Nutrition–relevant Actions – Nutrition policy discussion paper No. 10

Table of Contents

Nutrition–relevant Actions – Nutrition policy discussion paper No. 10

UNITED NATIONS  **NATIONS UNIES**

ADMINISTRATIVE COMMITTEE ON COORDINATION – SUBCOMMITTEE ON NUTRITION

ACC/SCN STATE–OF–THE–ART SERIES
NUTRITION POLICY DISCUSSION PAPER NO. 10

NUTRITION–RELEVANT ACTIONS

Some Experiences from the Eighties and Lessons for the Nineties

by Stuart Gillespie and John Mason

October 1991

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 Subcommittee 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, World Bank, IFAD, ILO, UN, UNDP, UNEP, UNESCO, UNFPA, UNHCR, UNICEF, UNRISD, UNU, WFC, WFP and WHO. 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 topics 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. Ten–year programmes to address two major deficiencies, vitamin A and iodine, have been launched.

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. As decided by the Subcommittee, initiatives are taken to promote coordinated activities – inter–agency programmes, meetings, publications – aimed at reducing malnutrition, primarily in developing countries.

Information on the ACC/SCN State−of−the−Art Series, as well as additional copies of papers, can be obtained from the ACC/SCN Secretariat. Inquiries should be addressed to:

Dr John B Mason
Technical Secretary, ACC/SCN
c/o World Health Organization
20, Avenue Appia
CH−1211 Geneva 27
Switzerland

Facsimile No: (41−22) 798 88 91
Telex No: 415416

ACKNOWLEDGEMENTS

We are greatly indebted to the following people, all of whom have taken time to comment on previous drafts while many participated in the preparatory and *ad hoc* group meetings: Kalyan Bagchi, Bill Bertrand, Wencke Barth Eide, George Beaton, Alan Berg, Bill Clay, David Dapice, John Field, Marito Garcia, R. Ghirotti, Peter Greaves, Ted Greiner, Marcia Griffiths, Rainer Gross, Abraham Horwitz, Urban Jonsson, Judit Katona−Apte, John Kevany, Benny Kodyat, Reynaldo Martorell, Simon Maxwell, T. Moremi, Elizabeth Morris−Hughes, Sandra Murillo−Gonzales, Philip Payne, James Pines, Alberto Pradilla, Hans Schoeneberger, Kalinidhi Subbarao, Hamid Tabatabai, Julia Tagwireyi, Santiago Tobon, Andrew Tomkins, Tomas Uribe, S. Venkitaramanan and Joachim von Braun.

We would like to thank the Advisory Group on Nutrition (AGN) of the ACC/SCN, under the chairmanship of John Kevany then Reynaldo Martorell, for continual guidance throughout the process leading to this book.

Finally, we would like to express our gratitude to the German bilateral development agency, GTZ, for providing support, enabling the *ad hoc* group meeting to be held and the background paper to be developed, finalized, and published.

S R Gillespie
J B Mason
ACC Sub−Committee on Nutrition
October 1991

FOREWORD

The overall role of the ACC/SCN is to help harmonize policies and activities in nutrition in the UN system. Supporting this, the SCN has compiled information on trends in nutritional problems in the world, and on resources available to deal with these. A range of specific issues has been examined and conclusions published in our State−of−the−Art series. Recently, the SCN decided to review actions that had been taken to address the major problems of underconsumption and malnutrition especially among the poorest, to point the way for renewed efforts in the 1990s. A meeting was held in November 1990 among members of UN and certain bilateral agencies most concerned with nutrition, drawing upon others with wide experience. The experiences during the last decade, as documented in the original background paper, were reviewed by the meeting. Moving on from this, the meeting then discussed lessons for future policy, and recommended that a summary of options for improving nutrition in the 1990s should be published. “Nutrition−relevant Actions” is an up−dated and expanded version of the background paper which includes this summary as the concluding chapter.

Both the review of actions and the summary of options are structured according to the type of nutritional problem so as to facilitate the correct choice of actions. With reference to this latter purpose, nutrition is considered as an outcome. The actual policy−making process, being situation−specific, has not been considered here. Rather, the options presented under each heading should be seen as “building blocks” for policies aimed at nutritional improvement.

Formulating a nutrition policy as an expression of what a government intends to do in order to improve the nutritional status of people on the bases of nutrition–relevant actions through a sectoral approach, is regarded by many as a valuable undertaking, but unfortunately seldom practiced.

Dr. A Horwitz
Chairman, ACC/SCN

PREFACE

The aim of policies for improving nutrition could be summed up by saying: to ensure that people are well–fed, healthy, and well–cared for. This sounds simple, but is not deceptively so. It provides additional focus to addressing the aim of "eradication of hunger and malnutrition" as for example set out by the World Food Conference of 1974[1]. It is useful in organizing the proximal causes of malnutrition, and emphasizing that the three prerequisites of adequate nutrition – food, health, and care – are not alternatives: each is a goal in its own right, they are "ands" not "ors".

The World Food Conference of 1974 in fact gives an important starting point for our consideration of nutrition policies. In Resolution V (devoted to nutrition) the first two recommendations envisaged concerted inter–sectoral food and nutrition plans and policies; subsequent recommendations referred to specific intervention programmes. Although the outcome in practice has not usually been concerted inter–sectoral plans, a very considerable number of specific interventions have been initiated.

The Sub–Committee on Nutrition of the ACC (ACC/SCN) itself stemmed from the World Food Conference, with a mandate to help harmonize policies of the UN agencies in this field. Renewed interest in the Sub–Committee concerning nutrition policies led to the decision to prepare for and convene a meeting on the topic[2]. The direction taken relates much more to ways in which individual policies and programmes have been carried out, and their possible effects, than to a consideration of the inter–sectoral plans previously conceived.

Another stimulus for attempting to review experiences in the 1980s was better knowledge of the outcomes – that is trends in nutrition indicators – as had been compiled by the SCN in its reporting on the world nutrition situation[3]. This provided a better empirical basis than was previously available for relating policies to outcomes. At the same time, a better sense of the level of external resources available had been obtained from the SCN's estimates of flows of external resources; these could be added to government budget data available in the literature[4]. Given the SCN's role in the area of UN agency policy, it made sense to try to assess nutrition–related actions in the light of known outcomes. The SCN had throughout its existence periodically reviewed the state–of–the–art regarding nutrition interventions themselves, in terms of effects[5] and management issues[6].

Work began on compiling case–study material in 1989, and a first draft review was considered at a small preparatory meeting in January 1990. At this meeting the framework for analysis and the scope was considered. Following this, the paper was expanded and revised, to act as a basis for the ACC/SCN *Ad Hoc* Group meeting, held in London, 12–14 November 1990. Funding support was made available from the German bilateral agency GTZ – for which we are most grateful. This enabled the background work to be completed and the meeting to involve representatives of concerned UN and bilateral agencies and several prominent academics in the field[7]. The meeting had the following objectives:

> i) to establish agreement, where possible, on the interpretation of the experience gained in the last decade concerning nutrition–relevant policies and to define areas of uncertainty that need to be resolved;
>
> ii) to decide what actions can now be advocated, by international and bilateral agencies, for improving nutrition under different circumstances (bearing in mind trends in nutrition, and resources available);
>
> iii) to agree on an analytical framework for country–specific studies to document experience in more detail, and to resolve uncertainties.

To emphasize that the focus of the meeting and the review was on problems of poverty and malnutrition the meeting's title was explicit as "*Ad Hoc* Group on Policies to Alleviate Underconsumption and Malnutrition in Deprived Areas".

At the meeting, following detailed discussion of the experiences of the 1980s and lessons for the 1990s, based on the original background paper, it was decided that an initial output from the meeting should be a summary of options for improving nutrition during the 1990s. Such options were to be organized according to their relation to broad nutritional problem areas, whether food or health–related, whether household or individual level. The intent was to provide decision–makers with building blocks for action to improve nutrition, while emphasizing that the final choice of action has to be specific to the particular situation. Hence, a brief entitled “Some Options for Improving Nutrition in the 1990s” was drawn up, circulated to all participants for their comments, revised and published as a supplement to SCN News No 7 (mid–1991). The brief is included in full here as chapter 5, and also effectively serves as a summary of essential considerations distilled from the earlier chapters. After further consultation and revision, particularly to incorporate the meeting's conclusions on its objectives, the background paper was developed into this book.

In sum, we hope this book serves a purpose in providing a framework for grouping nutrition issues and deciding on the type of relevant actions. While it builds on considerable country–level experience in the recent past in drawing some general lessons, it is not intended to be prescriptive. A decision that country A or B should attempt programme X or Y to deal with its nutrition problems, is a decision that can only be made with an in–depth understanding of that particular country's context and internal dynamics. In the ACC/SCN's Country Reviews of nutrition–relevant actions, underway in selected countries[8], such a study is being undertaken – these represent further steps along the road to more informed decisions on actions to combat malnutrition.

The intended audience includes professionals in nutrition–related disciplines in agencies and governments, individuals from other disciplines who may be considering the possible benefits of a greater nutritional orientation in their work, and, more broadly, as an introductory text for use in training. As for most SCN publications, the hoped–for use is in two particular directions. First, the material should be useful for professionals concerned with poverty and malnutrition for advocating increased attention to the problems, indicating possible actions that can be taken. Those to whom this advocacy is addressed may include different levels of policy making, as well as more generally helping to make the case to others with influence, including non–specialists. Secondly, the detailed material is intended for people in their day–to–day work, those concerned with improving the effectiveness and extent of actions to improve nutrition – upon whom most of the progress in this field depends. We hope you find it useful, and through your efforts people will indeed become better fed, healthier, and better cared for.

ACC/SCN
Geneva
October 1991

S.R.G.
J.B.M.

Notes:

1. World Food Conference: Universal Declaration on the Eradication of Hunger and Malnutrition and Resolutions Adopted (FAO: C/75/INF/5, October 1975).

2. Following an initial decision in 1988 (report of ACC/SCN 14th Session, para 104), the Advisory Group on Nutrition recommended and the ACC/SCN decided in 1989 (report of 15th Session, paras 93–95) to carry out the review and hold the *Ad hoc* group meeting in 1990 (report of 16th Session, para 90); and in 1991 to publish the outcome (report of 18th Session, para 41).

3. *First Report on the World Nutrition Situation.* (ACC/SCN, 1987); *Update on the Nutrition Situation: Recent trends in nutrition in 33 countries.* (ACC/SCN, 1989a).

4. Yoon, P., and Mason, J.B. *Estimate of Flows of External Resources in Relation to Nutrition: 1987,1988, and 1989 Multilateral and Bilateral Funding Flows.* ACC/SCN (May, 1991).

5. Austin *et al.* (1978); Beaton and Ghassemi (1982); Kennedy and Alderman (1989).

6. *Managing Successful Nutrition Programmes.* ACC/SCN State–of–the–Art Series No. 8. ACC/SCN (1991a).

7. List of participants is on page 117.

8. This study follows from a workshop held by the SCN at the IUNS Conference in 1989 (see note 6 for output of that meeting) as decided in 1990 (SCN 16th Session report, para 111). It was initiated in 1990 with financial support from UNICEF (SCN 18th Session report, paras 104–106). The reviews currently underway are based in India, Zimbabwe, Tanzania, Colombia and Thailand. Results will be presented at the forthcoming IUNS Congress to be held in Adelaide in 1993, and are intended to be available for the International Conference on Nutrition in December 1992.

Note: Full citations are given in the References section, pp. 119–133.

CHAPTER 1: INTRODUCTION

Concepts and Definitions

'Nutrition' has been used in the past to describe both an input (consumption of nutrients) as well as a set of outcomes. Some of the confusion about the scope of actions to improve nutrition may be cleared up by distinguishing causality and effect. Thus, if nutrition is to be seen as an input, then the focus will be primarily on food. If it is to be viewed as an outcome, on the other hand, then other factors, notably disease, need to be considered. In aiming to reduce problems of nutritional deprivation, it is argued here, the policy focus should be on achieving outcomes rather than pre–defining inputs. This leads logically to the concept of *'nutrition–relevant' actions* – those that affect nutrition even if that is not the main objective – rather than the more restrictive definition of an explicit nutrition policy.

A functional definition of malnutrition is used here – *malnutrition* is defined as a state in which the physical function of an individual is impaired to the point where he or she can no longer maintain adequate performance in such processes as growth, resisting and recovering from disease, pregnancy, lactation and physical work. Such a definition does not imply aetiology, which proximately may be food–related and/or health–related. This book focuses primarily on chronic protein–energy malnutrition – i.e. problems of deficit rather than excess. Micronutrient deficiency problems are considered only briefly, while the important areas of diet–related chronic disease – which refer largely to excesses and/or imbalances – are not included. This is in order to keep the scope within bounds, but requires brief explanation, given later (see “Types of Nutritional Problems”).

The concept of chronic malnutrition, as the main problem of concern here, is illustrated in Figure 1.1. This formulation emerged from an ACC/SCN workshop on “Uses of Anthropometry” (ACC/SCN 1990a) and a fuller description is given in the text under the figure. The physiological processes shown inside the box depend on diet and infection; they are often regarded as related to 'nutrition', and their state as 'nutritional status'. The results are those on the right of the figure – in children, growth, physical activity, morbidity, and psychological development; in adults, physical activity and morbidity. These may be regarded as “nutritional outcomes”, and the state of nutrition assessed by measuring one or more of them.

Growth, measured by anthropometry, is the outcome most commonly assessed. This is consistent with the often–stated view (e.g. WHO 1983, 1986; FAO 1987) that anthropometry is the most useful tool for assessing nutritional status of children. An important point stemming from the figure is that growth (or anthropometry) is not synonymous with nutritional status; moreover, anthropometry may be correlated with physical activity, morbidity and psychological development, but is not on the direct causal pathway.

The prevalence of 'underweight' under–five year old children is useful to summarize nutritional conditions. Such indicators are non–specific to causes, but provide a measure of nutritional outcome (see ACC/SCN 1990a p5). '*Underweight*' is often defined as below 2 standard deviations of the NCHS weight–forage standard (ACC/SCN 1987 p4). One limitation of this indicator is that we are looking at under–five children only and that the severity of their undernutrition and their degree of functional impairment is not captured. Associations have been found between low anthropometric indices and excess infant and child mortality, infectious disease, decreased activity, delayed cognitive development, impaired school performance and decreased productivity (the functional consequences of malnutrition are also illustrated in Figure 1.1). Ideally, several indicators are needed over time to build up a picture of the factors, processes and outcomes associated with nutritional deprivation; thus under the groups of problems discussed below, relevant intermediate indicators are also discussed. Nevertheless, trends in 'underweight' prevalences of under–fives do to some extent reflect the positive or negative effects of nutrition–relevant actions, and give a view of

underlying nutritional trends.

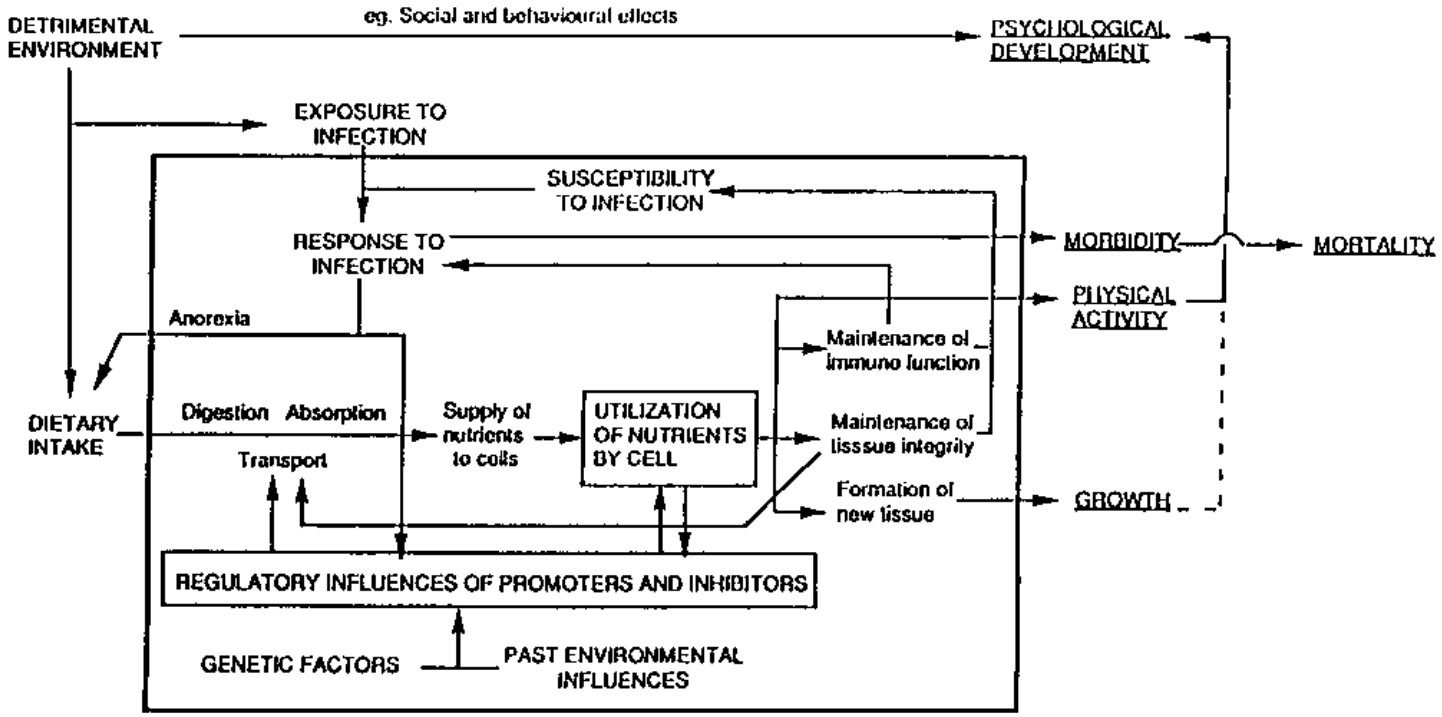


Figure 1.1: Influence of Diet and Other Environmental Factors (outside box) on Physiological Processes in Children (inside box) and Outcomes (on right, outside box, underlined)

Figure 1.1 shows certain physiological processes during growth and development, and ways in which a constraining environment affects these. First, inadequacy of dietary intake can reduce nutrient availability to cells, and impair cellular function, thus affecting susceptibility and response to infection and reducing growth. Psychological development may also be affected, through limited physical activity. However, cell function is also regulated internally, under the influence of both genetic factors and previous environmental influences – the latter for example through altered patterns of tissue development. Further, while susceptibility to infection and response to it are influenced by the competence of the body's immune system (a function of tissue activities) one of the responses to infection is itself an effect on the regulation of cellular activity. Thus, for example, the formation of new tissue (hence growth) might be reduced by: (a) an inadequacy of dietary intake, or (b) by an inhibition of cellular processes responsible for growth, secondary to an infectious process, or (c) by other regulatory influences, or (d) a combination of these.

The figure suggests also that the observed variation in growth rates of young children, or of achieved size in older children, will be derived from the interaction of genetic and environmental factors. Importantly, current environmental effects become a part of the regulatory memory of the body. Consequently, failure to grow at normal stages of development may represent a missed opportunity with a lasting effect observed as stunting at older ages.

Figure 1.1 also portrays a postulated effect of an unfavorable environment upon psychological development. While it is not intended to imply a complete absence of effects mediated through tissue growth mechanisms (e.g. brain development), the figure emphasizes the fact that development of brain function involves interactions with the social environment of the child. These interactions may be influenced by the adequacy of energy intake and utilization for physical activity, such as for play, as well as household effects on child care and other family functions. While both growth failure and impaired psychological development may originate from the same constrained environment, they may have unrelated causal pathways. Thus achieved size would be seen as a marker of the environment that produced both growth failure and impaired psychological development, but small size would not be seen as a cause of impaired psychological development; and the two would not necessarily move together as the child matured (McGuire and Austin, 1987).

Source: Figure and text from ACC/SCN 1990a p4–5

An understanding of the causes of malnutrition is fundamental to the appropriate design of actions to overcome it – the type of solution should derive from the type of problem. Throughout the book, aetiology is briefly discussed before going on to review relevant actions.

Recent Trends in Nutrition

Information about trends is needed in order to adequately respond to problems of malnutrition. This section is largely based on results from the “First Report on the World Nutrition Situation” (ACC/SCN 1987) which brought together various nutrition−related data from several countries to build up regional estimates of nutritional indicators.

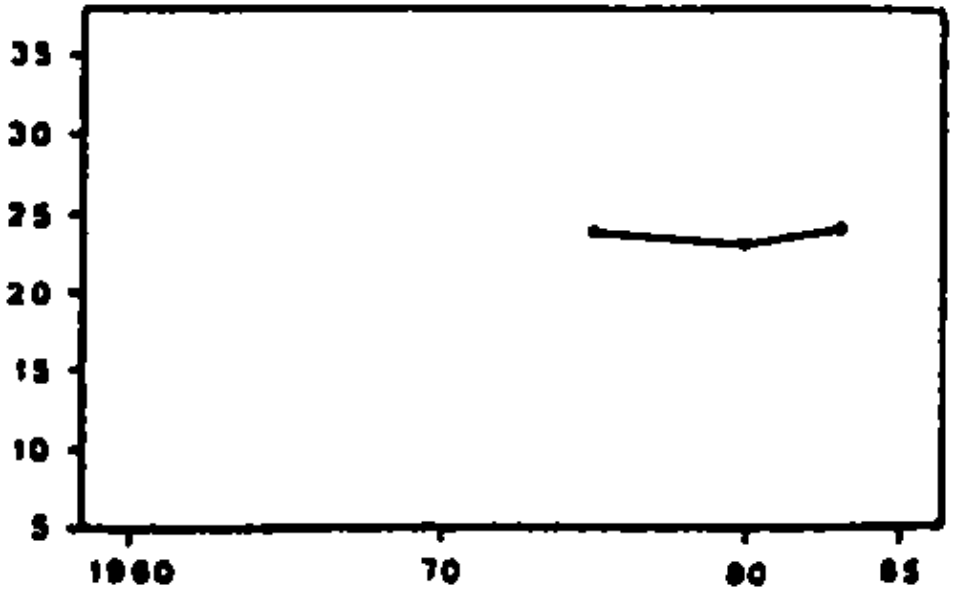
Figure 1.2 (taken from ACC/SCN 1987) shows the trends in the regional prevalences of underweight under−five children from the mid−1970s to the mid−1980s. Prevalences declined in most regions during this period (or in the case of South America remained stable), with the exception being Sub−Saharan Africa where prevalences rose in the early 1980s. Improvements in living conditions recorded in many countries during the 1970s slowed or halted with the severe economic recession of the early 1980s, and this had a marked effect on child nutrition.

These trends are assessed on the basis of country−level data, and may differ considerably within regions (defined according to the UN designations). Only tentative conclusions can be drawn owing to the scarcity of anthropometric data in many countries precluding a more robust assessment. Weight−for−age data are not available from nationally representative samples for the majority of countries and, even when they are, results usually refer to only one point in time; (the 'First Report' also to some extent relies on estimates of prevalences of underweight children based on regression models, incorporating information from food balance sheets, infant mortality rates and other variables, to fill gaps (see section 4.1.6. ACC/SCN 1987)). Nonetheless, the trends shown are considered a reasonable estimate of the recent situation.

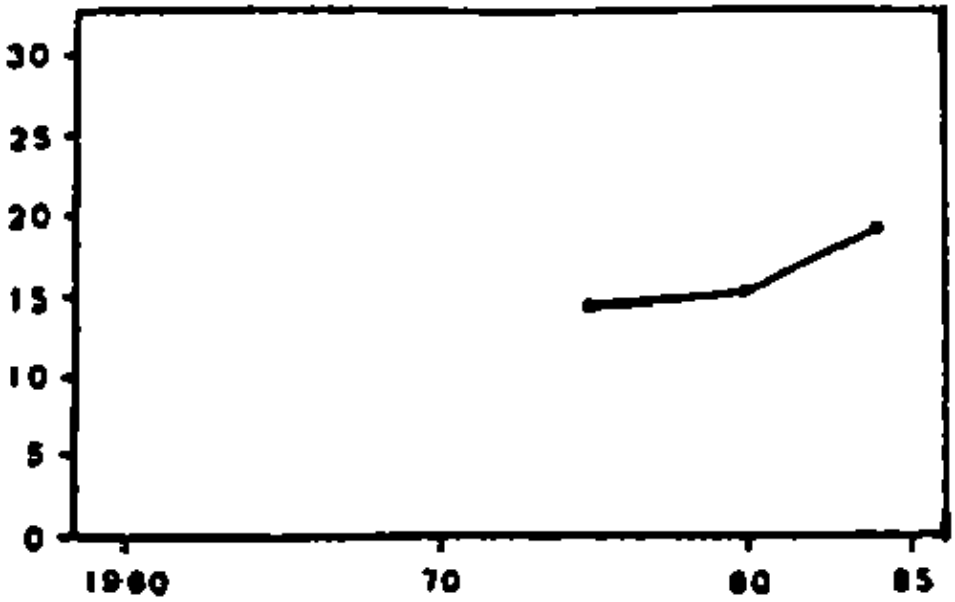
When considering trends, proportions should be distinguished from actual numbers of people. Owing to high population growth rates in many regions, the numbers of underweight children may be rising despite decreasing percentages affected. This can be seen to be the case in South Asia, Southeast Asia, and to a lesser extent in South America. China is the main 'region' where declining prevalences are matched by declining absolute numbers of underweight children. These results provide general background to considering actions taken in the eighties, and lessons for the nineties.

We need to distinguish problems of famine (which involves acute starvation and a sharp increase in mortality) from those of chronic malnutrition (which refers to nutritional deprivation on a persistent basis). They are different problems necessitating different responses, although clearly in the long−run socio−economic development is the answer to both. Famines may be caused by a catastrophic collapse in the entitlements and livelihoods of certain social groups within society, while chronic malnutrition is an outcome of a range of persistent deprivations including food, health care, education and environmental sanitation, etc. Alleviating famine usually requires a rapid deployment of resources for relief, while chronic or endemic malnutrition may be tackled with broader, longer−term policies and programmes, as described later. Countries differ with respect to these two types of problem − India and China are two notable examples. While there has not been a famine in India since the 1943 Bengal famine, chronic malnutrition is still a major problem, accounting in part for high levels of mortality. China, on the other hand (as Figure 1.2 bears out), while succeeding to some extent in controlling endemic malnutrition, was nevertheless hit by an enormous famine in 1958−61 which killed millions.

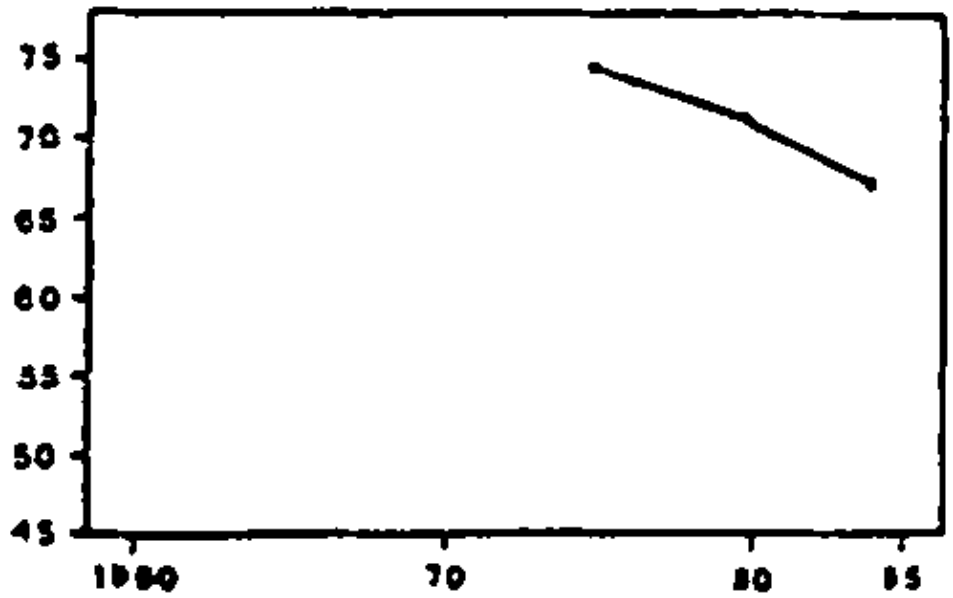
Figure 1.2: Regional Prevalences (percentages, graph (i)) and Numbers (millions, graph (ii)) of 'Underweight' Children (< 2SD weight−for−age)



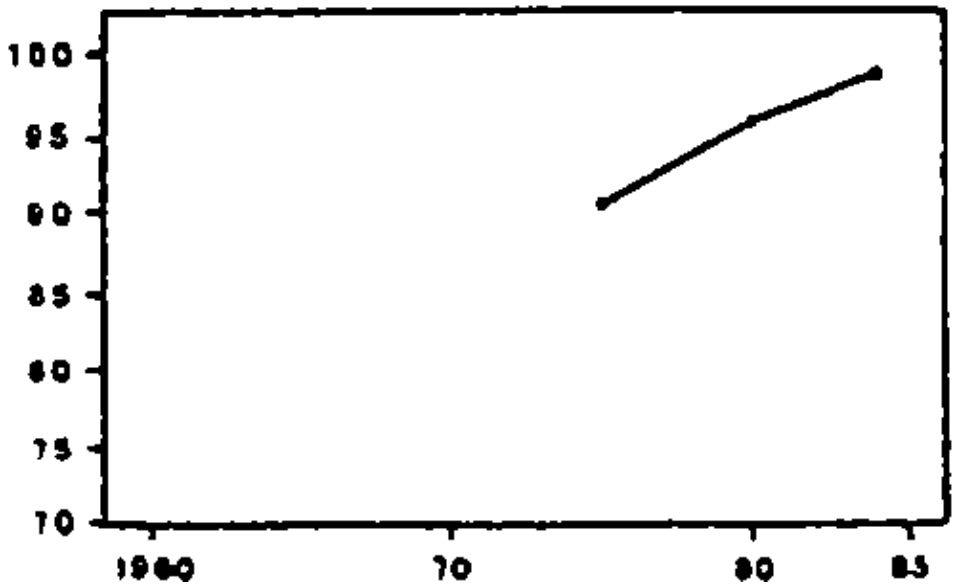
SUB–SAHARAN AFRICA (i)



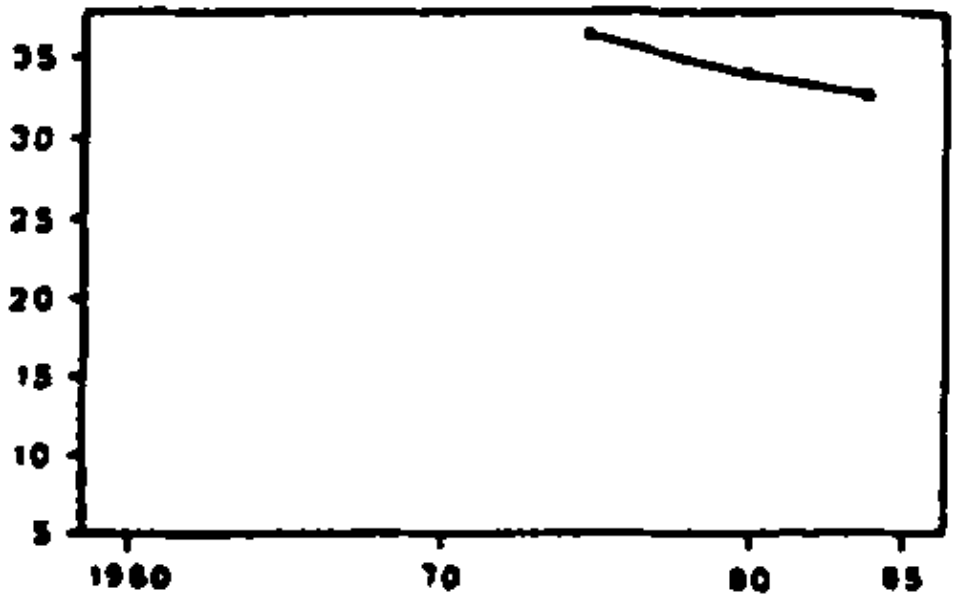
SUB–SAHARAN AFRICA (ii)



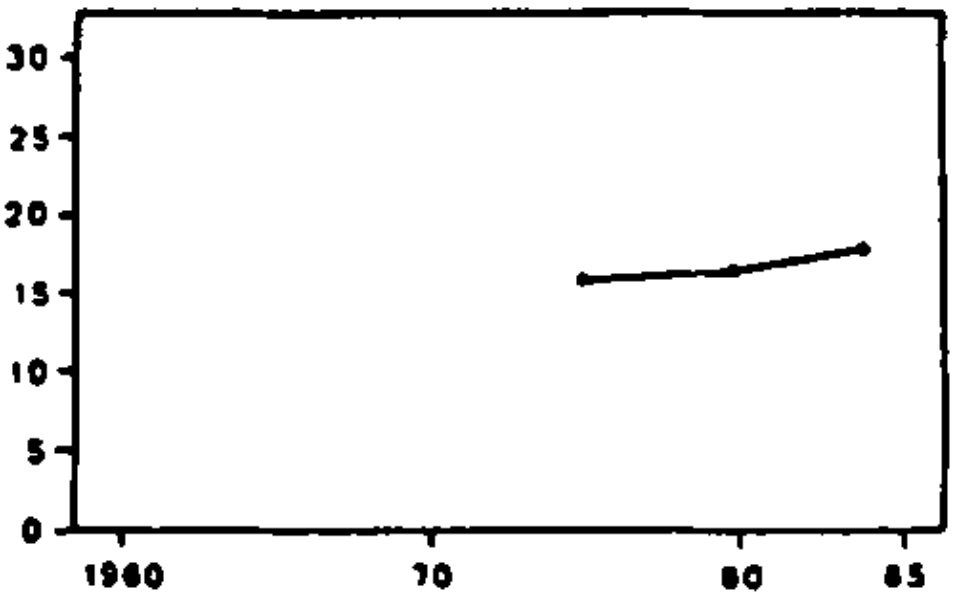
SOUTH ASIA (i)



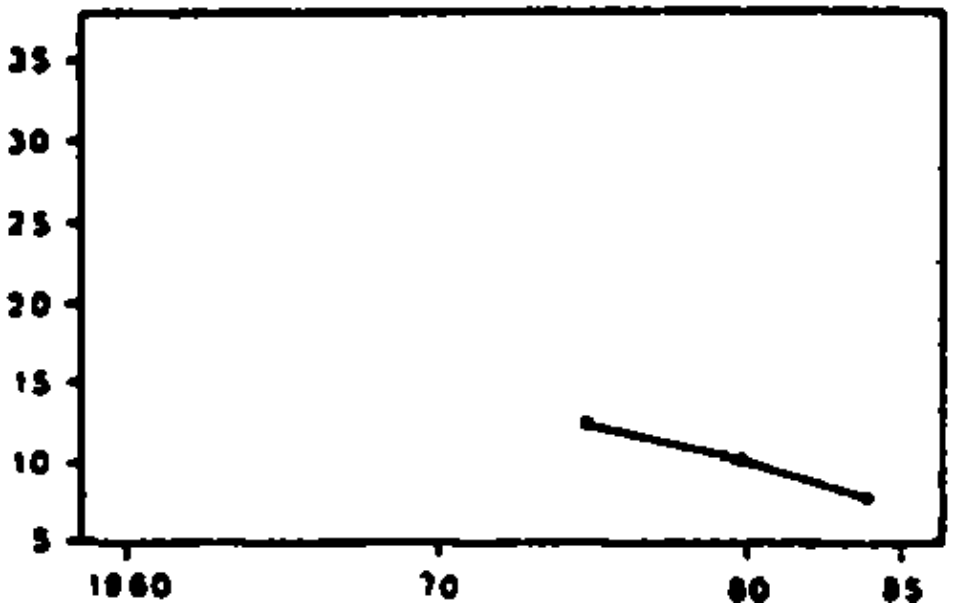
SOUTH ASIA (ii)



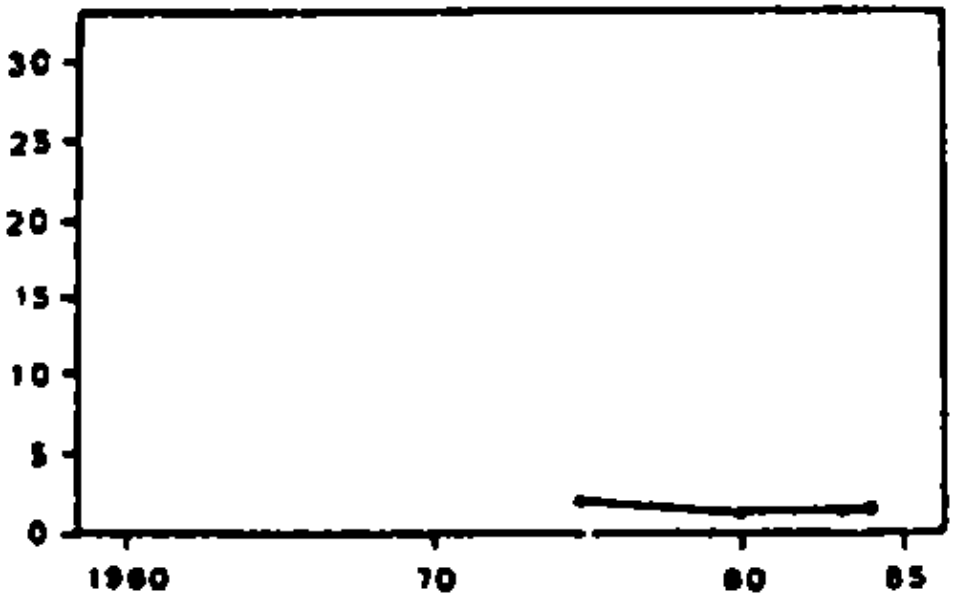
SOUTHEAST ASIA (i)



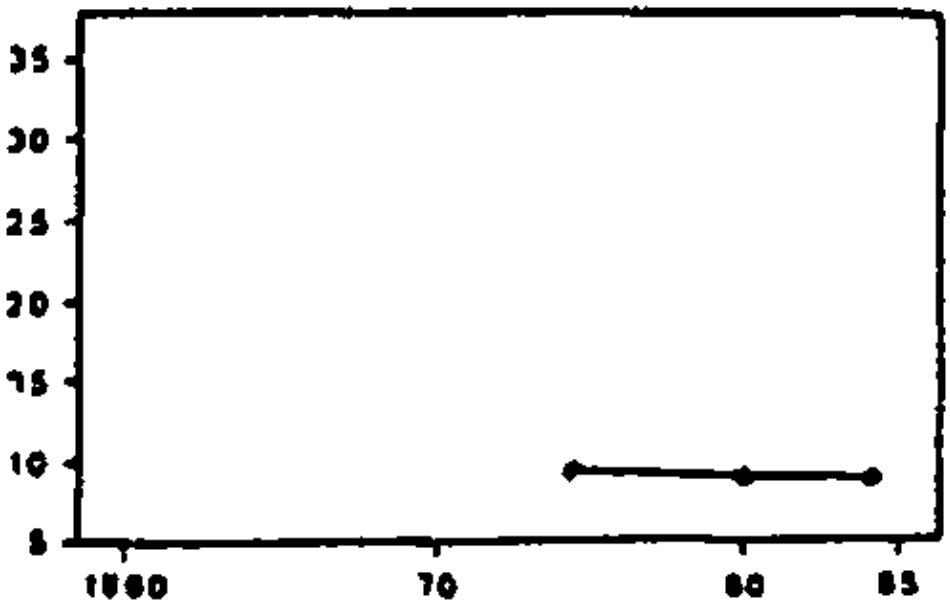
SOUTHEAST ASIA (ii)



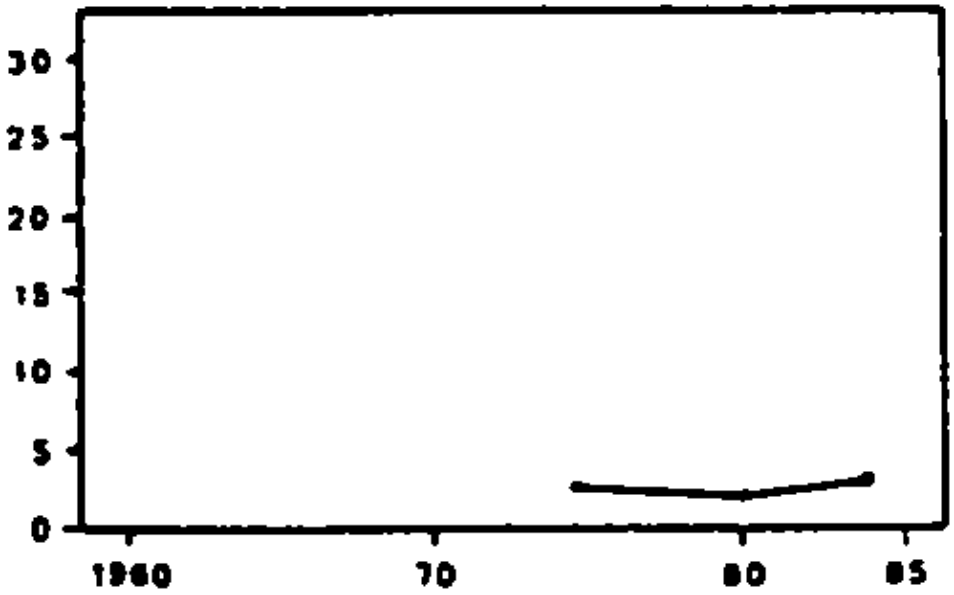
MIDDLE AMERICA/CARIBBEAN (i)



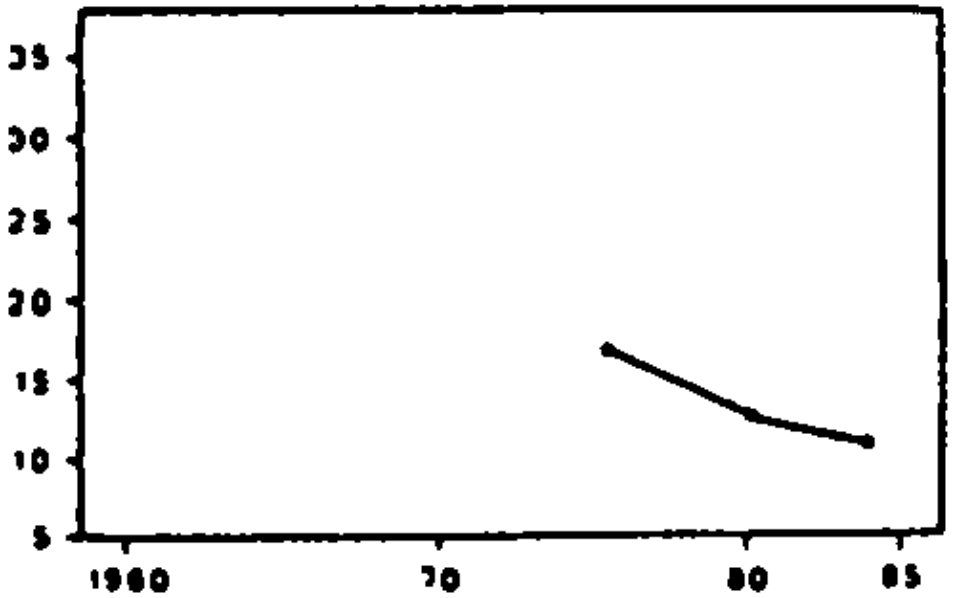
MIDDLE AMERICA/CARIBBEAN (ii)



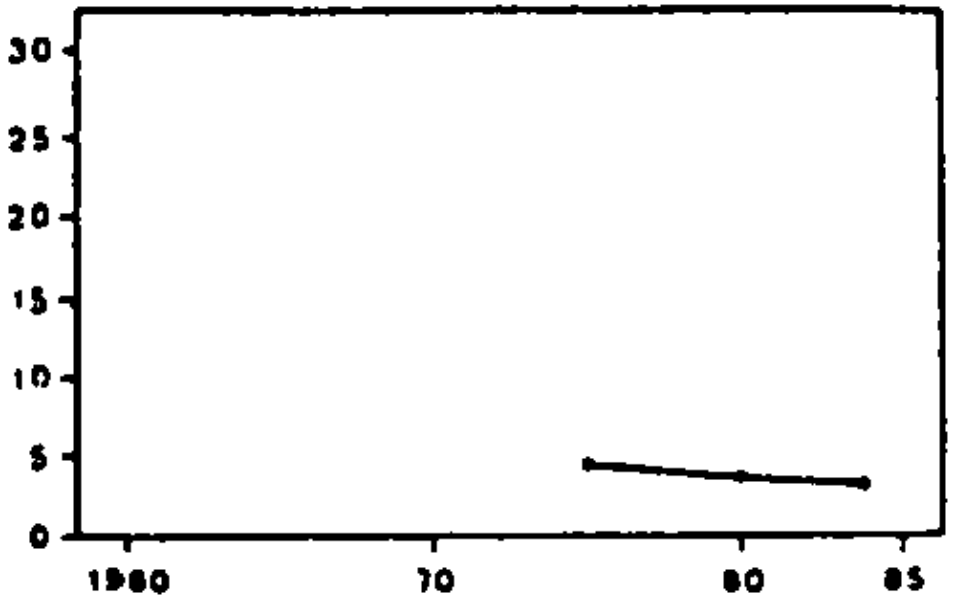
SOUTH AMERICA (i)



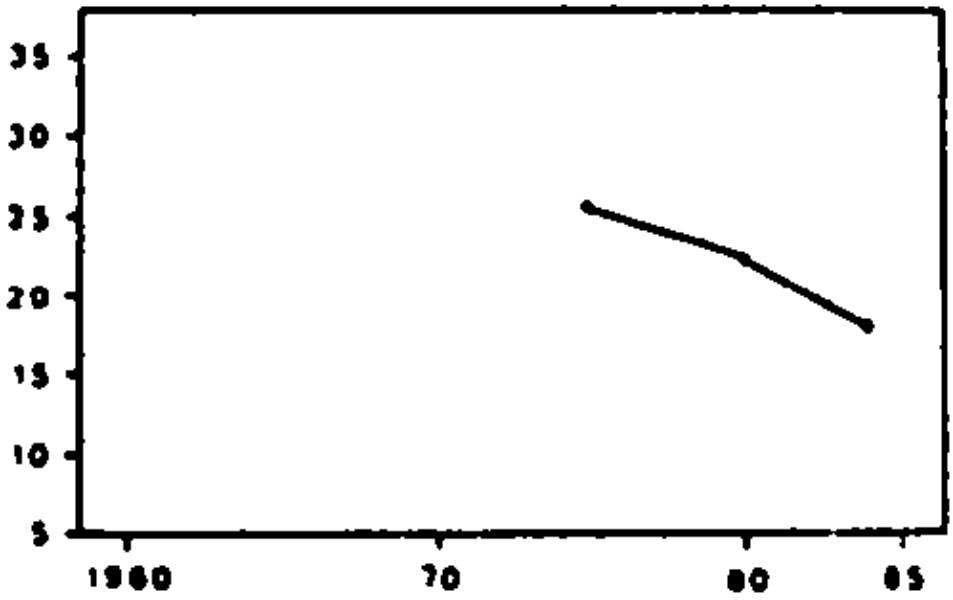
SOUTH AMERICA (ii)



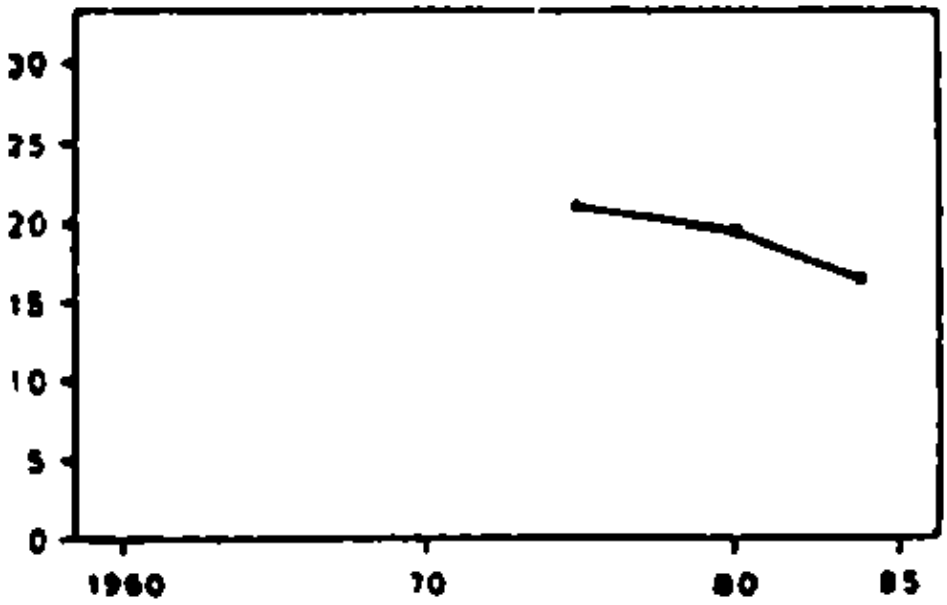
NEAR EAST/NORTH AFRICA (i)



NEAR EAST/NORTH AFRICA (ii)



CHINA (i)



CHINA (ii)

Organization of Material

Organization of this chapter

Since nutritional status is an outcome of many processes affecting the human condition, organization of problems, and methods for realistically selecting possible actions, are essential. Otherwise, arguments become diffuse and analysis overly complex. Equally, nutritional concerns risk departing from the mainstream of thinking and planning for development unless considered in a broader and accepted context Thus, a workable structure for viewing problems and deciding on possible actions is needed at the outset. In this chapter we try to synthesize and make explicit a structure that is coming to be widely adopted.

Firstly, we group causes into problem areas. Distinguishing food– and health–related causes of malnutrition is logical and conventional; now the area of 'care' is being emphasized – affecting how, within the household, resources and services are used, food is distributed, exposure to infection can be mitigated, and so on. This forms an important and distinct third area of concern together with food and health issues. This grouping is discussed in the next section, and provides the overall structure for the book. It must be stressed however that

here this grouping is still an organizational device. There is nothing absolute about it – indeed it does not always work perfectly. It can be seen as putting labels on groups of issues to facilitate communication and analysis; nothing fundamental would be lost in transferring issues from group to another – but we need some organizing principles.

Second, we link approaches to nutritional problems to the emerging consensus on overall development policies, in the section 'Types of Solutions'. An important emphasis here is on achieving *both* poverty–oriented development *and* public support for current social security. Social security is very relevant to nutrition and may be a particular area where these concerns should be more emphatically addressed. Underpinning both growth and support is the important area of human resources development.

Third, the central question to be addressed concerns the selection of actions. Many actions that can potentially improve nutrition are not primarily driven by nutritional objectives. This means that careful judgement in any given circumstance, is required in deciding where to press for new or modified policies and programmes. The basis for this judgement, it is suggested, should give prominence to an assessment of how far nutritional considerations are in fact likely to be influential. For example, structural adjustment fundamentally affects nutrition, but is often only marginally influenced by this concern; on the other hand, nutrition education is relatively cheap, much easier to launch, based mainly on nutritional objectives – but less far–reaching in its effects. While no general formula is possible, it is stressed that setting the scope of 'nutrition–relevant' actions is essential, and that the trade–off of likely influence on policy, and the likely effect of that policy on nutrition, must be considered. The relative merits of trying to influence broad policies and resource allocations as against technically optimizing use of available resources for improving nutrition is briefly introduced. In general, experience suggests that it is more fruitful to seek opportunities within sectors, than to attempt multi–sectoral planning. This is discussed in the section entitled 'Influenceability of Actions' (for want of a better expression).

Fourth, the process of making policy is outlined so as to understand the rationale and means whereby decisions get made. This includes considerations of how information is used, as well as political economy.

Fifth, a brief consideration of typology, of different circumstances by country or community, is introduced. The typology refers to characteristics leading to (potentially) successful adoption of appropriate policies to alleviate malnutrition, not to the nutritional situation itself (although these may be related). This area is the subject of continuing work, so is only introduced here.

In sum, in this chapter it is suggested that to address nutritional problems, it is necessary to consider:

– three clusters of problems, the conditions of *each* of which need to be adequate;

– policies of poverty–oriented growth, *and* public support for social security, *and* development of human resources;

– selecting policies and programmes (for initiation and/or modification) based on the likely influence of nutritional considerations on decisions on these, *and* on their likely impact on nutrition;

– influencing overall resource allocations, *and* deciding on how best to use available resources;

– seeking opportunities within sectors rather than pursuing multi–sectoral planning.

Organization of the book

In the three chapters which follow, we link an analysis of the nature, causes and measurement of the three nutritional problem areas mentioned above with a review of relevant policies and programmes carried out in the 1980s. In chapter 2 which focuses on household food security issues, such actions include macroeconomic development policies, policies on employment, agriculture and price as well as public distribution initiatives which may include food subsidies, food stamps, rations, quotas and so on. Nutrition is related to infectious disease control in chapter 3 where appropriate actions include supplementary feeding, breastfeeding promotion, improved weaning practices and growth monitoring and promotion. The means of operationalising such actions – including channeling them through health services or incorporating them

within conventional nutrition programmes – are then described, before briefly considering how other sectoral actions can impinge on the malnutrition and infection complex. In chapter 3, a consideration of the problem of women's inadequate control over resources is followed by discussion of broader socio–economic actions to counteract discrimination and improve resource control. Moving on from this, more direct interventions with potential for improving the capacity for household members (not just the mother) to care, are examined. Throughout these chapters, illustrative country–level examples of how such policies and programmes have worked in practice in the 1980s, are provided in boxes.

Finally, chapter 5 builds on this to consider options for actions relevant to each problem group, with potential for improving nutrition in the 1990s. Ultimately of course the actual choice of actions can only be carried out at a country–level, although the options presented here, based as they are on what has been seen to work in the recent past, will hopefully provide a useful point of departure for such decision–making.

Types of Nutritional Problems

The causes of chronic protein–energy malnutrition may be seen as clustering into three main groups (see UNICEF 1990; FAO/WHO 1990), as follows.

> *i) Inadequate household food security:* this refers to inadequate access to the food needed for a healthy and active life for all household members. This may result from chronic, acute and/or seasonal deficits in food available to the household. Such deficiencies in entitlement may in turn result from a lack of production and/or inadequate purchasing power.
>
> *ii) The 'malnutrition–infection complex':* the synergistic inter–relationship between malnutrition and infection is the main cause of ill–health and preventable death among individuals, particularly children.
>
> *iii) Lack of women's control of resources and caring capacity:* this may be seen less as a discrete group, more as a pivotal link between the above two groups. Issues of gender represents a pervasive dimension of many nutrition problems. Access to and control of resources by women, governed by their economic and social status, conditions their potential to provide food for their families as well as to feed and care for their children.

How do these problem groups inter–relate? Such a question often leads to the development of an elaborate integrated flow diagram of causal pathways which, if it is to be comprehensive, generally ends up too complex and thus ultimately unhelpful to policy makers. It is more useful at this stage to sketch out a few of the broad links and boundaries between the sub–groups before, in later sections, linking these to the design of appropriate ameliorative actions.

While *household food security* refers to the ability of household members to provision themselves with adequate food through whatever means, ensuring it is often not sufficient to ensure the adequate nutrition of its individual members. The economic and social status of women may be the pivotal link between household food security and the adequate health and nutritional status of individuals. *Women's control over resources and caring capacity* will determine to some extent how income and food is allocated within the household. Certain individuals may be discriminated against in terms of the allocation of food or health care. The trade–off in ensuring household food security may also be reduced maternal time available for child care and feeding. While a household may have access to food, levels of environmental sanitation may be low resulting in a high exposure of individuals to disease. Access and use of health care (health security) may be a problem. Knowledge of disease management may also be lacking. These may cumulatively put individuals at risk of the *malnutrition–infection complex*.

Figure 1.4 indicates relations between these groups of problems. Household food security relates to dietary intake. Malnutrition–infection – shown as a cycle in Figure 1.3 – encompasses exposure to infection and the physiological processes involved. In organizing the discussion, factors affecting individual dietary intake (at a given level of household food security) and associated actions are included in the malnutrition–infection cluster. The third cluster – lack of women's control of resources and caring capacity – clearly affects individual dietary intake and exposure to infection, and may well affect responses through mechanisms not fully understood, but including, for example, better feeding of anorexic children and their better care influencing the course of infection.

Household food security has dimensions both of time (e.g. current, near and distant future), and of a wide range of social, economic and environmental conditions. These are too complex to be usefully put into a flow diagram here, but are illustrated in Table 1.1 below (also see Table 2.1).

These three groupings – of household food security, infectious disease control, and caring capacity – may provide a sound structure on which to build an analysis of policy actions. The first point to stress is that each cluster of causes needs to be adequate to prevent malnutrition. Adequacy in each area is a necessary but not sufficient condition for good nutritional status.

