continue, the proportion of underweight (currently at 31%) and underfed populations in the region is likely to continue to decline to the year 2000.

Rapid economic growth together with vigorous community–level health and nutrition programmes have brought malnutrition down rapidly in countries such as Thailand and Indonesia. Where there is less growth, there has been less resources and organization for programmes, and less progress, such as in the

Philippines. If such programmes can be intensified, the rate of improvement may speed up. In favour of this is the health service infrastructure and high levels of education in most countries in the region. Whether improvement can be accelerated even further, for example as needed to meet the goals of the World Summit for Children, is not clear – but sustaining and intensifying existing programmes would clearly play a role. Threats to the generally positive prospects would include, obviously, economic slowdown, possibly related to hitting up against the technological limits of agricultural production, and increasing pressure from population growth. But in general, if growth and stability can be maintained, future prospects for nutrition in the region are good.

China

(Panel 5)

Survey data of anthropometry in young children, covering much of the country, were collected in 1987, giving a first assessment reasonably comparable to other countries. The results gave an estimate of around 21% of children under six as underweight. As previous anthropometric surveys were not national in scope, it is not possible to compare this result directly with earlier surveys. However, results from surveys over many years in Beijing (as given in the SCN's Update Report) showed rapid improvement in the 1970s, leveling off during the 1980s. Estimates have been made of likely trends from 1975, as shown in Panel 5B, using methods similar to those for other countries based on data such as calorie availability, education, etc. From these, the proportion of underweight children is estimated to have fallen from around 26% in 1975 to the present level of 21%; the calculations indicate a more rapid fall in 1975–85, and, in fact, a slight increase in the prevalence in the late 1980s. These results imply that total numbers underweight were roughly stable at 21 million between 1975 and 1985, increasing slightly to around 24 million by 1990.

The prevalence of underweight children varied greatly by location – for example, in data from 1987, between 6% and 27% in urban areas, and 12% to 47% in rural areas. The provinces of Zheijang and Shandong seemed to have the lowest prevalence rates, while Guandong Province had the highest. In general, the problems are greater in the northern and inland provinces. The southern and coastal provinces, particularly in the Shanghai and Shandong areas, have lower prevalence rates, associated with higher income levels.

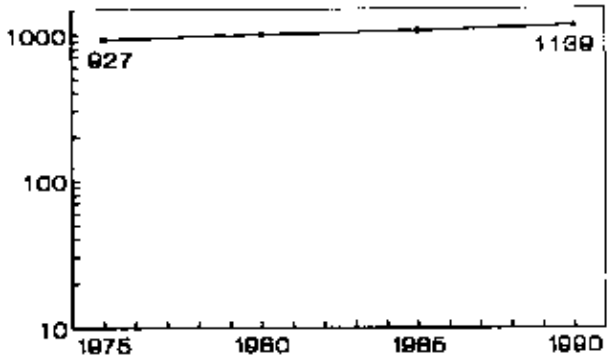
Nonetheless, the overall levels of underweight are remarkably low, considering that China remains one of the poorest countries. The per caput GNP is fairly similar to South Asia (compare Panels 3F and 5F), but China has about *one–third* of South Asia's prevalence of underweight children.

The National Survey on Child Growth indicated that China's percentage of low birth weight babies, which was 9% in 1987, is also among the lowest in the developing world.

Infant mortality rates are low in China, in line with nutritional indicators. Moreover, they have continued to fall in recent years, from around 40 per 1,000 live births in 1980 to 30 in 1989. These values are indicative of the successful deliberate actions in the social sector in China, and no doubt benefit from the adequacy of birth weights. Countries of similar GNP per capita as China in 1990 (around US$370), such as Pakistan, Kenya, Haiti, Ghana, and India, have infant mortality rates ranging from 67 to 103 per 1,000 live births. China's IMR is equivalent to that found in Argentina and Venezuela – countries that have incomes which are six times that of China. A reasonable comparison may be with the state of Kerala in India, which has similar low income but excellent IMR figures, and a much lower child underweight prevalence than other Indian states.

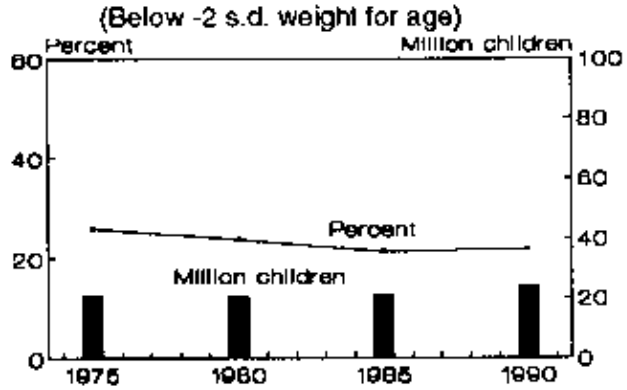
Panel 5 CHINA

POPULATION

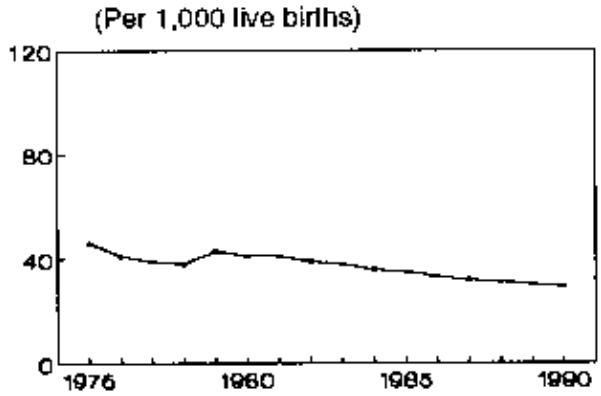


A. Million, log scale

CHILD GROWTH AND SURVIVAL

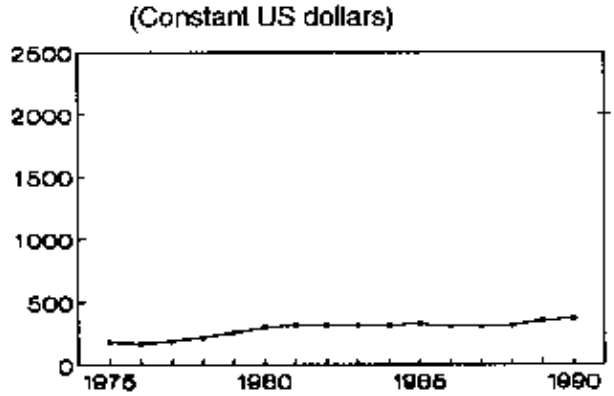


B. Underweight preschool children



C. Infant mortality rate

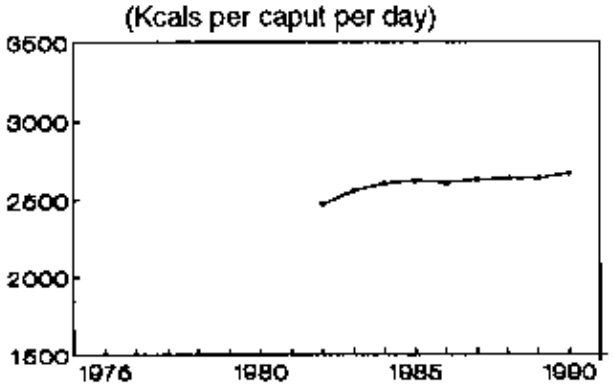
ECONOMICS



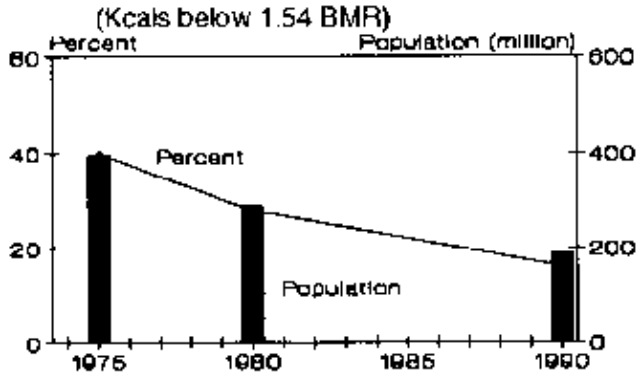
D. GNP per capita

E. Debt service ratio

FOOD

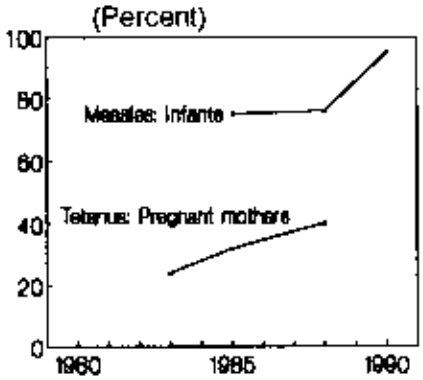


F. Dietary energy supply

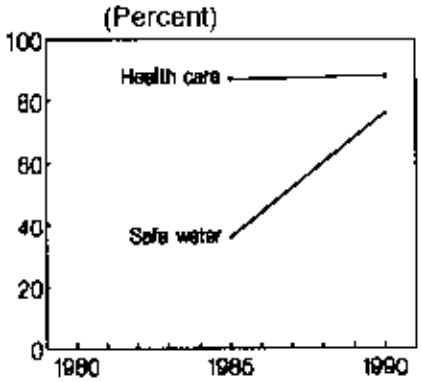


G. Underfed population

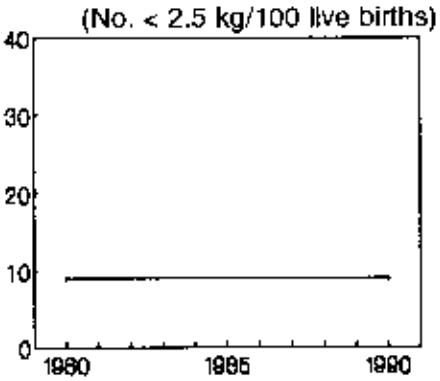
HEALTH



H. Immunization coverage

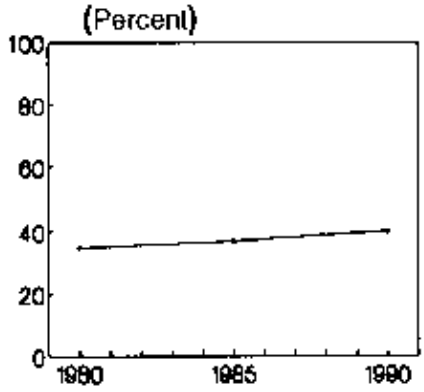


I. Access to health services and potable water

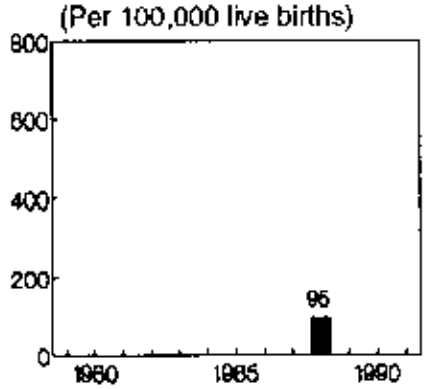


J. Low birth weight

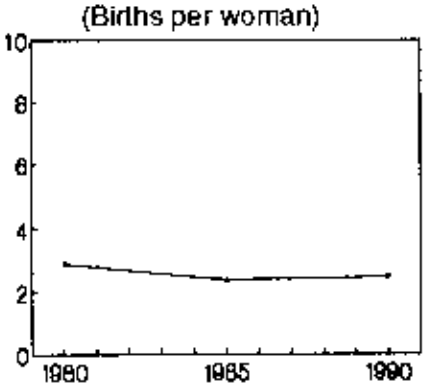
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

The overall trend in nutrition in China in the last two decades is linked positively to overall improvements in the economy, which grew by 5.3% in real per capita terms between 1975–77, and with accelerated growth between 1978–84. Administrative and fiscal decentralization, as well as external trade and exchange rate reforms, had a positive impact on economic growth. After such dramatic growth, the economy slowed down considerably, growing 2.47% annually between 1985–89. The industrial sector's output growth rate fell to 8.3% in 1989 as compared to 20.8% in 1988.

The slowing of economic growth, especially in 1988–89, resulted from a conscious attempt by the government to remove excess liquidity in the economy and thus lower the inflation rate, which was averaging 20% in 1988 – at one point reaching 30% in urban areas. A combination of restrictive monetary policies, increased interest rates to encourage savings as well as reduced public sector investments, were successful in reducing urban inflation to 3.3% in 1990.

With the significant economic expansion, per capita household income rose considerably during the 1980s. The average Chinese household saw an increase in its nominal income of 240% during the 1978–88 period; in real terms, rural incomes increased by 116%, and urban incomes by 87%. Poverty studies also indicate that the proportion of the population considered to be below the poverty line declined to 13% in rural households in 1988 compared to 17% in 1981.

Food production in the last half of the 1980s increased, but not as fast as during the 1978–84 boom period. In the late 1970s, the government initiated a series of reforms, including increasing fertilizer accessibility, and raising the quota price (at which farmers sold output to the government) by 20%. Households rather than communes once again became the central unit of production and, under a new system of contract responsibility, households had to meet certain production quotas before being able to sell any surplus in local markets under market–determined prices. These agricultural reforms were highly successful and the gross value of agricultural output increased as much in 1978–84, as in the 21 years prior to this. Increase in production in the 1980s was built on earlier investment in irrigation, soil quality maintenance through fertilizer application, and the use of high–yielding varieties of wheat, rice and maize.

Overall per capita calorie availability is estimated by FAO at 2,700 in 1990, up from 2,600 in 1985, and 2,100 in 1975 (see Panel 5F). The proportion of the population estimated to be consuming inadequate energy associated with these kcal availabilities roughly halved between 1975 and 1990, from about 40% to 20% (Panel 5G).

The government spends a considerable amount of money on food subsidies for the urban population through a rationing system which has been in operation since 1953. Under this system, most households receive ration coupons for grain and certain other basic foodstuffs, which are heavily subsidized. In rural areas, there is no formal ration system, but the government does intervene in transferring grain from surplus to deficit areas.

China has given high priority to programmes in health and sanitation. Compared to other countries with similar levels of income, China has implemented far more direct actions to provide social services to its population. Access rates were achieved of 71% for safe water supply and 96% for sanitary facilities in the home or immediate vicinity in 1991. Likewise, immunization campaigns have been very successfully implemented. Reports by WHO indicate that the proportion of infants immunized against measles increased from 75% in 1985 to above 90% in 1991, while one–third of pregnant women in 1985 were immunized against tetanus. In 1991, 74% of infants received BCG shots, 98% were immunized against polio, and 97% with DPT.

Priority for health care in China has strong historical roots. In the Mao period, China implemented a massive health care delivery system linked to the brigades in the rural areas. The ratio of Western–style doctors per 100,000 population is two–and–a–half times that in India, while the number of village–level health workers is 4.5 times. Financing for health care comes from three main sources: private outlays (32%), labour insurance (31%), and state budget expenditures (30%). In 1981, about 70% of the population had complete health insurance. There are, however, significant urban/rural differences: urban expenditures on health are about US$16 per person, about three times the amount spent for the rural areas. State subsidies for health in urban areas are almost ten times those of the rural areas – about US$13 per capita annually compared to US$1.50 per capita.

Indicators of women's situation in China show a moderately visible role in the economic life of the country. Female labour force participation has been very high (42% of all women in 1975) and has remained at that level for most of me 1980s. This high rate of economic participation of women has put a stress on child care, and this has become a major issue, especially in the urban areas where women have generally worked in factories. Female enrollment in primary education has been increasing. Largely as a result of the effects of increasing labour participation and of the family planning programme which aimed at one child per family, the country has reduced its population growth to an average of 1.5% from the early 1970s to 1990, and total fertility to just over two births per woman on average, see Panel 5M.

Diet–related chronic diseases, dietary patterns, and life styles, especially for more affluent segments of the society, are an emerging concern. Coronary heart diseases, stroke, and cancer are rising as causes of mortality, proportions becoming similar to those of the United States. In 1986, reported deaths from cerebrovascular diseases were four times what they were in 1957, and from heart disease, three times.

China has thus been through a major transition, from large–scale food insecurity, including periods of famine, to widespread dietary adequacy, with even the risk of overconsumption among some people. This was achieved largely as a result of the government's high – priority to ensuring adequate caloric intakes through rapid production increases of staple crops. The overall trend in food supply, coupled with the high priority the government attaches to direct social actions in sanitation, immunization, and health care, have contributed a good deal to the achievements in nutrition.

China has remarkably good nutritional status and related indicators such as infant mortality rate, considering the low GNP per caput. Food availability is relatively better than might be expected from GNP, as are access

to health services and literacy, all of which no doubt contribute to the favourable nutritional situation. Improvements in underweight children ceased in the latter 1980s, in line with slowdown in growth of GNP and food consumption, and restoring economic growth would clearly be important for continued improvement in nutrition.

Middle America and Caribbean

(Panel 6)

In the last Five years, nutritional indicators in the region were rather static, after improvements from the mid−1970s to the mid−1980s. In the decade prior to 1985, improvements in prevalences of underweight preschool children from 19% to 15% were enough to negate the growth in zero to four−year−old population; the number of underweight children fell from 3.4 to 2.8 million. Then, between 1985 and 1990, the absolute number of underweight children rose slightly (from 2.8 million to 3.0 million) based on prevalence rates of 15.2% and 15.4% respectively. Direct survey estimates showed improvements in Costa Rica and Jamaica.

Between 1983−85 and 1988−91, the incidence of low birth weight declined from 15% to 12% according to WHO/UNICEF figures, partly as a result of the increasing coverage of antenatal care. As examples, the proportion of pregnant women receiving antenatal care in Costa Rica increased from 1984 to 1989 from 54% to 91%, 26% to 69% in El Salvador, and 66% to 83% in Panama, although, in Haiti, this indicator fell.

The average GNP per capita of the region fell to a 1990 level of US$1,700 per capita from a peak of US$2,300 in 1982. In the earlier decade, dramatic increases in economic output were noted, very strongly in Mexico and many other Central American countries. The sharp swings in income over *the* 15−year period were brought about by the immediate effects of structural adjustments in Mexico, in particular. Also, generally adverse developments in the world economy in *the* early 1980s had an impact via reductions in external demand, terms of trade, and the supply of external finance − all crucial elements in the rapid economic growth of the 1970s. Debt in practically all countries in the region rose dramatically − from around US$240 per capita in 1975 to US$1,000 in 1990 − more than one−half of the per capita incomes of the region. Mexico's total debt rose from US$15 billion in 1975 to USS85 billion in 1990 − one of the largest in the world. The debt service ratios were very high (see Panel 6E), reaching 50% in the late 1970s, and still above 30% by 1990. This curtailed available capital for domestic investments, and stalled economic growth in the last few years.

The impact of the structural adjustments and external debt in the 1983−87 period negatively affected food availability and consumption. Calorie availability per capita, which increased before the adjustment period, from a 2,600 per capita level to around 2,900 in 1982/83, declined to a level of 2,800 by 1987 (Panel 6F). Food consumption declined in the 1984 to 1988 period, but remained unchanged for the rest of the decade. Overall, the proportion of the population with inadequate access to food was estimated by FAO to be unchanged between 1980 to 1990, at around 14−15%. The slide was somewhat stemmed by the end of the decade, particularly in Mexico, which registered a significant rebound in per caput food production in 1990.

Hyperinflation in the mid−to−late 1980s badly hit standards of living − for example, in Mexico, the consumer price index in 1990 was 120 times that of 1980. Food prices were equally affected, but at least not worse than general inflation − the FPI/CPI ratio actually fell during the 1980s in Mexico (see Volume II).

Measures to protect the well−being of the poor (particularly children and pregnant women) from the severe economic shocks differed among countries in the region. In Mexico, general food subsidies were replaced with targeted interventions such as the Tortibonos (tortilla) programme introduced in 1986, which was targeted to low−income households based on minimum wages, and the Liconsa subsidized milk programme in urban neighborhoods. In Jamaica, food stamps were issued to draw cornmeal, rice, and dry milk. Direct maternal and child health and food programmes were also in place in Costa Rica, Honduras, Guatemala, El Salvador, and Panama. However, in Haiti and the Dominican Republic, direct MCH and food programmes were very small in relation to the magnitude of the nutrition problems.

Coverage of such direct programmes was quite high. In Mexico and Jamaica, feeding programmes covered 44% and 57% of all preschoolers, respectively − a far higher proportion than the estimated preschool underweight prevalences of 14% and 13% in 1980, respectively. Coverage in the school−aged population is even higher − averaging 68% in Honduras, 82% in Guatemala, and 96% in Costa Rica in the mid−1980s. Other countries, by contrast, have low levels of direct feeding programme coverage of preschoolers, e.g., 2% in Haiti, 14% in El Salvador, and 10% in the Dominican Republic.

Government expenditures on health fell in absolute terms in the 1980s, generally in line with the total government budget. The most severe decline was in Mexico, where the 1988 total budget for health care institutions was only 47% of the level in 1981. These cutbacks generated a movement towards making health care more cost–effective. WHO estimated that the coverage of people with health care increased from 51% to 91% in Mexico between 1982 and 1987, and 52% to 86% in the region as a whole for the period 1983–85 to 1988–91. Specific programmes such as immunization of infants against measles increased on average from 34% in 1983 to 77% in 1991 (Panel 6C), and had nearly universal coverage in Cuba, the Dominican Republic, Panama, and Costa Rica by 1991. Immunization of pregnant mothers against tetanus covered 38% in 1991, up from only 14% in 1983. These programmes partly explain the general decline in the regional IMR, which is estimated to have fallen to a 1990 level of 47 per 1,000 live births, down from 68 in 1975.

There were other positive developments in the health sector. The high coverage of deliveries by trained personnel in the region contributed to the relatively lower levels of maternal mortality, estimated at around 237 per 100,000 live births in 1983 (220 in Caribbean and 240 in Central America) (Panel 6L). In the latest estimates by WHO, the overall regional maternal mortality fell to around 180 per 1,000 by 1988, with dramatic declines, particularly in Mexico. These are levels which are about one–half those seen in Asia and only one–third of those in Sub–Saharan Africa.

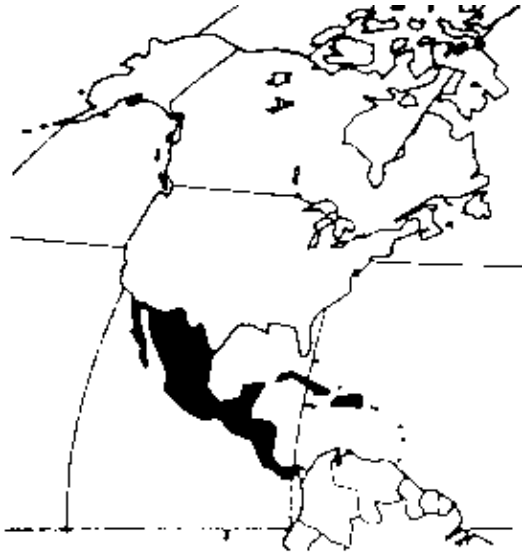
Generally, initiation and duration of breastfeeding probably improved during the 1980s – this was demonstrated in Mexico.

Another factor associated with the relatively better nutrition of children in the region is the high literacy levels of women – above 90% in Costa Rica and Mexico, and about 75% in the Dominican Republic, Guatemala, and El Salvador. The average female enrollment in the secondary schools was 49% in 1990, up from 34% in 1975. The female literacy rates are very high. One striking characteristic of education in the region is that there are virtually no differences between male and female literacy rates in most of the countries.

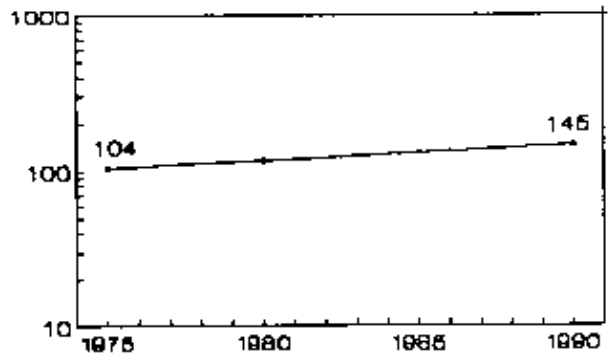
Recent statistics indicate that the proportion of female–headed households is rising in some parts of the region. In Cuba, statistics available for the mid–1980s indicate that 28% of households are female–headed, 44% in Barbados, 25% in Trinidad and Tobago, 18% in Costa Rica, and 15% in Guatemala. In the Dominican Republic, it was shown from recent studies that children in female–headed households tend to be more at risk of malnutrition compared to male–headed households; but the opposite has been indicated in Jamaica.

Improvements in nutrition slowed down in the latter 1980s, in line with economic problems. Future prospects depend heavily on restarting economic growth. At the same time, the extensive outreach of health care, and relatively good access to food, as well as falling fertility rates, are factors in favour of renewed improvements in nutritional status. On the other hand, levels of malnutrition as measured by underweight children are already relatively low, and bringing these down to the levels of developed countries may require more effective targeting of existing programmes, and special efforts of outreach to the remote and the poor.

Panel 6 MIDDLE AMERICA AND CARIBBEAN

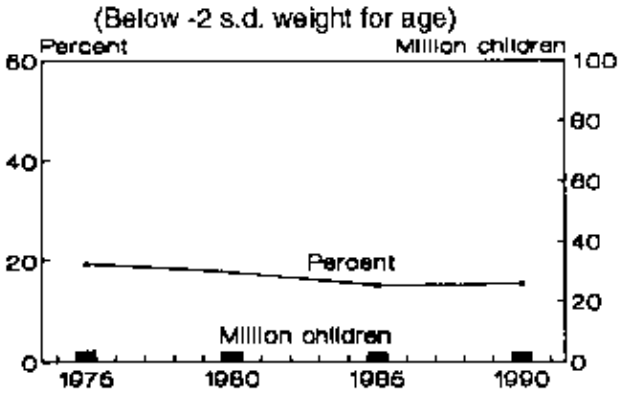


POPULATION

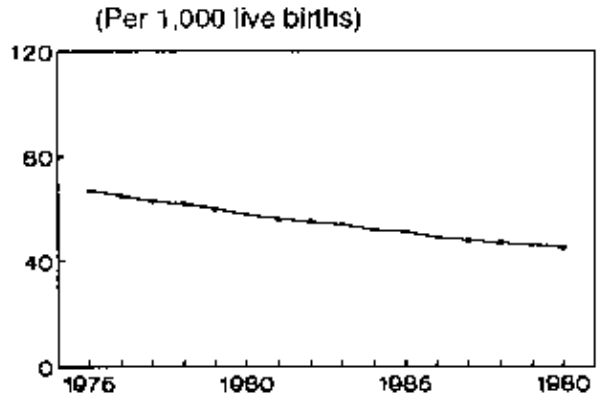


A. Million, log scale

CHILD GROWTH AND SURVIVAL

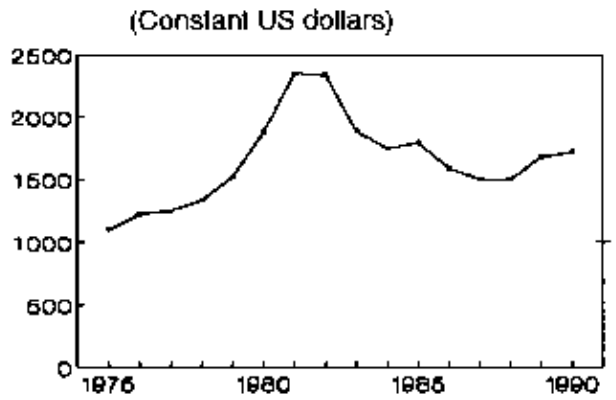


B. Underweight preschool children



C. Infant mortality rate

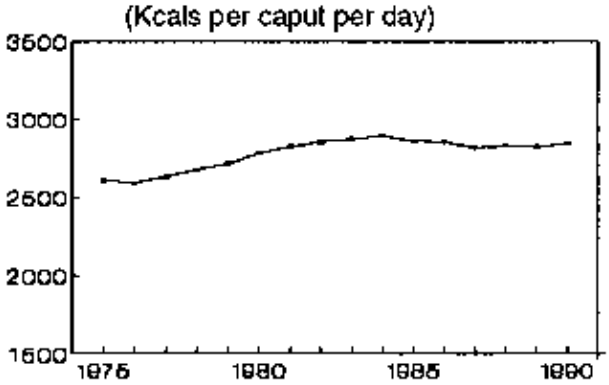
ECONOMICS



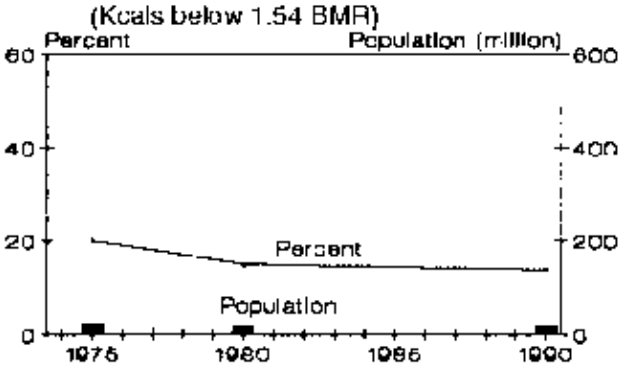
D. GNP per capita

E. Debt service ratio

FOOD

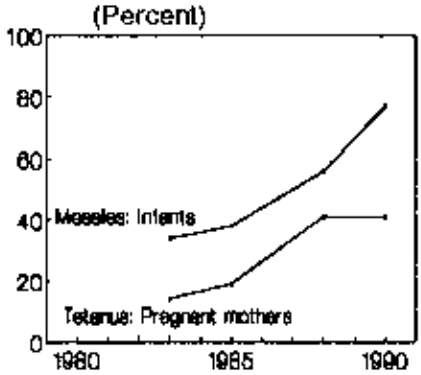


F. Dietary energy supply

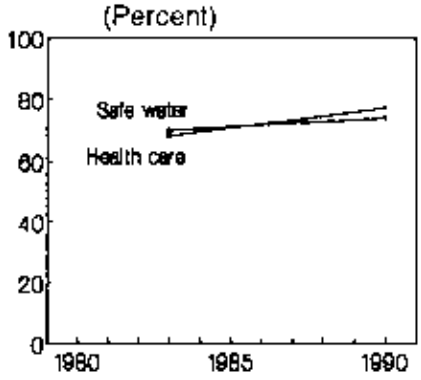


G. Underfed population

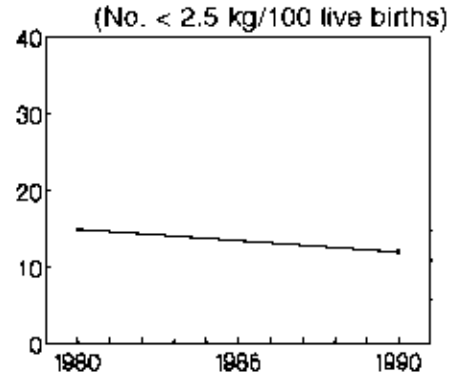
HEALTH



H. Immunization coverage

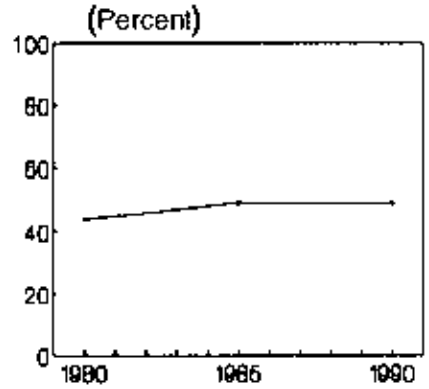


I. Access to health services and potable water

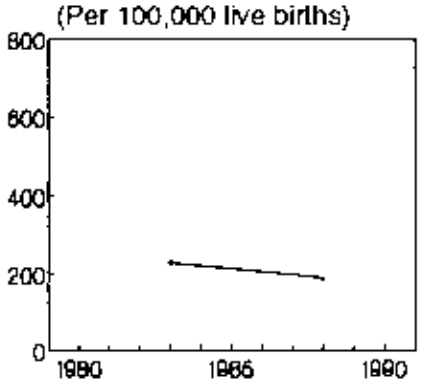


J. Low birth weight

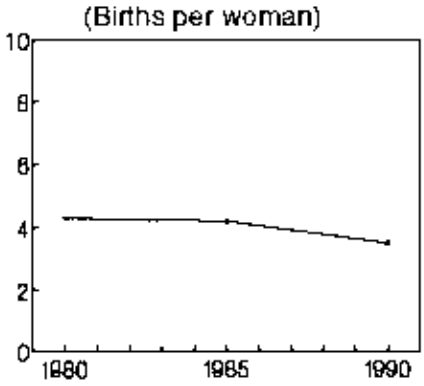
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

South America

(Panel 7)

The underlying trend in nutrition in South America was for definite improvement in me late 1970s, slowing substantially in the 1980s, or even becoming static in some countries. Direct assessments from national surveys in Brazil, 1975 and 1989, were of considerable importance in identifying long–term improving trends in child growth in the region. The likelihood is that much of the improvement was in the first part of this period, and in fact recent economic problems may threaten to reverse some of the gains (Panel 7B). Falling underweight prevalences were directly observed in Bolivia, Colombia, and Venezuela, and in Chile there was a steady reduction in IMRs; these generally occurred in the face of economic hardship, and are in line with the Brazil results. Thus despite severe economic shocks in the 1980s, the region showed remarkable resilience in terms of nutrition. Part of the reason may be that underlying trends in literacy, in health infrastructure, and in falling fertility rates (Panel 7M) protected nutrition. Certainly, the nutrition results are in line with observations of infant mortality rates (Panel 7C).

