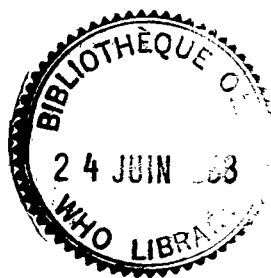# A GUIDE TO NUTRITIONAL ASSESSMENT

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CONTENTS

PREFACE

This guide is aimed primarily at professional health workers who, although not necessarily specialists in nutrition, often have to make decisions or advise decision-makers on the nature of, and choice among, interventions to combat malnutrition, and also as to the selection of target groups and location, etc. These health workers also formulate, or advise on the formulation of, nutrition policies.

It is a guide and not a manual, in the sense that it does not give precise instructions on how to proceed, but offers broad guidelines, illustrated with examples, on the appraisal of the nutritional status of population groups and the selection of priority areas or groups for action. It suggests ways of assessing policy objectives or deciding on the basis for nutritional surveillance, and of monitoring and evaluating interventions. It recommends a sequence of steps that are generally the most appropriate, but may be adapted to a wide variety of situations and objectives.

The guide explicitly acknowledges that, since it must be accepted as a fact of life that time, funds, and qualified personnel are invariably restricted, it is preferable to assess nutritional status on the basis of existing data rather than generate new data through surveys or special studies.

The guide can be used for nutritional assessment at the national, regional, district or project level, and within a given sector at any one of these levels. While it is not intended for use in very small communities, much of it will nevertheless be applicable to specific situations in such communities.

Nutritional assessment, as it is understood here, is justified only when taken as a preliminary step to further action. Therefore the study of the nutritional status of a population or of selected groups for other purposes (such as research, validation of indicators, confirmation of suspected problems, etc.) is not covered in this manual. In other words, a nutritional assessment as described here is necessarily a step in a planning process. It cannot be made in isolation from either decisions previously made about future action or the subsequent steps in the planning cycle.

While this guide is addressed mainly to the health sector, it does have broader applications. It will be useful not only to health workers, but also to officers in planning ministries or commissions and the nutritionists who advise them, as well as to managers of development programmes and projects. In addition, it can and should be used to

strengthen the ability of the users in assessing nutrition and, more generally, in achieving a clearer understanding of nutrition problems: their causes, their implications, and possible solutions.

The authors have drawn heavily on their own field experience, as well as on the experience of others who offered suggestions and criticism. Special thanks are due to Alberto Pradilla, Chief, Nutrition Unit, World Health Organization, who in the mid-1970s was a pioneer in the development of assessment procedures; to Christiane Dricot d'Ans and Jean Dricot, Hanoi, Viet Nam; to Carlos Montoya, Division of Strengthening of Health Services, WHO, and lastly to the members of the Nutrition Unit at WHO Headquarters, for their substantial contribution both to the concepts underlying the guide and to the methodology it presents.

Chapter 1

INTRODUCTION

To formulate policies or choose appropriate interventions for combating or preventing malnutrition, the policy-maker, the planner, the manager, and of course the nutritionists who advise them require a sufficiently precise knowledge of the particular nutritional situation and its causes. This knowledge will be based on statistics, reports, direct observation, expert advice, and, if necessary, on special surveys.

Frequently (and increasingly so) decisions must be made within a short space of time: for example, when a rural development project wishes to add nutritional considerations to its activities; when a national planning agency requires a chapter on nutrition in a forthcoming development plan; when a health ministry decides to develop its nutrition activities; when a primary health care programme is offered funds to incorporate a strong nutrition component; or when a financial agency is ready to provide a loan or a grant for nutrition activities. In such cases, an in-depth diagnosis of the nutritional situation is often impossible and, as we shall see, in many instances it is not even necessary. A compromise must then be found between a legitimate respect for accuracy and scientific rigour, on the one hand, and the obligation to provide all the relevant answers before the established deadline, on the other. Time being short and resources generally scarce, the nutritional situation has to be assessed rather than studied in great detail.

"Nutritional assessments" have been conducted in recent years in a wide variety of situations and at different levels (national, regional, and project). People of extremely diverse backgrounds and experience have, to a large extent, had to improvise *ad hoc* methodologies according to each new situation. Needless to say, as a result, the relevance and quality of the assessment reports are extremely varied. It is time to build on the best of these, to prune out what is irrelevant, impractical, or costly, and to summarize in one practical document the current "state of the art".

The context in which assessment is made will sometimes be extremely limited. The nature of the assessment will vary according to such factors as the objectives of the assessment, the amount and reliability of the existing information, the resources available (notably funds and the time at the disposal of qualified personnel), and the time within which the assessment has to be completed.

Purpose of the guide

The purpose of this guide is to assist decision-makers and their advisers to gather, interpret, and use nutritional and associated information efficiently. More specifically it provides a methodology designed to: (a) select the data to be used more objectively; (b) give a global view of nutritional and related problems; (c) organize the work in a practical way; (d) utilize the information more efficiently; and (e) identify the responsibilities of each sector or institution involved in the assessment process.

The guide is intended for use by such people as:

— policy-makers and planners in central government, planning offices, or ministries; planners in ministries of health, agriculture, education, rural development, social welfare, etc.; national food and nutrition councils, etc.;

— nutritionists at the central or regional level;

— programme planners and managers at the regional level, as well as planners and managers of projects, such as health or rural development projects;

— officers in international and bilateral agencies, private and public, who may be invited to advise or assist in an assessment of nutritional status.

The guide is intended for use in assessing the nutritional situation of population groups and it is applicable at national, regional, or local levels. The term "population groups" is used here in a very broad sense. It can be the total population of a country, region, or province; a given stratum, defined by age, occupation, socioeconomic status, or other criteria; those expected to benefit from a project; a group of villages or a borough in a city; etc.

Brief history

The first studies of nutritional status and food intake in developing countries were conducted before the Second World War. However, only in the 1950s and 1960s, when a considerable amount of study was undertaken on the nutrition problems of people in developing countries, did the first large and comprehensive nutrition surveys appear.

By the end of the 1960s, however, the serious limitations and drawbacks of these large surveys were becoming progressively apparent. In the first place, they were expensive and time-consuming

and tended to divert the time and energy of qualified people away from finding actual solutions to the problems at issue. Generally the results were available only after considerable delay, often years after the field work had been completed, and much of the information collected was never fully analysed. The patterns became repetitive: it was shown again and again that malnutrition was associated with poverty. The same major causes were found almost everywhere, but the mechanisms leading to malnutrition were unclear. Basically, these surveys did not prove useful, either for corrective or preventive action or in planning.

Since the early 1970s—perhaps even the late 1960s—a new and more pragmatic approach has evolved, in response to the short-term concerns of governments and funding agencies, both international and bilateral, particularly the United States Agency for International Development (USAID) and the World Bank. Sophisticated and time-consuming surveys have given way to less precise, but also less costly and much quicker, procedures for "assessing" a nutritional situation, its causes, and its trends. These were designed for the rapid identification of priority areas and groups (on which eventually a diagnosis in greater depth could be performed if necessary).