Table 1.1: Levels of Household Food Security

Level of security	***Determinants***	***Outcome***
Current	Income Prices Production Stores Other entitlements incl. social security	Daily mean kcal. and nutrient consumption
Near future	Drought Employment security Ill–health	Future food acquisition
Distant future	Environmental degradation Land pressure Migration	Sustainability of livelihoods

Before going on, it is worth reflecting briefly on what processes or factors predispose populations to such problems. In seeking to answer this, the need to distinguish between the chronic and the acute, between long–term trends and sudden 'shocks', becomes evident The means to prevent or alleviate deprivation will differ according to whether the situation has arisen through a long–term deterioration or through a sudden sharp, external shock, such as drought or war. Moreover, some groups can mitigate the effects of the latter better than others. They cope better; they are less vulnerable.

Vulnerability, coping and sustainable livelihoods

Vulnerability has been defined as “a state of defencelessness, insecurity and exposure to risk, shocks and stress” (Chambers 1989). It is different to poverty itself which refers to a lack or want In fact, there are two sides to vulnerability – externally, an individual or household may be subject to shocks or risk, while internally, the means to cope may be inadequate or non–existent.

The concept of 'livelihoods' usefully integrates poverty and vulnerability. A 'livelihood' may be defined as a level of wealth and of stocks and flows of food and cash which provide for physical and social well–being and security against becoming poorer. Poverty lines and other definitions of deprivation based only on flows (e.g. income), and not on assets or reserves which can be disposed of in emergencies e.g. sickness, drought, are less satisfactory. Assets such as land, trees, livestock etc. reduce vulnerability and act as buffers to “shocks”. As with aspects of nutrition such as the status of women and seasonality, for example, sustainable livelihoods should not merely be dealt with as an appendage to an analysis of deprivation – these are integral threads that are better understood as pervading all aspects of the problem.

There may also be trade–offs between vulnerability and poverty, or security and income. For example, poverty alleviation programmes which seek to generate incomes by providing loans to purchase assets may not be popular owing to the fear of chronic indebtedness prejudicing their livelihoods. An understanding of poor people's level of concern for poverty vs. vulnerability (although these often overlap) will be instructive in the design of programmes, including those aimed at improving nutrition.

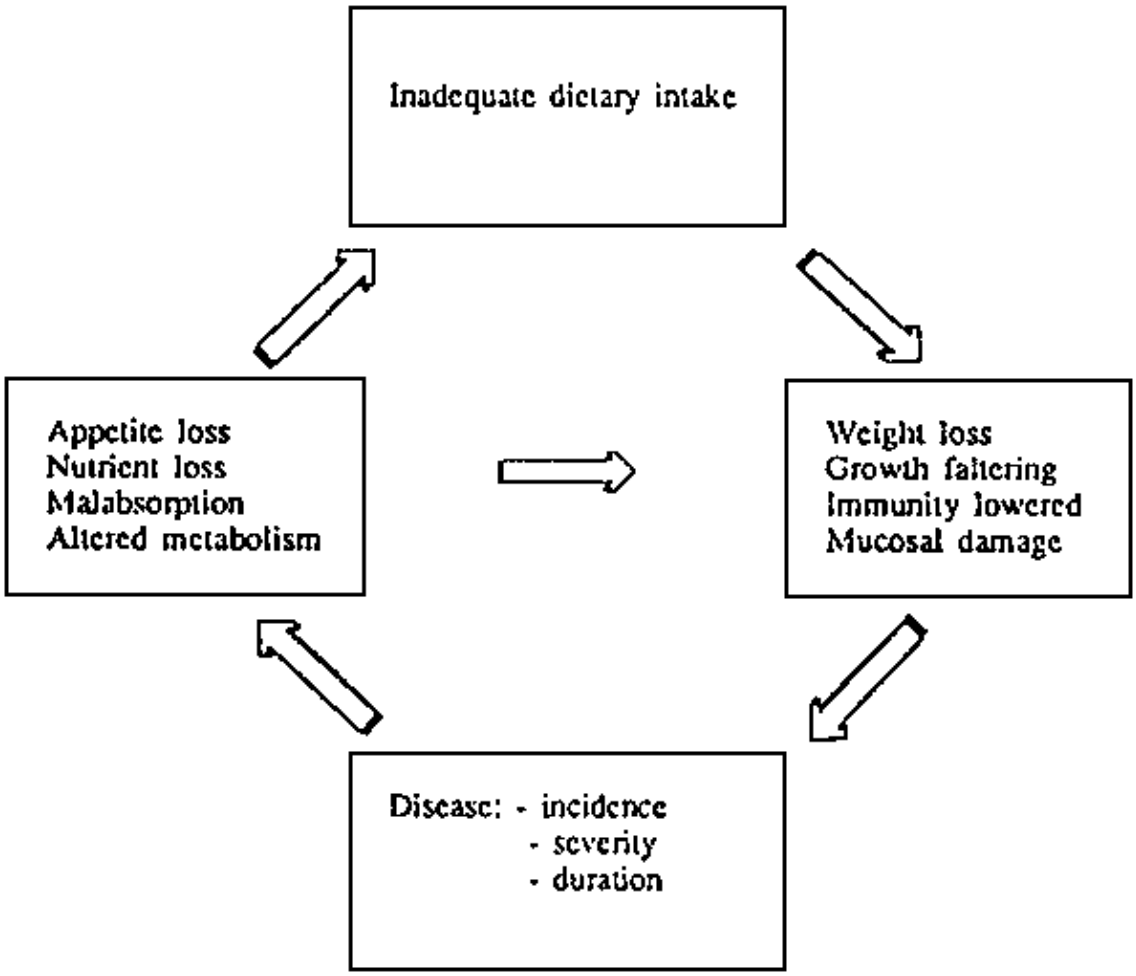


Figure 1.3: Malnutrition/Infection Cycle

Interactions between malnutrition and infection are cyclic and closely linked, and it is relevant to talk of a malnutrition–infection complex. Figure 1.3 depicts these interactions, which can be summarised as follows. Inadequate dietary intake can cause weight loss or growth failure in children, and leads to low nutritional reserves. This is associated with lowering of immunity, probably with almost all nutrient deficiencies. Particularly in protein–energy and vitamin A deficiencies there may be progressive damage to mucosa, lowering resistance to colonization and invasion by pathogens. Lowered immunity and mucosal damage are the major mechanisms by which defences are compromised. Under these circumstances, diseases will be of potentially increased incidence, severity and duration; the relative importance of these three factors is not fully worked out in all cases. The disease process itself exacerbates loss of nutrients, both by the host's metabolic response, and by loss from the intestine. At the same time, many diseases are associated with a loss of appetite and other possible disabilities, cycling back to further lower dietary intake. While other relationships play a part, this cycle summarises many of the most important, and accounts for much of the high morbidity and mortality under circumstances of high exposure to infectious disease and inadequate diet, characterizing many poor communities.

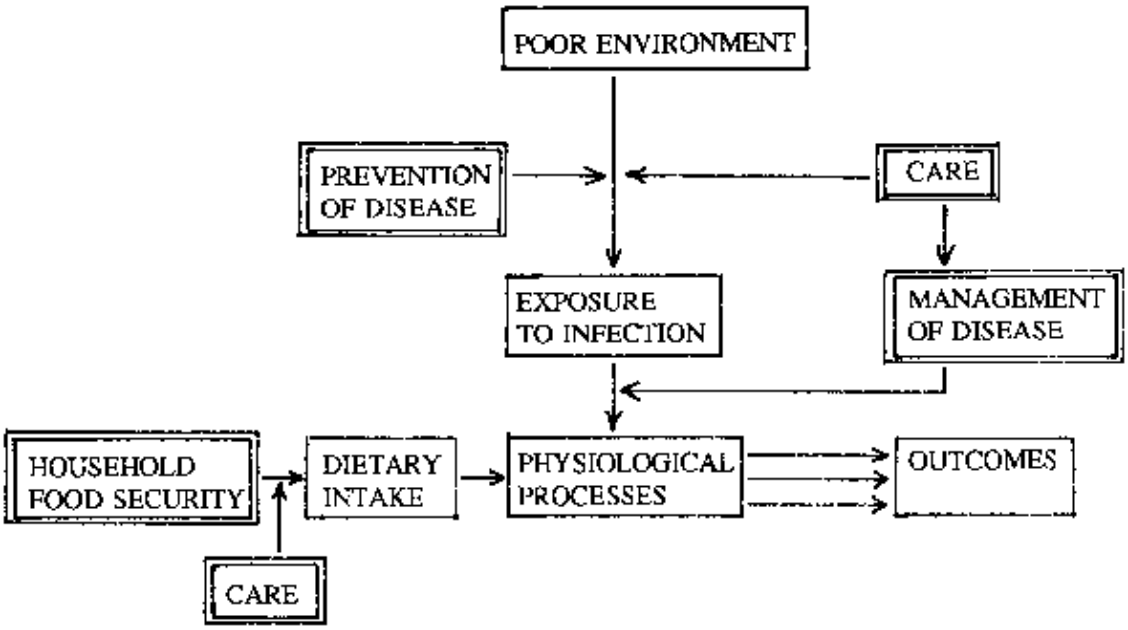


Figure 1.4 Inter−relationship between Nutrition Problem Groupings

A distinction is also needed between shocks that affect whole societies, and those affecting individuals. For example, in drought−prone areas, certain mechanisms may be appropriate for preventing effects of occasional drought on the population, with somewhat similar considerations applying to seasonal effects. Buffer stocks or price stabilization are examples of appropriate policies. On the other hand, individuals require social security against sudden illness, unemployment or other loss of livelihood. This may be developed in communities, but generally needs resources from more central levels.

The relative place of community−level social security and central−level (as pointed out by von Braun (1990)) depends on various factors. First, less administratively developed societies (e.g. in Sub−Saharan Africa) may need to rely on the community, and indeed have much established potential for community security e.g. the system of stocking food through local religious organizations in West Africa. Second, certain aspects of social security, e.g. curative health care, necessarily depend on at least some input from central levels, whereas others e.g. food stocking and sharing, may be well suited to community organizations.

To counteract vulnerability, actions will need to put floors under the vulnerable (Chambers 1989) e.g. through employment provision, guaranteeing prices for whatever the poor can sell during bad times and assuring access to cheap food (see chapter 2).

Measurement issues

While the main purpose of this book does not concern assessment and monitoring of problems, it may be useful to consider how the three problem groups addressed are or could be measured. For a start, it helps to define the problem if one considers how to measure it. Beyond that, acquiring the actual data allows assessment of magnitudes, severity, and trends, leading to policy analysis, and, on occasions, evaluation of policy and programme effects.

Measurement of the final outcome of concern, nutritional status, was mentioned earlier. The three clusters of problems defined here are both concerns in their own right, and intermediate outcomes affecting nutritional status. Household food security clearly relates to food consumption − already difficult to measure and interpret − but goes beyond at−one−time assessment to include ideas of maintenance and assurance of intake. Malnutrition−infection is conceptually the more straightforward. Women's control of resources and caring capacity, have perhaps only recently been defined as issues to the point that measurement could be considered (see UNICEF 1990) although indicators concerning women's issues are becoming available (e.g. World Bank 1990). These issues are taken up under the respective headings below. But first, we outline two important nutritional problem areas not specifically covered in this book − diet−related non−communicable disease, and micronutrient deficiencies.

Diet–related non–communicable diseases

The issue of dietary contribution to the causation of non–communicable diseases has been explored in depth in an number of WHO publications, most extensively with respect to the European situation by James *et al.* (1988) and in broader terms in WHO (1990). Because of concern that chronic diseases such as arteriosclerosis and diabetes may be emerging as major health problems in developing countries, this issue may begin to take more prominence on the agenda of nutrition–relevant actions for the poor. However, it is felt important that the "new" problems do not distract attention from the "old", of malnutrition related to inadequate food security and infection (ACC/SCN 1990b). The balance of concern will vary country–by–country. It can be argued that where infant and child malnutrition, infection and mortality remain high, and insecure food availability affects large numbers of the population, addressing these problems is the priority. Some would argue that the problems are fundamentally different in that while one relates to inappropriate (dietary) choice and is to some extent behavioural, the other is in large part economic and there is no choice.

As the situation in some parts of the world tends to converge towards that of the industrialized countries, so the need for dietary guidelines aimed at mitigating chronic diseases increases. The pattern of disease and causes of death can give some guidance as to priorities. Two examples are shown in Annex I, for Guatemala and the Netherlands, to illustrate this. They show clearly that infectious disease is of more concern (in relation to preventable mortality, in this example) than chronic disease in a country such as Guatemala, with the opposite being the case in the Netherlands. This type of contrast, we feel, helps justify the insistence that undernutrition among the poor remain a major moral priority.

Micronutrient deficiencies

Deficiencies of the three most important micronutrients (in this sense) – iodine, iron, and vitamin A – are well–recognized as public health problems, and control programmes are receiving increased attention. For iodine and vitamin A, the technology and programme requirements for effective control are established, and the major need now is for wide implementation. There is wide consensus on what needs to be done, the point now is to do it. The UN at the initiative of the ACC/SCN has proposed 10–year programmes for controlling these two deficiencies and the SCN has published policy discussion documents on the topics (Hetzel 1988, West and Sommer 1987). Indeed, the World Health Assembly in 1990 decided on the objective of eradicating iodine deficiency by the year 2000 (see SCN News No. 5, p27).

The position on iron deficiency – in fact the commonest of the three – is less advanced but progressing. In this case although the scientific basis for control is there and consensus largely exists on approaches, a series of practical problems (related partly to the need for daily intakes in contrast to iodine and vitamin A) remain still to be solved. The SCN has contributed to this by convening a workshop on iron deficiency control, and publishing its proceedings (ACC/SCN 1991b).

Types of Solutions

The position in some developed countries where malnutrition is extremely rare could provide an example of ways in which malnutrition may ultimately be eliminated. It now seems more reasonable to examine the elements of these conditions, which include social security/welfare, public health services, and legislation protecting vulnerable people, especially children; and to add these to the more familiar approaches to long–run economic development.

Three recent publications are highly relevant – Dreze and Sen's 'Hunger and Public Action' (1990), the World Bank's World Development Report (1990), which focuses on poverty, and UNDP's Human Development Report (1990). These, in slightly different ways, recognize that a combination of government action to support the poor, and rapid (but somewhat equitable) economic growth have been responsible for improvement where it has occurred. Dreze and Sen make a distinction between 'growth–mediated security' and 'support–led security'. The World Bank advocates a two–track strategy of labour–intensive growth plus security through the provision of basic social services to the poor, while UNDP talk of growth with equity, combined with an across–the–board provision of basic services (including health and education) along with schemes targeted towards deprived groups. All three tend to regard adequate nutrition (and food security) as an aspect of *social* security, in a broad sense. The views seem compatible, at least with respect to nutrition (although the Bank

report uses 'nutrition' in the sense of food programmes, as in the US). This seems to strengthen or clarify a paradigm that includes:

> – economic growth that deliberately involves participation of the poor (i.e. labour–intensive) as the long term solution to poverty;
>
> – in the interim, social security ('safety net') for the poor to maintain a basic level of living, including sustained access to adequate food (or food security) and ensured health access as its central features;
>
> – the development of human resources as an essential underpinning of the first two.

A number of points influencing their application to nutrition should be made concerning these principles. First, allocation of resources to poverty–alleviating growth may involve trade–offs with total economic growth: under many national circumstances deliberate decisions are needed as to how far investments are made that benefit the income of the poor specifically. Second, the financing of effective social security for the poor depends on adequate economic growth: the first two principles are linked. Third, the effects of growth policies that fail to involve the poor cannot sustainably be rectified through social security. Finally (again as stressed by von Braun 1990), a strong case can be made for 'social security–with–growth', particularly to more rapidly improve nutrition and health of the population so as to facilitate the growth process, and hasten the demographic transition within developing countries. This applies with particular force to the poorest countries (see 'Constructing Country Typologies' below).

Where does nutrition fit into this? Indeed, are the objectives and means of long term alleviation of poverty practically indistinguishable from those of reducing malnutrition? Not entirely. While the reduction of poverty is a major part of ensuring household food security, adequate nutrition goes further than this, being influenced by other (largely non–monetary) entitlements, such as health, education and environmental sanitation. Thus while equitable growth in the medium–term will provide nutritional benefits, it is not necessarily *sufficient* for adequate nutrition. A strengthening economy provides the potential for improving the health and nutritional status of a population, a potential that may not be used. More telling, it will not be sufficient to wait[1] for wealth, not least because of the interim negative effects of malnutrition and ill–health on a person's productivity and cumulatively the economy. As many case studies in the UNDP and World Bank reports show, social progress is not merely a by–product of economic development – policies *do* matter. Public support may be a fundamental component of such policies, both during the initial stages of growth, and once a stage of affluence has been reached whereby sustainable social security can be paid for by a government. Costa Rica provides one example of the nutritional value of public support achieved during the growth process (see box in chapter 3).

> [1] Dreze and Sen, in an interesting calculation, demonstrate that the extra annual growth of per–capita GNP required (by China) to reach its observed under–five mortality rate in the absence of outstanding public support measures, is very large indeed. In other words, the 'wait' may be very long!

How then does this paradigm relate to the three problem areas, household food security, malnutrition and infection and caring capacity? Considering growth–with–equity, macro–level development policies will govern agriculture, employment, health and education (and how, if at all, adjustment is carried out), and thus potentially influence *all* problem groups to a greater or lesser degree. Protecting nutrition, along with health, education and environmental considerations is a fundamental component of social security. Elements of a social safety net are part of the solution to *each* nutritional problem area outlined here e.g. food market interventions and employment provision (household food security), gender–targeted food interventions, maternal technologies (women's resource control) and universal primary health care and education (malnutrition–infection).

Scope of nutrition–relevant actions

While nutritional considerations may be integral to both equitable growth and effective social security, it is crucial to be realistic in setting the scope of possible actions. Certain factors importantly affecting nutrition – such as overall development policy, or the political system – are generally beyond much influence from nutritional considerations. Nonetheless, it is worth distinguishing the use of nutritional considerations to *generally* influence policy – for advocacy – and the more detailed and technical areas of deciding i) how

existing or intended policies may better help nutrition, and ii) how resources once allocated to (at least some) nutritional goals can best be used. Here we focus mostly on how resources allocated with at least some inclusion of nutritional objectives can be used, but first we need to look at the broader picture.

Firstly, advocacy (*i.e. influencing resource allocations*) remains important The nutritional effects of non−nutritional policies should be monitored, and modifications suggested where adverse impacts are felt. Timely and relevant information will be important here. Nutritional outcomes may thus be a useful monitor of the degree of equity in the growth process. Secondly, *how best to use available resources* within development policies or systems of public support will be important (e.g. as food subsidies, stamps or rations, or as pan of public provisioning of health care and education). This perspective encompasses direct interventions with specific nutritional objectives, and deals with the more nuts−and−bolts issues of how to make interventions work cost−effectively.

What then are 'nutrition−relevant' actions? A constraint in analyzing and advocating ways of reducing malnutrition has been that everything seems to be connected to nutrition. Thus at first glance there is no clear priority of policies to consider. Potential trade−offs abound throughout decision−making and the type of necessary action may not always be obvious. Where such an action has been identified, there may be a conflict in the allocation of sufficient resources for it to be implemented. For example, how does better nutrition as an output compare with a better educated community? As well as evaluating objectives in this way, decisions are required on the means to achieving an agreed objective. Assuming here that better nutrition is the agreed objective, resources allocated to education may still be felt to have a greater potential for long−term nutritional improvement than resources made available for supplementary feeding programmes. The difficulties in evaluating outcomes may give rise to serious conflicts between sectors, within sectors and even within departments. It is thus not straightforward, for example, to distinguish the validity of considering a fundamental attack on poverty from pursuing an incremental (some say palliative) direct service approach. All these can be 'relevant' in one sense or another.

Nutrition−relevant actions potentially span agricultural, employment, health, education, social welfare and environmental concerns. Actions may be direct or indirect, within the influence of 'nutrition' or beyond it. The potential menu and combinations are extensive and need to derive from an understanding of what is necessary and feasible. In some of the poorest countries, malnutrition is directly prevented. In India, huge programmes clearly protect some children e.g. the Integrated Child Development Services (ICDS) and the Tamil Nadu Integrated Nutrition Programme (TINP). The rice marketing programme (BULOG) and the family health programme (UPGK) in Indonesia involve keeping food on the market and targeted health care respectively. Botswana provides another example: while the direct feeding for drought relief is clearly relevant in conventional terms, labour−based relief, providing income, may be indirectly as effective in preventing malnutrition. In many other cases, however, important improvements to nutrition can be ascribed to essential underlying factors, notably overall economic growth and a conducive social environment e.g. South Korea. Relatively equitable economic growth combined with widespread programmes may have contributed to nutritional improvement in other countries e.g. Thailand.

The issue addressed next is how to determine the relative priorities for trying to mould major policies to nutritional goals, compared with going for direct programmes. This is difficult and situation−specific, but important as not everything can be done. One possible criterion is 'influenceability'.

Influenceability of actions

Having recognised the diverse nature of nutrition−relevant policies and programmes, it is helpful at this stage to distinguish between those which are generally within the scope of a nutritional influence, and those beyond it. It should also be noted here that influenceability is likely to be particularly country−specific and best assessed at country−level; the classifications in this section are based on general findings and are unlikely to rigidly apply in all country situations.

Policies beyond influence generally include the underlying macro level or sectoral actions which while relevant to nutrition, are not operationally so, as nutritional considerations do not usually have a role in their design. These may be defined as *contextual* in that they form the backdrop to nutritional policy−making and programme design. While not derived from nutritional considerations, they are nevertheless likely to substantially determine the conditions for nutritional improvement.

This contextual nature however need not be immutable – there may indeed be space to make these policies more effective for nutrition, to be worth a sustained advocacy effort in the future. A case in point is structural adjustment. The adverse impacts of many recent macro–economic adjustment programmes on vulnerable groups, highlighted by UNICEF, has resulted in a global awareness of the need for "adjustment with a human face" (Cornia *et al.* 1987). Adjustment programmes, widely supported by the World Bank and the IMF, are being re–designed with potential nutritional effects in mind. Compensatory programmes are being incorporated in the design of new programmes, or tacked on to existing ones, to buffer the poor from initially detrimental impacts on welfare.

Many aspects of long–term development policies are generally not heavily influenced by nutritional considerations. These may concern such factors as the openness of the economy, the flexibility in the markets for foreign capital, the nature of the interest rate setting, the extent of indexing of wages, and the level of import protection and export taxes or subsidies. These will in pan determine the structure and growth rate of a country's economy. Equally important policies relate to income distribution, urbanization, education, and setting the conditions for future growth. Changing trends in nutritional outcomes need to be considered against the backdrop of such policies and their overall consequences in terms of GNP growth rates, measures of income distribution, employment, population factors, etc.

A second group of policies and programmes could be considered as being *operationally–relevant* to nutrition. These are defined essentially by whether decisions on formulating and implementing the policies are primarily motivated by concern for food consumption and nutritional status in the first place. This is where the technical role for nutrition becomes important in deciding how finite resources are to be optimally used to improve nutrition. Direct nutrition interventions, health programmes, school feeding programmes, etc are all obviously operationally relevant. Food subsidies may be intermediate; general subsidies are more contextual being largely determined by national economic outcomes, while targeted food subsidies are more geared to protecting the welfare (including nutrition) of vulnerable population sub–groups.

In Figure 1.5, we illustrate these ideas by classifying selected policies and programmes according to i) their level of influenceability by nutrition considerations and ii) their potential impact on nutrition outcomes. This is not a rigid structure and classifications will obviously vary country–by–country. Indeed, such a classification may be one important first step for a nutritional advocate to take at a country–level.

The future advocacy role for nutrition within growth–oriented policies then can be seen to relate largely to actions of low influenceability, but high potential impact on nutrition e.g. macroeconomic adjustment. Leverage here should be sought to promote a greater awareness of the nutritional consequences of such actions and positively influence the allocation of governmental resources. The technical role for nutrition relates more to policies and programmes which are to some extent influenced by nutrition, through seeking ways of more efficiently and cost–effectively utilising whatever finite resources are available. These often tend to be support (social security–type) programmes as illustrated in Figure 1.5. Ultimately, to achieve the overall objective of ensuring the adequacy and efficient use of resources allocated to nutrition, both roles – macro planning/resource allocation and micro–level programme design – will need to be integrated.

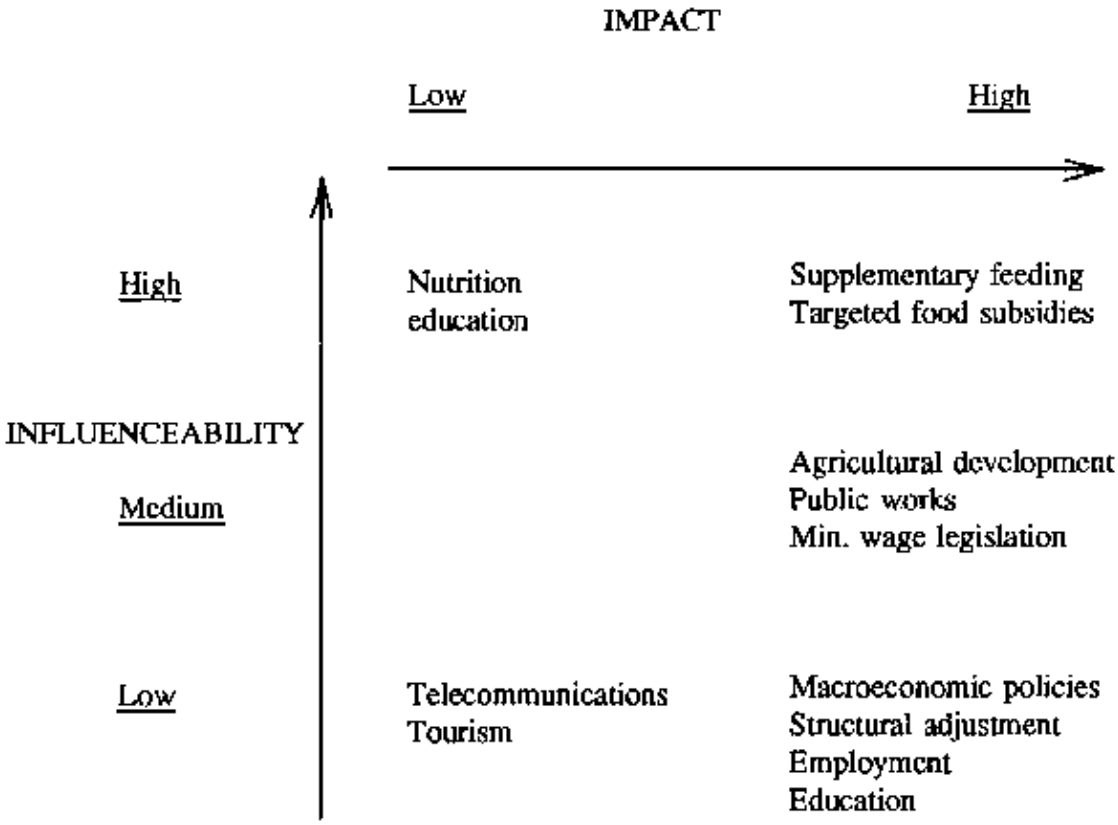


Figure 1.5: Examples of Trade−offs between Influenceability and Impact

The amount of governmental resources earmarked for policies and programmes relevant to nutrition will obviously depend on economic factors such as the overall fiscal situation and the balance of payments. Furthermore, given a budgetary sum, allocations between sectors and the degree of incorporation of nutritional concerns in decision−making on policies will hinge on the persuasiveness of the analytical and political case for expenditures influencing nutrition vis−a−vis other needs. Figure 1.6 encapsulates resource allocation decisions, as they potentially affect nutrition. Nutritionists while wanting more for 'nutrition' *per se* will seek to influence allocations in other sectors e.g. agriculture, education. The flow diagram charts four potential avenues of influence in addition to the use of resources for 'nutrition' itself. Generally, influencing decisions becomes progressively more difficult from (A) to (E), although (D) and (E) are often the most important regarding their potential nutritional impact. This degree of influence will depend on the type of policy (e.g. agriculture, health), its objectives, the degree to which nutritional considerations can be interwoven within these, and the existence of relevant information.

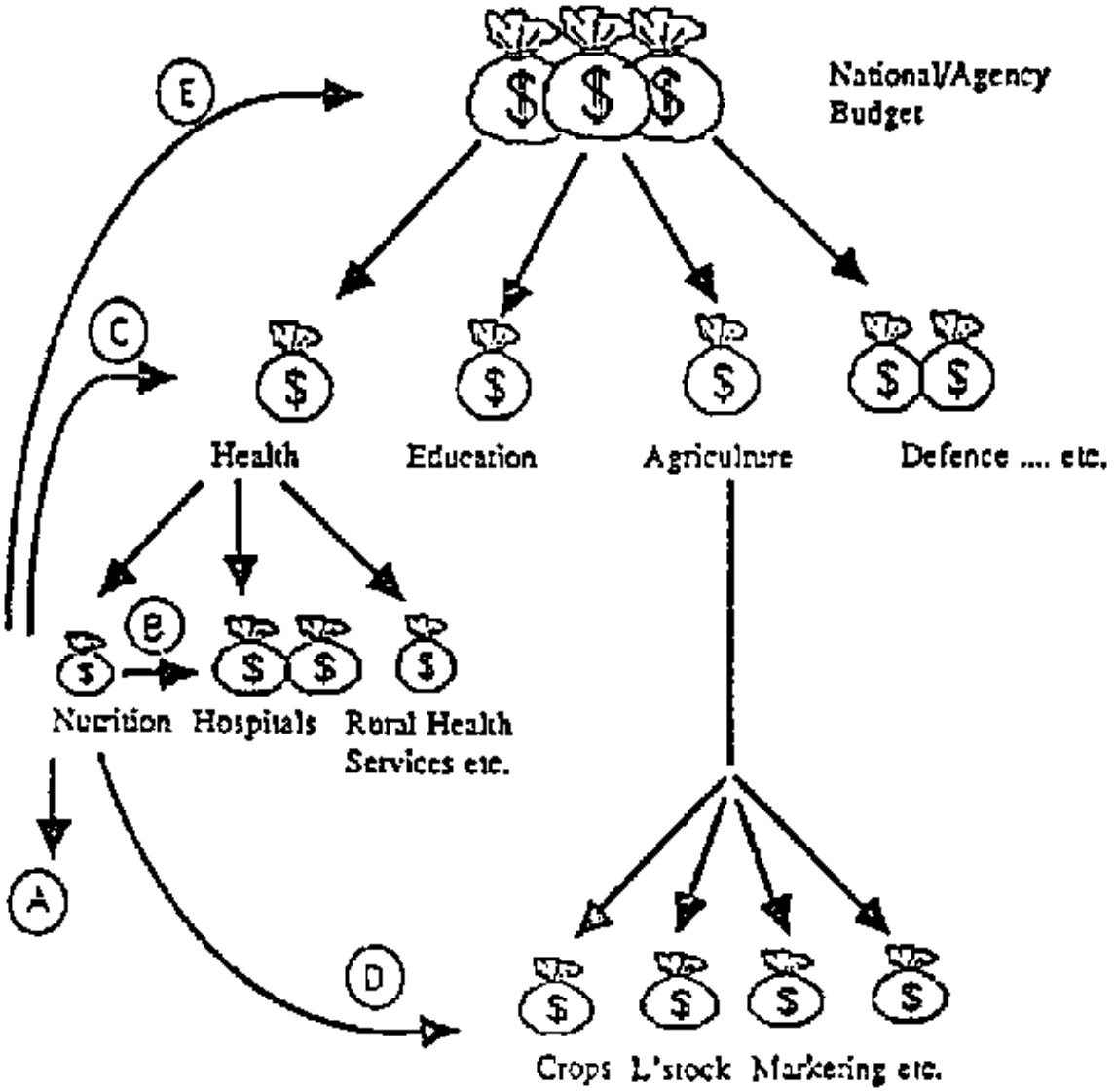


Figure 1.6: Illustration of Decisions on Resource Allocation and Use

The example imagines a nutrition unit in a Ministry of Health, wishing to make or influence decisions that affect nutrition. Often this may involve persuading others to make decisions. These may get progressively more difficult – but sometimes more important – in the examples A–E:

(A) decisions by a nutrition unit on the use of its own resources: e.g. nutrition education vs. nutritional surveillance:

(B) recommendations on use of resources by departments within the same sector – e.g. including nutrition education activities in primary health care;

(C) recommendations on allocation of resources between departments within the same sector, e.g. hospitals vs. rural clinics;

(D) recommendations on use of resources by other sectors: e.g. nutritional considerations in agricultural projects;

(E) recommendations on allocation of resources between sectors.

Source: Mason (1988)

Resources made available to different sectors for dealing with nutritional problems may be utilised in a variety of ways depending on country circumstances, actual level of available resources, extent and degree of different problems, etc. In each chapter 2–4, we will be reviewing country experiences with various policies and interventions (that is, resource use) following a discussion of the problem areas they are designed to alleviate.

Sectoral opportunities versus multi−sectoral planning

The concluding chapter of this book follows previous chapters' reviews of experiences in the 1980s by drawing lessons and providing a catalogue of options for reducing malnutrition in the 1990s. Although all these actions may impinge on nutrition, it does not follow that they should (even if they could) *all* be done in each case, nor that even a few need be integrated simultaneously into an overall nutrition policy. Although malnutrition has multiple causes, reality simply has not been conducive to the development of effective nutrition plans which simultaneously deal with all such causes. Such integrated nutrition planning has often failed as a result of problems of method, organization and politics. Inter−donor and inter−ministerial collaboration proved too difficult to achieve in most cases.

Multisectoral planning and interventions are thus not necessarily the solution to the problem of malnutrition. There is generally not an inescapable need for a complicated mix of actions, and it is often possible to decide on single or a few useful, if not optimum, interventions. This is not to say that campaign−style quick fixes are warranted − they undermine the institutional capability for broad responsiveness. But not everything has to be done at the same time. Responsible planning identifies the best feasible approaches at any one time, with an eye to future needs. The fact that influenceability does not necessarily correlate with impact, shows that effective multi−sectoral planning may not be feasible to initiate, even if it could be successfully managed once underway.

A sectoralised approach geared to organizational realities is more pragmatic. It does not invalidate the systems analysis of malnutrition causation but involves seizing opportunities to tackle malnutrition in key sectors, if necessary simultaneously. Logical necessity is balanced with political feasibility and a sector−specific analysis reflects prevalent governmental resource allocation and decision−making processes.

As for many other development interventions, flexibility may also be desirable. Lessons may be learned from an evolutionary process of planning as opposed to the less flexible blueprint planning (Maxwell 1989). There is thus no absolute need for governments to develop all−embracing statements which constitute a 'nutrition policy' − such a document may promote the notion that a centralised multisectoral planning approach is required. Nutrition policies are thus not essential for nutritional improvement, although they may serve an indirect purpose in providing a focus for nutritional advocacy and a framework for monitoring the attainment of nutritional goals. Decisions and actions are more important than statements.

Formulating Policies

Revealing the scope for a nutritional re−orientation or at least fine−tuning of macro or sectoral development policies calls for an understanding of how they are formulated. The following conceptualisation has been termed the mainstream or linear model:

i) Defining the problem
ii) Laying out alternatives
iii) Predicting consequences of each alternative
iv) Valuing each outcome
v) Making the choice (i.e. a 'decision')

Such a model is incomplete and often does not work well in practice. Incomplete because it separates the decision from implementation, and thus opens up escape hatches through which policy makers can avoid responsibility (for example, the oft−heard problems of “bad implementation”). Implementation should not be detached from the design (and analysis) of the policy. If “policy is what it does” (Schaffer 1984) then, by definition, implementation is part−and−parcel of the policy process, there are no escape hatches and responsibility has to be accepted. Unless work on implementation is encouraged, “the capacity of evaluation to detect failure is likely to outpace the ability of implementation to cause success” (Field 1985).

The linear model, it can be argued (e.g. Schaffer 1984), is also simplistic because policy is treated as if decisions are actually made from a choice of options on a rationale basis. Even if goals are agreed, actions are usually determined by sectoral agendas. Given the institution and the knowledge (data habitually collected) the decision could not often be otherwise. In an ideal world, however, the range of choice in policy should not be constrained by embedded sectoral agendas with their routine categories of data, problems,

strategies, classifications and determinations of feasible actions. The nature of the problem being addressed (e.g. household food insecurity), the institutions to address it (e.g. agriculture or employment sectors), and how the needy will be reached (e.g. commodity targeting, food–for–work) all need to be considered. An understanding of the nature of the problem should precede the design of actions to overcome it, and this will require relevant information (see 'Information for policy').

The mainstream model furthermore allows little scope for open, responsible political discussion although policy clearly is not made in a political vacuum. Such a de–politicisation leads to an avoidance of responsibility, passing the buck. If not 'obstacles to implementation', then failures may be blamed on 'a lack of political will', when both these should be included within the policy process. This comes back down in part to differentiating winners and losers in the political economy of nutrition. The losers in fact may be rich landlords with sufficient clout to pre–empt the initiative by causing both the lack of political will and the obstacles. These likely effects must be considered from the start as being implicit in the policy, hence the need to consider the benefits to (target) groups and the trade–offs of certain actions. As well as considering who *benefits*, the question of who *defines* the problem and who *acts* are fundamental and decide the level and type of community involvement in policy – an essential step to avoid future failure due to conflicts between insiders and outsiders' perceptions of needs, and hence programmes.

The need for a broader view of policy formulation incorporating considerations of implementation and political economy may be particularly important for nutrition. This is because nutrition is interdisciplinary and has no single obvious sectoral home. Consequently, a relatively closed–off process of policy–making, as represented by the linear model, is less likely to be open to nutritional considerations. A freeing–up of the process would also allow for the data routinely collected to design and monitor policies to be open to scrutiny. At this point, a decision may be made to include data on nutritional outcomes.

An example of a more open process of deciding on and implementing relevant actions for nutrition is the 'Triple A cycle' (Jonsson 1988, UNICEF/WHO 1989). This is an organising principle incorporating problem assessment, causal analysis, and action based on the analysis of available resources, which was used successfully in the development of the Iringa Nutrition Programme in Tanzania in the mid–1980s (JNSP 1989). Ideally governments should seek ways of supporting the effective participation by target households in the problem assessment (who, what), analysis (why) and subsequent design and implementation (how) of programmes. The latter will also necessitate an assessment of the institutional and administrative capabilities, and funding sources.

Information for policy

Information is used to allocate resources, decide on priorities and make correct choices of action. While information systems may be technically designed to provide optimum information of the right type and quality to inform decisions, decision–making ultimately is political. Building nutritional information (or surveillance) systems will thus provide no panacea for inadequate policies. It is a country's democratic institutions such as a free press and an independent judiciary that may catalyse the formation of a consensus on what constitutes unacceptable deprivation (see 'Political economy of nutrition'). An accountable government in a functioning democracy cannot afford to ignore press reports of deteriorating nutritional conditions among its population, if it wants to stay in power (see Dreze and Sen 1990). Information should both reveal such deprivation where and when it occurs, and facilitate subsequent action to address it.

Timely and appropriate information then is the key to the effective monitoring of the micro–level nutritional effects of macro policies. For example, Lipton and de Kadt (1988) showed that usually *no* information on health impacts is incorporated into the appraisal or monitoring of agricultural decisions, although these are often extremely important determinants of health status. In the design of policies which are nutritionally relevant e.g. agricultural policies, the policy–maker could be provided with a check list of questions regarding the potential nutritional effects of the policy. One example is a shift from food to cash crops: more income may accrue, but to whom and who controls expenditure of any such increases in income? Ideally, the policy–maker should be provided with a crude breakdown of the numbers and proportions of the policy's target group that fall into different socio–economic groups (e.g. landless labourers, marginal farmers, large farmers, landlords) with age–sex breakdowns, estimates of the extent and severity of undernutrition in each group and a check list of questions relating to likely policy impacts on each group.

Both the process and impact of policies need some monitoring through the regular collection of minimum feasible amounts of relevant data. The right type of information is needed at the right time at each level, with

the potential user always in mind. Failures and successes may thus be accounted for. Without such revelations, there is no responsibility, and failures will always be blamed on someone else with the process of inappropriate decision–making being perpetuated.

The building of a nation–wide capacity for monitoring policies through the routine collection of such data may be one of the main outcomes of strengthening local level institutions. The fact that intersectoral data collection and analysis has been hard to achieve and act on in the past should not deflect from the eventual need to build such a capacity. This leads into the area of institution–building, which has been dealt with in three papers prepared for the ACC/SCN (Soekirman 1988, Greiner 1989, Gillespie 1990).

But how can relevant information for policy be collected quickly and cheaply? In the last ten years or so, several new data collection methodologies have emerged and been tested. Rapid rural appraisal (RRA), rapid assessment procedures (RAP), and more recently participatory rural appraisal (PRA) have all been shown to be both feasible and revealing (e.g. UNHCR 1982, Pacey 1981, Cervinskas and Young 1990, Scrimshaw and Hurtado 1987, Chambers 1990). These approaches are sensitive to the local community, recognizing the vast, detailed knowledge and experience that rural people possess about their situation. Emphasis is more on qualitative analyses of community dynamics, less on numbers – although a mix of methods may hold great potential (rapid assessment cannot fully displace conventional surveys e.g. clinic data (see, for example, Mason *et al.* 1984, ACC/SCN 1989a)). Essentially, the work of anthropology is “telescoped” with such methods, as its essential tasks are performed in a shorter time. Rapid assessment methods have been used to identify target groups, determine the inter–related causes of malnutrition in a community, and recommend priorities for intervention. Their strength has been their ability to reveal gender, class and age differentials which more conventional top–down surveys often miss, as well as enabling the 'why', as well as the 'what' part of an enquiry to be addressed.

Rapid however is not necessarily participatory, and several groups, particularly in South India, have been carrying out successful participatory rural appraisals (Chambers 1990). Communities are fully involved in analysing their situation, using local implements and drawing maps and charts on the ground. PRA requires that outsiders “pass the stick” to villagers, and allow them to describe their problems and priorities. Successful applications have included charting seasonality of malnutrition as it affects different groups in a village, mapping households in a village with respect to locally–derived poverty variables, and charting maternal and child nutrition practices over three generations to analyze continuity and change.

Political economy of nutrition

In countries with highly developed social security systems (such as the United Kingdom), significantly malnourished children are neglected children who have fallen through the social welfare 'safety net'. Households at risk of failing to care adequately for children are generally monitored by the social services, from birth onwards; if neglect occurs service failure is blamed. On a wider scale, as Sen (1981) pointed out, the avoidance of famine in the United States and the United Kingdom with the high unemployment levels of the early 1980s was due again to the social welfare system, including guaranteed public health, income support and insurance systems. Some of the most 'nutrition–relevant' policies in practice thus are legislation, social services and welfare. Characterization of the political systems that have established such effective prevention of malnutrition are worth considering.

Accountability and people's means of expressing needs and influencing their own situation through the political system – improving with the incoming tide of democracy – may be the most important nutrition–relevant actions of all, as recently emphasised by Dreze and Sen (1990). Public action is not exclusively state action, and its forms will vary with the types of socio–political systems of different countries. It is not something done *for* the public, but crucially also *by* them. As James Grant, Executive Director of UNICEF has stated:

> “Each of the great social achievements of recent decades has come about not because of government proclamations but because people organised, made demands and made it good politics for governments to respond. It is the political will of the people that makes and sustains the political will of governments”

The public however are not a homogeneous group. There will be winners and losers in the political economy of nutrition, hence the need for weighing costs and benefits and making trade–offs in the design of actions. Political sensitivities and decision–making power are crucial considerations. An important trade–off in

development is likely to be between the interests of the poor versus those of the nonpoor, rather than growth versus poverty reduction. Labour–intensive development will have more chance of success where the poor have some political power, in any case it is much more feasible than land reform. This emphasises the need to show the 'non–zero–sum' nature of the choices involved; the better–off need not necessarily lose out as the poorest gain. Where the state does respond to the threats perceived by richer groups to any organisation of the poor, however, experience shows community involvement may need to be sponsored by external agents (often more effectively by NGOs than governments and international agencies (Jeffery 1985)).

Public involvement will come from an awareness of their social, political and economic environment and the means of changing it to meet their perceived needs. Such an awareness may originate from a democratic society, with a free press and scope for public debate. UNDP (1990) compared countries on the basis of a 'human development index' which incorporated GNP with two social indicators – adult literacy and life expectancy. They recognised then that the concept of human development was much broader than such a measure could reveal. Factors such as the presence or absence of such aspects of freedom as free elections, multi–party political systems, an uncensored press, adherence to the rule of law, free speech guarantees and personal security are all directly related to levels of human development, but difficult to quantify. In a later report, some refinements to the index were suggested, so as to better reflect how economic growth translates into human well–being, although it was fully recognised that such a national average conceals important differences in regional, local, ethnic and personal distributions of human development indicators (UNDP 1991).

While recognising that the establishment of such democratic institutions may ultimately provide more scope for the nutritional improvement of a population than any other single actions, we shall proceed in the following chapters to restrict ourselves to more technical policy instruments – those with potential for influencing nutritional outcomes in the short as well as the long–run, whether directly or indirectly.

Constructing Country Typologies

An analysis of a nutrition situation – the problems, their causes and possible solutions – will be country–specific. One set of contrasts is from 'Poverty and Hunger' – a World Bank publication (1986) which distinguishes the policy combinations applicable to conditions obtaining in Sub–Saharan Africa, Latin America and India and Bangladesh. In brief, priority is proposed in the first case to agricultural development; in the second to consumer subsidies; and in the third to a package of employment programmes and consumer subsidies targeted on the rural landless and the urban poor. Countries also differ with respect to the role of nutrition objectives in planning, and the role perceived for nutrition programmes.

Thus the level of priority attached to the types of actions discussed in this paper cannot be discussed in a general manner. Rather, such a prioritisation has to be based on a particular country's resources, problems and potentials. We have selected 19 countries, mostly low and middle–income (according to World Bank classifications), and carried out a brief characterisation of their economic resources, nutrition–related problems (household food security, infectious disease control, caring capacity), and nutritional outcomes, largely during 1987. Criteria for choice were geographical location, data availability and levels of economic development. Countries were selected equally from Africa (6), Asia (7) and Latin America (6) and spanning poor ($180 per capita GNP) to relatively high–income ($2690 per capita GNP). The aim is to better understand the characteristics or circumstances that facilitate the adoption of appropriate nutrition–relevant policies. As a first step, we use a very simplified proxy for appropriate policy adoption i.e. the absolute and relative (to GNP) governmental expenditure on health, education and 'social security and welfare' (cumulatively called 'social expenditure'), while realizing that this does not capture any nutrition–orientation of non–nutritional policies. 2–4 variables are used to describe the degree of severity of the three underlying clusters of nutritional problems, and the actual nutritional outcome data, where available, are also shown. More information could be gleaned from examining trends in these variables, but this is merely a preliminary exercise to see how countries differ with respect to underlying nutrition problem areas, on the one hand, and their level of resources and response for dealing with these, on the other.

Table 1.2 and Figure 1.7 tend to show that, by and large, as a country's income (GNP) increases, the absolute and relative amounts of its social expenditure increases. Furthermore, economic growth and concurrent increases in social sector expenditures have been associated with decreases in infant mortality rates (see von Braun 1990, p400–1). This is also borne out for the main part in Table 1.2, with Sri Lanka and China standing out as examples of positive outliers (with lower IMRs than their GNP would suggest) and Brazil an example of a negative outlier. But is there inevitably a trade–off between economic growth and

social security?. In fact, this may well not be the case – an appropriate strategy for many low–income countries, particularly in Sub–Saharan Africa is likely to be 'social security–with–growth' (von Braun 1990). This is because, firstly, economic growth in many such countries will depend on agricultural growth, which in turn depends on increased labour productivity. In many situations, the productivity of labourers could not be increased without ensuring their nutritional welfare (Kumar 1987). Secondly, social security may speed up the 'demographic transition' (from high mortality/high fertility/high population growth rates) as it will reduce mortality rates, increase the proportion of children born that survive, and reduce the demand for children. The constraints on available resources induced by increasing population growth rates may thus ease. Social security provision need therefore not be traded–off with a pure growth strategy – pursuing both simultaneously is likely to bring mutual benefits.

In the mid–1980s, (World Bank–classified) low–income countries (or those with GNP per capita below US$ 500) spent about 10.7% of central government budgets on social security (von Braun 1990). As a country's per capita GNP increases, absolute social security expenditures have been found to increase exponentially, and a similar relationship can be detected in Table 1.2. By the time a country has reached the upper middle–income bracket (approximately GNP per capita US$ 2,200), about 25% government expenditure is on social security, on average (von Braun 1990, p398), although we usually don't know the actual components of such an allocation from published figures. A 'threshold' appears to exist at around US$ 400–500 per capita GNP, above which both the absolute per capita governmental social expenditure (see Table 1.2) and the relative (to GNP) social allocations (see Figure 1.7) appear to rise considerably. At this threshold, 5–10% of a country's GNP, on average, is allocated to social expenditures, amounting in practice to between US $50–100 per capita per year. Obviously there are countries (e.g. Mexico and South Korea here) which diverge from this pattern. Also, richer countries, like South Korea, may still maintain a level of absolute per capita social expenditure even if they choose to lower their relative (to GNP) allocations, providing economic growth is sufficient.

Particularly for the poorest countries below this threshold, however, the need then will be to set priorities for social expenditure as incomes slowly rise. Nutritional concerns must be foremost, with food security and health and sanitation policy, targeted at the most food and health–insecure, regarded as major priorities.

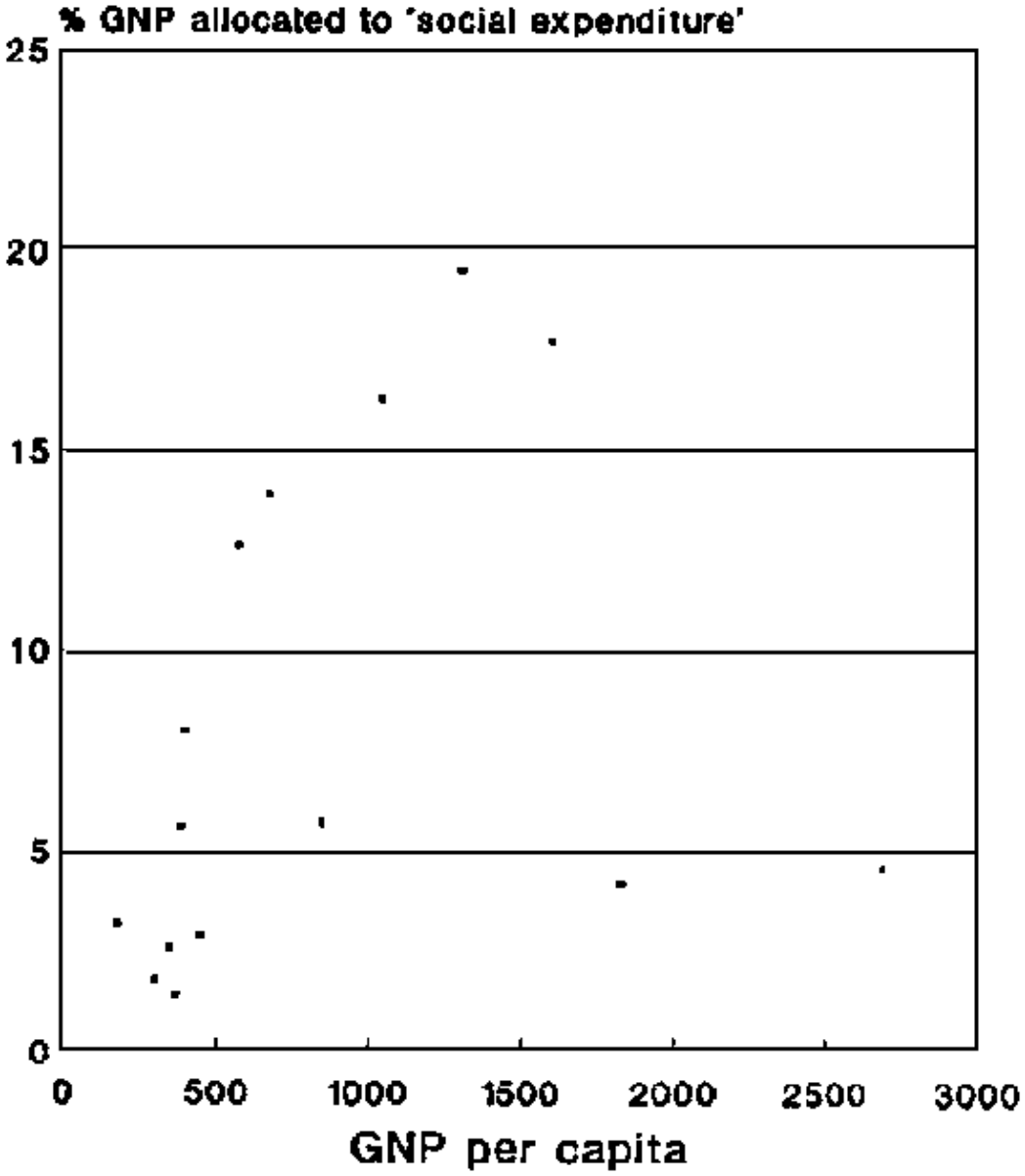


Figure 1.7: Relative Social Expenditures (as % of GNP) for Selected Countries in 1987

Country case studies

We examine the actual policies and programmes of six of these countries – Botswana, Ghana, India, Indonesia, Colombia and Costa Rica – illustratively throughout the book. By way of introduction, five of these countries have explicitly built nutritional considerations into planning, while in Botswana, such objectives were implicit in their programmes for raising entitlements. Nutrition programmes featured in all six, although their role in Costa Rica is now becoming less important. It should be recognised that the existence of programmes does not necessarily relate to the need for them – countries like India and Indonesia, for example, may have the infrastructure and resources for implementation unlike a poorer country with greater need such as Ethiopia, or indeed much of sub–Saharan Africa.

Of the six countries, five (Botswana, Ghana, Colombia, Costa Rica, Indonesia) have been purposely selected as examples of countries with trends of decreasing prevalence of underweight (under–five year old) children during at least the last five years (see Figure 1.8). In India, there are substantial inter–state variations; Kerala and Tamil Nadu are two relatively successful examples. Prevalences have generally been dropping since 1980 in Colombia, Costa Rica and Indonesia, while Botswana and Ghana both experienced rises between 1980–84, before improvements in the latter half of the decade. The Latin American countries generally have had prevalences below 10% during the 1980s, while the others have averaged over 20%.

Table 1.2: Nutrition–related Resources, Problems and Outcomes in Selected Countries

Country	*Resources*			*Demography*		
	Per capita GNP ($ 1987)	*Govt. expenditure (% GNP 1987) on: hlth/educ/welf (total).*	*Govt. 'social expenditure ($ per cap. 1987)*	*Population (m) (1987)*	*Population density (per sq. km) (1987)*	*% urbanisation (1987)*
Tanzania	180	1.2/1.7/0.3 (3.2)	5.8	23.9	25	28
China	290	...	...	1068.5	113	21
India	300	0.3/0.5/1.0 (1.8)	5.4	797.5	238	27
Pakistan	350	0.2/0.5/1.9 (2.6)	9.1	102.5	128	31
Nigeria	370	0.2/0.8/0.4 (1.4)	5.2	106.6	110	33
Ghana	390	1.2/3.4/1.0 (5.6)	21.8	13.6	57	32
Sri Lanka	400	1.7/2.5/3.8 (8.0)	32.0	16.4	249	21
Indonesia	450	0.4/2.1/0.4 (2.9)	13.1	171.4	89	27
Zimbabwe	580	2.5/8.2/1.9 (12.6)	73.1	9.0	22	26
Egypt	680	1.1/5.5/7.3 (13.9)	94.5	50.1	51	48
Thailand	850	1.1/3.6/1.0 (5.7)	48.5	53.6	104	21
Jamaica	940	...	...	2.4	219	51
Botswana	1050	2.8/8.7/4.8 (16.3)	171.2	1.1	2	21
Colombia	1240	...	...	29.5	26	69
Chile	1310	1.9/4.0/13.6 (19.5)	255.5	12.5	17	86
Costa Rica	1610	5.5/4.6/7.6 (17.7)	285.0	2.6	54	51
Mexico	1830	0.3/2.0/1.9 (4.2)	76.9	81.9	41	71
Brazil	2020	...	...	141.4	17	75
South Korea	2690	0.4/3.2/1.2 (4.6)	129.1	42.1	425	68

Data were extracted from World Bank (1989) *World Development Report*, except population density (from *UN Demographic Yearbook* 1987), urbanisation, health services access, water access (from *UNICEF State of the World's Children* 1989), per capita kcals. and percentage income on food (from World Bank (1990) *World Development Report*), and maternal mortality rates (from UNDP (1991) *Human Development Report*). 'Social' expenditure refers here to combined expenditure on health, education and 'social security and welfare. Nutritional outcome data refer to percentage prevalences (of under–five year old children) below 80% weight–for–age from ACC/SCN (1987), unpublished.