The level of underweight prevalence is the lowest of the developing world, around 8%. Noting that 2.5% prevalence is expected in developed countries and in the standards, there is not far to go in the region, on average, before child growth failure as a widespread problem is a thing of the past. On the other hand, there are large areas and populations, such as North East Brazil, which remain highly vulnerable, and events in the next several years will determine what happens. Absolute numbers of underweight children remained practically the same at around three million during the 1980s.

Overall, regional rates of low birth weight were estimated at 12% in 1983 and declined to 10% in 1990. Estimates by WHO/UNICEF indicate some improvements in Bolivia between 1983–85 to 1988–91, and remain unchanged in Chile, Paraguay, and Venezuela.

Infant mortality rates in the region in 1990 were estimated at 55 per 1,000 live births, compared to 61 in 1983 and 75 in 1975. Although the levels attained in Chile (20 per 1,000 in 1989) parallel those in many developed countries, other countries in the region have very much higher rates. Bolivia, for example, is reported at 110 per 1,000 in 1989, the highest in the South American region. Peru's IMR is also high at 88 per 1,000.

The economic shocks in the early 1980s, brought about by the debt crisis and international recession, deeply affected the economic well–being of many South American countries. Brazil, Bolivia, Chile, and Colombia faced crises before 1985, followed by Argentina, Ecuador, and Uruguay. Brazil, for example, had a falling real per caput GDP between 1980 and 1984, which recovered to the level of 1980 by 1988; hyperinflation began in 1987, although food prices, if anything, fell as a proportion of the consumer price index. Structural adjustment programmes were introduced in many countries, aimed at reducing imports and government expenditures, in order to stabilize economic conditions and restructure the economies to higher growth paths. Most countries had extremely high debt service ratios – the regional average rising as high as 65% in 1982, and subsequently falling. This peak of 65% debt service ratio was substantially higher than any other region, the nearest being Middle America in the late 1970s, reaching nearly 55%.

With national incomes fluctuating throughout the 1980s, and hardly increasing on average, the population in poverty also varied. Studies by me World Bank indicate that the level of incidence of poverty in Brazil rose from 17% in 1980 to 30% in 1983 at the start of the structural adjustments, then fell later to around 24% in

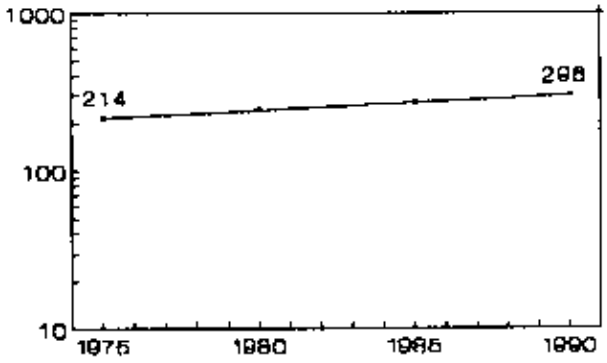
1987. Other studies (e.g., ECLAC, 1990), using a different cutoff, indicated, however, that there was virtually no change comparing 1979 and 1987 in Brazil, nor in Colombia, but rising poverty in Peru, Venezuela, and Uruguay in the same period. Rural areas appear to have been disproportionately affected by the rise in poverty in the latter countries.

FAO's recent estimates indicate mat the proportion of underfed populations increased slightly in the 1980s – averaging 12% to 13%. Overall, regional food supply per capita recovered from a severe slump in 1985. The calorie availability estimated by FAO indicates a regional level of calorie per capita of 2,670 in 1990, up slightly from 2,600 calories in 1985. These averages hide considerable variations of consumption patterns among and within countries. While Brazil, Ecuador, and Colombia had higher calorie availability in 1989 compared to 1980, Chile, Paraguay, and Venezuela suffered slight declines. For the first time in 20 years, Bolivia's calorie availability per capita fell below 2,000 per day in 1989.

The structural adjustments also had the effect of contracting total social spending of the public sector, although most recovered. Central government expenditures on health (as a percentage of total expenditures) were protected in some countries, while in others, the levels were restored following cutbacks in the early years of the crisis. PAHO (1990) reported that public health services were not curtailed during me crisis, and scarce resources did not generally translate into fewer consultations or admissions.

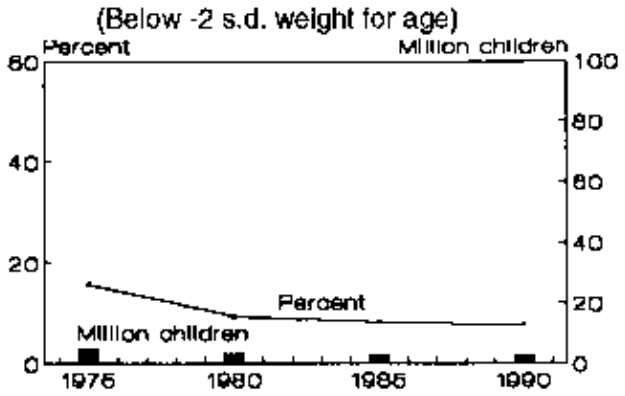
Panel 7 SOUTH AMERICA

POPULATION

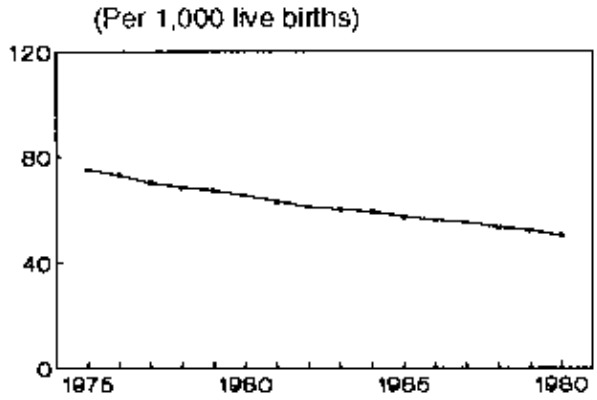


A. Million, log scale

CHILD GROWTH AND SURVIVAL

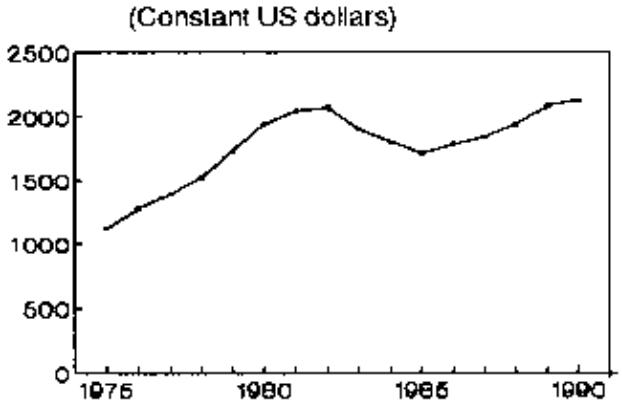


B. Underweight preschool children

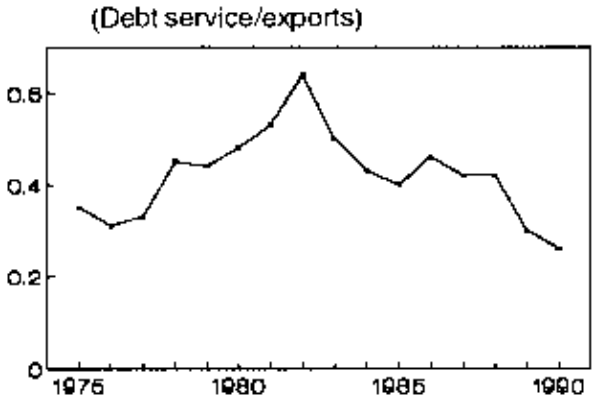


C. Infant mortality rate

ECONOMICS

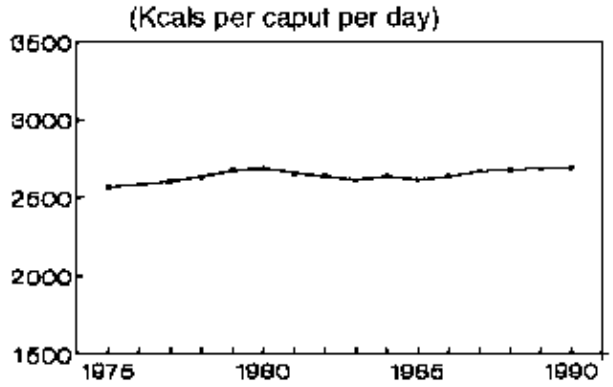


D. GNP per capita

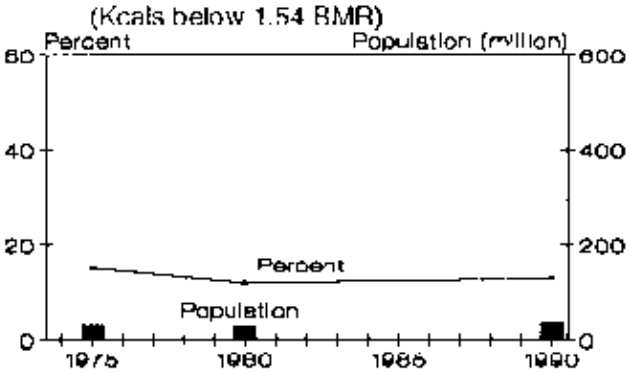


E. Debt service ratio

FOOD

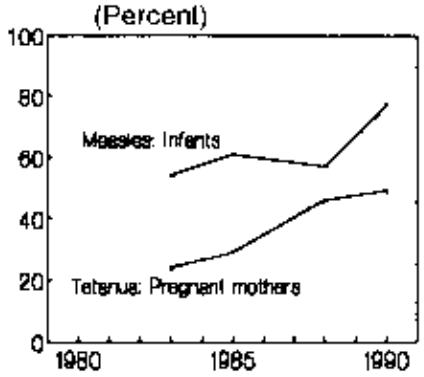


F. Dietary energy supply

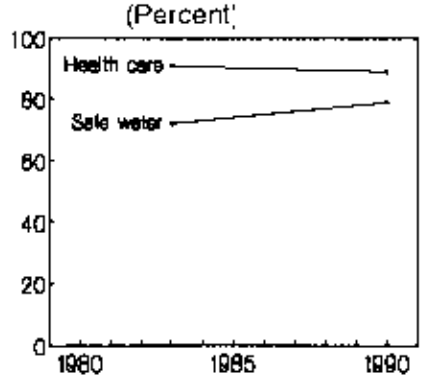


G. Underfed population

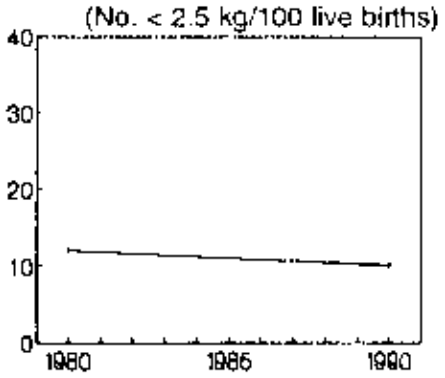
HEALTH



H. Immunization coverage

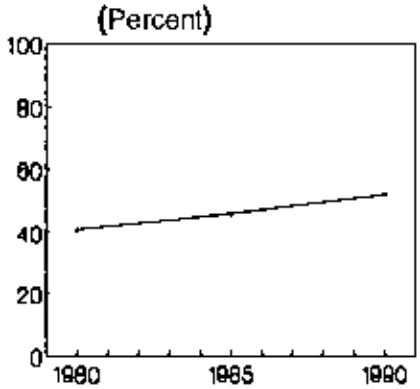


I. Access to health services and potable water

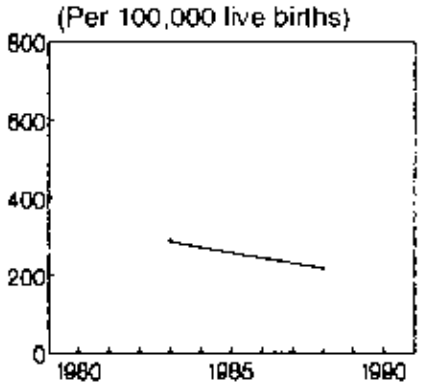


J. Low birth weight

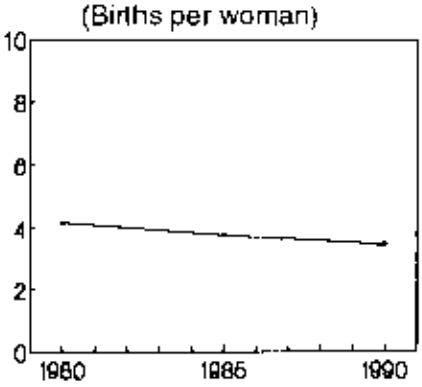
WOMEN'S STATUS AND CARING CAPACITY



K. School–age females in secondary school



L. Maternal mortality rate



M. Total fertility rate

For many countries, it was reported that governments faced with serious cutbacks in available resources were able to increase the efficiency of public services, such as those of health and nutrition. In Peru, for example, 84% of preschool children and 77% of primary school children were covered by some form of food aid or

supplementary feeding programmes in mid−1980s, while only 13% of preschool children were underweight. Overall regional coverage by supplementary feeding for preschoolers was about 50%, and 64% for primary school children, in the 1980s. This implies a large scope existed for re−targeting in the face of fiscal constraints without necessarily jeopardizing the outreach to the 8% of underweight preschoolers in the region as a whole.

Health care coverage also was reported to have been relatively protected during the economic difficulties of the 1980s. From a survey of several countries in the region, WHO reported that most did not curtail coverage between 1984 and 1990. Levels of coverage remained high, around 95% in Chile, 88% in Colombia, and 80% in Ecuador. Immunization against measles actually increased overall for the region (Panel 7H), from 54% in 1983 to 77% in 1991 − reaching near universal coverage levels for Argentina and Chile and above 80% for Colombia and Uruguay, but lower in Bolivia, Peru, and Ecuador. The number of pregnant women immunized against tetanus increased by nearly threefold between 1983 and 1991. Immunization against polio, BCG, and DPT improved in coverage.

Maternal mortality rates declined from 290 per 100,000 live births in 1983 to 220 in 1988, according to recent data from WHO. This trend can be partly explained by the increase in the proportion of women receiving antenatal care by trained personnel (for example 49% in 1983 compared to 71% in 1991 in Ecuador, 46% to 60% in Peru) and the proportion of women receiving delivery care by trained personnel, which rose from 69% to 82% in Paraguay, and was maintained at 93% level in Chile, and 73% in Brazil, in the same period. Fertility rates continued to fall during the 1980s, from around four births per women to just over three. This had multiple benefits for women themselves, and, as dependency ratios declined, for households, with the possibility of channelling more resources to each child.

Breastfeeding initiation and duration tended to increase between the 1970s and the 1980s (comparing WFS and DHS). Moreover, the positive benefit of education was again seen, the improving trends in breastfeeding being greater in the better educated groups. For example, in Peru, the median duration of breastfeeding remained at around 11 months in urban areas and 19 months in rural areas, but this measure increased from 12 to 16 months in those mothers with four to six years education, and from six to ten months in those with seven plus years. Similar patterns were seen elsewhere.

Female literacy in the region is among the highest in the developing world (above 75%), and the trends appear to be improving, given the increasing percent of female enrollment in the secondary schools, e.g., in Chile 74% in 1990 compared to 55% in 1980, in Uruguay from 60% to 74% in the same period. There is a slight difference in literacy between males and females, but not as high as most other developing regions in the world.

If the trend of improvement in the 1970s were restarted in the 1990s, the problem of underweight children would be solved before the end of the century. Already, countries such as Chile, Venezuela, and Paraguay have virtually contained the problem. The prospects are likely to be determined by the strength of the recovery from the debt crisis. Perhaps, too, the benefit from the decline in fertility has bottomed out already. Adjustments “with a human face” comprise much of the restructuring that continues in the region. The WB and IMF have encouraged governments to put aside a substantial portion of budgets from other sectors (for example, proceeds from the privatization schemes) into “social funds” to be used to protect vulnerable groups. Brazil, Bolivia, and Venezuela are examples of such countries. For the most part, the response of governments in the region to economic crisis were responsible for the protection of nutrition.

This region would then become the first among developing countries to have effectively dealt with its problems of undernutrition. Much depends upon continued stability and economic growth. Underlying conditions are good, in terms of health infrastructure, falling fertility rates, and high immunization rates, as well as a relatively good food availability. On the other hand, many countries in South America were badly affected by economic recession in the 1980s, and it is important that the recovery of the late 1980s continues. Better targeting of available resources will be important. The concern is that there are large areas, such as North East Brazil and the Andean altiplano, that are relatively much poorer and less accessible than the rest of the region. These may lag behind the development elsewhere, with continuing nutritional problems.

Chapter 3: Micronutrients

Deficiencies in the intake or absorption of vitamin A, iron, and iodine have serious consequences for health and mental and physical function. The clinical manifestations of these nutritional deficiencies − such as

xerophthalmia, anaemia, and goitre – have been identified as major problems with increasing public health significance. This chapter summarizes what is known about trends in micronutrient malnutrition, focussing on these three most prevalent known deficiencies. Other micronutrient deficiencies – of vitamin C, thiamine and niacin – are also briefly referred to.

Vitamin A Deficiency

The most obvious results of vitamin A deficiency are progressive damage to the eye, eventually leading to blindness. The general term for this is “xerophthalmia”, which ranges from the mildest form, night blindness, through reversible signs in the eye, to ulceration and destruction of the cornea, thence blindness. The eye is the most observable tissue damaged by vitamin A deficiency, and progressive damage to other membranes probably occurs, unobserved, in parallel with the eye damage. Increased ill health and mortality have long been associated with vitamin A deficiency, and in recent years intervention trials have established with increasing certainty that providing vitamin A to young children in areas where the deficiency exists, has a significant effect on mortality, of around 30 percent reduction. These effects are observed in children who do not necessarily have eye signs, but may have sub–clinical deficiency. Assessment of vitamin A deficiency is most commonly feasible from clinical signs of eye damage. Dietary surveys and food balance sheet data can also be used to assess the supply of vitamin A in the diet. Vitamin A itself may be preformed in the diet from animal sources, or obtained from carotenes from vegetable sources; the unit, allowing for differential conversion to vitamin A and absorption, is retinol equivalents in mcg.

WHO reported that in 1991 nearly 14 million preschool children had eye damage due to vitamin A deficiency (WHO, 1992c). Around 10 million of these children are located in Asia. The geographical distribution by WHO regional groupings is given in Table 3.1, and mapped in Figure 3.1. Each year it is estimated mat between 250,000 to 500,000 preschool children go blind from vitamin A deficiency. About two–thirds of these children die within months of going blind.

The total number of preschool children living in areas where they are at risk of vitamin A deficiency is estimated by WHO at around 190 million, see Table 3.1. This number increases greatly if other age groups in areas known to be vitamin A deficient are included, such as school age children and women of child–bearing age.

Vitamin A deficiency, defined by eye signs, has been identified as a widespread public health problem in 37 countries worldwide (see Figure 3.1). In countries in which xerophthalmia is endemic, the dietary supply of retinol (mcg/caput/day) estimated from FAO data is often extremely low. Minimum average requirements are around 250 mcg retinol equivalents (RE)/caput/day. As examples, in Mozambique average availability is estimated as 200 mcg RE/caput/day; in Zambia, 290 mcg/caput/day; in Bangladesh, 240 mcg/caput/day. These average supplies are therefore probably below average requirement, making the existence of vitamin A deficiency inevitable in the population. Nonetheless, overall national retinol supply is not always the principal constraint. In 10 of the 37 countries, average supply was above 600 mcg RE/caput/day, and maldistribution of the available supplies is clearly involved. This is particularly the case in those countries that appear to have ample vitamin A because of red palm oil, the production and consumption of which tends to be localized, and not reach deficient areas.

Demand for vitamin A behaves differently to that for overall food intake, or calories, for a number of reasons. Firstly, vitamin A is only present in a limited number of foods especially fruits and vegetables; although these tend to be cheap, they are often subject to considerable seasonal fluctuation. Secondly, whilst appetite affects the demand for food, adequacy of vitamin A in the diet is not directly sensed. Intakes of foods rich in vitamin A thus do not respond to changes in either income or food prices in the same way as calories do. Such considerations mean that, on the one hand, vitamin A distribution does not necessarily follow income distribution or trends; on the other hand, through marketing, promotion, and consumer education, it may be possible to improve the adequacy of vitamin A dietary intake relatively cheaply.

Table 3.1 Populations at Risk of and Affected by Vitamin A Deficiency, by WHO Region, 1991

(Million pre–school children)

	Vitamin A deficiency

WHO region	*Total pre–school child population in countries where xerophthalmia exists*	*Estimated number with xerophthalmia*
Africa	18	1.3
Americas	2	0.1
Southeast Asia	138	10.0
Europe	–	–
Eastern Mediterranean	13	1.0
Western Pacific	19	1.4
Total	190	13.8

Source: WHO 1992c.

The supply of vitamin A estimated from FAO's food balance sheets indicates an improving trend for most developing countries in the last 20 years, with the notable exception of Sub–Saharan Africa. The data are shown in Figure 3.2. Countries in the Middle East and North Africa, Middle America and Caribbean, and South America, achieved levels likely to be substantially above average requirements, by the late 1980s. Vitamin A supply is increasing quite rapidly in South East Asia, to the point where it now exceeds average requirements. Vitamin A deficiency persists in this region, but the increase in supply should give potential for redistribution to begin to eliminate the deficiency. In South Asia overall supplies are particularly low, and not rising very fast. This is in line with the observation of quite extensive deficiency in this region, and the slow rate of improvement indicates particular urgency for dietary modification and promotion of consumption of higher retinol–containing diets.

The vitamin A situation in Africa requires closer examination. First, it is essential to distinguish between those countries where red palm oil is produced – in West Africa – and the other countries. This is shown in the bottom part of Figure 3.2. When this is done, it becomes clear that East and Southern Africa have very low availabilities of vitamin A, in Southern Africa probably on average below requirement, so that here vitamin A deficiency is likely to be widespread. Added to this, there are some indications that the overall supply is actually decreasing in East Africa, which would exacerbate the problem. In West Africa and the Sahel the apparently high availability does not preclude the co–existence of deficiency, as is indicated in the map in Figure 3.1. As noted above, this is related to the fact that red palm oil is not marketed all that widely in a number of these countries.

The retinol supply assessed from food balance sheets should, however, be treated only as potential supply. Effective levels of physiological intake are determined by many factors including the state of maturation of certain fruits and vegetables, effects of dietary fats on the intestinal absorption of Vitamin A, and intake of enriched foods. In 1986–88, the developing regions of the world derived more than 70 percent of vitamin A from plant sources. These include green leafy vegetables, carrots, various fruits, sweet potatoes, and palm oil. In contrast, developed countries got only 45 percent of vitamin A from food of vegetable origin. The proportion coming from animal products tends to be more in higher income countries. Countries in Middle and South America which have incomes above $2000 per capita derive about half of the total retinol supply from animals, compared to only 14 percent in Southeast Asia, a region with a per capita income of $850 on average in 1988. As countries develop, diet diversifies, mostly into consumption of more meat and fish, milk products, eggs and butter.

Growth in vitamin A availability in South Asia, South East Asia and Middle East/North Africa was explained largely by the increases in vegetable sources of the vitamin (e.g. palm oil in Malaysia), whereas the increases in China and Middle America were due primarily to increases in availability from animal sources. The elimination of Vitamin A deficiency problems has recently been adopted as one of the goals for the 1990s by the World Summit for Children (1990) and the Montreal Conference on Micronutrient Malnutrition (1991). WHO reported that programmes were in operation in 44 countries in 1991, while another 49 countries were making plans for implementing action programmes. This is markedly higher in terms of number of countries and in coverage than 1987, when only eight such countries had programmes in place.

Iron Deficiency

Iron deficiency is the commonest nutritional disorder in the world and affects over one billion people, particularly reproductive–aged women and preschool children in tropical and sub–tropical zones; it also has a serious impact on school children and working males. If uncorrected it leads to anaemia of increasing severity, reduced work capacity, diminished learning ability, increased susceptibility to infection and greater risk of death associated with pregnancy and childbirth. It results from consuming diets with insufficient iron, reduced dietary iron availability, increased iron requirements to meet reproductive demands, and losses due to parasitic infections; these factors often operate concurrently.