Dozens of nutritional assessments of whole nations (or states or provinces) have been performed during the last ten or fifteen years by governments of developing countries—usually assisted by FAO, WHO, or other specialized agencies of the United Nations, by USAID, by the World Bank, or occasionally by governments of industrialized countries. Most of these assessments were produced over a short period of time (usually in a few months), which was generally dictated by the budgetary cycle of the funding institution. The results are not easily available. First, it is necessary to know where to find them, because few copies are printed and circulated. and in some cases the government prefers to classify them. The assessments that are available vary considerably in length. presentation, quality, and emphasis. However, some general points can be made:

— The assessments do not follow any standardized methods, but are improvised in a pragmatic way, at least partly, by the person or the team in charge. (Some agencies do provide guidelines which are more or less followed.)

— The authors are sometimes nutritionists, more commonly economists, a few calling themselves "nutrition planners". The range of competence. ideology, or previous experience in the same country is extremely wide.

— There is a widespread tendency to include every piece of information collected during the short assessment period, without any regard to quality or relevance. As a result, many reports are

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lengthy and heavy and the required information is sometimes
diluted in a wealth of largely irrelevant data.

— Often there is a lack of consistency between (*a*) the information
presented and discussed, (*b*) the conclusions put forward, and
(*c*) the proposals for action.

— Many authors do not make their basic assumptions clear,
presumably because they do not use a manual, or because
existing manuals are mechanical rather than conceptual. These
manuals seem to describe step-by-step procedures, including the
pitfalls, rather than explain the rationale behind the method
employed or the concepts on which the procedures are based.
This can lead to difficulties of interpretation, as well as
misunderstanding of some of the major implications of the
assessment's conclusions. If the reader is a government authority
with the power to make decisions, the outcome may indeed be
unfortunate for the project. In fact, the few manuals or
assessment guidelines that do exist are not widely available.

— Few people appreciate that a nutritional diagnosis invariably
reflects the ideology of its authors or its potential users. It is
partly because of this essential factor, which is discussed in
slightly more detail below, that a number of assessments seem to
miss the real problem, provide an unintentionally distorted
picture, or offer solutions that are barely relevant, if not
completely irrelevant.

Basic assumptions

In designing this guide, a number of assumptions were made. These
need to be spelled out clearly, so that the best use may be made of
the guide, instructions can be easily followed, and assessments may be
planned and implemented with maximum efficiency. The underlying
assumptions set out below concern both concepts and methods.

Conceptual assumptions

The literature repeatedly shows that malnutrition is caused by a
combination of factors, such as low income, illiteracy, an unhealthy
environment, unsatisfactory health services, inadequate food habits,
low agricultural productivity, etc., and that all these factors affect
each other differently according to the particular situation. It is also
clear, judging by observations in countries where nutrition has actually
improved, and also by the results, good or bad, of intervention
programmes, that improving one of these factors in isolation—raising
income, for example, or providing clean water or increasing
agricultural output—is generally not enough to improve nutrition

significantly. In this guide, therefore, it is assumed that malnutrition is due to a multiplicity of causes, and that solution of the problem requires action in a variety of sectors.

(a) *The health sector (or for that matter, any other sector) alone will not solve the nutritional problems of the population.*

The improvement of nutritional status is not the only purpose of the health sector, and for the most part it is not even a major goal. Good nutrition is only one among other objectives, and its priority varies from place to place. However, many activities in the health sector do have a nutritional impact whether this is expressed as an objective or not.

(b) *An analysis of causes is a prerequisite to any decision-making.*

Before choosing relevant interventions, and indeed before selecting the information required for conducting a meaningful assessment, a thorough understanding of the causes of, and mechanisms leading to, malnutrition is necessary. The assumption here is that the analysis of causes and mechanisms needs to be performed *in depth, intersectorally,* and *prior to data collection.*

Experience shows that it is not enough to establish an association between malnutrition and such factors as income, education, geographical location, etc., if one is to grasp all the practical implications of the situation. A much deeper understanding, requiring the cooperation of the major interested sectors (agriculture, health, education, rural development, social affairs, etc., depending on the circumstances), is necessary. Furthermore, the causal analysis should be completed prior to data collection. The relevance of an indicator (or the suitability of an intervention) cannot be determined without formulating a hypothesis linking the indicator or intervention to the nutritional situation of the group under consideration.

The analysis of causes before the collection of data is a departure from the common practice of collecting as much information as possible first and then attempting to provide an explanation for the facts observed.

(c) *A causal model is a key component of the assessment procedure.*

The importance of building a *hypothetical causal model* at an early stage will become clear as the methodology is presented and discussed in Chapter 2. The term "model" is used here to mean a simplified representation of a system or a process, and not in the sense of an example to be followed. Some people might prefer an alternative term

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such as *conceptual framework* or *analytical diagram*, but, regardless of the name or the formulation it is given, the hypothetical causal model is simply an ordered set of causal hypotheses linked together in a rational, hierarchical manner. There will be a specific model for each situation, and a new model should accordingly be built for each assessment. A model is not definitive: after data have been collected and analysed, not all the hypotheses will be confirmed and new ones may be formulated, and the model—or rather the results of the causal analysis—may have to be amended. The formulation of causal hypotheses is a continuing process that has to be modified as new information becomes available or the situation is changed as a result of interventions.

The building-up of a causal model of malnutrition in the particular situation under consideration, for which simple and readily applicable methods are now available (see Annex 1), is an essential step for two reasons:

— it gives a global view of nutrition and its determinants;

— it helps substantially in the choice and interpretation of data.

More particularly, the use of such a model:

— allows discrimination between relevant and irrelevant information, thus helping to eliminate useless data and saving the time spent on collecting and processing;

— guides and facilitates the analysis and interpretation of data, thus accelerating the availability of the data and making its interpretation clearer;

— fosters a common understanding of the nutritional problem among people with widely diverse backgrounds;

— assists in the distribution of tasks;

— facilitates interdisciplinary work and thus creates a working methodology that can be maintained even after the assessment is completed; and

— can be adapted to a wide variety of situations and levels.

(d) Globality does not mean totality.

Even if the causal analysis is comprehensive and includes factors beyond the scope of the sector, the size of the project, or planning intentions, this does not imply that every piece of information must

be included in the data collected, or that action should be designed to combat all causes. While the analysis must be broad and encompass as much as possible, it should focus only on what is feasible and effective, given existing constraints.

(*e*) *A nutritional assessment is not independent of the ideology of its author and its users.*

Malnutrition must be viewed in a context largely determined by culture, type of social organization, distribution of power, and dominant values among those who hold power. In different contexts, the same statistical figures and survey results will indicate different problems and lead to different courses of action. This becomes apparent during the building of a causal model. The choice of some chains as important, the rejection of others, and the depth to which the analysis is permitted to go, reflect the political context of the situation and the personal values of the participants. Similarly, the selection of the areas of the model that are to be analysed, i.e., the choice of the data to be collected, will influence interpretation and hence the type of action eventually taken.