Country	**Household food security**		**Infectious disease**			**Caring capacity**			
	Per capita kcals (1986)	**% income on food (1980–85)**	**IMR (1987)**	**Health services access (1985–88)**	**Water access (1985–88)**	**Female literacy (1985)**	**Female/male lit ratio (%) (1985)**	**Mat. mort. per 100,000 live births (1980–87)**	**Contraceptive prevalence (%) (1980–88)**
Tanzania	2192	64	179	76	56	88	95	340	1
China	2630	61	45	...	...	55	69	44	74

India	2238	52	152	...	57	29	50	340	3
Pakistan	2315	54	169	55	44	18	42	500	8
Nigeria	2146	52	177	40	46	31	56	800	6
Ghana	1759	50	149	60	56	42	66	1,000	1
Sri Lanka	2400	43	45	93	40	81	88	60	6
Indonesia	2579	48	120	80	38	64	80	450	4
Zimbabwe	2132	40	116	71	...	55	79	480	4
Egypt	3342	50	129	...	73	30	50	320	3
Thailand	2331	30	51	70	64	87	92	...	6
Jamaica	2590	39	23	90	96	98	100	110	5
Botswana	2201	35	95	89	54	60	73	250	3
Colombia	2542	29	69	60	92	84	98	110	6
Chile	2579	29	...	97	94	92	99	47	4
C. Rica	2010	33	23	80	91	92	100	36	7
Mexico	2080	35	70	45	77	82	93	82	5
Brazil	2500	35	87	...	78	77	96	120	6
S. Korea	2680	35	34	...	...	91	93	26	7

A thumbnail sketch is provided here of each country's experience in economic growth, governmental expenditure (both the relative and absolute allocations to health, education and 'social security and welfare') along with the types of nutrition–relevant policies and programmes implemented and the associated nutritional outcomes (clinic–based prevalences, comparable across time) largely from the mid–1970s to 1986.

Botswana: As the economy grew during the 1970s and 1980s, so did government expenditure relative to GNP. Relative (to GNP) allocations to health remained stable while those to education rose. In 1986, the level of per capita social expenditure, particularly on education, was high. $ 20 per capita per year was spent maintaining some form of social security. During the prolonged drought of 1982–88, as food production steadily dropped, food supplies were maintained through commercial imports and food aid, and income support was provided through the labour–based drought relief measures taken. Food consumption levels (per capita/day) were maintained at about 2,200 kcals. The Drought Relief Programme covered more than 70% of the population and cost the government $21 million (just 2% GDP) with foreign donors providing an equivalent amount. The relatively high degree of health service coverage (85% population in rural areas) provides the potential for channeling targeted food interventions through the health services to reach vulnerable groups not covered by employment provision. With respect to nutritional outcomes, prevalences of underweight children (below 80% Gomez weight–for–age) were contained between 25–31% during the 1980s.

Ghana: As the economy declined so did expenditure relative to GNP, although slight increases were made in relative health and education allocations. In 1986, while per capita health and education expenditure was low, some form of 'social security' did exist (though costing less than $3 per capita). Food consumption levels (kcals/capita/day) were extremely low during the early 1980s, dropping to 1,500 in 1983. Only 45% of the rural population are covered by health services, so food interventions through health services do not yet hold promise. A strongly socially–oriented structural adjustment programme (including food stamps, food–for–work and health interventions) was in operation in the 1980s, later followed by the Programme of Action to Mitigate the Social Costs of Adjustment (PAMSCAD). Prevalences of underweight under–five children rose from 35 to 50% between 1980–1983, before dropping back down to 35% by 1986. The nutritional improvement mirrored changes in food prices.

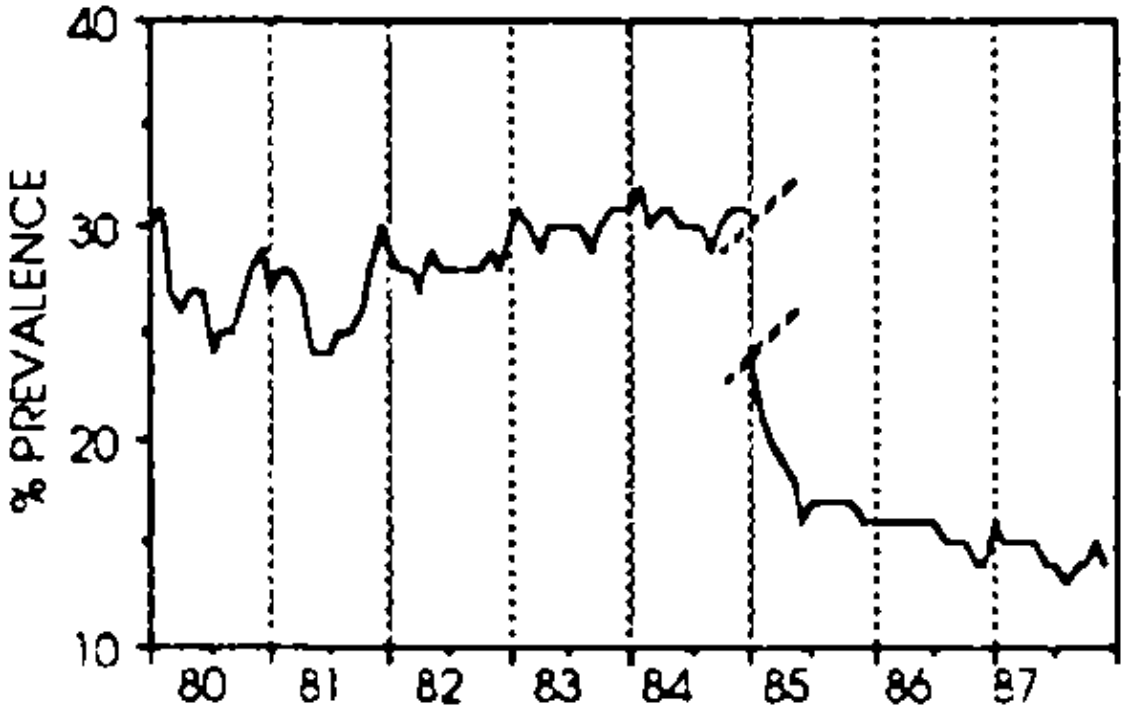
India: While India has experienced slow economic growth during the last two decades, government expenditure relative to GNP has increased slightly. However, allocations (both around 2%) and per capita expenditure (both around $ 1) for health and education remained very low during the 1980s. Other problems persist with rural health care access and anti–female bias in primary education and adult literacy, albeit with

regional variations. Food consumption levels (per capita/day) were relatively low in the mid−1980s. No social security existed during this time, although elements of a safety net were in place in the Public Distribution System, the Employment Guarantee Scheme in Maharasthra, and the National Rural Employment Programme. Integrated nutrition and health interventions (e.g. ICDS) also were underway, although these programmes often worked best in those areas where they were least needed i.e. where outreach was less of a problem and an infrastructure existed for delivery (hence the marked regional differences in nutritional outcomes). At the time of writing, National Nutrition Monitoring Bureau (NNMB) survey data were only available up to 1982, although more recent data are to be published soon. Using the Gomez weight−for−age classification and local standards, progressive decreases occurred in both 'severe' (less than 60% weight−for−age), and 'moderate' (60−75% weight−for−age) categories between 1976 and 1981, with prevalence of 'severe' dropping from 9% to 5%, and 'moderate', from 40% to 34%, although 1981 was a drought year. There are known to have been noticeable state−by−state differences in changes in nutritional outcomes in the last fifteen years. For example, the nutritional situation in Kerala and Tamil Nadu has improved significantly since 1975, while Gujarat and Orissa have experienced deteriorating nutritional conditions.

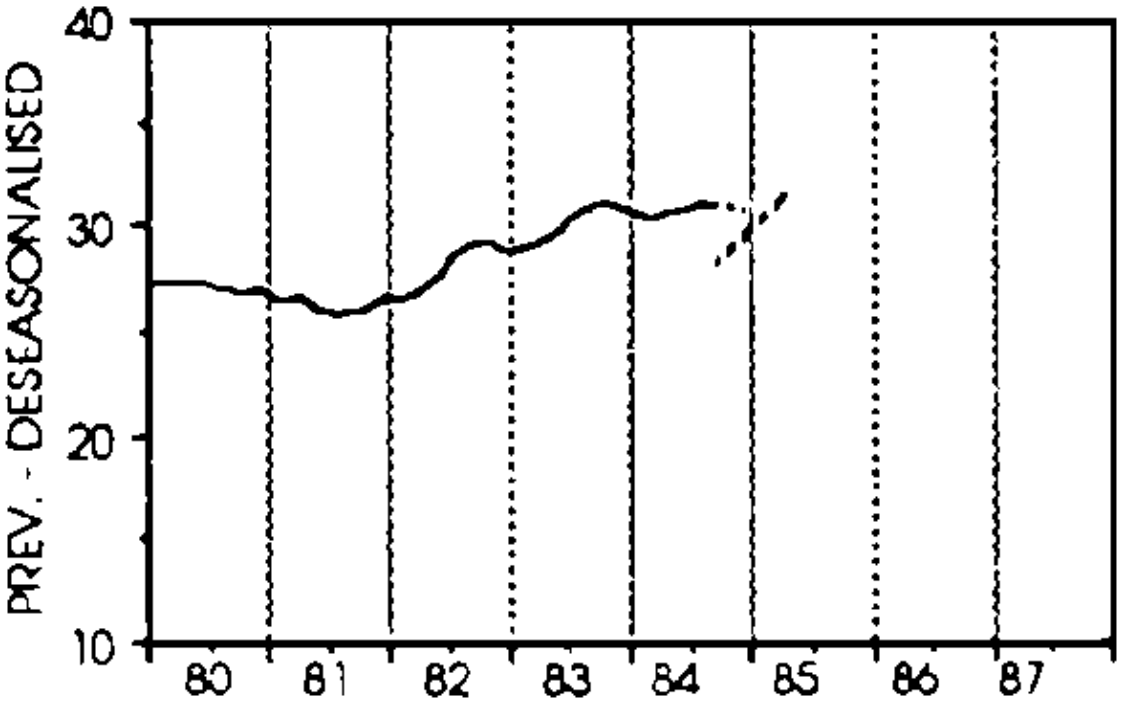
Indonesia: As the Indonesian economy steadily grew, government expenditure relative to GNP increased as did relative allocations to health and education. Household food insecurity was less of a problem, with daily per capita food consumption above 2,400 kcals. for most of the 1980s. Per capita expenditure on health was very low in 1986, higher for education. There was no social security although, like India, there was a food distribution scheme (BULOG) and an integrated nutrition and health intervention with wide coverage (UPGK) − both of which (also like India) varied regionally. Regarding nutrition, the prevalence of underweight (here defined as less than 70% weight−for−age) children was 16% both in 1978 and 1986 in rural areas, while urban prevalence dropped from 13% to 9% over the same period.

Figure 1.8: Trends in Nutritional Outcomes for Case Study Countries (Source: ACC/SCN 1989a)

Botswana

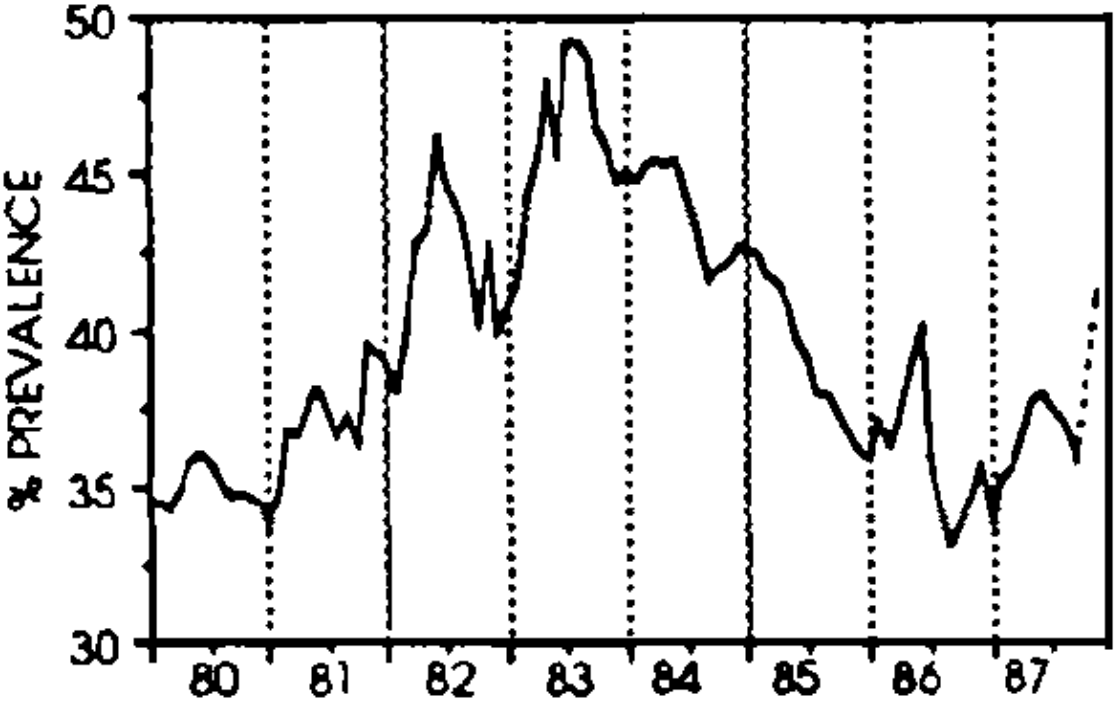


Prevalence of underweight (<80% Wt/Age) children aged under 5 years. Nutritional Surveillance Programme data.

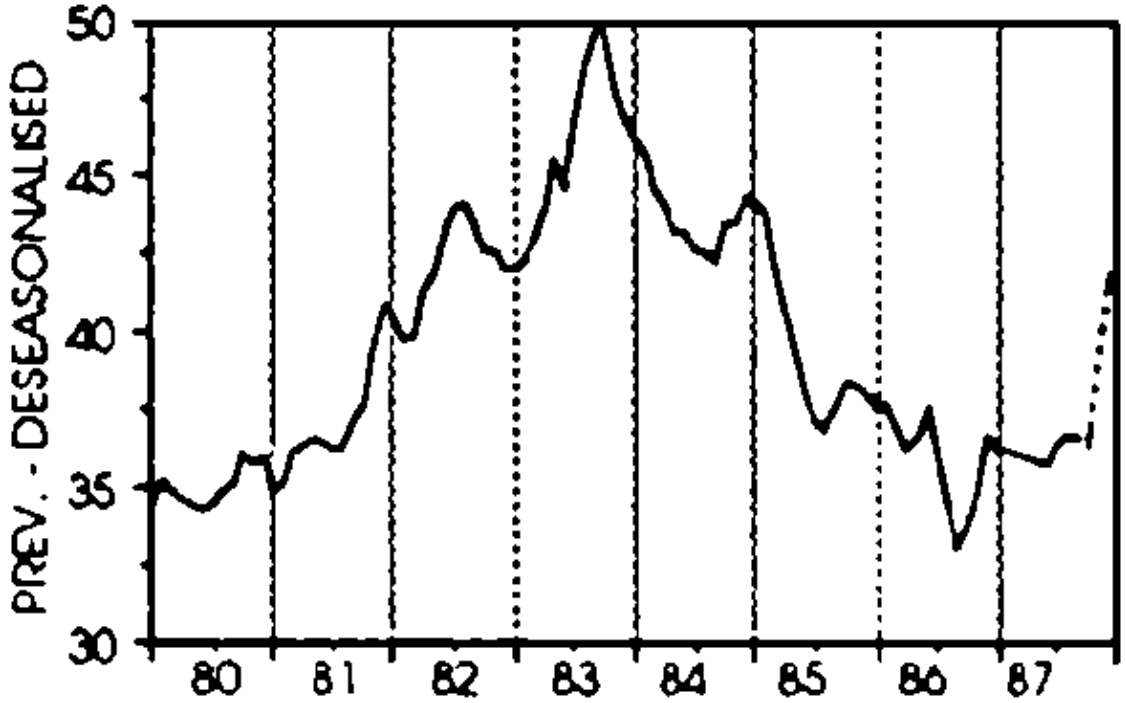


Prevalence curve de–seasonalized

Ghana

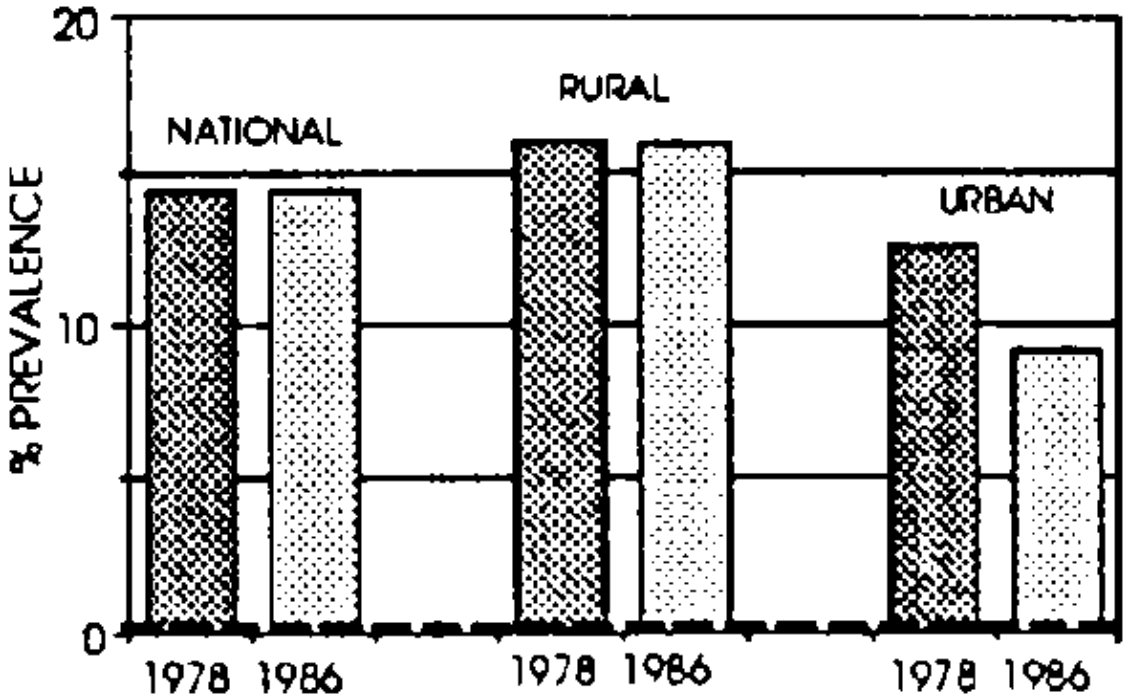


Prevalence of underweight (<80% Wt/Age) children aged 7–42 months. Health Centre data.



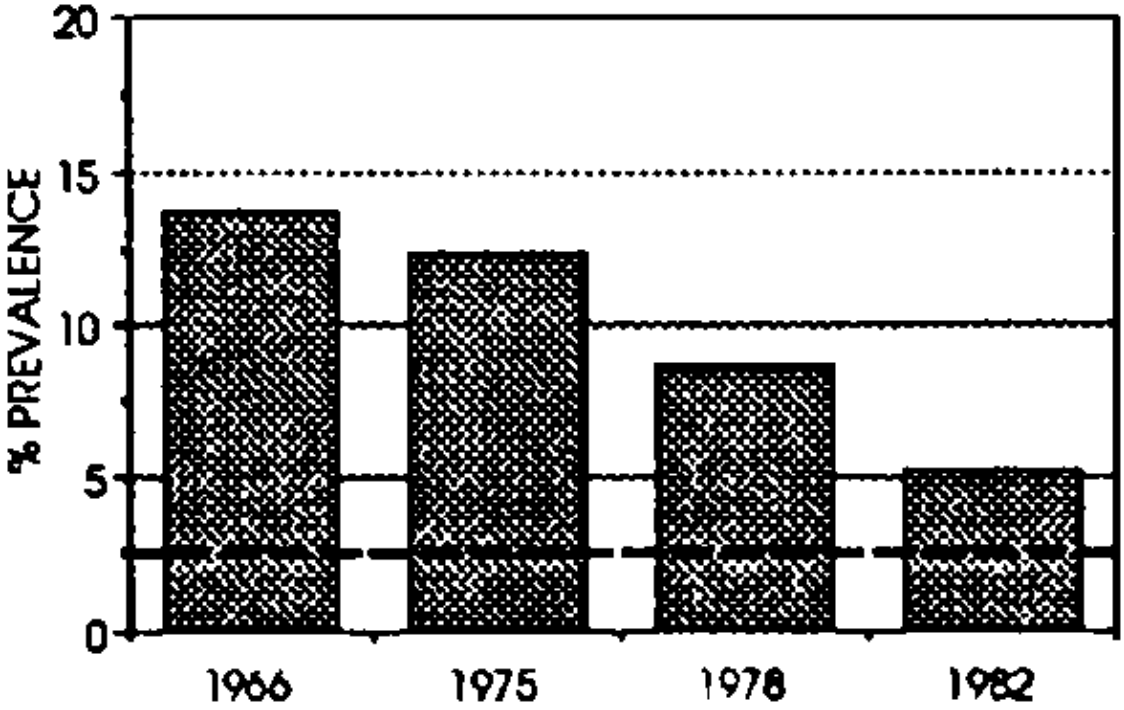
Prevalence curve de–seasonalized

Indonesia

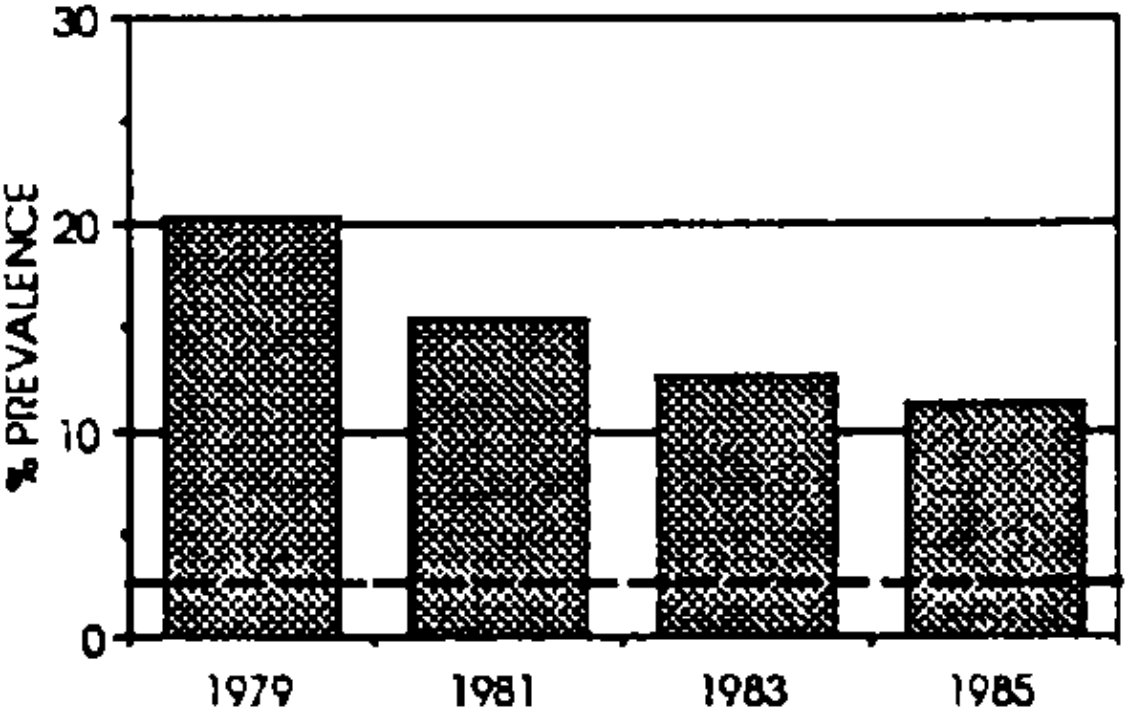


Prevalence of underweight (<70% Wt/Age) in children aged under 5 years: 1978 & 1986. By Urban/Rural area.

Costa Rica

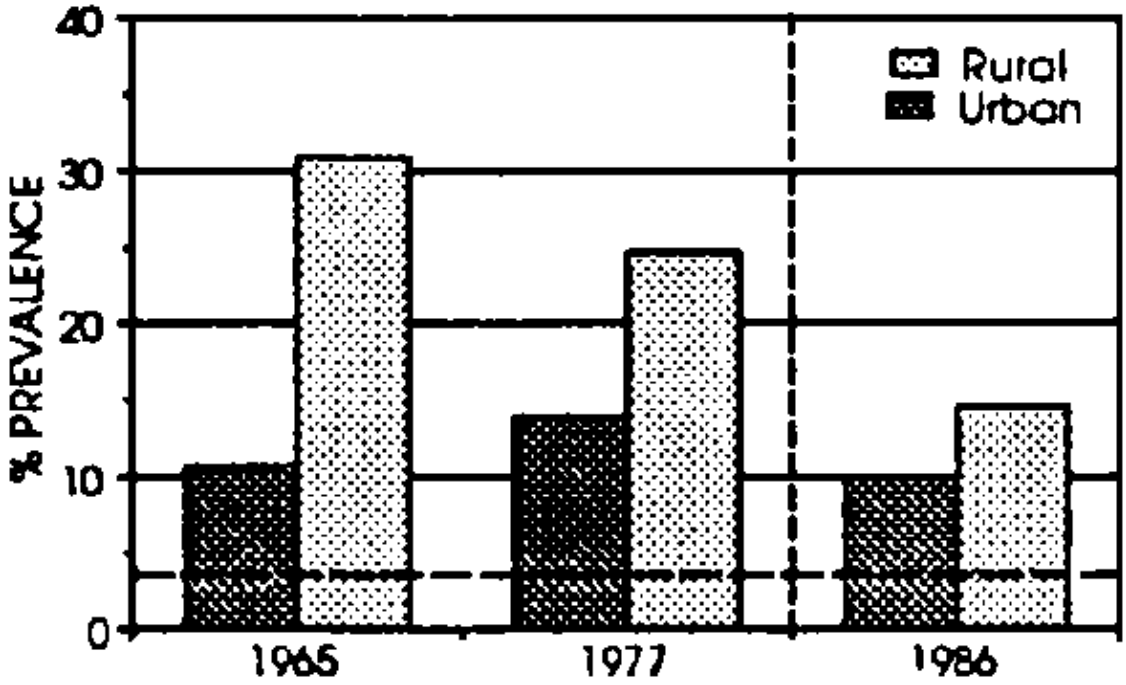


Prevalence of underweight (<–2 S.D. Wt/Age) in children aged under 6 years: 1966 –1982

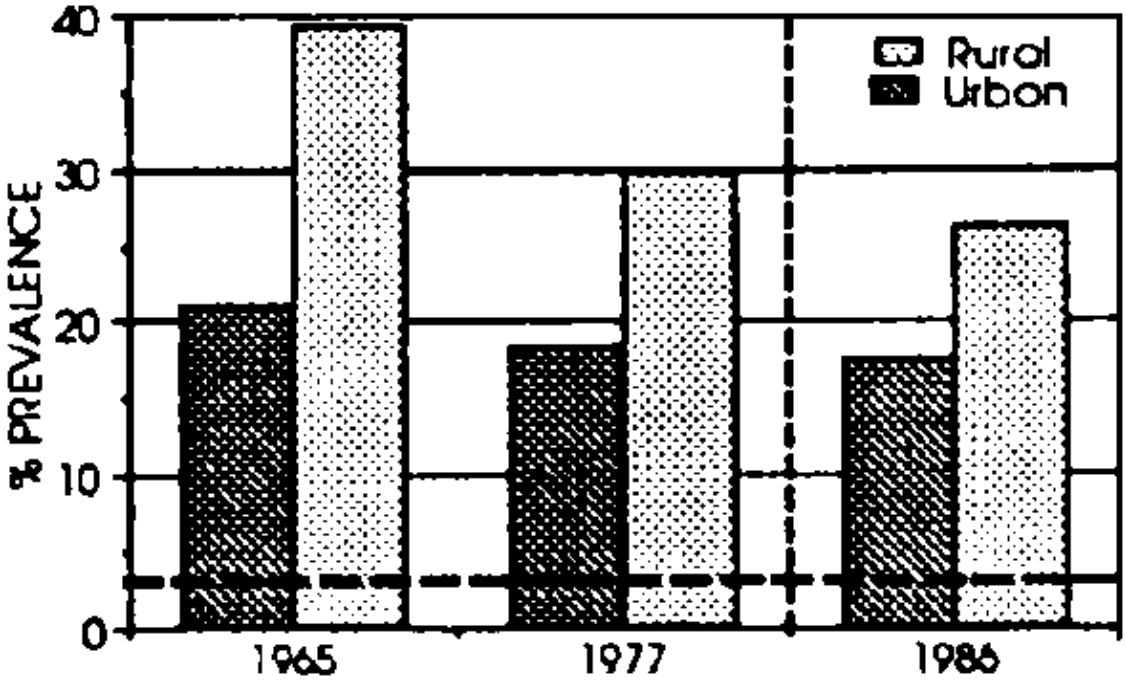


Prevalence of stunting (<–2 S.D. Ht/Age) in children coed under 6 years: 1979–1985

Colombia



Prevalence of underweight (<3rd. Percentile Wt/Age) in children aged 6–35 months ('65 & '77), 3–35 months ('86)



Prevalence of stunting (<3rd. Percentile Ht/Age) in children aged 6–35 months ('65 & '77), 3–35 months ('86)

Costa Rica: Although economic growth was slow, levels of per capita GNP in 1986 were high relative to many Latin American countries, and government expenditure relative to GNP increased. There was also a dramatic increase in the health allocation (up to 19% in 1986), as that to education dropped. In 1986, per capita expenditure was over $ 70 for each of health, education and 'social security and welfare'. Such large budgetary allocations permitted improvements in health service outreach and utilization as well as educational improvement. Food consumption levels (kcals/capita/day) were relatively high and household food insecurity was not a priority problem. From 1966 to 1982, there was a progressive decrease in child underweight prevalence from 13% to about 5%, while 'stunting' prevalence (less than 2 standard deviations height–for–age reference) dropped from 20% to 11% between 1979 and 1985.

Colombia: The economy grew slowly in the 1970s and 1980s, and the relative government expenditure remained stable. The data available unfortunately do not allow for trend estimation. A system of social security cost about $ 34 per capita in 1986. The daily per capita levels of food consumption are reasonably high.

During the last two decades, a high rate of urbanization has resulted in improved access to better urban health facilities for more people. A multi–sectoral nutrition programme also had some positive impact (during the second half of the 1970s) before it was wound down. Considering nutritional outcomes, the rural prevalences of both underweight and stunting came progressively down from 1965 (30% and 39% respectively) to 1986 (15% and 26% respectively). Thus, by 1986, the rural–urban differentials in underweight prevalence had been markedly reduced. Over the same time span in urban areas, there was little change: underweight prevalence ranged from 10–14%; stunting from 17–21%.

Conclusions. Where economies have grown (at whatever rate), governmental expenditure relative to increasing GNP has tended to increase, as has per capita social expenditure (on health, education and social security). Two of the poorest countries studied – India and Indonesia – do not officially have systems of social security, although there are elements of public support through food distribution and employment provision. Both these countries are very large in size and population and there are marked regional variations in infrastructure, programmes and nutritional outcomes. In both these countries, particularly low per capita expenditures on health and education have coincided. Owing to their large populations, relatively low levels of urbanisation and the economic predominance of agricultural growth, the particular need here (along with improving outreach and impact of public support) may lie in the promotion of equitable *labour–intensive* strategies of agricultural development. Other problems relate to the distribution of food and health care access. Combined geographical and commodity targeting of food subsidies may be important interim measures. Both African countries have had to rely considerably on external funding during the economically and environmentally calamitous 1980s. In Botswana, a progressive deterioration in child nutrition was avoided (or ameliorated when it occurred) during this time through the use of labour–intensive support for able–bodied adults combined with feeding programmes for children and other vulnerable groups. The latter could be delivered through the health services owing to their relatively high outreach. In Ghana, where health services were less developed, policies on food prices and public food distribution through subsidies and stamps were needed to prevent the collapse of entitlements. The Latin American countries are relatively economically well–off and have been able (and chosen) to maintain a system of public support, along with sustained allocations to health and education (*while* the economies have grown). Food interventions are much less of a priority in these countries.

CHAPTER 2: HOUSEHOLD FOOD SECURITY

THE PROBLEM AND ITS CAUSES

Household food security refers to a household's ability to acquire food. A working definition is: “A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, safety and culturally acceptable), and when it is not at undue risk of losing such access.”

Some definitions

“...a country and people are food secure when their food system operates in such a way as to remove the fear that there will not be enough to eat. In particular, food security will be achieved when the poor and vulnerable, particularly women, children and those living in marginal areas, have secure access to food they want...” (Maxwell 1990)

“[Food security is]....access by all people at all times to enough food for an active and healthy life. Its essential elements are the availability of food and the ability to acquire it. Food insecurity is in turn the lack of access to enough food” (World Bank 1986)

“ [The goal of food security is to]....ensure that all people at all times have both physical and economic access to the basic food they need....At the global level food security has three specific aims: ensuring production of adequate food supplies, maximising stability in the flow of supplies and securing access to available supplies on the part of those who need them” (Huddleston 1990)

“Food security can most simply be defined as the absence of hunger and malnutrition. For this to be possible, households, villages or countries must have enough resources to produce or otherwise obtain food. The condition is necessary, but not sufficient, because the resource must also be used well” (Kennes

1990)

Household food security requires adequate home production of food and/or adequate economic and physical access to food. Economic access comes from an adequate purchasing power, while physical access refers to the proximity of markets or other distribution channels through which food may be acquired.

The distinction between chronic and transitory (or acute) states of food insecurity should be kept in mind. Transitory food insecurity may be triggered by seasonal fluctuations in food availability, food prices and/or incomes, which themselves may result in seasonal fluctuations in individual nutritional status. Depending on the level of vulnerability of a household, transitory periods of food insecurity may precipitate the chronic condition. A household that cannot cope with seasonality in this way, may be thought of as 'fragile', while a household that weathers such periodic crises is more 'resilient' (Oshaug 1988).

Another consideration is: what does it actually *cost* to become food–secure, in terms of the amount of human and economic resources required. This has been illustrated with the matrix in Table 2.1 (Jonsson and Toole 1991). The priority group for any intervention lies in the top right–hand box – these are households which, despite using a large proportion of their available resources, remain food–insecure.

It is also worth noting here that the concept can be both subjective – as households members perceive it – and objective, as security in fact turns out. Subjectivity *is* important as coping strategies are designed on the basis of perceived threats of food deficit rather than those revealed by objective indicators. Minhas (1990) explored self–perceived adequacy/inadequacy in India as part of a comparison of the use of nutritional norms versus food behaviour in estimating adequacy of energy intakes. Recently, the National Sample Survey (NSS) in India conducted an opinion poll, within its routine survey questions, on the question whether or not the sampled households considered their food intakes adequate. Results showed that 18.5% households, on average in India, self–reported chronic and/or seasonal food inadequacy. This compared with figures of 14.6% according to food behavioural thresholds and 50.2% according to caloric norms.

Table 2.1: Costs of achieving household food security

	Household food–secure	***Household food–insecure***
Uses a large proportion of available resources	Food–secure, but at great risk (vulnerable)	Worst off
Uses a small proportion of available resources	Best off	Not too difficult to improve

Source: Jonsson, U. and Toole, D. (1991)

How does household food security relate to individual nutritional status? Household food security is necessary but, of itself, not sufficient to ensure adequate individual nutrition. It may be possible to be malnourished in a food–secure household through the effect of disease, inadequate care or inequitable food allocation. While a household may be food–secure in terms of calories, dietary quality will determine the likelihood of micronutrient deficiencies occurring in individuals. It should also be pointed out that it may be possible for an individual to be well–nourished in a food–insecure household, although this will usually be at the expense of other individuals' nutritional status, due to preferential food allocation and care. Assuring food security at the household level is thus a fundamental first step in assuring adequate nutritional status of individuals.

The 1980s shift of emphasis from 'food production' via 'food security' to 'household food security' brought the household into the picture as a target and unit of analysis. Once *household* food security is ensured then nutritional advocacy can be focused on within–household factors. The whole intra–household nutritional arena of women's resource control, food allocation, caring capacity, as well as the level of access and quality of health services is involved. The nutritional status of individuals, as measured by anthropometry, is one measure of the outcome of *all* these processes – although not specific to household food security, as borne out by several studies (e.g. ACC/SCN 1989b, Staatz *et al.* 1990).

Measuring household food security

The degree of adequacy of dietary energy intake for the health, growth and activity of all individual household members is one measure of household food security. The concept also has implications of assurance of future intake – removing the fear that there will not be enough to eat. Both 'current' and 'future' aspects are implicit in the definition.

Problems in practical assessment of current household–level food consumption derive from difficulties in both measurement and interpretation. One important aspect to which attention is now turning involves the time dimension (FAO 1990). If it *could* be measured, daily household energy consumption would probably vary considerably day to day. Cross–sectional measurements of 24–hour intakes will pick up some well off households who happen to eat little that day, and vice versa. The suggestion has been made (FAO 1990) that *daily* intake is too fine a measure: one low intake day may not be meaningful, while a low–intake week probably is, and a low–intake month definitely is. Adding this to the need to standardize the measurement period – which varies from days to months by different methods – means that taking a monthly average would be convenient in measurement and easier in interpretation. A month on average of low kcal intake is clearly definable as a problem of household food security, and is measurable[1].

[1] More recent considerations have led to using yearly averages, but the same ideas apply.

The next issue is what constitutes “low”, or “adequate for what?” This was also considered by FAO (1990), and relates to scaling the kcal intake as a factor × BMR. Figure 2.1 was used to illustrate the effects, responses, and controls over the range of (monthly) kcal intakes. It implies that in principle levels of f × BMR (probably around 1.4 to 1.7 × BMR) per household (or adult equivalent (AE)) could be set (a) below which productive activity is reduced because of food energy constraints; and (b) within the area of discretionary activity, with appetite control over intake – as happens when food is plentiful. The point is *not* that we can agree absolutely on cut–offs, but that they could in principle be derived. Moreover, the “currently food secure” point is likely to be where percentage of income spent on food starts to drop, behaviour is less food–directed and life generally becomes more pleasant. That is what we are aiming for in terms of current food security.

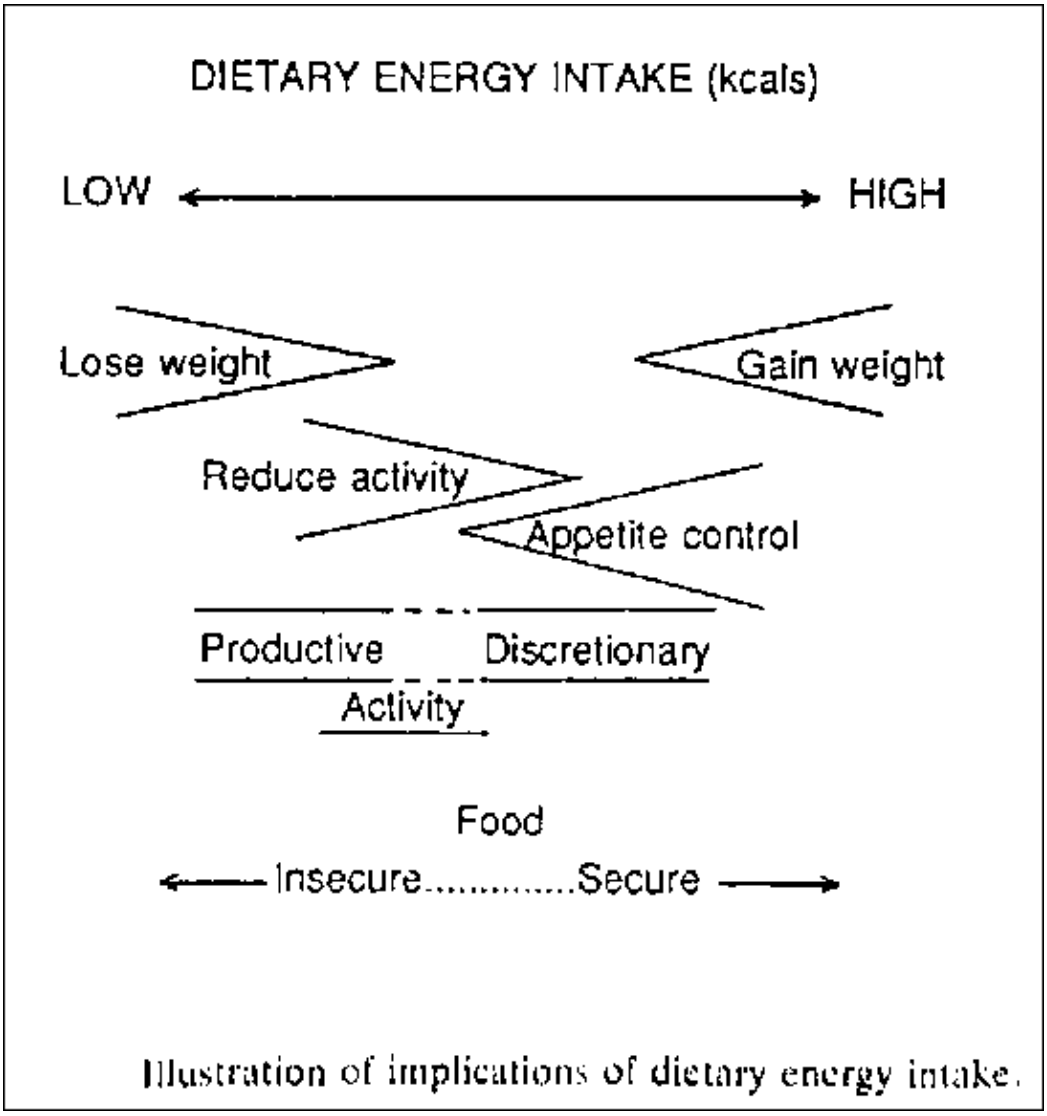


Figure 2.1: Illustrations of Implications of Dietary Energy Intake

Some indicators of 'current' food security that do not involve direct measurement of kcal intake are available, at least to indicate change, derived from food prices. These may be in relation to the Consumer Price Index (e.g. see ACC/SCN 1989a, page 57), or to wages (e.g. as percentage of salary, see ACC/SCN 1989a, page 149); or hours work needed to buy a food basket (see ACC/SCN 1987, pages 23–24).

The concept however also includes assurance of 'future' access to food – 'future' security (see Figure 1.5). This requires consideration of the risks faced and insurances available to the household. Assessing this is not easy. An attempt has been made using data from Southeast Asia, by Phillips and Taylor (1990). They link future security (FS), current security (CS), risk (R) and insurance (I) by the following simplified formula: FS = CS + f(I, R). Risks may include food production shortfalls, unemployment, price increases – events occuring randomly, cyclically or continuously. Insurance may be both public (e.g. employment guarantee schemes) and private (e.g. food stocks or savings). Security in this sense is the converse of vulnerability. Thus if one wanted to know “is this population food secure?”, in principle “current” (or retrospective) food security is objectively measurable and fairly interpretable; “future” food security depends also on knowing the levels of risk and insurance.

Causes of household food insecurity

The causes of household food insecurity are evident from the above discussion of the various dimensions of the concept. They may include inadequate control and quality of assets (including land), unemployment, underemployment or inadequate wages, high food prices, inadequate access to markets and other factors.

The ability of a household to command adequate food resources – through self–production or market

transactions – is primarily dependent upon assets and/or income. In agrarian societies, land ownership has been shown to be a sensitive indicator of wealth, and studies have indicated that undernutrition is associated with the lack of such a productive asset (Valverde *et al.* 1977; Nabarro 1984; Martorell *et al.* 1984), and/or low effective income (Bairagi 1980; Lipton 1983; Becker *et al.* 1986).

There are studies, however, that have shown that landless people are *not* likely to be at greater risk of chronic undernutrition in semi–arid areas, where land and water conditions are relatively poor (Lipton 1983). Walker (1984) has shown in a study of three villages in South India that seasonal variations in work and food – major sources of acute undernutrition – are actually worse for farmers than equally poor landless labourers. Land, however, can be mortgaged, and thus offers some protection against nutritional deprivation.

Poverty, as measured by flows of income and/or food, is a fundamental cause of household food insecurity. Poor households spend a high proportion (often over 80%) of their income on food and are therefore particularly vulnerable to adverse changes in their incomes or the price of food. Seasonality in food availability, labour demand, hence food prices and incomes may result in transitory food insecurity and cause fluctuations in individual nutritional status (Longhurst and Payne 1981; Gillespie 1989; ACC/SCN 1989a).

The degree of physical and economic access to markets is of obvious importance. Household food insecurity may also arise from a dependence on markets which do not operate perfectly and may interlock to further impoverish households. One example (very common in India) would be the wages of an indebted landless labourer in a bad harvest being reduced by his creditor/employer as food prices are raised, with the standing fixed sum debt repayment still being demanded. Here three markets – those for food, labour and money – interlock to further disadvantage the labourer. Food markets may discriminate against sellers of small quantities (i.e. poorer households) in terms of the per weight crop price received. Indebted households may also be forced to sell off a portion of their harvest at low post–harvest prices (in order to repay interest on a loan), and then buy back their subsistence needs at a later date and a higher price. With such “distress sales”, they may thus lose out whilst only repaying interest, with the capital debt remaining. They may even have to take out a further consumption loan to enable them to purchase food once their meagre stocks have run out. The land market is another source of exploitation. Tenants may be forced to pay rents in kind after harvest when prices are low. They may be required to provide rent in the form of labour on the landlord's land at a critical time for their own crops.

Such a compulsive involvement in interlocked markets impoverishes those dependent on them at the same time as it profits those in control. Larger farmers, landlords and creditors utilise markets to their own advantage – hoarding their crops and waiting to sell large quantities at times when the price is highest and interlocking the markets for food, labour, land and money so as to extract the maximum gain from labourers, tenants and debtors (a majority of the poorest groups are likely to be all three).

RELEVANT ACTIONS

The range of policy instruments available for influencing household food security, as defined, is wide. The following sections describe such actions which may be seen as falling broadly into three categories: economic growth; production; and marketing and distribution. Some such actions are influenced by nutritional considerations, while others conventionally are not. The spectrum of influenceability is spanned. Moving from macroeconomic adjustment through to targeted food stamps, for example, the policies and programmes become more obviously nutrition–oriented in their objectives and design (although not necessarily more important for nutrition). For the reasons explained in chapter 1, we describe both types of actions, while concentrating attention on those which are usually more 'influenceable'.

Such a diversity of potential actions under the 'household food security' umbrella means that decisions will need to be made concerning the allocation of resources between competing uses. Trade–offs will have to be confronted. With the roots of food insecurity being so deep and widespread, choices can range, for example, from building roads to improve physical market access, to feeding severely malnourished children. The criteria needed for project selection, the opportunity costs of choosing one project over another, and the mechanisms for setting priorities have all to some extent been explored in the IDS Bulletin (July 1990). Huddleston (1990), for example, uses a multi–criteria table to evaluate the costs and benefits of alternative food security interventions. Factors to consider may include those suggested by Maxwell and Belshaw (1990): scale, speed, cost–effectiveness, equity, consistency with government policy, administrative feasibility and sustainability.

Macroeconomic Adjustment

During the 1980s, many developing countries particularly in sub−Saharan Africa and Latin America experienced severe economic crises. To mitigate these, a variety of programmes were initiated, either independently or with support from the IMF or World Bank, with the explicit aim of reducing imbalances in the economy and generally with little initial consideration given to the potentially adverse nutritional impact on the poor. On average, every year between 1980 to 1985, there were 47 countries with IMF programmes, while 21 countries received World Bank credit for structural adjustment programmes. Adjustment programmes are of two main types:

> *i) stabilization programmes,* mainly IMF supported, aimed at reducing imbalances in the external accounts and the domestic budget by reducing government expenditure and restricting credit. These are deflationary and tend to have rapid effects on the balance of trade through a reduction in imports;
>
> *ii) structural adjustment programmes,* which aim to change the structure and efficiency of the economy over the medium term through an expansion of the supply of tradables and increasing exports and import−substitutes.

Debate about whether such a distinction is justifiable is secondary to the major concern (in this section) of examining the types of effects these macroeconomic adjustments have on the nutritional welfare of vulnerable groups during the short−term. Adjustment often manifests itself as a short−term economic shock. Frequently low priority is given to effects on income distribution or on particular social groups, and to welfare variables for monitoring.

Like other macro−level development policies, adjustment may affect nutrition through its effect on all problem groups − household food security, women's control of resources and the malnutrition−infection complex. Problems of household food insecurity may be exacerbated due to forced unemployment and devaluation and cuts in food subsidies leading to food price rises (see example of Ghana).

Nutritionally adverse impacts may be direct or indirect. Indirect effects may be mediated by effects of adjustment on growth, employment, income distribution and poverty. One example of a direct effect, on the other hand, would be a reduction of per capita energy consumption by market−dependent households in response to either food price hikes designed to stimulate production, or a reduction in real food subsidies. Capping or reducing food subsidies has in fact been part of about one third of adjustment programmes supported by the IMF during recent years.

As well as declines in real income as food prices rise, there may be increases in individual time demands (often women's), and hence food energy requirements, as households try to substitute home production for purchased goods. Cuts in government health expenditure may also have a direct adverse impact on health status of individuals. The burden of such adjustments often fall disproportionately on vulnerable household members. Owing to their multiple productive and reproductive roles, women are particularly vulnerable to adjustment−induced changes. The squeeze is felt on both sides: while more time may be necessary to care for dependents due to cuts in social services, more time is also needed to work to compensate for increased food prices or reduced real incomes.

Increased public awareness of such adverse impacts over the last decade has catalysed the incorporation of nutritional considerations in the design of adjustment measures (e.g. in Ghana). Within structural adjustment programmes, both medium−term policy changes and short−term *compensatory* measures to protect the consumption of the poor are recognized. It may be, as with the likely nutritional focus on “support” measures discussed above, that nutritional concerns have a particular opportunity with compensatory action. (This has been elaborated in the context of nutritional surveillance in ACC/SCN (1989c)).

Where major economic imbalances occur, some type of adjustment is necessary. Where it has been initiated, we do not know what type and how severe the consequences of an economy in free fall would otherwise have been. The point is adjustment is an *intervention,* open to modifications to protect the vulnerable. The important question is *how* to adjust i.e. how to combine adjustment with protection of the vulnerable and the restoration of economic growth? Is it possible to select a mix and sequence of domestic policies that reduce or eliminate the decline in real incomes of the poor while accomplishing the goal of improving the macroeconomic balance? On the basis of ten in−depth country case studies, published in a second volume, Cornia *et al.*

(1987) proposed six elements of an appropriate adjustment policy. In sum, these envisaged policies aimed at productive and equitable growth; targeted interventions; early warning and compensatory measures to protect the consumption of the vulnerable.

Several common constraints to the design and implementation of compensatory programmes include limited administrative and management skills, the need to increase cost–effectiveness in the use of scarce resources e.g. through community participation, and problems with targeting and appropriate monitoring. Concern also exists that compensatory measures should not distract from the need to design adjustment programmes from the outset with longer–term food security and poverty–reduction objectives in mind.

In fact, adjustment need not be detrimental to the poor. In a recent report, the World Bank (1990) suggested principles for making adjustment "work for the poor". Firstly, a set of core expenditures should be determined. These can be *economic* geared to improving income–earning potential (e.g. extension and credit services, irrigation) as well as *social* (e.g. targeted food subsidies, integrated nutrition and health interventions, improved supply of basic educational materials). Secondly, monetary targets should be set for lending to the poor, particularly poor women, preferably with group collateral. Thirdly, as many African households produce tradable goods (e.g. food) overvalued currencies tend to depress prices for agricultural producers; hence devaluation leads to increased producer prices potentially benefiting farmers, although imperfect functioning of markets needs specific attention if such signals are to be transmitted to poor producers. Poor urban groups will also need protection through appropriately targeted food subsidies. A more labour–intensive growth pattern may be pursued through shifting output towards exports and efficient import substitution. While this is likely to affect wage levels and employment favourably in the medium and long–term, adverse interim effects will need to be ameliorated through the use of, for example, public works schemes. Nutrition–relevant interventions, whether interim or longer term, hold promise, provided they can be shown to be appropriate, feasible and cost–effective.

Specific consideration is now being given by the World Bank to ways of protecting nutrition during adjustment programmes (Selowsky 1991). Selowsky sees no necessary trade–off between the goals of adjustment and protecting the purchasing power of vulnerable groups. The key to this, he claims, is to link savings from public finance reforms to social programmes (including nutrition and health) targeted to vulnerable groups. State subsidies to inefficient industries must be reduced or curtailed and user fees for services used by the middle or upper classes increased. For example, a large part of education subsidies go to higher education, preferentially benefiting richer groups. In Brazil, 40% of health subsidies benefit the richest 20%. This type of cost recovery may thus be equitable as well as efficient. For such proceeds then to be channeled into effective social programmes would require, in many cases, significant improvements in institutions and delivery systems. Such institution–building will take longer but is essential.

Another study (World Bank 1989) compares the experience of 70 food and nutrition programmes in 17 Latin American countries. It concludes that with 1% GDP, an average Latin American country could finance a good targeted food programme. Its preliminary findings reveal that on average, school feeding programmes cost $25–50/student/year, and direct supplementary feeding, $100/child/year (see also 'Programme costs', chapter 3). These are not large amounts relative to the resources one can obtain by restructuring the public sector and improving the tax system, if targeted well.

Employment Policies

Employment policies are discussed here as background macro–level policies which affect nutrition through their impact on the levels, fluctuations and distribution of income and purchasing power. For many developing countries, the major employment policy will be the policy on agriculture (see below, particularly the 'Green Revolution' case study)

Fiscal and exchange rate policies determine the relative prices of capital and labour in agriculture and how technological progress affects the rate of growth and income distribution. Policies which lower capital costs vis–a–vis labour costs will encourage labour–saving mechanization and inhibit the growth of employment, whereas a fall in the relative price of food (the principal wage good) vis–a–vis non–foods, promotes an employment–based labour–intensive development strategy which increases the income of the poor. The latter leads to an increase in the demand for food since the income elasticities of demand of the poor are high. Furthermore, increases in small and medium farmers' incomes stimulate growth in the non–farm sector of the economy, which in turn produce income for the poor, thus raising demand for food and stimulating technological progress in agriculture.

Development of a Socially−Oriented Adjustment Programme in Ghana

Background: From being one of the most advanced countries of the sub−Saharan region from the mid−1950s, Ghana experienced a prolonged period of stagnation from the latter half of the 1960s to the 1980s. This resulted from severely adverse external circumstances (world recession) and poor economic management, and was compounded in 1982−84 by acute drought, accompanying bush fires and the arrival in early 1983 of over 1 million Ghanaians expelled from Nigeria.

In the early 1980s, heavy spending on imports and regular budget deficits led to spiralling inflation. These factors, combined with an overvalued currency, reliance on energy imports and falling export earnings, contributed to an average annual decline of 0.2% in real GDP over the period 1970−1980. Per capita income fell by one third from 1974 to 1982, food production dropped and by 1982, when the drought struck, per capita food availability was (with Chad) the lowest in Africa (at 68% minimum basic calorie requirements) and the lowest since independence in 1957. During the recession, most Ghanaian families were reduced to having one meal a day. At the end of 1983, the government requested 250,000 MT of emergency food aid.

The data on food availability, food prices and nutritional status, taken together with those on incomes, underlines the fact that Ghana's nutrition problem is not simply one of food availability – a large part of the problem is very low effective demand. How did this come about? As well as the droughts in the mid−1970s and 1982−83, the transport system deteriorated considerably, adversely affecting farmers' market access. Both labour and land deteriorated in quality as a result of rural−urban migration and population growth. These problems were ubiquitous in the sub−Sahel, but two were thought to be particularly related to Ghana's situation: inadequate producer prices and labour shortage. Ghana's real consumer price for food grew faster than any other country in the region between the mid−1970s and the early 1980s. Why then didn't producers respond by increasing their outputs? In fact, the underlying trend in producer prices for food crops was downwards. This divergence between consumer and producer prices was due to increasing costs of marketing. At the same time, wage earners and cocoa producers were suffering even worse declines in rates of return. Effective demand with average real incomes was falling dramatically. Between 1975 and 1983, real wage income declined by more than 20% per year and the real cocoa producer price by some 12% a year. The severe economic decline in Ghana started precisely when the developments in the world oil market in 1973−74 created a vast demand for foreign labour in Nigeria. In the course of the following years up to 2 million Ghanaians (i.e. approx. 20% of the population, and a higher proportion of the working population) migrated to Nigeria, and also later to Cote d'Ivoire (UNICEF 1984).

These factors all combined to push Ghana to the position it reached in 1982/83. Ghana probably only managed to fend off famine due to the fact that people's food entitlement fell sharply but more or less evenly. Entitlement did not collapse entirely for any group (Tabatabai 1988), for the following reasons: the drought was not localised but covered the whole country: the economic decline had narrowed income inequalities; the urban population took to subsistence production, and the extended family system enhanced food security.