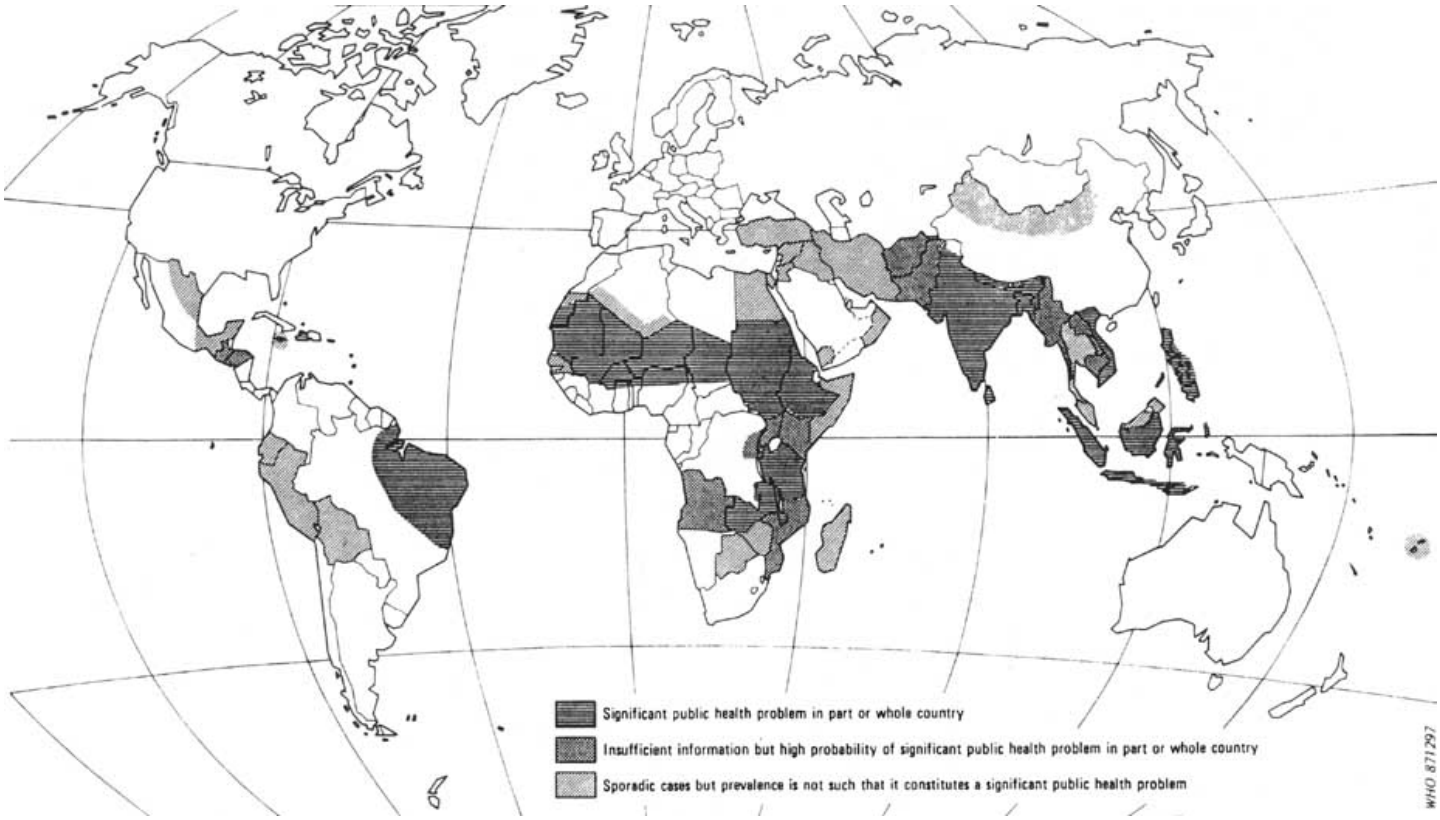


Figure 3.1 Geographical distribution of xerophthalmia, 1987

Source: **WHO (1987)**

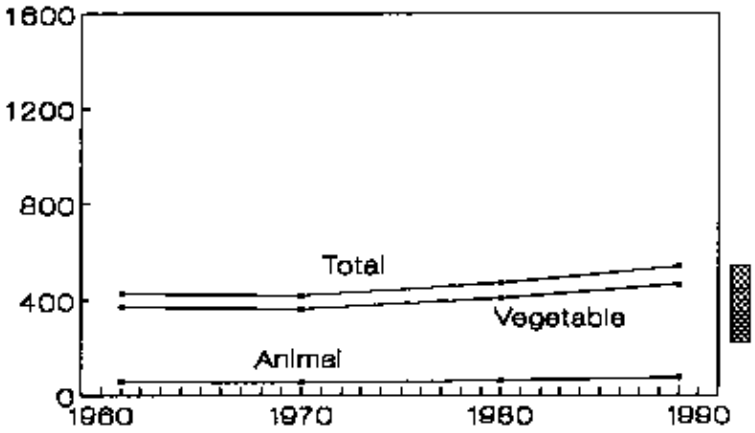


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – A. South Asia

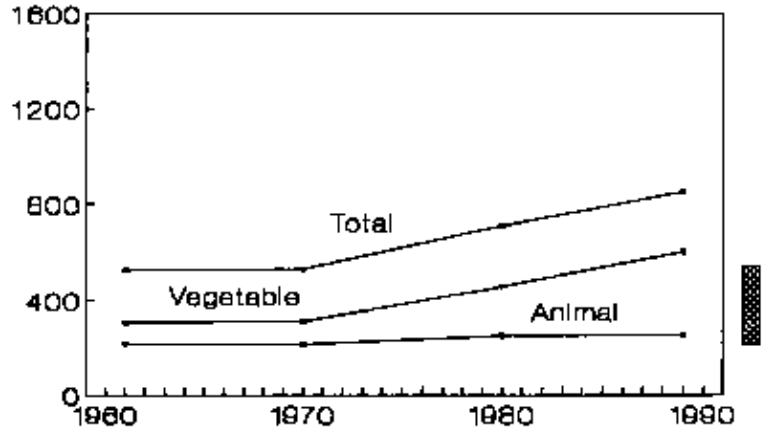


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – B. Near East and North Africa

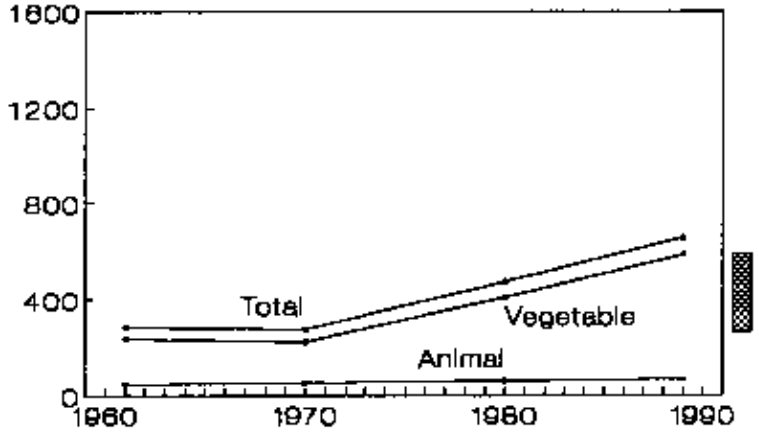


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – C. South East Asia

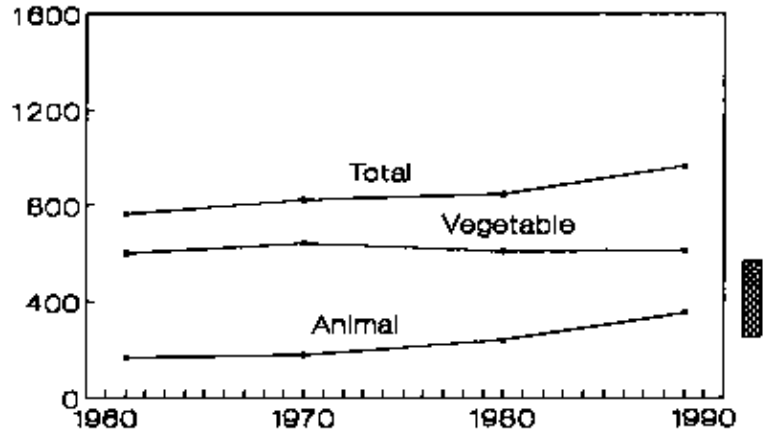


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – D. China

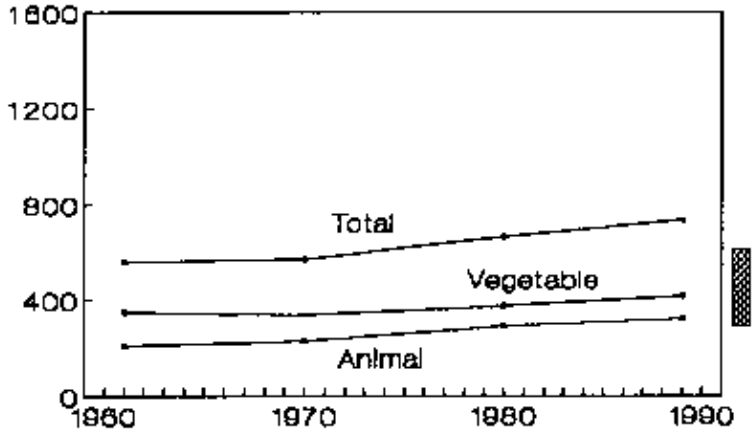


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – E. Middle America & Caribbean

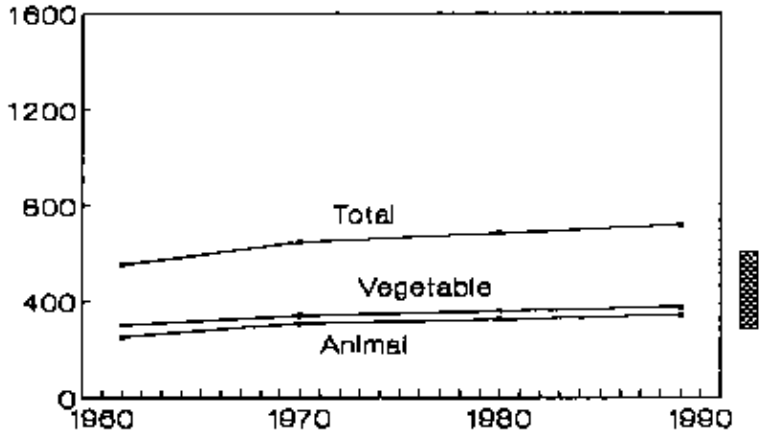


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – F. South America

AFRICA SUB–REGIONS

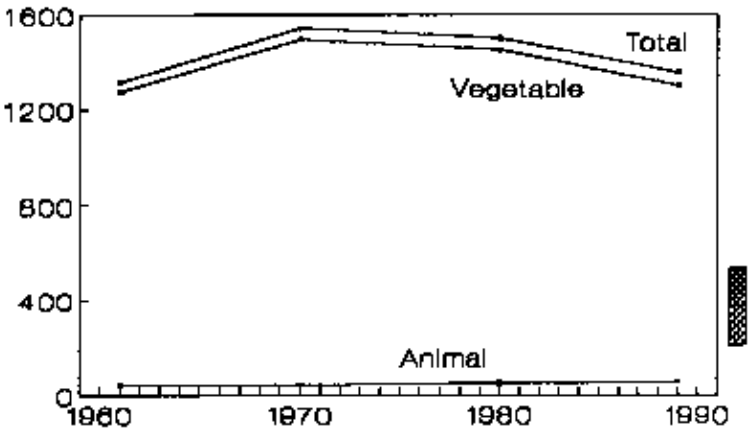


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – G. Sahelian Region

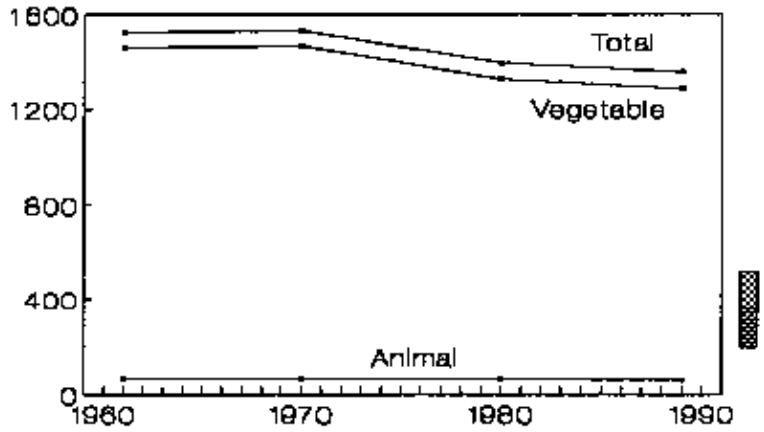


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – H. West Africa

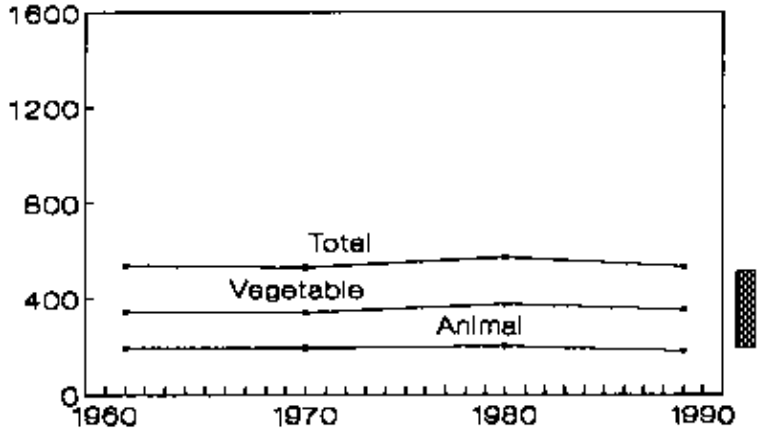


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – I. East Africa

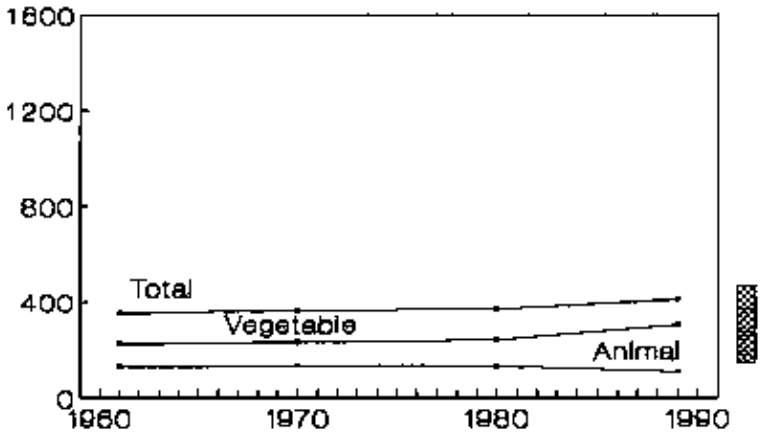


Figure 3.2. Vitamin A supply, 1961 –1989 (Retinol equivalent per caput per day) – J. Southern Africa

Source: Calculated from FAO data, see Chapter 7.

Note: The band shown, for guidance in interpretation, is from 250 to 550 mcg retinol equivalents/caput/day. This is based on Tables 4.1 and 4.4 of FAO/WHO, 1988. 250 mcg approximates to the “base requirement” weighted by a typical age–sex distribution in the population. The upper bound of 550 mcg is approximately the population–weighted “safe level” of intake, usually applied to individuals and likely to be above the mean population requirements. For further discussion, see technical notes in Volume II.

Anaemia is thus a serious outcome of iron deficiency. Since there are multiple causes of anaemia, and since iron deficiency can exist without haemoglobin levels being lowered, there are potentially four different situations, or populations: those anaemic and iron deficient; those iron deficient but not (yet) anaemic; those anaemic not due to iron deficiency; and those iron replete and with normal haemoglobin. Causes of anaemia

other than iron deficiency often include malaria, intestinal parasites, other nutrient deficiencies such as folate and vitamin B12, and genetically determined haemoglobinopathies such as thalassemia. It is generally held that at least half of the anaemia worldwide is directly due to dietary iron deficiency. On the other hand, there is emerging evidence that low iron stores, even in the absence of anaemia, are also related to functional disadvantages, in cognitive development, learning and behaviour. The extent of this problem has not been widely determined. However, anaemia prevalences are reasonably well established, and can generally be taken as an indicator of the extent and trends of iron deficiency. These distinctions are further discussed in the technical notes, but here we concentrate on anaemia as assessed by low haemoglobin, with cutoffs determined by WHO (bearing in mind that much of this is due to iron deficiency, although the precise amount is unknown); and the dietary supply of iron taken from FAO food balance sheet data.

Estimates of the extent of anaemia are shown in Table 3.2. These are taken from the database compiled by ACC/SCN to assess the nutritional status of women, described more extensively in Chapter 4. Results here are given by the same regions as used elsewhere in this report, and refer to anaemia in women of reproductive age (15–49 years old). The overall prevalence for women in developing countries is estimated at 42 percent, equivalent to just over 370 million women; in pregnant women (with a cut off of 11g/dl haemoglobin) the prevalence is estimated at 51 percent, and in non–pregnant women at 41 percent (cut off 12g/dl). These results are almost identical to those calculated by WHO (WHO, 1992d; with different regional groupings), which estimate 44 percent prevalence for all women in developing countries, with 56 percent prevalence for pregnant women and 43 percent for non–pregnant. While there is considerable variation in prevalence by region – from around 64 percent in South Asia to 23 percent in South America, by the SCN results – it is striking that anaemia is prevalent throughout the developing world. The geographical distribution is shown in Figure 3.3, from WHO data. Nearly half the total number of anaemic women are in South Asia.

These new estimates now also cover China, updating the figures in the First Report on the World Nutrition Situation (ACC/SCN, 1987). The current figures confirm that levels of anaemia worldwide are very high, but indicate little global change (excluding China) since the previous assessment. This may partly be because of scarcity of data. In the two regions where survey results extend across the last 15 years, Sub–Saharan Africa and South Asia, there are some indications that the prevalence of anaemia is, if anything, increasing, as discussed in Chapter 4 (see Figure 4.8). Relating trends in anaemia to estimates of iron availability does give a consistent picture, as will be indicated in Table 3.3.

Table 3.2 Prevalence of Anaemia in Women (15–49 years old) by Region, in 1980s

	Pregnant[a]		*Non–pregnant*[b]		*All*	
	Percent	*Million*[c]	*Percent*	*Million*[c]	*Percent*	*Million*[c]
Sub–Saharan Africa	50	6	40	35	42	41
Near East/North Africa	44	2	31	13	33	15
South Asia	64	19	64	139	64	158
South East Asia	56	8	47	49	48	57
China	34	11	26	64	26	75
Middle America/Caribbean	34	1	27	8	28	9
South America	31	3	21	12	23	15
Total (all regions above)	51	50	41	320	42	370

a. Proportion and numbers with haemoglobin below 11 g/dl.

b. Proportion and numbers with haemoglobin below 12 g/dl.

c. Numbers are based on population estimates for 1985 (UN. 1991) in developing countries.

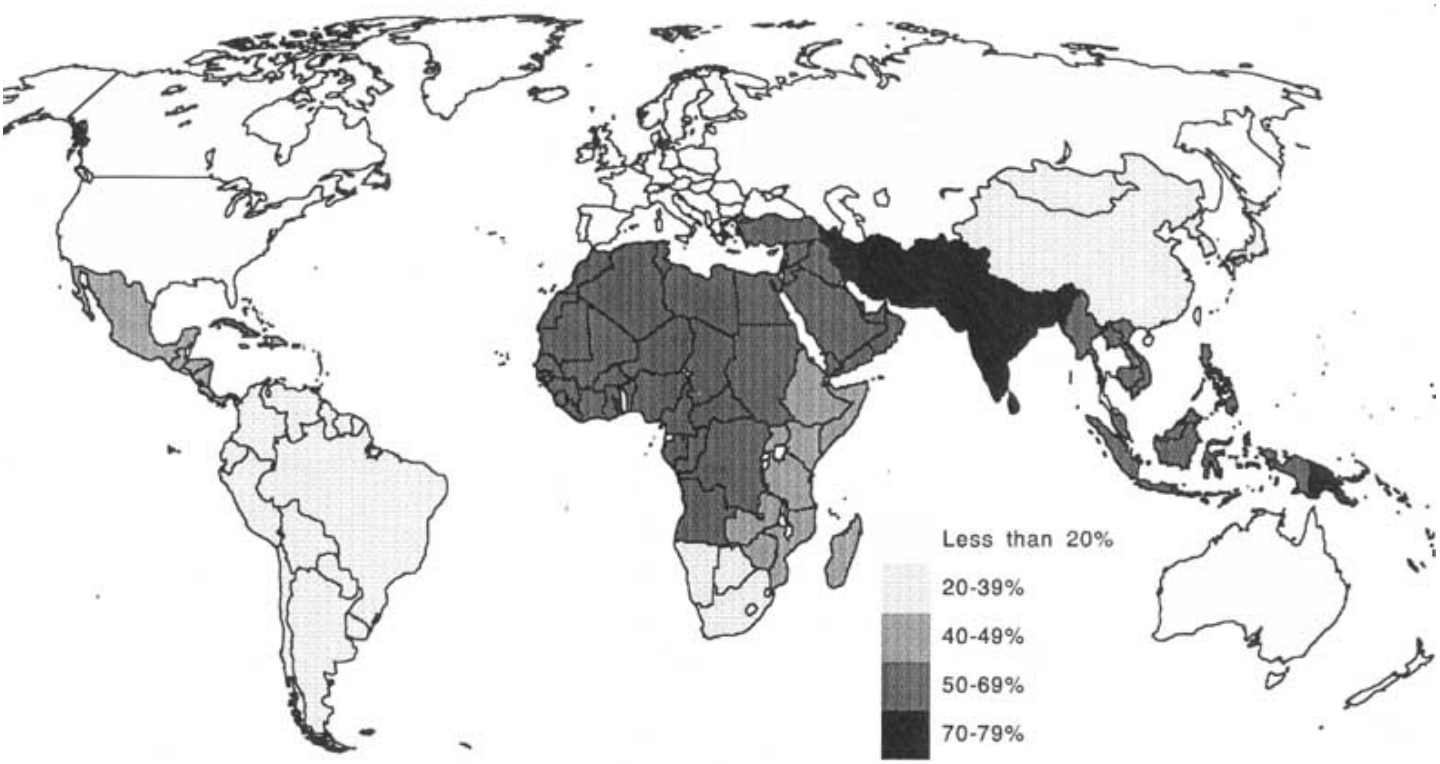


Figure 3.3 Prevalence of anaemia in pregnant women (1988)

Source: **WHO, 1992d**

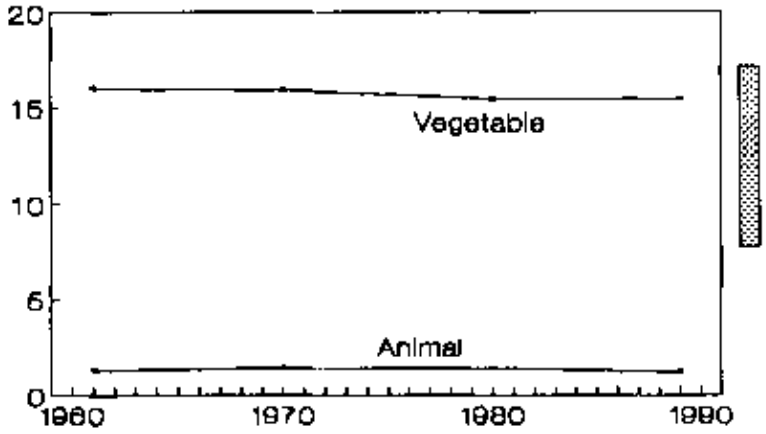


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – A. Sub–Saharan Africa

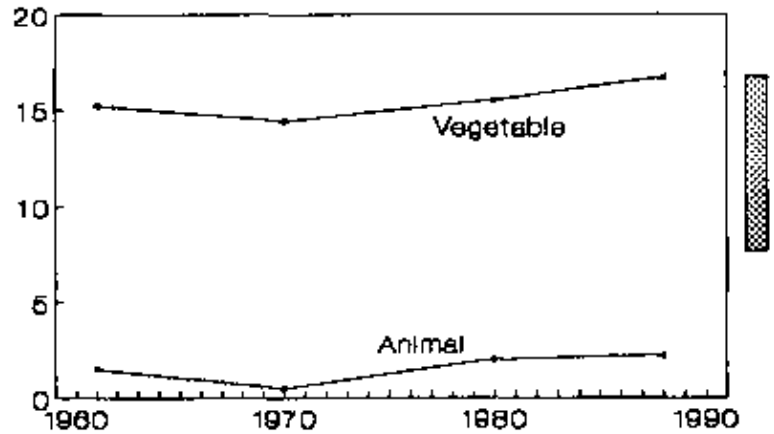


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – B. Near East and North Africa

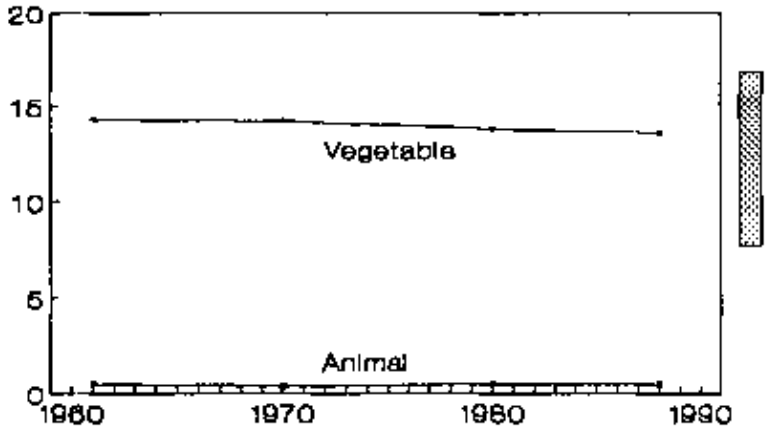


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – C. South Asia

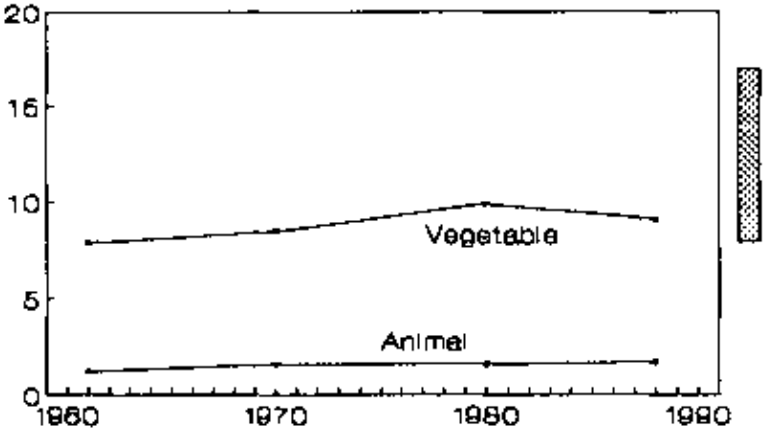


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – D. South East Asia

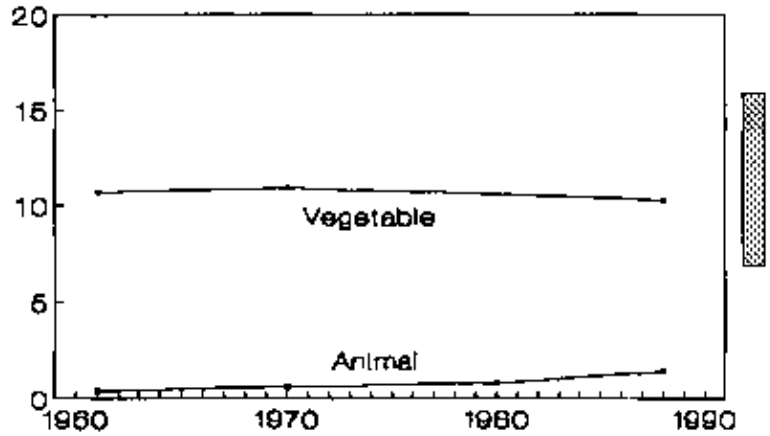


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – E. China

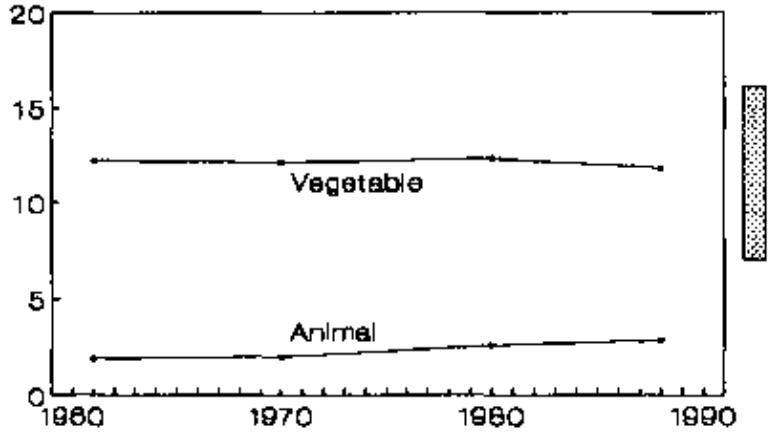


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – F. Middle America and Caribbean

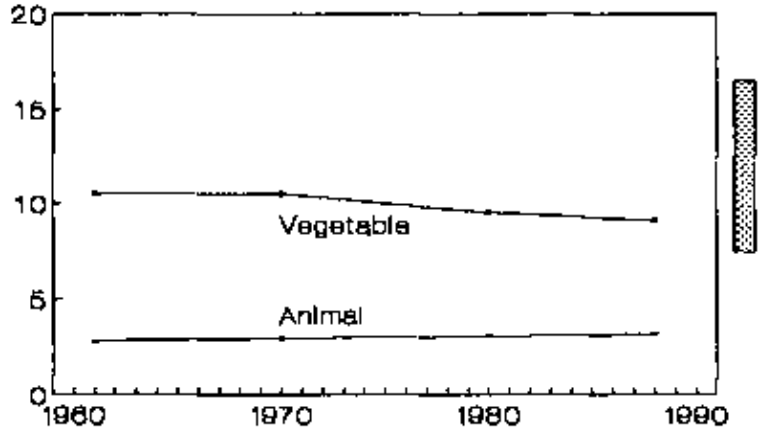


Figure 3.4. Dietary iron supply, 1961–1989 (Mg. per caput per day) – G. South America

Source: Calculated from FAO data, see Chapter 7.

Note: The band is the range of iron intake needed to prevent anaemia in women of reproductive age on low and intermediate bioavailability diets (5% bioavailability. 17 mg. per day; 10% bioavailability, 8 mg. per day). This is taken from FAO/WHO (1988), Table 5.6. The estimated dietary requirements for iron in mg. per day, taking the lowest values, which are the median requirements to prevent anaemia, by age and physiological group areas follows:

Median requirements to prevent anaemia (Mg. iron per day)										
	Infants	Children			Boys	Girls	Men	Women		
Age group (years)	(0–1)	(1–2)	(2–6)	(6–12)	(12–16)	(12–16)	(16+)	Menstruating	Post–menopausal	Lactating
Low bioavailability	11.0	6.5	7.5	12.5	19.0	22.0	12.0	17.0	10.0	16.0
Intermediate bioavailability	5.5	3.5	3.5	6.0	9.5	11.0	6.0	8.0	6.5	7.0

The main types of iron available in foods are: haem iron which is present in meat and its products and is well–absorbed; and non–haem iron which is present from food of vegetable sources, generally of low bioavailability. Iron is also provided by other animal products, such as milk, with intermediate absorption. Isotopic methods of measuring iron absorption from complete meals have increased the knowledge of how these foods are absorbed by the body. Haem iron from meat is highly bioavailable – around 20 to 30 percent being absorbed; whereas non–haem iron from cereals, pulses, fruits, vegetables, etc. has much lower bioavailability – ranging from 1 to 8 percent. The absorption of non–haem iron is highly variable and depends on the nature of the meal. Vitamin C importantly enhances iron absorption. A large number of substances inhibit the absorption particularly of non–haem iron – for example tea, coffee, egg yolk, and bran. Hence it is difficult to interpret the actual availability of iron from overall dietary data. This depends not only on the dietary

pattern itself, but also on food habits concerning composition of meals – for example drinking tea with a meal will inhibit iron absorption more than if tea follows the meal.