Methodological assumptions

(*a*) *The objectives of the assessment must be clearly defined at the outset.*

An assessment, of necessity, has a clear purpose; in this respect, it is quite different from surveys or studies that merely collect data or are carried out as part of a research programme. It is justified only when taken as a preliminary step to further action. Therefore, its objectives, which can vary widely, should be precisely defined. For example, the objectives might be:

— to select priority areas or groups for action;

— to formulate or analyse the objectives of a nutrition policy (or the nutritional component of a development or sectoral policy);

— to contribute to the selection of interventions or major project components;

— to furnish the basis for surveillance, monitoring, and/or evaluation;

— to inform policy-makers, politicians, and public opinion in order to motivate them (i.e., to serve as an "eye-opener");

— to help in deciding whether to undertake a survey and, if so, for
what purpose and of what kind.

Experience shows that, as the preliminary data are being assembled
and an overview taken of the situation, or as discussions are being
held with decision-makers and representatives of different sectors, the
initial objectives may sometimes have to be amended, and occasionally
markedly changed. The more precise and clear they are to all parties
involved, the easier the joint work will be.

(b) *An assessment does not only consist of collecting data and
describing a situation. It is also an explanation and an
identification of trends.*

It is not enough just to describe a situation: an explanation is needed
from which solutions can be found. Such an explanation must be
consistent and take into account the evolution of the situation over
time. This has three implications for the assessement:

— the data to be collected (and the indicators to be used) will relate
not only to the nutritional state, but also to its causes;

— the causes of malnutrition need to be analysed, both to provide
an explanation and to identify major determinants;

— trends should be identified to provide a dynamic rather than a
static image of the nutritional situation and its causes, i.e., a film
rather than a snapshot.

As the last point suggests, it is important to collect retrospective data
particularly for the prognostic aspect of the assessment (i.e., for
estimating what is likely to happen if things continue in the same
way).

(c) *Deadlines and financial constraints restrict the choice of data to
be collected.*

The data to be collected and used must be kept to a strict minimum,
i.e., they must be relevant. This means that:

— the assessment will have to rely exclusively or mainly on existing
data;

— the relevance of all information must be assessed, hence the
importance of the causal analysis (performed prior to data-
gathering, as mentioned above).

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(d) *The maximum use of existing data is the rule: large surveys are often unnecessary.*

As stated earlier, large surveys are costly and time-consuming and often the data gathered are irrelevant. However, in most countries, relevant information already exists which can meet the assessment's objectives in a more cost-effective way. This may be readily available (in published statistics, survey reports, articles, studies and books, etc.) or may require a certain amount of "digging", i.e., active searching in government offices, forgotten files, etc.

(e) *It is important to break down the data.*

Aggregate data often do not adequately reflect the real situation and may even distort it. Therefore those making the assessment should assume that the factors affecting malnutrition are distributed in a heterogeneous manner and, depending on the need, data should be broken down according to one or more criteria, such as:

— region, geographical location, urban/rural differences;

— socioeconomic, ethnic, or occupational categories;

— age groups; etc.

Data can easily be reaggregated later, if it appears that the disaggregation was unnecessary, or if it results in empty or almost empty sections.

(f) *A nutritional assessment is the responsibility of an inter-disciplinary team and not of one or two individuals, even if they are specialists.*

The team should include members of various disciplines and representatives from each of the main sectors involved in present or future nutrition-related work. This basic methodological assumption rests on two observations:

— The causes of malnutrition, being multiple and complex, cannot be fully understood by one individual, at least when time is short. Hence the need to share a common understanding: one team-member will have a deeper understanding of one aspect, while another will be knowledgeable in a different field.

— The action eventually taken will be multisectoral, i.e., it will involve two or more sectors. Even where only one sector is involved, it will still have to act within a global context which needs to be clearly understood by the authors of the assessment, as well as by the decision-makers and implementers.

(*g*) *Decisions will have to be made in all cases.*

Even if the existing data are of poor quality (unrepresentative for example, or incomplete) the planners and managers will have to make decisions about policy, programmes, etc. Any assessment therefore involves a compromise between, on the one hand, quality and accuracy and, on the other, speed and relevance. There is inevitably a certain degree of subjectivity. Judgement will have in part to replace facts. It is better to make a decision based on the personal opinion of a multidisciplinary team than one based on unreliable data. In other words, since there will rarely be direct access to primary sources of information, it is essential that the reliability, validity, and quality of the data used are explicitly analysed and appraised in the assessment document itself. Subjectivity should, however, be reduced to a minimum and all value judgements and assumptions made clear to the reader. This is why, as we shall see, the preparatory phase of the assessment is so important.

STEPS TO BE FOLLOWED

How, then, does someone (government officer, planner, nutrition adviser, etc.) proceed, who accepts the responsibility for conducting or assisting in a nutritional assessment?

The proposed outline procedure, which is not intended to be followed rigidly, is divided into eight steps, as shown in Fig. 1. The steps are listed in sequence, but the process is in fact more iterative and circular than linear. Step 6, for example (data-gathering) can only be performed when all previous steps have been completed, if necessary repeated, and made totally consistent with each other. Such conformity, in turn, may require a return to earlier steps. For instance, the causal analysis (Step 4) may lead to a change in the composition of the assessment team, or to a redefinition of objectives. Similarly, the analysis and interpretation of results (Step 7) may indicate the need for new data, or for other kinds of analysis. The major loops that may be encountered in practice are indicated on the diagram.

In effect, the division of the whole procedure into steps is arbitrary. Some people may prefer a greater number, while others would choose to have fewer steps to emphasize the interaction between them. Each person should adapt the sequence according to his or her own perceptions and logic. While the proposed procedure has proved useful, it is not claimed to be the best.

Step 1. Justification and definition of objectives

The rationale, scope, and precise objectives of the assessment need to be clearly defined, preferably in writing, to avoid any misunderstanding either within the assessment team, with the sponsors, or with those who might provide data in the future.

The first aspect to be considered is the justification for the assessment. Those in charge need to know the background to it, i.e., who decided to make it (government, local authority or community, lending or granting agency, international organization, etc.), and why. They also need to know what decisions will be affected by the assessment's findings; who is going to use the results and how; at what level the assessment is to be performed (national, regional, provincial, project), and which population and/or area is to be covered.