Response: In 1983, during the drought, with GDP 13% lower than in 1980, the government recognised the need for drastic reforms. A structural adjustment loan of $500 million was agreed with the IMF in April 1983, heralding the launch of the 3 year Economic Recovery Programme (ERP), which included 97% currency devaluation, tight monetary and fiscal controls and 67% increases in producer prices for the most important export crop, cocoa. As a result, the economy was stabilised between 1983−86: per capita incomes increased, inflation was down (from 70% between 1980−84) to an annual average of 23% from 1985−87; export earnings rose from $430 million in 1983 to $700 million in 1986. Hoarding, however, was widespread, and basic commodities were not available on the open market. Difficulties caused by rising prices did not subside with the end of the drought in 1984, and debt service obligations were over 50% exports between 1985−87.

The rise in food production in 1984 was not enough to bridge the deficit, and 175,000 metric tonnes food aid was needed. To maintain the continuity of food supplies throughout the year, the government drew up a national food security and buffer stock system. A price−support structure to combat fluctuating producer prices, was introduced in 1985 and moves were underway to sell state farms back to the private sector.

The positive effects of the eventual economic recovery were not fully reflected in improvements in human welfare: health care and education remained on declining trends: the water supply situation had not changed materially, while the nutritional situation had improved compared with the worst of the drought, but

remained precariously balanced. Real incomes of poor households were still quite inadequate to meet dietary needs. In response to these perceived problems, a comprehensive Human Recovery Programme – the first socially–oriented programme to accompany a structural adjustment programme – was developed after the drought and supported by the World Bank.

It comprised three main elements:

i) protection of nutritional status of vulnerable groups and ensuring food security. This aimed at improving food entitlements in the long run, but recognised the need for immediate interim action, including: measures to increase food production, feeding programmes targeted to children and pregnant and lactating women, food–for–work projects to increase employment and consumption as well as building up infrastructure (especially water, sanitation, roads), and support of small–scale activities (including assistance in credit provision and marketing advice). For formal sector low–wage urban employees, food stamps, administered by employers, represented one short–term means of increasing productivity, real incomes and consumption, before the effects of recovery began to be felt. In the urban informal sector and the deprived rural areas, on the other hand, food–for–work programmes were aimed at raising consumption. In the rural areas, work schemes could use food purchased locally, with any food aid being sold in the urban areas to finance the scheme.

ii) rehabilitation and restructuring of the social sectors, through increases in the availability of essential inputs such as drugs, school books etc., restoring adequate working conditions and halting the outflow of trained personnel. UNICEF and the World Bank have begun to support programmes for a considerable expansion and improvement in primary health care activities in Ghana, and the government has been encouraged to reverse the bias towards hospital–based care. In the water sector, there is a need to repair many borehole handpumps as well as raising the number of urban water points, while urban public sanitation facilities need to be improved.

iii) introduction of low–cost child nutrition and health interventions (often cutting across sectors) e.g. immunisation and diarrhoea control to complement the food production initiatives in improving the nutritional situation.

Lacking financial support, many of the traditional communal activities have faded away. Revitalisation of community action is a basic thrust of government policy, and UNICEF have proposed the setting up of a Community Fund, using both external and government funds, whereby financial support could be provided for villages which had committed resources – labour, local materials or food – towards identified health and nutrition projects. Fund finance could be used to purchase materials from outside the community (e.g. weighing scales for growth monitoring) and for necessary expertise and training.

The Human Recovery Programme also needs effective monitoring, which would require improved collection of data on child nutritional status, levels, distribution and sources of incomes, food prices and food production. Data should be collected regularly and transmitted quickly to a central point.

A Programme of Action to Mitigate the Social Costs of Adjustment (PAMSCAD) was presented by the government to a donor's conference in early 1988. This inducted measures such as employment–generation projects, community–based infrasfructural improvements, basic needs projects and supplementary feeding. The package costs $83.9 million with $11 million in the form of food aid and initial commitments have been made for funding.

The relationship between economic growth and employment is complex. The transmission of economic expansion to employment growth depends on the nature of the economy, the functioning of the labour market, and the distribution of productive assets and technological change. Structural adjustment policies adopted in many countries have led to a deterioration in the overall employment situation. One indicator of this is the decline of modern sector wage employment. For example, formal sector wage employment in 36 sub–Saharan African countries accounted for only 9.4 per cent of the labour force in 1980, while this is now estimated (ILO 1989) at below 8 per cent. Another indicator is the widespread fall in real wages. Out of 20 African countries with comparable and recent data only three, Burundi, Senegal and the Seychelles, have reported modest increases in real wages since 1980.

The segmentation of labour markets between formal and informal, agricultural and rural non–farm sectors is gradually disappearing at the household level in many countries, as many urban household reestablish links with rural areas as a strategy to survive in the face of adjustment–induced drops in real wages. Such occupational multiplicity, however, is at the expense of labour productivity and output, and is likely ultimately to prove harmful to economic growth.

In the ILO's report on adjustment in Africa, pre–conditions for employment and income growth were suggested as, first, a tax and government expenditure policy which restricts higher–income, and promotes lower–income level expenditure, and, second, action to support small–scale producers. Wage policy aimed at reducing occupational multiplicity, and recreating a stable, motivated, efficient and specialized workforce, is felt to be indispensable for the revival of growth in the modern sector.

There is a distinction to be made between long–term employment creation and public works employment (including food–for–work) as a means of more immediate income support. Nutritional considerations may help to define needs for public works, for targeting both populations and in time – for example in food crises as happened in Botswana, India, and Indonesia.

Employment provision

While macro employment policy prescriptions may eventually have an effect on nutrition, direct labour–based interventions (e.g. food–for–work and employment guarantee schemes) often targeted at vulnerable groups may be one important available means of affecting nutrition through improving a household's purchasing power, whilst simultaneously creating valuable community assets for future use. Employment provision obviates the need either to move food to families or families to feeding programmes, as work can be offered close to home, building up the assets of the community. It promotes increases in local wages as well as being amenable to self–selection. Public works may preferentially benefit women who form a great majority of the workforce on such schemes, through a raising of their incomes and consequent improvements of their economic and social status (see chapter 4 below). Wage differentials between sexes can be eliminated, with possible knock–on effects on local labour markets. Net income gains (taking into account income foregone from other work) can be substantial, and timed to buffer recipients from seasonal food and cash flow problems.

Food–for–work and employment guarantee schemes vary enormously in their scope and coverage. They also vary in stated purpose: to provide employment, to provide income to the poor, to produce assets. They are generally self–targeting providing wages below market wages. The subsidies involved constitute the difference between the costs of carrying out the programmes and the assets generated. The latter may include roads, drainage and irrigation channels, which could themselves provide a long–term source of employment, through repair and maintenance as well as stimulating rural non–farm activities, especially trades and services. Projects are usually location–specific and thus necessitate travel for workers whose net income will be the difference between wages paid and the costs of travel, living away from home and income foregone from private employment or reduction of production at home. Diversion from home production is unlikely to be a major problem however as many seeking work do not have much (or any) land, and in any case any displacement may be counterbalanced by upward pressure on wages resulting from the public works. In fact, a study in Bangladesh (World Bank 1990, p98) found that the foregone earnings of Food–for–Work programme participants were only about one third of their gross earnings from the programme.

As the schemes involve asset–creation, second–round effects on incomes will be felt by the poor and non–poor depending on who uses these assets. The continuation of the Maharashtra Employment Guarantee Scheme in India may in large pan be due to the fact that assets created preferentially benefit the non–poor. Ideally, assets created should as far as possible benefit the poor. Reforestation, erosion control and the rehabilitation of agricultural land are all particularly relevant in this regard.

One major choice is whether to introduce a *guarantee* of employment, as an insurance. Such a safety net will obviously be more costly. The Maharashtra scheme is financed by taxes on rich urban sector workers, and was originally introduced as one means of reducing rural–urban migration into Bombay. In Bangladesh, aid is used to fund such schemes and wages are paid in–kind.

Employment Provision in India

In the late 1970s, food–for–work programmes were seen by the Indian government as one means of providing employment in infrastructure building, reducing nutritional deprivation as well as reducing their mounting buffer stocks of grain. In a study of the implementation of the programme in Tamil Nadu, Balaji and Ramachandran (1980) criticised the timing of the work, being provided as it was at periods of peak agricultural labour demand. However, these were also periods of low food availability and high food prices, so seen in this context, the timing appears more relevant. Alternatively, programme timing may be largely determined on the supply side by the need to reduce buffer stocks before replenishment with the new harvest. Other common criticisms, revealed in a review by Wijga (1982), included the lack of benefit to the project labourers of the infrastructure they create. Roads, canals and irrigation tanks have in the past tended to benefit landlords and big farmers more than the poor. Opportunities do, however, exist for providing relevant work for the poor e.g. improving water supply and sanitation, at critical periods of the year.

The Food–for–Work Programme was replaced in 1980 by the National Rural Employment Programme (NREP). This was funded equally between the Central and State Governments. The Programme provides employment, wholly or partly paid for in grain, for the creation of rural assets to targets self–selected among the asseted and landless poor. For this purpose, half the programme expenditure is on materials. The targeting of expenditure is complex, involving proportional targets for types of asset (25 per cent on social forestry) and types of people (10 per cent on scheduled castes and tribes) as well as absolute financial targets (Rs 60 million on latrines). Regional targeting is also sophisticated. Resources are allocated regionally according to weightings derived equally from i) the proportion of the State's population under the poverty line and ii) the absolute population of agricultural labourers, marginal farmers and marginal workers. In 1986–87 the programme absorbed Rs 7.2 billion and generated nearly 400 million man days of employment.

Independent research revealed several problems in the first five years of the NREP (Gillespie 1988). There was a spatial patchiness in terms of coverage, wage rates and cash/kind ratios in wages, and advantages by several criteria (number of days' work created, wage levels and the food component) tended to accrue disproportionately to the most developed districts. Instances of payment being under the legal minima for the State, delays in payment, payment in inedibly deteriorated grain or in a foodgrain (most notably wheat) not eaten by the poor were all recorded. At the aggregate level, under 1 per cent of rural employment was provided by the programme. Payments were often reduced where labour was organized by private contractors, though this has been made illegal. In some cases, assets created may damage equity by being captured by the non–poor. The NREP was not easily geared up to food emergencies, just as the targeting of employment was not easily co–ordinated with the targeting of assets under other GOI programmes. Subsequent reform has included expansion and multiplication of such programmes in order better to target the excluded.

The type of payment – either cash or kind – also varies. Cash wages may be quicker, less prone to corruption and administratively easier, although this requires that such newly created demand can be satisfied through marketing channels that function reasonably well. If this is not the case (as in many famine situations), then kind wages, as food, may be a better option. The latter also recognises the need in many situations to turn over buffer stocks.

Rarely do such programmes have explicit nutritional objectives. It is commonly assumed that because such schemes often do involve food, they must positively benefit the nutritional status of participants. Given their common focus (1 to 3 months participation) however they will generally only be effective in smoothing out seasonal fluctuations in consumption. Nonetheless, this may be important to cover gaps while more fundamental improvements occur, and may also serve to prevent distress sales and asset depletion during seasonal hard times. While India's experience with such programmes is well known, Dreze and Sen (1990) show there is also great potential in Africa. Botswana has already successfully initiated a labour–based relief system (see below), informal security systems in Africa are often characterised by searches for work, and Africa, unlike India, has a wealth of publicly owned land on which to base such schemes. Ghana, Kenya, Lesotho, Malawi, Zimbabwe, Tanzania and Mozambique have all used employment provision.

Labour–based Drought Relief in Botswana

Over 80% of the population of Botswana are rural, and the majority of these are dependent on agriculture for their livelihood, although the agricultural sector accounts for only 8.5 per cent of GDP (1982/83). Poor soils and low and erratic rainfall result in low crop yields and crop failures in two out of every five years. Overall food production is quite inadequate for the population. For 15 years after independence in 1966

livestock was the main agricultural source of growth, although the benefits were inequitably distributed. During the 1970s, a rapid growth rate in the Botswana economy was largely fuelled by a rapid increase in the production and export of diamonds. This allowed for cereal imports to meet about 75% staple food needs. In 1981, a trade deficit emerged due to a temporary hiccup in the diamond market and before exports resumed rapid growth in 1983, the government had adopted a stabilisation policy involving restraints on government expenditure and a wage freeze which stabilised imports. The most vulnerable groups were not directly affected by this crisis.

The acute and prolonged drought from 1982–1988, however, reduced real incomes and food availability, particularly in the rural population. In 1982, food availability reached its lowest level, at a time when food aid was also particularly low, before both picked up from 1983. In 1983, over 85% farms produced no crops, and only 1% harvested sufficient to cover their annual food needs. From 1982 – 1984, cereal production declined from 50,000 MT to only 6,000 MT, and from 1982 to 1986/7 the numbers of head of cattle fell by a quarter from 3 million. Drought relief measures, which covered 70% population, were introduced in 1982. These included:

i) a Labour–Based Relief Programme (LBRP) which provided employment on socially–useful infrastructural projects and was designed to replace 50% lost income. In 1985/86, an estimated 74,000 workers were covered with 37% of the income lost from the 1983–85 crop failures replaced. Projects were decided upon by village committees who also identified participants (80% were women). Rural assets were protected, many distress sales prevented and the need for migration for work avoided:

ii) human water relief: funds were made available to help repair water systems and transport emergency supplies when local sources dried up;

iii) arable and livestock agricultural relief and recovery programmes:

iv) supplementary feeding programmes for primary school children, under fives, pregnant and lactating women and tuberculosis patients. Direct on–site feeding of severely malnourished children was also carried out with specially prepared foods at health facilities in remote areas.

Problems and interventions were identified by the comprehensive nutritional surveillance and early warning system. The National Nutritional Surveillance (NNS) system, as part of this, reports on the nutritional status of all under fives attending health facilities throughout the country, while the agro–meteorological, agricultural and food supply situations are also monitored. Pan of the success of the relief programme derived from experiences gained in dealing with earlier drought situations. Other important factors included the ability of the government to divert significant amounts of national resources to relief activities ($18 per capita to drought relief in 1985/86), a relatively small population, improved infrastructures in most areas and the ability to attract donor support, particularly food aid (a matching $18 per capita in 1985/86).

By 1983, the levels of cereal imports and food aid donations were high enough to offset the production shortfall and raise overall food availability to pre–drought levels. During the period of the drought relief programme (1982–86), malnutrition was effectively contained with only a relatively small rise from 25 – 31% in the proportion of children below 80% weight–for–age Gomez standard, while despite the continuing drought, malnutrition fell slightly between 1985–87 (ACC/SCN 1989a).

Maximising income through employment provision is not always sufficient to maximise the food security of all household members for the same reasons that national food availability does not translate into household food security. A crucial question is who *controls* the increased income? This leads into the area of intra–household resource control, particularly women's, as developed in chapter 4. Not all the poor are able to participate in employment provision schemes – with shifting demographic profiles, the proportion of the poor who are old and infirm is increasing. This is coinciding with a breaking down of traditional community–level social security systems (often driven by the commercialisation of agriculture), and emphasises the increasing need to meet these people's special needs. In industrialised countries, social welfare systems exist for this, but elsewhere such groups may be targeted in food distribution schemes and covered by preventive and basic health care systems (see chapter 3). State support for existing community–based systems should also be encouraged.

Agricultural Policies

One of the primary goals of policy formulation should be the integration of the supply, distribution and consumption of food. An essential pre–requisite for an efficient food system is a stable and adequate food supply, whether achieved through production or trade. Adequate food availability in society does not however necessarily translate into adequate individual food consumption. People need *physical* access to food. Distribution may be adversely affected by marketing bottlenecks caused by the lack of infrastructure such as roads and telecommunications or inefficient parastatal marketing boards. Even where the market works relatively well, certain groups of people are still likely to have inadequate *economic* access to food – their purchasing power may be insufficient. Although most vulnerable groups e.g. the landless and marginal farmers, are primarily dependent on the food market for consumption (not sale), total food availability is important to them also inasmuch as more food in society usually means cheaper food.

Agricultural policies and individual development programmes may thus influence household food security through their impact on both the supply and the demand for food; through determining food availability and the levels and fluctuations of household incomes, through their impact on food prices, on women's labour demand and time allocation, and on the nutrient content of foods made available. In the past, agricultural development has been primarily concerned more with supply–side increases in food production than with increasing household consumption levels, or generating sustainable livelihoods for people (e.g. the 'Green Revolution' in India in the 1970s, see box). Certain social groups may not benefit from an overall increase in food production, due to the inadequacy of their entitlement to food. The focus should thus be on people and their means of *acquiring* as well as producing food. Higher and more stable real incomes for people dependent on unskilled agricultural labour may be the most important contribution that agricultural policies could make to human nutrition and health in developing countries. The labour–intensity of agricultural strategies is increasingly becoming a major priority (see Lipton and Longhurst 1989).

In order to promote the future incorporation of nutritional objectives into agricultural policies and programmes, agricultural planners and decision makers must understand the extent and the mechanisms by which agricultural policies and plans may affect nutrition throughout a population. Most basically, there is the need for them to appreciate that nutrition in agriculture refers to much more than simply aligning production targets to estimated nutritional needs, or to simply improving national food balances or even economic accounts. A focus on people and livelihoods will necessitate the agricultural sector addressing the social, economic, and nutritional effects of its activities; who produces food and other agricultural commodities, how is it produced, and who has access to the produce or proceeds from its sale.

Cropping policy provides one example of such concerns. A government may choose to increase its foreign exchange earnings through promoting cash–cropping and commercialization of agriculture (this has also been a feature of many structural adjustment programmes). In a shift from food– to cash–cropping, the impact on nutrition via a household's effective demand for food (mediated by changes in employment and income distribution) is likely to be greater than the nutritional impact achieved via effects on food availability (ACC/SCN 1989b). Foreign exchange earned from cash–cropping may not necessarily be used to replace food lost for domestic consumption. Households become more dependent on fluctuating markets, the propensity to consume calories out of additional income can be quite low, even in households with malnourished members, and more expensive (not necessarily more) calories are often purchased. Lumpy sources of income from cash crop sales are often spent on non–food items.

Income generated may thus not benefit nutrition. The expenditure behaviour of a family is furthermore influenced not only by total income, but by its source and form (cash or kind), and who controls it. This again shows the link between women's control over resources and household food security, and how cash crops may affect intra–household power relations. In–kind income, for example, is more likely to be controlled by women and used for consumption.

Cash crops however are not good or bad per se. This depends their role in the economic process as a whole, which will differ between countries and between regions within countries. For example, certain cash crops may be labour–intensive and provide much needed labour for agricultural labourers without other possibilities. They are more remunerative than food crops and may be nutritionally beneficial *providing* the income they produce can be and is used to support livelihoods. Maxwell and Fernando (1989) found evidence linking increased cash cropping to an improved command over food. Longhurst (1988) has shown how different characteristics of cash crops will determine whether they are “virtuous” in terms of enhancing food security, or not. Virtuous characteristics include potential use as food crop, complementarity not competition with food crops and the control of production and/or marketing by women. Recent research on the effects of agricultural commercialization, carried out by IFPRI (Von Braun and Kennedy 1986) in the Gambia, Guatemala, Kenya,

the Philippines and Rwanda, has shown little impact – either positive or negative – on the nutritional status of preschool children. Health and sanitation constraints were usually found to overshadow any positive income effects – another illustration of the need to promote both food–related and health–related policies and programmes.

The choice of appropriate food supply policies will depend on the administrative and political feasibility, the costs and expected benefits, as well as the characteristics of the main commodities involved and the circumstances of the countries. For agricultural development, land–rich countries will require technologies that increase the productivity of labour, while yield–enhancing technologies will be more appropriate for land–scarce regions.

With population pressure on resources increasing in several countries, land scarcity is a growing problem. As this happens, a diversification of income sources is a coping strategy that reduces dependence on agriculture; surveys in low–income rural areas of 12 countries worldwide have shown, in half the cases, that the share of household income from non–agricultural sources was 50 per cent or more (von Braun and Pandya–Lorch 1991). Other examples relate to the management of production or consumption incentives. Increasing national food supplies and lowering food prices would benefit the poor in countries with high proportions of urban dwellers or rural landless, who are net food purchasers. Such a policy, however, would not help the poor in countries like Bangladesh and many Sahelian countries, who are net sellers of food, and as such, would benefit more from increased food prices and the substitution of imported for domestic products.

As well as higher food prices as incentives to production, there are other requirements for an increased supply. Surplus needs to be sold to generate income. Transport to markets needs to be adequate, non–food consumer goods need to be available in rural areas for increased incomes to be spent on; agricultural inputs and new technology need to be available for augmenting production and producers need prompt payment for their surplus, without any siphoning off by monopolistic private middlemen. Markets need to be efficient for price increases to be transmitted to the producer, while marketing losses due to inadequate storage, for example, need to be minimized (the example of Ghana above provides an example of how production failed to increase due to problems with marketing raising consumer prices and reducing demand). Unless at least some of these conditions obtain, particularly in societies with high degrees of economic inequality, higher prices *per se* may result in accelerated land transfer from small to large farmers (Streeten 1987).

Winners and Losers in India's "Green Revolution"

During the 1960s, scientists at the International Rice Research Institute (IRRI) in the Philippines succeeded in restructuring the rice plant, making possible potentially dramatic yield increases, though only under conditions of high fertility. Rice varieties like IR 8 and IR 20 began to be introduced in Tamil Nadu in 1967–68, with the High Yielding Variety Programme (HYVP), though not on a large scale until 1970. Talking of this "Green Revolution", an Indian economist, K. Mukerji (1974), summed up the highly optimistic attitude prevalent in the early seventies thus: "the technology of Green Revolution is knocking at the door. It is a technology that involves hybrid seeds, high fertiliser dosages, use of pesticides, and so on. All that is necessary is to open the door. That is all."

In Tamil Nadu, for example, HYVs were found to do well in the hot, dry season, but rapid spread was inhibited as many farmers could not afford the seed–fertiliser–water technology to cultivate at this time, and in many places, water was simply not available. During the cloudier monsoon season, the yields were found to be less impressive, and since the product obtained was less palatable and fetched a lower price, market–oriented farmers initially often stuck with traditional varieties (Farmer 1977). Although the adoption rate of HYVs was initially higher among the large land owners, and varied considerably from village to village and year to year, many Tamil Nadu farmers now use HYVs, largely as a result of a marked increase in the duration and reliability of the water supply.

What has been the social impact of the "Green Revolution"? In the late sixties it was assumed that poverty was a problem of food production, and that an improvement in production techniques, such as the use of improved crop varieties with higher dosages of chemical fertiliser and pesticide, would inevitably improve the economic and nutritional position of all households, with a higher food availability at all levels of the food system. The assumption was that if food is there, people will be able to eat it. Twenty years later, however, undernutrition in India is more often a problem of poverty, with people unable to buy food, rather than one of food supply. Poor people at nutritional risk are increasingly likely to be agricultural labourers rather than 'small farmers'.

It is true that marked increases in labour productivity have been realised with HYVs. Chinappa and Silva (1977) found traditional varieties of paddy rice grown in North Arcot district to yield 24 GJ of net edible rice per hectare, with a labour input of 0.73 GJ – a conversion ratio of work energy to food energy of 1:34. To cover its subsistence needs, a family of five would need about 0.7 ha. of paddy land. Changing to a high yielding variety would raise the yield to 33 GJ per hectare, and increase labour demand to 0.85 GJ – an input: output ratio of 1: 40. The household could move into surplus production, and might need to hire in labour. At first sight the change seems to be advantageous, more food production generally, and more employment. However, the effects are complex, and are not neutral to scale. HYV technology will ensure similar increases in net incomes of all cultivators, big and small, provided they can afford the higher cultivation costs involved and the necessary inputs are available to them at the right time, in adequate quantities and at reasonable prices. Fulfilling these provisos however proved to be beyond many small and marginal farmers.

At the start of the HYVP, HYVs were introduced in a deliberately selective way to richer farmers, in order, it was thought, not to spread resources too thinly, and to produce more surplus for the market, thus accelerating the capitalist transformation of agriculture. Richer farmers were in a better position to acquire inputs and had sufficient 'credit worthiness' to gain access to credit. They were able to dig wells and install pumpsets to give them a degree of independence from the vagaries of the monsoon, thus enabling them to cultivate during the two dry seasons for which the available HYVs were better suited. For a small farmer, on the other hand, more inputs necessitated more credit, increased indebtedness and greater risk as the HYVs were more vulnerable to the vagaries of climate and disease. They had to pay for their investment from the product of smaller landholdings than richer farmers and failure meant hunger and/or the forced sale of land.

Increased employment opportunities were thought to be of potential benefit to these smaller farmers, and may indeed be so for those families with a low dependency ratio. Seasonality in farming, and thus labour demand, has been heightened, although as labour peaks for everyone at the same time, there may be a conflict between the need to work on their own land, and the opportunities for earning ready cash by selling their labour for a wage. Increased labour demand – particularly for transplanting, weeding, harvesting – is disproportionately being met by poor women. If this results in income gains which they can control, and if child care is not adversely affected, then such increases in employment may be beneficial.

The impact on labour demand and wages has varied geographically. In regions with little unemployment and limited labour supply, increased labour demand has resulted in higher wages, although in other areas this has been countervailed by both population growth and mechanisation, increasing the supply and reducing the demand on labour respectively. Thus in many areas wages have remained static or fallen as an increasing use of labour–displacing mechanisation e.g. tractors has kept real wages down and led to a resurgence of patron–client relations between employer and employee for securing labour. Moreover, wages are becoming increasingly paid in cash, rather than kind, with adverse consequences in periods of high inflation and rising food prices.

While market prices of staples e.g. rice may decrease as a result of new technological innovations in production, the impact on consumers depends on their degree of market dependence on such staples, compared with changes in their real incomes. If they subsist on coarse grains, there will be no positive impact. This will only be achieved if the real food price (i.e. market price relative to income) of preferred staples decreases. In practice, when food prices are restrained, employers can and do restrain wages thus lowering labourers' real incomes. Such a “second round” effect is further catalysed by population growth which increases the number of people seeking work. While there may be income gains for the poor, economic inequality increases as the absolute gains of the rich are higher than those of the poor (Chinappa and Silva 1977). In another early Indian study, Dasgupta (1977) concluded that some of the major social and economic consequences of the new technology included: “proletarianization of the peasantry and a consequent increase in the number and proportion of landless households, growing concentration of land and assets in fewer hands, and widening disparity between the rich and poor households....”.

By the late seventies, the Green Revolution ideology was even being described as “a cruel and facile optimism” (Farmer 1977). Food production had increased, though by way of apparent paradox, food consumption had decreased, and agriculture was becoming divorced from nutrition (Palmer 1972; George 1977). Increases in agricultural productivity were accompanied not only by increases in food production, but also by an increased risk of undernutrition for people within certain social groups. As Lipton and Longhurst (1989) pointed out, the “Green Revolution” was not, in fact, a true revolution at all, as unlike the Neolithic or medieval agricultural revolutions, it did not transform society; rural power structures not only remained but facilitated the increased flow of benefits to rural elites further strengthening their economic positions. Urban

elites have also benefitted through their increased access to a price−restrained 'wage−good'.

In a later review, Pinstrup−Andersen and Hazel (1985) claim that inappropriate polices and institutions were to blame for undesirable initial developments of the 'Green Revolution'. Policies supported the take−over of land by larger farmers or the termination of rental arrangements which led to increased landlessness. What was needed, they claim, were policies to remove input market constraints for small farmers and thus fuel adoption. While they recognise that changes in land tenure have occurred, they claim that factors other than the 'Green Revolution' technological package e.g. demographic pressures, regional migration, have also been instrumental. Prevailing government policies on credit, land ownership, access to inputs, prices and marketing were dearly not drawn up with concern for short−term nutritional objectives. This view is also held by Binswanger and von Braun (1991) who blame bad policy, not commercialisation per se, for such effects: “constraints on trade, coercion in production, and ill−advised tenancy laws are government actions that may turn a promising opportunity into a disaster for the poor”. The answer to this is policy reform e.g. changing credit polices and extension services that are biased against the poor. However, where institutional changes and policy responses actually reflect existing conflict among social groups, this will be difficult to achieve e.g. in the case of tenant eviction. Improving the political power of weaker groups will be crucial here.

New technologies though should be designed with respect to prevailing socio−political systems, not simply imposed on them. Research design for poverty−reducing HYVs should differ as between the type of land (humid, semi−arid) and the type of poor people (small farmers, landless labourers). A recent paper (World Food Council 1991, p12), stated that an important deficiency in research efforts on modern cereal varieties in Asia, Africa and Latin America was “the lack of an adequate emphasis on socio−economic policy research linked to agricultural technology development and application to ensure that technology and socio−economic policy efforts are integrated in programmes to support the attainment of national, human−centred development objectives”.

At a national level, after the US PL480 food aid programme was halted in 1971, India struggled to become more self−reliant in food in a difficult economic environment of global food crisis and oil price hikes. There were also unfavourable weather conditions, droughts, especially in Western India and severe floods during 1974 in the North East. Yet India came through the crisis period with the two pillars of its food strategy, a political commitment to self−reliance in food and a determination to prevent famine, strengthened by these experiences. The decade up to the beginning of the Seventh Plan in 1985 was the period of greatest success in these two directions. Per capita production of two cereal crops (wheat and to a lesser extent rice) increased, as did the use of inputs, and the area irrigated expanded. In this period, HYV−fuelled increases in output caused first a reduction in imports, then a small net increase in exports, and finally, a build up of 25−30 million tons of foodgrains in government stocks (in order to avoid catastrophic collapse of producer incentives).

During this period, however, the incidence and severity of hunger hardly changed. Many of the poor could not afford this extra food. Where the poor's purchasing power does not rise sufficiently quickly to prevent domestic price decreases, the government may decide to artificially maintain production incentives by setting a higher price to larger farmers for staples. These staples may be used to supply the urban population, restrain imports or they may even be exported. The labouring rural poor with little purchasing power will not benefit unless built−up stocks are used in public distribution and nutritional support schemes e.g. targeted food subsidies, food−for−work, supplementary feeding (see later sections).

In summary, the 'Green Revolution' can be seen to have had gainers and losers. While aggregate food production has increased, this may have not been achieved equitably. Some 'marginal farmers' may have become landless due to their initial inability to afford necessary production inputs, and in many areas, agricultural labourers' wages have remained low relative to food prices. There are however some positive signs of forthcoming benefits for the poor as initially adverse policies that prevented their adoption of modern varieties have been reformed in some cases. If future modernised varieties of cereals are to alleviate poverty, research design will need to take more account of the political power and purchasing power of poor people, and appropriate policies put in place to fuel their adoption. To protect and improve nutrition, new technologies should be directly available to the poor through being labour−intensive (yet profitable) and/or concentrated on crops (or areas or assets) that remain in the control of the poor. Furthermore, within poor households, there are particularly vulnerable individuals. Planning HYV technology so as to generate extra income for mothers would improve the long−term survival prospects for female children in the poorest households where food allocation decisions are geared to ensuring the overall survival of the family i.e. biased to wage−earners.

Home gardens

There is some evidence (Kennedy and Alderman 1985) that home gardens have a positive impact on micro–nutrient intake, but little to suggest they affect energy consumption. Promotion of local production of carotene–rich foods for home consumption, by home and school gardens, has obvious potential for vitamin A deficiency prevention, although again problems of expansion from small–scale will need to be surmounted. Households with even small gardens in Bangladesh, for example, had less vitamin A deficiency than those with no gardens (Cohen *et al.* 1985). Common constraints to establishing gardens include insufficient land and labour; problems which are usually most critical for the most nutritionally needy families.

Experience from Zimbabwe has shown that *community* gardens (within which each person has a private plot) may be a viable option in Africa. Constraints recognised here were the high cost of fencing to keep out animals, lack of water, lack of gardening knowledge and lack of inputs. The economies of scale with such enterprises may enable such constraints to be more easily surmounted; extension officers can serve more people at the same time. In fact, the training of such officers was improved in response to demands made by community gardeners in Zimbabwe.

Food Price Policies

The basic dilemma that exists between higher food prices as production incentives and their undesirable consumption effects on net purchasers of food provides one example of the need to integrate supply, distribution and consumption in policy design. In a study in Indonesia, for example, a 10 per cent rise in the price of rice was shown to cause the poorest 8 per cent of the consumers to reduce their kcal. rice consumption by 19 per cent, presumably switching to other starchy foods (Pinstrup–Andersen 1987). Another study in Thailand (Trairatvorakul 1984) has shown also how the majority of the rural poor are both rice producers and net rice purchasers, and rice price increases benefit only the larger farmers.

Although in the long term, high food prices may bring supply benefits, their short–term impact will impinge on vulnerable groups such as landless labourers, small farmers and the urban poor (hence the common short–term negative effects of structural adjustment). Such policies carried out in Africa, Asia and Latin America will differ in their effects owing to the relative proportions of the population falling into these social groups, and the ratio of subsistence/market orientation in production.

It is also important to distinguish between foods which are internationally traded, the prices of which are determined by world prices and the exchange rate, and non–traded foods – the prices of which are determined by domestic demand and production (Reutlinger 1987). Increasing the supply of a traded food will lower its price and decrease its domestic production, which will benefit the poor only to the extent that they are net food purchasers. An increase in domestic production of a traded food need not affect its price as the increased supply can be offset by reductions in imports or increases in exports – the sole beneficiary will be the farmer producing a net food surplus.

So what are the policy options for resolving this food price dilemma? Historically, it has been resolved in two ways: importing food to fill the gap between inadequate domestic production and the level of consumption stimulated by reduced food prices, or raising the price of the preferred grain, while reducing that of coarse grains consumed by the poorest groups i.e. commodity targeting.

Rice Price Policy in Indonesia

In Indonesia during the mid 1960s, the economy virtually collapsed, with massive budget deficits, external debt and inflation. From 1969, a series of five–year development plans (Repelitas) were begun with considerable external financial support and annual growth rates of 7–8% were realised during the 1970s.

In Repelita I (1969–74), the achievement of self–sufficiency in foodstuffs, particularly rice, was seen as a priority, with 83% total projected spending on agriculture being allocated to rice production and the rehabilitation of the irrigation network. In 1969, the Bimas yang disempurnakan programme was introduced. Under this scheme, the government established a support price for rice to be defended by its food marketing agency, BULOG. Although the government's desire to maintain low consumer prices for rice meant that this support price also had to be set at a relatively low level, it sought to compensate farmers by providing them with yield–increasing modern inputs at highly subsidised prices in order to ensure that they would nevertheless find the adoption of these inputs profitable. Although production reached 14.6 m. tons

by 1973, the goal of self−sufficiency remained unfulfilled, as demand increased.

Highly incentive−oriented agricultural policies were continued in Repelita II (1974−79), and rice production increased to 18.2 m. tons in 1978−79. Production of rice more than doubled between 1969 and 1984 when self−sufficiency was achieved, although this was only achieved at an extremely high financial and economic cost, by subsidising both inputs and outputs. During the late 1970s, oil well surpassed agriculture as the prime export, and by 1981 Indonesia was classified by the World Bank as a middle−income country, with per capita GNP exceeding US $500. As oil prices weakened in 1983, a programme of structural adjustment was initiated. In 1986, a 31% devaluation in the rupiah aimed at increasing export competitiveness, after which inflation rose by 20−40%, and public expenditure and imports were reduced. Problems continued despite World Bank and IMF loans between 1980−85.

As a result, there was anxiety in 1985 and 1986 over the financial strains imposed on BULOG by the procurement and storage costs of the large purchases it was forced to make in support of the support price, which had caused its stocks to rise beyond 3m. tons at the end of 1985. In a major reversal of its earlier policies, the government decided to limit further production increases to approx. 2.4% (the rate of increase in annual demand anticipated by future population and income growth) and radically altered input/output price ratios (from 1.83:1 to 1.52:1 between 1984−87) by refusing to raise the 1986 support price from its 1985 level, while at the same time, substantially increasing input prices. As well as an initial commitment to increased production and consumption of food, the following two objectives have characterised policy during the 1980s − diversification of the diet to avoid excessive reliance on any one staple, particularly rice, and stabilisation of food consumption of vulnerable groups: the poor, pregnant and lactating women, and children.

Efforts to promote diversification included programmes of intensification of dry land use for secondary crops, improvements in food processing industries and post−harvest technologies, while on the consumption side, nutrition education programmes were intensified. Reliance on rice as the major staple, however, increased, as incomes increased; it represented 72% of total staple consumption in 1980, compared with 68% during the 1970−75 period. This was probably related to income and pricing policies of the 1970s in which the price of rice was kept low relative to the prices of other major staples such as cassava, wheat and corn.

A World Bank study (Chernichovsky and Meesook 1984) showed that there is a wide scope for nutrition policies based on changes in incomes and relative prices, as food consumption does respond rather dramatically to such changes. However, any pricing policies designed to reduce this dependency must take into account the evidence suggesting that no single food can substitute for rice as a major source of most nutrients. The data also strongly suggest that inadequate diets are prevalent among the better−off and the better−educated as well. Hence, alleviating malnutrition in Indonesia is not just a matter of raising levels of income but also of nutrition education.

Examples do exist to illustrate the possibility of pursuing long−term production goals through price incentives without negative short−term consumption consequences. Cavallo and Mundlak (1982) demonstrated in a study in Argentina how consumers could be compensated for higher food prices through subsidies whose costs amounted to less than the financial gains from the original policy of trade liberalization and exchange rate management In India, food system operations involve partitioning markets, separating supply from purchase through procurement of wheat and rice at incentive prices in surplus areas, combined with retail sales at subsidized prices in urban areas and recently in certain states rurally (Clay *et al.* 1988). These market interventions have been sustained by inter−state public sector movements of food and controls on private, interregional trade. The deficit states are effectively receiving food aid from the surplus areas. There is also direct distribution of subsidized food through food−for−work and various kind distribution programmes on a considerable scale.

As the poor usually spend more than half their income on foodgrains, any serious instability in prices causes severe instability in their purchasing power for food. Risk and uncertainty arising from unstable prices in an environment without insurance or effective credit markets act as a serious constraint to investment in agriculture. Food price stabilisation policies are relevant here. State trading could help nutritionally at−risk households by reducing seasonal fluctuations in price. This would reduce the exploitative effect of interlocked markets and the impoverishing cycle of post−harvest distress sales and pre−harvest buy−back. In India, State trading through the Food Corporation of India, instead of supplying the free market to reduce price fluctuations, distributes grain through fair−price shops (see 'rations and quotas' below). This may help some poor households within reach of such shops, but not all. The chances of success in reducing price fluctuations by supplying the free market in India however will be severely constrained by the fact that markets are generally not competitive.

In the face of food price increases, consumers may be more likely to maintain acceptable levels of calorie consumption, as opposed to micronutrients. A study in the Philippines in the mid–1980s (Bouis 1991) found this to be the case. If the price of the preferred staple rose, consumers were more likely to switch to other calorie–dense staples, or reduce expenditures of non–staples or non–foods, so as to protect calorie consumption levels. Intakes of vitamin A and C, on the other hand, were found to fluctuate widely with prices, although iron consumption was relatively immune to price fluctuations, owing to the diversity of iron dietary sources. Such findings were all the more important considering the percentage of households far below recommended intakes of micronutrients was much larger than the corresponding figure for calories. Educational programmes aimed at increasing awareness of the need for micronutrients and the levels within local foods were felt to have potential for vitamins A and C.

Public Distribution

The following are conventional policy options for subsidizing consumption and thus alleviating problems for net consumers arising from producer (and hence market) crop price increases. They represent governmental attempts at guaranteeing food security through the provision of some form of social safety net. Such schemes to some degree compensate for the lack of social security systems more commonly seen in industrialised countries. Indeed, they could be regarded as early steps in establishing social security systems. Once established (and particularly if used and found to be effective) they are difficult to dismantle by future less socially–oriented governments without social and political violence. The example of Chile – where the safety net was maintained during a ruthless political dictatorship – is illustrative. The different means of subsidizing consumption discussed here include general and targeted food subsidies, rations and quotas, food stamps and coupons. These are all means of lowering the real price of food for targeted consumers.

General food subsidies

With general subsidies, a government pays a portion of the total production, storage and marketing costs (particularly reducing the market price) of a commodity. Although there is no explicit targeting involved, a *de facto* targeting occurs to the extent that marketing channels determine distribution. Such schemes thus have tended to improve real incomes and nutritional status of the urban, rather than rural poor, and indeed, the primary goal of many of these in the first place was a reduction in the urban cost of living and the prevention of urban unrest.

The Public Distribution System (PDS) in India

The PDS is an indirect intervention, administered through the Food Department and aimed at improving household access to food through making grain available according to need. The entitlement concept has shown that food consumption levels depend on purchasing power, and the PDS aims at providing food grains at lower than market price to vulnerable households through a network of easily accessible public distribution outlets for staple foodgrains. This is sustained by inter–state movements of grains, with surplus states, in effect, giving food aid to deficit states.

It was first conceived after the Great Bengal Famine, as a rationing scheme in urban areas, before being extended relatively slowly to cover rural food deficit areas. Kerala was the first state to be covered, followed in 1980 by Tamil Nadu. PDS coverage and rural extension has in reality depended upon the initiative and resources of each state, and is unrelated to the incidence of poverty. This mismatch between supplies and needs will be seen later to be common to more direct interventions. PDS is also expensive as a result of a lack of targeting. Subbarao (1989) claims that it can only become a cost–effective instrument of food supply if access is restricted to the hard–core poor, and proceeds to show how this would not incur any extra expenditure, since costs are directly related to coverage. Tamil Nadu is cited as a relatively successful example of effective targeting, in contrast, for example, to the blanket coverage of PDS in Andhra Pradesh.

Grain consumption has increased in areas where the PDS is administered, but this may only be slight. For example, a study of drought afflicted villages in Tamil Nadu in 1983 showed that the PDS there amounted to only 3 per cent of dietary energy (Harriss 1986). One unintended adverse side–effect of the urban – orientation of the PDS may be a reduced consumption of equally poor uncovered rural households as a result of higher rural retail open–market prices. In a review, Clay *et al.* (1988) claim that the patchy record of the PDS could be improved through a complete socialisation of the grain trade and more refined targeting.

Food price subsidies may influence nutritional status in three ways. First, subsidies increase the purchasing power of recipient households because they can purchase a larger amount of food at the same cost. Secondly, they may reduce the price of food relative to the prices of other goods, thereby encouraging households to buy more food. Thirdly, they may make certain foods cheaper relative to other foods and in this way change the diet composition. Kennedy and Alderman (1985) in their review found some evidence that subsidies improve family calorific consumption, though little to suggest it had a positive impact on child nutritional status.

General subsidies are usually expensive, but will vary in cost depending on the size of the subsidy and the amount of food subsidized. In 1975 food subsidy costs accounted for 21 per cent of Egypt's total budgeted expenditure, 19 per cent of Korea's, 16 per cent of Sri Lanka's, and 12 per cent of Morocco's (Berg 1981). This compares with average figures of around 6 per cent for health and nutrition programmes in such countries. The experience of Sri Lanka in 1974 illustrates the detrimental consequences of cutting back on a general subsidy programme due to financial unsustainability: food shortages due to this were thought to be the main plausible reason for the significant increase in the death rate that year (Kumar 1979).

In sum, while general food subsidies are difficult to implement on a small scale, they are also expensive and administratively difficult to implement on a large scale, particularly in rural areas. The market may actually end up discriminating against the poorest groups who are intended to benefit. Richer households usually receive greater per capita allocations through general subsidies than poorer households; in Egypt, for example, the poorest quartile received only 20% of total benefits. Market–wide subsidies are thus not generally regarded as a sustainable, cost–effective way of reducing chronic food insecurity among the poor.

Targeted food subsidies

Targeting almost always makes a programme more cost–effective, yet it is often politically unpopular. Excessive targeting may reduce political constituencies and even render its introduction impossible in the first place, in some cases explaining the persistence of blanket interventions (a study by FAO (1988) found that 53 of 56 countries reviewed had general market–wide subsidies intended to benefit all sections of the population).

Targeted Food Subsidies in the Philippines

A pilot scheme was implemented in three provinces, using data collected by a detailed IFPRI study (Garcia and Pinstrup–Andersen 1987). The scheme consisted of price discounts on rice and cooking oil and a nutrition education component. Targeting was both geographical and by commodity. Each household with a high incidence of malnutrition and poverty was issued with a ration card indicating its monthly quota of rice and oil, based on family size. The rice ration subject to a price discount was only about half the amount usually consumed by most of the households, but the oil ration exceeded the amount usually purchased prior to the subsidy. Thus, consumer rice prices were not reduced at the margin, unlike oil prices.

According to the analysis, the subsidy component of the scheme caused a significant increase in household food expenditures and calories acquired and consumed, as well as in calories consumed by most individual household members. Although adults obtained the largest share, the average weight of preschoolers also increased. The nutrition education component was found to have a small positive effect when accompanied by the subsidy, but no effect could be detected when the education was unaccompanied by additional purchasing power. Where education did have an effect, it was intra–household, resulting particularly in increased consumption of children – an indication that nutritional messages can increase the focus on children.

Findings indicated that consumers were more likely to increase their food consumption if foods were subsidized than if incomes were raised directly. Overall, the evidence indicated that the subsidy had positive effects on both households and preschoolers.

In terms of costs, 84% was the subsidy itself, 9% administrative costs, 7% incentive payment to retailers to ensure efficient food distribution. The fiscal cost of each $1.00 transferred to participating households was $1.19, or, if only transfers to malnourished preschoolers are considered a benefit, the cost increases to $3.61. Cost–effectiveness is thought to be favourable. Costs were low because, first, geographical targeting based on growth monitoring costs less than targeting based on household income levels; second, the use of

existing private sector retail outlets for the distribution of subsidized foods costs less than a separate distribution network; and third, the use and expansion of existing local bureaucratic structures cost less than the creation of a new and independent structure.

The study concludes by recommending additional targeting based on growth monitoring as a means to achieve the goal of expanding food consumption of households with malnourished preschoolers and improving the nutritional status of these preschoolers, even more cost–effectively.

Costs of subsidy programmes can nonetheless be reduced considerably by targeting, providing an infrastructure for administration exists. For example, the highly concentrated national coupon programme of Colombia (which was part of PAN) at its peak in 1980–81 cost only 0.2% of the national budget (Ochoa 1984). Positive income and consumption effects with such subsidies were demonstrated in Sri Lanka, Kerala and Bangladesh (Gavan and Chandrasekera 1979; George 1979; Kumar 1979; Ahmed 1979).

Subsidies may be targeted by community, household, season, or commodity. There is a trade–off between refined targeting which reduces leakages to non–deficit households and the administrative costs of increased targeting. *Geographic* targeting proved to be more effective in identifying those in need and less of an administrative burden than eligibility requirements based on household income in food subsidy and food coupon programmes in Brazil and Colombia respectively (Berg 1987). The former also allowed subsidized foods to be available routinely to fit in with the needs of poorer consumers to buy in small quantities – unlike, for example, the Public Distribution System in India. Targeting by *season* to counteract seasonally variable food prices would seem to offer one relatively unexplored means of efficient subsidy provision. Subsidies for *weaning* foods and special foods for pregnant and lactating women are other options for reaching the most vulnerable.

Administrative requirements may be reduced by promoting self–selection by the poor. Targeting by *commodity* is one possibility which may be effective. The best foods to subsidize are those largely consumed by the poorest groups e.g. coarse grains. A study in Indonesia (SUSENAS V 1976), which involved the calculation of food–consumption elasticities by income class, has made the significant finding that if rice prices are increased gradually (by about 10% per year), at the same time as equal decreases in the prices of corn and cassava, the energy and protein intakes of the urban and rural poor will actually increase. The higher rice price serves effectively as a redistributive tax whose proceeds could be channeled into subsidies for the foods consumed by the poor. Selective subsidization like this has also worked well in Bangladesh (Karim *et al.* 1980). Targeting to households on the basis of *child anthropometry* may generally not be a good form of selection owing to real problems of it promoting disincentives to child care (see 'supplementary feeding', chapter 3). A mix of targeting – by area, age, income etc. – is likely often to be the most efficient and cost–effective means of beneficiary identification.

Rations and quotas

These can assure a more equitable distribution of a subsidized commodity. A quota may exist for the purchase of a commodity at a price which is below the free market price, while purchases of unlimited amounts are permitted in the parallel open market. Rations resemble an income transfer, and usually involve a degree of income–targeting. Similarly to the Philippines example quoted here, a ration scheme in Kerala, India was found to be substantially more beneficial than an equivalent transfer of income in terms of effect on energy intakes (Kumar 1979). The same study showed that the mean weight–for–age of children would fall by 8% if the scheme was discontinued. In a Sri Lankan food–ration shop scheme, the ration subsidy contributed the equivalent of 16% of the purchasing power of low–income families (Gavan and Chandrasekera 1979).

It has been argued that in conditions of chronic hunger, income transfers through tied or untied cash payments are politically unpalatable, prone to fraud, and do not necessarily increase food expenditures. In conditions of drought however, cash support may be useful providing there is food to be bought Cash hand–outs may raise food prices, but only as a reflection of increased purchasing power of vulnerable groups, and hence not detrimentally if supply responds. Such increased food prices, even in drought areas, may act as an incentive to food production, as occurred in Ethiopia in 1984 (see Dreze and Sen 1990, p.98).

With rations, as with general subsidization, some self–targeting occurs due to the scope for consumer preference in such two–tiered markets where the rationed commodity is perceived to be of a lower quality than the open–market alternative. Ration outlets may also be strategically located in poor neighbourhoods and quantities distributed should be small – two more disincentives to participation by the affluent. India's

fair–price shops disburse rationed commodities, although there is an urban bias in the distribution of the shops; only Kerala and Jammu and Kashmir have extensive regular rural distribution (George 1985). In general, studies which have quantified the share of subsidies in rationed systems which go to the poor indicate a slight progressive tendency in such systems.

Apart from the institutional problems of bureaucratic inefficiency and corruption, there are risks of disincentive effects of subsidy or ration programmes on food production. These would only occur if they caused imports to increase more than the net increase in domestic demand brought about by the programmes – a possibility where a government chooses to use cheaper donated or imported food for the schemes. Concern about such disincentives though may be exaggerated (Deaton 1980), and evidence from Brazil, Pakistan, Tunisia, Botswana and Lesotho have not shown such effects (Berg 1981).

The Food Stamp Programme in Jamaica

Jamaica ranks highly with respect to indicators of human resource development among countries with comparable income per capita. Economic decline in the 1970s and adjustment in the 1980s brought hardship to many sections of the population. After the 1986 currency devaluation, the government introduced general food subsidies of up to 29% of the price of 11 imported items. A year later, the need for targeting became apparent. Food and nutrition actions comprised general food subsidies, targeted food stamps and school feeding programmes. The general food subsidies were phased out over a two year period.

The Food Stamp Programme introduced in 1984 provides bi–monthly allotments of $7.5 worth of food stamps applicable to the purchase of cornmeal, rice and dried skim milk. Eligible beneficiaries include pregnant and lactating women and children under–five who receive health care at public health clinics, the elderly poor, very poor families, and persons already enrolled in one of the other welfare programmes. Thus preventive health care was promoted while screening out the richer households who sought private health treatment.

The following table shows the effectiveness of targeting, which, since 1988, has reduced numbers eligible from 400,000 in 1988 to 300,000 of which 200,000 were actually being reached in early 1991. In comparison with a concurrent general subsidy programme, food stamps had a larger impact on the incomes of the poor at half the cost.

Item	***General subsidy***	***Targeted subsidy (food stamp)***
Cost as share of govt. expenditure*	3.0	1.6
% transfer going to:		
Poorest quintile	14.0	31.0
Richest quintile	26.0	8.0
Transfer as % expenditure per recipient:		
Poorest quintile	2.3	9.5
Richest quintile	0.1	1.0
% households covered:		
Poorest quintile	100.0	51.0
Richest quintile	100.0	6.0

* does not include administrative costs

Source: Jamaica Statistical Institute and World Bank

The two main pre–requisites for the programme's success (lacking in many countries) are a developed (health) infrastructure for administration and governmental commitment to ensure its sustainability.

Food stamps and coupons

Food stamps differ from rations in that with stamps the value of the quota is in terms of a nominal currency unit while the commodity ration is usually in terms of the weight or volume of a commodity. While food stamps are cheaper to administer however, their value is vulnerable to price inflation. For example, the doubling of the price of food in Sri Lanka between 1979 and 1982 occurred as food stamps retained their original face value, thus halving their purchasing power.

The rationale behind transferring stamps rather than cash is that the marginal propensity to consume food may be higher with in–kind transfers. If, however, the amount of food stamps given is smaller than a household would spend on food, the expected nutritional effect should not be greater than that produced by an equivalent amount of cash. One way round this is to require the household to pay an amount close to that which it ordinarily would spend on food in order to receive food stamps with a larger cash value. Such a purchase requirement was effective in the U.S. programme, which had a greater effect on family intake than an income effect alone.

Purchase requirements, however, are difficult to implement and administer, and may not be feasible in rural areas of developing countries where the needy are subsistence farmers unable to set aside the cash for a regular monthly or biweekly purchase requirement The application of such a programme may also be hindered due to difficulties in establishing the stamps with retailers as an alternate currency, while advantages of self–targeting can not occur without sacrificing advantages of utilizing normal marketing channels.

Country Case Study Experience

Macroeconomic shocks affected Botswana, Ghana, Costa Rica, Colombia and Indonesia (see ACC/SCN 1989a, p. 37, 57, 147, 143, 117) in the 1980s, with India, by and large, escaping, although suffering a severe drought. In *Botswana,* a stabilization policy was adopted in 1981 in response to a temporary trade deficit, while *Ghana* suffered a period of marked economic stagnation leading to the adoption of a structural adjustment programme (including a socially–oriented component, the first of its kind) in 1983. Both countries also suffered from drought in the early 1980s, which severely affected agricultural production. Large amounts of food were imported and supplemented by food aid (see ACC/SCN 1989a, p. 39, 59). Problems related to demand as well as supply. Decreases in production of the main export crop, cocoa, in Ghana reduced real incomes of agricultural wage labourers, as decreases in the production of food crops increased food prices. Trends in child 'underweight' prevalences in Ghana during the 1980s were found to strongly mirror those in relative food prices. In Botswana, measures to increase demand included a labour–based relief programme, while in Ghana food stamps and food–for–work programmes targeted people in urban and rural areas respectively as pan of its adjustment programme.

The economic recession affecting many Latin American countries was particularly severe in *Costa Rica* at the beginning of the 1980s. In 1983, more than 50% foreign exchange earnings were being used to service debt. Import substitution and export promotion measures were taken in 1985, and the trade account gradually balanced out. During the crisis, relative food prices increased markedly, though, unlike Ghana, prevalences of 'underweight' children dropped – a paradox widely attributed to the control of infectious disease through education, primary health care and community organization. In Costa Rica, food availability and consumption is much less of a problem than say Ghana, with its per capita daily kcal. intake the highest of the case studies, at 2800 kcal. in 1986 (as compared to 1750 kcal. in Ghana). *Colombia* suffered recession at the same time, before recovering around 1984 through increases in international coffee prices. From 1976, until its termination in the early eighties due to problems with its multi–sectoral nature, the PAN programme in Colombia included a strong food availability component, which included processed food production, food coupon distribution, direct food distribution and kitchen plot production.

In *Indonesia,* a structural adjustment programme was initiated in 1983, as prices for their main export, oil, weakened. This imposed financial strains on the national food marketing agency, BULOG, which procured and stored large quantities of rice to support producer prices. From 1975 to 1985, *India* succeeded in becoming self–reliant in food in a difficult global economic environment as well as preventing famine during periodic droughts through its system for food distribution. A severe drought in 1987 however precipitated a growing concern over future food strategy, including potential environmental consequences. The policy dilemma between incentive–oriented producer prices (for rice) and their potential adverse effects on net consumers, was particularly apparent in the Asian countries. In Indonesia, the food marketing agency BULOG supported rice producer prices through bearing procurement and storage costs, while a commodity–targeted

food subsidy scheme buffered consumers from adverse effects. In India, selective use has been made for some time of subsidies, rations or quotas and market–partitioning, while simultaneously providing the motor for agricultural expansion through supported producer prices.

CHAPTER 3: NUTRITION AND CONTROL OF INFECTIOUS DISEASE

THE PROBLEM AND ITS CAUSES

Interactions between nutrition and infection, to produce the 'malnutrition/infection complex' (see Figure 1.3) cause the major public health problem in the world (Tomkins and Watson 1989). Infection can cause malnutrition through its effects on intake, absorption and utilisation of nutrients and in some cases the body's requirement for them. A child's rate of growth may be retarded by too little food and/or too many infections or parasites. Growth retardation has been shown to have a synergistic relationship with disease (Scrimshaw *et al.* 1968; Black *et al.* 1984; Tomkins and Watson 1989). Infections can lead to a loss of appetite (Mata *et al.* 1977; Martorell *et al.* 1980), decreased efficiency of food and nutrient utilisation (Briscoe 1979), to increased energy requirements (Tomkins 1983), and to decreased rates of child growth (Rowland *et al.* 1977; Baumgartner and Pollit 1983). The relationship between diarrhoeal disease and physical growth in children has been shown in several studies to be particularly close (Levinson 1978; Chen *et al.* 1979; Prahlad Rao 1980; Martorell *et al.* 1984). It is thus usually meaningless to attribute malnutrition to either low food intake or infection, as both are bound up synergistically, while other wider socio–economic factors may have contributed. Nonetheless food and non–food causes of malnutrition can be regarded as deficiencies in two fundamental entitlements: one for food and one for hygiene or health (Osmani 1990).