Dietary iron sources are distinguished between vegetable and animal in the supply data shown in Figure 3.4. Moreover, these are not added together in the figures, since with the large variations in bioavailability this might be misleading. It can be seen that in developing countries the predominant source of dietary iron is from vegetable sources, and the diets are likely to be usually of low bioavailability. In Figure 3.4 an indication of rough levels of adequacy is given, for guidance; but with the added uncertainty of distributional effects, relative levels between regions and trends are more informative.

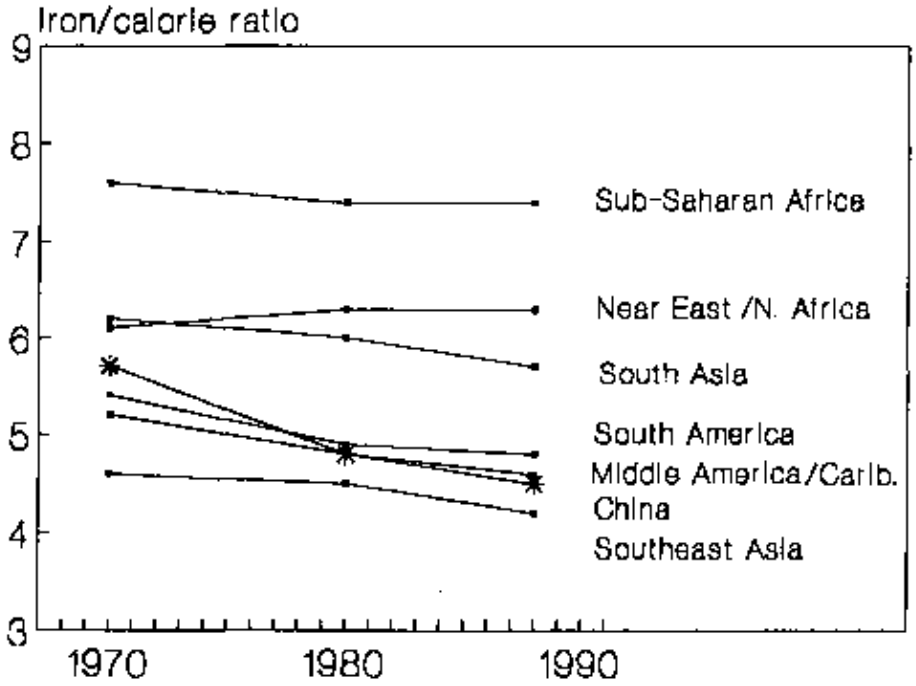


Figure 3.5 Iron density in the diet, 1970–1989 (Mg iron per 1,000 calories)

Source: Calculated from FAO (1990a).

The iron intake patterns in the various regions of the developing world (in Figure 3.4) show the dominance of non–haem iron (plant/vegetable). In China for example, out of the 11.7 mg iron consumed per day, around 10.3 mg comes from plant sources, mainly rice, wheat and vegetables. In most developing countries, the diet typically contains cereal, roots and/or tubers and only small quantities of meat, fish or ascorbic acid–rich foods. Thus, cereals and roots/tubers account for a large proportion of iron in the diet – ranging from 25 percent for those primarily dependent on roots and tubers to around 40 percent for rice, and 60 percent for those consuming millet and sorghum. The rest of the vegetable sources of iron comes from pulses, and green leafy vegetables. In Sub–Saharan Africa, and South Asia, iron supplies from animal sources are extremely low – typically accounting for about 1 mg or less per caput compared with a total of around 13–15 mg from plant sources. Such a combination of foods in the diet is conducive to very low absorption of iron.

The overall iron supply is particularly limiting in Sub–Saharan Africa, South Asia, and South East Asia. In these three regions animal sources are low, the average diet is likely to be of low bioavailability, and for many people the supply probably does not reach even the minimum average requirement. This is in line with these regions having the highest estimated prevalence of anaemia, as shown in Table 3.2. Results from China are inconsistent, and few anaemia estimates are available. In the other regions, the iron supply, particularly taking into account the higher level of animal iron sources, may on average be just adequate; this gives a potential for improvement with redistribution.

More important, perhaps, is the observation that the overall per caput supply of iron appears to be static or perhaps decreasing in all regions except Near East and North Africa. In South Asia this is at least partly due to a major decrease in the production and availability of pulses (lentils, beans, etc.), which have been squeezed out in many areas by the green revolution emphasis on cereal crops. In Sub–Saharan Africa, the decrease may be partly related to a shift away from millets and sorghums; in South East Asia these plus other factors may apply. Thus, the diet quality in terms of iron seems to be deteriorating, and this can be assessed by the iron concentration in me diet, expressed mg iron/1,000 calories. The trends in this indicator are shown

in Figure 3.5. These results demonstrate the deterioration (or lack of improvement) in the diet quality in terms of iron over the last two decades in all regions except Near East/North Africa.

Table 3.3 Regional Trends in Iron Availability and Anaemia (1970–1990)

Region	*Trends in Dietary Iron Supply (see Figure 3.4)*	*Trends in Anaemia (non–pregnant Women)*
Sub–Saharan Africa	Down slightly, especially from animal sources	Up, see Fig. 4.6
Near East/North Africa	Up, from both animal and vegetable sources	Probably down (est. 36% 1975/80, 28% 1985/90)
South Asia	Down, due to reduced pulse production (?)	High and increasing, see Fig. 4.6
South East Asia	Down slightly, especially vegetable sources from 1980	Probably up (est. 40% 1970–80, 57% 1980–90)
Middle America/Caribbean	Down vegetable sources, but animal sources up	Probably up (est. 20% 1970–80, 30% 1980–90)
South America	Down, but animal sources relatively high	Probably down (est. 24% 1970–80, 20% 1980–90)

Putting together the results on trends in anaemia (although these are based on rather scanty results) with the dietary iron supply from food balance sheet data, does give a consistent picture, as summarized in Table 3.3. Dietary iron supply trends are deteriorating in most regions except the Near East/North Africa, although the average availability may be relatively good in South America because of higher levels of iron from animal sources. The exception, Near East/North Africa, is the one region where indications are that anaemia prevalences are not rising, or possibly even improving. In South America the prevalence of anaemia is probably fairly stable. However, in the other regions, and in particular in Sub–Saharan Africa and South Asia, there are signs that the prevalence of anaemia may be increasing, and this is consistent with the decline in the dietary supply of iron. For regions other than Sub–Saharan Africa this is the one nutrition problem that seems to be getting worse. These results, which no doubt require further investigation, should raise warning flags and shift attention further towards dealing with iron deficiency. At the same time, control of malaria and intestinal parasites must be stressed.

Average iron consumption based on national figures generally hide the distribution across various locations and socioeconomic groups. Recent research on micronutrients indicate that iron consumption behaves differently from other nutrients. It is more income elastic (perhaps the most of major nutrients), owing to the fact that as income increases consumers will purchase more meat and fish. In the Philippines for example, the highest income quintile consumed three to four times more meat and pulses than households in the lowest income quintile. This means that iron consumption overall is likely to be inadequate for poorer households.

Within households, a number of studies show highly disproportionate distribution of iron relative to individual requirements. In the Philippines, adequacy ratios for mothers in three provinces was estimated at 0.65 compared to 1.05 percent for fathers, 0.77 for adolescent girls compared to 0.91 for adolescent boys. While a substantial part of iron adequacy reflects the higher dietary requirements for pregnant mothers and adolescent girls, it is evident that given similar intakes, these sub–groups are likely to suffer most from low availability of iron in the diet due to their different physiological needs. An NNMB 1979 study in India showed that average iron intakes of children 1 to 4 years was 10.2 mg per day, compared to 34.5 mg for adult men, although children have more than half the requirements of adults.

There are in principle two strategies used in controlling iron deficiency – (a) through dietary improvement and (b) by food supplementation and fortification. In clinical practice, those suspected of being anaemic are treated with medicinal iron supplements. In a public health setting, however, it is impossible to test each patient and therefore the approach is to give supplements to entire high–risk groups – mainly pregnant women. There are well defined delivery mechanisms which have been tried for supplementation (ACC/SCN, 199 la). A number of these programmes are now in operation in developing countries. However, many programmes limit effectiveness and sustainability partly because of the need for frequent administration (e.g. daily) in contrast to vitamin A and iodine. WHO reported that in 1991, a total of 102 countries have been preparing plans for the implementation of anaemia control programmes, and 11 countries have so far set up

comprehensive control programmes within the health ministries. Another 65 countries have reported to establish monitoring and evaluation systems.

The longer term solution to the problem of iron deficiency is dietary modification. This includes increasing the uptake of haem iron from animal products and vitamin C which enhances absorption in iron, and increasing household level availability of iron rich fruits and vegetables. The latter will mainly be in the realm of policies to encourage the availability of iron rich foods.

The indication here that dietary iron supplies maybe decreasing in many places has important implications for food policy. While the substantial reduction in production of pulses has been of concern for some time, the effect on iron status is only now being indicated on a wide scale. Reduced iron availability in other areas need further study. However, steps will be needed to reverse the trend.

Iodine Deficiency Disorders

Iodine deficiency exists in most regions of the world, resulting from a low intake of iodine in the diet. The consequences of iodine deficiency include goitre, reduced mental function, increased rates of still births and abortions, and infant deaths. Severe mental and neurological impairment known as cretinism occurs in babies with severely iodine deficient mothers. Deficiencies in iodine later in infancy and childhood cause mental retardation, delayed motor development, growth failure and stunting, neuromuscular disorders and speech and hearing defects. Mild deficiency can cause lethargy, and this is reversible when iodine status improves, as is goitre.

The commonest measure of iodine deficiency is from observation of goitre, enlargement of the thyroid gland, usually obtained by specific surveys in iodine deficient regions. Since goitre tends to be localized in such regions, most data are not nationally representative, and thus prevalence estimates are somewhat tentative; trends have not yet been assessed.

WHO estimates that in 1990 around 1,000 million people lived in iodine deficient environments around the world (see Table 3.4). These tend to be regions where the iodine, normally supplied from soil and water, has been leached from the topsoil by rain, flooding, glaciation, and snow. These regions tend therefore to be mountainous and remote, as well as flood plains. In Figure 3.6 areas in which iodine deficiency control measures have been implemented are shown; since these tend to be quite effective, it can be taken that in most of these regions the extent of iodine deficiency is likely to be improving.

The extent of goitre has been estimated (by WHO and ICCIDD) as more than 200 million people, added to which should be around 6 million with overt cretinism. These figures are shown by WHO region in Table 3.4. Around half of these are in South East Asia, including India. It is further estimated (WHO, 1992c) that some 20 million people worldwide are mentally defective as a result of the deficiency.

Table 3.4 Estimated Prevalence of Iodine Deficiency Disorders in Developing Countries, by Region, and Numbers of Persons at Risk

(in millions)

	At Risk	*With Goitre*	*Overt Cretinism*
Africa	227	39	0.5
Latin America	60	30	0.3
South East Asia	280	100	4.0
Asia (other countries including China)	400	30	0.9
Eastern Mediterranean	33	12	–
Total	1,000	211	5.7

Source: WHO 1990c.

Growing international awareness of the problem has led to increased programme and surveillance activities. The problem is largely preventable, and cost–effective methods of eliminating the problem are well known. WHO/UNICEF has declared the goal of eliminating IDD by year 2000, and activities now on–going in collaboration with ICCIDD (International Council for the Control of Iodine Deficiency Disorders).

Control of IDD is mainly through fortification of salt with iodine (salt iodination), and/or periodic distribution of iodized oil, either administered orally or by injection (every three to six months orally, up to two year interval by injection). The coverage of control programmes is shown in Figure 3.6. Further extension of iodine deficiency control is likely, and preparations are under way in many countries. For example, in the African region, 36 countries have data on the magnitude of problems of which 14 carried out surveys since 1987. National control programmes are now operational in Algeria, Congo, Ethiopia, Kenya, Malawi, Mali, Tanzania, and Zaire. National programmes are being drawn up and ready to be implemented in 10 more countries.

In Asia, where the largest global concentration of population affected by IDD is located, intensification of salt fortification and iodized oil distribution, training and education have produced improvements in Indonesia, Bhutan, Nepal and Thailand. As of 1990, about 10 million injections of iodized oil were administered in Indonesia, successfully preventing cretinism. National programmes are in place in Bangladesh, India, Myanmar, Nepal, and new initiatives started in Korea and Sri Lanka.

The problem of IDD in South America is highest in the Andean region, mostly in rural areas where iodized salt is not available. In Ecuador, a national programme which includes the distribution of iodized salt through a single private company has been successful. Some assessments of the problem have been done in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. Targeted programmes in Bolivia and Peru have been intensified.

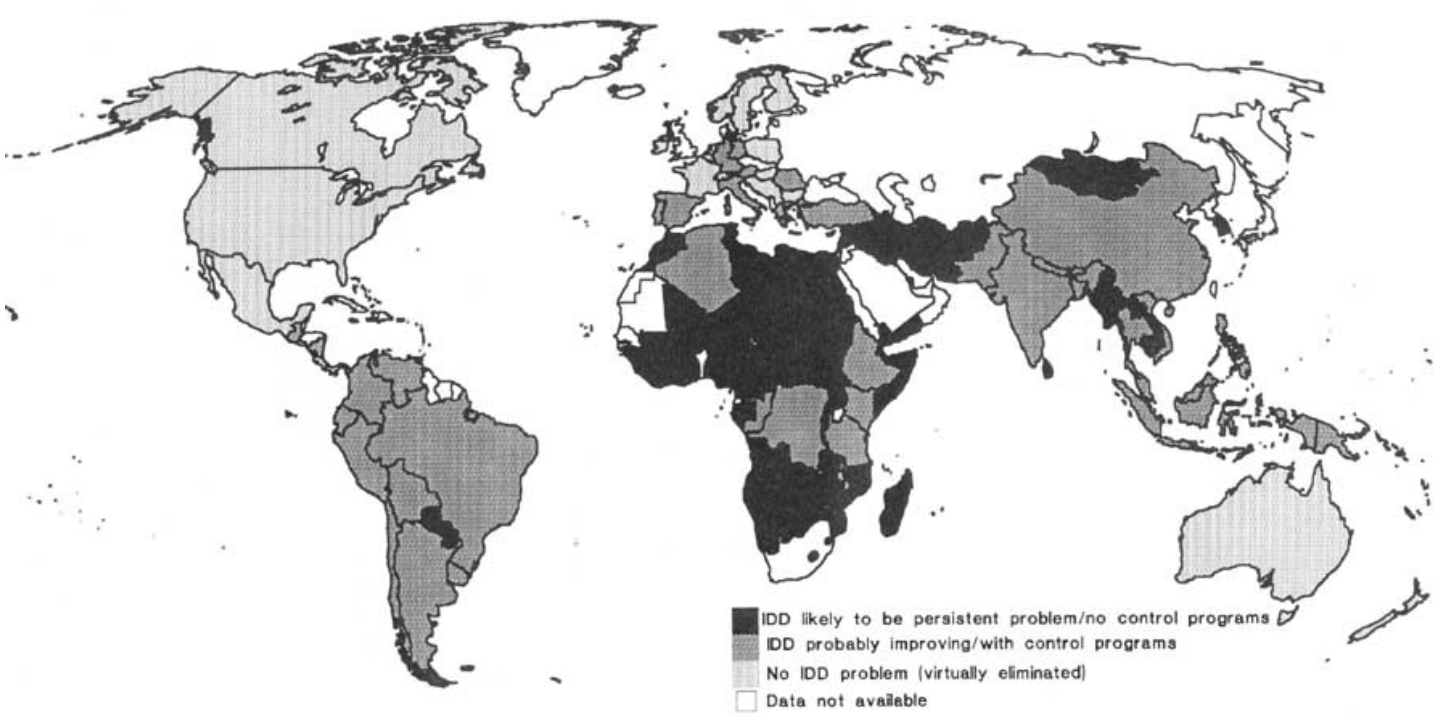


Figure 3.6 Iodine deficiency disorders: Areas affected and control programmes, 1991

Source: **Map drawn with data from Table 4 in WHO, 1990c**

The ICCIDD has summarized the increases in programmes to control IDD. As of 1991, 22 countries were implementing control programmes and another 40 countries were planning to implement action plans. Five years earlier only around six developing countries had IDD programmes in place. Intensified and accurate assessments of the problem, public awareness followed by monitoring and evaluation are essential for reaching the objective of complete elimination of the problem by the end of the century.

Deficiencies in Vitamin C, Thiamine and Niacin

In recent years, outbreaks of micronutrient deficiency diseases among populations in refugee camps have occurred. Scurvy (vitamin C deficiency) has been reported among refugees and displaced persons especially in Somalia and Ethiopia. Pellagra (niacin deficiency) has affected Mozambican refugees in Malawi when groundnut supplies were interrupted. Beri–beri (thiamine deficiency) was reported among Cambodian refugees in Thailand. In principle, these diseases are preventable and methods of diagnosis and treatment are well known.

Deficiencies in vitamin C, niacin and thiamine generally occur in long–stay refugee camp populations when there is total or near–total dependence on rations provided, or when rations are of very limited variety and when trading of fresh foods is for various reasons not possible. Pellagra occurs in maize eating populations. When maize is not complemented with either legumes or fish in the diet, the risk of pellagra increases. Beri–beri on the other hand occurs among rice eating populations – when these diet are undiversified and based on milled (polished) rice. Including other foods such as whole cereals, legumes, and fresh vegetables in the diet reduces the risk of beri–beri. These micronutrient deficiency problems had previously been virtually eliminated, and their re–appearance in refugee camps is an indication of food management constraints in the camps.

Chapter 4: Women's Nutritional Status

Women are vulnerable to malnutrition, for social and biological reasons, throughout their life–cycle. As children, in some parts of the world, girls are discriminated against in access to health care, to food and education, and in other ways. As teenagers, they risk early pregnancy and suffer more risk from retarded growth than boys. Reproductive–aged women are subject to numerous stresses affecting their health and well–being. Elderly women in many societies are deprived. Malnutrition in women may be a problem insufficiently recognized and inadequately documented. Here, we focus on reproductive–aged women and make a first attempt to describe the problems. To date, much of the emphasis has been on women as mothers. Indeed risks of motherhood including mortality are severe, and intergenerational effects perpetuate growth and developmental failure. But women's malnutrition is also an issue of human rights in itself (see Box 4–1).

In some societies, preference for boys can start even before birth, leading to selective abortion upon ascertaining the sex of the foetus. Beyond that, infant and child mortality amongst girls may be higher. For example, the sex ratio of females to males is nearly as low as 900 females per 1,000 males in parts of India and Pakistan. Many reasons have been described, for example the less likelihood of girls being brought to clinics when a cost is involved. Thus in some societies girls leave childhood with more growth retardation than boys.

Box 4–1 Women's nutrition through the life cycle

"She's 35 years old. When she was born her mother was malnourished and overworked. She was very small and low–weight at birth. She grew slowly. During childhood she had little good food to eat – even less than her brothers. She could not go to school as her brothers did, but remained at home with her mother to help with the housework and child–minding.

"By adolescence, her pelvic bones were misshapen and she was shorter than she should have been. As was the tradition, she was married and had her first baby when she was only 14, even before she had fully developed. It was a difficult birth, but she survived it and many more, though once she had so much bleeding that everyone was afraid she would never recover. She's been anaemic ever since, a condition aggravated by the hookworm she carries. During another pregnancy she suffered a malarial fever and miscarried.

"Like her mother before her, she never went to a health centre when she was pregnant. It was too far away and too foreign. She used the same traditional midwife who delivered her and who helped her sisters. The midwife had no training in cleanliness, and she suffered serious infections after childbirth.

"She had little time between pregnancies to regain her strength, and little enough food at any time. During later pregnancies her fatigue was draining her.

"She had so much work in the house and the local brick factory she could not bear the thought of another pregnancy. When it came she went to a woman in the village for something to end it. She was very sick, but it worked.

"Today she still feels dull pains and soreness in her belly which flare up from time to time. Also after so many pregnancies she probably has a partially prolapsed uterus, which often causes her discomfort, especially after a hard day's work carrying bricks."

"She is a woman who cares desperately about her family and wants to limit her pregnancies. She heard about family planning from her sisters, but was always too afraid of her husband, who would never allow it. She once got some contraceptive pills, but she felt so nauseated and had so many headaches that she thought it must surely be a punishment for disobedience, and she stopped taking them..." (UNFPA, 1989).

Source: Hammer (1981).

The major social vulnerability of girls during adolescence is the potential for beginning reproduction too soon after maturity. In many societies early marriage is still a common phenomenon. Although legislation often exists prohibiting it, the practice is still widespread. Strikingly, the World Fertility Survey found "that 25% of 14–year–old girls in Bangladesh, and 34% of 15–year–old girls in Nepal were married, although the legal minimum age for marriage is 16 in both countries" (WHO/UNFPA/UNICEF, 1989). Formal education for the girl usually ends with marriage and there is pressure to conceive to gain status through fecundity. Early marriage is not the only social contributor to early pregnancy, "in certain societies... adolescent pregnancy and childbirth are common outside marriage and regarded as a means of improving status, demonstrating fecundity, and attracting a new partner to provide support for each successive child". Although growth begins slowing for girls by the age of approximately 14, linear growth particularly of the long bones is not complete until the age of 18, and peak bone mass is not achieved until the age of 25 (FNB/NAS/NRC, 1989). In terms of pregnancy risk, it is important to note that "the development of the birth canal is slower than that of height during the early teenage period and does not reach mature size until about 2 – 3 years after growth in height has ceased" (Harrison et al., 1985). Early pregnancy thus not only stunts height, leads to low birth weight, but also increases risk of obstetric complications. Nonetheless, this work (in Nigeria) also showed that supplementation and anti–malarials can support continued growth in young mothers, even during pregnancy.

The magnitude of the problem can be partially described with the following figures: the percentage of women giving birth by age 18 is in Africa 28%, in Asia 18%, and Latin America 21%, and the percent of first births that are to women of 15 to 19 years in illustrative countries is: Costa Rica 44%, Mexico 41%, Jordan 18%, Malaysia 19%, Philippines 24%, and USA 29% (UN, 1986).

Even if early pregnancy is avoided, the stresses on women in poor societies during their reproductive years are extensive. Most women have multiple roles to fill within their family and community. They have the major biological role in reproduction through pregnancy and lactation. Independent of this, the social roles of women often result in very heavy work loads. The frequent combination of these roles creates a major challenge for women to cope with. The social roles of women generally include major responsibility within the household of care for the other members, involving household management, food preparation, cleaning duties, obtaining health care, education and supervision of children. In addition to this family role, they frequently have kin and community roles and finally, "productive" income–producing as well as non–income producing roles in agriculture, the marketplace, home production, factory or other work activities. The extent and nature of the specific set of roles for any given woman at any particular point in her life is highly variable, but in all cases biological reproductive roles are undeniable (although in rare circumstances they can be avoided) and in the overwhelming number of cases the household responsibilities lie within the woman's basal set of tasks. Time allocation studies have shown repeatedly that the woman's work day is longer than a man's. Women have less "leisure" or "discretionary" time available than men. Girls frequently spend more time in household maintenance activities than boys. The long hours and multiple roles of women create a "social vulnerability" to problems of malnutrition particularly during the reproductive years. Time constraints may lead to infrequent meals and exhaustion may lead to a reduced appetite, and lower overall intake results in lower intake of individual nutrients. Given the long hours worked and multiple roles frequently fulfilled by women in settings of poverty, they are at risk for general undernutrition.

Data that are available to assess level and trends in women's nutritional status are mainly: anthropometry; anaemia; incidences of low birth weight; and maternal mortality. The latter is particularly striking. Maternal mortality is a tragedy that shows one of the sharpest contrasts between developing and developed countries. The lifetime chance of maternal death in North America, for example, is better than 1:6,000; and in Africa it is around 1:20. Nutrition problems in fact play an important role in causing or aggravating dangerous situations of childbirth. Although problems of delivery are considered to be in the realm of medical/health care providers, it is in fact increasingly clear that many problems could be reduced in severity by prevention through adequate nutrition at earlier stages. There are four major causes of maternal mortality, and for three of these (haemorrhage, infection, and obstructed labour) nutrition is involved; in eclampsia the causality is less clear. Given the high prevalence of anaemia among women in developing countries, the severity of haemorrhaging (the top cause of maternal mortality) could be reduced through reduction of anaemia. "Around 50% of maternal deaths in Indonesia and in Egypt and over 30% of deaths in India are due to postpartum haemorrhage" (UNFPA, 1989).

Malnutrition and infection are interrelated, as has been discussed elsewhere. This relates both to protein–energy malnutrition, and to even mild deficiencies of micronutrients, in this context particularly iron deficiency related to immunocompetence. Finally, small stature is a well–known risk factor for obstructed labour, in turn related to previous malnutrition. In addition, perception of this risk can lead to deliberately reduced dietary intake amongst pregnant women in some cultures.

This much has been established by research over many years. We now aim to bring together available evidence on the extent, and where possible trends, of malnutrition in women of reproductive age in developing countries. The reproductive years are chosen partly because the biological role of reproduction introduces additional risks. These data have been assembled from published studies from developing regions, but these differ from the results used for child anthropometry in that most of the surveys are not nationally representative, but are parts of smaller–scale studies published in the scientific literature. The data base was compiled from around 340 studies carried out since the late 1970s. The methods of analysis, particularly aggregation, are described in the technical notes, and the results in terms of levels, and certainly trends, are less secure than those for child anthropometry. Nonetheless, with these provisos, it is considered that they give a reasonable estimate of the extent of the problem.

The first four results concern anthropometry – the stature, weight and thinness of women by region in developing countries. These results while indicating women's health and well–being, use cutoff points which are determined more by pregnancy outcome than by other criteria of welfare. This is due both to practice and data availability, and also to the logic that adequate health is probably reasonably indicated by satisfactory pregnancy outcomee.

In Figure 4.1, the prevalence of short stature in developing regions of the world, averaged over the period 1977 to 1990, is shown. The cutoff point of 145 cm. has been chosen partly as that most widely reported, itself frequently used to indicate obstetric risk. Bearing uncertainties in the data in mind, it seems likely that this problem is particularly extensive in Asia, and also in Latin America. In contrast, women in the African continent are considerably taller. Mean values of attained height are estimated as around 158 cm. for Sub–Saharan Africa, 157 cm. for Near East and North Africa, 154 cm. for Middle America/Caribbean, 152 cm. for South America, and 150–151 cm. for women in Asia. The estimates for China are of 158 cm. on average. For comparison, European standards give a mean height of 161 cm., with virtually zero prevalence below 145 cm. These comparisons emphasize that women are particularly stunted in Asia, but, in contrast, show relatively little deficit in height in Africa.

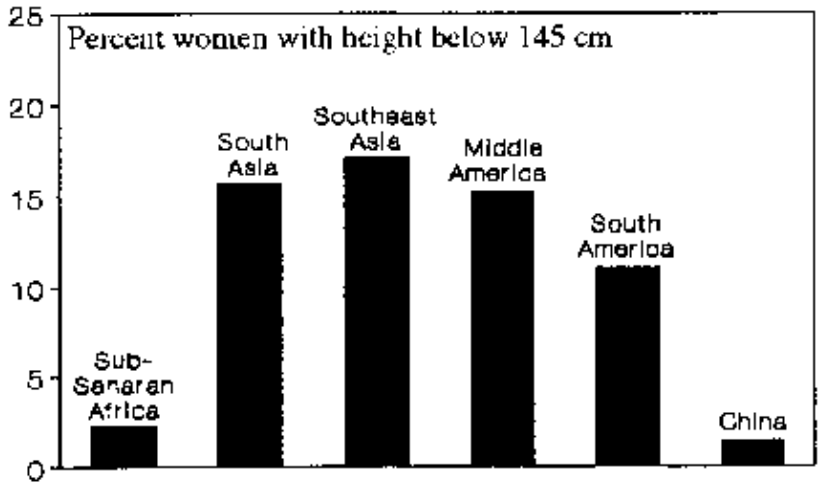


Figure 4.1 Stunting in adult women, 1980s (Women, 15–49 years old)

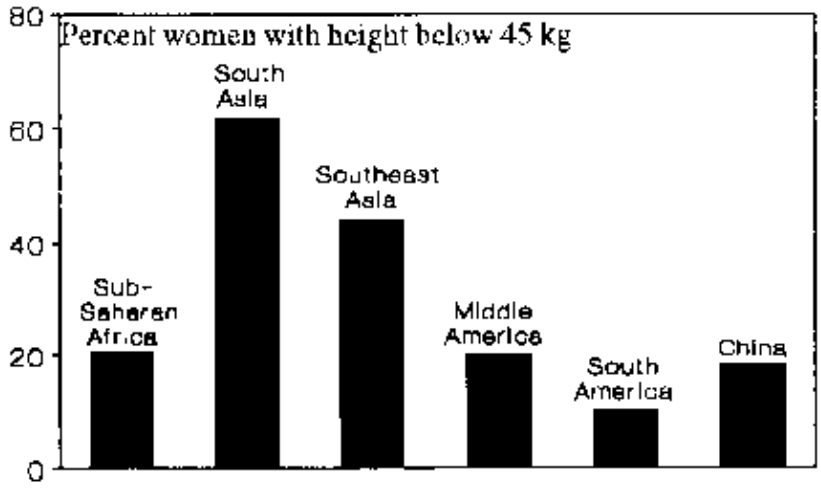


Figure 4.2 Underweight adult women, 1980s (Women, 15–49 years old)

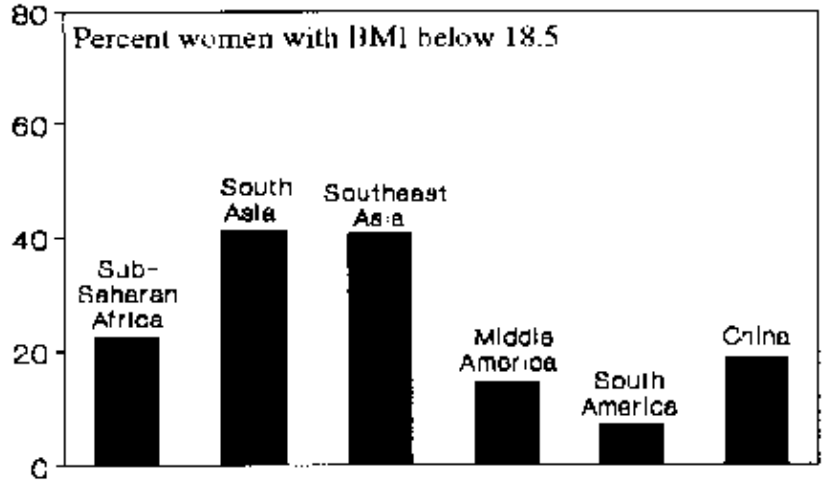


Figure 4.3 Low body mass index, 1980s (Women, 15–49 years old)

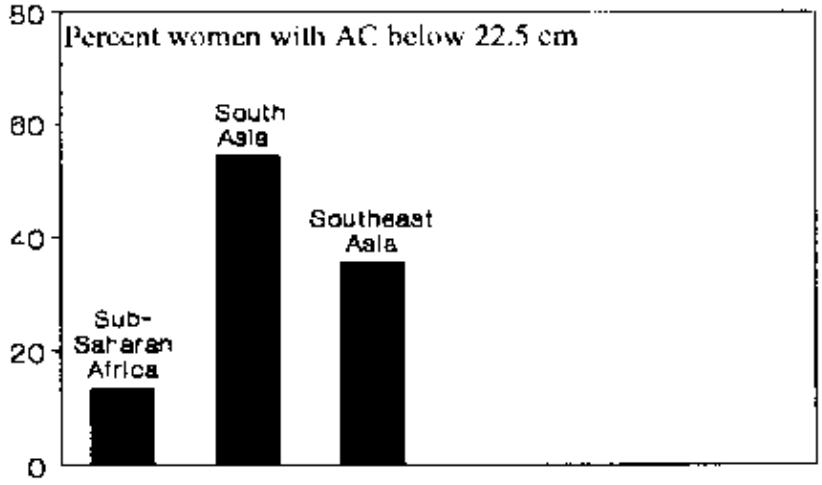


Figure 4.4 Arm circumference, 1980s (Women, 15–49 years old)

The prevalences of underweight (< 45 kg) women are shown in Figure 4.2. These follow roughly the same relative distributions as stunting, but the overall proportion of underweight women is very much higher – up to about 60% in South Asia, around 45% in South East Asia, and about 20% in Sub–Saharan Africa. Considering that the cutoffs of height and weight are those commonly considered to indicate both obstetric risk and higher probability of low birth weight, these results do indicate a substantial problem of women's nutrition itself, moreover very probably linked to maternal mortality; and go a considerable way towards accounting for the extent and distribution of low birth weight.