Fig. 1. Flow diagram of steps to be followed in conducting a nutritional assessment

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┌──────────────────────────────────┐
│ 1. Justification and definition of │
│   the objectives of the assessment │
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┌──────────────────────────────────┐
│   2. Preliminary appraisal and     │
│        reconnaissance              │
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                │
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┌──────────────────────────────────┐
│        3. Setting up a team        │
└──────────────────────────────────┘
                │
                ▼
┌──────────────────────────────────┐
│     4. Analysis of the causes of   │
│    malnutrition in the population   │
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┌──────────────────────────────────┐
│      5. Consistency appraisal      │
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│    6. Assembly of existing data    │
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│ 7. Data analysis and interpretation │
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│   8. Presentation of the results   │
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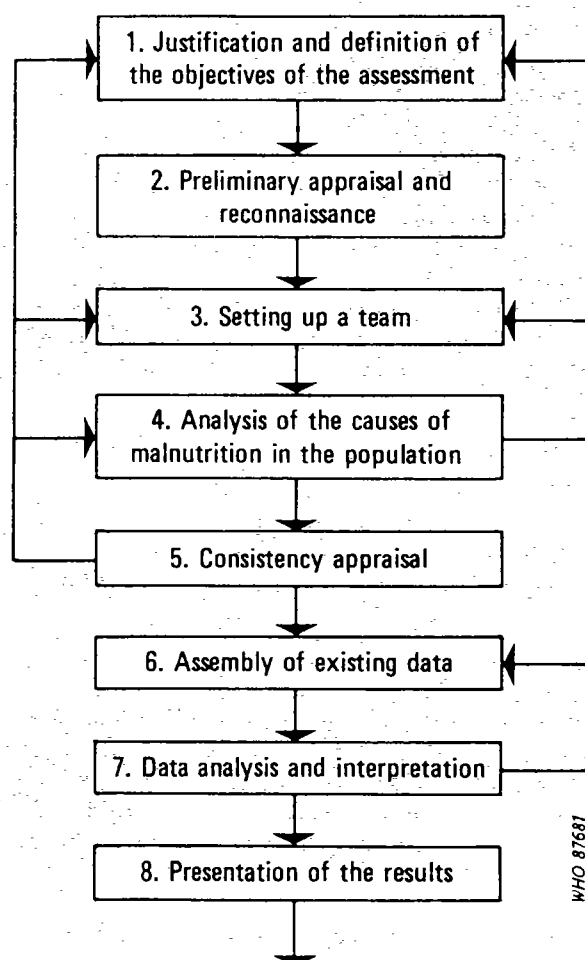
Generally the answers to the majority of such questions are known by the time the assessment procedure begins, when most decisions about the assessment will have already been made. Still, the implications of any decision must be made clear and to that effect it will often be necessary to elucidate a few additional points, using interviews, meetings, opinions, and other reliable sources.

As well as decisions on the level and scope of the assessment, a general idea of the resources available, the people and institutions who will take charge, the time available, and the additional funds needed, is required before an assessment takes place. Institutional arrangements, potential conflicts of interest, and the distribution of responsibilities also deserve consideration at this stage, as well as the existence of—or need for—written agreements (particularly when funding comes from specialized national or external agencies).

This preliminary step should also include a general overview of the nature and sources of the information that will be required. Is there free access to this information? Is there any limitation on its use? Will the institutions collaborate in supplying data?

Ideally, the precise objectives of the assessment should be formulated at the outset. Experience, however, shows that this is not always possible. It can happen that policy-makers request an assessment, the relevance of which is not immediately apparent. This situation obviously creates a problem for the technical personnel. They can only try to guess as accurately as possible the underlying motive of the policy-makers and the degree of political interest in the assessment, and then attempt to formulate objectives accordingly. Note, however, that an assessment may be initiated as an "eye-opener", for example, without any specific goal other than to gather information.

A final requirement in this first step is an all-round appraisal of the assessment's feasibility and the identification of major predictable constraints (see page 33 for a discussion of possible constraints).

Once all this information is to hand, a preliminary appraisal of the nutritional situation will be necessary before selecting a team and starting to design a work plan.

Step 2. Preliminary appraisal and reconnaissance

This is a brief but essential step. It includes a swift review of articles, books, and reports on the nutritional problems in the country or area, interviews with knowledgeable persons, and a short

reconnaissance of the assessment area(s). The information required
includes:

— the nature and extent of the nutritional problem: the evidence for
  malnutrition, the kind of information on which it is based
  (reports, data, opinions of well-informed people), its reliability,
  the possibility of bias;

— the target group to be considered, the kind of action, if any,
  envisaged by the policy-makers, and the kind of improvement that
  would seem desirable;

— the causes of the problem, the probable explanations for it and
  the evidence on which these explanations are based;

— how the problem is perceived by technical personnel, public
  opinion, and the population concerned;

— the programmes already undertaken, and whether they are still in
  existence or have been abandoned.

A reconnaissance—i.e., a brief visit to selected sites and institutions—
is also part of this second step. It is an indispensable way of
obtaining an insight into, or a "feel" for, the problem and an idea of
whether data exist and how they are collected locally, as well as being
a means of appraising their reliability.

At the end of Step 2, it may be necessary to re-evaluate the
objectives of the assessment, and even in some cases to renegotiate
them with the sponsoring agency or ministry. In any event, there
must be complete agreement on the terms of reference of the
assessment team before it is assembled.

Step 3. Setting up a team

The individuals and institutions needed to participate in an assessment
team will generally have been identified in Steps 1 and 2. The
assessment team can now be assembled. From this moment on, the
conduct of the assessment is the collective responsibility of the team.
Although the tasks of data-gathering and carrying out the initial
analysis of the data will be distributed among the team-members, all
subsequent steps will be implemented by the whole team working
together.

The team should be small, comprising a few permanent members who
are present throughout the assessment. These members need not
necessarily work full-time on the asessment, but should be sufficiently
free from their routine obligations to meet almost daily. If the core

group does not have this kind of flexibility, it might be impossible to meet the deadline.

If the amount of work makes it necessary to involve a larger number of people, they should report their findings and observations to the core team. Commissions on special topics, or within chosen sectors, will often need to be created on an *ad hoc* basis, but they will report to the small central assessment group.

The assessment team should be composed of: (*a*) technical representatives of the major sectors that are, or will be, involved (these will almost always include health and agricultural workers, as well as economists, planners, social scientists, educators, geographers, statisticians, and similar experts); (*b*) local staff, particularly in the case of assessments at regional or project level (those who are or will be implementing the project, or people with equivalent qualifications and general knowledge of the local situation); and (*c*) whenever possible, representatives of those who will benefit from any course of action under consideration; this last group will be most relevant for assessments conducted at local level (e.g., in a village or group of villages) and at regional level. At national level it will be needed only when local people are represented by the central administration, for example, by mass organizations in socialist countries.

The contribution of specialists (national or international) who are not full-time members of the team must be defined. Some will have to be paid an honorarium, while for others, permission for their participation should be requested from their organizations. In any event, the timing and nature of their participation and their relationship to the assessment team and team coordinator should be specified.

Step 4. Analysis of the causes of malnutrition in the population

The purpose of this essential and often neglected step is to provide an understanding of the mechanisms that lead to malnutrition in the groups identified as probable targets. This allows the team to:

— identify the major "determinants" (factors that play a causal role) of malnutrition;

— select relevant information, i.e., the minimum amount and type of information needed;

— identify links in the causal chains leading to malnutrition against which action can be taken;

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— distribute tasks among team-members;

— ensure cohesion of the team; and

— facilitate analysis and interpretation.

Experience shows that multidisciplinary groups that are knowledgeable about the development problems of their country or area of activity generally have a good broad understanding of the main causes of malnutrition. In most cases this understanding is sufficient to permit Step 4 to be implemented without major difficulty.