A number of detailed and specific studies (both population based and more narrow) have helped elucidate malnutrition–infection interactions. Many are cited in Tomkins and Watson (1989), a considerable number involving longitudinal assessments of infection, growth and other factors in individual children. Only a few succeed in assessing dietary intake at the same time in individuals, because of the extreme difficulty of such measurements.

While policies that are being drawn up to deal with the *combined* outcome of malnutrition–infection interactions on the child have merit, they do not deal with the decisions needed at a household level on the allocation of resources (Payne 1985). The nature of these linkages *is* important to understand, and use as the basis of policy. This is well illustrated by the mother's pivotal role concerning decisions regarding the feeding and health care of infants. An understanding of the linkages within the 'complex' will allow the relative value of women's time allocated to income–earning to be weighted and compared with the time she spends in improving sanitation around the home, or caring for a sick child (see chapter 4).

Both individuals and households may be *vulnerable* to the physical and economic effects of ill–health. For instance, Pryer (1989) found a strong association of severe child malnutrition with the ill–health and consequent inability to work of breadwinning adults in slums in Bangladesh; households where an adult earner had been sick during the previous month were 2.5 times more likely than others to have a severely malnourished child. Other studies bear out the need to consider the economic costs of ill–health (see Corbett 1989 for a review). Sickness makes poor people poorer through delayed treatment, the costs of treatment and the loss of earnings. One main asset of a poor person is his/her body as it affects the ability to work. At the same time, it is the poor who are particularly vulnerable to malnutrition and sickness. The costs of ill–health include those due to the loss of income (or even employment) as well as those for treatment. In fact, where illness is chronic, the body turns from being an asset into a liability as it has to be fed, clothed, housed and treated. Other income–earners in the family may have to divert time and forego wages so as to care for the sick. Such ill–health in a household may become a 'poverty ratchet' i.e. a contingency which make a household permanently poorer as assets are irreversibly disposed of to meet these costs (Chambers 1983).

Such types of vulnerability may be becoming more widespread as several trends become evident: for example, conventional health care is becoming more expensive (Corbett 1989) and a common component of structural adjustment is the introduction of cost recovery through user charges. A major policy prescription flowing from studies of vulnerability and health is free or low–cost, accessible and effective health services. Imposing high costs for use of health services hits precisely those who are most in need and least likely to afford to pay them. In the foregoing of treatment, acute conditions may become chronic, irreversible and if not fatal often disastrous economically through labour days lost. If humanitarian grounds are not sufficient,

maintaining free or low–cost services, even in times of austerity, may turn out to be cost–effective as the means to reverse impoverishment are usually more expensive than those that prevent it. Publically organised health insurance schemes and other social security measures will also have relevance here. Another implication for policy is a re–consideration of targeting criteria; while nothing should detract from attention focused on women and children, the well–being of the main earner, whether male or female, is clearly of fundamental importance for the health and nutrition of dependents.

Nutrition as a highly effective preventive health measure

Exposure to most of the major diseases, which in turn interact with nutrition, can be reduced by preventive measures. These are primarily environmental, or through immunization. Environmental sanitation will reduce exposure to gastro–intestinal pathogens; improved housing and reduced crowding are important in controlling respiratory tract infections (of which pneumonia is by far the most lethal) and malaria to some extent Water quantity and quality and sanitation may have a considerable impact on nutritional status whether through diminished morbidity, savings in maternal time and energy or improved food production, (Tomkins *et al.* 1978; Henry 1981; Tomkins 1983; Esrey and Habicht 1985).

Reduction in infant and child mortality rates is undoubtedly closely related to the success in extending immunization coverage. The importance of immunization especially for measles is well known, in the context of nutrition. However, below a certain level of infant and child mortality, in other words where deaths due to immunizable disease have already been prevented, further improvement is likely to depend on other factors such as nutrition. Particularly important here are diarrhoea and acute respiratory infections.

Good nutrition is itself part of preventive health, as deficiency of protein–energy and many micro–nutrients compromises the immune system, and in many cases the integrity of epithelial tissues, which lowers defences to pathogenic invasion (see Figure 1.3). Studies have shown that malnutrition is related more to the duration, severity and outcome of an illness, than to its incidence (Black *et al.* 1984; Tomkins 1986), although the latter may be associated with severe malnutrition.

The case for nutrition as a preventive health measure has been made with particular force by McKeown (1988, see also SCN News No. 4). The policy issue here is then how effective (or cost–effective) is attention to good nutrition as a preventive health measure, compared with the more conventional preventive health interventions. To investigate this, one would need to look at health outcomes in relation to nutrition (probably separating different nutrients) controlling for health services and environmental factors. The results are probably largely unknown in an epidemiological sense, and the supporting evidence is more from recent and increasing knowledge of the mechanisms. Specifically, effects of malnutrition, even mild, on the immune system and integrity of epithelial tissues are becoming increasingly emphasized with new research (see Tomkins and Watson 1989). Thus it may be justified and important to begin to re–emphasize the role of nutrition as a general preventive health measure.

Measuring malnutrition and infection

Malnutrition and infection can be measured by well–established methods, including anthropometry often through growth monitoring in children. The caveat of careful definition of terms and concepts has been stressed earlier. Anthropometry is an indicator of nutritional status, and specific applications (discussed in detail in ACC/SCN 1990a) distinguish between individuals and populations, cross sectional and longitudinal measurement, and situations ranging from emergencies to chronic.

Anthropometry is non–specific, indicating problems but not of itself defining causes. In principle, we know that acute infection causes growth faltering in children, and in early stages this affects soft tissue, hence an acutely sick child becomes wasted first. However, in the absence of other information, one cannot confidently interpret wasting prevalence as indicative of infection (although these may often be correlated). It is clear that low values of weight–for–height and/or height–for–age (or weight–for–age) measure malnutrition/infection, but do not well, of themselves, distinguish inadequate food intake from infection (which themselves are related). It is however probably true to say that anthropometric measures provide for adequate assessment of the overall malnutrition and infection complex in children.

For adults, there is not such extensive experience and study as for children. Attained height itself is obviously not useful for current nutritional status. Measures of wasting or thinness are used – presently arm circumference or body mass index (BMI – weight/height^2), although development of reference weight and height data would ease interpretation. Measures of wasting, notably BMI, have been related to chronic energy deficiency rather than infection. However, the proviso is clear that the presence of chronic diseases, such as tuberculosis or now importantly AIDS, must be taken into account. Thus Ferro–Luzzi *et al.* (1988) have proposed that below a certain level of thinness (BMI less than 16) chronic energy deficiency can be asserted without food intake data. Above a certain value (BMI greater than 20) chronic energy deficiency will not be present. In the intermediate area (BMI 16 – 20) food intake data on the individual is needed, although it is likely that in this range infection effects will not be readily distinguished from dietary intake.

Assessing problems relating to nutrition and infectious disease control is relatively straightforward in principle. Data are available from service or administrative sources in some cases, in others from household surveys. In more administratively developed countries causes of death may also be available from vital registration, and epidemiological surveys are common (although not so frequently used in nutritional assessment). Some relevant indicators are proposed below (and also dealt with later in chapter 5). Those generally only available from household surveys are designated (S), although data availability (and reliability) from service or administrative sources will vary greatly and may also require special surveys.

For assessing *management* of infectious diseases, the following indicators (usually as percentages) may be important case fatality rates by disease (e.g. diarrhoea, pneumonia, measles); measles cases given vitamin A; individuals with chronic diseases given food and/or micronutrient supplements; proportion of mothers breastfeeding during child's illness (S); feeding patterns and frequency during child's illness (S); aspects of child care during illness including use of oral rehydration therapy (S).

For assessing disease *prevention*, the following indicators should be considered: incidence of low birth weight; age at first pregnancy; proportion of short birth intervals (e.g. less than 24 months); contraceptive prevalence rates. Other important information may be obtained from such data as: proportion of infants exclusively breastfed for four to six months (S); feeding frequency, weaning food preparation, with respect to both quantity and quality (S); vitamin A supplementation and disease–specific mortality (S).

Infectious disease control for nutritional improvement may be assessed by a number of standard methods, generally involving household or individual surveys, which would include: immunization coverage rates; coverage of programmes for control of diarrhoeal disease, acute respiratory infections, parasites; proportion of individuals receiving effective primary treatment of infections. It should be noted that morbidity data obtained by questionnaire from mothers is usually unreliable, as it is commonly confounded by better–educated mothers from higher income groups more readily reporting sickness in children than less–advantaged mothers.

At the national level, there are several indicators of health service development e.g. percentage government expenditure on health, intra–sectoral allocation of health resources (urban/rural; hospital/peripheral; doctors/nurses), type of health care (preventive/curative) and access to health services (population per health worker, etc.). Indicators of environmental health too (e.g. access to safe water supply) are important.

RELEVANT ACTIONS

In Chapter 5, 'disease management', 'disease prevention' and 'infectious disease control for nutritional improvement' are used as headings, while in this section we give details of the types of services or programmes that relate to these goals (the “what to do”). Priority actions in this context are supplementary feeding for children and pregnant and lactating women, promotion of breastfeeding and improved weaning practices, and growth monitoring and promotion. Figure 3.1 outlines the different life–cycle stages of vulnerability of mothers and children to the malnutrition–infection complex, and the place of such specific actions for counteracting this. All of the specific actions shown in Figure 3.1 are described in this chapter, except nutrition education which follows in chapter 4. In the subsequent section the means available for effectively operationalising these actions (the “how”) is discussed.

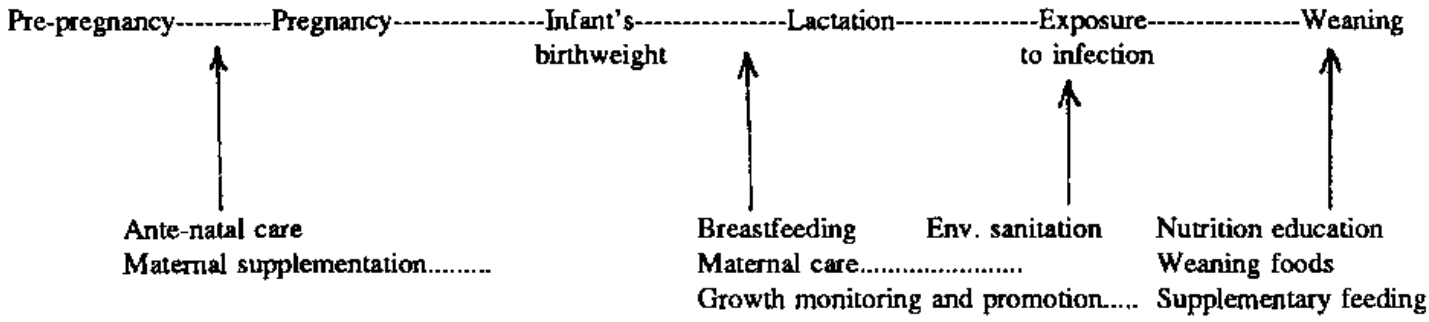


Figure 3.1: Stages of Vulnerability to Malnutrition/Infection and Types of Appropriate Interventions

Supplementary Feeding

Supplementary feeding programmes are aimed at increasing the energy consumption of vulnerable individuals through free or subsidized food distribution. Food distribution may be on–site, take–home or within nutrition rehabilitation centres for the severely malnourished. A variety of foods are usually distributed, both imported and locally produced, including cereals and legume blends, dried skim milk, sugar and oil, and sometimes weaning foods (see next section). Theoretically, amounts distributed should relate to the calorie deficits of recipients' diets, although, they will also depend on resources available, while 'leakages' will reduce amounts actually received.

Programmes are generally targeted to vulnerable individuals, for example by the age of the child or the state of pregnancy or lactation of the mother. Targeting of supplements is more often on the basis of nutritional indicators than income, and may initially be geographic – to clinics which distribute the supplementary food. School feeding is one alternative to clinic–based feeding, although it lacks the potential synergism with health services, and targets a different group (though both types may discriminate against the poor). Only school–enrolled children will benefit from school–feeding, although the availability of subsidized meals may encourage enrolment of children from poorer households.

Children

In reviewing child supplementary feeding programmes, it is necessary to differentiate intervention trials that seek experimentally to estimate the effect of feeding on child nutritional outcomes (i.e. efficacy), from actual large–scale programmes that have been implemented with or without an in–depth evaluation component (i.e. effectiveness). Regarding the former, many studies (e.g. Gopalan 1973, Martorell *et al.* 1980, Mora *et al.* 1981) have shown that raising dietary intake through supplementary feeding can have beneficial nutritional consequences. The impact may be divided between effects on outcomes such as growth, activity, cognitive development and compensation of energy lost during illness. From 1969 to 1977, the Institute of Nutrition of Central America and Panama (INCAP) carried out a longitudinal nutrition intervention study in four Guatemalan villages to investigate the effects of child supplementation. Important effects on physical and mental development were noted in early childhood. The benefits were greater in children with lower socio–economic and nutritional status and higher prevalence of morbidity. The long–term effects were recently investigated in the Guatemalan Oriente Study 1969–1989 (IDECG 1990) which followed–up the children originally supplemented to assess effects in adolescence. Results show that after 15 years with no additional intervention, the group that received the supplement as young children maintained most of the original gains in height and weight, showed increased physical capacity and had better performance on various cognitive and behavioural tests (IDECG 1990).

Further light has also recently been thrown on interactions between nutrition and health, with implications for supplementary feeding programmes. Supplementation has been found in studies in Colombia and Guatemala (Lutter *et al.* 1989, Martorell *et al.* 1990) to modify the negative effect of diarrhoea on growth – the more severe the diarrhoea, the more the positive protective effect of feeding. Thus it is crucial to ensure satisfactory dietary intake during infection. This is made more difficult by the anorexia that commonly accompanies infectious disease, and by the low energy density of many weaning foods.

Regarding evaluations of the effectiveness of large–scale supplementary feeding programmes in the real

world, two reviews in particular are informative. Firstly, the study by Beaton and Ghassemi (1982) in which over 200 reports of past food distribution (take−home or supervised feeding) programmes for young children were reviewed. They found that the net increase in the food intake by the target recipients was 45 to 70 per cent of the food distributed. The chance of a detectable weight response was increased if supplementation were targeted on undersized children. 'Leakages' are likely to benefit households of which the children are members. Most of the programmes reviewed used imported foods, either donated or purchased by the local government. Conflicting evidence was found as to the costs of using local foods instead. Costs to the family was the most important determinant of participation, rather than source, familiarity or knowledge of appropriate use. Beaton and Ghassemi (1982) concluded that such programmes have been rather expensive for the measured benefits but caution: “we remain unconvinced that the benefit usually measured, physical growth and development, is either the total benefit to the family and community or even the most important benefit. Therefore, we judge that it would be unwise to withdraw such food distribution programmes until researchers have had an opportunity to assess their true effects and benefits.”

Secondly, in a comparison of five supplementation programmes in India, Pakistan, Costa Rica, Colombia and Dominican Republic, Kennedy and Alderman (1985) found actual results in terms of measured anthropometric change in children to be discouraging. Rations were insufficient generally to have filled caloric gaps, and many recipients were not very undernourished initially anyway. A number of approaches were suggested to raise the net caloric increments in individual children e.g. designing a programme to be perceived as a snack, focusing on the 'food as medicine' approach, and using a nutrition education programme. It should be re−iterated that before effects are manifested anthropometrically, there may be significant increases in voluntary activity by children (Rutishauser and Whitehead 1972), which promotes cognitive development Figure 1.1 shows how the benefits of increased dietary intake in an individual (e.g. through supplementary feeding) may not all be manifested in enhanced growth. The latter may be one, albeit very important, outcome along with increased physical activity and reduced morbidity.

As well as the amounts of distributed food, the nutritional status of recipients, the timing of supplementation in an individual's life−cycle and duration of participation influence effectiveness of supplementary feeding.

Regarding nutritional status, it would be unwise to ignore the possibility that targeting by the nutritional status of a child may prolong his or her selection for feeding. As long as a child is eligible for feeding (i.e. sufficiently undernourished), household food resources may be freed for other members and to some extent the onus of care falls on the feeding programme administrators. The worry here is that the child may be kept underweight to maintain eligibility for feeding. This calls again for the need to look at the household and to aim to ensure that household level basic rations are adequate while supplementary feeding of individuals is being undertaken. If household level rations cannot be ensured, then children should be fed at least as much as they would be at home, to reduce the adverse effects of disincentives to feeding at home. Otherwise, supplementary feeding should be considered more as a form of income transfer to the household, with its effects on the target individual less likely to be manifested (despite considerable household−level benefits being possible).

Timing of supplementation is important to consider. Responsiveness to interventions may be age−dependent with true growth failure only responsive during the period that failure is occurring (not when it has been converted to the 'state of being small'). If enhanced growth is the main objective, then this points to the need for targeting most children in their first year of life. By two years of age, growth has been irreversibly programmed, and may not be responsive to attempts to make up any environmentally−induced deficits suffered in the past Furthermore, the *voluntary* intake of the child will match the requirements of his or her reduced body size. This is supported by recent evidence from age−specific cross−sectional survey data from a number of countries (Zerfas and Teller 1990). Deviations from reference data started at around 6 months and were complete by about 18 months in most cases, and by 24 months by a few. This is followed by essentially normal growth for the reduced body size. This does not however necessarily contra−indicate supplementary feeding for over−two year olds if benefits other than growth are sought. As Figure 1.1 has shown, other outcomes potentially achieved through increasing dietary intake include increased activity and enhanced psychological development (ACC/SCN 1990a) − outcomes which cannot be measured by anthropometry.

Finally, with regard to duration of participation, on−site and take−home feeding takes much longer to produce a significant growth increment than do nutritional rehabilitation centres. Anderson *et al.* (1981) suggest at least one year is required for on−site and take−home programmes to show any effect.

Supplementary feeding thus can have both short and long−term benefits for children, particularly undernourished under−twos, even if anthropometry is not sensitive to all effects. For it to be a worthwhile

intervention, it needs an adequate infrastructure and resources (both economic and human) for the sustained delivery of food of the right quantity and quality to those who could benefit. Supplementary feeding may best be undertaken as a selective component of a health and nutrition package (see boxes on such Indian programmes).

Pregnant and lactating women

Studies have examined the effects of supplementation on maternal weight gain, activity, birthweight and breast milk intake of infants. Whereas little effect was seen on maternal weight gain (Adair *et al.* 1983; Prentice 1987) or activity (Lawrence 1988; Roberts 1982), significant improvements were seen in birthweights. The more malnourished the mother, the greater the positive impact. Owing to the association between birth weight and mortality risk in infants, the supplementation of pregnant women may be one important means for reducing infant mortality rates. Tall thin women have been found to have larger positive birthweight responses to supplementation than short, thin women in a Taiwan study (Adair and Pollitt 1985). This is one further illustration of the detrimental and irreversible effects of childhood stunting – girls who become stunted will be less responsive later in life as mothers to attempts to improve birthweights through maternal supplementation. The cycle of stunted child – short adult – low birthweight offspring – stunted child is thus more likely to be perpetuated.

Programmatic implications of these findings suggest the need to target supplementation to those mothers who are more likely to have a beneficial response with increased birthweights i.e. tall, thin women. Again, childhood stunting should also be vigorously counteracted so as to keep such options open to young mothers (in addition to the many other reasons). An important caveat to bear in mind here is that a poor environment may affect birth weight and subsequent infant mortality – e.g. through infection or through maternal workload. Birth weight (especially if only slightly reduced) may not be causally related to survival. Hence a specific intervention like maternal supplementation could increase birth weights with only minor effects on infant mortality if other factors are unchanged.

In lactating women, supplementation has not been found to have a marked effect on breast milk intake of the suckling infant (Prentice 1980,1983). This may in any case be hard to separate from the effects of supplementation during pregnancy as breast milk production depends on the intensity and frequency of suckling by the child which is a function of its birthweight and thus also supplementation during pregnancy.

A mother who is malnourished, however, is less likely to maintain breastfeeding and more likely to introduce complementary foods at an early age. Under poor environmental conditions, the detrimental effect of infections due to contaminated complementary foods has been found to be worse than if the mother persisted with exclusive breastfeeding, despite inadequate milk production (Martines *et al.* 1989). Thus programmes that aim to improve maternal nutritional status in the pregnancy, or even pre–pregnancy, periods may, if successful, both improve the chances of child survival both immediately (via increased birth weight) and later (via maintenance of exclusive breastfeeding). The fact that both these effects are likely to be enhanced where environmental conditions are good is one more example of a beneficial interaction between preventive health (this time via an improved environment) and nutrition.

Maternal supplementation, as part of an ante–natal care system, to women from early pregnancy is likely to confer significant benefits on birth weights and the subsequent survival prospects of the child. The case for supplementing lactating women, on the other hand, is not strong. Taking a broader perspective, supplementing adolescent girls in an effort to maximize growth as well as postponing first pregnancies may be beneficial both for the mother and the first child.

Breastfeeding Promotion and Improving Weaning Practices

Breastfeeding both prevents and manages disease in a child, as well as benefiting the mother. Exclusive breastfeeding for four to six months is advised. It helps to prevent diarrhoea by minimizing the infant's exposure to diarrhoeal pathogens, common in other foods and in water. At the same time, breast milk provides anti–bacterial activity in the infant's gut, reducing the risk of disease if contaminants should be ingested. Similarly, breastfeeding has direct benefits in preventing other diseases, from acquired passive immunity from the mother. It also probably prevents malnutrition, not only secondarily to diarrhoea, through the cycle of suckling promoting production of maternal milk. Continued breastfeeding during a child's second

year may thus prevent disease both by providing some continuing direct protection against infectious agents, as well as indirectly by contributing to adequate nutritional status.

Lactational amenorrhoea, prolonged by breastfeeding, is also of great benefit through increasing birth intervals. This will reduce the likelihood of cumulative reproductive stress in the mother and improve her ability to adequately care for her child. The individual child too will benefit from birth spacing and maternal health through more adequate feeding and care practices.

Breastfeeding should be continued when a child has an infection, especially in cases of diarrhoea, measles, respiratory tract infections, and malaria. During episodes of diarrhoea, continued exclusive breastfeeding (with increased frequency and duration of feeds if possible) is the most important nutritional aspect of management. If such infants nonetheless become dehydrated, rehydration therapy may be required. When breastfeeding is maintained during diarrhoea, the growth faltering commonly associated with diarrhoea is rarely seen, and the risk of death is minimized. Continued breastfeeding, sometimes with increased frequency, is also central to the management of other acute infections, such as measles and acute respiratory tract infections, of which pneumonia is the most serious. Many more benefits of breastfeeding have been set out in an important publication “Facts for Life” (UNICEF/WHO/UNESCO 1989).

Activities designed to promote breastfeeding include those that empower women with the knowledge of the benefits of breastfeeding (see 'nutrition education' section in chapter 4) as well as those that motivate and support them in this. The Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding (WHO/UNICEF 1990) outlines some such measures, which include the removal of constraints to breastfeeding within the health system, the workplace and the community. This requires “a responsive and comprehensive communications strategy involving all media and addressed to all levels of society”. Ten specific actions which can be undertaken by maternity services to protect, promote and support breastfeeding have been outlined in a joint WHO/UNICEF statement (WHO/UNICEF 1989). Measures to ensure adequate maternal nutrition and access to family planning services are also advocated in the Declaration. Governments should develop national breastfeeding policies and set appropriate targets, which should be monitored using indicators such as the prevalence of exclusively fed infants at discharge from maternity services, and the corresponding prevalence at four months of age.

An integration of services for health care, nutrition and family planning, as breastfeeding is likely to be beneficial in each area. In the past, integration between nutrition and family planning programmes may have been hindered by the fact that different targets were being addressed – with family planning programmes focusing primarily on women, and nutrition programmes on the child. Breastfeeding promotion is the one activity that links both targets and can form the cornerstone for an integrated programme. Programmatic considerations as to how to integrate family planning and nutrition interventions, in terms of policy formulation, programme planning, training and the support of community level initiatives present several challenges, which were addressed in the ACC/SCN symposium on 'Nutrition and Population' (ACC/SCN 1991c). They include the need for:

– appropriate training of health and family planning workers (the motivation to support and counsel women should emerge from common goals);

– reconciling programmatic priorities of agencies that differ in their support for the concept and practice of integrated breastfeeding and family planning strategies;

– recognition of constraints on exclusive breastfeeding due to competing demands on women's time, misinformation and other factors, hence the need for appropriate programmatic support to enable women to practice breastfeeding;

– resource mobilization to provide relevant information, education and communications to promote the practice of breastfeeding and the adoption of contraceptives, including research on beliefs and obstacles to family planning and infant feeding.

Complementary feeding is necessary in the latter half of a child's first year, before it can eat the adult diet. A number of issues arise here, concerning energy density, nutritional value, and food hygiene. It is essential to promote frequent feeding of foods of adequate energy density (including use of amylase–rich flours). Microbial contamination may be reduced using fermented foods. In some circumstances, notably in urban areas, special low–cost weaning foods may be marketed. For weaning practices to be improved, several prerequisites have been suggested (Dijkhuizen 1991): Mothers (or caretakers) must be convinced of the importance of good weaning food practices, the new weaning food must be affordable (2–3 times the staple

food price seems acceptable), easily prepared, continually available, and it must have a built–in incentive – or 'status'. Failures of nutrition education programmes (see chapter 4) to introduce new weaning food mixes, where these have occurred, can be traced to their not meeting all these prerequisites. For example, although the new food may be excellent nutritionally, it may take more time to prepare, which is not compensated by increased appeal or status. A comprehensive evaluation of the impact of several weaning schemes (Orr 1972, 1977) found that most schemes at this time had not made an impact on those children most at–risk due to such reasons as the high cost of ingredients, processing and packaging, which priced the products beyond the reach of the poor, difficulties of access, and problems of cultural unacceptability and poor promotion. More recent developments have learnt from these mistakes.

Growth Monitoring And Promotion

Growth faltering in children is a warning sign of health and/or nutritional problems. It is commonly detected through regular measurements of a child's weight Of itself, growth monitoring has no merit. As well as a means of problem diagnosis, it should facilitate and accompany actions designed to remedy the causes of growth faltering. It has been used for many purposes – for example, to evaluate the effectiveness of other child nutrition interventions, to select beneficiaries for supplementation programmes, to estimate prevalence rates of underweight children in nutritional surveillance, to follow up the efficacy of treatment of sick or malnourished children, to trace children not attending or not returning to health centres for immunization, etc. (Lotfi 1988). In the Tamil Nadu Integrated Nutrition Programme (TINP), for example, growth monitoring is the criterion for both entry into and discharge from a supplementary feeding programme. The Iringa project in Tanzania is another successful example, which used child weighing both as a means to screen children for supplementary feeding and as a vehicle for maternal nutrition education.

The following definition from National Institute for Public Cooperation and Child Development, New Delhi (UNICEF 1987) clarifies the concept and its operational implications: “Growth monitoring and promotion is defined as an operational strategy for enabling the mother to visualize growth or lack of it, and to receive specific, relevant and practical guidance in ways that she, her family and community can act to ensure health and continued regular growth of the child.”

Where growth monitoring and promotion has not worked in the past, this may have been due to a lack of appreciation of its promotive nature (as opposed to curative), its utilization for behavioural change and its linkages with other nutrition–relevant activities. In many cases, subsidiary objectives overshadow the main purpose of growth monitoring. For example, growth charts may serve primarily as a record of a child's immunization history, or the dosages and dates of vitamin A capsules or iodized oil injections. The main objective of growth promotion can be attained through linking monitoring to the identification of at–risk children, individual counseling and appropriate subsequent actions to at least prevent further deterioration. The importance of frequent social interactions between health workers and mothers to facilitate this is evident in the relative success of small–scale programmes, where this is easier to achieve than in large–scale programmes. Particular attention needs to be paid to such aspects of implementation in the scaling–up of small–scale programmes.

Growth monitoring thus should be seen as an integrating tool, not an isolated activity. It is not an end in itself, but a start of a dialogue between the mother and health worker on appropriate actions to maintain healthy growth in a child or deal with growth faltering. It may be linked with such programmes as immunization, water and sanitation, oral rehydration therapy, income generation etc. and serve as an effective forum for behavioural change.

OPERATIONALISING RELEVANT ACTIONS

In this section, the various means available for operationalising or delivering the actions described above are outlined, with services being differentiated from programmes. First, we discuss the contribution of health services to nutritional improvement, as dealing with the malnutrition and infection complex clearly involves most of the activities of the health sector. It is also useful to define specific actions that can be channeled through the health services and enhance nutritional impact – similar perhaps to considering measures whereby food security contributions to nutrition may move ahead of economic development Such actions are not necessarily nutrition programmes as such, although they usually require collaboration between nutritionists and those responsible for planning and managing primary health care.

Secondly, we discuss the role of programmes in improving nutrition. These include free–standing 'nutrition interventions' and integrated health and nutrition interventions, which are often the responsibility of the health sector, although they may be successfully run, for example, by social services or specially established organizations. Much debate has occurred about whether such direct interventions are an appropriate and effective way of having a wide enough impact on nutrition to be significant Indeed, this debate continues: "... although nutrition programmes were often successful in narrow technical terms, they had not been effective, sustainable or widely reproducible at an acceptable cost..." (FAO 1989). Perhaps the question to ask is where – for which people – and when in the course of development are different types of nutrition programme most appropriate? The answer seems likely to lie between "never" – implied above – and "always", which even the strongest advocate might hesitate to claim.

Finally, we briefly outline how other sectoral actions, such as those in urban development, housing, agriculture and education, can influence nutritional outcomes via their effects on the malnutrition–infection complex.

We may at this point need to pause to consider the roles of services and programmes in a developing country's attempts to reduce nutritional deprivation. At a certain stage of economic growth, direct nutrition interventions may be useful as an interim measure to nutritionally buffer vulnerable social groups, while poverty is tackled in the long–run. While economic growth and improved environment and services will be the eventual solution, doing nothing while waiting for this – many decades for a lot of countries by most projections – should be unacceptable. However, in some of the poorest areas of the poorest countries, with hardly any rural infrastructure or capability for service delivery, the very first priority may be to develop some kind of health care, communications, etc. with nutrition programmes of somewhat lower urgency. Policies aimed at improving household food security (agriculture, price, distribution, employment, credit), may also be less demanding on service–delivery systems, and possibly of greater priority for the poorest countries (see chapter 2). At the other end of the development spectrum, priority for nutrition programmes as such may tail off as countries industrialize, food becomes plentiful, and health care extensive. More developed economies can then move into establishing systems of social welfare and enacting legislation designed to provide safety nets. As suggested in chapter 1, such systems may ultimately be the major insurance against malnutrition.

Health Services

The synergism between disease and malnutrition provides the essential reason for the health sector's major responsibility in addressing malnutrition. Health measures by themselves will not relieve all the underlying causes of malnutrition, so long as food entitlements are chronically inadequate, although food interventions may be delivered through the health services (see 'supplementary feeding' above). Effective health services are thus among the most important interventions for dealing with malnutrition. Many details are given in such documents as "The Role of the Health Sector in Food and Nutrition" (WHO 1981). Even in the absence of specific nutrition interventions, general health measures can have an important effect on nutritional status. For example, the incidence of gastro–intestinal infections and parasitic infestations can be significantly reduced by improved sanitation and provision of safe drinking water. Malaria control and immunization against six childhood diseases will reduce negative influences on nutritional status. Certain aspects of health services as they relate to nutrition are now being re–emphasised (see Tomkins and Watson 1989): for example, vitamin A delivery with immunization services; promoting feeding during diarrhoea, especially persistent diarrhoea; nutrition and respiratory tract infections; iron and malaria.

Irrespective of nutritional considerations, basic levels of health care (preventive and disease management) are always necessary. When the outreach and support of health services is minimal, such as in the poorest African countries, it has been argued that selection of priority health measures is required. The argument for selective primary health care was put forward by Walsh and Warren (1979), and is related to the thrust for oral rehydration and immunization as top priorities. On the other hand there is the institution–building approach, which uses the primary health care concept developed at Alma–Ata (Mahler 1981) and envisages a much wider package of health measures, including nutrition. The priority in this case would be to build the capability and infrastructure before progressively extending health services at community level throughout the population.

Focusing on selected interventions such as ORT saves lives – unarguably desirable – but does not directly cut into the cycle of malnutrition and infection. Consequences other than immediate mortality, particularly continued depressed immunity (hence future morbidity and mortality) are not affected. Similarly, developmental disadvantages are not reversed. In practice, emphasis on selected interventions such as ORT, if delivered campaign–style, not only crowd out other interventions, but can actually damage the institutional

capability. It has been observed that everything else gets dropped in favour of the current priority, so facilities, supplies, training, and motivation for other interventions actually deteriorate. To this extent there is a risk that selected interventions have a residual negative effect. A nutritional perspective would argue more for a longer–term broader institution–building approach to primary health care – one that fully recognises, and aims to deal with, the synergisms between malnutrition and infection.

Health services 'intensity' may be important i.e. there may be a certain minimum threshold of health services development at which an impact (on health or nutrition) begins to be seen, in other words that the response is non–linear (see, for example, Habicht *et al.* 1984; Drake *et al.,* 1980; Heaver 1989). A similar consideration is likely to apply to nutrition programmes, whereby an annual expenditure of about US $10–30 per beneficiary appears to be of the order required for a programme sufficiently large to have a potential impact (see later section on programme costs).

It is also likely to be the case that there is a certain point in health services' development at which it becomes possible to begin to introduce extra nutrition actions. If so, the aim would be to invest in basic services and infrastructure so as to raise the input to above this threshold level, before extending outreach or adding new activities. The level of health expenditure currently observed in developing countries is informative in this regard. Many countries have annual health budgets of under $2 per person per year (see, for example, India, Pakistan, Indonesia and Nigeria in Table 1.2, chapter 1; also Chandler 1984). A major priority in these countries will be to build health infrastructure.

Nonetheless, some experiences of successful delivery of health care on very low budgets have indicated factors important for success. Experiences have been reviewed in China, Sri Lanka, Kerala (India), Costa Rica, Chile and Cuba, where marked health improvements occurred despite moderate to low per capita income (Halstead *et al.* 1985; Horwitz 1987). These are countries (or states) which have shown firm commitments to public support *during* their economic growth. Costa Rica illustrates the degree of positive nutritional impact a comprehensive, adequately funded and managed health care system can have (see box).

Nutrition actions within the health services

Nutrition has certain contributions to make to the prevention and management of specific diseases through actions which can be incorporated within a country's health services. For example, persistent diarrhoea has a higher mortality per episode than acute diarrhoea – not from dehydration but from debilitation – and maintaining adequate dietary intake is thus crucial to management As rehydration is often not the major issue, oral rehydration therapy (ORT) is not the answer. A number of other important opportunities for nutrition actions in relation to prevention and management of disease have been laid out in “Malnutrition and Infection” published by the ACC/SCN; the introduction summarizes the operational implications, and the review by Tomkins and Watson (1989) gives the scientific background and details some important nutritional contributions as summarized here:

– exclusive breastfeeding related to prevention of diarrhoea in children up to 4 – 6 months of age;

– continued breastfeeding for management of diarrhoea;

– adequate feeding during persistent diarrhoea, and in convalescence;

– micronutrient prophylaxis;

– vitamin A and measles, both in prevention and treatment;

– supplementary feeding and measles, to reduce severity and in post–measles recuperation;

– respiratory tract infections, breastfeeding, vitamin A and supplementary feeding;

– intestinal parasites and supplementary feeding.

These actions are being increasingly incorporated in the advice given at international level, for example by WHO. The extent to which they are operationalized in country programmes is not yet known to us. It seems reasonable that an essential move in addressing malnutrition–infection, at a minimum, perhaps before more extensive efforts to promote nutrition programmes, would be to vigorously promote such actions within the health sector. This is elaborated in chapter 5.

Health Care in Costa Rica

Context; About half of the population of 2.8 million (1987) live in rural areas, the climate is tropical in the coastal lowlands and temperate in the highlands. During the 1980s, political conditions were stable. Main issues facing the new government in 1982 were a domestic economic crisis and tensions arising from civil strife in the region. The years 1979–1980 marked the beginning of the crisis, with recession, inflation, unemployment and drastic devaluation of the national currency. Most Latin American countries experienced similar economic difficulties, but the effect was particularly severe in Costa Rica. The rising cost of petroleum and the declining coffee prices eroded the balance of foreign trade to a point where the external debt amounted to more than 10 per cent of GDP in 1982, the third highest in Latin America. At the same time, inflation rose from 9.2 per cent in 1979 to 37.1 per cent in 1981 and 90.1 per cent in 1982, also the third highest in Latin America. During 1980–1982, the annual per capita GNP growth rates were negative. The effects of inflation during this time were shown in the increases from 40% to 60% of households spending at least 50% income on food. Once inflation was under control in 1985, this dropped to 37%. There is some evidence that the adverse trend had slowed down by 1982–83, with relative stabilisation of the currency and some control of inflation. In 1986, a commitment was made to increase social investment, particularly in housing and employment–generation, although this came partly at the expense of other social programmes. During the 1980s, total food availability from all sources rose slowly despite declines since 1985 in cereal availability. In 1985, the government embarked on a programme of export promotion and import substitution which led to increases in exports of coffee and sugar contributing to foreign exchange earnings and a balanced trade account. Debt service requirements in the mid–1980s, however, were very high; in 1983, for example, more than 50% foreign exchange earnings were being used to service debt.

Health and Nutrition: In the 1970s, health indices in Costa Rica approached those of some advanced industrialised nations, defying the orthodox concept (as in Sri Lanka and Kerala (see Halstead et al (eds) 1985)) that it is necessary to attain economic and industrial development in order to improve the health conditions of a society. The likely determinants of this rapid improvement, according to Mata and Rosero (1988) were: i) emphasis by all administrations on social rather than economic development, ii) improved environmental sanitation, housing and income, iii) emphasis on education without sex discrimination, iv) extension of primary health services to most of the rural areas, v) adoption of health and medical technologies to tackle the main health problems, and vi) intersectoral action in planning and executing health programmes.

These elements were brought together through more than 100 years of historic evolution, during which time education, democracy, observation of human rights, and peace were fostered. The absence of a military establishment has prevented the concentration of power and released substantial resources for education and health – now budgetary priorities in Costa Rica.

The basic primary health care instruments were the rural health programme (begun in 1973) and the community health programme (1976). By 1980, 60 per cent of the population had been reached by domiciliary services in both rural and urban areas. Immunisation campaigns against measles, diptheria, pertussis and tetanus were important. Sanitation activities (provision of potable water and sewage disposal) in rural areas were intensified, and community participation in health programmes encouraged. The nutritional status of women and children did not deteriorate during the economic crisis in 1979, due, many believe, to the decades of investment in health and education (Mata and Rosero 1988). In a study by Rosero–Bixby (1986), health interventions were singled out as the main determinant of the marked fall in the infant mortality rate during the 1970s (from 67/1000 in 1970 to 21/1000 in 1980). Multiple correlation analyses suggest that up to 75% of the fall was a result of health programmes in general, and around 40% of the decline was due to primary health care. Furthermore, because less–privileged sub–populations were targeted, primary care reduced the differentials that prevailed in child mortality.

The total percentage of GNP invested in health remained high in the early 1980s, and even tended to increase despite the deterioration of some services. This contradiction was due to continued heavy investment in the school lunch and food distribution programmes which have been criticised as being overly developed, with a low benefit–cost ratio (Mata 1978) and inefficient due to minimal targeting (Selowsky 1991). The whole concept of supplementary feeding in a country like Costa Rica may be obselete, as there is no evidence of food shortage, even during times of crisis. Rather, “when (growth failure) is confined to infants and young children....the primary causal role is infection and social pathology rather than inadequate food supply” (Mata 1982). Selowsky (1991) believes that the large fraction of governmental health expenditure going to such feeding programmes with little targeting could be better directed to those better targeted – like those delivered by Nutrition Centers to reduce severe malnutrition – which currently receive a

small share of resources.

Conventional Nutrition Interventions

'Nutrition interventions' in practice have generally included one or a combination of food supplements, growth monitoring, micronutrients distribution, promotion of home gardens, health and nutrition education and family planning technology and information. Figure 3.2 shows the frequency of types of activity to improve nutrition, based on a review of 15 large−scale nutrition programmes, reported at the ACC/SCN workshop at the IUNS Congress in Seoul, Korea in August 1989 (see ACC/SCN 1991).

Nutrition interventions are usually explicitly designed to deal with at least one of the necessary conditions for adequate nutrition i.e. household food security, infectious disease control and caring capacity. As such the term 'nutrition intervention/programme' may not be sufficiently descriptive for this analysis. Here each component is described as it logically relates to each condition e.g. home gardens in chapter 2 (household food security), supplementary feeding, growth monitoring and promotion and health−related services in this chapter (infectious disease control) and nutrition education in chapter 4 (caring capacity). It may be argued that supplementary feeding is a household food security initiative, or that growth monitoring and promotion relates more directly to caring capacity. This only emphasizes that effects on nutrition (as the outcome of concern) may be achieved via effects on *more than one* of the necessary conditions.

Figure 3.2: Typical Components of Nutrition Programmes in 15 Examples

Component	***Number***	***Frequency (%)***
Nutrition education	14	93
Health−related services	11	73
Supplementary feeding	12	80
Growth monitoring	10	67
Micronutrient supplementation	4	27
Home gardens	3	20

Integrated health and nutrition interventions

The synergistic relationship between nutrition and infection has important implications also for the integration of nutrition and health interventions. Food is usually a necessary but insufficient component of any nutrition intervention – additional health services will involve additional costs, but are likely to increase nutritional impact. Anorexia brought on by chronic morbidity in children may result in their refusing to eat offered food and so an appropriate intervention will usually need to include elements of disease control as well as feeding. Moreover, the recognition of the linkages between the process of growth failure in children and constraints – both food and health−related – of the environment has obvious implications for integration. Many health and nutrition activities are thus compatible and mutually enhancing in their effectiveness and a greater efficiency of service delivery may be achieved through integration.

Integrated health and nutrition interventions may include diarrhoeal disease control, breastfeeding promotion, feeding programmes, vitamin and mineral supplementation, nutrition education and immunization against the six communicable diseases. The distribution of iron tablets to all pregnant mothers and capsules of high−dosage vitamin A to children in order to prevent anaemia and xerophthalmia, respectively, are clear examples.

Integrated health and nutrition programmes may be run through the health services or be free−standing. Channeling extra actions through the health services may be demanding on administrative and institutional capabilities, especially where the nutritional component involves food distribution. Problems of health service outreach and infrastructure development will also limit nutrition interventions channeled through the system. The coverage of the population by health services has often been inadequate, with groups in greatest need often having the poorest services. As mentioned above, there may also need to be a minimum threshold of basic infrastructure for the delivery of health services after which an impact (on health or nutrition) begins to

be seen. These considerations may explain some of the disappointing results of delivering nutrition interventions through the health system in the past. Nutrition interventions also risk overloading the health services and in any event could divert resources from the possibly greater priority of raising investment above threshold levels where services exist *before* extending infrastructure. Once this stage has been reached, may be the time to consider channeling nutrition interventions through the health sector. Where the health services are less developed, other approaches to reach the nutritionally vulnerable may need to be sought, as for example with Tamil Nadu Integrated Nutrition Programme (TINP) in India – a successful integrated health and nutrition programme which is not channeled through the health sector.

Integrated nutrition and health interventions in India, for example, have generally included one or a combination of food supplements, health care, health and nutrition education, and family planning technology and information. The first component dominated public policy during the 1950s and 1960s in India, when supplementary feeding programmes of various kinds were introduced. In 1959, the Applied Nutrition Programme was initiated for pre–school children and pregnant women. This was followed by school lunch programmes for improving school attendance as well as child nutrition. A modicum of geographical targetting was introduced under the Special Nutrition Programme in 1970–71 which aimed at providing food to children below six years, and to expectant and nursing mothers living in urban slums and tribal areas. During the mid 1970s, in addition to interventions, such as the Integrated Child Development Services (ICDS), described below, health interventions such as prophylaxis against Vitamin A deficiency, nutritional anaemia and endemic goitre were also introduced. The ICDS and TINP programmes are described in the boxes.

Many free–standing nutrition programmes are too small–scale to have a major impact upon total communities or countries. If they were to expand to a point where they could exert a significant impact, objectives would need to be further defined. For example, are such programmes to be used as a means of redistribution of effective income/demand (with the household or community as target), or are they to be designed to improve the nutritional status of targeted high–risk individuals? The design of the programme should relate to the type of problem. For example, is it primarily health– or food–related? If the latter, is it calories or micronutrients that are deficient; for whom and when? At what time are targeted individuals actually responsive to the intervention? Time–bound objectives should focus on a few critical needs; management should be facilitated by a strong component for regular training; realistic staff–to–client and supervision ratios need to be set, and periodic re–appraisal undertaken on the basis of the results of monitoring and evaluation. Permeating all this, there needs to be a high level of active community involvement, borne from an accurate assessment of local needs at the problem definition stage along with appropriate subsequent training. The overall effectiveness of a programme, that has been seen to be successful on a small–scale, will depend on its coverage of families or individuals relative to the total numbers in need in any one country. Sustainability then is important, particularly as individuals may become worse off following abrupt termination of an intervention, due to their inability to reestablish previous states of environmental adaptation.

Integrated Child Development Services (ICDS), India

This is mainly a health intervention which adopts a holistic approach aimed at improving both the pre–natal and post–natal environment of the child. It is a Centrally–sponsored, State–administered scheme consisting of maternal health care in pregnancy and growth monitoring and nutritional supplements for children – services received at community centres or anganwadis. The nodal department may be Social Welfare, Women and Child Development, Rural Development or Health, depending on the state. Health departments have responsibility for the health component. Its objectives are:

- To improve the nutrition and health status of children aged 0–6 years.
- To lay the foundations for proper psychological, physical and social development of the child.
- To reduce the incidence of mortality, morbidity, malnutrition and school drop–out.
- To achieve effective coordinated policy and its implementation amongst the various departments to promote child development.
- To enhance the capability of the mother to look after the normal health and nutritional needs of the child through proper nutrition and health education.

Programme components:

• *Supplementary Nutrition* is provided to 0–6 year olds and pregnant and lactating women. The "most needy and malnourished" are selected as beneficiaries. Women belonging to families of landless labourers, marginal farmers, scheduled castes or tribes, or very low income groups, or requiring feeding on health grounds are selected. Children are enlisted on the basis of mid–upper–arm circumference (MUAC) under 13.5 cms and weight–for–age (Grade II and below) measurements. Moderately malnourished children receive a food ration of 300 kcals and 8–10 grams protein per day for 300 days in the year, while severely malnourished children receive twice this amount. Pregnant/lactating women receive 500 kcals and 20–25 grams protein from the third trimester of pregnancy up to six months of lactation. Ready–to–eat supplements are used in some areas, while in others locally available cereals are cooked and fed on site. Children aged 1 – 5 are also given six–monthly doses of vitamin A (200,000 IV). Iron supplements are provided for 100 day periods based on an assessment of need by the Auxiliary Nurse Midwife (ANM). Children receive daily doses of 20 mg iron +0.1 mg folate, while pregnant/lactating women receive 50 mg iron + 0.5 mg folate.

• *Immunization.* BCG, DPT, OPV and measles vaccinations are provided to all children under six according to the international schedule, and two doses of tetanus toxoid are provided to pregnant women.

• *Health check–ups* include antenatal and postnatal care for women, care of neonates, and 3 to 6–monthly checks of all children under 6. These are provided by health staff. 'At risk' subjects receive special attention. Anganwadi workers (AWWs) also have a medical kit to provide a few simple treatments and first aid.

• *Referral services.* Serious ailments requiring specialized treatment or care are referred to PHCs or taluk/city/district hospitals.

• *Nutrition and Health Education.* Basic health and nutrition messages are imparted to all women between 15 and 45 years in order to increase awareness of child care needs and capacities to care for children. Mothers of severely malnourished children receive special attention. Both the AWWs and health staff have roles in this component.

• *Non–formal Preschool Education.* Children between 3 and 6 years are provided preschool education to develop motor skills and coordination, social interaction, 'desirable attitudes', hygienic habits, etc. Play and other activities are organized with inexpensive locally available materials and toys by AWWs.

In theory then ICDS targets regionally and individually according to criteria of need, although, according to Subbarao (1989), there has been little of the latter, with the objective of reaching the malnourished being sought through a judicious location of projects, rather than beneficiary selection following nutritional screening. This mismatch between the distribution of severely malnourished children and those receiving ICDS services is accentuated in some states by long delays in operationalising sanctioned projects. Its overall coverage in 1985–86 was found to be low (only 1.5 million mothers and 6.5 million children in 1985–86), and its focus on anganwadis often excluded the poorest who cannot dress their children suitably for attendance (Clay et al. 1988). Hundreds of impact studies of the ICDS have been carried out since its inception in 1975, though, according to Sharma (1987) "the integrated package has been studied in a disintegrated manner", and the findings are often conflicting. Subbarao sums up his recent review of these studies by saying that the ICDS "undoubtedly (has) immense potential for reducing malnutrition in India", but that at present (1989) it suffers from weaknesses in the targeting of beneficiaries, the recruitment and training of core workers and eliciting community participation.

Tamil Nadu Integrated Nutrition Programme (TINP)

TINP started in October, 1980 and is implemented by the Government of Tamil Nadu/Department of Social Welfare and TINP Project Coordinator's Office, with external support from the World Bank. In 1989, TINP covered 9000 villages (total population over 10 million), in 6 districts of Tamil Nadu with the lowest per capita calorie consumption. TINP was developed within an administrative structure that was already strong. The infrastructure for nutrition service delivery was set up by recruiting, training and deploying a community worker in each of the 9000 villages, as well as instructors, supervisors and nutrition officers who supported the system. TINP's overall objectives are to reduce malnutrition and consequent high mortality in children

under–three, and to improve their health and nutritional status and that of pregnant and lactating women. Its operational objectives are:

• Nutrition surveillance through regular growth monitoring of all children in the age group 6–36 months;

• Help rehabilitate and prevent malnutrition through short term food supplementation;

• Reduce the mortality and morbidity due to protein–energy malnutrition and specific nutrient deficiencies;

• Improve the nutritional status of pregnant and nursing women;

• Strengthen health services to provide adequate back–up support to the nutrition effort;

• Improve home child care and feeding practices through education;

• Improve the efficiency and the impact of the above through sustained performance monitoring and evaluation;

Programme components:

• *Nutrition* services delivery formed the core of TINP I. A Community Nutrition Centre was established in each village (population 1500) and run by a Community Nutrition Worker (CNW). The CNW surveyed all households in the area (survey updated every quarter) and registered target children in the age group 6–36 months. These children were weighed each month and their weights plotted on growth charts to determine their nutritional status on a weight–for–age basis and to monitor their growth. Children determined to be at risk (i.e. with Grade III/IV severe malnutrition, or showing signs of growth faltering – losing weight, failing to gain weight or showing inadequate weight gain between successive weighings) were admitted to a short term supplementary feeding programme. Pregnant women were also selectively fed. The CNW administered Vitamin A prophylaxis to all children, along with deworming treatment. Iron and folic add was distributed to pregnant/lactating women. Monthly weighing sessions also provided workers the opportunity to check on the children's health needs (e.g. immunisation, management of diarrhoeal episodes) and to educate mothers.

• *Health:* In recognition of the synergism between nutrition and health, it was decided to simultaneously upgrade the infrastructure, supply position, and worker skills in the existing health system, in order to improve the delivery of mother & child health services. The project helped to deploy and train one female multi–purpose health worker (MPHW) in a health sub centre for a population of 5000 (4–5 villages), and in the absence of a village based health care worker, sought to establish a functional linkage between the nutrition and health care systems through the CNW. Specifically, those children who failed to respond to supplementation were to be referred to the health worker by the CNW for diagnosis, treatment and referral upward if necessary. The MPHW was also expected to deliver her package of MCH services through the Community Nutrition Centre, with the help of records and contacts made by the CNW. They were to make joint house visits for the purposes of nutrition and health education.

• *Communications:* Both the health and nutrition components were to be reinforced by a Communications Component which was designed to: i) make mothers more fully aware of the nutritional needs of children; ii) bring about better intra–family food distribution: and iii) enable the community to better handle its health and nutritional needs. The strategy used was to encourage families to adopt a limited number of specific practices to improve the nutrition and health status of children. These included the importance of colostrum and breast feeding, timely introduction of solid foods to supplement breast milk, home management of diarrhoea, immunization, and improved environmental hygiene.

The annual per capita cost has been estimated as US $0.81 compared with US $1.49 for comparable services in the state in the ICDS (Berg 1987). This relatively low unit cost is largely due to its participative

nature (with a cadre of trained female para−professionals). Moreover, as the programme starts to improve the nutritional status of participants, annual food costs decline. On average, ICDS weighs fewer children per post (43 compared to 60), but feeds relatively more of them at any given time (100 per cent against 27 per cent for TINP) since everyone who is weighed is fed. Despite the lower direct costs, primarily the result of proportionately fewer children being eligible for feeding, TINP appears to have had a greater impact on child nutritional status. Mid−term evaluations showed that severe malnutrition had been reduced from 15−20 per cent to 8−9 per cent over 4 years (Subbarao 1989) and, unlike in ICDS, which achieved reductions in severe malnutrition of 20−25 per cent in the same period, such progressive reductions were noted in every project area. The three main qualitative differences between the ICDS and TINP relate to the coverage of beneficiaries, the involvement of mothers and the recruitment and supervision of workers. The TINP is seen by the World Bank as an example of how freestanding nutrition projects should be narrowly focused and "consisting of no more than three or four well−integrated nutrition interventions that (do) not require extensive managerial skills" (Berg 1987).

Features of Successful Nutrition Programmes

A recent source of information on large−scale nutrition programmes in operation is the ACC/SCN Nutrition Policy Discussion Paper No. 8 "Managing Successful Nutrition Programmes" (ACC/SCN 1991) which emerged from a workshop held at the IUNS Congress in Korea, August 1989. Rather than re−iterating the detailed characteristics of these programmes, we will summarise some of the features found to have related to their success:

Objectives Achievable time−bound objectives should be set in programme design, and subsequently determine the implementation and evaluation of the programme. One outcome of Berg's (1987) review of several World Bank−funded nutrition interventions – in Brazil, Colombia, Indonesia and India – pointed to the need for limiting the number of project components and focusing actions on a few critical needs, recognizing that these are likely to cut across sectors. The choice of intervention should be based on a careful analysis of the actual problem – for example, supplementary feeding programmes will have little impact where ill−health is mainly related to environmental conditions.

Community mobilization The involvement of the community in the design and implementation of actions ostensibly for their benefit is an essential determinant of their effectiveness and sustainability. There must be a felt need among a programme's intended beneficiaries, as well as active participation by the community. This will often follow from the problem definition stage, and the training and supervision of local workers. Accumulating experience confirms that local participation in decisions is far better than simply delivering services from higher levels without people having a voice. Villages and their institutions – however rudimentary – must be involved from the beginning if a nutrition programme or project is to lead to self−sustaining results. The people must be allowed to influence project design, rather than being asked to accept standardized packages of interventions. Only thus can the necessary feeling of commitment be generated. Devolution of decision−making can range from some consultation at district and village levels, with programme decisions still made centrally, to deciding centrally that resources will be made available locally without insisting on allocations to specific activities. The latter may be a key feature of a successful programme.

Coverage The overall effectiveness of an intervention will depend on its coverage related to the need for it in terms of the numbers and distribution of malnourished individuals. Outreach to intended recipients (measured as sensitivity) is as important as excluding the non−targeted (specificity). With targeting, such a trade−off between coverage and efficiency needs to be understood.

Targeting Methods of targeting take considerable time (up to five years) to evolve. They get simpler with operation: geographical area, biological status (age, pregnant/lactating), then selection by e.g. weight/age or growth monitoring, being the common method. The Tamil Nadu Integrated Nutrition Programme (TINP) in India includes targeting of children that varies in time – growth monitoring identifies children with growth faltering for supplementary feeding, while those who are growing smoothly are not eligible; a different group is thus targeted each month.

Leadership and management As Gwatkin et al. (1980) put it “the need is not just for an appropriate mix of components, but for an appropriate mix of effectively administered programme components”.

Training and supervision Most of the successful programmes highlighted in the case studies included strong elements of training and supervision e.g. TINP in India, and the Botswana Drought Relief Programme. As well as a sufficient period for initial training e.g. 2 months (TINP) or 3 months (ICDS, also in India), re−training at given intervals needs to be undertaken. Staff−to−client and supervision ratios need to be realistic. The successful Indian programmes reviewed by Heaver (1989) had worker−client ratios of around 1:200−300 families and supervision ratios of around 1:10.