The deficit in weight and height can be due to both stunting and thinness, thus it is useful to look at direct indicators of weight deficit in relation to height. For this, the body mass index (weight/height^2) can be used, and here the cutoff point indicating moderate thinness of 18.5 has been used, the results being shown in Figure 4.3 for the regions where enough data were obtained to make reasonable estimates. These results show substantial prevalence of thinness in South and South East Asia (around 40%), and a significant prevalence also in Africa, of around 20%; thus the underweight among women in Africa is mostly thinness, in line with the low prevalence of stunting, and the similarity in the prevalences of underweight and low BMI. In Middle America, the problem as estimated is more one of stunting than thinness.

Estimates were also obtained of low arm circumference, as an alternative measure of thinness. Data availability was reasonable only for Sub–Saharan Africa and South Asia (12 and 17 studies respectively) and these gave prevalences below 22.5 cm. (a cutoff in the range commonly taken to be predictive of low birth weight, thus also likely to be related to moderate malnutrition) of 13% Sub–Saharan Africa and 54% in South Asia. These estimates given in Figure 4.4 generally support the conclusions drawn from the BMI data.

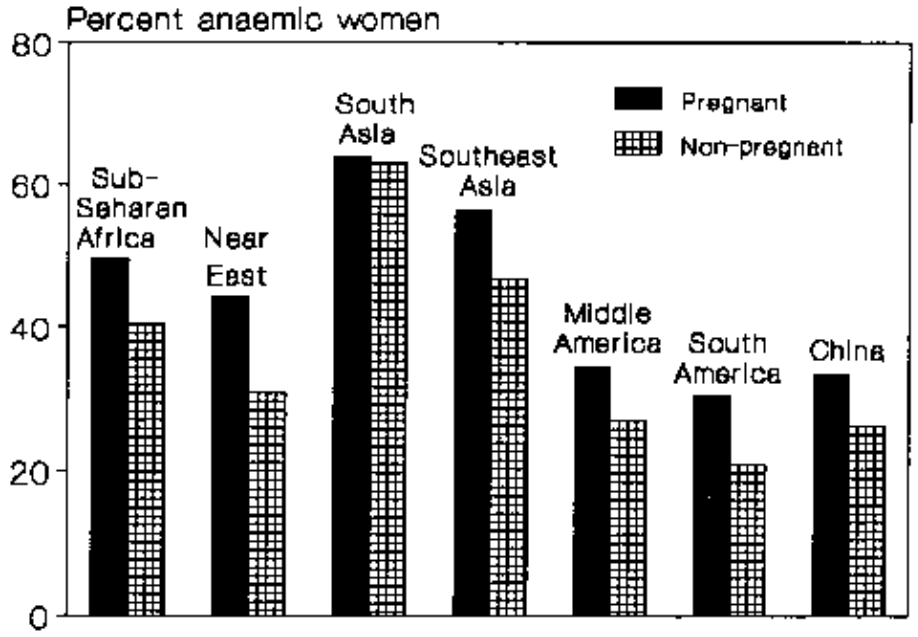


Figure 4.5 Anaemia, 1980s (Adult women, 15–49 years old)

The data available do not allow for much disaggregation between socioeconomic classes, or other such factors. Partly this is because there is a strong effect of region, thus the small sample size is a particular constraint. In general, the expected relations with socioeconomic status exist. The data available are fairly balanced between urban and rural location, and the indications are that, for example, stunting is considerably more prevalent in rural than in urban areas (e.g. overall approximately 25% in rural areas versus 10% in urban).

Prevalences of anaemia were also assessed from the database, and some results have already been given in the previous chapter. To recap, the relative prevalences of anaemia by region, distinguishing pregnant and non–pregnant women, are shown in Figure 4.5, which plots the prevalence data given in Table 3.3. This emphasizes the extremely high prevalence of anaemia throughout the developing world, particularly among women in Asian countries. The cutoff points used here are those recommended by WHO, and include mild anaemia. On the one hand, it may be useful in the future to examine distributions of more severe anaemia, using lower cutoff points, since in clinical terms a haemoglobin level of just below 12 g/dl is not regarded as particularly serious. Using lower cutoffs would provide for this and indicate targeting priorities. On the other hand, with the emerging evidence of functional effects of iron deficiency even in the absence of anaemia, one must be careful not to understate the overall problem of iron deficiency.

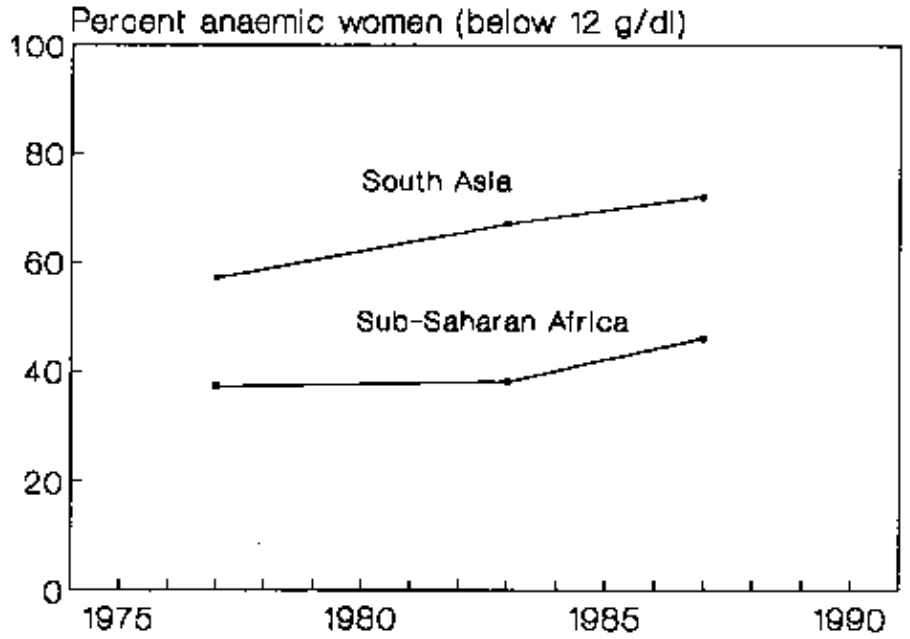


Figure 4.6 Trends in Anaemia, 1977–1987 (Nonpregnant adult women, 15–49 years old)

Using the relatively high cutoff points for anaemia probably does capture better the extent and distribution of iron deficiency than using lower cutoffs.

Again, knowing the relationship of anaemia to both maternal mortality and to low birth weight, these findings are in line with other observations. For example, it has been noted that significant loss of blood through haemorrhaging is the leading cause of maternal death; it is known that the risk is much more serious for anaemic women; and maternal mortality is higher where anaemia is more prevalent.

The database does not allow extensive comparisons of anaemia prevalences over time. However, data for non–pregnant women in Sub–Saharan Africa and South Asia show that the prevalence of anaemia may, if anything, be getting worse over time. These results are very tentative, and should be treated with caution. Data from the late 1970s, 1981 through 1984, and 1985 onwards, indicate that the prevalence of anaemia in Sub–Saharan Africa increased from around 37% in the first period to around 46% in the last; for South Asia, the estimates are around 57% in the first period, 67% in the second period, and 72% most recently. These results are plotted in Figure 4.6 for clarity, but do require further investigation. As noted in Chapter 3, this is in line with trends in dietary iron supply; since these supply data are from a completely different source, this congruence could be quite significant. In general, the data are not adequate to assess trends over time in other nutritional status indicators. However, secular trends have been observed in individual countries, such as Brazil and China, generally showing an increase in women's heights over periods of decades in these two countries.

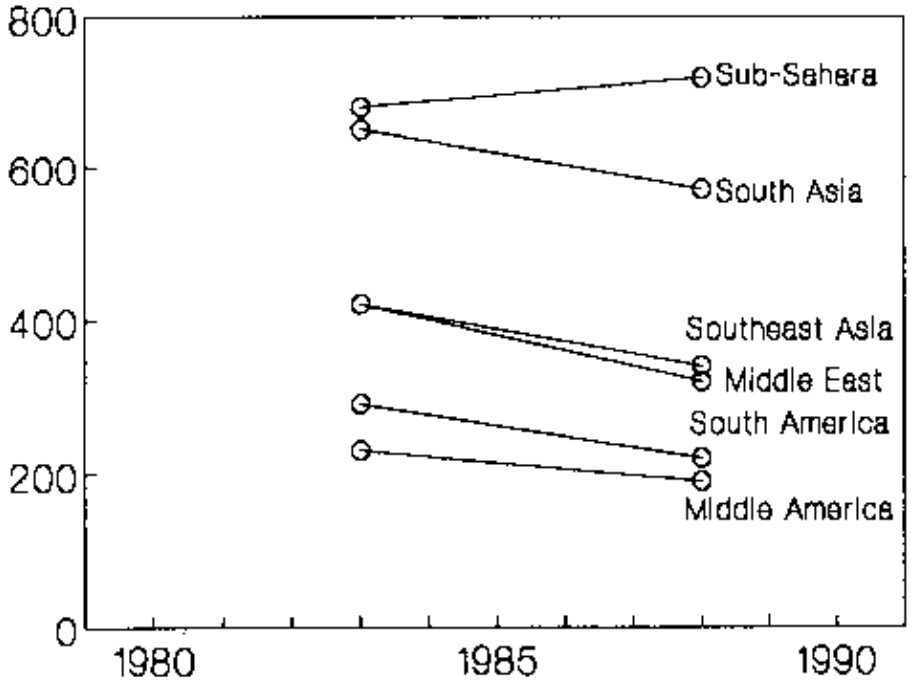


Figure 4.7 Maternal mortality rate (Per 100,000 live births)

Source: WHO (1991b).

Maternal mortality estimates compiled by WHO are shown in Figure 4.7. The much higher risk of maternal death in developing countries has already been noted. The average rate for developed countries, to compare with those shown in Figure 4.7, is around 30/100,000 live births. This is one tenth of the world average, developing countries having, on average, 15 times the rate of developed countries. The trend, is, however, improving in all regions of the world except Sub–Saharan Africa where there are indications that maternal mortality may actually be increasing. Nonetheless, there is clearly a very long way to go, particularly in South Asia, before the problem is brought under control.

Incidences of low birth weight, also compiled by WHO, are shown in Figure 4.8. South Asian women have twice the low birth weight incidence of any other region, no doubt related to the high prevalence of anaemia, underweight, and early pregnancy. The incidence in Sub–Saharan Africa is much lower, in line with the larger body size of mothers, but there are signs that the incidence is creeping up. In other regions, the incidence is gradually declining, but again there is some way to go before this reaches the levels of developed countries.

Finally, we can look at the relationship between the different indicators so far discussed. Some of these relationships are well established – for example that low maternal anthropometry and anaemia predispose to low birth weight and maternal mortality. One way of illustrating these effects is to look at the intergenerational links: small maternal size, low birth weight, growth failure in children, leading back to small adults. This vicious cycle of malnutrition between the generations can be illustrated as shown in Figure 4.9.

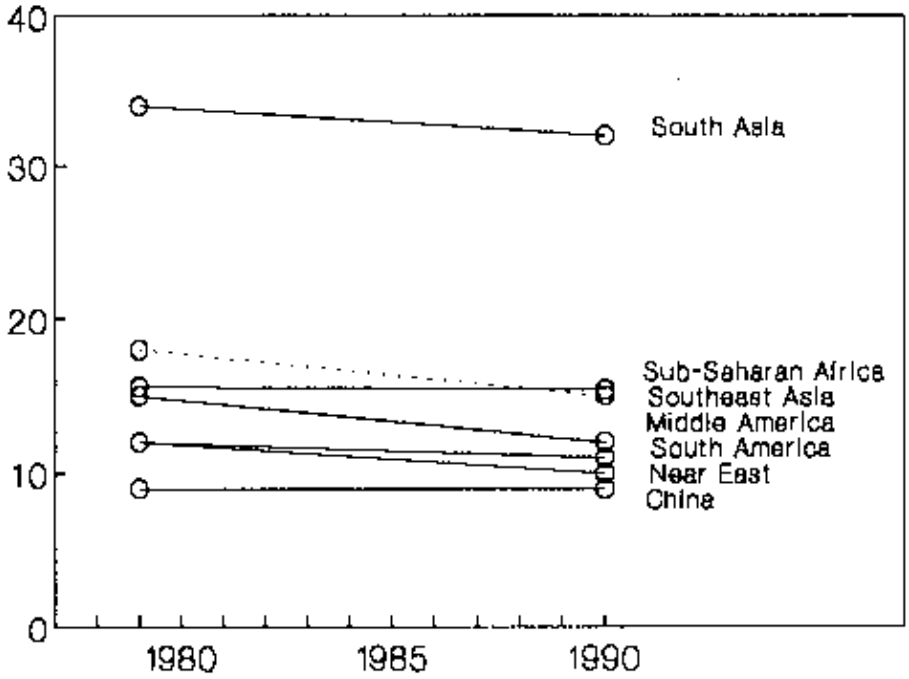


Figure 4.8 Low birth weight: Percent births below 2.5 kg

Source: WHO/UNICEF (1992).

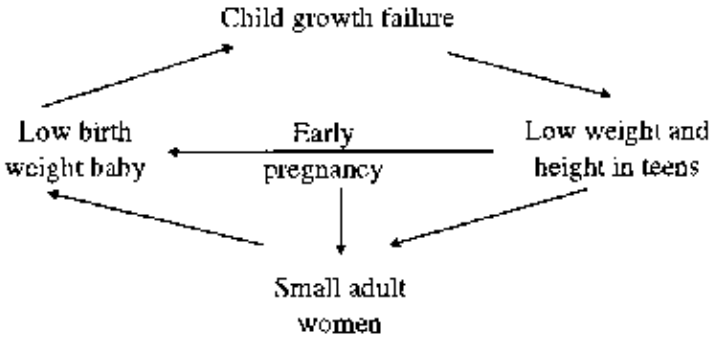


Figure 4.9 Intergenerational cycle of growth failure

This diagram also illustrates the effects of early pregnancy, both in terms of low birth weight and inducing premature cessation of growth in the mother.

The data go back nearly far enough in time to allow examination of this sequence over the last 20 years. In fact, birth weight and underweight child data are available for the mid 1970s, and if only limited change is assumed over the previous five year period, which is reasonable, then the associations can be viewed as shown in Figure 4.10(a) through (c). In the first of these (a) the data for prevalences of underweight children by region as given in Chapter 1 are plotted with the estimates of underweight in adult women for the 1980s from this chapter. The association is seen to be fairly close, illustrating that where there is a high proportion of underweight children, this may lead to higher levels of underweight adults. In the second plot (b) the most recent estimates available of low birth weight, around 1988, are shown scatter plotted against percent underweight women. This illustrates, again as is reasonably well known, that high incidences of low birth weight occur in areas where there is much underweight in women. Finally, the linkage of underweight children to low birth weight is shown in figure (c), for late 1980s. This display is intended to illustrate the effect across generations, small mothers having small babies who grow into small mothers again.

However, in many parts of the world progress is being made. The trends in low birth weight, as were given in Figure 4.8, in a sense, complete the cycle. These show that low birth weight incidences are decreasing; earlier it was also shown that prevalences of underweight children were decreasing. One means of summarizing this is to reproduce Figure 4.10(c) superimposing the values for around 1980 and around 1990. This is shown in Figure 4.11.

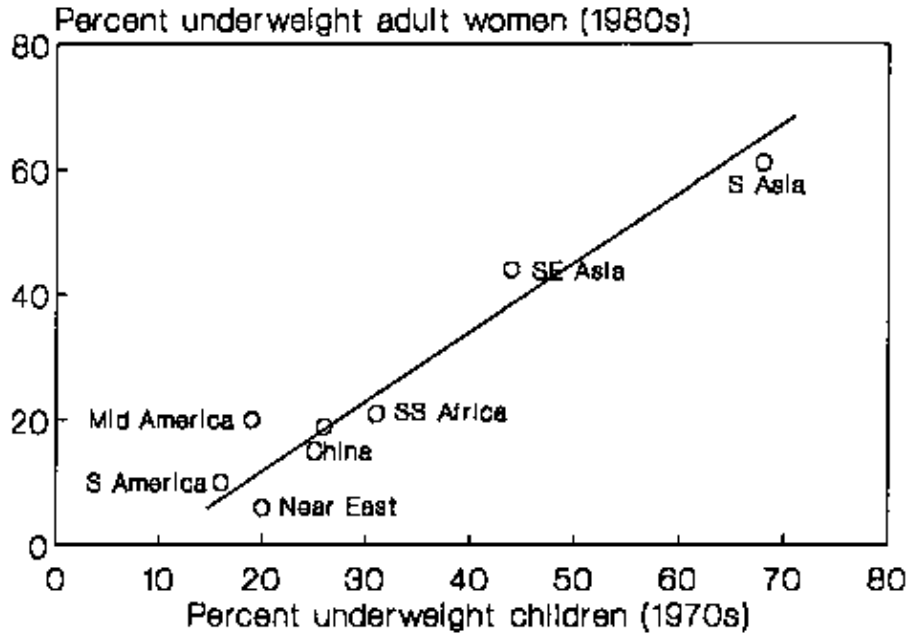


Figure 4.10 Intergenerational effects: Children, adults, next generation children, 1970–1990 – A. Prevalence of underweight children (1970s)

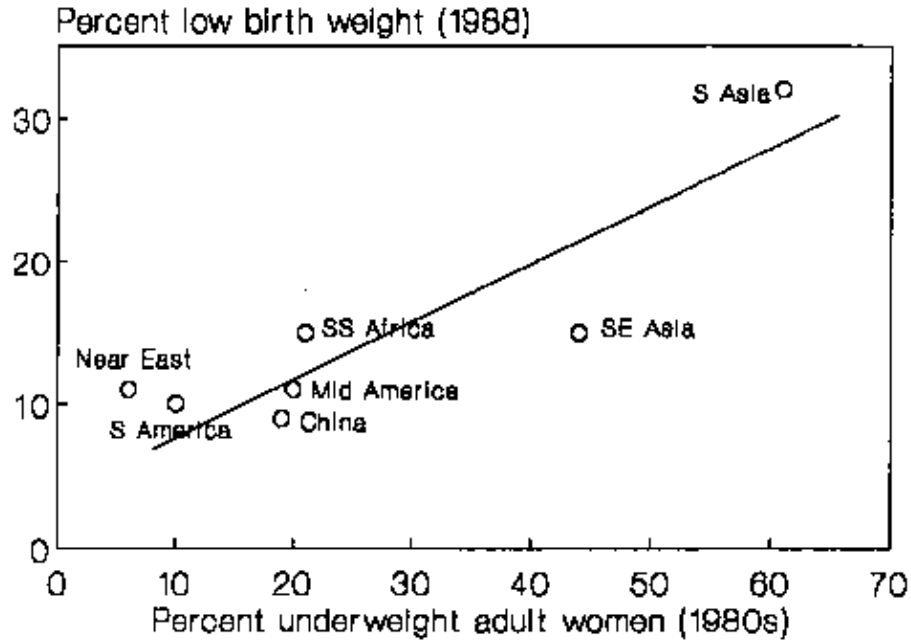


Figure 4.10 Intergenerational effects: Children, adults, next generation children, 1970–1990 – B. Prevalence of underweight adult women (1980s)

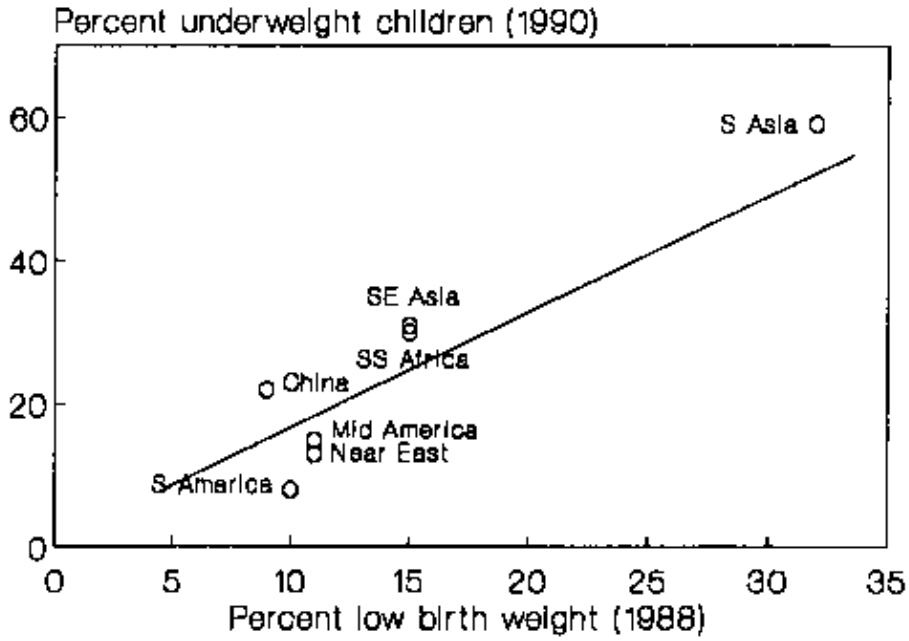


Figure 4.10 Intergenerational effects: Children, adults, next generation children, 1970–1990 – C. Prevalence of low birth weight (1988) and underweight children (1990) by region

The lack of change on either variable in Sub–Saharan Africa over approximately the last 15 years is striking.

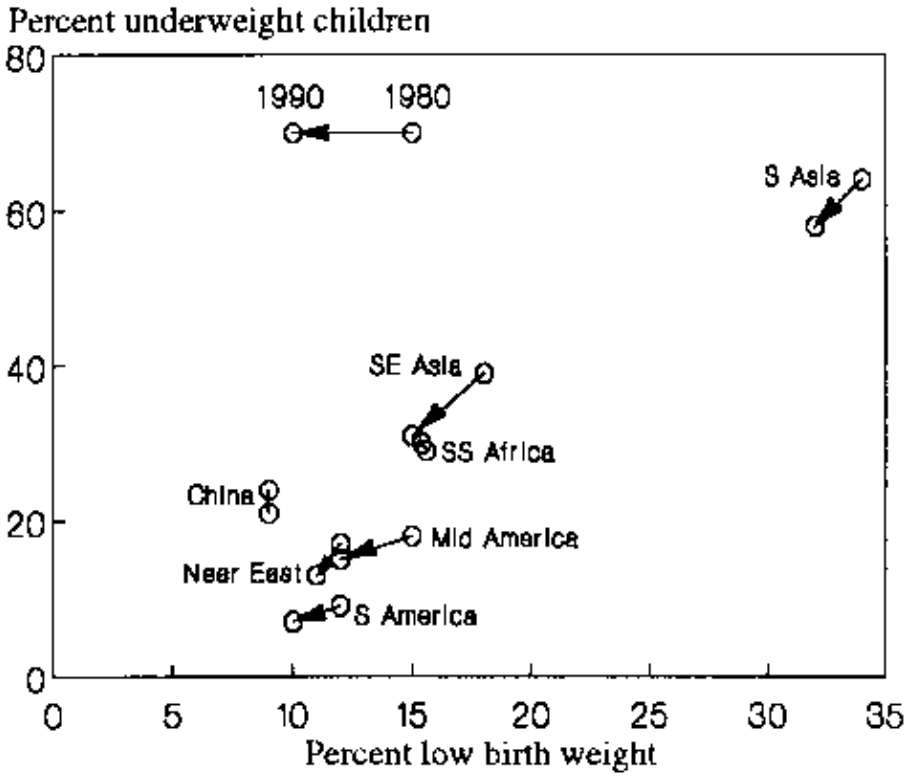


Figure 4.11 Changes in prevalence of low birth weight and underweight children, approx. 1980–1990

In general, linked improvement is seen in both measures over the last ten years. In the Americas, proportions of low birth weights and underweight preschool children are similar, and going down in parallel. In South Asia, preschool child underweight is falling more rapidly than low birth weight. But overall, the two indicators are tending to improve together, not surprisingly, perhaps, in view of their interdependence, but encouraging to confirm. In China, low birth weight incidence appears static, but, at around 9%, is already low. On the other hand, South East Asia appears on a trajectory towards 20% underweight and 10% low birth weight in the next 15 years or so.

The results presented here are only a first step in assessing women's nutrition. In particular, it would be important to assess trends, similarly to the estimates on children. Equally, it is important to assess who is

malnourished, and the correlates of their malnutrition. It seems clear, however, that malnutrition among women is a problem that has perhaps been under−recognized, and should now take greater priority. The focus here is only on reproductive−age women, and future assessments should consider both the elderly, and the adolescent girl. It is hoped to include such results in future reports.

Chapter 5: Non−Communicable Chronic Diseases

While malnutrition and infection persist as the major nutritional problems, affecting especially children, chronic diseases are the main cause of premature death in adults, probably even in the poorest countries. Immunizations and antibiotics are having a major impact on infectious diseases, but progress is much slower in combatting non−communicable chronic diseases (NCCDs). As always, the burden is heaviest for the poor, not least because treatment is complicated and often relatively ineffective.

“Over the past forty years, life expectancy has unproved by 20 years in the less developed regions and by 10 years in the developed regions of the world. Although the current rate of improvement is greater in less developed regions, the process has gone further in developed countries, such as Britain... where only 3% now expect to die before 40, still almost 30% do so before 70. Thus, in Britain death before middle age has been largely avoided, but death in middle age is still common, though it is largely avoidable: 80% of such deaths involve vascular or neoplastic diseases, for many of which better treatments and more effective preventive measures can be foreseen.” This is from a recent comment by R. Peto, of the Cancer Studies Unit in Oxford (Peto, 1992). Later in the article he continues: “Although the growing importance of chronic disease control has been stressed, the chief global health priority in the 1990s remains control of the main infectious diseases. In 1980 there were about 50 million deaths in the world, half in people under 35 years of age. Indeed, 15 million were under five... in early childhood about four million deaths a year were due to diarrhoea, about four million to acute respiratory infections, and about four million to diseases that can largely be prevented by vaccination... so, although easy control of infective disease remains the most important priority, the more successful it is the more people will survive to middle age, and the more important will become the control of the large avoidable causes of premature death from chronic disease, such as hepatitis B, blood pressure, blood cholesterol, and, particularly, tobacco.”

Environmental factors contribute importantly to the causality of non−communicable chronic diseases. Indeed, it was estimated some ten years ago that of the avoidable causes of cancers around 35% were environmental, such as diet − Peto again (Doll and Peto, 1981). Since then, a number of authoritative reviews have further documented the evidence for dietary contributions to chronic disease: in the US the Surgeon General’s Report in 1988 (US/DHHS, 1988); the National Research Council (NRC, 1989); in Europe (from WHO) James et al. (1988a); and in the UN, WHO published me report of a WHO Study Group, entitled “Diet, Nutrition, and the Prevention of Chronic Diseases” (WHO, 1990b).

Four classes of disease are considered particularly, likely to be associated with diet: cardiovascular (including hypertension and stroke); certain cancers; diabetes; and liver cirrhosis. In line with the increasing priority given to diet−related NCCDs, it was decided to begin to include information on this topic in the series of Reports on me World Nutrition Situation. This chapter results from a first look at the subject. A major issue in compiling it has been to identify suitable data from developing countries, since these remain the focus of the report. As for other nutrition problems, the first step was to try to identify outcome data. An important source of this has been the age− and cause−specific mortality data compiled by WHO. Data with adequate coverage to allow estimation of levels and trends are relatively scarce. Here, a coverage of at least 80% was used.

The data that would ideally be used are illustrated in Table 5.1. This shows, on the right−hand side, the diseases that need to be monitored − either by mortality, which in practice is all that is widely available, or preferably from morbidity information, which is very scarce from developing countries. The dietary risk factors that are postulated to be contributing to these NCCDs are shown in the left−hand column of the table, and indicators of these can be more readily obtained, from food balance sheet data (as used here) and from dietary surveys, to be identified for future research. The linkage between possible dietary causes and diseases, while no doubt very lagged, probably involves some intermediate health indicators which could be picked up from surveys, clinic records, etc. − examples are obesity, serum cholesterol and lipids, blood pressure, and blood glucose. Such data are not available widely, but again it is worth noting the data that would be the next priority for better tracking of the situation and for early warning of future problems.