Step 4 is itself divided into six substeps, preferably to be followed in the sequence suggested below.

1. Clear identification and characterization of each target group

The target groups have usually been identified earlier. At this stage they are clearly defined, i.e., their major characteristics are identified. Examples are: rural children 6 months–3 years old; pregnant women from low-income groups; primary schoolchildren; families of landless labourers; preschool children from slum areas.

2. Construction of a simple and functional hypothetical causal model of malnutrition (insist on simplicity)

This crucial step will determine the whole rationale behind the choice of data and their eventual interpretation. Generally it is also the step that most often deters those people who have not yet attempted a model-building exercise. They may be put off by the word "model" or reluctant to tackle what is viewed as a difficult mental task, or they may simply be sceptical about the usefulness of an appararently overcomplicated procedure. In fact, experience shows that these doubts are not justified and this attitude should be firmly dismissed. Simplicity, however, is the rule. Since the assessment is often performed in a limited context, models that are too large or unbalanced should be avoided.

The technique for constructing a causal model is described in detail in Annex 1.

3. Identification, from the model, of the relevant and feasible indicators with their desired characteristics and of data sources and the institutions responsible for providing data

The procedure to be followed is described in Annex 2. Table A2.1 in the same annex presents a selection of commonly used indicators.

The following points should be noted:

(*a*) An indicator may not be good by itself, but may be valuable if it helps to compare groups or regions, or to identify trends—particularly if it has practical and operational uses, and if other indicators complement it.

(*b*) The importance of health sector indicators will be determined by the model. Other indicators must also be well selected. The degree of detail necessary will be determined by the model, the purpose of the assessment, the time available, etc.

(*c*) Similarly, certain administrative, operational, and institutional indicators may be necessary.

(*d*) Cost and time constraints require that the minimum number of indicators be utilized.

The outcome of this substep should be an inventory of:

— data available from existing sources and institutions;

— data that are likely to become available through further analysis, interviews, questionnaires, "snapshot" surveys, field visits, visits to institutions, etc. (see page 36).

4. *Identification of special studies that may be needed to complete the data and that can be conducted with available resources within the allotted time*

Special studies on a specific topic, problem, or category of people will sometimes be justified. In view of the time they can take and the risk of diverting competent personnel from the main task of assessment, such studies should be kept to a minimum. They should be undertaken only when it is considered that the results will be indispensable for meeting the operational objectives of the assessment. It is better to err on the side of caution when contemplating such studies.

5. *Designing a plan for data analysis and interpretation, based on the model*

The model is a convenient guide for organizing the analysis: it points to key associations and, by simply following the major causal chains "upstream", one can easily summarize the major findings. A tentative format for analysis and presentation can be established before data collection starts. The collection—or gathering—of data is made easier when there is already a preliminary scheme for analysing them.

6. Distribution of tasks

Tasks should now be distributed among the members of the assessment team. These tasks comprise both data-gathering and the initial processing. Here the model will prove helpful in the sense that broad areas in the model will show up clearly as the responsibility of one sector or institution. More specifically, the previous substep should have identified the data sources thus suggesting who should collect which information.

When the assessment is sizeable, involving a larger number of people and institutions, it is advisable to appoint individuals for specific tasks in data collection and/or analysis (preferably full-time). These appointments should be formally approved by the relevant authorities.

At this stage it is necessary to define the role of "outsiders", e.g., specialists who do not belong to the team: consultants; *ad hoc* subgroups created to assemble or interpret part of the data; field staff; and the actual communities where the assessment is being carried out.

Step 5. Consistency appraisal

Although this step is listed as the last prior to the actual collection of data, Steps 1–4 should be checked constantly for consistency and reappraised at the end. After completion of Step 4, the team will therefore reiterate Steps 1–4 and ensure conformity within the first four steps. Some or all of the steps may have to be modified.

For example, where there is a need to reformulate the justification or objectives of the assessment, Steps 2–4 should be amended to be consistent with the newly expressed objectives. The situation may then have to be reappraised. Changes in, or additions to, the team may be required. Similarly, the causal model may need improvement or the target group may need to be defined differently.

Two optional components of this step, which the authors have found useful, ought to be considered:

(*a*) *A renewed discussion of the assessment's objectives.* This is easier after model-building and the choice of indicators. The relevance of the whole exercise also becomes clearer, and the participants in the next phase—data assembly—see their role more clearly.

(*b*) A preliminary and relatively superficial exchange of views on the most suitable points at which to introduce interventions aimed at breaking some of the causal chains—in other words, *a preliminary look at potentially relevant interventions.* The benefits of this are the same as those mentioned in the preceding paragraph.

Experience shows that such discussions, even when informal, help each participant to understand the direction of the assessment better; to see the value of his or her own participation; and consequently to work with greater efficiency and satisfaction.

Step 6. Assembly of existing data

This step concerns *data-gathering* rather than data collection, since basically it is existing information that is to be used. In fact, *data-hunting* is often a more appropriate term.

The types and sources of data to be assembled and the institutions responsible for providing the data should have been identified in the course of Step 4. It is important to remember that this new phase can be approached only after completing Steps 1–4, and ensuring consistency between them (Step 5).

The first job is to organize the data-gathering, i.e., to establish a plan of work and a timetable, define procedure, and distribute tasks.

The plan of work should be brief, informal, and flexible. It will focus on the organization of data-gathering, which should be prepared with particular care. The advantages of good preparation are manifold and include:

— better distribution of tasks: the responsibilities of each individual or sector are clear, and everyone understands how each part of the data fits into the overall picture and what other people's contribution will be (the causal model is invaluable in determining each person's share of the work);

— greater consistency, as well as easier solutions to contradictions arising when data come from different sources or belong to different categories; and

— above all, the amount of time that is saved: good preparation avoids considerable wastage of time (fewer data to be collected, quicker collection when the location and the person responsible are identified beforehand and there is no overlapping, faster interpretation thanks to the causal model, etc.). This is extremely important since data-gathering is the most time-consuming phase of the assessment process.

All this can be done within a wide variety of operational modes, ranging from a small team working on a local project to a sophisticated national food and nutrition committee assisted by a group of specialized commissions.

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The following points should be noted:

(a) Operational organization

— Keep all data collected at one central place and make copies whenever a team needs information. (For this purpose there should be free and generous access to a photocopying machine throughout the assessment period.)

— Organize material according to the "boxes" laid out in the causal model.

— Design provisional graphs and tables at an early stage.

(b) Respect for established timetables

— Each person should produce his or her part of the information on time, even at the risk of some loss of accuracy. Periodic reviews can decide whether or not to delve further to improve the data, depending on other urgent tasks.

— Hold periodic meetings to discuss progress (clearly define the frequency and precise purpose of each meeting; write explicit agendas; make sure decisions are arrived at; implement decisions).

Once established, the timetable of operations must be strictly adhered to. It therefore needs to be drawn up with great care and realism. It is particularly important to decide on the frequency of team meetings for the purpose of reviewing the progress of data collection and embarking on preliminary analysis and interpretation.