Process monitoring and evaluation This will ensure effective implementation. Programme re−appraisal should be based on the results of the monitoring, with flexibility to modify where necessary. A lack of such periodic evaluations may lead to the continuation of ineffective programmes e.g. in Costa Rica, where food distribution programmes continued although the problem was primarily health−related.

Attitudes This may be one of the key issues governing the potential for a successful scaling up from a pilot project (with its unique selection of staff) to a large−scale operational programme (which must accept existing staff).

Programme costs

Certainly, no matter how effective these programmes might be, they should be affordable and within the means of governments in countries where implementation is intended. This is crucially important if these efforts are to be sustained after external assistance – if in place – has been withdrawn.

Cost assessment is perhaps one of the most difficult aspects of any programme evaluation. There are always hidden expenditures, like cost to the beneficiary e.g. time spent travelling and waiting in the line. Theoretically, costs to the beneficiary using the services should be set against the costs the beneficiary has saved through participation in an effective intervention. Examples are having a better pregnancy and lactation outcome, having a healthier child, less episodes of disease in the family, use of knowledge gained in the areas of nutrition and health for siblings not in the programme, or benefits for the family as a whole.

The problem of cost comparing of different programmes is not only related to the variations in their objectives, components or size, but also to differences in the whole context and environment in which these have been implemented. Cross−project comparisons are therefore complex.

In fact, costs or related data are seldom addressed in individual nutrition programme reports. Where data are available, cost components (food and non−food costs, management costs, etc.) have often not been distinguished clearly. Total costs, even when reported, have limited value by themselves. Frequently the cost of reaching an individual using the provided services (cost per beneficiary or recipient per year) is calculated (see Table 3.2), and this provides for some standardization for comparative purposes, although there are a number of limitations. First, it does not reflect the quality of services provided, nor does it show whether the programme has had any impact on the recipients. In the Tamil Nadu Integrated Nutrition Project (TINP), the cost/child in the programme fell by 19% between 1982 and 1985. Here, from the cost per beneficiary value alone, it is not clear whether this has been due to a change in coverage, or that fewer children required the rehabilitation feeding as a result of the programme's positive impact on the recipients (as was in fact the case). Second, it is not known how many of the beneficiaries were in fact those targeted. Third, there is a trade−off between close targeting to those who will respond (e.g. the most underweight in a feeding programme), the costs of this targeting, and the lowered effectiveness if many non−responders are included among the beneficiaries. For this reason, in many supplementary feeding programmes the cost per individual enrolled in the programme has been several times lower than the cost calculated for those actually having been helped by the programme.

Previous reviews of nutrition programmes have tried to estimate costs−per−beneficiary, as well as per−caput, in project areas. We will focus on the former. In one review (Beaton and Ghassemi, 1982) it has been calculated that generally the annual cost of providing 300−400 kcal/day would range from $15 to $25 per child (1976 US$ equivalent). The reviewers noted that the cost would be different for different types of food

distribution. Another review (Anderson *et al.* 1981) has reported a somewhat wider range: $10–30/year per child fed in take–home and on–site feeding programmes. A third review (Kennedy and Alderman 1989) has shown the difference in the costs of delivering a certain number of calories, citing examples from two programmes in the Philippines. The average cost of the Mother and Child Health Programme ($ 31/beneficiary) was higher than the cost of the School Feeding Programme ($12/beneficiary). Yet in terms of the delivery of 1000 kcal., the former programme becomes cheaper than the latter ($0.25 versus $0.43 per 1000 kcals).

In the community–based Iringa programme in Tanzania (JNSP 1989), the total cost of $17 per beneficiary was divided into i) start–up cost ($3.6), ii) expansion cost ($5.3) and iii) ongoing cost ($8.05). Such disaggregations are helpful as, for example, the degree of financial sustainability could be proxied by the latter figure.

In the Philippines Food Subsidy Scheme (see chapter 2), 84% of the cost was the subsidy itself, 9% was administrative with 7% being an incentive payment to retailers to ensure efficient food distribution. The fiscal cost of each $1.00 transferred to participating households was $1.19, or, if only transfers to malnourished preschoolers are considered a benefit, the cost increases to $3.61. Cost–effectiveness is thought to be favourable. Costs were low because, first, geographical targeting based on growth monitoring costs less than targeting based on household income levels; second, the use of existing private sector retail outlets for the distribution of subsidized foods costs less than a separate distribution network; and third, the use and expansion of existing local bureaucratic structures cost less than the creation of a new and independent structure.

Seven out of the ten pilot nutrition and health interventions reviewed by Gwatkin *et al.* (1980) had reported cost values, although cost per person in the project area could not always be distinguished from cost per beneficiary. In all the seven projects discussed, nutritional services were complemented by health measures, with the exception of project in Etimesgut, Turkey, where services were predominantly medical support and family planning. The annual per capita population costs of these projects ranged from $0.8 to $7.5 or approximately 0.5–2.0 per cent of the annual per capita GNPs of the countries concerned for the year to which the costs in each instance refer. This is similar to the levels of governmental health expenditure in many developing countries (see Table 1.2).

Nutrition education programmes are among the least expensive. For example, the Indonesian Nutrition Education Programme cost only $4 per beneficiary per year initially, decreasing to $2 during expansion (Berg, 1987). These calculations did not include food provision, but when food cost was added the total cost came to around $11/beneficiary/year (Yee and Zerfas, 1987). The Indonesian weighing and feeding programme (NIPP), at $56/beneficiary/year, was much more expensive. The annual costs of weaning education in six countries were found (Ashworth and Feachem 1985) to fall in the range of $2–10 per participating child per year, although these costs are not directly comparable, due to differences in programme design and methods of cost calculations. It was concluded, however, that weaning education may be an economically attractive diarrhoeal control measure in some countries.

The cost of micronutrient deficiency control programmes has been estimated as very low compared to the dramatic benefits usually obtained. The cost is mainly related to delivery, rather than supplies, which in turn depends on targeting strategies and availability of services. For vitamin A capsules, the costs have been estimated as 2 cents/beneficiary/year. This would be increased to 20 cents for capsule dose taken (West and Sommer 1987). Salt iodization from the experience in S.E. Asia cost 5 cents/beneficiary/year, while intramuscular oil injection is reported to cost twice this figure from such programmes in Zaire and Nepal (Hetzel 1988). Fortification of salt with iron costs 5–9 cents/beneficiary/year, and that of centrally processed grain products with vitamins and minerals would cost about 8 cents/person/year (Berg 1987, p. 116).

Annual cost per beneficiary estimates available for several nutrition programmes are summarized in Figure 3.3. An important factor explaining the differences between amounts is whether or not food (or feeding) costs are included. Generally, the health and education programmes have the lowest cost/beneficiary/year, although these are less directed toward malnutrition. Overall, the amounts are in line with – if somewhat higher than – those calculated from previous studies of smaller–scale projects. But they tend to confirm that the range of US $10–30 per beneficiary per year is around that needed for programmes with sufficient scale to be likely to have a positive effect The expected relationship between expenditure and effects is usually non–linear (Habicht *et al.* 1984). US $10–30 may approximate the minimum level necessary to begin to affect nutrition. One conclusion from this is that it has to be considered worth sustaining an expenditure of about this magnitude if direct nutrition programmes are to be undertaken.

Figure 33: Comparing costs per beneficiary (US $) for selected programmes

Project/country	***Main programme components***	***Cost per beneficiary (US $)***	***Notes and sources***
Drought Relief Programme/Botswana	Direct feeding Cash for work Livestock, water, and agricultural relief	7	1985, direct feeding programme
		38	1985, for all programmes. Quoted from Quinn, et al. (1988)
National Nutrition and Holistic Care Programme/Costa Rica	Preschool and school feeding Nutrition education	21	1982, quoted from (ACC/SCN 1991)
Health and Social Development Programme/Costa Rica	Health services	2	1982
		3	1983 (see ACC/SCN 1991)
Institutional Support for Health and Nutrition/The Gambia	Growth monitoring Food supplement Nutrition/health education	55	ACC/SCN 1991
Tamil Nadu Integrated Nutrition Programme (TINP)/India	Growth monitoring Supplementary feeding Nutrition education Health services	9	Overall cost
		7	Weighing–screening
		12	Weighing–feeding (Berg 1987)
Integrated Child Development Services (ICDS)/India	Growth monitoring Supplementary feeding Health services	7.5	Not including food (ACC/SCN 1991)
Family Nutrition Improvement (UPGK)/Indonesia	Growth monitoring Supplementary feeding	2	Weighing
		11	Weighing and feeding. Quoted from Yee and Zerfas (1987)
Pilot Food Price Subsidy Scheme/The Philippines	Consumer food subsidy	9	1984, quoted from Garcia and Pinstrup–Andersen (1987)
Joint WHO/UNICEF Nutrition Support Programme/Iringa, Tanzania	Growth monitoring	8	Recurrent costs
		17	Total costs. (JNSP Evaluation Report, 1989)

Finally, the prevention and control of infectious disease often requires substantial inputs from sectors other than health to be effective. The priorities of those sectors may not be compatible with those of the health sector in terms of nature, area, targeting or timing. Physical planning and housing policies, for example, determine the adequacy of the physical (and often social) environment and the degree of overcrowding. The redevelopment of urban slums is a costly and sometimes disruptive process, and the extension of water and sanitation to temporary settlements often conflicts with longer term plans for permanent developments.

Malnutrition in preschool age children may adversely affect subsequent school performance – an important linkage fully described in a statement made at the 16th Session of the ACC/SCN (ACC/SCN 1990c). Adverse effects of malnutrition may be manifested through school enrolment, aptitudes, time spent in school, (i.e. attendance, drop–out rates) and achievement. Severe nutritional problems (e.g. cretinism, blindness due to xerophthalmia, marasmus), as well as mild and moderate forms of these deficiencies, are known to be important factors contributing to the educational problems facing developing countries. This should be a strong enough reason for the education sector to invest in nutritional improvements of young children. Moreover, school age children cannot often compete with the pre–school child for health sector resources, and may thus be neglected. The statement goes on to suggest activities the education sector can initiate to combat childhood malnutrition and thus invest in human capital: “School feeding programmes may also contribute to the correction of specific nutrient deficiencies and short term hunger. Vitamin and mineral supplements may be required. Efforts should also be included to combat parasitic diseases when appropriate. In general, feeding and health programmes should be so placed that they facilitate unconstrained growth and development throughout the school age period, including meeting the special needs of adolescents”.

Agricultural policies may have important implications for nutrition, not only through household food security, but also via their effects on health factors. Changes in agricultural patterns resulting in greater involvement of women and children can affect health care and exposure to infectious diseases (e.g. malaria, hookworm). Irrigation schemes, for example, can markedly extend the distribution of schistosomiasis. In an important WHO publication, Lipton and de Kadt (1988) described the linkages between agriculture and health and their implications for the adoption of an agriculturally–based strategy as one route to “health for all”. The energy costs of agricultural labour and searching for work, labour hazards (e.g. pesticides, machinery, back injury), women's trade–off between agricultural and domestic work (see chapter 4) and the seasonal co–incidence of high labour demands, peak disease exposure and food shortages, are all immediate examples of linkages between agriculture and health. There are also major feedback effects: healthier workers are often more productive and may earn more; a family's health security (or lack of vulnerability) may allow for more experimentation with crops and methods; the lack of adequate health care may be one factor promoting rural emigration.

CHAPTER 4: WOMEN'S CONTROL OF RESOURCES AND CARING CAPACITY

THE PROBLEM AND ITS CAUSES

The area of women's resource control and caring capacity is viewed here as one of the three conditions for adequate nutrition, along with household food security and infectious disease control (see UNICEF 1990). As discussed in chapter 1 (and illustrated in Figure 1.4), it may be seen as a pivotal link between these two other conditions. The issue of 'caring capacity' refers to all household members – male and female – who are potential caretakers of children. In practice, the main responsibility for child care lies with the mother, who often also has a major role as an income–earner. Her ability to manage the many competing demands on her time will govern the degree to which she can maintain a clean household environment (disease prevention), care for a sick child (disease management) and provide and prepare food for all household members, particularly infants (household food security). This integral precondition for adequate nutrition may not be as well recognised by policy–makers as compared to household food security and infectious disease control. Partly this may be as a result of its many linkages with these two other areas, and partly as little data is routinely collected to reveal the gender dimensions of nutrition problems. In this chapter, we concentrate on defining the problem, before sketching out several approaches and interventions for alleviating it. The following definition (from the ACC/SCN meeting in November 1990; see chapter 5) may serve to delineate the scope.

"Care" in general refers to the provision in the household and the community, of time, attention and support to meet the physical, mental and social needs of the growing child and other family members. It leads to the optimal use of human, economic and organizational resources. At an extreme, lack of "care" is neglect. Particularly in the child nutrition context, most importantly it facilitates the optimal use of household food resources for child feeding, and the optimal use of parental (or other) resources to protect from infection, and care for the sick child, or other vulnerable members (e.g. the disabled, elderly). More generally it includes nurturing the full psychological and emotional well–being, which are goals in themselves, and which in turn may benefit nutrition and health.

The multiple roles of many women in poor households – as mothers, home managers, producers and community organisers – frequently set two of their primary resources, namely income and time, in conflict (ACC/SCN 1990d). The capacity of a mother to care adequately for her children will depend to some extent on how she allocates her time between productive (income–earning) and reproductive (domestic) work as well as on her access to health services, water and fuel supplies, and markets for food. Within the household, her economic and social status will govern her degree of control over her time and income, and hence her capacity to care for her children and ensure their health and well–being. The nutritional and health status of children has in fact been considered a function of the quantity and allocation of income and time (Kumar (1983) even termed the combination of income and time in this context "household real income").

There are many potential trade–offs. Income earned by the mother may raise a household's effective demand for food, although the time allocated to earning income may be at the expense of time spent in feeding and caring for her child. Time–intensive intra–household activities such as breastfeeding, preparation of energy–dense foods and child care may be cut back as income and effective demand for food increase. Increases in female income may not, furthermore, translate into increased energy intake of children, if the women does not have control over the income she has raised (von Braun 1989); if, however, the income she generates translates into her improved economic and social status, her decision–making power and control over resources may improve anyway. The effect of maternal income on the child's well–being is thus not obvious.

Maternal labour participation and child care: some findings

– A rural study in the Philippines indicated that mothers' labour force participation, had net negative effects on the average nutritional status of young children (Popkin 1980);

– In Haiti (Smith *et al.* 1963) and India (Ryan *et al.* 1984), no significant relationship between mother's hours of work and either child mortality or nutritional status was detected;

– In a study in Kerala, South India, Kumar (1978) found that families with working mothers were generally poorer and their children more malnourished, but within that group increases in mothers' incomes had a positive effect on child nutritional status;

– In a study conducted in villages of northern Ghana, Tripp (1981) found that the trading activities of the mother were the single most important determinant of the nutritional status of their children. Women traders controlled their earnings, which were used to purchase food;

– The coincidence of the birth of a child with a period of peak labour demand was found to lead to an increased risk of infant and child mortality in India (Crookes and Dyson 1981) and/or have an adverse effect on the efficacy of breast–feeding (Rajagopalan *et al.* 1981);

– In a study of South Indian tribals, Gillespie (1989) found an adverse net effect of high maternal labour participation on child nutritional status during the early rains, when female labour demand for paddy transplanting coincided with high disease incidence amongst under–fives (particularly infants);

– Among rural Kenyan women, Paolisso *et al.* (1989) found a similar seasonal problem, although infants were cared for by female siblings;

– In a study in Santiago, Chile, Vial *et al.* (1989) found better weight gain in the infants of working than non–working mothers and concluded that the negative effects of early termination of breastfeeding were outweighed by the higher incomes earned which allowed increased expenditures on food and better access to health care.

In addition to child feeding, time constraints on the mother may affect the child in other ways, including a lowered utilization of health services for the child (including preventive health care such as immunizations), less time for protecting the child from unsanitary conditions through maintaining a clean and healthy environment, less time for fuel and water collection, and food gathering. Social stimulation, as well as diet, health and physical activity, may also affect the growth rate of children (Popkin and Solon 1976; Grantham–McGregor 1984). It is widely held that a child that receives plenty of loving care from parents, guardians, relatives and friends, thrives better.

During the 1980s, two main schools of thought existed concerning this “maternal dilemma” between a woman's productive and reproductive roles. The 'women–in–development' school sought to enhance women's income–earning capacity and de–emphasize child care responsibilities, while proponents of the 'child welfare' school tended to view women as instruments to produce healthy children and down–played the need for women from poor households to work. Only recently have bridges begun to be built between these two schools leading to policy recommendations aimed at improving *both* the status of women *and* the welfare of children (see Leslie and Paolisso (1989)). This increasing collaboration has come about as the nature of women's work in developing countries has changed – with more women working away from home earning cash incomes – and as recognition of the importance to the household of female income has increased.

Findings anyway differ regarding the net impact of this trade–off on the child's nutritional status. Intervening factors, other than household and maternal income, such as the type of labour, its location and compatibility with child care and the quantity and quality of child care provided by the mother–substitute, are all important qualifiers. Research does tend to show that concepts of work and welfare both need to be disaggregated by such variables to arrive at meaningful and useful results. Some of the studies are shown in the box above. Inadequate control by women over household resources is one aspect of social discrimination.

Social discrimination

It has been a common belief that there is a hierarchy of vulnerability to malnutrition *within* households, whereby women are more vulnerable than men, and children more vulnerable than women. Evidence from South Asia (Harriss 1990) and elsewhere (Haaga and Mason 1987) has disputed this, and suggested that in general undernutrition is more often a result of inadequate household entitlement than intra–household maldistribution. Social discrimination against female children, particularly in South Asia, however has been documented and can have an impact on child nutrition (Chen *et al.* 1981; Carloni 1981) though conflicting results have emerged. Studies in India, Nepal, Sri Lanka and Bangladesh have found no gender differences in nutritional status (Hilder and Steinhoff 1983; Christian *et al.* 1989; Martorell *et al.* 1984; Perera 1983; Abdullah 1983), while in two other studies in Bangladesh, (Chen *et al.* 1981; Bairagi 1983) significantly more under–five year old girls than boys were found to be severely malnourished. Where discrimination does occur, it has been found to decline during periods of pronounced (seasonal) stress (Abdullah and Wheeler 1985, Brown *et al.* 1985).

In many societies, as girls will become members of other families upon marriage, they do not bear the social responsibility for supporting the parents in old age, and may be perceived as temporary and somewhat less valuable members of the family than boys (Katona–Apte 1988; Chaudhury 1988). While there are significant variations worldwide, there have been several reports of anti–female bias in food distribution (e.g. WHO 1986b), in health service utilization following illness (Holmboe–Ottesen *et al.* 1989; Chaudhury 1988; WHO 1986b), school enrolment and adult literacy rates (UNICEF 1990b), and in child mortality rates (UNFPA 1989). The disparity in access to education appears to be greatest followed by access to medical care and food. It is possible that discrimination in favour of boys decreases as the item or service is perceived as necessary for survival. For example, food is an immediate need for survival, medical care may be regarded as less so and education may be regarded as non–essential, particularly for girls (Merchant 1990).

Gender differentials in child nutritional status and mortality are hypothesised as being related to female economic and social status which may be influenced by both material and cultural factors (Clark 1987). *Material* explanations relate to the economic undervaluation of women (Bardhan 1987). This, in turn, depends on female labour demand, participation and earnings, as well as the gender distribution of inheritance rights (that governs control of property) and the exchange value of the female at marriage (reflected in dowry costs). Many studies (see Dreze and Sen 1990, p58) have shown that greater female involvement with outside work and paid employment does tend to go with less anti–female bias in intrafamily distribution. Household income differentials may have paradoxical effects. In poorer households, women may participate more in the wage labour markets, have greater autonomy in the management of household resources and suffer less from the

adverse effects of patrilinearity. However, these resources being more scarce in such poorer households, the results of less discrimination may nonetheless be more serious. While material factors are of obvious importance, *cultural* factors determine not only the gender division of waged tasks within which market mechanisms may operate but also systems of property ownership (Das Gupta 1987).

Regardless of such widespread behaviorally–based discrimination, the biological roles of females in reproduction, pregnancy and lactation cycles in particular, generally put women at higher risk for debilitation or death as demonstrated in the scanty but striking statistics on maternal morbidity and mortality (Royston and Armstong 1989). The social context described above will condition the degree to which women are vulnerable biologically. Another trade–off made by the mother in aiming to ensure household food security is thus often her own nutritional status. In their role as mothers, women may be nutritionally depleted through repeated extra reproductive demands of pregnancies and close child spacing. Maternal nutritional deprivation, while totally unacceptable in itself, is also associated with low birth weight of infants and high infant mortality rates. Kabeer (1990) has suggested expanding the food chain to consider how nutrients are *used up* in order to secure more food and care for dependents. The concept of a gender–sensitive food cycle, rather than food chain, helps to draw attention to the depletion of maternal energy reserves in fulfilling their multiple roles, and may alert planners to ways of reducing extra burdens on women in future interventions.

Women in India

Women generally occupy a very underprivileged position in Indian society, although there are significant regional variations. Discrimination against females begins early in life, with more females than males dying in infancy and childhood. In fact, female mortality is greater than male mortality up until the age of 35, while in most of the rest of the world, female mortality is correspondingly lower. In some slates, such as Andhra Pradesh and Kerala, female death rates were lower than those for males, while in Assam, Rajasthan, and West Bengal, however, there are about 10% more living males than females, with even worse situations in Uttar Pradesh, Punjab, and Haryana (i.e. the more northerly states). Dreze and Sen (1990) show that if India had had the female–male ratio obtaining in Sub–Saharan Africa (around 1.02) then – given the number of Indian males – there would have been 37 million more women in India in the mid–1980s!

The average age of marriage in India is one of the lowest in the world (18.3 years in 1981) with child marriage still prevalent. Girls are sometimes promised in marriage at birth. India has now moved towards a law on marriage which make the minimum age of marriage 18 for girls and 21 for boys. Child bearing also begins early, with 8% of the births in India occurring to mothers less than 19 years of age. Family size tends to be large. The average Indian woman has from 6 to 7 pregnancies, giving birth to 5 or 6 live infants. 4 to 5 of these will survive to reach the age at which they can reproduce. Pregnancies are difficult in India, and the maternal mortality rate about 400 to 500 times as large as for the developed countries. Only an estimated 32% of rural births, and 74% of urban births are attended by qualified personnel (these figures show wide regional disparities, and in Jammu and Kashmir, Rajasthan and Madhya Pradesh, fall to less than 10%). Abortion is yet another problem that Indian women must face. Although legal in India, abortions are still performed in unsanitary conditions. Indian women desperate for an abortion will go to unsanitary clinics sometimes because of their ignorance of the law, and other times because a government run clinic which offers relatively safe abortions is inaccessible. Sex selective abortion is problematic because of the perceived worthlessness of daughters and the value of sons in Indian society. According to a 1984 report from Bombay on abortion, after pre–natal sex determination, 7999 out of 8000 foetuses aborted were female.

Health services are used less often by women than by men. Parents take sick sons to the health clinics at an earlier stage in an illness than a daughter. A 1982 study in Rajasthan demonstrated that the ratio of male to females coming to government health centres for treatment was 5:1. Another study in Uttar Pradesh showed that only about 9% of cases of female illness went to a health centre for treatment. White mixed evidence has been found regarding infra–family distribution of food in India, inequalities in health care, medicine and general care can, on their own, yield excess female mortality rates (Harriss 1990).

The level of female education has been on the rise in India. The percentage of girls in an average class in primary school rose from 38% in 1978 to 41% in 1986. A census from 1981 estimated that around one–third of urban girls, and two–thirds of rural girls aged 6 to 13 years do not attend school. Again there are regional variations. In Rajasthan, for example, in 1987/88, only 52% of the girls of the age 6 to 11 years were in school, while of those aged 11 to 14, only 17% were enrolled. The lower education levels of girls are due to a variety of reasons. The daughter is often seen as only a temporary member of the family who will enter the family of her husband upon marriage. Daughters also greatly help the mother in her work at home, and

therefore keeping her at home is seen as more useful for the family than improving her education. Schools in which there are male teachers and male students, and to which the girl must travel long distances may be seen as threats to the purity of the girl. Also, a less educated girl is usually easier to marry off, and the dowry less debilitating. The literacy of adult females in rural India is often extremely low. In Rajasthan, for example, more than 90% of the rural females were illiterate. The scheduled rural women have a literacy rate of below 7%. On the other hand, rural female literacy in Kerala was at 72%.

Most Indian women, in addition to domestic work, also work outside the home. About 60% of rural women work for a wage while 51% of urban women do so. The wage earnings of these women may sometimes contribute significantly to family income, with about one–quarter of working women bear the sole responsibility for earning family income. Even so, about 63% contributed less than half the total family income. Indian women are introduced to work at a very early age. The average 9 to 14 year old girl living in a rural area spends 8 hours every day on work of one kind or another, while a boy of the same age only puts in about 3 hours.

The government has attempted to improve the situation of women somewhat by instituting various laws to improve their rights and legal powers. Legally, women should receive equal pay for equal work, although this law is poorly enforced. There have been recent amendments to laws such as the Rape Law, Dowry Prohibition Act, Prevention of Immoral Traffic Act, and many others. However, problems in their implementation have meant that the position of women has not been greatly affected. The law on prostitution still treats the women as the sole criminal, while the man suffers no legal consequence. Laws on bigamy and adultery are still biased in favour of the male. There are different rights for husband and wife, and equal inheritance laws for sons and daughters do not exist. Few of the laws deal with women working at home or in un–organized activities.

Women in Indonesia

Indonesian women find less barriers to their participation in the labour force, education, and public life than their Asian and Muslim counterparts. In Indonesian history, there have been several powerful queens, demonstrating that the country has a tradition of strong female participation in the ruling of the country. The Indonesian constitution, written in 1945, recognizes no difference between men and women in the fields of labour, health, politics, and law, although there is still discrimination in these areas. Some male–female ratios are: 1.6:1 in secondary and higher education, 1.3:1 in literacy, 2:1 in the labour force, and more than 10:1 in the policy making levels of government (UNICEF–Indonesia 1988).

Labour laws state that women should receive the same wages for the same work as men. They also outlaw discrimination based on sex in the work place. A fully paid maternity leave is allowed, as well as leave after a miscarriage, and time off to nurse infants. Women can take off two days a month during their menstruation. Although all these laws give women extensive rights and protection, many of them are not widely enforced, and they remain poorly used by women who are uninformed about their legal rights.

While educational standards are lower for women than for men, the difference has reduced in recent years. The adult literacy rate for men has increased by 17% from 66% in 1970 to 83% in 1985, while the female literacy rate has increased by 23%, going from 42% in 1970 to 65% in 1985. The rapid rise in female literacy is mostly due to the currently high primary school enrolment ratio. The net primary school enrolment of women from 1986 to 1988 was only slightly lower for women (97 for females, 99 for males) (UNICEF 1991). In the 1970's, the number of females who had no education fell by 29%, and although the number of men fell by more (34%), this still represented a significant gain by women in the domain of education. An even more promising statistic is that of the percentage of either sex that completed primary school. The percentage of females completing primary school rose by 12% even though the percentage of males fell by 4% (UNICEF–Indonesia 1988).

In fact, an important part of the problem of inadequate female resource control is the fact that it is very often hidden. Women's unpaid work in and around the house, in small–scale agriculture and in the informal sector is missed by national accounting and censuses, despite its obvious productive and social value. The particular burden shouldered by women during structural adjustment has already been mentioned (see chapter 2). UNDP (1990) estimate that unpaid household work by women would add a third to global production. A gender–specific disaggregation of indicators of labour participation, time allocation to domestic and productive work, wages, power over decisions made are examples that would show the relative status of women vis–a–vis men in different societies. National censuses, particularly agricultural surveys may need re–designing. Educational statistics (enrolment, literacy levels) may be the exception as they are more routinely available (see World Bank 1990).

The underlying causes of inadequate female resource control thus relate largely to social discrimination against women in many societies, resulting in low socio−economic and educational status and little power over intra−household decisions. The more immediate manifestations of these causes include intra−household maldistribution of food, inadequate feeding of young children (including when sick), exposure to infection, inadequate utilization of health care and reduced social stimulation of the child. It should be noted here that these factors all affect nutrition outcomes through the malnutrition−infection complex.

RELEVANT ACTIONS

Thus, in aiming to counteract such problems, we need to consider how to tackle underlying causes as well as their more visible consequences. In the following section, we focus first (as with other chapters) on the type of long−term actions for dealing with the resource control problem, followed by consideration of more direct household−level actions for improving caring capacity.

Improving Women's Control of Resources

Important household resources include income, food, time and knowledge. Improving women's control over these may be brought about through a multi−pronged approach. For example, institutions seeking to empower women can be supported; appropriate technological change within and outside agriculture can both augment income−earning opportunities and reduce time constraints; entitlements to better targeted state welfare benefits can be increased (e.g. food stamps, supplementary feeding); educational policies can seek ways to increase female primary school enrolment rates, reduce drop−out, and improve adult female literacy rates.

Empowering women

Patriarchy is likely to be the main obstacle to securing a fairer distribution of resource control between adult household members. Gender divisions however are not written in tablets of stone − they can be altered. In many societies throughout history the social status of women has been improved by raising their economic status. Measures aimed at increasing women's economic productivity will affect their own position in the immediate family as well as their valuation in society in general. Direct unmediated access to income drastically reduces a woman's dependency and thus strengthens her ability to realise her own preferences within the family, of which the health and well−being of her children is likely to be seen as a priority.

In the longer term, as women's economic status improves, so will the opportunity cost of not investing in the welfare of women. This means that raising female earning power may be critical to increasing the effective demand for education, health and family planning services necessary to improve women's welfare. As improvements occur in female economic productivity and opportunities for women to earn and control income are enhanced, household food security is likely to improve. With such a change, the economic advantages of having many children would be reduced. This in turn would be followed by reduced fertility and population growth, particularly if accompanied by renewed family planning efforts and expanded outreach of services to hitherto uncovered communities. Also, as women's economic and social status improves, the investment in the education of daughters would also be increased thus reducing the gender inequities in school enrolment, attendance and literacy levels seen in many countries. The pay−offs in educating young girls may include reduced fertility, reduced infant mortality rates and an increased awareness, communication and exchange of ideas.

The empowerment of women through advocacy and mobilisation is the aim of women's groups worldwide, which seek to ensure 'voice, access and participation by poor women in the process of economic development'. Donor support for such capacity−building groups is recommended by a recent review (Grown and Sebstad 1989).

Improving command over income and food

A woman's command over income and food relates also to concerns with household food security, and there is a range of possible interventions that may simultaneously improve a household's food security through improving female control over cash and/or food resources.

Modern crop varieties, irrigation and increased commercialisation have often been associated with an increased need for hired labour, a high proportion of which may be women from poor landless households. Studies in India and Nepal (World Bank 1990, p61) have found that the overall use of hired female labour rose substantially with the introduction of modern varieties. However, increases in income are not necessarily paralleled by improved control. The source, form and timing of payment are important factors (see chapter 2): in–kind income, for example, is more likely to be under female control than cash payment. There may be important socio–economic differentials in this: in Rwanda, for example, spending from women–controlled income was more food–oriented (than men–controlled) only for the lowest income group – precisely those people likely to be at greatest nutritional risk (von Braun *et al.* 1991). Female control over income is likely to be particularly beneficial for nutrition among the poorest.

Commercialisation also brings technological change, which may be beneficial or not Innovations that reduce drudgery and improve productivity without displacing labour hold the greatest potential. However, mechanisation has often displaced female labour e.g. rice dehuskers in Bangladesh, harvesting technologies in the Philippines, and chemical fertilisers (substituting for cow dung) in India (World Food Council 1991). Increased female labour demand in certain circumstances can heighten the “maternal dilemma”; increased income–earning opportunities will need to be matched by initiatives to counteract the negative effects of reduced time available for child care.

Employment provision, food stamps or coupons, and other state schemes could be preferentially directed towards women. However such benefits cannot in many cases be successfully defended. A more sustainable solution might entail legislative changes in women's access to assets such as land, changes in the structure of state agencies for credit and marketing, and restructuring markets to reduce discrimination (Elson 1990). This has particularly relevance for the design of structural adjustment programmes (see chapter 2).

Growing experience confirms that providing credit facilities to women, even without traditional collateral, is feasible and effective as a means of improving the situation of women and their households. Micro–enterprises which are in the hands of women have been shown to have good credit repayment records in a number of credit schemes in Asia and Latin America. The Grameen Bank in Bangladesh recognised this in 1976, and saw the importance of 'peer pressure and peer support' in credit. Groups of five women, of their own choosing, could draw loans, with the group 'peer pressure' as collateral (Quanine 1990).

Saving time

Strategies aimed at the amelioration of womens' *unwaged* work loads should be pursued. These offer one means of mitigating the “maternal dilemma”. A focus on unwaged work removes the undesirable possibility that labour–saving technologies result in displacement of female wage labour and/or reduced wages. The emphasis needs to be on reducing drudgery in unpaid tasks such as food processing, cooking, cleaning, fetching water, and gathering fuel. Examples are appropriate technologies for transplanting and post–harvest processing, improved water supplies (which relieve women of longer journeys carrying water) and improved hoes which reduce the energy used in weeding.

It should be remembered that in industrialized countries part of the rapid improvement in women's position has been because widely available home technology has helped to free up time, to reduce the drudgery of household chores. While labour–saving technology, primarily from domestic appliances and electrification (refrigerators are important in food hygiene) may be some time in coming to many countries, their relevance to the topic should not be underestimated. However, more simple applications of technology could make major differences in the time women spend on other tasks. These range from better cooking facilities (such as liquid fuel stoves), to village–level milling facilities (for preparation of cereals), to piped water, to technology in other areas of women's work, such as in agricultural labour. Some of these may be seen as direct measures feasibly incorporated within nutrition programmes, others dependent on non–nutritional policies.

The potential for women to negotiate an easier work load and demand appropriate technologies may exist. One example would be the reform of rural institutions (especially farming co–operatives) to allow women full

membership rights and direct access to the returns to their household labour. The function of a farmers' co−operative could also be extended to imposing a levy on household income from the sale of produce to finance investment in some technology which reduces womens' work load in unremunerated tasks.

Time may also be saved through the expansion, improvement and maintenance of public sector services such as primary health care, water and sanitation. Another important public sector service is education.

Female literacy

Maternal literacy and schooling has been associated with a more efficient management of limited household resources, greater utilisation of available health care services, better health care practices, lower fertility and more child−centred caring behaviour (McGuire and Popkin 1988). Importantly also, it raises awareness of the means to overcome problems and generates effective political demand.

In general, education has both a direct and an indirect effect on nutrition, in the long run probably one of the most important The indirect effect is because increased education and literacy has a multiplying effect on development, and income, which in turn contributes to improve nutrition. The direct effect relates to the common observation that maternal education and literacy is associated with better utilisation of household resources and improved nutrition of children. Those countries that have promoted education (measured by literacy rates, if possible separated by gender; school enrollment etc) generally have a relatively better nutrition situation. Primary and secondary education, especially of women, were found to be important factors contributing significantly to the effectiveness and efficiency of the health−care system in Chile, Costa Rica and Cuba (Horwitz 1987). Although educational indicators may be highly co−linear with other possible determinants of nutrition (e.g. income, environment), it seems reasonable that at least part of the observed association reflects causality.

Direct Interventions relating to Caring Capacity

More immediate manifestations of problems of inadequate resource control may include intra−household maldistribution of food (towards women and children), constraints on child feeding, high levels of exposure to infection, low utilization of health and family planning services, and inadequate day care for children of working mothers. Direct interventions for counteracting these problems may include supplementary feeding (of women and children), breastfeeding promotion, increased access to improved weaning foods, removal of barriers to health and family planning service utilization, revised workplace organisation, and overall access to relevant information. Many direct interventions can be seen to have an educational component of some sort. In addition, there are household food−security components (in food distribution and maternal and child supplementary feeding) and health and environment−related components (affecting exposure to infection and health service utilization). While educational attainment and female literacy *per se* have been considered above as underlying conditions for adequate resource control, nutrition−oriented education, on the other hand, is an intervention more directly related to caring capacity, and is described in detail later in this section.

Ensuring equitable intra−household food distribution

Intra−household sharing of food for the benefit of growing children is difficult to influence through direct interventions, although it is one common objective of nutrition education (discussed below). There would seem to be scope for positive discrimination in favour of the child, as it can readily be shown that sharing of even inadequate household food resources such that children's requirements are met has only small effects on meeting adult requirements, as children's requirements are smaller (Haaga and Mason 1987). At the same time ensuring equitable distribution in favour of women in the household is obviously important Actual within−household distribution of food however is difficult to measure, requiring as it does assessment of individual food intakes. Indirect evidence can also be obtained from, for example, gender differences in child growth rates, although this is also affected by other aspects of care.

Interventions designed to actually increase the food intake of individuals within the household e.g. supplementary feeding of children or pregnant/lactating women, have been described in Chapter 3. For women, intervention trials have shown that supplementation of maternal diets is feasible, and has effects on birth weight As a routine intervention, maternal supplementation is not common, and an issue arises

concerning its likely feasibility and cost effectiveness. On the other hand, maternity benefits in terms of supplementary income (or food), legislated rights to time off from work (perhaps with pay), and certainly rights of return to employment, are features of social security in more developed countries, and could legitimately be considered as important aspects of social development.

Improving child feeding practices

These can also be affected by conventional programmes of supplementary feeding and nutrition education, but also technology has a role here. Access to processed foods or labour saving means of processing them, better cooking facilities, etc, are important. Not to be forgotten in, at least, middle income countries is access to satisfactory food storage, including refrigeration. The importance of feeding sick anorexic children, and those convalescing from illness, is of particular concern here.

A good example of the levels of care and support that may be required are those needed for optimal breastfeeding. Breastfeeding women need: i) emotional support and appropriate information from family, community and/or health workers if any problem with breastfeeding occurs, ii) appropriate support and information any time they have contact with the health care sector: prenatally, at the time of delivery, during the early weeks of lactation, and even during the second year of life and beyond, iii) maternity benefits appropriate to their working situation, ideally including paid leave for at least four months and a creche near the place of work.

Preventing disease

For disease prevention, women need time to undertake household chores e.g. cleaning, food preservation, accessing water supplies, etc. Labour−saving technologies again may have a role. Health education and access to simple supplies, e.g. soap, may be part of health and nutrition programmes. The care of sick children in this context, to reduce the severity and duration of current infection, to prevent secondary infection, and to prevent worsening of minor injuries, requires both time and knowledge. In this case, home visits by health workers, and better access to appropriate health services may be important. The use of home remedies – these days notably oral rehydration – is clearly open to intervention, including distribution of (e.g.) oral rehydration salts, and the information and education needed to use them. Here it must be remembered that extensive time is needed for oral rehydration of young children, and whilst no obvious solution to this is available, ignoring it will constrain the effectiveness of ORT.

Family planning

Women need access to pre−natal and obstetric services, family planning services, as well as health services in general. Family planning benefits the unborn baby, the youngest child and the mother. Too close spacing may result in low birth weight, inadequate capacity for care of the new born and other young children. If the previous child is abruptly weaned it will be at greater risk. The mother herself may be both biologically depleted from too−frequent births, and burnt−out by too many tasks, including excessive demands for child care. Education on the value of family planning needs to be targeted also towards men, who often wish for more children than their spouses. The benefits of breastfeeding in contributing to longer birth intervals should once again be stressed (for further discussion, see SCN News No. 7, 1991; and 'Nutrition and Population', ACC/SCN, forthcoming).

Organising day care for children

Well organized and supported day care may have a direct benefit on nutrition. If it could be shown that day care has benefits because children are less neglected, even though parents have to work and have other major constraints on their time, this could give additional priority to this approach. Work organisation may need revision to allow for breastfeeding and child care or the establishment of child care facilities, particularly in seasons of stress. Where womens' work is characterised by seasonal labour, the potential for collective child care is obvious. Day care or creche facilities may also be a suitable location for seasonal child feeding, particularly as household food availability is often low at a time when child care is most needed (i.e. when

female labour demand peaks). This has been done successfully in several places e.g. harvest season day–care centres were an effective addition to the Narangwal Project child health programme in the Punjab, North India (Chambers 1982). Mobile creches, managed by trained “child–care educators”, are a feature of many construction sites in several Indian cities.

Community Child Care in Colombia

In the Colombian Community Child Care and Nutrition Project, supported by the World Bank, the target group – 2–6 year old children and their parents – is drawn mainly from the poorest 20% of the population. A group of mothers selects a “community mother” to provide day care and other services for 15 children in her home. She receives training, a small stipend, and credit to upgrade her home to hygiene and safety standards. Food is also provided by the National Family Welfare Institute – sufficient to meet 80% of each child's daily requirements. The child is also exposed to preschool learning activities while parents have the opportunity to seek remunerative employment without worrying about their child. The project is popular and has expanded from its inception in 1987 to cover 500,000 children by late 1989 – i.e. nearly half of Colombia's “at–risk” children. It costs about $11 per month per child.

Nutrition education

While actions that address the resource constraints women face are fundamental to major progress, many of the more direct interventions above deal with what can be done within the confines of such constraints. These are often aimed at effecting change in people's behaviours. One specific intervention type – often a component of 'nutrition programmes' – is nutrition education.

The need for nutrition education is most pronounced where large changes have occurred in the environment and constraints within which household decisions are made, such as rural to urban migration, shifts from subsistence to cash cropping, and other changes that significantly alter the magnitude and source of household incomes and availability of food and non–food commodities (Pinstrup–Andersen 1987). Nutrition education may have an impact in an environment in which resources are not the primary constraint, through improving the utilisation of available resources. For it to do so in such circumstances, educational messages must be relevant and comprehensible to the target audience. Human nutrition may be influenced through changes in household acquisition and allocation behaviour related to food, health and sanitation. There are obvious limits to nutrition education because by no means all causes of malnutrition are reversible by education; some, like bad water, are economic. Goitre is another example; education only becomes practical after salt has been iodised.

In nutrition education, the importance of communicating to the mother the value of exclusive breastfeeding in the early months of a child's life (four to six months), increasing the energy–density of complementary foods (e.g. through use of germinated flour), decreasing contamination (e.g. through fermented foods) and maintaining frequent feeding, are all paramount.

Nutrition education programmes are reported to cause substantial behavioural change, as demonstrated in projects in Micronesia, Indonesia, The Gambia, Honduras, Philippines, Tanzania (see Price Gittinger *et al.* 1987). These are likely to have a greater effect on nutritional outcomes if accompanied by programmes designed to increase effective demand (see Philippines targeted food subsidy example, chapter 2). In Morocco, education plus food supplements was reported to produce greater nutritional status change than did supplementation alone (Gilmore *et al.* 1980). However, certain types of education programme have been reported as being successful by themselves e.g. a mass–media programme in Indonesia (Manoff 1987).

A distinction needs to be made between women's basic education/literacy (discussed earlier) and nutrition–oriented education. Experience has shown that although female literacy is positively associated with nutritional improvement, the nutritional status of children can be improved *now*, through well–crafted and appropriate nutritional education programmes directed at mothers who may be illiterate.

One reason why several nutrition education programmes did not succeed in the past was that the “messages” were not well formulated, partly as a result of inadequate understanding of the causes of malnutrition. Over–emphasis may have been placed on imported Western home economics–style education on the prime importance of a “balanced diet” and what each food group contains.

A central problem of nutrition education is the trade–off between reaching large audiences, which

media–based programmes can do, and producing nutritionally significant behavioural change, which *face–to–face* projects have been able to do. The problem with media–based programmes is their tendency to become dissociated with what goes on in the field. It is also sometimes argued that they are likely to affect superficial knowledge or practices, but will not affect behaviours that are more complex or important for an individual (Hornik 1985). If face–to–face education is to expand, communities will need to take administrative and financial responsibility. Community–based participation in the formulation of concepts and message design is indispensable in projects, as perceived needs for food– and health–related services may change, as may child care and breastfeeding practices.

Communications media and face–to–face nutrition education are not antagonistic. They may work synergistically to create awareness and change behaviours and practices. Although outreach of face–to–face methods is clearly a problem, so it is with health services in general. The experiences of Chile, Costa Rica and Cuba in the Americas, for example, have shown that it is feasible to organize a health infrastructure including nutrition interventions, that is accessible to all or most of the people (Horwitz 1987). Although it is difficult to assess the contribution of health and nutrition education activities, it is clear that they made a significant difference by working through the social networks that they helped to create.

The 1980s saw increasing recognition of nutrition education as an effective intervention to bring about behavioural change to improve nutritional status. One project that demonstrated this was the Nutrition Communications and Behaviour Change (NCBC) project of the Government of Indonesia, 1979–1982. The Indonesian experience was replicated with less money, less technical assistance etc. in the Dominican Republic and Ecuador – both demonstrated behaviour changes, and the Dominican Republic project improved child nutritional status (Manoff International Inc. 1984). The type of nutrition education programme that has produced these positive changes has certain characteristics that distinguish it from nutrition education of the past; it focuses on behaviour change not just information transfer; it is designed with potential programme beneficiaries, not by nutritionists, i.e. it begins with good qualitative research, and it uses a mix of media (mass and interpersonal). A common element of all of these programmes was counselling following growth monitoring. A careful set of messages was designed depending on the child's status (gaining or not gaining weight) and the child's age.

In the latter part of the 1980s, the new communications techniques were applied to improving the feeding of young children. These included social marketing techniques such as focus group discussions and participant observation to facilitate the design of more effective area–specific messages. Again an evaluation of the Indonesia project demonstrated positive changes in knowledge, behaviour, dietary intake and nutritional status.

In summary, the experience of the last decade has shown us that appropriate health and nutrition education can result in improved nutrition under certain conditions. In understanding its role in improving nutrition, a sequence of questions should be posed, such as: which groups of people have nutritional problems, what types of problems, to whom should nutritional messages be directed, what specific behavioural changes are required, are these relevant, practicable and affordable given the target group's social and cultural values, income and time availability? In many cases, what is needed is sustainability of funding to allow programmes to evolve (beyond the average life span of five years) and be refined as opportunities arise. While nutrition education is not costly, it is also not without cost (at about $2–5 per beneficiary, see Figure 3.2).

School health and nutrition education

Evidence is also now available to indicate that specific health and nutrition education as part of the school curriculum can not only influence knowledge and beliefs, but also favourably influence behaviour to improve health (Abt Associates of Cambridge 1986). One would expect most of this effect to operate parent–to–child. However, there are some reports of “child to child” education – that is the children in school are taught some elements of health and nutrition practices to be applied to their siblings. The effect of such education is very long term, indeed inter–generational, since the people currently being educated are expected to be those that will provide better conditions for their children.

Conclusion

This chapter reflects the evolution of our thinking up to the November 1990 meeting. At that meeting, considerable progress was made in pinning down the more specific actions in this area – this was, after all, a relatively new field for nutritionists to examine. We therefore leave this chapter (particularly) as background, and direct attention to the conclusions given in section D of chapter 5. Although here the topic is not adequately explored, it is intended to set it firmly on the agenda for improving nutrition: care crucially modifies the effects of household food insecurity and infectious disease on the nutrition of the individual. Future policy must address the issues mentioned here, and others yet to be properly defined and brought in.

CHAPTER 5: SOME OPTIONS FOR IMPROVING NUTRITION IN THE 1990s

This chapter stems from ACC/SCN's Ad Hoc Group on Policies to Alleviate Underconsumption and Malnutrition in Deprived Areas, which took place in London on 12–14 November 1990, supported by GTZ. The list of participants is annexed. The chapter is constructed from the rapporteurs' reports, as agreed at the meeting, and has been circulated to participants. Comments were incorporated and the final version published and distributed as a supplement to SCN News No. 7 (mid–1991).

A. INTRODUCTION

This summary is intended to be useful for international agencies concerned with certain major nutritional problems in poor societies, and through them for governments making decisions on policies to alleviate these problems. It aims to provide a view of the state of current knowledge, based on recent experience, emanating from a meeting convened by the ACC/SCN in November 1990, and reviewed by the UN and bilateral agency representatives at the ACC/SCN 18th Session in February 1991.

Nutrition itself is seen as an *outcome*, a result of access to food, dietary intake, care of the individual, and health. Access to adequate food and to health are among the universally adopted human rights[1]. It is therefore the responsibility of those whose actions affect the nutrition of the deprived to assign priority to protecting this central aspect of their rights. Adequate nutrition is also a pre–requisite for most other human aspirations. From conception through old age, adequate nutrition is essential for individual development, activity, good health, and self–fulfillment. For societies and nations, adequate nutrition is required for their function and success. The concerns range from day–to–day meeting of basic needs, including survival especially in infants and children, through lagged effects on performance of individuals and societies, even to inter–generational influences notably through women's nutrition.

The aims of socio–economic development include preventing inadequate nutrition. But this objective will not be reached unless actions different or additional to those presently undertaken are pursued. One aim of this paper is to outline the scope of possible actions that now, at the beginning of the 1990s, should be considered as feasible options under different circumstances.

Inadequate nutrition encompasses a set of issues with biological and social dimensions. In the child, it concerns survival, growth, health or sickness, activity and cognitive development. In adults, it particularly concerns health, biological function, and productive activity. Nutritional status might be assessed by a number of these outcomes; most often in practice it is estimated using growth in children and thinness in both children and adults (for protein–energy; other measures are used for micronutrient deficiencies). Poor nutritional status of the individual results usually from a combination of inadequate dietary intake and infectious disease.

Malnutrition is extensive in the world. There is (by definition) no single measure. Some widely quoted indicators of the present status do however give a useable picture, for example: some 150 million children are underweight[2]; around 500 million women anaemic due to iron deficiency[3]; over 20 million low birth weight infants born each year[4]; some 40 million children are estimated to be vitamin A deficient, and over 1,000 million people either suffering or at risk of iodine deficiency[5]. In this context the trends are particularly relevant. During the 1980s, although in all regions except Sub–Saharan Africa the average proportion of the population malnourished may have declined or at least remained static, the numbers affected – whether assessed by growth in children or as underfed in the whole population – continued to increase. Moreover, where the average proportion has declined, the rate is nowhere near rapid enough that maintaining current policies

offers the prospect of an acceptable nutrition situation in the foreseeable future. A judgement based on the continuation of present trends would be that numbers malnourished may substantially increase in the 1990s. Goals proposed for the Fourth Development Decade by the U.N.[6], by WHO/UNICEF[7], at the World Summit for Children[8] and in a number of international contexts recently[9] include such aims as: virtually to eradicate severe malnutrition, and to reduce mild/moderate malnutrition by half. Such goals will only begin to be met with a great deal of deliberate action. Again, one purpose of this paper is to suggest a possible scope for this action.

Although global and regional trends of malnutrition, and their implications for the future, are cause for concern, success in improving nutrition has been seen within a number of countries from all regions. In some cases nutrition has improved more than might be expected from the economic situation, or has been protected during recession[10]. It is on this basis that specific actions can be proposed. The causes of improvement are often multiple. They range from favourable macro–economic policies through improved service delivery to direct nutrition interventions. Although nutrition may not be the primary motivation for all such policies, the fact that success is possible encourages the preparation of this statement.

Since the Second World War the view of nutrition has evolved, and it is hoped that the present view of problems and their possible solutions is appropriate to the time. While there have been different schools of thought over the years, a consensus is now emerging. It may be worth looking briefly at the history to set the context.

In the 1940s and 1950s, freedom from hunger and prevention of famine were seen as global priorities – e.g. the constitution of FAO[11]. At the same time malnutrition itself (at least in children, and for micro–nutrients) was regarded as largely a medical problem. (Starting even earlier, attempts were made to conquer such vitamin deficiency diseases as beri–beri, pellagra, scurvy, and xerophthalmia.) Kwashiorkor – more visible in children than thinness – was widely reported, as was its cure by high–protein foods; as well, protein requirements were over–estimated. Consequently, protein deficiency came to be seen as the most extensive nutrition problem. This perception led on the one hand to attempting prevention and treatment by providing protein to individuals (by technical means); and on the other hand to a global supply concern for the “protein gap”.

The reappraisal of protein requirements in the early 1970s and better understanding of protein–energy interactions, combined with the temporary food supply crisis at the time of the World Food Conference of 1974, swung the pendulum the other way: overall food energy supply became the issue. Analysis soon revealed (e.g. FAO's Fourth World Food Survey[12]) that *distribution* of food, or access to food for the poor, was crucial. Poverty was then established as a major cause of malnutrition. The inference drawn however was that addressing poverty as a whole was the only way to prevent malnutrition, which was over–ambitious, and often set nutritional concerns in potential competition – or anyway interfering – with virtually all other aspects of socio–economic development It also tended to lead to unworkable schemes for integrated policy–making and programmes. In turn, this led to a sector–wise view of nutrition – in agriculture and in health especially – with emphasis on introducing nutritional considerations into sectoral planning. An issue here was that these sectors essentially retained their own priorities, and considered what they were doing as that which was necessary anyway to improve nutrition, so that specific nutrition considerations were often regarded as rather superfluous.

A number of national governments however confronted this problem more directly. Measures such as food price stabilization, social security, and special health services for women and children, gradually took root One result is that today, whatever the theory, there is experience to build on.

An opportunity is also provided by the convergence between policies advocated internationally for poverty alleviation[13], and those for nutrition. Emergence of household food security (as opposed to national) as a concern, with the emphasis that 60–80% of the expenditure of the poor is for food, sets household food issues centrally in concerns for poverty[14], and within social security as short–term measures for support. Prevention of the malnutrition–infection complex[15] – still the most prevalent public health problem in the world – is a major objective of primary health care. The crucial role of women in all aspects of nutrition (here especially in caring for their families) is increasingly recognized[16].

Strategies for addressing malnutrition can be based on these considerations. UNICEF's nutrition strategy focusses on the three underlying issues of food, health, and care[17]. FAO/WHO, in preparing for the forthcoming International Conference on Nutrition, use a similar structure[18]. This framework has guided the structuring of the strategies and policies discussed here.

At the same time, two other issues of emerging importance should be noted, although they are not treated in detail here. First, the priority of tackling specific micronutrient deficiencies is now being reemphasized, particularly since the technical feasibility of preventing them through focussed and relatively inexpensive programmes is now clear[19]. This applies particularly to iodine and vitamin A deficiencies. Control programmes for iron deficiency – the most prevalent – while effective technically are more dependent on service delivery infrastructure and may take longer to develop. A short section on control of micronutrient deficiencies is included here, as section E.[1]

[1] While it is recognized that micronutrients relate to the qualitative aspects of household food security (as defined), this section is separate for ease of presentation and added emphasis.

Second, the contribution of incorrect nutrition to chronic disease is being more firmly established as research progresses. Aspects of nutrition policy, initially in industrialized countries, are addressing this issue. The concern extends to developing countries – nutrition contributes to chronic disease among the poor in many societies – and actions to head off or reverse undesirable trends in diet are needed. These issues are not gone into here, which in no way reflects their priority but results from the need to limit the scope.

Nutrition and Development Policies

The principles for development policies in the 1990s are widely put forward – most recently by World Bank and UNDP[20] – as including three tracks. First, economic growth that deliberately involves participation of the poor is the long–term solution to poverty. Second, social security is required to maintain a basic level of living ("safety net") for the poor; sustained access to adequate food ("food security") is a central feature of this. Third, development of human resources is an essential underpinning of the first two.

The options put forward here in the technical areas related to nutrition are entirely consistent with these principles and are aimed at achieving nutritional goals for the 1990s.

A number of points influencing their application to nutrition should be made concerning these principles. First, allocation of resources to poverty–oriented growth may or may not involve trade–offs with total economic growth: under many national circumstances deliberate decisions are needed as to how far investments are made that benefit the income of the poor specifically. Second, the financing of effective social security for the poor depends on adequate economic growth: the first two principles are linked. Third, the effects of growth policies that fail to involve the poor cannot sustainably be rectified through social security.

A related issue is that policies must address both underlying trends, and short–term fluctuations or "shocks". There is some distinction between shocks that affect whole societies, and those affecting individuals. For example, in drought–prone areas a safety net mechanism may be appropriate for preventing effects of occasional drought on the population; somewhat similar considerations apply to seasonal effects. Buffer stocks or price stabilization are examples of appropriate policies. On the other hand, individuals require social security against sudden illness, or unemployment. This may be developed in communities, but generally needs resources from more central levels.

A specific concern at the present time is for the effects of structural adjustment policies on nutrition, particularly in the short–run. This concern is likely to continue in the 1990s, and is discussed below under "household food security".

Grouping Issues

Malnutrition, especially in women and children, is the problem to be solved. The immediate causes at an individual level are inadequate dietary intake and infectious disease (viral, bacterial, parasitic). Certain actions can address these directly, as will be discussed later, while measures addressing underlying household–level causes are often more practical. Nutrition issues are grouped here into three clusters: household food security, nutrition and infectious disease control, and caring capacity, with their detailed definitions being given in respective sections later. Briefly, their interaction is as follows.