Table 5.1 Important dietary risk factors, intermediate health indicators, and diseases[1]

Dietary risk factors/indicators
Total energy (kcals) Total fat (% total energy) Animal fat (% total energy) Complex carbohydrate (% total energy) Fibre Free sugar Antioxidants (vitamins A, C E; betacarotene) Salt

Intermediate health indicators
Obesity Serum cholesterol, lipids Blood pressure Blood glucose

Diseases
Cardiovascular diseases (CVD); especially coronary heart disease (CHD)) Hypertension Stroke (cerebrovascular disease) Cancer (esp. breast and gastrointestinal tract) Diabetes Dental caries

[1] Dietary risk factors may relate to more than one disease, and to several intermediate health indicators. These intermediate health indicators themselves may predict several diseases. Associations between individual risk factors, intermediate indicators, and diseases are not shown here, for simplicity. The table is not meant to be read across for associations (it is not implied, for example, that animal fat is necessarily related to blood pressure, nor blood glucose to hypertension).

Source: Mason (1992); FAO/WHO (1992a).

The relative impact of infectious and chronic disease on mortality at different ages gives one indication of priorities. This can be displayed as shown in Figure 5.1, where the percentage of deaths from these causes, and the actual rates, are shown for the Netherlands, Egypt, and Guatemala. It is clear that in the Netherlands, infectious disease is no longer a major cause of death; Egypt is in transition, where up to the age of ten years infectious disease dominates, and there is still a significant infant and child mortality. In Guatemala infectious disease clearly remains an important priority. Results such as these, even if low coverage had to be accepted, seem quite useful for assessing relative priorities when considering the nutrition and health situation in different countries.

Assessing trends in chronic diseases, necessarily from mortality data in developing countries, runs up against the problem of data availability and quality. Only from certain Latin American countries are there data available over time, with adequate coverage (> 80%) and repeated within periods where the classification of diseases is reasonably comparable (the International Classification of Disease is revised periodically, which complicates trend assessment). The indicators require some care. First, because infectious disease mortality is dropping rapidly, it is important to examine mortality *rates,* from chronic diseases, not proportions – the latter will inevitably show an increase because infectious diseases are coming under control more rapidly than chronic diseases. Secondly, it is essential to *use premature* mortality rates; using total mortality gives a confusing picture as everyone dies eventually of some cause, generally chronic disease, but the objective is usually to prevent these deaths at earlier ages. Mortality rates prior to age 75 are used here. In some cases for assessing trends and comparing countries, me rate in the age group 65 through 74 years is the indicator chosen.

One developing country for which reasonably adequate data on age– and cause–specific mortality rates are available, from the 1970s (1976) and the 1980s (1986) is Mexico, which is fairly typical of Latin American countries (see later in discussion of Figure 5.3). These data have been taken from WHO'S World Health Statistics Annual (e.g. WHO 1992a), and aggregated into the categories shown in Figure 5.2. These are: total premature mortality (Figure 5.2A); infectious and parasitic diseases (Figure 5.2B), and then total chronic

diseases possibly related to diet (Figure 5.2C). This is disaggregated into diseases of me circulatory system (Figure 5.2D), malignant neoplasms (Figure 5.2E), diabetes (Figure 5.2F), and cirrhosis of the liver (Figure 5.2G). For comparative purposes, the estimated mortality from these different causes is shown from the Netherlands, as an example from a highly industrialized country with good statistics. Mexico is equivalent roughly to Egypt in Figure 5.1, that is in transition from high infectious disease mortality to chronic disease.

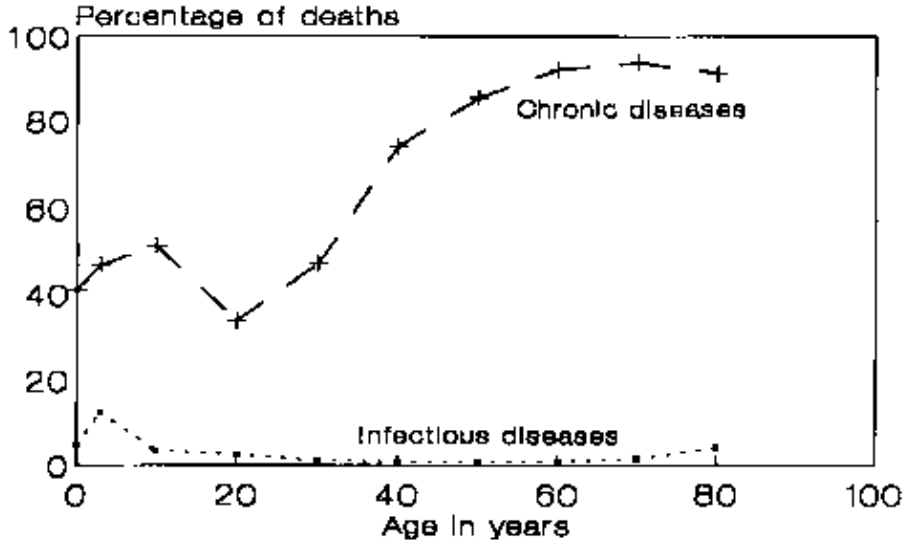


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – A. Netherlands (1988)

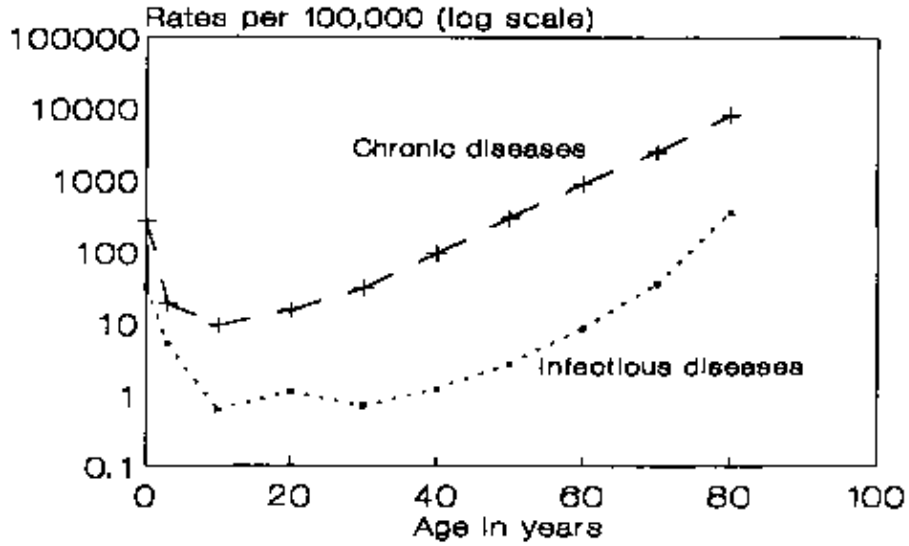


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – B. Netherlands (1988)

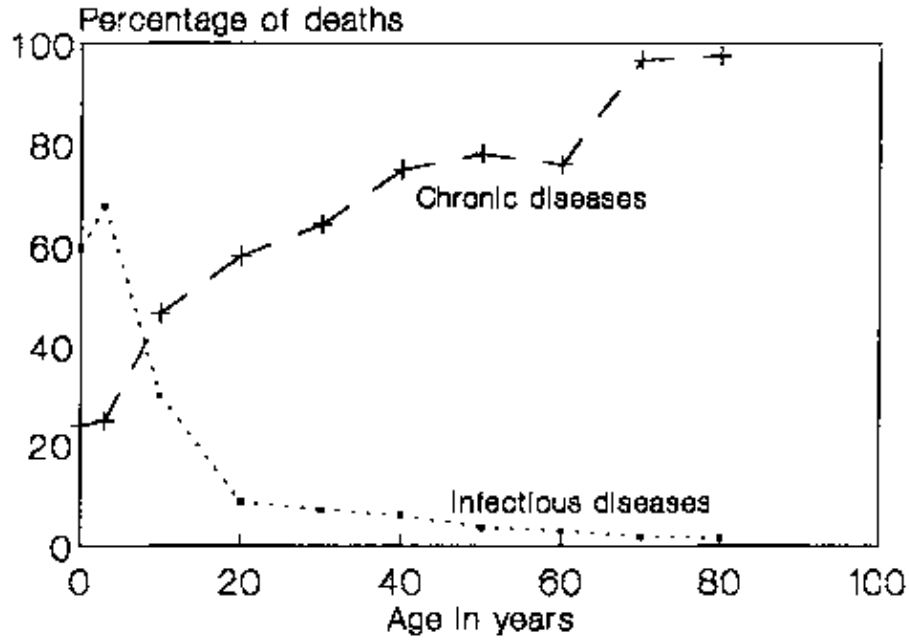


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – C. Egypt (1987)

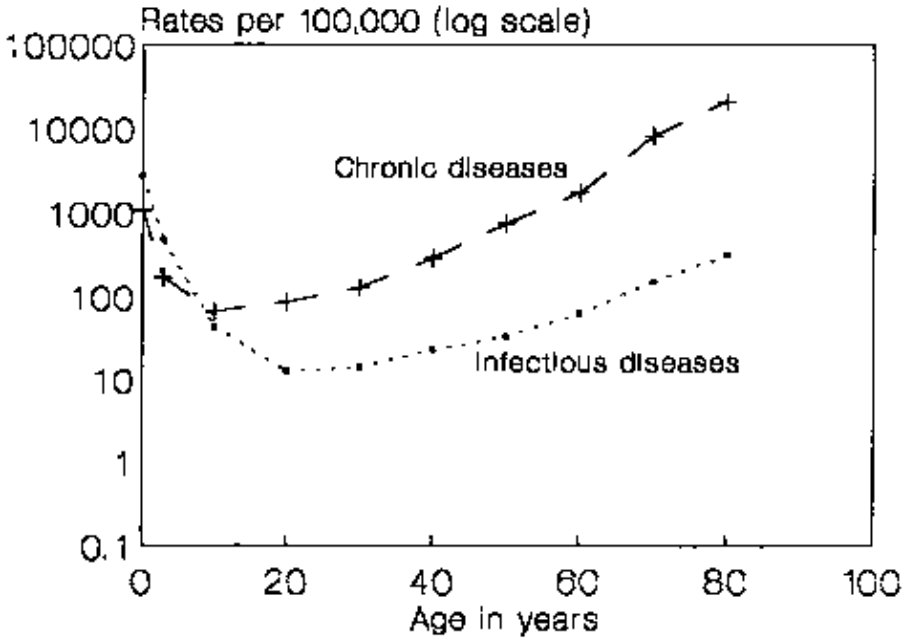


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – D. Egypt (1987)

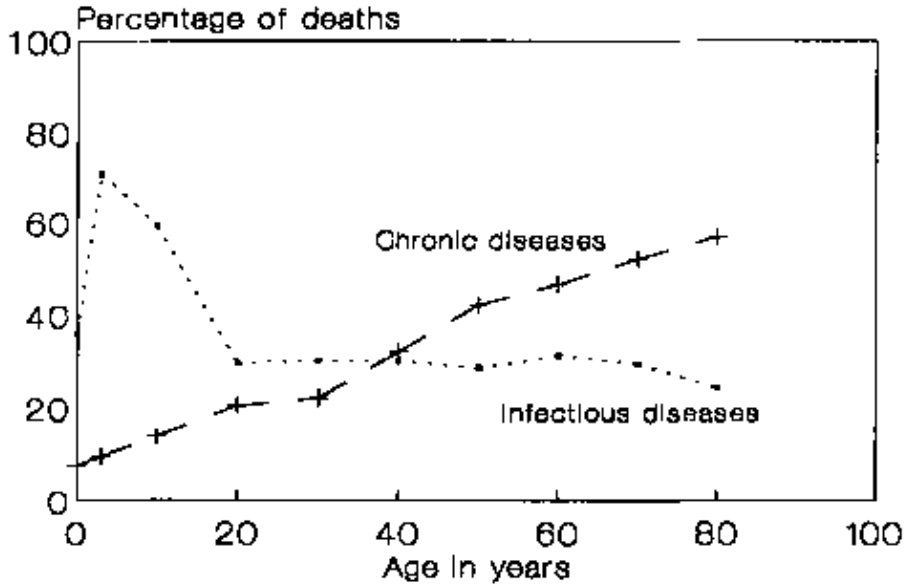


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – E. Guatemala (1984)

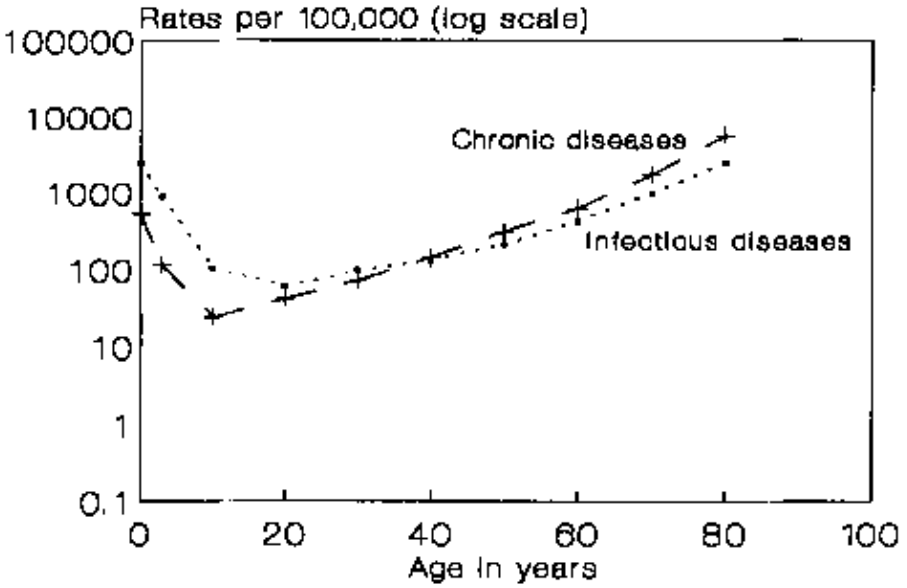


Figure 5.1 Percentage of deaths from infectious and chronic diseases[1] – F. Guatemala (1984)

[1] Ill defined causes of death: Netherlands (1988) 6%; Egypt (1987): 1 to 13%; Guatemala (1984): 9%.

Source: Calculated from WHO data, see Chapter 7.

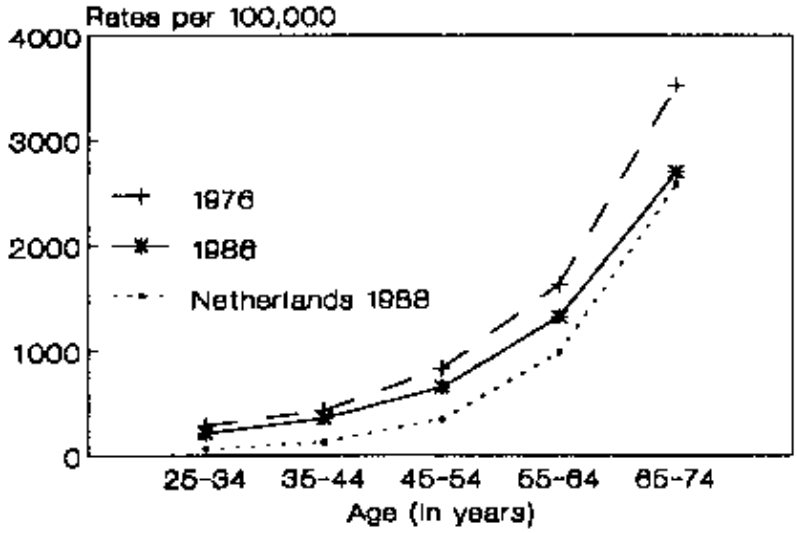


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – A. All causes

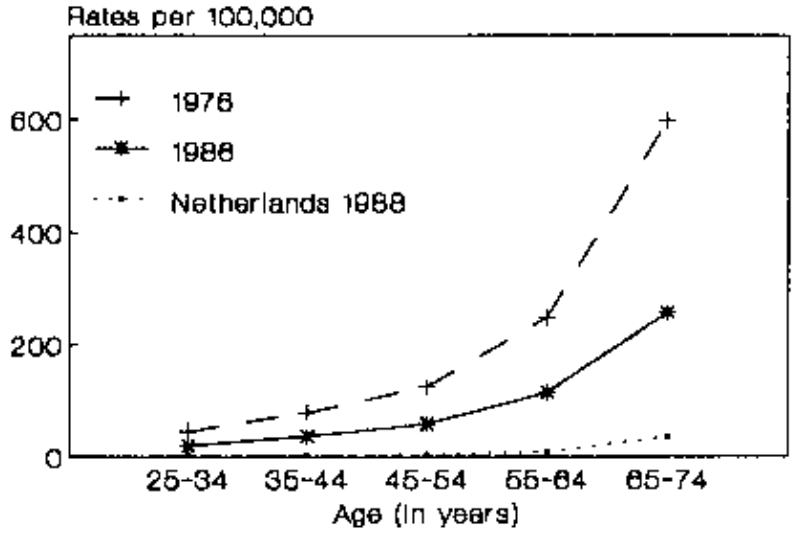


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – B. Infectious and parasitic diseases

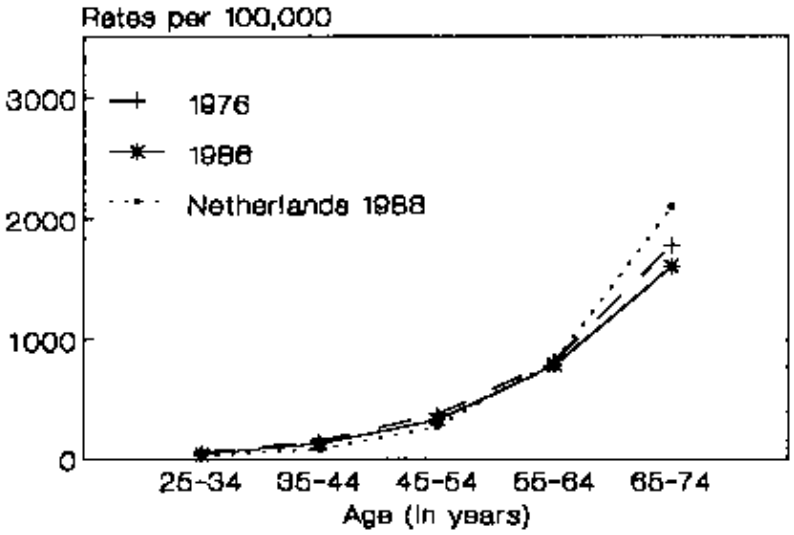


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – C. Chronic diseases

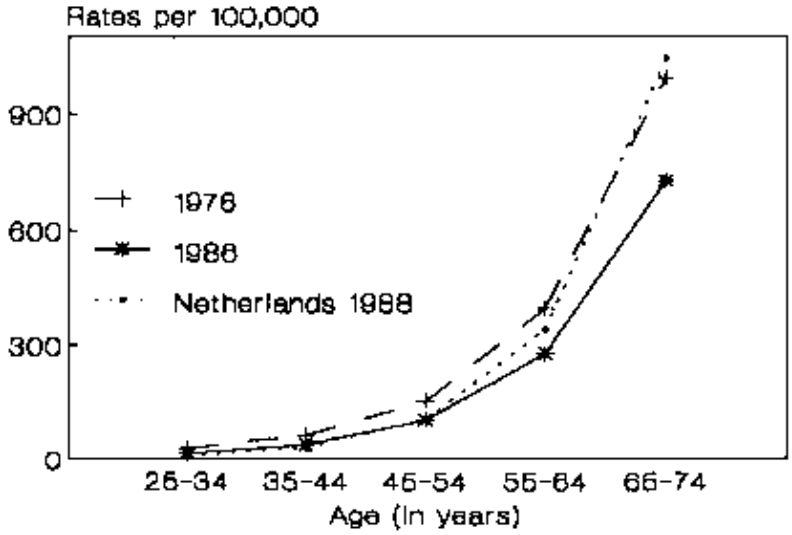


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – D. Diseases of the circulatory system

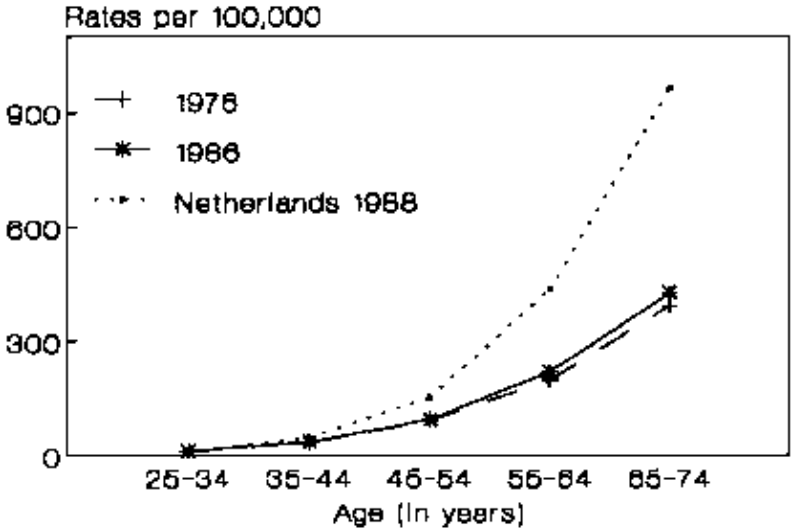


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – E. Malignant neoplasms

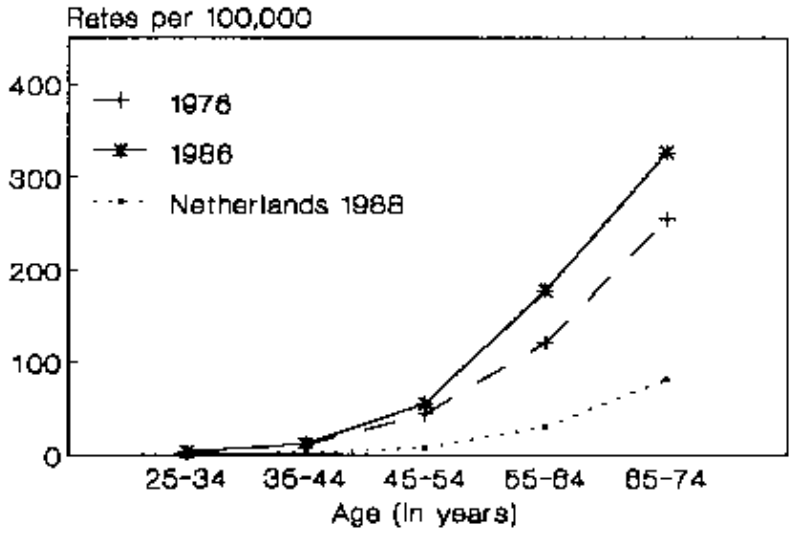


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – F. Diabetes

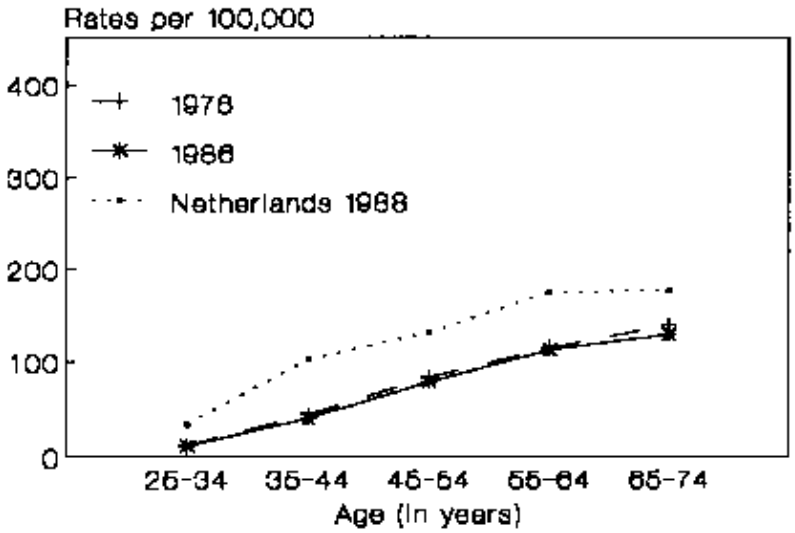


Figure 5.2 Age and Cause Specific Mortality Rates in Mexico, 1976–1986[1] – G. Cirrhosis

[1] Ill–defined causes of death:

Mexico (1976): 7%
Mexico (1986): 2%

Source: Calculated from WHO data, see Chapter 7.

The data in Figure 5.2A show the fall in premature adult mortality between 1976 and 1986, nearing but not yet quite reaching the low levels of the Netherlands. The rapid fall in mortality from infectious and parasitic diseases is clear in Figure 5.2B; nonetheless the rates remain higher than in the Netherlands, and there is still some way to go in control of infectious diseases. In Figure 5.2C the total mortality from the four types of chronic disease possibly related to diet shows little change between 1976 and 1986, but does indicate that this mortality is if anything slightly less than that seen in the Netherlands. The mortality from diseases of the circulatory system (Figure 5.2D) may have fallen somewhat in Mexico, and be slightly below that from the Netherlands. In fact, the experience of the industrialized countries where cardiovascular disease mortality increased rapidly for men until the 1970s, and then decreased, may be as likely a pattern for developing countries as that of Eastern Europe where cardiovascular disease premature mortality is now rising. Countries that are industrializing may not necessarily go through the disease patterns that the West saw.

Mortality due to cancers is currently reported as lower in Mexico than in me Netherlands, as indicated by Figure 5.2E, and appears to be relatively stable. While some of this difference may be due to diagnosis and reporting, at least part may be real, and indicates that it would be important to guard against environmental and behavioural influences that would change such a pattern towards that of the industrialized West.

The one cause of premature mortality that appears to be on the increase in a number of developing countries is diabetes, so the pattern shown in Figure 5.2F for Mexico is probably common. This shows an increase in the diabetes mortality in the 1970s to the 1980s, and a much higher rate than in the Netherlands. As yet, the total mortality reported from diabetes is certainly less than that from the other major causes discussed so far, but the increase is of considerable concern. While the causes are not fully understood, it is likely that increased obesity is at least a risk factor involved. Finally, in Figure 5.2G the mortality from liver cirrhosis is shown. Not a great deal of change is in evidence, and the rate is less, reportedly, than in the Netherlands.

Changes in chronic disease mortality in other countries are compared with Mexico in Figure 5.3. Here the indicator is the mortality from the various causes in the age group of 65 through 74–year–olds. The results from Colombia, Chile, and Costa Rica, compared with Mexico, show the common pattern of falling mortality overall, partly due to control of infectious disease. Overall mortality from chronic disease is falling in all four countries, mainly due to a decrease in mortality from diseases of the circulatory system. Cancer mortality appears to be falling also in Chile and Costa Rica, and stable or rising slightly in the other two countries.

Results such as these based on published mortality data are in line with other specific studies, one of which was recently prepared for the World Bank (Murray and Feacham, 1990), based on data from Cuba, Costa Rica, Sri Lanka, Singapore, Chile, and China. These authors concluded "... this fall in the non–communicable disease mortality runs counter to many widely quoted statements about the 'rise of non–communicable

diseases' with development. The evidence for a decline in non–communicable disease mortality rates in adults, however, in unequivocal".

Nonetheless, there are enough reports from various sources of serious concern for increased morbidity and mortality from chronic diseases in developing countries that the prospect has to be examined carefully. Given the likely long lags between environmental causal factors, here notably diet, and disease, there is a risk that deterioration has not yet shown up. On the other hand, this long latent period may also give opportunity for preemptive action to head–off undesirable dietary changes, to possibly correct early pathology, and to promote future health. The conclusion from the mortality data could be, at least, mat increasing incidence of chronic disease may not yet have occurred; and indeed the situation may even be improving. However, it is clearly important to keep track of both likely causal factors in the diet, and the intermediate health indicators such as those put forward in Table 5.1. Here, we have assessed the evidence from FAO Food Balance Sheet data for trends likely to predispose to chronic disease, in line with me recommendations of the WHO Study Group (WHO, 1990b), which drew attention to a number of dietary characteristics that could threaten or promote health. Risk factors and indicators are given in the first column of Table 5.1. Priority is given to tracking total fat, as a percentage of energy intake; animal fat (as a proxy for saturated fat) as a percentage of total calories; and intakes of complex carbohydrates, a decrease in which is likely to be a risk to health. One of the questions examined was how far dietary changes are inevitable over time, particularly with increased income, here displayed as log GNP per caput. Finally we have used the WHO mortality data (for those countries in which at least one estimate was available) to classify countries into three approximately equal categories of chronic disease mortality, and then chosen the Food Balance Sheet data for these countries.