(c) Advantages of preliminary analysis

Preliminary analysis is useful for the following purposes:

— Above all, to ensure that data are consistent and complete, thus making it possible to begin organizing the following step (analysis and interpretation).

— To check that basic assumptions are respected.

— To appraise the quality of the data. An estimate (at least) of the validity of the proposed correlations or of the stated differences between regions or groups should be attempted if statistical significance cannot be established. The authors must make a judgement of the assessment, not leave it to the reader. If some

data do not seem adequate, but appear to be useful for purposes of comparison (between periods, places, groups), they should be mentioned. An intuitive judgement is better than none at all.

— To identify gaps in information.

— To make sure that the assessment will fulfil its objectives.

— To introduce any necessary changes—for example, in the plan of work, the model, the timetable, or the choice of data.

Step 7. Analysis and interpretation of the data

This follows the order suggested by the causal model. The boxes in the upper part of the model (i.e., nutritional status and its most immediate determinants) are discussed first, then major chains are analysed and data put together to support (or reject) the relationship represented in the model. The same order can profitably be used in writing the report.

Experience shows that the simpler the model, the easier and quicker the analysis.

The analysis and interpretation of the data are the responsibility of the team as a whole, rather than the individual sectors involved, although the sectors will often be invited to process or reprocess part of their own data. Analysis and interpretation should be short, in terms of both the time taken, and the amount of space they occupy in the report.

As already mentioned, preliminary graphs and tables, as well as maps, when appropriate, are useful when time is limited, and early tentative conclusions will help save time. Step 6 (data assembly) and Step 7 are a continuing process: analysis and interpretation begin while data-gathering is still in progress.

The nutrition situation should be not only described, but also explained, i.e., consideration should be given to the causes and the mechanisms involved.

Time trends should receive attention, and an attempt should always be made to project the past and present situations into the future.

The team should constantly keep the objectives of the assessment in mind and discard irrelevant data (any data not consistent with both the objectives and the causal analysis). This will eliminate the risk of complicating the analysis and arriving at inconsistent conclusions.

Note on equipment

Microcomputers. Most of the assessments reviewed for the preparation of this guide were conducted before microcomputers were widely available, and more recent reports do not specifically mention them. Their advantages over manual processing systems are obvious, and they probably have advantages over larger computers (sectoral computers or centralized data-processing units with remote terminals), but these are still not documented. There are many reasons why microcomputers are likely to be an essential tool for future assessment teams. As well as providing information extremely rapidly, they make it possible to obtain more accurate and more relevant information (for example, by offering alternative ways of processing and presenting data, thereby allowing a more appropriate choice from a wide range of possible forms of presentation, including maps). Another valuable use is in processing texts and therefore saving time in the drafting, reviewing, and editing of a report that must be approved by several people.

Photocopying. The value of unrestricted access to photocopying facilities throughout the assessment has already been stressed.

Overhead projector. The use of an overhead projector and transparencies is particularly helpful in discussion of preliminary data. It has an advantage over either the blackboard or paper sheets in that transparencies can be photocopied and then used for further analysis and interpretation by various people simultaneously.

Transparent maps. Transparent maps, drawn to the same scale and therefore easy to overlap, are useful for comparing the distribution of various indicators between geographical areas or administrative subdivisions. Using carefully chosen colours, combinations of indicators permit the identification of problem areas. However, this approach does not seem to be used as often as its usefulness would indicate.

Step 8. Presentation of the findings and conclusions

General remarks

— The presentation of the results should first be rehearsed within the team and then, if time permits, tried out on selected reference people (specialists) prior to final drafting and formal presentation to the authorities or to the public.

— The presentation of results should be consistent with the objectives of the assessment.

Format of the final report

The written report might contain:

(*a*) A *summary*, of 1–1½ pages, intended for politicians (similar to the "executive summaries" used by many agencies).

(*b*) A relatively detailed *table of contents*, broken down sufficiently to allow the reader to find the specific information he or she needs without necessarily having to read the whole document.

(*c*) A *short text* presenting the conclusions, based on a few selected tables and figures (the minimum number needed to support the conclusions). The text needs to be brief for three basic reasons:

— it will be read more carefully and by more people;

— it will cost less, its publication will take less time, and it will be possible to print more copies, permitting wider and more rapid circulation;

— it will be more efficiently proof-read and edited and therefore less likely to contain errors.

The text should briefly describe the nutritional situation, providing an explanation of its causes and, whenever possible, projections into the future. It should follow a logical order of presentation derived from the model, which should also be included.

All other relevant information should be presented in an annex. All non-relevant information should be discarded, regardless of its intrinsic merits.

(*d*) A separate volume of *annexes*. This is optional, but generally useful, and has the advantages that:

— the first volume (i.e., the text itself) can be printed and circulated without being delayed by the production of the second;

— the volume of annexes does not need to be reproduced in as many copies as the report itself.

The volume of annexes might contain material such as:

— the data used for the consolidated tables, figures, and maps in the report itself, properly and clearly disaggregated (tables, graphs, maps, diagrams);

— a selection of information used wholly or in part in arriving at the conclusions;

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— a description of the methodology employed, including the time spent, the cost, the number of people involved, constraints, etc., together with a review of the data sources and an appraisal of their reliability to assist those wishing to draw their own conclusions;

— a list, with full addresses, of the participating institutions;

— the names and jobs of the people who have participated in the assessment;

— a comprehensive list, with full and accurate references, of the documents consulted.

Common mistakes made in presenting nutritional assessment reports

A review of approximately twenty assessment reports highlighted a few mistakes that are made repeatedly. These are discussed in Annex 3, page 60.

Chapter 3

GENERAL CONSIDERATIONS

Approximate timing

The following steps may be found useful in establishing an approximate timetable for the assessment. A rough estimate is given of the length of time each step might take in a typical national or regional assessment.

Step 1. Justification and definition of the assessment

This involves answering a certain number of questions about which all decisions will usually have been made beforehand, and it should not take more than a few days (if it does take longer, then the assessment cannot really be considered to have started).

Step 2. Preliminary appraisal and reconnaissance

This should not take more than one or two weeks, often less. If the territory is particularly extensive or unfamiliar, it may take a little longer.

Step 3. Setting up a team

This can, at least in part, be done at the same time as Steps 1 and 2. In itself it does not take much time. The major delay occurs when people need to free themselves from their current obligations. Allow an additional week.

Step 4. Building a causal model and choosing indicators

With good tutoring, this can be achieved in 6–9 hours of intensive work, with a maximum of $2\frac{1}{2}$–3 hours per day. In practice, this means approximately 3–5 half-days. usually spread over a period of 1–2 weeks.

Sometimes this step may take longer, since it is vital that all team members should participate in all model building sessions. Dates convenient for everybody need to be agreed upon. However, some of the basic data-gathering can take place in the meantime, saving time on the stages that follow.