Household food security is clearly a pre–requisite for adequate dietary intake of all household members, which in turn is one (of the two) requirements for preventing *malnutrition/infection*, disease prevention being

the other. However, dietary intake is influenced by many within–household factors, especially to do with women's roles; this applies particularly to infant and child feeding. At the same time, exposure to infection in the household environment is greatly affected by care of the individual which includes provision of adequate hygiene, clothing, care when sick and recovering, etc. Thus the cluster of problems concerned with "*care*", affecting both dietary intake and infection, has been included as central to policies to address malnutrition.

The problem clustering has, it should be emphasized, been defined pragmatically for operational purposes of grouping policies, rather than on a rigorous analytical basis. This applies particularly to women's issues, which are important in all three policy areas.

Choosing Options

The policy options and experience described in the next sections are not prescriptive. It is not implied that, even under given circumstances, one particular set of actions is always recommended. They are intended as "building blocks" when policy options are considered for alleviating malnutrition. They provide examples of actions that have been considered effective sufficiently widely that their serious consideration is advocated. Further, it should be stressed that this paper does not address the *process* of deciding on actions – or policy–making – but rather the potential content and results of such decisions.

Usually a judicious *mix* of policies – within the cluster of problems/options such as household food security – is appropriate. Reliance on one option has been seen to be less effective: only public works employment, or only food subsidies (even if targeted), for instance.

The relative priority assigned to each of the three clusters of problems/options is likely to vary country–by–country. In some countries household food security is relatively assured, but malnutrition persists for reasons encapsulated in the other clusters; in others, this factor may be of overriding importance. But it is stressed that adequacy in *each* of the areas is required: each is necessary but not of itself sufficient.

Inter–sectoral[1] policies or interventions are nevertheless not considered essential to address nutrition problems. Experience has shown that complicated plans involving many different possible actions have been difficult to implement. Often a better approach is to decide on currently feasible sectoral actions. Because nutrition problems have multiple causes does not mean that all causes have to be addressed at the same time. Equally, as for many other development interventions, flexibility in nutrition policy and interventions is desirable. Lessons may be learned from an evolutionary process of planning as opposed to the less flexible "blueprint" planning. There is thus no absolute need for governments to develop all–embracing statements which constitute a "nutrition policy". Such a document may promote the notion that a centralized inter–sectoral planning approach is required (although developing such a policy can in some cases give focus to commitments to nutritional goals, and a framework for deciding between options). Decisions and actions however are more important than statements.

> [1] A distinction has been drawn between "inter–sectoral", meaning "measures of different sectors integrated with each other for a coordinated effort", and "multi–sectoral", meaning "several sectors taking part".

Characteristics of nutrition problems, their causes and options for solutions, vary by country. In theory, suggestions could be made for relative priorities of options based on typology of problems and situations; attempting this could be a future step, but was not undertaken for this review. Such a typology might link problems and options with (a) characteristics of countries, e.g. by income level, government expenditures especially on health, education, and social security, population factors (density, growth rate, urbanization); (b) specific factors relative to household food security, such as dietary energy availability, dietary patterns, proportion of income spent on food; (c) nutrition and infectious disease, including infant and child mortality rates, access to health services, sanitation, disease patterns; and (d) assessment of caring capacity, perhaps using such data as female literacy rates and other measures of women's status.

Prioritization of policies and interventions cannot be done in a general manner. Just as the preconditions for successful actions differ between countries, so do the chances that any particular intervention will be appropriate and feasible. Furthermore, the success of interventions depends on the existence of other policies e.g. infrastructure, access to markets. Policy priorities are thus, to a large extent, country–specific and cannot be decided without full consideration of the social and economic context in which they would be implemented. Again, the *process* of deciding options could be considered as a future step, but was not part of the present

review.

B. HOUSEHOLD FOOD SECURITY

Food insecurity continues to threaten large proportions of households in low income countries. It is common among the absolute poor in middle income countries, and even in some rich countries. The problem is widespread, and is not confined to any one sector or group of nations. Even when hunger is avoided, families suffer from its threat. The entire society benefits when people feel their access to food is secure.

An operational definition of household food security is proposed as follows. *A household is food secure when it has access to the food needed for a healthy life for all its members (adequate in terms of quality, quantity, safety and culturally acceptable), and when it is not at undue risk of losing such access.*

Food insecurity, as a household–level issue, can be addressed by a wide range of alternative policies and combinations of policies and programmes. Policies for food security should aim at attaining required food consumption levels and reducing the risk of the poor losing access to food. Access to food and purchasing power are central, and both transitory (e.g. seasonal) and chronic food insecurity problems are of concern.

Adequate global and national level food supply remain necessary but insufficient conditions for household food security. High levels of food self sufficiency in low income countries have no necessary relationship to their households' food security, which has to be addressed by specific policies. Households should be viewed in the context of their community, and not in isolation. Many of the problems considered below have an important community and local government dimension and cannot be addressed by the central government alone.

The nature and scale of the food security problem differs a great deal among and within countries, and also between urban and rural areas. Wise policy needs to take account of this, and therefore has to be country–and region–specific and problem–oriented. Food security cannot be achieved free of charge in terms of fiscal resources. Public capabilities for problem identification and policy design and implementation are required to help to find ways to eliminate the unacceptable human misery caused by food insecurity, or by extreme efforts that households may take to avert it. In addition to humanitarian considerations, food secure households are a precondition for a modernizing and healthy society whose members concern themselves with investment in a productive future (e.g. education) rather than scrambling for adequate food today. Governments have an obligation to enable families and communities to achieve long–term food security and to provide a safety net to prevent destitution.

Food is such a high priority for poor households that many may be tenuously “secure”, but at great sacrifice – for example spending almost all their money or time on securing food. Thus not only must current food security itself be tackled, but also both the vulnerability and the disadvantages from enforced concentration on acquiring food, to the detriment of other needs like education or housing. Moreover increases in income even among the lowest income groups do not necessarily go entirely to increasing food energy intakes, but also towards better quality in terms of a more palatable and diversified diet. This represents an important aspiration not captured by dietary energy intakes alone, and is another objective of improved food security.

Setting for Action

A first step for improved food security that applies universally is to develop government and district–level capacity to assess, analyze, act, and evaluate actions relating to malnutrition in general and food security in particular. Community participation in this process is essential to successful capacity building at all levels, just as community mobilization must be a key feature of implementation. The ability to implement policies and monitor their effect is at least as important as the ability to design policies. Integrating all these activities into a continuous process will help to ensure that initial mistakes in policy conception are corrected, and that adjustments are made as circumstances change.

The general development strategy of a country greatly influences the food security of its households. A development strategy supportive of sustainable agriculture and rapid growth in labour–intensive output will enhance food security. So too will a macro–economic strategy that builds upon stability to encourage growth. This type of management reduces economic insecurity caused by sudden large devaluations, drastic budget

cuts, sharp curtailment of credit, and shortages of goods. These fluctuations hurt food security in the short and long−run.

Household food security is substantially influenced by macro−economic adjustment policies. The situation typically preceding adjustment includes such factors as overvalued currency, price policies negatively affecting agriculture, inefficient market interventions and government expenditures; these tend to depress production and incomes (particularly rural), and reduce the access to food of the poor. However, adjustment programmes, although necessary, usually lead to at least short−run insecurity especially among the urban poor and net consumers (wage−earners, landless) in rural areas. Reasons include increasing food prices, rising unemployment, and reduced budget allocations to social sectors. These should be cushioned by compensatory measures. Adjustment programmes are aimed in the long−run to lead to sustainable development, which will benefit nutrition, and considerations discussed later for development strategies are relevant.

Support for sustainable agriculture implies fair prices for farm output and inputs, and concern with resource mining, and spill−over and dynamic biological effects of agricultural inputs. (More plainly, problems such as erosion, groundwater depletion, pollution from fertilizers and pesticides, and problems of pest resurgences are addressed). Labour−intensive growth implies avoiding subsidies to capital via overvalued exchange rates, cheap credit, tax holidays, and low tariffs on capital goods; and also avoiding artificially high wages. Improvements in marketing, distribution, and agro−industries, as well as promoting the contribution of the private sector in job creation, all have important roles. Food safety and food quality must be assured by appropriate legislation, consumer protection and information.

Appropriate macro−economic management must recognize the lessons of the 1980s: growth and equity will be faster and smoother in a stable macro−economic environment. Avoiding large fiscal and current account deficits, high levels of inflation, rapid credit growth, or unchecked public enterprise losses will allow higher levels of productive investment, fewer recessions, and less unemployment. Arriving at a favourable macro−economic situation can be painful, but must be managed so as to allow food security for all families.

Measurement of Household Food Security

While the basic concept of household food security is clear, and an ideal measure of it is easy to describe, it is surprisingly difficult to gauge it in practice. This difficulty does *not* mean waiting for years of academic research. It does suggest that operational research and evaluation should be built into food security activities, so that confidence in the precision of actions will grow as the decade progresses.

An ideal measure of household food security includes the *measurement of household food availability and average household food consumption levels over a period of time, in relation to need.* For various reasons, this is all but impossible to achieve at a reasonable cost in a reasonable time period: there are problems with measuring both availability and consumption, and need itself. It is sufficiently difficult that it is best regarded as an ideal rather than practical measure. The *proportion* of available resources required for achieving food security may also be assessed; for example, households with adequate food security but spending almost all their income on food should clearly be distinguished from those only needing to spend a moderate proportion on food. This proportion is indicative of the stress on households' well−being, and reflects on their capacity to cope and indeed survive.

There are a number of other variables that might help to indicate trends, or serve as proxies for, food security. The best general indicator is probably real income, although still hard to assess; more fundamental measures, such as landlessness, should be included. Research is needed to see which groups of indirect indicators are best used under which conditions. In general, more weight has to be placed on indirect indicators where local government is weak and participation in the policy process is low; and also where investigative journalism is suppressed. Examples of potential indicators are changes in food production by region, changes in price ratios (e.g. crop/livestock or crop/wage price ratios), migration, assets; priority data from household surveys conducted for this specific purpose include; food consumption, the perceived risk of food insecurity, use of famine foods, and anthropometric measurements.

In relation to causality, none of these indicators are reliable on their own. All should be used in conjunction with other information. Emphasis should be on changes from normal levels, as many indicators will change for reasons unrelated to food security. For example, migration may rise in response to urban job opportunities, and weight−for−length indices may drop due to a rise in infectious disease. In general, careful analysis is

needed before inferring changes in food security. However, there is often adequate data available or easily gathered to allow judgements about food security – lack of precise data is no excuse for inaction.

Scope of Options

The purpose of the policies discussed below is to improve household food security. This is done, in part, by having a social safety net. A government has an obligation to ensure food access for all, extending especially to women and children. But true security comes from raising the level of production and earned income and improving asset ownership. If food prices are stabilized, and food availability assured, this will help families realize an acceptable minimum livelihood, food security, and adequate energy intakes.

As stressed above, appropriate policies can only be identified in a specific country context. The listing of major policy options for food security can therefore only be indicative of a government's choices. Conclusions regarding their impact and cost–effectiveness must remain at a very general level. A large body of research and experience exists for each policy and use of this will help guide decisions in specific contexts. Not every policy will fit every country, but most policies – if well applied – have the potential to improve food security in many countries. A brief list follows.

i) Promotion of small–scale agricultural production remains central to food security in most poor countries, to provide food and income for those at risk. Agricultural growth for employment expansion and food supply is important because many of the food insecure live in rural areas and are directly or indirectly linked to agriculture. Sustainable technology improvements in agriculture can increase the productivity of labour without diminishing employment. There are potential gains in food, cash crops, and in livestock. Traditional food crops and collected foods must be given systematic attention. Central elements of this policy include research and extension linkages, drawing upon indigenous knowledge, and improved input supply.

ii) Income generating projects including livestock and non–farm activities will allow rural families to use time previously spent on low productivity work to switch to jobs with higher returns. Non–farm work generates incomes not closely connected to farm income, thus helping to stabilize household incomes. Income generation is equally or more important in urban areas, although often the investments may differ from those in rural areas – urban families are usually more reliant on purchased foods.

iii) The initiation of credit programmes is one way to allow the rural poor access to loans, both for consumption and especially for production. Loans can make it possible for the poor to acquire assets, which both increase their income–earning capacity and provide buffers against disaster. Women should have equal legal and effective access to credit (see section D), as its availability allows higher incomes to be earned, and improves the resilience and flexibility of the household's income base. Lending to micro–enterprises using non–traditional and unregulated intermediaries has proved effective in reaching the poor, such schemes could now be expanded. (The success of credit programmes for the poor does not in general hinge on an interest rate subsidy, so decisions on subsidy to credit can be made depending on local conditions.)

iv) Public investment in infrastructure will have a number of benefits. Labour intensive construction creates jobs. Better roads lower marketing costs, thereby allowing *both* better prices to farmers *and* lower consumer prices in cities. Roads also improve the flow of information and reduce the power of local monopolies. They allow the easier movement of labour out of low wage or drought–struck areas, and cheaper movement of food into them. If irrigation and regreening are investments, continued gains in employment and incomes can be enjoyed.

v) Public stockpiling of food has sometimes efficiently improved food security by assuring physical supplies and stabilizing prices. In general, however, if transport costs are low, stockpiling will not be the best way to ensure access to food. Use of futures markets and international trade would provide a cheaper alternative. If transport costs are high, national, regional, or even community stockpiling in excess of normal commercial stocks may be needed. If a nation's demand can raise the price of its imports, stockpiling may be needed,

even with low transport costs.

vi) Food price stabilization can benefit farmers by allowing more confident investment in inputs, and consumers by reducing extreme fluctuations in real wages. This policy may sometimes involve driving a wedge between local and world prices, but these should not deviate too far from average world prices for too long.

vii) Food price subsidy and rationing policies are widely used. An important distinction is between *targeted subsidies* which are aimed mainly at households facing food insecurity and *general subsidies* aimed at most or all households. Targeting can be done by means–tested food stamps, ration books or coupons, by type of staple (e.g. cassava rather than rice), by geographic location of shops, or by restriction of the subsidy to certain groups, such as pregnant and lactating women and young children. Targeted subsidies face lower food costs, somewhat higher administrative costs, and, sometimes, a lack of widespread political support. General subsidies are very costly, popular, and hard to stop.

viii) Public works for food security (including food–for–work) continue to play an important role in Asia. Their potential in Africa appears to be increasing as there is rising population concentration, resource conservation opportunities, and infrastructure needs. If wages are set somewhat below normal levels, this intervention has the highly desirable feature of being self–targeting for the poor. Women are often attracted to these public works, although questions of child care, preferably near the place of work, should be addressed. The dual effects of short–term employment and long–term asset creation are described under infrastructure.

ix) Free distribution of food to selected groups is useful in emergency situations, such as famines or floods; and in chronic situations where poor pregnant and lactating mothers or underweight young children are at risk. *Supplementary feeding programmes* are common in this category. These may be aimed at households, such as food–for–work (section viii above), or individuals such as school–children, pre–schoolers or mothers. They can be successful where the service infrastructure and budgetary resources are adequate for sustained application. The benefits go beyond correcting growth failure to include child health and development (e.g. immunity and activity, school feeding for educational performance), and they should be considered and assessed in these terms. This type of distribution should be limited to those who will clearly benefit from the food; food distribution to the *general* population is seldom a cost effective way to intervene to improve household food security.

x) Food quality and safety control are important to reduce food contamination from chemicals (e.g. pesticide residues), mycotoxins (e.g. aflatoxin) and bacteria, both during storage and preparation (e.g. “street foods”). Attention to storage is important not only to prevent post–harvest losses but for reasons of palatability and acceptability. Certain foods need specific processing to be safe and acceptable (e.g. cassava, soya) and investments in this area can contribute to a safe and inexpensive food supply.

xi) Timely warning and intervention systems integrate local levels of data gathering, analysis and response. In some situations, this can prevent serious food security problems from developing, by increasing the availability of public works or subsidized food before real deprivation sets in. These systems require a fairly sophisticated local government which is not always available, but can be built up over time.

xii) Specific micronutrient programmes should be considered among the options for improving household food security. These are discussed in a separate section (E).

Related Policies

The above listed indicative policies all need to be examined in terms of the extent to which they are consonant with policy priorities in a given country. They cannot be evaluated or advocated in isolation from the policy and development strategy framework of a country. Most of the policies mentioned can include community participation and should to a large extent involve the private sector in actual implementation – e.g. privately run licensed ration shops, or privately bid infrastructure construction.

Given the essential contribution of women to household food security and adequate food intake of specific household members, especially women and children, part of any process for policy and programme choice needs to be the assessment of the likely impact of policy on them. Many policies create losers and gainers, and these should be identified.

Food security policy must be sustainable in the broad sense, i.e. in terms of fiscal resources, the preservation of natural resources, and in terms of a conducive political support base. Erratic changes in policy misguiding food insecure households can do more harm than doing nothing. While in any specific country and at any specific time, the best mix of policies may not be clear, this is no longer an acceptable excuse for delayed action.

C. NUTRITION AND INFECTIOUS DISEASE CONTROL

The interaction of infection and nutrition as a cause of mortality and severe morbidity in children is well documented, and has a disproportionately high impact on lower socio–economic groups. Addressing infectious disease is thus a second essential part of actions to improve nutrition. Malnutrition and infection form a cycle. Here, nutrition actions as they affect infectious disease in terms of prevention and management are discussed in some detail. Infectious disease control itself is so important – both in its own right and in relation to nutrition – that it is also included under this heading.

Because malnutrition and infection interact and are closely linked, it is relevant to talk about a "malnutrition–infection complex". Of the about 13 million infants and children who currently die each year in developing countries, most of the deaths are due to infections and/or parasitic disease, and many if not most of the children die malnourished. The malnutrition and infection complex remains the most prevalent public health problem in the world today[21].

The principles underlying malnutrition and infection can be summarized as follows. Inadequate dietary intake leads to low nutritional reserves, which are manifested as weight loss or failure of growth in children. Depleted nutritional reserves are associated with a lowering of immunity, probably with almost all nutrient deficiencies. Particularly in protein–energy and vitamin A deficiencies there may be progressive damage to mucosa, lowering resistance to colonization and invasion by pathogens. Lowered immunity and mucosal damage are the major mechanisms by which defences are compromised. Under these circumstances, the incidence, severity, and duration of diseases may be increased. The relative importance of these three factors is not fully worked out under all conditions. The disease processes themselves exacerbate loss of nutrients, both by the host's metabolic response, and by physical loss from the intestine. These factors themselves worsen the malnutrition, leading to further damage to defence mechanisms. At the same time, many diseases are associated with a loss of appetite, and other possible disabilities, cycling back to further lower the dietary intake. While other relationships play a part, these are some of the most important, and account for much of the high morbidity and mortality under circumstances of high exposure to infectious disease and inadequate diet, characterizing many poor communities.

Control of infectious disease, and dietary/nutrition interventions to promote this process, are thus of major importance in cutting into the cycle of malnutrition and infection. Controlling infectious disease through primary health care is a major priority of the health sector. Concern for nutrition only reinforces this priority. It is worth noting that prevention and management of infection is particularly important in malnourished communities: for example, measles immunization would be expected to save more lives in malnourished communities than in those better off.

Dietary interventions during and immediately after infectious disease can affect the course and effects of the disease, and reduce the extent to which nutritional status suffers. Nutrition is thus relevant to disease *management*. Adequate nutrition maintains immunity and other protection against disease, so that nutritional or dietary interventions can be important in *prevention*; indeed, it has been claimed that longer–term trends (over decades) towards improved health in many countries are basically due to the preventive effect of better nutrition[22].

Interventions during management of infection often fall naturally within the existing concerns of the health sector – as examples in combatting anorexia, and in maintaining dietary intake during persistent diarrhoea. Nutritional interventions for prevention may or may not be through the health sector; for example the social services are responsible in some countries.

In sum, policies to improve nutrition necessarily include control of infectious disease. Often, they will reinforce priorities that are already accepted: for example, the prime importance of breastfeeding needs to be promoted through the health and other sectors. Equally, nutrition considerations would support the priority given to environmental sanitation, housing, as well as measures such as immunization, oral rehydration, parasite control, etc. Within these conventional health measures, nutrition considerations may have a part to play in terms of targeting and monitoring and evaluation of outcomes.

Concern with nutrition improvement may be particularly usefully translated into action by emphasis on feasible, usually incremental, actions incorporated within services. These are stressed here, not least because of their obvious relation to nutritional concerns, and the fact that they may get lost sight of in sectoral planning. The scope for action is discussed later as specific strategies for tackling malnutrition and infection in the context of primary health care and its support systems, under three main headings:

- dietary *management* of infection
- dietary *prevention* of infection
- infectious disease control to improve nutrition.

Growth monitoring is important for all three aspects and should be promoted for individual problem detection, for communication with mothers and communities, for assessing progress, and for other reasons[23].

Setting for Action

While the control of infectious diseases is accorded a high priority within health departments, effective programmes are complex, costly and difficult to implement Furthermore, to be most effective they require substantial contributions from sectors other than health. Financing of the health sector is traditionally assigned a low priority in developing countries with market economies. Within limited health budgets, a high proportion of funds is allocated to hospital–based curative care, involving major capital and recurrent costs and leaving only minor resources for the development of preventive programmes. Limitations of health infrastructure result in low overall coverage which in turn limits the reach of primary health care programmes and their infectious disease control components.

The control and prevention of infection should be central to health policy in developing countries where infectious disease morbidity is the major component of hospital admission. Primary health care programmes give clear priority to a range of services and activities designed to reduce the incidence and severity of common infections. While infectious disease is a clear priority for the health sector, a number of the principal interventions for its control are the responsibility of other sectors. Adequacy and safety of water supply, sanitation and housing are usually substantially determined by public works departments and local authorities.

The interaction between infection and malnutrition has an overwhelming impact on those who are poorest in social, economic and environmental terms and is the major cause of death, sickness and disability in infants and young children as well as being an important contributor to ill–health and reproductive problems of their mothers. Its occurrence is the single most powerful expression of the biological consequences of poverty and disadvantage. Reduction of the frequency and severity of infection in the long–term requires addressing poverty and deprivation within the broader framework of economic growth and social development In the context of this paper, such an approach includes the improvement of household food security, environmental hygiene, child caring capacity, and the empowerment of women. These are discussed in sections B and D. Micronutrient deficiency control programmes are covered further in section E.

Dietary Management of Infection

Dietary management seeks to modify the course and outcome of infection by the improvement of food intake during disease and recovery, particularly in young children. This is applied principally through education programmes enabling mothers and carers to acquire and apply the necessary food resources and skills in an effective manner. The education may be formal, through the school system for example, but importantly includes information and counselling through health care workers. Under a number of circumstances, supplementary food, micronutrient supplements, and technologies such as for fermented and amylase–rich foods may be supplied as part of the services. A brief list of possible actions, related as appropriate to specific common diseases follows.

i) Continuation of breastfeeding during infections This applies to all infections, but with particular force to diarrhoea, measles, respiratory tract infections, and malaria. In children up to four to six months of age, exclusive breastfeeding if recommended. During episodes of diarrhoea, continued exclusive breastfeeding (with increased frequency and duration of feeds if possible) is the most important nutritional aspect of management If such infants nonetheless become dehydrated, rehydration therapy may be required. When breastfeeding is maintained during diarrhoea, the growth faltering commonly associated with diarrhoea is rarely seen, and the risk of death is minimized. Continued breastfeeding, as required with increased frequency, is also central to the management of other acute infections, such as measles and acute respiratory tract infections, of which pneumonia is the most serious. In children older than four to six months, continued partial breastfeeding is of similar importance, and its continuation during episodes of infection should be emphasized.

ii) Maintenance of diet during infection, especially persistent diarrhoea, including both active and recovery (catch–up) phases Maintaining supplementary foods in young children (above four to six months of age) during the course of infection, and increasing intake during the recovery period, is essential. This is made more difficult by the anorexia that commonly accompanies infectious disease, and by the low energy density of many weaning foods. The mistaken view that is still prevalent in some communities that dietary intake should be restricted during infection is particularly pernicious, and needs to be vigorously counteracted. In this context, not only is encouragement to continue feeding required, but promotion of methods that increase the energy density of palatable diets should be stressed – there is considerable potential for use here of fermented foods (often along traditional lines) and use of amylase–rich flours to reduce bulk. Supply of supplementary foods may also be a means of increasing food intake during these critical periods.

iii) Administration of vitamin A in the management of measles, acute respiratory infections, etc.[24] In areas where vitamin A deficiency exists particularly during and in the immediate post–infection phases of measles and respiratory tract infections, vitamin A supplementation has been shown to be effective in reducing case–fatality, preventing further infection and promoting recovery. This may be accomplished by counselling for vitamin A–rich foods in the diet, and often can also be effectively achieved by direct provision of vitamin A supplements.

iv) Use of oral rehydration therapy in treatment of acute diarrhoea This intervention is well known and widely applied, and has relevance to nutrition not only in the management of the disease itself, but very possibly in counteracting anorexia, thus enabling more successful application of the interventions mentioned here. Home–prepared fluids (e.g. gruels) for treating dehydration may be considered.

v) Dietary support in chronic infections With diseases such as tuberculosis, leprosy and AIDS, attention to maintaining adequate dietary intake forms an important part of the management Methods in young children are similar to those discussed above, including continuation of breastfeeding, and provision of higher energy density and palatable foods, and emphasis on frequency of feeding.

vi) Iron and malaria Malaria is frequently associated with iron–deficiency anaemia, and the interactions are complex. However, current evidence is that *oral* administration of iron during the treatment of malaria, in moderate doses, is valuable. This will help enhance immunity, and the benefits of oral supplementation are considered to outweigh the risks which are peculiar to malaria since the parasite requires iron for multiplication.

vii) Other micronutrient deficiencies Multiple micronutrient deficiencies are commonly associated with infectious disease and have particularly been implicated in acute respiratory infections (notably zinc, iron, and possibly vitamin D). Due attention to micronutrient status during management is appropriate.

viii) Intestinal parasites Infection with intestinal parasites is frequently associated with malnutrition, and the potential for integrating parasite control and nutrition programmes is clear. In this context, where intestinal parasite infestation is prevalent, parasite control programmes may usefully include food supplementation, and *vice versa.*

ix) Effective nursing/caring during sickness in the family In effect, many of the interventions discussed here depend upon family members and helpers. To be effective these may need counselling and support to care for sick children during infection, and importantly in the nutritional context to promote their rapid catch−up during the recovery phase. Emphasis on providing the appropriate information through all available channels is required, because this aspect is frequently overlooked in the delivery of health and nutrition programmes.

Dietary Prevention of Infection

Dietary prevention seeks to reduce the frequency and severity of infection by ensuring a safe and nutritionally adequate diet and limiting energy expenditure, to protect nutritional status. Good nutritional status prevents infection by a number of mechanisms, notably through the immune system and maintaining the integrity of epithelial tissues. Again, education and information are important means of implementation. Specific interventions through the health system may also be needed. Dietary prevention of infection includes promoting or ensuring the following.

i) Exclusive breastfeeding for four to six months Exclusive breastfeeding helps to prevent diarrhoea by minimizing the infant's exposure to diarrhoeal pathogens, which are common in other foods and in water. At the same time, breast milk provides anti−bacterial activity in the infant's gut, reducing the risk of disease if contaminants should be ingested. Similarly, breastfeeding has direct benefits in preventing other diseases, from acquired passive immunity from the mother. It also probably prevents malnutrition, not only secondarily to diarrhoea, through the cycle of suckling promoting production of maternal milk.

ii) Continued breastfeeding into the second year of life Continued breastfeeding promotes prevention of disease through protection of nutritional status, as well as some continuing direct protection against infectious disease. Indirect effects are also important, through birth spacing.

iii) Satisfactory quality and intake of complementary foods A number of issues arise here, concerning energy density, nutritional value, and food hygiene. It is essential to promote frequent feeding of foods of adequate energy density (including use of amylase−rich flours). Microbial contamination may be reduced using fermented foods. Good feeding practices may be promoted through education, and in some circumstances, perhaps notably in urban areas, special weaning foods may be marketed.

iv) Vitamin A status in relation to measles and respiratory tract infections Vitamin A supplements are indicated in all populations at high risk from measles where vitamin A deficiency exists. Measles precipitates vitamin A deficiency, and the disease is worsened in the deficient individual. There is also accumulating evidence that vitamin A deficiency increases risks of developing respiratory diseases, and that children who are vitamin A deficient are more likely to suffer from chronic ear infections. Thus prevention of vitamin A deficiency is particularly important to reduce the incidence and severity of respiratory tract infections, of which pneumonia is the most serious. In general terms, preventing vitamin A deficiency by dietary improvement, fortification and/or supplementation is expected to ameliorate infectious disease, through effects on immunity and on epithoreal tissues.

v) Prevention of low birth weight Improving women's nutritional status, especially pre−and during pregnancy, is important not only for the nutrition of women but in preventing low birth weight (especially intra−uterine growth retardation) and subsequent likely higher risks of malnutrition, morbidity and mortality in the offspring. A number of interventions to improve women's nutrition are mentioned in section D, and those that are particularly relevant in this context include maternal supplementation, reduction of energy expenditure, and family planning, with particular reference to adolescent mothers. Low birth weight infants are considered to be at particular risk of respiratory tract infections, thus reducing low birth weight may have this specific benefit of reducing RTIs.

vi) Iron and malaria As for management of malaria and anaemia, there are complex issues concerning iron supplementation in malaria endemic areas. In general, *oral* iron should be administered to all pregnant women under malaria chemoprophylaxis; however this issue

does not arise for the population in general, since malaria chemoprophylaxis is no longer recommended on a population basis, at least for young children, in situations where there is inadequate assurance that it can be maintained in the long–term. Where malaria chemoprophylaxis cannot be administered systematically, it is nonetheless expected that iron supplementation under these conditions would be of benefit, due to the immune effect relating to malaria, as well as through improving anaemia. In general, assuring adequate iron status will have widespread public health benefits, reducing anaemia and improving immunity.

Infectious Disease Control

Control of infectious diseases which will improve nutrition and have other benefits, is widely described[25]. The main point to emphasize here is that concern for nutrition inevitably includes priority for infectious disease control.

Controlling infectious diseases involves improving the health environment, and assuring access to adequate health services – indeed all the factors encompassed under the concept of primary health care. In the context of child malnutrition, particular emphasis may be appropriate to programmes of immunization (EPI), controlling respiratory infections, malaria, schistosomiasis, and intestinal parasites. At the same time, promoting the early diagnosis and treatment of infection in children and mothers (especially during pregnancy) by primary care services has a central role. Of the specific disease programmes in relation to malnutrition and young children, those that address diarrhoeal disease, not only acute diarrhoea for which rehydration is important, but also persistent diarrhoea for which dietary management is of particular importance, must be stressed.

Measurement Issues

Malnutrition and infection can be measured by well–established methods, including anthropometry often as growth monitoring[26]. Assessing the processes outlined in this section is also relatively straightforward in principle, from service or administrative sources in some cases, otherwise from household surveys. Some relevant indicators are proposed below; those generally only available from household surveys are designated (S), although data availability (and reliability) from service or administrative sources will vary greatly and may also require special surveys.

For assessing *management* of infectious diseases, the following indicators (usually as percentages) may be important; case fatality rates by disease e.g. diarrhoea, pneumonia, measles; measles cases given vitamin A; individuals with chronic diseases given food and/or micronutrient supplements; proportion of mothers breastfeeding during child's illness (S); feeding patterns and frequency during child's illness (S); aspects of child care during illness including use of oral rehydration therapy (S).

For assessing *prevention*, the following indicators should be considered: incidence of low birth weight; age at first pregnancy; proportion of short birth intervals (e.g. less than 24 months); contraceptive prevalence rates. Other important information may be obtained from such data as: proportion of infants exclusively breastfed for four to six months (S); feeding frequency, weaning food preparation, with respect to both quantity and quality (S); vitamin A supplementation and disease–specific mortality (S).

Infectious disease control is assessed by a number of standard methods, generally involving household or individual surveys, which would include: immunization coverage rates; coverage of programmes for control of diarrhoeal disease, acute respiratory infections, parasites; proportion of individuals receiving effective primary treatment of infections.

Related Policies

The prevention and control of malnutrition/infection requires substantial inputs from other sectors than health to be effective. The priorities of those sectors may not be compatible with those of the health sector in terms of nature, area, targeting or timing; some examples follow. Physical planning and housing policies determine the adequacy of the physical (and often social) environment and the degree of overcrowding. The redevelopment of urban slums is a costly and sometimes disruptive process, and the extension of water and

sanitation to temporary settlements often conflicts with longer term plans for permanent developments. Crowded education curricula may not permit the introduction of health education within official school hours and teaching staff may not live in the community. Agricultural policy which encourages commercial cash cropping may have adverse effects on nutrition if income increases are not translated into improved diet and better quality care. Irrigation schemes can markedly extend the distribution of schistosomiasis. Changes in agricultural patterns resulting in greater involvement of women and children can affect health care and exposure to infectious diseases (e.g. malaria, hookworm). Development of a more stable society and infrastructure can have a direct effect on infectious disease transmission (.e.g. STDs).

D. CARING CAPACITY

A major factor in determining nutrition in poor households is the use of available resources, especially for provisioning food, and maintaining of health in the face of unsanitary conditions. This applies with particular force to children and mothers. Another way to say this is that, given certain levels of household food security, health environment and access to services, much depends on how the individuals in the household, especially the women, *cope* with their situation. Many of the underlying factors (e.g. women's education, skills, and time) and immediate linkages with nutrition (e.g. maternal health, breastfeeding) can be addressed by public policies, and must be to successfully alleviate malnutrition. Others lie in the realm of social organization, role patterns, and the division of labour in the individual household. This series of issues has been grouped under the heading of “caring capacity”. The definition suggested is as follows.

“Care” in general refers to the provision in the household and the community, of time, attention and support to meet the physical, mental and social needs of the growing child and other family members. It leads to the optimal use of human, economic and organizational resources. At an extreme, lack of “care” is neglect. In the context of nutrition, most importantly it facilitates:

> *– optimal use of household food resources for child feeding;*
>
> *– optimal use of parental (or other) resources to protect from infection, and care for the sick child, or other vulnerable members of society (e.g. the disabled, elderly).*

More generally it includes nurturing the full psychological and emotional well–being, which are goals in themselves, and which in turn may benefit nutrition and health.

The underlying theme of “care” has above all to do with women's role and resources – although “parental” care including that of the father and other relatives should be included. The major underlying issues affecting “care” are for women, knowledge, time, and control over economic resources, including income. At the same time, caring capacity at the level of family and community needs to be stressed; the priorities suggested here can apply at different levels.

Issues specific to maternal and child nutrition include breastfeeding and infant care, complementary feeding practices including energy density of foods, food quality, feeding frequency, etc.; as well as direct interventions to improve women's health and nutrition.

A good example of the levels of care and support that may be required are those needed for optimal breastfeeding. Breastfeeding women need: i) emotional support and appropriate information from family, community and/or health workers if any problem with breastfeeding occurs, ii) appropriate support and information any time they have contact with the health care sector: prenatally, at the time of delivery, during the early weeks of lactation, and even during the second year of life and beyond, iii) maternity benefits appropriate to their working situation, in many cases including paid leave for at least four months and a creche near the place of work.

Setting for Action

Caring capacity mediates the effects of household food security and the health environment on the nutritional status of women and children. Again, all the relevant factors in this context are objectives in their own right In this case setting priorities depends completely on the current situation: if, for example, women's literacy is low, it needs to be improved for many reasons including nutrition. So does access to family planning, for example.

It is not the aim here to suggest priorities *between* such factors – where there is a need, it should be met for reasons including nutrition, although methods will depend on local circumstances. This contrasts with, for instance, options in the household food security field, where, say, targeted food subsidies may be an *alternative* to public works employment.

Constraints to adequate care can be viewed in general terms as lack of knowledge, lack of time, and lack of control over resources. Some specific options are suggested later in this section. Their relation to nutrition, and certain indicators, is introduced here.

Lack of knowledge is attributable to inadequate access to formal and informal education, (including nutrition, health and family planning) and vocational training. The overall policy is clear ensure access to all channels of knowledge and improve diffusion of new knowledge and awareness of new innovations. This is addressed in item (i) below. Several indicators could be used, including school enrollments, levels of adult literacy and vocational training, visits by extension agents and health workers, knowledge of family planning, child feeding practices.

Lack of time – or excessive work burdens – is another major problem which has worsened over time in some countries as population densities have grown and available resources such as fuel wood and water have decreased. For child nutrition, lack of time is a principal constraint to breastfeeding and effective child rearing practices (e.g. feeding frequency). Several policies could help ease pressures on women's time. These include those relating to appropriate labour–saving technologies for domestic work (e.g. fuel and water collection, food preparation and cooking) as well as policies on family planning and child spacing, child care arrangements for working women, maternity leave, etc. These are mentioned in items (ii), (iii) and (vii) below. Time allocation studies at the household level are a principal means for measuring the work efforts of women. Other indicators such as proportion of households with access to services and infrastructure (e.g. piped water) could be used.

Lack of assets and control of resources both within the family and outside. Evidence suggests that control of household incomes by women tends to have a favourable impact on child health, education and clothing. Female access to resources usually leads to overall improvements in family welfare. Around the world there are successful experiments (e.g. the Grameen Bank in Bangladesh) that widen women's income–earning opportunities. Policies and legislation should aim at improving access to land and livestock ownership. Social security including pensions, maternal benefits to landless, etc. can also be valuable, although these are more difficult to establish in poor societies. Items (iv) through (vii) below refer to this aspect. Assessments should use social and economic data, disaggregated by gender, from surveys (e.g. household budget) and administrative sources.

The relative importance for new policy decisions in these areas will depend both on the current situation and existing policy priorities and budget allocations. In some countries, for example, literacy may be high but women's economic and social security have not yet been addressed.

Scope of Options

The following brief list groups possible interventions that should be considered under different circumstances to alleviate constraints on family – notably women's – coping and to improve the nutrition of all household members.

> *i) Education and literacy* Women's education and literacy affects almost all aspects of their coping or caring capacity. In this context, it determines much of their ability to benefit from all the other policies listed here. While adult education/literacy classes should be a priority, carefully tailored education on child feeding/child care can begin to close the gap created by lack of formal education. Teachers and trainers themselves need access to up–to–date information; better training in nutrition, and investment in the relevant institutions is required. Educational efforts, if designed with the mothers intended to benefit, can improve the understanding and practices of non–literate or low literacy mothers (in areas such as breastfeeding and complementary feeding) to the levels of better–educated mothers.
>
> Although other factors – such as an enabling environment, appropriate legislation, and social security – influence breastfeeding and complementary feeding, perhaps the latter are most importantly affected by women's education and best seen under this heading. Thus,

communicating the importance of exclusive breastfeeding in the early months of life (four to six months), increasing the energy–density of complementary foods (e.g. through use of germinated flour), decreasing contamination (e.g. through fermented foods), maintaining frequent feeding, and similar factors, all depend on education, access to information, and public awareness. In the long run, improved education will contribute to lowered fertility, and better employment opportunities; and these in turn will enhance household food security, health, and caring capacity.

Investments in education particularly of the girl child would have large long–term returns because of her pivotal role (both reproductive and productive) in the future of her own family. Putting back the emphasis on the science of home economics and improving the quality of nutrition education taught at the secondary and tertiary school levels will generally improve the state of knowledge and future caring capacity of the girl child.

ii) Access to health and related services Women's own health and nutrition requires adequate access to publicly–provided services, notably:

– pre–natal and obstetric services.
– family planning services.
– health services in general.

Family planning services need to be seen as having multiple benefit for individuals' health and nutrition. Adequate birth intervals benefit both the youngest child and the unborn baby: too close spacing may result in low birth weight, inadequate capacity for care of the new born and other young children. Equally, the previous child, for example abruptly weaned, is at greater risk. The mother herself may be both biologically depleted from too–frequent births, and burnt–out by too many tasks, including excessive demands for child care. Education on the value of family planning needs to be targeted also towards men, who often wish for more children than their spouses. The benefits of breastfeeding in contributing to longer birth intervals can be stressed in this context.

iii) Technology and infrastructure Demands on women's time are a major constraint. Some of these may be relieved by investment in improved infrastructure and technology. Domestic chores need to be seen as productive work, to be made more efficient. In fact, most feasible labour–saving technologies for unremunerated work will be beneficial. Important examples – depending on local circumstances – include the following:

– supplies of fuel and water enormous amounts of women's time could be spared by reducing the burden of collecting water (by improving water supplies) and of gathering fuel (by provision of more efficient stoves, fuel for cooking, etc.);

– access to health services is usually extremely time consuming: better service outreach, more mobile clinics – as well as improved transport – must be considered; somewhat similar considerations apply to access to markets;

– technical solutions exist for some hygienic problems – e.g. supplies of cleaning materials; piped water and sanitation; and technologies for food storage (including refrigerators where appropriate), etc. – these all free time and improve the household health environment.

iv) Women's property and income rights Legislation to ensure equitable access to property and productive resources is lacking in many societies. Without this, women are not able to care adequately for themselves and their families. Particular issues concern female–headed households (increasing in many communities) and families with migrant bread–winners. Ensuring access to potentially available household resources often requires legislation.

v) Access to credit Growing experience confirms that providing credit facilities to women, even without traditional collateral, is feasible and effective as a means of improving the situation of women and their households. Micro–enterprises which are in the hands of women have been shown to have good credit repayment records in a number of credit schemes in Asia and Latin America. Knowing that women's resources preferentially benefit their children

means that this is an important way of enhancing their caring capacity. Expansion of women's access to production–oriented credit and development of the required institutions, must be pursued in this context.

vi) Employment, home productivity and control of resources It has been quite widely established that the income controlled by women has greater benefit for the family's nutrition than general, or male–controlled, income. Women's control over the household income needs to be enhanced through fostering opportunities for women's employment, and for remuneration of production from household assets. Policies here range from wage employment opportunities, enforcement of minimum wage legislation, to home industries, cropping policies in agriculture, and again education. Such policies should, however, also take into consideration the balance of work outside the home which can conflict with the capacity to provide adequate care for the family.

vii) Social security for women Some aspects have been considered under point ii). It is worth noting that programmes specifically aimed at enhancing food availability and access to health services have been shown to be cost–effective in developed countries (e.g. W.I.C. in the United States). Targeting social security benefits specifically to women is accepted in many developed countries – e.g. supplementary benefits in United Kingdom. Rights to maternity leave are an important policy issue with potentially far–reaching benefits for the health and nutrition of women, and by extension their children. An enlightened evolution of social security policies in countries that can afford them may well usefully consider such specific targeting to women.

E. CONTROLLING MICRONUTRIENT DEFICIENCIES

The priority now being urged for specific programmes to prevent deficiencies of iodine, iron, and vitamin A comes from, first, the increasing understanding of their extent and far–reaching consequences. (Certain other micronutrient deficiencies e.g. those of vitamin D, zinc, fluoride and folic acid may be important problems in certain areas for certain population groups, but are not discussed here.) Mental retardation caused by iodine deficiency; the contribution of iron deficiency to anaemia, hence debilitation and excess mortality particularly in childbirth; and the effect of vitamin A deficiency in causing blindness, and on increased incidence and severity of infection, and possibly mortality – all these have led to a view that the modern world should not tolerate the persistence of these deficiency diseases.

At the same time, the existence of proven and low–cost methods[27] for preventing these deficiencies adds powerfully to the case for controlling them widely and without delay. These options are briefly outlined below.

Iodine

In the long–run, iodine deficiency can be prevented (and has been for many years in most industrialized countries) by fortification of salt with iodine. This normally requires legislation, a centralized salt supply, and the necessary equipment, funding, and distribution systems. This method is being adopted in a number of developing countries, and requires sustained support and trouble–shooting technical problems.

In the interim, vulnerable individuals can be protected using iodized oil, administered by injection or orally. Single injections of iodized oil prevent deficiency for up to 5 years. Administration by mouth probably gives around 12 months protection. Programmes to provide immediate cover are important while fortification is established, particularly in remote areas – and iodine deficiency often is concentrated in these – with particular emphasis on reproductive–age women to prevent mental retardation at birth, in its extreme form causing cretinism.

Iron

Preventing iron deficiency requires increasing the daily intake and absorption of this micronutrient, in contrast to iodine and vitamin A where periodic supplementation can work. Fortification is a long–term option, again

adopted in many industrialized countries, for example using bread or sugar. Dietary change to increase iron intake and – crucial in this case – absorption, can be promoted by various means including public education, and will often gradually occur with economic development, but only slowly. Increased consumption of animal products and sources of vitamin C (to increase absorption) are needed, as well as lowering intakes of absorption inhibitors such as in certain cereal products, which is more difficult.

Distribution of daily supplements of iron tablets (usually ferrous sulphate) is therefore widely necessary to reduce the extent of anaemia, which is immensely prevalent and damaging, particularly in women in poor countries, where prevalences of 50% or more are commonly observed. The success of such programmes on the scale needed depends on a number of factors, many in common with other aspects of health (especially antenatal) care and distribution of essential drugs. Constraints are common in supply and logistics, access to health posts or other distribution points, training of staff and communicating to recipients, adherence to the daily regime, anaemia diagnosis and treatment, and so on. Overcoming these requires sustained support. But the point is that there are no insuperable problems, the supplement itself is cheap and potentially highly cost–effective, and determined efforts to control iron deficiency can be expected to succeed, with enormous benefits especially for poor women.

Vitamin A

Deficiency of vitamin A can be tackled by periodic distribution of large doses (e.g. as capsules every six months), by fortification, and by changing dietary patterns. Here again, both short– and long–term measures may be indicated, depending on circumstances. The benefits include reducing sickness, preventing blindness, and increasing child survival.

For young children in areas of vitamin A deficiency – particularly those at risk of measles – periodic distribution of oral vitamin A doses generally through the health (including immunization) or social services may be an important option. The doses are inexpensive and straightforward to administer. Here again, what is required is the decision to tackle the problem, supplies and distribution, training, public information, and monitoring.

Fortification is technically feasible – of sugar, for instance – although yet to be widely adopted in developing countries (in industrialized countries there is generally enough vitamin A available in the diet and fortification is unnecessary). Nonetheless, this is an option to be considered.

In many countries the overall food supply is adequate in vitamin A and its precursors (in many plant products). The issues are to do with feeding patterns, notably of young children, and absorption; the latter improves with increased intakes of fats and oils. Increased income is associated with better vitamin A nutrition. In the interim success has been achieved through interventions such as nutrition education and promoting vegetable production through home gardens. These constitute useful options especially in areas where the deficiency is particularly common.

As results accumulate of studies currently underway on the effects of vitamin A supplementation on child survival – most so far showing a significant response – it can be expected that even greater attention will be directed to preventing this deficiency. The means exist, and need to be implemented.

NOTES

1. Universal Declaration of Human Rights, 1948, Article 25; International Covenant on Economic, Social and Cultural Rights, 1966; Center for Human Rights, Right to Adequate Food, UN, 1989; Convention for the Rights of the Child, 1990.

2. ACC/SCN (1987) *First Report on the World Nutrition Situation*; ACC/SCN (1988) *Supplement on Methods and Statistics to the First Report on the World Nutrition Situation*, Table A III.

3. See DeMaeyer *et al* (1989) *Preventing and Controlling Iron Deficiency Anaemia through Primary Health Care*, p9. WHO, Geneva; ACC/SCN (1991) *Controlling Iron Deficiency*, State–of–the–Art series No. 9 p4.

4. WHO (1984) The Incidence of Low Birth Weight: an Update. *Wkly Epidem. Rec.* **59**, (27) 202–212.

5. Vitamin A: see ACC/SCN 1987, reference in note 19; Clugston G. (1988) *Proceedings of Regional Meeting on Vitamin A*, Jakarta, p54, WHO.

Iodine: see WHO, 43rd WHA, March 1990, doc A43/4, p14; ACC/SCN (1987) reference in note 2, p40.

6. E.g. UN General Assembly Resolution May 1990, S–18/3 *Declaration on International Economic Cooperation*; UN *Ad Hoc* Committee on the Whole, *International Development Strategy*, August 1990: these stress “eradication of poverty and hunger”.

7. *Strategy for Improved Nutrition of Children and Women in Developing Countries*: UNICEF (1990) Policy Review Paper E/ICEF/1990/1.6, UNICEF, New York; JC 27/UNICEF–WHO/89.4.

8. World Declaration and Plan of Action, World Summit for Children, United Nations, New York, 30 September 1990. See also SCN News No. 6 (1990) p27.

9. Declarations from: Cairo (World Food Council, 1989); Bangkok (Task Force for Child Survival, 1990) and Bellagio, (1990) are available in *Food Policy* **14** (4) 346–358 (1990).

10. Commonly quoted examples are Chile, Costa Rica, Jamaica, Kerala (India), Sri Lanka. See Dreze J. and Sen A. (1989) *Hunger and Public Action,* pp 198–199, 221, 227–253, Clarendon Press, Oxford; Cornia G. *et al* (1987), *Adjustment with a Human Face,* Vols I & II, UNICEF, give further relevant examples, e.g. Botswana, Zimbabwe.

11. Basic Texts of the Food and Agriculture Organization of the United Nations (1980 Edition), quotes the Constitution preamble: “The Nations accepting this Constitution, being determined to promote the common welfare by furthering separate and collective action on their part for the purpose of:

> raising levels of nutrition and standards of living of the peoples under their respective jurisdictions;
>
> securing improvements in the efficiency of the production and distribution of all food and agricultural products;
>
> bettering the condition of rural populations;
>
> and thus contributing toward an expanding world economy and ensuring humanity's freedom from hunger”

12. FAO (1977) *Fourth World Food Survey;* Reutlinger S. and Selowsky M. (1976) *Malnutrition and Poverty. Magnitude and Policy Options.* World Bank; World Bank (1986) *Poverty and Hunger: Issues and Options for Food Security in the Developing Countries.*

13. World Bank (1990) *World Development Report;* UNDP (1990) *Human Development Report;* Dreze J. and Sen A. (1990) *Hunger and Public Action,* Clarendon Press, Oxford.

14. *Food Security in Developing Countries,* IDS Bulletin (1990) 21 (3); see also *Poverty and Hunger* referenced in note 12.

15. Scrimshaw *et al* (1968) *Interactions of Nutrition and Infection,* WHO, Geneva; Tomkins A. and Watson F. (1989) *Malnutrition and Infection,* ACC/SCN State–of–the–Art series No. 5; ACC/SCN Report of 16th Session, 1990, para 12.

16. ACC/SCN (1990) *Women and Nutrition,* State–of–the–Art series No. 6.

17. UNICEF (1990) see note 7.

18. FAO/WHO (1990) *Meeting the Nutrition Challenge.*

19. ACC/SCN (1988) *The Prevention and Control of Iodine Deficiency Disorders,* State–of–the–Art series (SOA) No. 3.

ACC/SCN (1991) *Controlling Iron Deficiency,* SOA No. 9.

ACC/SCN (1987) *Delivery of Oral Doses of Vitamin A to Prevent Vitamin A Deficiency and Nutritional Blindness,* SOA No. 2.

20. See references in note 13.

21. ACC/SCN (1990) *Report of 16th Session,* para 12; also in SCN News No. 6 (1990), p29.

Tomkins A. and Watson F. (1989) *Malnutrition and Infection,* see note 15.

See also SCN News No. 4 (1989) pp 7–11.

22. WHO Features, No. 131, Dec 1988; T. McKeown, *The Origins of Human Disease,* Blackwells, Oxford. See also SCN News No. 4 (1989) pp 17–19.

23. Hendratta L. and Rohde E. (1988) Ten Pitfalls of Growth Monitoring and Promotion, *Indian J. Ped.*, **55** (1); ACC/SCN (1990) *Appropriate Uses of Anthropometric Indices in Children,* State–of–the–Art series No. 7. See also SCN News No. 5 (1990) pp 8–19.

24. WHO (1988) *Vitamin A Supplements: A Guide to their Use in the Treatment and Prevention of Vitamin A Deficiency and Xerophthalmia.*

25. See WHO publications, e.g. in "Health for All" Series; also Bibliography in Tomkins and Watson referenced in note 21.

26. See note 23.

27. See note 19.

LIST OF PARTICIPANTS

ACC/SCN *Ad Hoc* Group Meeting on Policies to Alleviate Underconsumption and Malnutrition in Deprived Areas

London, 12–14 November 1990

Ms R Agble, Ministry of Health, Ghana

Dr K Bagchi, WHO – EMRO, Alexandria Egypt

Dr W Barth Eide, IFAD, Rome

Mr W D Clay, FAO, Rome

Professor D Dapice, Tufts University, USA (rapporteur section B)

Dr M Garcia, ACC/SCN – IFPRI, Washington DC (general rapporteur)

Dr Ghirotti, Ministry of Foreign Affairs, Italy

Dr S R Gillespie, ACC/SCN, Geneva (general rapporteur)

Dr T Greiner, SIDA, Sweden

Dr R Gross, GTZ, Indonesia

Dr A Horwitz, ACC/SCN and PAHO, Washington DC (Chairman)

Dr U Jonsson, UNICEF, New York

Professor J Kevany, Trinity College, Ireland (rapporteur section C)

Dr B Kodyat, Ministry of Health, Indonesia

Professor R Martorell, Food Research Institute, Stanford, USA

Dr J B Mason, ACC/SCN, Geneva (general rapporteur)

Mr S Maxwell, Institute of Development Studies, UK

Ms T C Moremi, Ministry of Finance and Development Planning, Botswana (rapporteur section D)

Dr S Murillo–Gonzales, Costa Rica

Professor P Payne, London School of Hygiene and Tropical Medicine, UK

Dr H Schoeneberger, GTZ, Germany

Professor K Subbarao, World Bank, Washington DC (rapporteur section D)

Dr S Tobon, FINAGRO, Colombia

Professor A Tomkins, Institute of Child Health, UK (rapporteur section C)

Dr H Tabatabai, ILO, Geneva

Dr Venkataramanan, Governor, Reserve Bank of India, Bombay, India

Dr J Von Braun, IFPRI, Washington DC (rapporteur section B)

REFERENCES

Abdullah, M. (1983) *Dimensions of Intra Household Food and Nutrient Allocation: A Study of a Bangladeshi Village.* PhD. thesis, University of London.

Abdullah, M. and Wheeler, E. F. (1985) Seasonal Variation and the Intra–household Distribution of Food in a Bangladesh Village. *Am. J. Clin. Nutr.,* 41, 1305–1313.

Abt Associates of Cambridge (1986) *Massachusetts Study,* Contract no. 200–81–0600, sponsored by the Centers for Disease Control and the Office of Disease Prevention and Health Promotion, PHS, DHHS, 1986.

ACC/SCN (1987) *First Report on the World Nutrition Situation.* United Nations Administrative Committee on Coordination/Sub–Committee on Nutrition.

ACC/SCN (1988) *Supplement on Methods and Statistics to the First Report on the World Nutrition Situation.* United Nations Administrative Committee on Coordination/Sub–Committee on Nutrition. December 1988.

ACC/SCN (1989a) *Update on the Nutrition Situation: Recent Trends in Nutrition in 33 Countries.* United Nations Administrative Committee on Coordination/Sub–Committee on Nutrition.

ACC/SCN (1989b) *Report of Cash Cropping Symposium,* SCN News No. 3.

ACC/SCN (1989c) Suggested Approaches to Nutrition Surveillance with Particular Reference to Structural Adjustment. A Report to the Management Committee of the IFNS Programme.

ACC/SCN (1990a) *Appropriate Uses of Anthropometric Indices in Children,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 7.

ACC/SCN (1990b) Report of the 17th Session of the ACC/SCN, Geneva, July 1990.

ACC/SCN (1990c) Report of the 16th Session of the ACC/SCN, Paris, February 1990.

ACC/SCN (1990d) *Women and Nutrition,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 6.

ACC/SCN (1990e) *Estimates of Flows of External Resources in relation to Nutrition,* mimeo.

ACC/SCN (1991a) *Managing Successful Nutrition Programmes,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 8

ACC/SCN (1991b) *Controlling Iron Deficiency,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 9.

ACC/SCN (1991c) Report of the 18th Session of the ACC/SCN, New York, 25 February – 1 March 1991.

Adair, L.S. *et al.* (1983) Maternal Anthropometric Changes during Pregnancy and Lactation in a Rural Taiwanese Population, *Hum. Biol.,* 55 (4), 771−87.

Adair, L.S. and Pollitt, E. (1985) Outcome of Maternal Nutritional Supplementation: A Comprehensive Review of the Bacon Chow Study. *Am. J. Clin. Nutr.,* 41, 948−978.

Ahmed, R. (1979) *Foodgrain Supply, Distribution and Consumption Policies within a Dual Pricing Mechanism: A Case Study of Bangladesh.* Research Report No. 27. IFPRI: Washington D.C.

Anderson, M.A. (1979) Comparison of Anthropometric Measures of Nutritional Status in Preschool Children in Five Developing Countries, *Am. J. Clin. Nutr.* 32, 2339−2345.

Anderson, M.A., Austin, J.E., Wray, J.D. and Zeitlin, M. (1981) Study I: Supplementary Feeding. In: Austin, J.E. and Zeitlin, M. *Nutrition Intervention in Developing Countries.* 5 vols. Cambridge, Mass.: Oelgeschlager, Gunn and Hain, Inc.