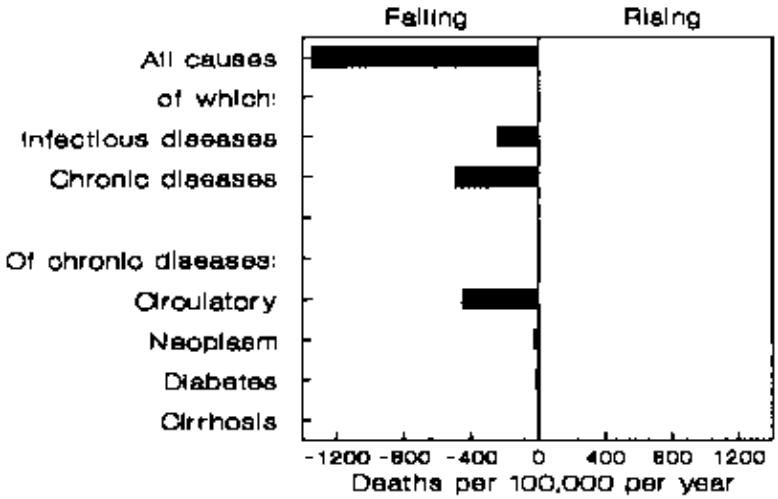


Figure 5.3 Mortality rates of 65–74 year olds: Change from 1970s to 1980s – A. Colombia: 1972–1974

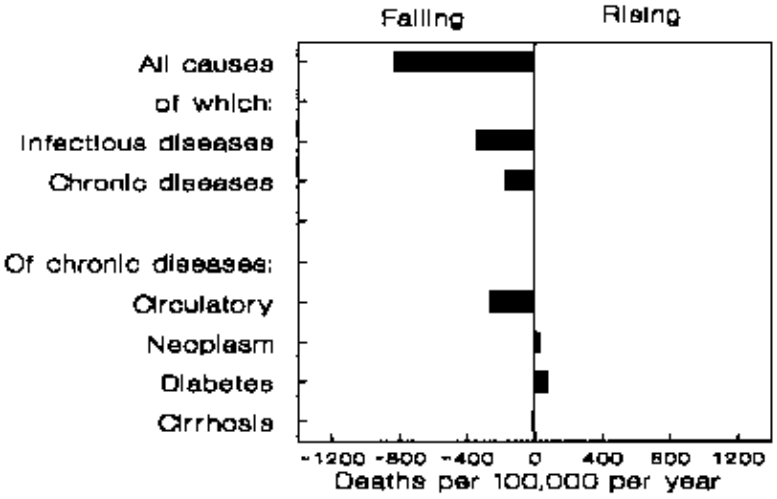


Figure 5.3 Mortality rates of 65–74 year olds: Change from 1970s to 1980s – B. Mexico: 1976–1986

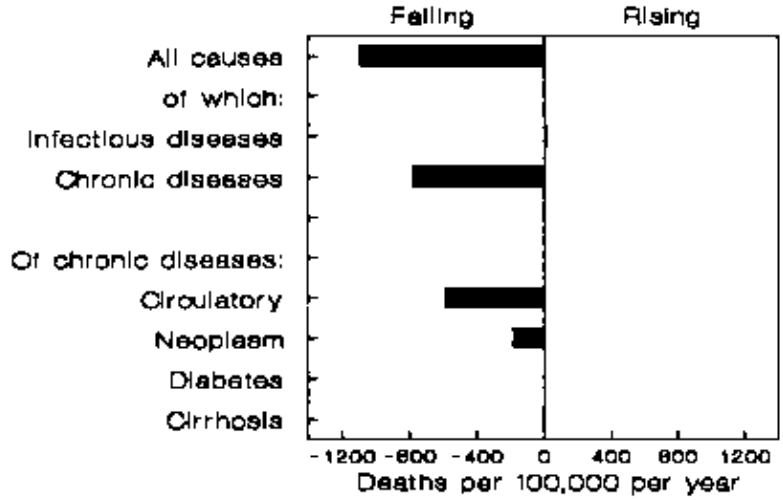


Figure 5.3 Mortality rates of 65–74 year olds: Change from 1970s to 1980s – C. Chile: 1970–1987

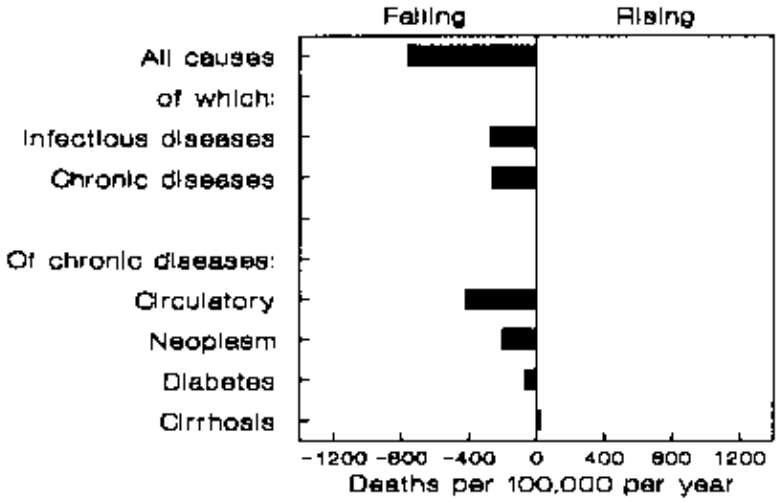


Figure 5.3 Mortality rates of 65–74 year olds: Change from 1970s to 1980s – D. Costa Rica: 1971–1988

Source: Calculated from WHO data, see Chapter 7.

In Figures 5.4 and 5.5, dietary indicators from FAO Food Balance Sheets are plotted against log GNP, for three points in time, 1965, 1980, and 1989. This presentation shows the effects of both GNP changes and secular trends. Further, comparing vertically between the three charts in each figure gives some idea as to possible relationships between dietary indicators and chronic diseases, taking out the effect of GNP.

Examination of Figure 5.4, which shows total fat intake as a percentage of energy, against time and GNP, gives the impression that although there are some increases in total fat percentage with GNP and time, there are also important differences between countries. In other words, to take an example from Figure 5.4(a), Thailand is not necessarily headed to the same high level of fat intake as seen in Spain, say; and given national income (e.g. GNP = US$1,000), there are substantial differences, in this case, between Thailand, Peru, Costa Rica, Portugal and Spain. This can be examined more formally, and it can be shown analytically that different regions are significantly different in their fat consumption from each other, and particularly from Western countries, controlling for GNP and year. In fact, the secular trend itself is not very significant when these variables are in the equation. The tentative conclusion would be that there is a significant and important effect of different food habits (or cuisines) between regions, and it is not inevitable that, for example, Thailand will end up because of increased income with 30 to 40% fat in the diet. At least, the changes are not happening so rapidly that it is too late to embark upon consumer education in an attempt to maintain healthy diets where these are the current practice. For guidance, WHO (1990b) suggested an upper limit for population average intakes of 30% of total energy from fat.

Somewhat similar conclusions come from examining the animal fat intake as shown in Figure 5.5. There is indeed a trend upwards in animal fat consumption, in line with increased consumption of animal products overall with income. Again, there are important differences between different parts of the world; countries

known for high animal production such as New Zealand and Argentina are indeed shown to have rather high animal fat percentages, and also have among the higher mortality rates from NCCDs. In New Zealand and the US there are signs that this percentage is coming down, perhaps in response to public education. For guidance, WHO (1990b) suggested an upper limit on a population basis of 10% of energy as saturated fat.

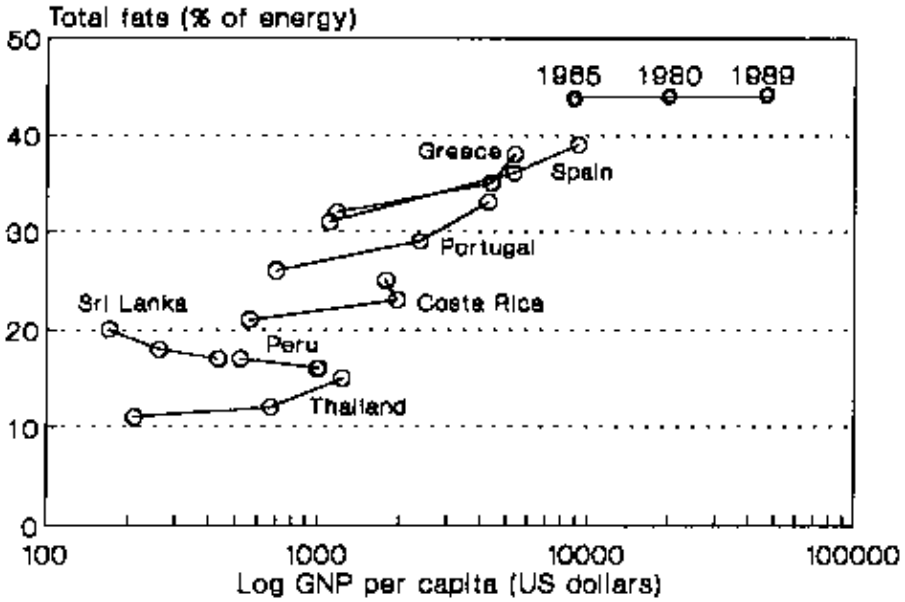


Figure 5.4 Changes in dietary supply of *total fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – A. Low NCCD mortality

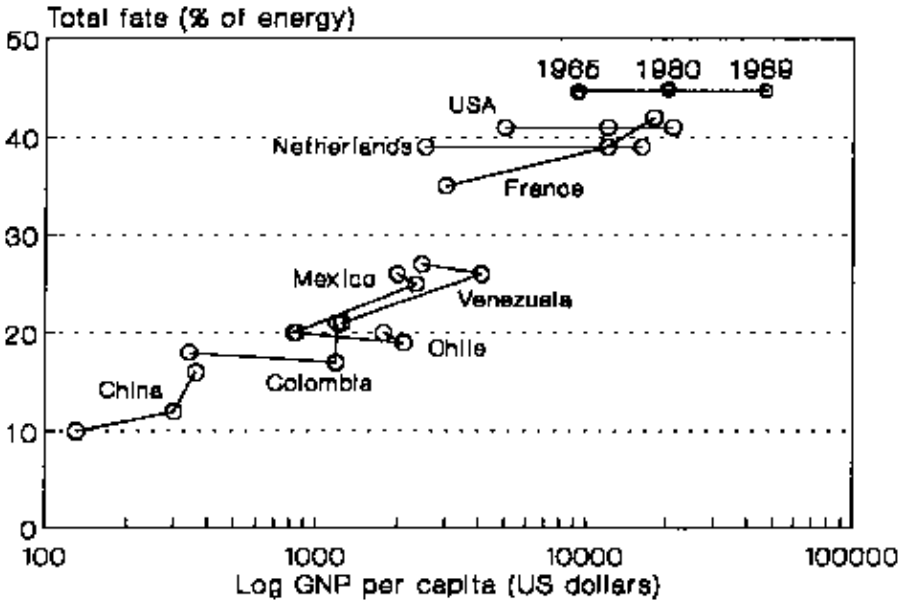


Figure 5.4 Changes in dietary supply of *total fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – B. Medium NCCD mortality

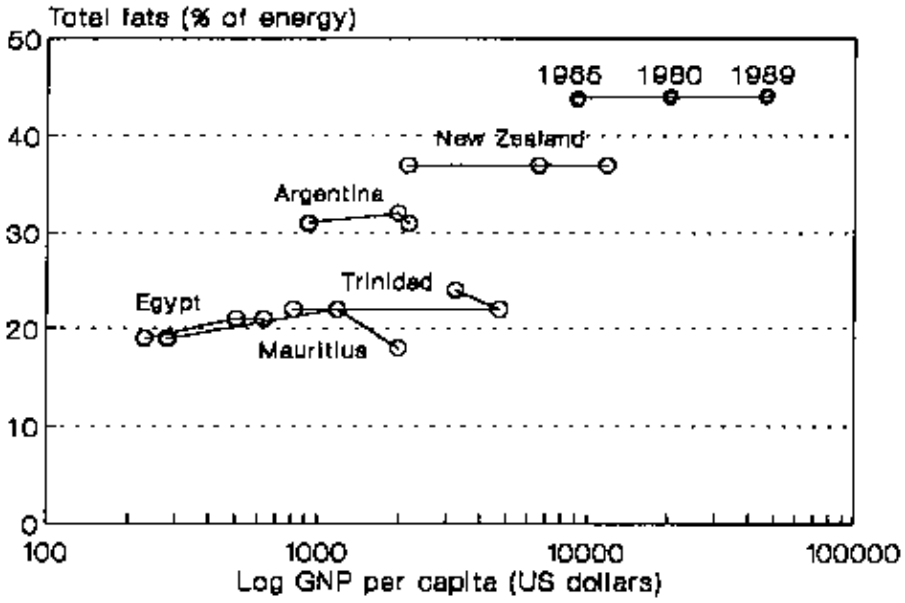


Figure 5.4 Changes in dietary supply of *total fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – C. High NCCD mortality

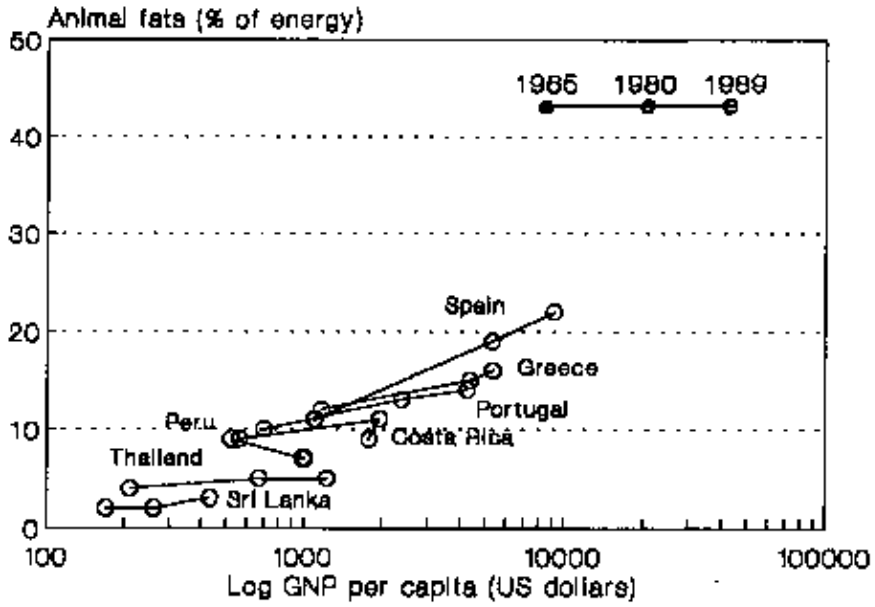


Figure 5.5 Changes in dietary supply of *animal fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – A. Low NCCD mortality

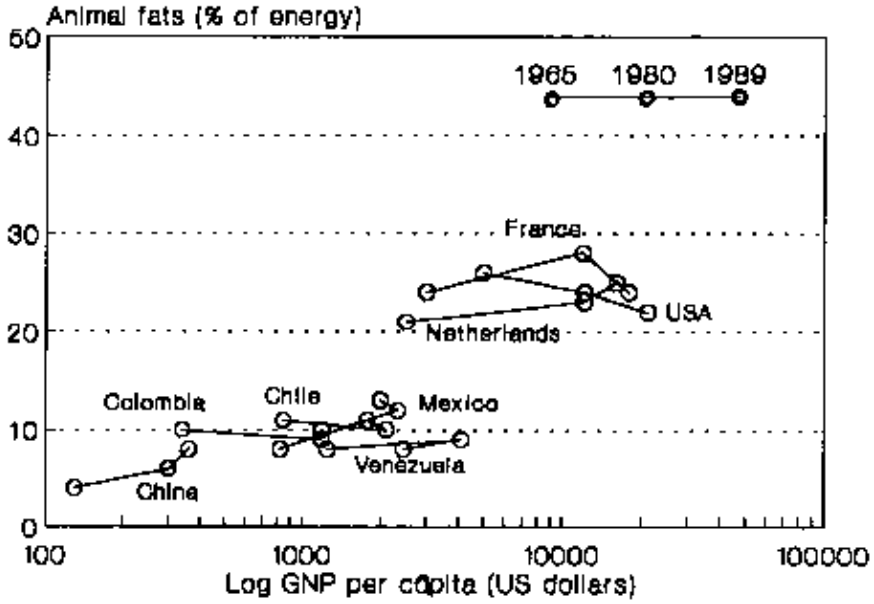


Figure 5.5 Changes in dietary supply of *animal fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – B. Medium NCCD mortality

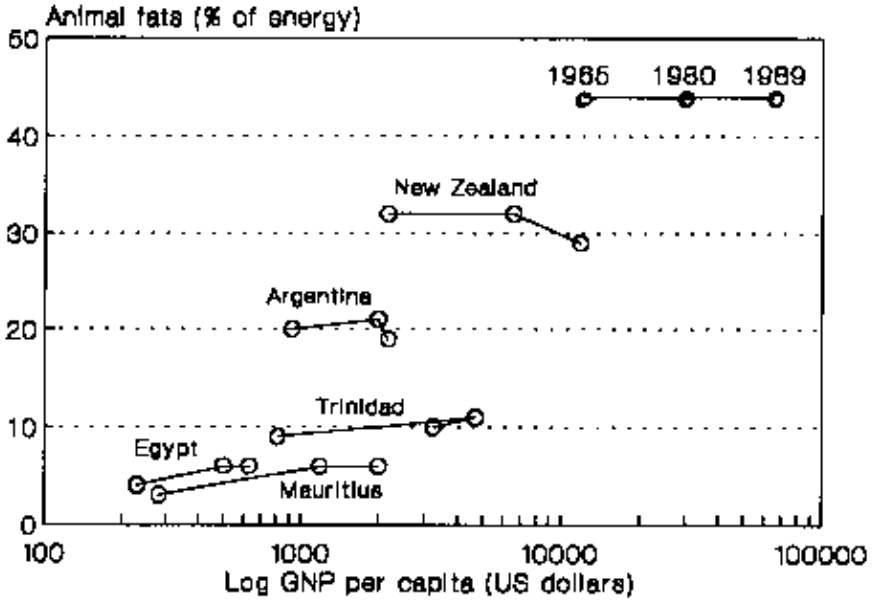


Figure 5.5 Changes in dietary supply of *animal fats* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989) – C. High NCCD mortality

Source: Calculated from FAO data, see Chapter 7.

Note: The graphs combine data on GNP and year. The points represent log GNP and fats as percent of total energy from 1965 (left hand dot), 1980 and 1989, generally from left to right. Where the GNP fell (1980 to 1989 in some countries), but fat percent still increased, the plot bends backward – as in Costa Rica in (A), and Chile, Mexico and Venezuela in (B) and Trinidad in (C). Classification into low, medium and high premature mortality rates from NCCD (non–communicable chronic diseases) is based on data calculated from WHO (see Chapter 7).

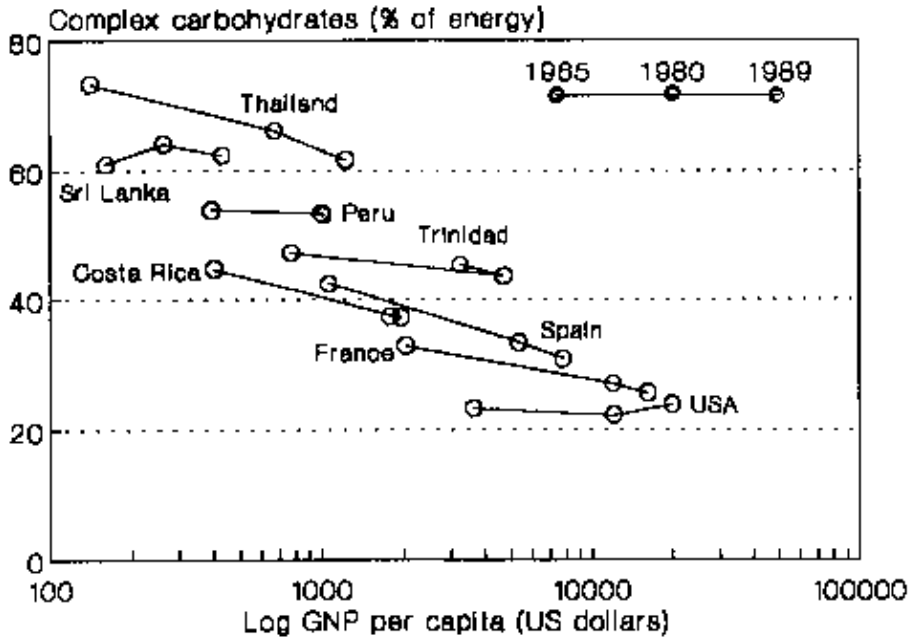


Figure 5.6 Changes in dietary supply of *complex carbohydrates* (as percentage of total energy), with log GNP per capita (1965, 1980, 1989)

Source: Calculated from FAO data, see Chapter 7.

In a number of countries GNP fell during the 1980s, which gives rise to a somewhat unfamiliar plot in Figures 5.4 and 5.5, where the line bends back on itself – Mexico, Venezuela and Chile are examples in Figure 5.4B. The fact that they bend upwards means that fat percentage still increased in 1980 to 1989, even though GNP per caput fell. This is some evidence that once a certain level of fat intake is adopted, even if this is in response to increased income, if income declines the food habits do not change very rapidly; in fact the fat proportion continues to increase somewhat over time. The pattern is a combination of dietary habits evolving over time, and responses to increased income.

Associations of these indicators with NCCD mortality are, however, not very striking. Drawing a vertical line in Figure 5.5 and comparing percentage animal fat intakes for charts (a), (b), and (c) controls for income, and does indicate some possible association of mortality with animal fats, which is indeed in line with theory. But the more general conclusion is that while diets in almost all cases are on a trajectory towards higher fat, and that at a certain level this will become undesirably high, the rate of change at least on average is not so rapid that it is too late to take preventive measures.

The other side of the picture of dietary change concerns consumption of complex carbohydrates, which tend to get displaced by increasing fat intakes, and consumption of free sugars. These intakes are shown in Figure 5.6, which does indeed indicate a somewhat concerning general trend downwards. The range of consumption is also striking, from 60 to 70% in Thailand, down to around 25% in the US. The WHO Study Group (WHO, 1990b) suggested that population average intakes should be of the order of 50 to 70% and it is clear that the richer countries are well below this, and that others are heading in the wrong direction.

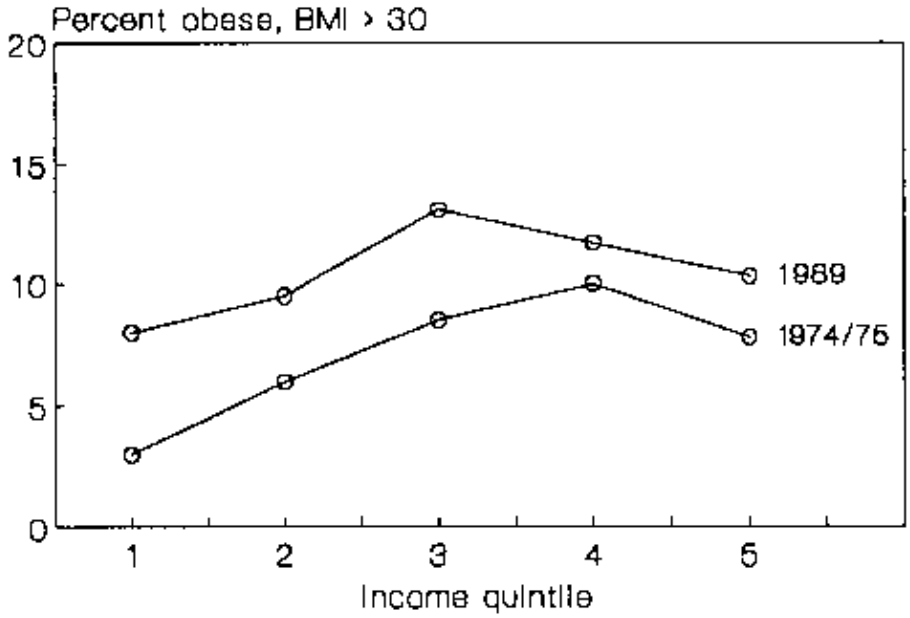


Figure 5.7 Prevalence of obesity of women in Brazil by income group, 1974/75–1989

Source: Coitinho et al. (1991).

It will be important in the future to track intermediate indicators, of which the most widely available is likely to be obesity. There is some evidence for increasing prevalences of obesity in many parts of the world, particularly among the poor in better off countries, and the middle income groups in some developing countries. The risk of obesity is probably related to increasing urbanization, and there are reports from Latin America of a rapid transition from undernutrition to overnutrition, and indeed of the coexistence of obesity and underweight in me same households. Finally, dietary and other factors, such as tobacco use, may interact to produce particular risks with changing life styles (Peto *et al.,* 1992).

An example of both the increase in the prevalence of obesity, and its shift towards lower income groups with development, is shown in Figure 5.7, which takes data from studies of nutrition in Brazilian adults. In the first survey, in 1974/75, around 10% obesity was observed towards the upper part of the income distribution among adult women. By 1989 both the level had increased, to a maximum of around 13% and the peak prevalence had shifted down to the middle of the income distribution. In other words obesity had increased, and had begun to preferentially affect the poorer population. It is likely that this evolution will be seen in a number of other countries, and is a warning sign for future problems of chronic disease.

Chapter 6: Projections of Malnutrition in Children

Projections of likely trends in underweight prevalences seem important as background consideration for future actions, for example, in the International Conference of Nutrition of 1992, and in relation to the goals of the World Summit for Children of 1990 (UN 1990). It may be useful to have a view of the probable evolution of the situation, when existing policies and conditions continue, to see what may happen, and to add to this the likely effects of changed policies and resource availabilities.

There are several approaches to projecting future trends. All are uncertain and require making explicit the assumptions. Given the uncertainty, simplicity has some value. One generally reasonable way is to bound the projections on the basis of historical trends. Another is to use econometric modelling techniques – through a series of structural equations which contain certain variables affected by policy – to look at the effects of the likely changes in these (for example, calorie availability, education levels, government funding support). In preparing this report, not too much time was assigned to the latter approach; results may be somewhat superficial, but are interesting as background for considering future policies. A more detailed approach was taken by Kelly (1992), with largely comparable results

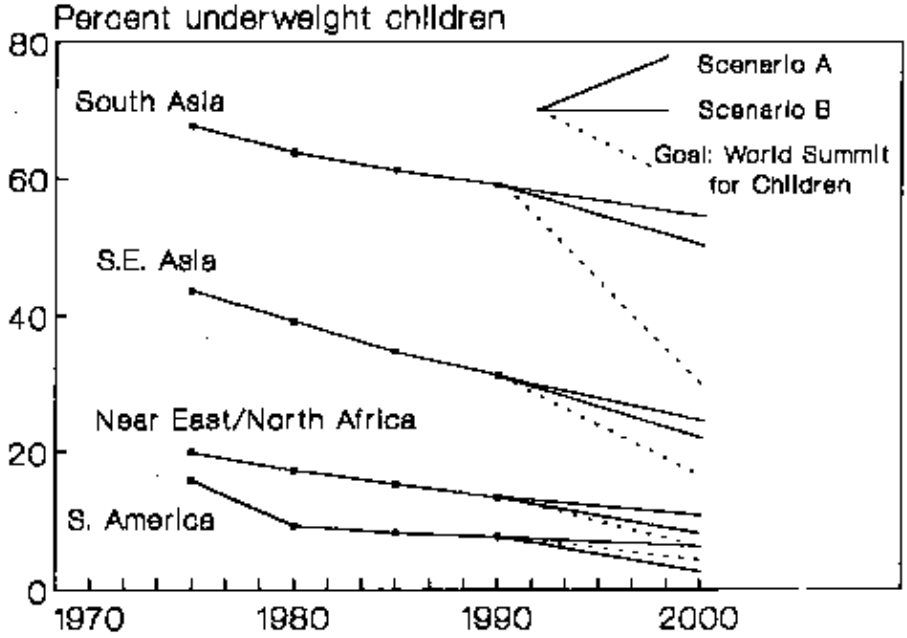


Figure 6.1 Projections: Trends in prevalence of underweight children: Year 2000.

The approach giving the results illustrated in Figures 6.1 and 6.2 is based on the historical trends – that is to say: an optimistic trend (called scenario B) would be to apply the best observed rate of change over a five–year interval during 1975 to 1990 to the regional grouping of countries. A pessimistic trend (called scenario A) is to take the worst five–year rate. Thus, for example, we could say that "if the trends in 1990 to 2000 are like the period from 1975 to 1980, we will see....; if like 1980 to 1985, we will see.... (or variations on this)". The projections based on historical trends do not account for possible positive breakthroughs in the future, e.g., new uses of biotechnology; nor of possible negative shocks and disasters, like uncontrolled spread of AIDS.

The results, shown in Figures 6.1 and 6.2 and summarized in Table 6.1, are also compared with the trend required to meet the goals set at the World Summit for Children (UN 1990) of "halving the prevalence of malnutrition by the year 2000" as shown by the dotted lines.

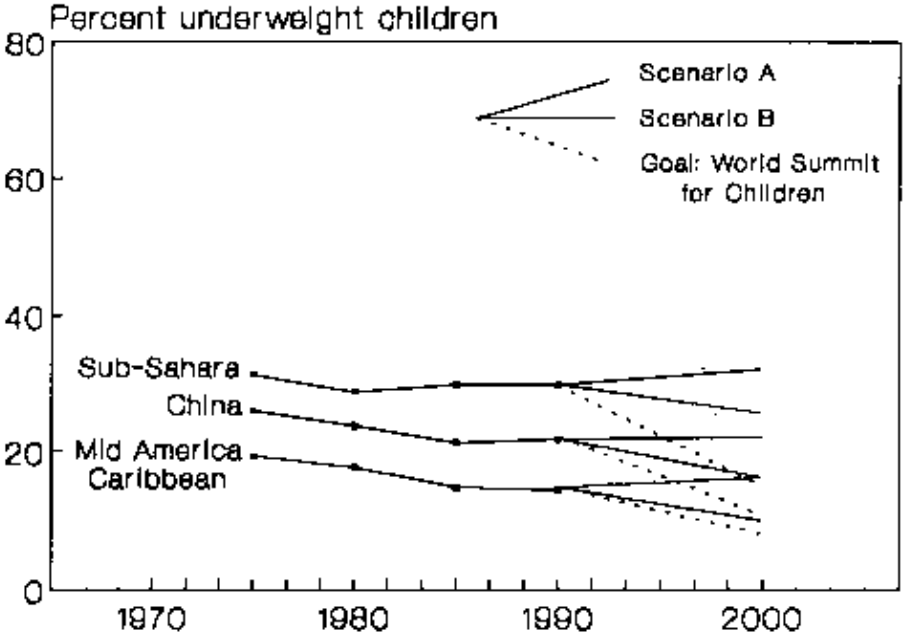


Figure 6.2 Projections: Trends in prevalence of underweight children: Year 2000

Table 6.1 Projections: Trends in Prevalence and Numbers of Underweight Children (1990–2000)

	Percent Underweight	***Numbers Underweight***

	Year 1990	*Year 2000*			*Year 1990*	*Year 2000*		
		Based on Historical Trends				*Based on Historical Trends*		
Region		*Scenario A Pessimistic*	*Scenario B Optimistic*	*WSC Goals*		*Scenario A Pessimistic*	*Scenario B Optimistic*	*WSC Goals*[1]
	(Percent)				*(Millions)*			
Sub–Saharan Africa	29.9	32	27	15	28.2	38	30	18
Near East/North Africa	13.4	11	8	6	4.8	5	3	2
South Asia	58.5	54	49	29	101.0	110	100	59
South East Asia	31.3	24	22	16	19.9	17	15	11
China	21.8	22	16	11	23.6	30	24	15
Middle America/Caribbean	15.4	16	10	8	3.0	4	2	2
South America	7.7	6	2.5	4	2.8	2	1	1
All Developing Countries	34.3	32	27.5	17	184.0	206	175	108

[1] Goals of 1990 World Summit for Children (UN 1990).