The preparation phase, namely Steps 1–4, will therefore last 3–5 weeks. It is normally difficult to make it shorter, since its duration

will depend on a number of external factors. If, however, the assessment is backed by strong political will and support, and if relevant preparatory sectoral work has already been done and abundant manpower and resources are made available, then the time required can be substantially reduced.

Step 5. Consistency appraisal

Consistency should be a constant concern, and since its appraisal can be carried out in parallel with the earlier steps, it should be completed almost simultaneously with Step 4. Nevertheless, a couple of days should be allowed for it in the timetable.

Step 6. Data-gathering.

It is impossible to specify exactly how long this essential step should take. Between 6 and 9 weeks should be allowed. The actual length will depend on the total time available to meet the deadline, making allowance for the preparation period (Steps 1–4) and for the expected duration of analysis and reporting.

Step 7. Analysis and interpretation

As indicated above, as much preliminary analysis as possible should be performed during the period of data-gathering. However, a few weeks need to be reserved for the final analysis (4 weeks at the most, otherwise it would go beyond an "assessment", as it is understood in this guide).

Step 8. Presentation of the results

If the instructions are followed, this step can be completed in a couple of weeks. A couple more weeks should be added for typing and reproduction: total 3–4 weeks.

Accepting these rough estimates, the total time taken would be around 25 weeks, broken down as follows:

Step	Duration in weeks	
	Minimum	Maximum
1	1/2	1
2	1	2
3	1	2
4	1	2
5	1/2	1
6	6	9
7	3	4
8	3	4
total	16	25

Since some steps may overlap, it might be possible to cut down on the estimated minimum of 16 weeks—although to conduct an assessment in less than 3 or $3\frac{1}{2}$ months seems extremely difficult. With a duration of more than 6 months, it is reasonable to ask whether the exercise is still an "assessment". However, it should be emphasized that the timetable above should be taken only as a broad guide, to be adjusted in the light of further experience. Situations in which a strict deadline must be met include those in which an agency requests a national assessment to be completed in a specific time, as occurred in Honduras (see Annex 3). Sometimes a more flexible timetable would be possible, for example when a government is preparing a 5-year plan.

There is one specific situation in which the assessment can be performed in much less time. This is when it is part of a project in which all the initial decisions and answers (Steps 1 and 2) are already clear, a team is already operational, and information can be collected easily because it is part of the broader project.

Common constraints

From the outset, this guide has recognized four main constraints; the need to meet a deadline, financial considerations, the limited time available to qualified personnel, and the need to rely primarily on existing information. In using the guide, additional difficulties are likely to appear. A fairly thorough review of assessment documents, and the authors' own experience, tend to show that almost every step in the proposed procedure is subject to particular constraints. The major constraints observed are reviewed below.

(a) *Incomplete or unsatisfactory prior decisions with regard to objectives, scope and distribution of responsibilities* (Step 1), *and the organization of the assessment*

The decision to conduct an assessment is often made with only a vague purpose in mind. The terms of reference may contradict stated (or unstated) policy, or the decisions may indicate a poor understanding of nutritional problems on the part of the policy- and/or decision-makers concerned.

In such situations, the planner or nutritionist must make his or her own assumptions regarding the intentions of the sponsors, even at the risk of making mistakes. On the other hand, he or she might use the opportunity to urge a more rational and better-informed consideration of the problems to be investigated.

(b) *Setting up a team* (Step 3)

Difficulties arise on such questions as: Who has the task of setting up the team? What is his or her authority or responsibility? How will the

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choice of participants be made and what will be the criteria? How is the assessment to be presented to the potential participants and how much importance will it be given? How much time will the selected participants be able and willing to spend on the assessment? Are there precedents of joint work involving various agencies and ministries? Has there already been an effective collaboration in the elaboration of projects or in joint field work regarding nutritional problems?

(c) Analysis of the causes of malnutrition in the population (Step 4)

Two objections are commonly raised when this step is reached. It is claimed that identifying the causes of malnutrition is a complex and difficult task, and that such an analysis is unlikely to work in practice.

In fact these objections are less valid than is generally believed. First, given the proper back-up, qualified and experienced people who are familiar with the area can quite easily identify the major causal chains leading to malnutrition. Secondly, the usefulness of the causal model for identifying major points of intervention aimed at breaking some of the causal chains, and for selecting relevant indicators, has been well established in a variety of circumstances.

(d) The assembly of existing data (Step 6)

An important constraint, often explicitly referred to in the assessments reviewed, is that the information available may be unsatisfactory in various ways. The data may be:

— incomplete;

— unreliable;

— insufficiently or inadequately disaggregated with respect to the objectives of the assessment;

— not representative of the population group studied;

— not valid, i.e., not measuring what they are expected to measure (because of the data-collection methods employed, the characteristics of the indicators, etc.), too old, obsolete;

— restricted, classified.

(e) The analysis, interpretation, and presentation of the results (Steps 7 and 8)

The implementation of Steps 7 and 8 depends in part on an available, competent, reliable, flexible, and fast-working secretarial service and

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access by the team-members to key support facilities, such as equipment for photocopying and data-processing, overhead projectors, etc.

Although the constraints above may seem obvious, the fact remains that if they are not adequately appraised by the team at the planning stage, there may be important delays in the completion of the assessment, wasting time that might have permitted the study to be carried out in greater depth.

Mistakes most commonly made in the presentation of assessment reports

The following list of common mistakes was established after reviewing some twenty nutritional assessment and survey reports. It is concerned with shortcomings of the assessment document itself, and not necessarily with the manner in which the assessment was conducted.

(a) Objectives

They are often too vague or too general, or, in a few cases, not defined at all.

(b) Organization of the assessment

In many reports little information is provided on the cost of the assessment, the time spent on it, the number of people involved, or the constraints faced at different stages. In a few cases, the considerable amount of work done seems out of proportion to the rather meagre results.

(c) Data

Some or all of the following shortcomings are found:

— there are no explicit basic assumptions that would justify the choice of data;

— a great many data are presented without clear selection, and unreliable or unrepresentative data are presented without any comment on their relevance or validity;

— data are inadequately or insufficiently disaggregated according to population group, age groups, location, etc.;

— trends are not considered.

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(d) Causality

The nutritional situation is described without an explanation of its causes. When an analysis of the causes is attempted:

— it is very descriptive and general;

— no clear hypotheses are formulated regarding the choice of causal factors;

— no statistical measurement of the correlation between nutritional status and presumed causes is provided;

— the significance of observed differences between regions or groups is not estimated or calculated.

(e) Analysis, interpretation, and conclusions

— Data provided in the report are often not taken into account in the analysis.

— Inconsistencies are frequent between the objectives and the conclusions of the assessment, or between the conclusions and the recommendations. Recommendations sometimes reflect the prejudices of the authors and are clearly not derived from the data.

— Proposals for action are not ranked in order of importance and/or according to the nature of the sector that should be involved in the intervention.

(f) Format of the report itself

Reports are generally lengthy and heavy, laden with only partially useful (or frankly useless) information, while lacking a good summary of the work done and the conclusions reached. Readability is affected by insufficient editing of chapters written by different people, poor proof-reading, and inadequate presentation of tables.