Ashworth, A. and Feachem, R. (1985) Interventions for the Control of Diarrhoeal Diseases among Young Children: Weaning Education, *Bull. WHO.* 63 (6), 1115−1127.

Austin, J.E. *et al.* (1978) Nutrition Intervention Assessment and Guidelines. Report prepared for the ACC/SCN (Cambridge, Mass.: Harvard Institute for International Development)

Bairagi, R. (1980) Is Income the only Constraint on Child Nutrition in Rural Bangladesh?. *Bull. World Health Organisation*, 58 (5), 767−772.

Bairagi, R. (1983) Dynamics of Child Nutrition in Rural Bangladesh. *Ecology of Food and Nutrition,* 13, 173−178.

Balaji, M. and Ramachandran, V.K. (1980) A Report on the Implications of the Food−for−Work Programme and the Employment Guarantee Scheme in Ramanathapuram and Dharmapuri Districts. MIDS, Madras, mimeo.

Bardhan, K. (1987) Women's Work, Welfare and Status. *Economic and Political Weekly,* 20 (50), 2207−2220; 20 (51−2), 2261−69.

Barth Eide, W. (1990) Household Food Security: A “Nutritional Safety Net”. IFAD Discussion Paper, mimeo.

Baumgartner, R.N. and Pollit, E. (1983) The Bacon Chow Study: Analysis of the Effects of Infectious Illnesses on the Growth of Infants. *Nutrition Research,* 3 9−21.

Beaton, G.H. and Ghassemi, H. (1982) Supplementary Feeding Programs for Young Children in Developing Countries. *Am. J. Clin. Nutr.* 35 (4), 864−916.

Becker, S., Black, R.E., Brown, K.H. and Nahar, S. (1986) Relations between Socio−Economic Status and Morbidity, Food Intake and Growth in Young Children in Two Villages in Bangladesh. *Ecology of Food and Nutrition,* 18, 251−264.

Berg, A. (1981) *Malnourished People: A Policy View,* World Bank: Washington D.C.

Berg, A. (1987) *Malnutrition: What Can be Done? Lessons from World Bank Experience,* World Bank Publication, John Hopkins University Press: Baltimore.

Binswanger, H. and von Braun, J. (1991) Technological Change and Commercialization in Agriculture: The Effect on the Poor, *The World Bank Research Observer,* 6 (1), January 1991.

Black, R.E., Brown, K.H. and Becker, S. (1984) Malnutrition is a Determining Factor in Diarrhoeal Duration, but not in Incidence, Among Rural Children in a Longitudinal Study in Rural Bangladesh, *Am. J. Clin. Nutr.* 37, 87–94.

Bouis, H.E. (1991) Dietary Patterns, Income, Food Prices, and Morbidity: An Analysis of Micronutrient Intakes for Philippine Farm Households, IFPRI mimeo.

Briscoe, J. (1979) The Quantitative Effect of Infection on the Use of Food by Young Infants in Poor Countries. *Am. J. Clin. Nutr.* 32, 648–676.

Brown, K.H., Black, R., Robertson, A. and Becker, S. (1985) Effects of Season and Illness on the Dietary Intake of Weanlings during Longitudinal Studies in Rural Bangladesh, *Am. J. Clin. Nutr.* 36, 303–313.

Carloni, A.S. (1981) Sex Disparities in Distribution of Food within Rural Households, *Food and Nutrition,* 7, 3–12.

Cavallo, D. and Mundlak, Y. (1982) *Agriculture and Economic Growth in an Open Economy: The Case of Argentina.* Research Report No. 36. IFPRI: Washington D.C.

Cervinskas, J. and Young, R. H. (1990) *Community Nutrition Research – Making it Rapid. Responsive and Relevant.* International Development Research Centre (IDRC), July 1990.

Chambers, R. (1982) Health, Agriculture and Rural Poverty: Why Seasons Matter, *Journal of Development Studies,* 18 (2), 217–238.

Chambers, R. (1983) Seasonality, Poverty and Nutrition: A Professional Frontier. Paper presented at the EFNAG National Workshop on Poverty and Malnutrition, 7–10 February, Tamil Nadu Agricultural University, Coimbatore, India.

Chambers, R. (1989) Vulnerability, Coping and Policy. *IDS Bulletin,* 20 (2), 1–8.

Chambers, R. (1990) Rapid and Participatory Appraisal for Health and Nutrition. The Silver Jubilee Celebration of the Nutrition Society of India, Hyderabad, December 1–3, 1990.

Chandler, W.U. (1984) Improving World Health: a Least Cost Strategy. *Worldwatch Paper* No. 59, Worldwatch Institute, 1984.

Chaudhury, R.H. (1988) Adequacy of Child Dietary Intake Relative to that of other Family Members, *Food and Nutrition Bulletin,* 10 (2), 26–34.

Chen, L.C., Chowdhury, A.K.M.A. and Huffman, S.L. (1979) Seasonal Dimensions of Energy Protein Malnutrition in Rural Bangladesh: the Role of Agriculture, Dietary Practices and Infection. *Ecology of Food and Nutrition,* 8, 175.

Chen, L.C., Huq, E. and D'Souza, S. (1981) Sex Bias in the Allocation of Food and Family Health Care in Rural Bangladesh, *Population and Development Review,* 7 (1), 55–70.

Chernichovsky, D. and Meesook, O, A. (1984) Patterns of Food Consumption and Nutrition in Indonesia. *World Bank Staff Working Paper No. 670,* World Bank: Washington D.C.

Chinnappa, B.N. and Silva, W.P.T. (1977) Impact of the Cultivation of High Yielding Varieties of Paddy on Employment and Income. In: *Green Revolution?* Farmer, B.H. (ed.) Macmillan: London.

Christian, P., Abbi, R., Gujral, S. and Gopaldas, T. (1989) Socioeconomic Determinants of Child Nutritional Status in Rural and Tribal India, *Ecol. Food Nutr.,* 23 (1), 31–38.

Clark, A. W. (1987) The Social Demography of Excess Female Mortality in India: New Directions. Paper prepared for the BAMENEH/American SSRC Workshop on Excess Female Mortality, Dhaka, January 1987.

Clay, E.J. and Schaffer, B. B. (eds) (1984) *Room for Manoeuvre: An Exploration of Public Policy in Agriculture and Rural Development.* Heinemann: London.

Clay, E.J., Harriss, B., Benson, C. and Gillespie, S.R. (1988) *Food Strategy in India. Report* for U.K. Overseas Development Administration.

Cohen, N., Rahman, H., Sprague, J., Jalil, M.A., Leemhuis de Regt, E. and Mitra, M. (1985) Prevalence and Determinants of Nutritional Blindness in Bangladeshi Children. *World Health Statistics Quarterly,* 38 (3), 317–330.

Corbett, J. (1989) Poverty and Sickness: The High Costs of Ill–Health, *IDS Bulletin* 20 (2), 58–63.

Cornia, G.A., Jolly, R. and Stewart, F. (eds.) (1987) *Adjustment with a Human Face* Volume I: Protecting the Vulnerable and Promoting Growth. Clarendon Press: Oxford.

Crookes, N. and Dyson, T. (1981) Data on Seasonality of Births and Deaths. In: Chambers, R. *et al.* (eds) *Seasonal Dimensions to Rural Poverty,* Francis Pinter: London.

Dasgupta, B. (1977) In: Bayliss–Smith, T.P. (1983) *Energy Flows and Agrarian Change in Karnataka: the Green Revolution at Micro–scale,* Cambridge University Press.

Das Gupta, M. (1987) The Second Daughter: Sex Differentials in Child Mortality, Nutrition and Health Care in Punjab, North India. Paper prepared for the BAMANEH/American SSRC Workshop on Excess Female Mortality, Dhaka, 1987.

Deaton, B.J. (1980) Public Law 480: The Critical Choices. *Am. J. Agric. Econ.* 62 (5), 988–92.

Dijkhuizen, P. (1991) Letter to SCN News No. 7.

Drake, W.D. *et al.* (1980) *Final Report: Analysis of Community–Level Nutrition Programmes. Vol. 1.* Washington D.C. US Agency for International Development.

Dreze, J. and Sen, A. (1990) *Hunger and Public Action,* Clarendon Press: Oxford.

Elson, D. (1990) *Some Issues regarding Women's Role in the Management of Family Resources for the Achievement of Household Food Security and Nutrition,* FAO Nutrition Consultants' Reports Series, No. 83, FAO: Rome.

Esrey, S.A. and Habicht, J–P. (1985) Epidemiologic Evidence for Health Benefits from Improved Water and Sanitation in Developing Countries. *Epid. Rev.* 8, 117–128.

FAO (1987) *The Fifth World Food Survey,* Food and Agriculture Organisation, Rome.

FAO (1989) Report of Annual Conference.

FAO (1990) Report on the Informal Group Meeting on the Sixth World Food Survey, held at FAO headquarters, 2–3 May 1990.

FAO/WHO (1990) *Meeting the Nutrition Challenge,* Framework paper for the International Conference on Nutrition, to be held in December 1992.

Farmer, B.H. (ed.) (1977) *Green Revolution? Technology and Change in Rice Growing Areas of Tamil Nadu and Sri Lanka,* Macmillan: London.

Ferro–Luzzi, A., James, W.P.T. and Waterlow, J.C. (1988) Definition of Chronic Energy Deficiency in Adults. Report of a Working Party of IDECG. *Eur. J. Clin. Nutr.* 969–981.

Field, J.O. (1985) Implementing Nutrition Programs: Lessons from an Unheeded Literature. *Am. Rev. Nutr.* 5, 143–72.

Garcia, M. and Pinstrup–Andersen, P. (1987) *The Pilot Food Price Subsidy in the Philippines: Its Impact on Income, Food Consumption and Nutritional Status.* Research Report No. 61. IFPRI: Washington D.C.

Gavan, J.D. and Chandrasekera, I.S. (1979) *The Impact of Public Foodgrain Distribution on Food Consumption and Welfare in Sri Lanka.* Research Report No. 13. IFPRI: Washington D.C.

George, S. (1977) *How the Other Half Dies: The Real Reasons for World Hunger* (revised edn.) Penguin: Harmondsworth.

George, P.S. (1979) *Public Distribution of Foodgrain in Kerala – Income Distribution, Implications and Effectiveness.* Research Report No. 7. IFPRI: Washington D.C.

George, P.S. (1985) *Aspects of Procurement and Distribution of Foodgrains in India.* Working Paper on Food Subsidies. IFPRI: Washington D.C.

Gillespie, S.R. (1988) The Government of India's Anti–Poverty Programmes: An Evaluation. Annex to Clay, E.J. *et al.* (eds) *op. cit.*

Gillespie, S.R. (1989) *Social and Economic Aspects of Malnutrition and Health Among South Indian Tribals.* PhD thesis, London School of Hygiene and Tropical Medicine, University of London.

Gillespie, S.R. (1990) Institution Building for Nutrition: Development of a Framework and Identification of Indicators for Evaluation. *Food and Nutrition Bulletin,* 12 (2), 103–5.

Gilmore, J.W., Adelman, C.C., Meyer, A.J. and Thorne, M.C. (1980) *Morocco: Aid and Nutrition Education* USAID Project Impact Evaluation Report No. 8, Washington D.C.

Gopalan, C. (1973) Effect of Calorie Supplementation on Growth of Undernourished Children, *Am. J. Clin. Nutr.,* 26, 563–66.

Grantham–McGregor, S. (1984) The Social Background of Childhood Malnutrition. In: *Malnutrition and Behaviour: Critical Assessment of Key Issues,* Nestle Foundation Publication Series, Vol. 4, 358–374.

Greiner, T. (1989) The Building of Nutrition Institutions: A Search for Guiding Principles based on SIDA Experience in Africa. Paper prepared for meeting of Advisory Group on Nutrition, September 1989.

Grown, C. and Sebstad, J. (1989) Introduction: Toward a Wider Perspective on Women's Employment, *World Development,* 17 (7).

Gwatkin, D.R., Wilcox, J.R. and Wray, J.D. (1980) *Can Health and Nutrition Interventions Make a Difference?* Monograph 13, Overseas Development Council: Washington D.C.

Haaga, J.G. and Mason, J.B. (1987) Food Distribution within the Family: Evidence and Implications for Research and Programmes. *Food Policy,* May, 146–160.

Habicht, J–P, Mason, J.B. and Tabatabai, H. (1984) Basic Concepts for the Design of Evaluation during Programme Implementation. In: Sahn, D. and Lockwood, R. (eds.) *Methods for the Evaluation of the Impact of Food and Nutrition Programmes,* UNU, Tokyo, 1–25.

Halstead, S.B., Walsh, J.A. and Warren, K.S. (1985) *Good Health at Low Cost.* Conference Report. Rockefeller Foundation.

Harriss, B.H. (1986) *Meals and Noon Meals in Southern India.* Occasional Paper, School of Development Studies, Norwich.

Harriss, B.H. (1990) The Intrafamily Distribution of Hunger in South Asia. In: Dreze, J. and Sen, A. (eds.) (1990) *The Political Economy of Hunger Vol. I: Entitlement and Well–Being.* Clarendon Press: Oxford.

Heaver, R. (1989) Improving Family Planning, Health, and Nutrition Outreach in India: Experience from Some World Bank–Assisted Programs, *World Bank Discussion Paper No. 59.*

Henry, F. (1981) Environmental Sanitation and Nutritional Status in Infants in Rural St. Lucia, West Indies. *Trans. Roy. Soc. Trop. Med. Hyg.,* 75 (4), 507.

Hetzel, B.S. (1988) *The Prevention and Control of Iodine Deficiency Disorders,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 3.

Hilder, A.S. and Steinhoff, M.C. (1983) RUHSA Nutritional Status and Immunisation Survey: Preliminary Report. CMC Hospital, Vellore, South India.

Holmboe−Ottesen, G., Mascarenhas, O. and Wandel, M. (1989) *Women's Role in Food Chain Activities and the Implications for Nutrition,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 4.

Hornik, R.C. (1985) *Nutrition Education* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 1.

Horwitz, A. (1987) Comparative Public Health: Costa Rica, Cuba, and Chile. *Food and Nutrition Bulletin* 9 (3), 19−29.

Huddleston, B. (1990) FAO's Overall Approach and Methodology for Formulating National Food Security Programmes in Developing Countries. In: *IDS Bulletin,* 21 (3), 72−80.

IDECG (1990) International Dietary Energy Consultancy Group (IDECG) *Annual Report.*

IMF (1990) *Government Finance Statistics Yearbook,* International Monetary Fund, Washington.

ILO (1989) *The Challenge of Adjustment in Africa.* Tripartite Symposium on Structural Adjustment and Employment in Africa, held in Nairobi, 16−19 October, International Labour Organization.

James, W.P.T. with Ferro−Luzzi, A., Isaksson, B. and Szostak, W.B. (1988) *Healthy Nutrition: Preventing Nutrition−Related Diseases in Europe* WHO Regional Publications, European Series, No. 24.

Jeffery, R. (1985) *Health and the State in India,* PhD. thesis, University of Edinburgh.

JNSP (1989) *The Joint WHO/UNICEF Nutrition Support Programme in Iringa, Tanzania: 1983−1988 Evaluation Report,* The Government of the United Republic of Tanzania, the World Health Organization, and the United Nations Children's Fund.

Jonsson, U. (1988) A Conceptual Approach to Understanding and Explanation of Hunger and Malnutrition in Society. In: *Hunger and Society,* Cornell International Monograph Series 17. Ithaca, New York: Cornell University Program in International Nutrition.

Jonsson, U. and Toole, D. (1991) Household Food Security and Nutrition: A Conceptual Analysis, UNICEF mimeo.

Kabeer, N. (1990) Women, Household Food Security and Coping Strategies. In: *Women and Nutrition* (ACC/SCN 1990e) *op. cit.*

Karim, R., Majid, M. and Levinson, F.J. (1980) The Bangladesh Sorghum Experiment. *Food Policy* 5 (1), 61−63.

Katona−Apte, J. (1988) Coping Strategies of Destitute Women in Bangladesh, *Food and Nutrition Bulletin,* 10 (3), 42−47.

Kennedy, E.T. and Alderman, H.H. (1985) *Comparative Analyses of Nutritional Effectiveness of Selected Interventions.* ACC/SCN State−of−the−Art Project.

Kennedy, E.T. and Alderman, H.H. (1989) Comparative Analyses of the Nutritional Effectiveness of Food Subsidies and Other Food−related Interventions: Conclusions, *Food and Nutrition Bulletin,* 11, (1), 74−76.

Kennes, W. (1990) The European Community and Food Security. In: *IDS Bulletin,* 21 (3), 67−71.

Kumar, S.K. (1978) Role of Household Economy in Child Nutrition at Low Incomes: A Case Study in Kerala. *Occasional Paper* No. 95, Dept. of Agricultural Economics, Cornell University.

Kumar, S.K. (1979) *Impact of Subsidised Rice on Food Consumption and Nutrition in Kerala.* Research Report No. 5. IFPRI: Washington D.C.

Kumar, S.K. (1983) A Framework for Tracing Policy Effects on Intra–household Food Distribution. *Food and Nutrition Bulletin,* 5 (4), 13–16.

Kumar, S. (1987) The Nutrition Situation and its Food Policy Links. In Mellor, J., Delgado, C. and Blackie, M. (1987) *Accelerating Food Production in Sub–Saharan Africa.* Baltimore: Johns Hopkins University Press.

Lawrence, M. (1987) Fat Gain during Pregnancy in Rural African Women: the Effect of Season and Dietary Status, *Am. J. Clin. Nutr.,* 45, 1442–1450.

Leslie, J. and Paolisso, M. (eds.) (1989) *Women, Work and Child Welfare in the Third World,* AAAS Selected Symposia Series 110; Westview Press: Boulder, Colorado.

Levinson, J.F. (1978) *"Morinda": An Economic Analysis of Malnutrition Among Young Children in Rural India,* Cornell/MIT International Policy Series, Cambridge, USA.

Lipton, M. (1983) *Poverty, Undernutrition and Hunger,* World Bank Staff Working Paper No. 597, Washington D.C.

Lipton, M. and de Kadt, E. (1988) *Agriculture–Health Linkages,* WHO Offset Publication No. 104, Geneva.

Lipton, M. and Longhurst, R. (1989) *New Seeds and Poor People,* Unwin Hyman: London.

Longhurst, R. and Payne, P.R. (1981) Seasonal Aspects of Nutrition, In: *Seasonal Dimensions to Rural Poverty,* Chambers, R., Longhurst, R. and Pacey, A. (eds), Frances Pinter: London.

Longhurst, R. (1988) Cash Crops and Food Security, *IDS Bull.,* 19 (2), 28–36.

Lotfi, M. (1988) Growth Monitoring: A Brief Literature Review of Current Knowledge. *Food and Nutrition Bulletin,* 10, (4), 3–10.

Lutter, C.K. *et al.* (1989) Nutritional Supplementation: Effects on Child Stunting because of Diarrhoea, *Am. J. Clin. Nutr.* 50, 1–8.

Mahler, H. (1981) The Meaning of Health for All by the Year 2000. *World Health Forum,* 2, 5–22.

Manoff International Inc. (1984) *Nutrition Communication and Behaviour Change Component: Indonesian Nutrition Development Program. Vol. 4, Household Evaluation.* Manoff International Inc.: New York.

Manoff, R.K. (1987) Nutrition Education: Lessons Learned. In: Price Gittinger *et al. op. cit.*

Martines, J.C., Habicht, J–P, Ashworth, A. and Kirkwood, B.R. (1989) Exclusive Breastfeeding and Growth: When should Supplements be Introduced?, In preparation.

Martorell, R., Yarbrough, C., Yarbrough, S. and Klein, R.E. (1980) The Impact of Ordinary Illnesses on the Dietary Intakes of Malnourished Children. *Am. J. Clin. Nutr.* 33, 345–350.

Martorell, R., Klein, R.E. and Delgado, H. (1980) Improved Nutrition and its Effects on Anthropometric Indicators of Nutritional Status, *Nutr. Rep. Inter.,* 22 (2), 219–230.

Martorell, R. Leslie, J. and Moock, P.R. (1984) Characteristics and Determinants of Child Nutritional Status in Nepal, *Am. J. Clin. Nutr.* 39, 74–86.

Martorell, R., Rivera, J. and Lutter, C.K. (1990) Interaction of Diet and Disease in Child Growth. In: Atkinson, S.A. *et al.* (eds.) *Breastfeeding, Nutrition, Infection and Infant Growth in Developed and Emerging Countries* ARTS Biomedical Publishers and Distributors, St. John's, Newfoundland, Canada.

Mason, J.B., Habicht, J–P, Tabatabai, H. and Valverde, V. (1984) *Nutritional Surveillance,* World Health Organization, Geneva.

Mason, J.B. (1988) Nutrition Surveillance: Extension at Country Level and Required Indicators. Paper prepared for AID workshop, 20–22 April, 1988, Annapolis, USA.

Mata, L. (1978) *The Children of Santa Maria Cauque. A Prospective Field Study of Health and Growth.* MIT Press: Cambridge, Mass.

Mata, L. and Rosero, L. (1988) *National Health and Social Development in Costa Rica: A Case Study of Intersectoral Action,* Technical Paper No. 13. PAHO, Washington D.C.

Mata, L. (1989) National Nutrition and Holistic Care Programme (NNHCP), Costa Rica. Report to workshop on "Managing Successful Nutrition Programmes", Seoul, Korea, August 1989 In: ACC/SCN (1991) *op. cit.*

Maxwell, S. (1989) National Food Security Planning: First Thoughts from Sudan. In: Maxwell, S. (ed.) *To Cure all Hunger,* ITDG Press.

Maxwell, S. and Fernando, A. (1989) Cash Crops in Developing Countries: The Issues, the Facts, the Policies, *World Development,* 17, (11), 1677–1708.

Maxwell, S. (1990) Food Security in Developing Countries: Issues and Options for the 1990s. In: *IDS Bulletin,* 21 (3), 2–13.

Maxwell, S. and Belshaw, D. (1990) Food for Development: New Roles for Food Aid in Ethiopia, *Report of the World Food Programme Food for Development Mission,* mimeo, Addis Ababa and Rome.

McGuire, J.S. and Austin, J.E. (1987) *Beyond Survival: Children's Growth for National Development,* UNICEF: New York.

McGuire, J.B. and Popkin, B. (1988) Increasing Women's Resources for Nutrition in Developing Countries. Paper prepared for 15th session of the ACC/SCN, New York, February 1989.

McKeown, T. (1988) *The Origins of Human Disease.* Blackwell: Oxford.

Merchant, K. (1990) Women's Nutrition through the Life Cycle: Social and Biological Vulnerabilities, ACC/SCN mimeo.

Minhas, B.S. (1990) On Estimating Inadequacy of Energy Intakes: Revealed Food Consumption Behaviour versus Nutritional Norms. Paper presented at a World Bank seminar, September 1990.

Mora, J.O. *et al.* (1981) The Effects of Nutritional Supplementation on Physical Growth of Children at Risk of Malnutrition, *Am. J. Clin. Nutr.,* 34, 1885–1892.

Mukerji, K. (1974) In: Bayliss–Smith, T.P. (1983) *Energy Flows and Agrarian Change in Karnataka: The Green Revolution at Microscale,* Cambridge University Press.

Nabarro D. (1984) Social, Economic, Health and Environmental Determinants of Nutritional Status: A Case Study from Nepal, *Food and Nutrition Bulletin,* 6, 1, 18–32.

Ochoa, M. (1984) The Colombian Food Coupon System: Design, Results, Nutritional Impact and Political Considerations, IFPRI mimeo.

Orr, E. (1972) The Use of Protein–Rich Foods for the Relief of Malnutrition – An Analysis of Experience, *Tropical Products Institute Report* (also FAO *Food and Nutrition* 1977)

Oshaug (1988) personal communication. *In:* Barth Eide, W. (1990) *op. cit.*

Osmani, S.R. (1990) Nutrition and the Economics of Food: Implications of Some Recent Controversies. In: Dreze J. and Sen A. (eds.) *The Political Economy of Hunger, Vol. I: Entitlement and Well–Being,* Clarendon Press: Oxford.

Pacey, A. (1981) Taking Soundings for Development and Health, FHE/81.2/Rev. 1 Geneva, WHO.

Palmer, I. (1972) The New Rice in Indonesia. In: *The New Rice in Asia: Conclusions from Four Country Studies*, Palmer, I. (ed.) UNRISD: Geneva.

Paolisso, M., Baksh, M. and Conley Thomas, J. (1989) Women's Agricultural Work, Child Care and Infant Diarrhoea in Rural Kenya. In: Leslie, J. and Paolisso, M. (eds.) *Women, Work and Child Welfare in the Third World* p217–230 (*op. cit.*)

Payne, P.R. (1985) Public Health and Functional Consequences of Seasonal Hunger and Malnutrition. Paper prepared for Workshop on Seasonal Causes of Food Insecurity, Policy Implications and Research Needs, London School of Hygiene and Tropical Medicine.

Perera, D.A. (1983) The Nutritional Status Surveys of Preschool Children in Sri Lanka. 14–51. In: Government of Sri Lanka (1983) *Nutritional Status: its Determinants and Intervention Programmes.* Colombo Food and Nutrition Policy and Planning Division, Ministry of Plan Implementation.

Phillips, T.P. and Taylor, D.S. (1990) Food Security: An Analysis of the SEARCA/Guelph Survey. Paper presented at the 2nd Annual workshop on Data Management for Rural Development, Los Banos, Philippines, 22–25 January 1990.

Pinstrup–Andersen, P. and Hazel, P.B.R. (1985) The Impact of the Green Revolution and Prospects for the Future. *Food Review International* 1 (1), 1–25.

Pinstrup–Andersen, P. (1987) Food Prices and the Poor in Developing Countries, 282–292. In: Price Gittinger *et al. (op. cit.)*

Popkin, B.M. and Solon, F.S. (1976) Income, Time, the Working Mother and Child Nutriture, *Environmental Child Health,* August 1976, 156.

Popkin, B.M. (1980) Time Allocation of the Mother and Child Nutrition. *Ecology of Food and Nutrition*, 9, 1–14.

Prahlad Rao, N. (1980) Determinants of Nutritional Status in India. In: Binswanger, H.P. et al. (eds) *Rural Household Studies in Asia.* Singapore University Press.

Prentice, A.M., Whitehead, R.G., Roberts, S., Paul, A.A., Watkinson, M. (1980) Dietary Supplementation of Gambian Mothers and Lactational Performance. *Lancet ii)* 886–888.

Prentice, A.M. (1983) Prenatal Dietary Supplementation of African Women and Birth Weight. *Lancet,* 489–492.

Prentice, A.M. *et al.* (1987) Increased Birthweight after Prenatal Dietary Supplementation of Rural African Women, *Am. J. Clin. Nutr.,* 46, 912–925.

Price–Gittinger, J., Leslie, J. and Hoisington, C. (1987) *Food Policy: Integrating Supply, Distribution and Consumption.* John Hopkins University Press: Baltimore.

Pryer, J. (1989) When Breadwinners Fall Ill: Preliminary Findings from a Case Study in Bangladesh, *IDS Bulletin* 20 (2), 49–58.

Quanine, J. (1990) Women and Nutrition: Grameen Bank Experience. In: *Women and Nutrition,* ACC/SCN (1990e), *op. cit.*

Quinn, V., Cohen, M., Mason, J.B. and Kgosidintsi, B.N. (1988) Crisis–proofing the Economy: The Response of Botswana to Economic Recession and Drought, In: Cornia, G.A., Jolly, R. and Stewart, F. (eds.) *Adjustment with a Human Face: Ten Country Case Studies (Vol. II),* UNICEF, Clarendon Press: Oxford.

Rajagopalan, S. and Kymal, P.K. (1981) Births, Work and Nutrition in Tamil Nadu, India. In: Chambers, R. *et al.* (eds) *Seasonal Dimensions to Rural Poverty,* Francis Pinter, London.

Reutlinger, S. (1987) The Nutritional Impact of Agricultural Projects, 153–65. In: Price–Gittinger *et al. (op. cit.)*

Roberts, S.B. (1982) Seasonal Changes in Activity, Birthweight and Lactational Performance in Rural Gambian Women, *Trans. Roy. Soc. Trop. Med. Hyg.,* 76 (5), 668–78.

Rosero–Bixby, L. (1986) Infant Mortality in Costa Rica: Explaining the Recent Decline. *Study Fam. Plan.* 17, 57–65.

Rowland, M.G.M. Cole, T.J. and Whitehead, R.G. (1977) A Quantitative Study into the Role of Infection in Determining Nutritional Status in Gambian Village Children. *Br. J. Nutr.* 37, 441–450.

Royston, E and Armstrong, S. (1989) (eds.) *Preventing Maternal Deaths,* World Health Organization, Geneva.

Rutishauer, I.H.E. and Whitehead, R. (1972) Energy Intake and Expenditure in 1–3 year old Ugandan Children living in a Rural Environment. *Br. J. Nutr.* 28, 145–52.

Ryan, J.G. Bidinger, P.D., Prahlad Rao, N. and Pushpamma, P. (1984) *The Determinants of Individual Diets and Nutritional Status in Six Villages of South India,* Research Bulletin No. 7. ICRISAT Economics Programme, Hyderabad.

Schaffer, B. (1984) Towards Responsibility: Public Policy in Concept and Practice, 142–190. In: Clay, E. and Schaffer, B., *op. cit.*

Scrimshaw, N.S. Taylor, C.E. and Gordon, J.E. (1968) Interactions of Nutrition and Infection, *WHO Monograph Series No. 37.*

Scrimshaw, S. and Hurtado, E. (1987) *Rapid Assessment for Nutrition and Primary Health Care: Anthropological Approaches to Improving Programme Effectiveness.* UNU, Tokyo; UNICEF and UCLA Latin America Center Publications, University of California, Los Angeles.

Selowsky, M. (1991) Protecting Nutrition Status in Adjustment Programs, Paper prepared for the ACC/SCN 18th Session in New York, 25 February – 1 March 1991.

Sen, A. (1981) *Poverty and Famines* Blackwell: Oxford.

Sharma, A. (1987) *Social Components of ICDS* National Institute for Public Cooperation and Child Development (NIPCCD), India.

Smith, M.F. Paulsen, S.K., Fougere, W. and Ritchey, S.J. (1983) Socio–economic Education and Health Factors influencing Growth of Rural Haitian Children. *Ecology of Food and Nutrition,* 13, 99–108.

Soekirman (1988) Principles of Institution Building in Nutrition based on Experience in Indonesia. Paper distributed at the 16th Session of the ACC/SCN, February 1990.

Staatz, J.M., D'Agostino, V.C. and Sundberg, S. (1990) Measuring Food Security in Africa: Conceptual, Empirical and Policy Issues, *Am. J. Agric. Econ.,* December 1990, 1311–1317.

Streeten, P. (1987) Transitional Measures and Political Support for Food Price Policy Reform, 277–81. In: Price–Gittinger *et al. (op. cit.)*

Subbarao, K. (1989) *Improving Nutrition in India: Policies and Programs and their Impact.* World Bank Discussion Paper No. 49.

SUSENAS V (1976) *The National Household Expenditure Survey,* Central Bureau of Statistics of Indonesia, Jakarta.

Tabatabai, H. (1988) Agricultural Decline and Access to Food in Ghana. *International Labour Review* 127 (6), 703–34.

Taylor, C.E. *et al.* (1978) The Narangwal Experiment on Interactions of Nutrition and Infections: I. Project Design and Effects upon Growth. *Indian J. Med. Res.* 68 (suppl.), 1–20.

Tomkins, A.M., Drasar, B.S., Bradley, A.K. and Williamson, W.A. (1978) Water Supply and Nutritional Status in Rural Northern Nigeria. *Trans. Roy. Soc. Trop. Med. Hyg.,* 72 (3), 239.

Tomkins, A.M. (1983) Nutritional Cost of Protracted Diarrhoea in Young Gambian Children. *GUT,* 24, 459.

Tomkins, A.M. (1986) Protein Energy Malnutrition and the Risk of Infection. *Proc. Nut. Soc.* 45 (3), 289–304.

Tomkins, A. and Watson, F. (1989) *Malnutrition and Infection: A Review,* ACC/SCN State–of–the–Art Series, Nutrition Policy Discussion Paper No. 5.

Trairatvorukal, P. (1984) *The Effects on Income Distribution and Nutrition of Alternative Rice Prices in Thailand.* Research Report No. 46. IFPRI: Washington D.C.

Tripp, R.B. (1981) Farmers and Traders: Some Economic Determinants of Nutritional Status In Northern Ghana. *J. Trop. Pediatrics,* 27, 15–22.

UNFPA (1989) *State of World Population* Investing in women: The focus of the nineties.

UNHCR (1982) *Handbook for Emergencies: Field Operations,* Geneva.

UNICEF–Ghana (1984) *The Situation Analysis of Children and Women in Ghana,* Accra.

UNICEF (1987) *Nutrition into the Nineties: Report of a Workshop on Nutrition Policy and Action,* Naivasha, Kenya, 1–6 April 1987.

UNICEF–Indonesia (1988) *Situation Analysis of Children and Women in Indonesia,* December 1988.

UNICEF (1990) Strategy for Improved Nutrition of Children and Women in Developing Countries, Policy Review paper E/ICEF/1990/1.6, UNICEF, New York.

UNICEF (1990b) *State of the World's Children,* UNICEF: New York.

UNICEF (1991) *State of the World's Children,* UNICEF: New York.

UNICEF/WHO (1989) WHO–UNICEF Strategy for Improved Nutrition of Mothers and Children in the Developing World, JC 27/UNICEF–WHO/89.4.

UNICEF/WHO/UNESCO (1989) *Facts for Life: A Communication Challenge.*

UNDP (1990) *Human Development Report,* Oxford University Press for UNDP.

UNDP (1991) *Human Development Report,* Oxford University Press for UNDP.

Valverde, V. Martorell, R., Mejia–Pivaral, V., Delgado, H., Lechtig, A., Teller, C. and Klein, R.E. (1977) The Relationship between Family Land Availability and Nutritional Status. *Ecology of Food and Nutrition,* 6, 1–7.

Vial, I., Muchnik, E. and Francisco Mardones, S. (1989) Women's Market Work, Infant Feeding Practices and Infant Nutrition among Low–Income Women in Santiago, Chile. In: Leslie, J. and Paolisso, M. (eds.) *Women, Work and Child Welfare in the Third World* p131–160, *(op. cit.)*

von Braun, J. and Kennedy, E. (1986) Commercialisation of Subsistence Agriculture: Income and Nutritional Effects in Developing Countries, *IFPRI Working Papers on Commercialisation of Agriculture and Nutrition No. 1,* IFPRI, Washington DC.

von Braun, J. (1989) Effects of New Export Crops in Smallholder Agriculture on Division of Labour and Child Nutritional Status in Guatemala. In: Leslie, J. and Paolisso, M. (eds.) *Women, Work and Child Welfare in the Third World* p201–16, *(op. cit.)*

von Braun (1990) *Social Security in Sub–Saharan Africa: Reflections on Policy Changes,* IFPRI Reprint No. 204.

von Braun, J. and Pandya–Lorch (eds.) (1991) Income Sources of Malnourished People in Rural Areas: Microlevel Information and Policy Implications, *IFPRI Working Papers on Commercialization of Agriculture and Nutrition No. 5.*

von Braun, J., de Haen, H. and Blanken, J. (1991) Commercialization of Agriculture under Population Pressure: Effects on Production, Consumption and Nutrition in Rwanda, *IFPRI Research Report No. 85,* Washington DC.

Walker, T. (1984) Fluctuations in Income in Three Villages of India's Semi−Arid Tropics. ICRISAT mimeo, Patencheru, Hyderabad, India.

Walsh, J.A. and Warren, K.S. (1979) Selective Primary Health Care: An Interim Strategy for Disease Control in Developing Countries. *N. Engl. J. Med.,* 301, 967−974.

West, K.P. and Sommer, A. (1987) *Delivery of Oral Doses of Vitamin A Deficiency and Nutritional Blindness,* ACC/SCN State−of−the−Art Series, Nutrition Policy Discussion Paper No. 2.

WHO (1981) *The Role of the Health Sector in Food And Nutrition,* Technical Report Series No. 667, WHO, Geneva.

WHO (1983) *Measuring Change in Nutritional Status,* World Health Organisation, Geneva.

WHO (1986) Use and Interpretation of Anthropometric Indicators of Nutritional Status, *Bull. World Health Organisation,* 64 (6), 929−941.

WHO (1986b) *Maternal Mortality Rates: A Tabulation of Available Information,* 2nd Edition. FHE/86.3. Geneva.

WHO (1990) *Diet. Nutrition and the Prevention of Chronic Diseases,* Report of a WHO Study Group, Technical Report Series No. 797, World Health Organization, Geneva.

WHO/UNICEF (1989) *Protecting, Promoting and Supporting Breast−Feeding − the Special Role of Maternity Services,* A Joint Statement, WHO, Geneva, 1989.

WHO/UNICEF (1990) *The Innocenti Declaration on the Protection, Promotion and Support of Breastfeeding,* declaration produced and adopted by participants at the WHO/UNICEF policymakers' meeting on “Breastfeeding in the 1990s: A Global Initiative”, held at the Spedale degli Innocenti, Florence, Italy, on 30 July − 1 August 1990.

Wijga, A. (1982) *The Nutritional Impact of Food−for−Work Programmes* Report to the Overseas Development Administration (U.K.).

World Bank (1986) *Poverty and Hunger: Issues and Options for Food Security in the Developing Countries,* Washington DC.

World Bank (1989) Feeding Latin America's Children, mimeo. Human Resources Division, Latin America and Caribbean Region, World Bank.

World Bank (1990) *World Development Report,* World Bank, Washington D.C.

World Food Council (1991) Meeting the Developing Countries' Food Production Challenges of the 1990s and Beyond. Synthesis of the Regional Overviews of Food Security Focused Agricultural Research, Technology Transfer and Application, prepared for a WFC/UNDP Interregional Consultation, Cairo, April 1991.

Yee, V. and Zerfas, A. (1987) Issues in Growth Monitoring and Promotion (Summary) In: *Information Packet: Growth Monitoring,* Clearinghouse on Infant Feeding and Maternal Nutrition, American Public Health Association International Health Programs, Washington D.C.

Zerfas, A.J. and Teller, C.H. (1990) Cross−country Comparisons and Intra−country Differentials in Nutritional Status and Infant Feeding: Presentation from DHS in 22 Countries and Recommendations. Unpublished report, Chevy Chase, LTS Corporation.

ANNEXES

ANNEX I: NON–COMMUNICABLE DISEASES

The association of diet with risk of non–communicable diseases has become much better understood in recent years. Indeed, the causes of *obesity* (itself a risk factor for a number of non–communicable diseases) which for years were ascribed only to excessive or inappropriate diets, have recently been seen to be more complex, including the important influence of heredity. While not all the causal relationships are fully worked out, at least the following are known to both have a diet–related cause, and in preventive terms be important for nutrition policy where prevalence is high.

Diabetes appears to be associated with high intakes of sugar. Although the exact aetiology is not fully known, it is a concern that in some populations a rapid increase in sugar consumption (often imported) has paralleled a startling rise in the incidence of adult onset diabetes. It appears likely that measures to limit the intake of simple carbohydrates (of which sugar is by far the most important) may be of public health benefit in counteracting this problem.

Heart disease is the greatest killer in industrialized societies, and is rapidly increasing in importance in the developing world. The influence of diet has been subject to extensive research in recent years. The balance of conclusions to date is that intakes of saturated fats (i.e. primarily from animals) and cholesterol itself do contribute directly to arterial disease, accounting for at least part of the recent increase in incidence. Added to this, high salt intake at a population level is associated with high blood pressure (*hypertension*); it is probable at least in susceptible individuals that restricted salt intake would be beneficial in lowering high blood pressure. Furthermore, high blood pressure interacts with arterial disease to further increase the risk of heart attacks. Consumer education and legislation, as well as possible supply–based policies, could be of considerable importance in this context.

The interactions of diet with cancer are still being worked out, and few have yet got to the point where they can be confidently incorporated in public policy. In this context, a number of distinctions need to be made, particularly between those components in the diet that *protect*, and those that are *causative*. In the former category, for example vitamin A or dietary fibre might be included; in the latter high intakes of saturated fat in relation to breast cancer. Equally, some effects may be general to all cancers, whereas others are related to specific organs.

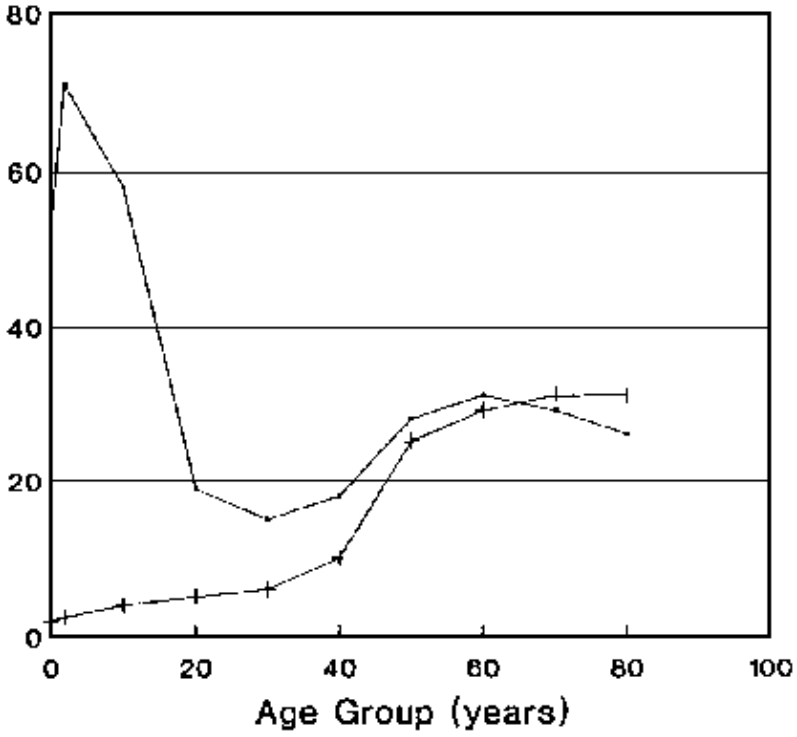
There are three areas, where evidence is particularly strong. The first relates to *bowel cancer*, where increasing dietary fibre and thus decreasing content of processed over–refined foods, is likely to be preventive for this the most common of cancers, at least in the U.S. Second, the influence of the balance of saturated/unsaturated fats is likely to have an effect on *breast cancer*. Third, in general terms such nutrients as vitamin A and possibly vitamin C may have a more general protective effect against cancer. Finally, of course, control of the content of carcinogens in the diet is needed: perhaps the best known of these is aflatoxin, but there are certainly others frequently being discovered.

Options for addressing such problems include raising public awareness and legislation. These are introduced in the European context by James *et al.* (1988). At the same time, epidemiological and experimental research need continuing support.

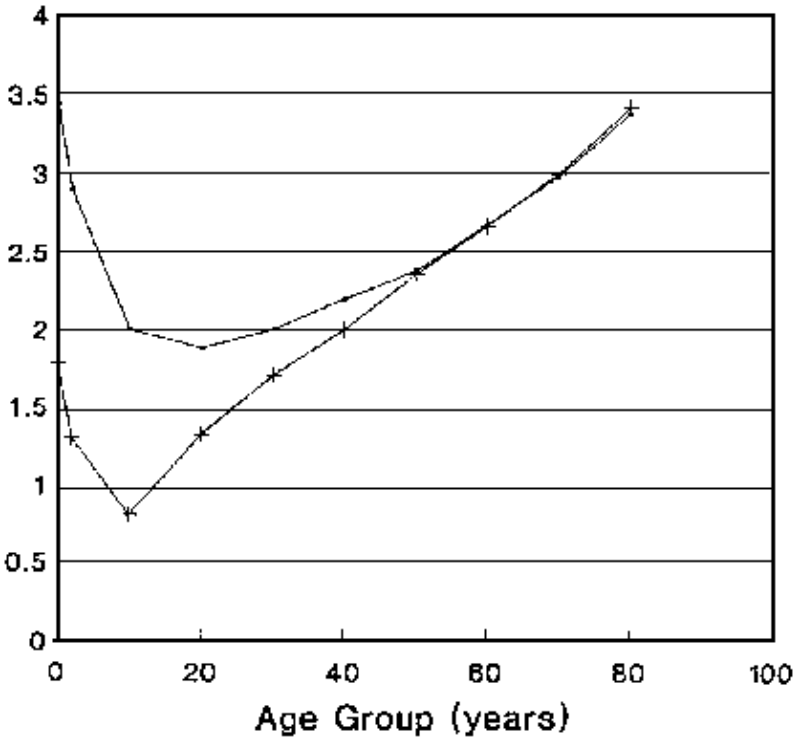
One way of assigning relative priorities to diet and chronic disease, and malnutrition (in the sense used here) by country is to look at the patterns of mortality by age, and by age and cause of death. Age–specific mortality rates are widely available, for instance in the World Health Statistics Annuals, and the UN Demographic Yearbooks. Cause– and age–specific mortality data are less so – hardly at all for Africa – but enough exist to illustrate the point. In the figure below, data for Guatemala (1981) and the Netherlands (1983) have been roughly recalculated from the 1985 WHO Statistics Annual. The different patterns are striking. Examining the Guatemalan data, it can be seen that both the percentage deaths by age group and the mortality rate are considerably higher for infectious disease from birth to middle age, where the two types converge. In contrast, the picture in the Netherlands is one of consistently higher mortality due to chronic diseases throughout life. Perhaps further plots by country such as these could contribute to establishing priorities.

Figure A: Comparing Age and Cause Specific Mortality in Guatemala and the Netherlands

GUATEMALA (1981)

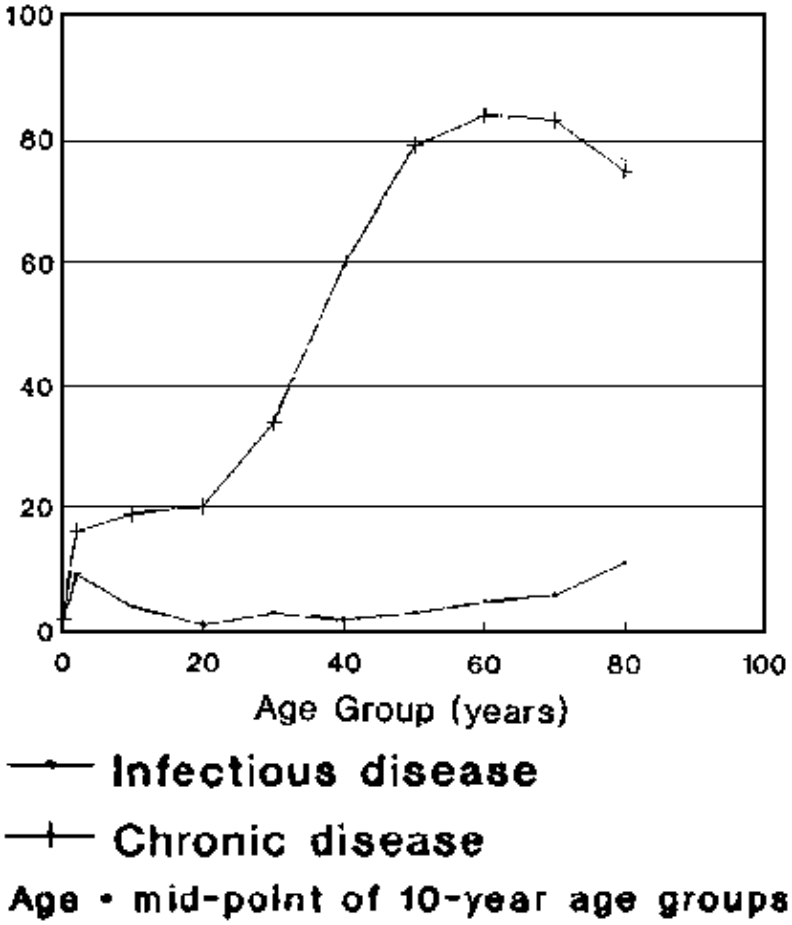


Percentage deaths by age group

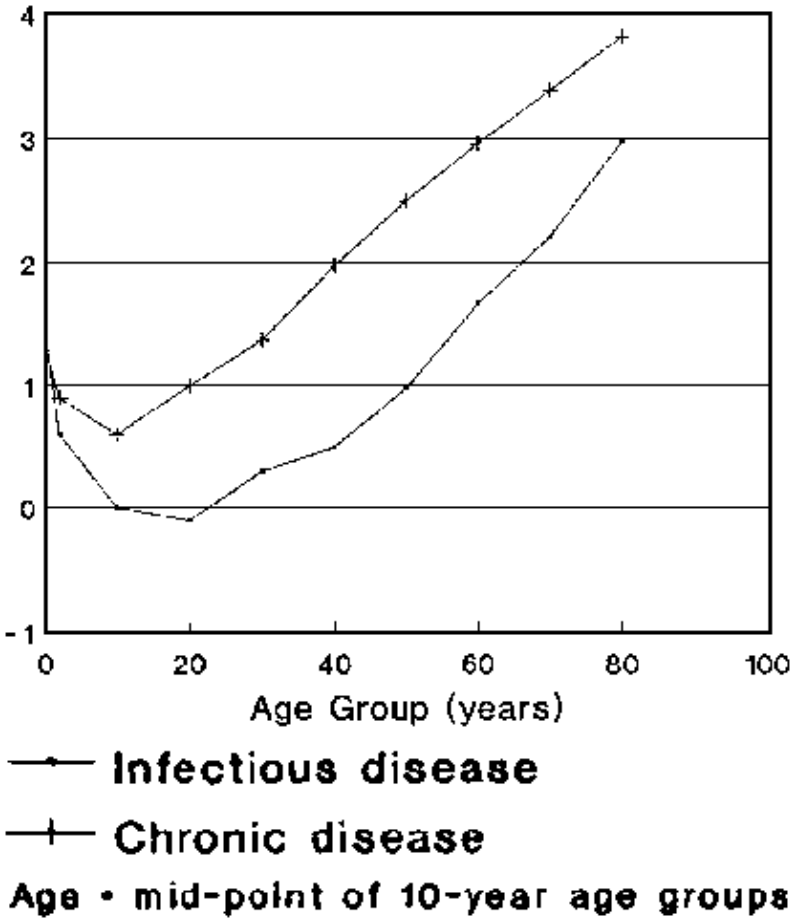


Log rate per 100,000 popn.

NETHERLANDS (1983)



Percentage deaths by age group



Log rate per 100,000 popn.

ANNEX II: DO MULTIPLE CAUSES MEAN INTEGRATED INTERVENTIONS?

It has long been held that because there are multiple causes of malnutrition, a number of simultaneous interventions, in one place and time, are essential. This is not obviously inevitable, and depends on how different causal factors interact. For example, malaria is endemic when the parasite (plasmodium) *and* the vector (mosquito) exist in the same place. However, malaria control may concentrate on dealing with either the parasite *or* the vector. (Mosquitoes are common in many developed countries, but not the parasite, hence no malaria). This does not always translate directly to nutrition: blindness from measles might be much reduced either by vitamin A supplementation *or* measles immunization; but for other reasons, both vitamin A and measles immunization are desirable. However, it is important to son this out rather than reflexively call for multiple interventions, if single interventions are easier to organize.

The actual interactions under different circumstances between causes – typically diet and infection – in producing malnutrition can be studied in two main ways. First, observational studies can be used, although these are rare because of the extreme difficulty of accurately measuring individual dietary intake over time. Second, intervention trials where food and health interventions have been assessed separately and together are crucial; Narangwal is classic, and there are others. It should be noted that, in principle, if e.g. *both* the parasite *and* the vector are needed to cause malaria – then *one* intervention to deal with one cause is in principle indicated (malaria prophylaxis, or eradicate mosquitoes). Conversely, if *either* (of two) causes leads to the problem, one must deal with both: e.g. if diarrhoea *or* inadequate dietary intake cause malnutrition, then both must be tackled (although dealing only with one may remove the interaction *part* of the problem as well as one cause).

Although it may not be feasible to assess this under different circumstances, it needs to be remembered – and it will be circumstance–specific. It can be illustrated by these two scenarios with the level of indicator of malnutrition (e.g. prevalence of 'underweight' children) in the cells:

Scenario 1:

	Food intake	
Health situation	*Low*	*High*
Poor	High	Low
Good	Low	Low

.....then it would be expected that:

	Food intervention	
Health intervention	*No*	*Yes*
No	High	Low
Yes	Low	Low

i.e. either intervention alone has an effect.

Scenario 2:

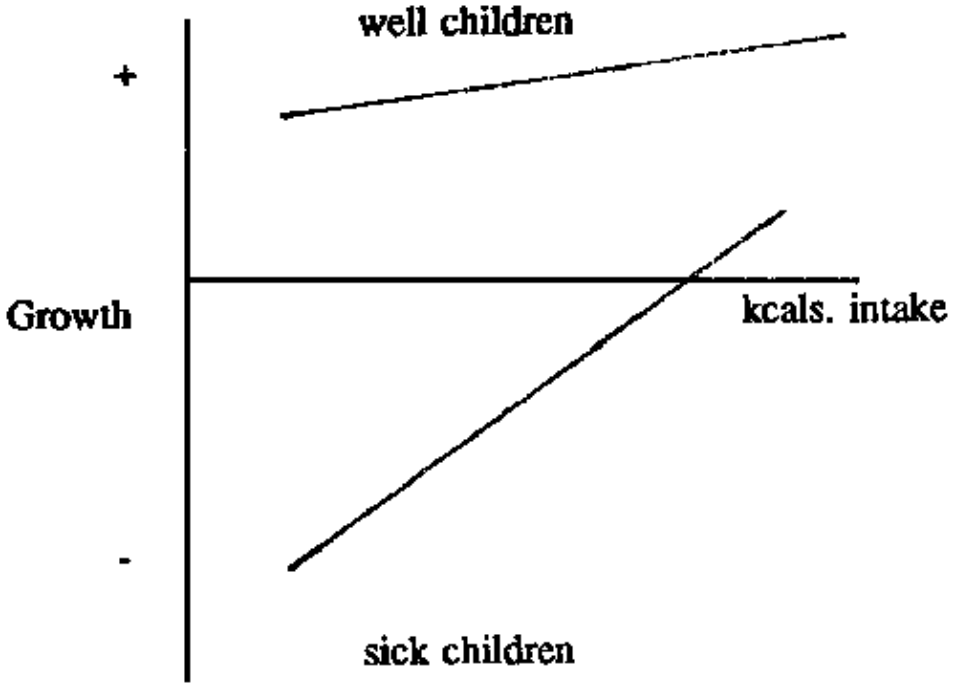
	Food intake	
Health situation	*Low*	*High*
Poor	High	High
Good	High	Low

....means it is expected that:

	Food intervention	
Health intervention	*No*	*Yes*
No	High	High
Yes	High	Low

i.e. both the health and food intervention are needed.

A few longitudinal studies of food intake and health have indicated the actual interactions. For example, unpublished data from the Gambia (JBM) gave the results shown below. This translates approximately into scenario 1. Feeding sick children mitigates the adverse effect of *interactions* within the malnutrition–infection complex (which are a substantial part of the problem) and thus have a considerable positive impact Studies by Lutter *et al.* (1989) and Martorell *et al.* (1990) provide some further empirical backing to this.



The Narangwal study (Taylor *et al.* 1978) used four groups: medical intervention, nutrition intervention, both, and none. Results varied depending on the outcome variable used. For example, growth after 18 months was significantly more rapid in the two areas with nutrition supplements than in the control area. There was little difference between child growth rates in the area in which nutrition supplements and medical services were both provided and those in the area in which only nutrition supplements were made available. The nature of the most effective intervention programmes also varied with age, nutrition appearing most important at the outset of life, then at age one, medical services, then nutrition again between 2–3 years. In terms of mortality, as an outcome, however, prevention, early detection and treatment of infectious diseases was the most cost–effective way of reducing mortality in both infants and children.

Growth: Mean per cent of Harvard standard weight for 24–36 month old children (figures are approximated from Fig. 5 in Taylor et al. 1978)

	Nutrition intervention	
Medical intervention	*No*	*Yes*
No	74.5	77.5
Yes	76.0	77.0

Mortality: Approximate infant mortality rates (0–1 year), 1970–73 (figures from Table B–8 in Gwatkin et al. 1980)

	Nutrition intervention	
Medical intervention	*No*	*Yes*
No	128	97
Yes	70	81

It is evident, therefore, that substantial improvements in a given outcome variable (either growth or survival) are possible without integration of health and nutrition interventions, but that integration makes possible improvements in *both* growth and child survival at a cost lower than the two separate interventions combined.

As well as causality interactions, as discussed here, there are cross–sector interactions e.g. food delivered through the health sector, nutrition education through agriculture, Vitamin A through immunization channels. With some, the benefits of one can not be realized fully without the other. Nutrition education has often not been successful if unaccompanied by economic change, brought about e.g. through food subsidies, or income

generated through cash crops (see the Philippines example in chapter 2).

Printed by The Lavenham Press Ltd., Lavenham, Suffolk, England.