This emphasizes that for most countries, a great deal of deliberate action, much more than ever before, would be needed to shift the trend line downwards to the extent of meeting the goals.

In South Asia. if the trend followed the 1970s (scenario B), an improvement of about 10 percentage points would be achieved – from 59% underweight in 1990 to 50% in the year 2000. The Summit goal for South Asia for the year 2000 is 29%. In terms of numbers, the percentage reductions under the more optimistic scenario (B) imply that the number of underweight children will remain static at around 100 million due to population increase. The size of the under–five population is likely to change, too, because fertility rates and IMR are also expected to decline, under the assumptions by the UN. Using scenario A (pessimistic assumption based on the 1980s trend), the improvement in South Asia is estimated at only 3.5 percentage points in prevalence – leading to an increase in the numbers of children underweight from 101 million in 1990 to 110 million in the year 2000, as a result of population increase which would be greater than the decline in percentage underweight.

In the case of South East Asia, scenario B (using the optimistic trends that occurred in the 1980–85 period) is likely to be closer to the Summit goals with a prevalence of 22% underweight in the year 2000, compared to the Summit target of 16% prevalence. In both scenarios for South East Asia, the numbers of underweight should decline by the year 2000, continuing the favorable trends observed in the last 15 years.

In contrast, the results of projections for Sub–Saharan Africa, even on scenario B, are pessimistic (see Figure 6.2). If the relatively good situation in the 1970s in this region were reestablished, a minor improvement in prevalence of 3 percentage points (1990 to the year 2000) would be achieved. In the pessimistic scenario (A), the prevalence would rise from 30% to 32%, and there would be 38 million underweight children in the year 2000 compared to 30 million in 1990. These projections are very far from the Summit goals of 15% prevalence and implied 18 million underweight by 2000. Using the econometric approach of projecting trends (the only region tried for the present report) – does not change the picture much. A simulation in which the policy influenceable variables were allowed to vary substantially does not greatly alter the overall conclusions. For instance, the year 2000 simulation that allowed a 200 kcal per capita increase, supplemented by an increase in the social support government expenditures by 20% and an increase in female secondary schooling by 20% produced a 4 percentage point improvement in prevalence, similar to scenario B. And this is without allowing for the potentially devastating effects of AIDS.

In North Africa and the Near East, prevalence of underweight would likely decline by anywhere between 8 to 11 percentage points from the 1990 rate of 13.4%, In China, if the 1970s trend were reestablished, the prevalence would fall to 16%, from 21% in 1990.

It is worth noting that, on present trends, South America will reach a prevalence by the year 2000 of roughly 2.5% – a figure comparable to the expected underweight prevalence in the NCHS growth standard. In other words, the nutrition situation as assessed by the indicator of underweight children would be comparable to industrialized countries.

There are a number of implications from the various scenarios of the future of malnutrition. First, even the optimistic scenarios fall way outside the World Summit for Children's goals. Secondly, the projected trends do not give a reasonable nutrition situation, at least in South Asia and Sub–Saharan Africa, in the foreseeable future – not for perhaps 100 years at the present rate will malnutrition (as evidenced by underweight children) cease to be a problem in South Asia.

There is increasing evidence, however, that direct interventions can have a short gestation period for improving nutrition (see ACC/SCN, 1991b). For example, results of the Tamil Nadu Integrated Nutrition Programme indicate substantial impact, by a combination of targeted health/food/education interventions. Rapid declines in child underweight prevalences were achieved in Thailand, related to many years of community–level programmes. As noted earlier, there is evidence that energetic community–level programmes in some African countries – such as Tanzania and Zimbabwe – have had a real effect. Wider application of such programmes could contribute to accelerating improving trends.

These results are preliminary, and intended at this stage to give an order–of–magnitude view of how the present rate of progress seems. The goals of the World Summit for Children provide an important basis for comparison. A next step now would be to assess what options there are for accelerating improvement. This should be at national level, in turn requiring assessments of national trends. Some of these are given in Volume II of this report. Analysis of why nutrition improves is needed as a guide to future actions. One compilation of relevant case studies will be in the forthcoming results of the SCN's Country Programme Review. However, most of the action is required within countries, to get updated assessment of trends, analyze current experiences, and determine future policies and programmes to improve nutrition. Even crude projections as shown in this chapter could usefully be attempted nationally or, indeed, for population groups within countries, to help guide decisions on future actions.

Chapter 7: Technical Notes

T he following notes are intended to give information on data used, sources, estimation procedures as well as limitations of this edition of the Report on the World Nutrition Situation. A more comprehensive description of the data, methods, and statistics will be given in Volume II (Methods and Statistics).

The First Report on the World Nutrition Situation (ACC/SCN 1987) and a companion volume entitled Supplement on Methods and Statistics (ACC/SCN 1988) give details of methods and data available at that time and provide the basis for concepts and approaches used in the present report. Previous country–level information is given in the Update on the Nutrition Situation (ACC/SCN 1989). Preparation of the present report included a study of nutrition trends in six countries, which gained detailed information in Brazil, Egypt, India, Mexico, Nigeria, and Pakistan. Summary results will be in Volume II, and full reports will be published in 1993. A related ACC/SCN study ("Country Programme Review"), which aims to examine the determinants of the observed nutrition trends in Brazil, India, Indonesia, Nigeria, Tanzania, Thailand, and Zimbabwe provided additional information for the present report. The latter study will be published in parallel in 1993.

Notes on Chapter 1

Prevalence and numbers of children underweight. Estimates at regional level were calculated using as a first step data from nationally representative surveys as compiled by ACC/SCN, WHO (e.g., WHO 1989), and UNICEF, from national surveys conducted by governments and through several international survey programmes such as the Demographic and Health Surveys (DHS/IRD 1992) financed by USAID; the Living Standards Measurement Surveys (LSMS), sponsored by the World Bank; and the PAPCHILD surveys in the Near East and North Africa region sponsored by the Pan–Arab League and UNFPA. A total of 100 nationally representative surveys between 1975 to 1991 in 66 countries are included in the analysis.

In estimating the prevalence of underweight children, a regression model was used, which derived the prevalence level for each country for each of the reference time points: 1975, 1980, 1985, and 1990. Direct estimates from surveys were used where available, corrected to the reference year. Each country's predicted prevalence rate was multiplied by the preschool child population, then aggregated to the regional level. This gave the number of children aged 0 through 60 months underweight in the region; and dividing this by the total child population of the region gave the estimates of the prevalence of underweight children for the region.

Sources of data and standardization procedures. Only nationally representative underweight prevalence data sets were used for the analysis. Underweight is defined as less than 2 standard deviations of the median value of weight–for–age, using the NCHS standards. This is the cutoff used by WHO (1983) to designate low anthropometric values. National data which were previously reported using other cutoffs (such as the Gomez categories, or 80 percent median) and using local standards – such as those in India, the Philippines, and Thailand – were standardized in terms of 2 S.D. cutoffs using NCHS. Most surveys reported coverage of children in age groups from 0 through 60 months; but in a number of cases, the range reported started at 3 to 6 months and in other cases extended only up to 36 months. Most of the early DHS surveys (1986 to 1989) (see DHS/IRD 1992), for example, covered children from 6 to 36 months. In view of the observed differences in underweight prevalence across age groups, it was necessary to standardize the reported prevalences into their equivalent in terms of the 0–to–60 months prevalence. This procedure is described in Volume II – Methods and Statistics.

Model to predict underweight prevalence. Two models were used: one for Sub–Saharan Africa and another for the rest of the developing world; this was done because the global models were not fitting very well for Africa. Estimation procedures are described in detail in Volume II Methods and Statistics. It should be emphasized that the procedure is intended to produce the best estimates of the prevalence of underweight children where weight–for–age data are missing; and has no reference to causality or structural relationships. The models were explored not only on the basis of goodness–of–fit (R^2) but also by looking carefully at the differences between estimated and actual values (residuals), with emphasis on reducing the residuals on countries with large populations. For the 20 data points for Africa, the model used has an R^2 of 0.82 and a standard deviation of the residuals of 3.3 percentage points. The final model included the following variables: female enrollment in secondary education, kcal availability per capita for the previous year, proportion of calories provided by animal products, proportion from roots; and population. The model fitted for the entire data set of 100 data points has an R^2 of 0.90 and a standard deviation of residuals of 4.6. Variables included were: percentage of females enrolled in secondary education; kcal availability per capita for the previous year; child population; proportion of government expenditures on health, education and social security; dummy variables for South Asia, South East Asia, and South America; interaction between South Asia dummy and kcal availability.

In countries where direct estimates from surveys existed, notably in Asia and South America, where data availability was extensive, it was possible to use actual data corrected to the reference year.

Data for the independent variables used in the model were obtained from various sources. Kcals, proportion of calories from root crops and from animal sources were retrieved from FAO's AGROSTAT (FAO, 1992a), while data on government expenditures from health, education, and social security were calculated from IMF's Government Financial Statistics (1991a). GNP per capita females enrolled in secondary education were derived from the World Bank's World Tables (World Bank, 199 la) and Social Development Indicators (World Bank, 1991b).

Calculation of population with inadequate energy intake (underfed). The results shown in Table 1.1, row 1, and Figure 1.7 of the estimated number of people with inadequate energy intake were calculated by FAO, and are the same results as used in the documentation for the International Conference on Nutrition (FAO/WHO, 1992c). They will also be the basis of FAO's Sixth World Food Survey report due in 1994. The method is described in detail in Volume II of this report, and an outline is given here. The method itself is a refinement of that used in previous World Food Surveys (e.g., FAO, 1987), and revised in the light of new information and considerations (FAO, 1990b; 199 la). Two estimates are required for the calculations: the average kcal supply available for consumption, and the coefficient of variation (cv) of the distribution of consumption.

The average kcal availability is calculated from FAO Food Balance Sheets, which themselves are based on country reports of production and utilization of food commodities, calculated through a "supply–utilization account", described in FAO (1984). These data, given on a kcal per caput per day basis and averaged over a calendar year are calculated for each country. Averaging across countries within a region by year gives the data shown in the panels, section G in Chapter 2. The distribution of food consumed is taken to be log–normal. The coefficient of variation (cv) of household per caput calorie consumption now excludes

short–term random and seasonal variations, and is intended to measure the between–household variation in average food availability during the course of a year. The range of cv is expected to be from 0.2 to 0.35, and individual country estimates are made as far as possible on the basis of existing information from those countries, including household budget surveys where available. The recent methods, and their results, have been described in FAO (1992c). From these two parameters, the mean and the cv, it is possible to estimate the numbers of people falling below a given cutoff point. In using the method, two issues arise: the first is the interpretation of cutoffs, and the second is concerned with correlations between food available to individuals or households, and their requirements or need.

The reference time period has now been defined as one year, and the definition of inadequacy refers to this period. It was decided by FAO that the definition should now be: “those people with food energy consumption averaged over a year inadequate to support more than light activity and maintain body weight”. This means that the cutoff point is set at an average level for light activity, meaning excluding productive manual labour, for which a value of 1.54 BMR (basal metabolic rate) was calculated as typical, based on previous estimates in James and Schofield (1990). Having established the cutoff point, the numbers of people falling below this cutoff can be calculated for each country, given the mean and cv. These are then summed and prevalences calculated in the usual way. It should be noted that the practice is to average these results over three–year periods, hence, the estimates refer for example to 1974/76 or 1979/81.

A particular complication, discussed in FAO (1992c) and other literature to be given in detail in Volume II, concerns the extent to which individuals are able to respond to increased need. In well–fed populations, this correspondence is almost exact, but when food is constrained, people needing to eat more do not have access to it. In other words, the correlation between consumption and requirement breaks down when food is constrained. Clearly, if some people below the 1.54 BMR cutoff did not require as much as 1.54 BMR, their intake could still be correlated with their need, and they should not be counted as low consumption or underfed. The cutoff of 1.54 BMR is considered to be low enough that this degree of misclassification is not very great; moreover, it is somewhat balanced by those above 1.54 BMR who are still not obtaining adequate food for their activity level. The effect of the size of this correlation has been a matter of considerable discussion, but, intuitively, it can be seen that when the correlation is inexact, that is, people are not able to meet their need, particularly over the period of a year, they can reasonably be defined as having inadequate consumption; the converse also applies, when needs are exceeded. The proportion below the cutoff of 1.54 BMR is considered to be a reasonable estimate of the numbers with inadequate consumption, and, certainly, trends in this number are likely to reflect real changes.

Estimates related to DES benefitted from many useful discussions with L. Naiken (FAO) and Dennis Casley.

Other sources for Chapter 1. Micronutrient malnutrition was assessed through food supply data from FAO’s Food Production Yearbook (1990a) and from WHO data on micronutrient deficiency diseases (WHO, 1992c). Publications on women and nutrition included Holmboe–Ottesen et al. (1989) and ACC/SCN (1990b). The latter included a compilation of data on women given in the article by McGuire and Popkin (1990). The “nutrition transition” discussions have been presented in Popkin (1991), and provided a theoretical basis for considering diseases related to unbalanced and/or excessive consumption.

Nutritional goals for the 1990s were agreed at the World Summit for Children (UN, 1990). These included halving mild and moderate malnutrition by the year 2000, and was endorsed by the ICN’s world declaration on nutrition (FAO/WHO, 1992b).

Detailed discussions of anthropometry relating to “Concepts and Indicators” are taken from Uses of Anthropometry (ACC/SCN, 1990a). Box 1–1 on anthropometry is also taken from ACC/SCN (1990a). Assessment methods and interpretation are reviewed in Mason (1992), and FAO/WHO (1992a).

The regression model used in Box 1–2 is given in Volume II, “Methods and Statistics” A quadratic income specification had the best fit, indicating strong nonlinear relationships between GNP per capita and prevalence of underweight children. The effect of government social expenditures (health, education, and social security) is significant after controlling for GNP per capita and other variables. This implies that the contribution of public action in reducing the levels of malnutrition could be significant. The dummy for South Asia shows that countries in that region have higher levels of underweight prevalence than most of the developing world, allowing for GNP. Discussions on relationships of social support expenditures to GNP are taken from Gillespie and Mason (1991). Reviews of malnutrition and income relationships are also given in von Braun and Pandya–Lorch (1991).

Concepts of household food security have been widely discussed and summarized in ACC/SCN (1991c), Jonsson and Toole (1991), Maxwell (1990), von Braun, Kumar, Bouis, and Pandya Lorch (1992), Gillespie and Mason (1991), and Frankenberger (1992). Issues of estimating numbers underfed are discussed in FAO (1992c).

Underlying causes of malnutrition – household food security, health, and care – are discussed in UNICEF (1990). Human rights in relation to nutrition are the focus of the World Alliance for Nutrition and Human Rights, recently formed in Oslo, Norway, at a meeting convened by Norwegian Institute of Human Rights and UNICEF in 1992.

Country–level prevalence estimates mapped in Figure 1.3 are derived from the regression model. Changes in prevalence of underweight from 1985 to 1990 mapped in Figure 1.4 indicates the trends for developing countries. A change of +/0.4 percentage point change per year was used as cutoff for defining “improving”, “deteriorating”, or “no–change”. Certain countries with acute problems in 1992 (including Sudan, Mozambique, and Ethiopia) were also identified in the map.

Notes on Chapter 2

Panels one to seven include graphical presentations of the trends between 1975 and 1990 for 15 variables mat describe nutrition, population, health, economy, food, and women’s status. Panels are comparable across regions, and designed after principles put forward by Tufte (1983), as are other graphics. Data were aggregated at the regional level, weighted by population of countries in each region. Methods for four of the indicators – underweight, DES below 1.54 BMR prevalence, DES, and GNP per capita – have already been described in the previous section and will not be repeated here.

Population data were obtained from the United Nations Population Division (1991) estimates. The data are presented on a log scale for comparability in growth rates across the different regional groupings. Trend data on infant mortality rates per 1,000 live births were obtained from the United Nations (1991). IMR is defined as the number of deaths of infants up to the age of one year per 1,000 live births. The regional IMR estimate represents the total of all infant deaths in the countries comprising each region divided by the total number of live births. The total fertility rates expressed in terms of births per woman were obtained from the UN (1991).

GNP per capita figures are given in constant US dollars and are obtained from World Bank’s World Tables (World Bank, 1992a). The regional GNP per capita is derived by aggregating the GNP of all countries in a particular regional group divided by the population of the region. The debt service ratio estimates, which were obtained from IMF Financial Statistics (1991b), are defined as total debt service as a percentage of the exports of goods and services. Debts here include public and private nonguaranteed debt.

Immunization coverage is reported for immunization against measles in children and tetanus for pregnant mothers. Data were obtained from diskette files of the WHO (1992b) Database on Health For All. Regional estimates were weighted by the child population and the pregnant women population of the countries comprising the regions. Data on access to health services and potable water supply were also drawn from the same data base. Access to local health services is defined as the proportion of the population having treatment for common diseases and injuries and a regular supply of at least 20 essential drugs available within one hour’s walk or travel. Access to potable water supply, on the other hand, is the proportion of the population having access to safe water supply in the home or within 15 minutes’ walking distance. Both indicators were averaged at the regional level, weighted by the population of the countries in the region.

Low birth weight data were obtained from estimates by WHO/UNICEF (1992). A low birth weight is defined as a birth weight which is less than 2,500 grams, the measurement being taken preferably within the first hours of life, before significant postnatal weight loss occurs, expressed as a percentage of all live births. The main sources of birth weight information are from hospitals, health facilities, and attended births. Coverage is a major issue; therefore, the trends reported should be interpreted with caution. The regional averages were weighted by the countries’ live births.

Maternal mortality rate figures were obtained from WHO (1991b). This is expressed in terms of number of deaths per 100,000 live births. Like low birth weight data, information on maternal mortality rates is scanty and unevenly reported. Coverage is also a major issue; therefore, the trend estimates should be interpreted with caution.

Breastfeeding trends were drawn from Sharma, Rutstein, Labbok, and Ramos (1991). Useful breastfeeding data are also available from the WHO Data Bank on BreastFeeding (WHO, 1990a), see also WHO (199 la).

Data on education of females were taken from UNESCO estimates and retrieved from the World Bank Social Indicators Database (WB, 1991b). The variable plotted is the percentage of school–age females enrolled in secondary schools, expressed in terms of percent.

A number of materials for this chapter were drawn from results of the ACC/SCN work on nutrition trends in six countries and a related study, “Country Programme Review”. Food trends were also drawn from Food Outlook (FAO, 1992b) and the State of Food and Agriculture (FAO, 1991b), FEWS (1992). Trends in income distribution and poverty were obtained from a compilation by Tabatabai and Fouad (1992).

Background information on countries was compiled from various sources – general sources included Europa (1992), the Economist Book of Vital World Statistics (Economist, 1990), The Economist Yearbook (Economist, 1992). Country–specific sources included UNICEF Situation Analyses, FAO Country Profiles, World Bank Surveys and Sector Reviews. Background information was initially compiled by Nicole Anker, Mahshid Lotfi, Alexander Marin, and Rita Aggarwal.

The Near East/North Africa section draws from the ACC/SCN study on nutrition trends in Egypt (by Nassar, Kaml, Elminiawy, and Moussa 1992). Materials on food subsidies also drew from Pinstrup–Andersen (1989), Alderman and von Braun (1984), Galal et al. (1987), Gabr (1991), and FAO (1991b).

The South Asia section draws heavily on the ACC/SCN trends/country review studies in India by Reddy, Shekar, and Gillespie (1992), and Pakistan by Malik and Malik (1992). Analysis of determinants of levels of undernutrition were drawn from Garcia and Alderman (1989), Alderman and Garcia (1992). The sections on food security were drawn from Alderman, Chaudhry, and Garcia (1988), Subbarao (1989), Sarma and Gandhi (1990), Pinckney (1989), Edirisinghe (1988), Dorosh and Valdez (1990) and Lipton and Longhurst (1989). Discussions on health care availability and utilization draw from Garcia and Aggarwal (1991).

The South East Asia section draws extensively from the ACC/SCN country review in Indonesia (by Soekirman, Tarwotjo, Soemodiningrat, Jalal, and Jus’at 1992) and Thailand (Kachondham, Winichagoon, and Tontisirin 1992). Studies on nutritional status determinants from Senauer and Garcia (1991) and Garcia (1990) were also used in the analysis.

The analysis of trends for China draws from Chen Chunming (1990) and from reviews by Stone (1990), Tong Zhong et al. (1991), and Pinstrup–Andersen, Dongni, Zu De, and Yang Ye (1990).

The Middle America and the Caribbean and South America sections draws on ACC/SCN study on the analysis of the trends in Mexico (Chavez, Avila, Bermeo, Roldan and Madrigal 1992), and in Brazil (Monteiro, Benecio, Iunes, Gouveia, Taddei, and Cardoso 1992). Results from PAHO’s volumes on Health in the Americas (PAHO, 1990) were also extensively used in the analysis. Studies by the World Bank on supplementary feeding programmes (Musgrove, 1991) and on the social funds (Selowsky, 1991) also provided useful information.

Notes on Chapter 3

Much of the data and definitions on micronutrient deficiencies are taken from WHO, summarized in WHO (1992c). Food supply data on micronutrients are taken from FAO’s Production Yearbook (FAO, 1990a). Data were also available in the material for the Montreal Conference on Micronutrient Malnutrition, and given in its report (WHO/UNICEF et al., 1991). Goals adopted by the World Summit for Children, which included virtual elimination of iodine and vitamin A deficiencies, and reduction of iron deficiency anaemia in women by one–third of 1990 levels, are given in UN (1990).

Indicators and methods are reviewed in FAO/WHO (1992a) and Mason (1992).

Information on iron deficiency is available in WHO (1992c). Requirements and other details are in FAO/WHO (1988). Programmes for preventing iron deficiency are reviewed in ACC/SCN (1991a). The NNMB study from India on iron is from NNMB (1980). Consumer behaviour and food choice relating to micronutrient consumption is discussed in Bouis (1991). Data on programmes for control of iodine deficiency are provided by WHO (1992c) and ICCIDD.

Micronutrient deficiency diseases among populations in refugee camps have been reported in the literature, for example, Toole and Waldman (1990). A comprehensive review is in the proceedings of an international symposium held in Oxford in 1991, Refugee Studies Programme (1991).

Figure 3.5 provides estimates of iron density in the diet – a measure of diet quality trends – averaged for the regional country groups, weighted by population. The ratio is defined as total iron in mg. per caput per day per 1,000 calories.

Anaemia trends in Figure 3.6 use cutoff haemoglobin levels of 11 g/dl for pregnant and 12 g/dl for nonpregnant women. The trends in anaemia were calculated from ACC/SCN's data base on women's nutrition.

The global map in Figure 3.6 was plotted from WHO data on IDD assessments and control programmes given in WHO (1992c). The regional estimates of population at risk and affected by vitamin A deficiency was taken from WHO (1992c) and given by WHO regions. The xerophthalmia map, Figure 3.1 is taken from WHO (1987). The map on anaemia in Figure 3.3 was taken from WHO (1992d).

Table 3.3 estimates the prevalence of anaemia by country groups. The estimates were calculated from ACC/SCN data base on women's nutrition. Pregnant women were separated in all analyses and include women 15 to 49 years of age. Results from studies that used other cutoffs were recalculated into the 11 g/dl and 12 g/dl cutoffs, using the means and standard deviations of haemoglobin concentration given in these studies.

Table 3.4 gives estimates of the prevalence of IDD in developing countries according to WHO regions. These are obtained from WHO (1992c). The map in Figure 3.6 was plotted from country data on IDD assessments and control programme given in WHO (1992c).

Chapter 3 benefited from review and comments by E. Aahman and C. Abou–Zahr (on anaemia), J. Kevany (on anaemia), and G. Clugston and B. Underwood.

Notes on Chapter 4

The database for this chapter was compiled from the literature with a publication date of 1980 or later. The data are different from child anthropometry in that they generally do not come from nationally representative surveys. Interpretation, therefore, requires caution. Overall, some 330 different studies from 87 developing countries were included. The nutritional outcome data on women were coded by factors such as: physiological group (pregnant, lactating, and nonpregnant), age, parity, location, and income group; each group was treated as a separate record, thus the the had some 1,500 records. The five main indicators chosen for this analysis are: (1) anaemia (2) proportion of adult women below 145 centimeters in height, (3) the proportion below 45 kg. in body weight, (4) wasting as indicated by percentage of adult women falling below 18.5 body mass index (BMI), and (5) percentage of adult women with a mid–upper arm circumference below 22.5 cm. The cutoffs are those which are most commonly reported in the literature. Standardization procedures were applied to studies which did not report the above–mentioned cutoffs.

Stunting estimates in adult women (15 to 49 years of age), which is given in Figure 4.1, used 145 cm. height cutoff for drawing comparisons of stature across the regional groupings of countries. More than half of the studies reported the 145 cm. height cutoff. For the rest of the cases, prevalences below the 145 cm. cutoff were calculated using the implied distribution given from the mean and standard deviations of heights reported in the studies.

The estimated prevalences of underweight adult women in Figure 4.2 use an arbitrary cutoff of 45 kg. This cutoff is used for making comparisons across regions, and is often used to indicate obstetric risk. Prevalence below the cutoff of 45 kg. can be calculated from the mean and standard deviations of weights.

The 18.5 cutoff in BMI in Figure 4.3 has been suggested by James, Ferro–Luzzi, and Waterlow (1988b) for identifying potential chronic energy deficiency in adults. This BMI cutoff is not necessarily the reference standard and is used here for purposes of making the regional comparisons. The mid–upper arm circumference cutoff of 22.5 cm. is used in this report for comparison across regions; this has also been suggested in the literature as the cutoff for identifying risk.

Data to estimate trends in anaemia are only adequate for South Asia and Sub–Saharan Africa, given in Figure 4.6. Data definitions and sources for low birth weight and maternal mortality rates have been given in earlier sections.

Box 4–1 is taken from Hammer (1981) and quoted from UNFPA (1989). Other references in the text are given in the reference section.

This chapter benefited substantially from a background paper written for the ACC/SCN by Kathleen Merchant (1990). Much of the first two pages of text are taken directly from this paper, which was reviewed by the ACC/SCN's Advisory Group (AGN) in February 1990. Compilation of the data presented and descriptive analysis was done by Mahshid Lotfi (Garcia and Lotfi, 1992) and final analysis by Karen Mason (Mason and Lotfi, 1992).

Notes on Chapter 5

Compilation of data on chronic diseases from WHO publications was started by Virginia Compere. The work was continued by Denise Vogel and Alberto Torres, who began the comparisons with dietary data. A background paper by Torres (1992) provided some material for the Chapter. Useful comments during this work, and a review of the final draft, were provided by Alan Lopez (WHO).

Mortality data were extracted from World Health Statistics Annuals (WHO, 1992a), various issues between 1975 and 1991. Data were classified into the causes of death categories discussed in the Chapter, and aggregated. Rates are given per 100,000 population in the WHO statistics, so could be directly added by age group. One problem encountered is that the International Classification of Diseases (WHO, 1980) has been periodically revised, although the categories for the 1970s are usually reasonably comparable with those of the 1980s. In contrast, the classification in the 1960s was less easy to compare, so generally was excluded. The estimated completeness and reliability of death registration importantly influenced the choice of countries for analysis. These estimates are now given in WHO Statistics Annuals, for 1990 and 1991 (WHO, 1992a, Table I, page xiv). For analytical purposes here, coverage of 80% or more of deaths was used. The coverage data provided by WHO include: estimated percentage for deaths registered; percentage of registered deaths medically certified; and percentage of registered deaths with ill–defined causes. The statistics, which are only available for the Americas, for countries quoted in Chapter 5, are as follows: Mexico, percentage of deaths registered 85%; percentage of registered deaths medically certified 90%; percentage of registered deaths with ill–defined causes 4%; Colombia: 80%, N.A., 6%; Chile: 92%, 91%, 8%; Costa Rica: 95%, 71%, 2%; and Guatemala: 90%, 50%, 10%. In Figure 5.4, countries were classified approximately into terciles of mortality rates, and here it was necessary to include countries where the coverage was unknown; thus, these distinctions into low, medium, and high premature mortality from NCCDs are approximations; the classification was taken from the most recent years for which cause of death data were available.

Trends in dietary supply of total fats, animal fats, and complex carbohydrates were obtained from FAO's Food Production Yearbook (1990a). These were calculated for 1965, 1980, and 1989 as percent of total energy for the respective years for selected countries. Like the kcal data, these were derived from FAO's food balance sheets from which food supply available for human consumption at national level during one year were obtained. Data from national food balance sheets have known limitations when used to describe the levels and trends in fats/carbohydrates intakes because of their inability to reflect changes at the household–level food processing patterns, for example, extent by which households remove or reduce fat intake. Food balance sheet data thus tend to overestimate consumption of fat as proportion of energy. When countries and sub–population groups consciously remove fats, this overestimation could be an important factor in masking fat consumption trends. Thus, it should be borne in mind that the levels of fats implied in Figures 5.4, 5.5, and 5.7 may be an overestimate of the actual levels.

Notes on Chapter 6

Calculations and data in this Chapter are based on those in previous chapters, and explained in the text. The World Summit for Children goal referred to, given in UN 1990 (and reported in SCN News No. 6, p. 27,1990) is expressed as "B. Nutrition (i) reduction in severe as well as moderate malnutrition among under–five children by half of 1990 levels". The indicator generally used to measure this is the same as in this report, that is, prevalence of underweight children.

Projection methods benefitted from discussions with B. Edmonston, J. Haaga, and A. Kelly. An approach using econometric models was adopted by A. Kelly and published as Kelly (1992). These results were given also in FAO/WHO (1992c). Results are essentially similar to those used here, but more detailed.

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