Existing data versus new data

From a pragmatic point of view, three categories of assessment data can be considered:

(1) existing data that are readily available (published reports or articles, official government or international agency statistics, books, etc.);

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(2) existing data that require a certain amount of "hunting" or "digging", i.e., an active search in files, regional offices, private libraries, etc. (this category also includes information collected by listening to people and recording their impressions and opinions and the facts they report);

(3) "new" data, i.e., prospective data that need to be collected through surveys and special studies.

The present guide uses categories 1 and 2 almost exclusively. The generation of new data is amply covered in the literature and is not our concern here.[1] One of the basic assumptions made in the present document is that it is necessary, and possible, to conduct an assessment using only the information that is both absolutely necessary and easily available.

There are, however, intermediary situations in which constraints with regard to time and/or resources are not as severe as they are assumed to be here. In such cases a certain amount of data-generating is possible, i.e., the assessment team may use a combination of existing data and of newly collected data. The latter may include short surveys and special studies.

If the time constraint is less strict, or if time is short but financial resources and qualified manpower are generously available, then a quick survey can bring highly efficient returns.

There is, furthermore, a very specific but common situation in which a combination of old and new data is particularly desirable: that is, when the assessment exercise is part of the preparation of a project.

Nutritional assessment as part of project preparation

When a primary health care project or a rural development project is being prepared, and its promoters wish to incorporate a nutrition component, they often require a nutritional assessment which, ideally, should be performed during the project identification[2] stage and form part of the overall diagnosis normally carried out at this stage. A preliminary appraisal should have been conducted during the earlier period when the project was conceived and the nutrition component was taken into consideration.

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[1] See: INTERDEPARTMENTAL COMMITTEE ON NUTRITION FOR NATIONAL DEFENCE. *Manual for nutrition surveys*, 2nd ed. Bethesda, MD, National Institutes of Health, 1963; JELLIFFE, D. B. *The assessment of the nutritional status of the community*. Geneva, World Health Organization, 1966; CASLEY, D. J. & LURY, D. A. *Data collection in developing countries*. Oxford, Clarendon Press, 1981.

[2] Investment agencies commonly distinguish four stages in the process of project preparation: (1) idea of project; (2) project identification; (3) project formulation; and (4) evaluation of the project as designed.

Quite often, however, the decision to carry out a nutritional assessment is made during or after the identification period. In such cases, the assessment has to be carried out in parallel with—or as part of—the *project formulation* itself, and the best combination of assessment procedures with new data-generating activities will have to be found on an *ad hoc* basis. The collection of additional data, including surveys when needed, may be incorporated into the general intensive collection of data which is part of the project diagnosis and which usually brings together more refined and disaggregated data (both for setting up targets and for establishing a baseline for the future monitoring and evaluation of the project as a whole).

Analysis of ongoing programmes

Since a nutritional assessment is justified only if it represents a preliminary step towards action, it is important to know and appreciate the context in which the anticipated action will take place.

The depth of such an appraisal will depend on the objectives of the assessment. It seems to be particularly justified when the aim is to:

— formulate or analyse the objectives of a nutrition policy (or of the nutritional component of a development or sectoral policy);

— contribute to the selection of interventions or major project components.

The context can be examined in two ways:

— through a simple inventory of government options and ongoing programmes; or

— by in-depth analysis of expected and observed outcome.

In spite of its interest, the second alternative requires too much time and does not seem to be feasible within the limits of an assessment. It seems preferable, therefore, to compare, on the one hand, the interventions that were identified as a result of the causal analysis with, on the other, those already being implemented and the general government policy. This would avoid duplication and, perhaps, contradictions. Quite often one will find that certain interventions were implemented in the past and later abandoned. It might be interesting to know the reason why.

Linked to this point, and very much within the scope of an assessment, is an appraisal of the constraints (mainly with regard to personnel and infrastructure) that may have hindered the successful implementation of relevant interventions in the past or may do so in the foreseeable future.

BUILDING A HYPOTHETICAL CAUSAL MODEL OF A NUTRITIONAL SITUATION

General

To assess and understand a particular nutritional situation, a certain number of variables must be studied. These variables are chosen because they are presumed to influence, directly or indirectly, the nutritional status of the population under scrutiny. We will call such variables *factors*, or *causal factors*. In selecting these variables, a hypothesis about their role as causal factors must be formulated, i.e., a *causal hypothesis*.

As we have said, a variable can influence nutrition directly or indirectly. In the latter case, it acts through one or more other factors. Each of them is a *link* in a *causal chain* leading to the nutritional status. These chains are merely sets of hypotheses. Even if a statistically significant association is found between two factors, such an observation would in no way establish causality. Causality can only be established through individual observation, which can seldom be made under the usual conditions of an assessment.

There are a number of ways of formulating hypotheses prior to selecting the variables to be studied. The method adopted here assumes that causal hypotheses can be organized into a "hypothetical causal model" [1] This is a set of organized and hierarchical causal chains linking together the factors that play, or are supposed to play, a role in a particular nutritional situation.

A causal model can be built in two ways. One way is to begin with the most fundamental social, economic, and even political causes and progress downwards towards the final outcome, seen as the result of converging influences. The other, which is the one used here, begins with the dependent variable and builds the model through a successive breakdown of the factors presumed to play a causal role. Experience shows that this second technique is more useful in practice.

Although the relationships cannot always be demonstrated during an assessment, this does not imply that the whole model is inconsistent.

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[1] There are many possible definitions of the term "model". A model is understood here as a "simplified representation of a process or system".

The proposed method can still help to identify important variables and their possible place and role and therefore provide a justification for studying them. The method avoids a hasty choice of variables, allows the amount of data to be reduced to the minimum that is both relevant and feasible, and in particular, ensures that all important intermediary links are included.

In practice, the model is custom-made to the needs of the assessment team. It is constructed progressively and based on the experience and knowledge of the multidisciplinary group. The model-building exercise is not just a means of generating new knowledge, but also a process whereby the understanding and knowledge of all the participants can be organized and shared. If the few conditions and rules described below are respected, the exercise will be easy to carry out in progressive steps, and participants will almost invariably be satisfied both with their own involvement and with the outcome.

Conditions

It is essential that all participants involved in the assessment should be present throughout the model-building process. The number of participants should not exceed 15, although at a later date the details of the more specialized components of the model (e.g., health services, agriculture, etc.) can be worked out by subgroups.

Model-building sessions should last no more than $2\frac{1}{2}$ –3 hours in one stretch, and there should preferably be only one session per day. Exercises of this kind are new to some people and can become a strain, reducing concentration. To avoid this, it is better to spread the exercise over a few days.

The total amount of time required will vary widely, depending on the level of analysis, the complexity of the situation, and the purposes of the exercise. Broadly speaking, the organizers should allow for 3–5 sessions, spread over an equal number of days. The time between sessions can be profitably used in assembling documents and data, completing the reconnaissance period, if necessary, etc. In the rare situations in which time is particularly short, there could be 2 sessions a day, but this would reduce efficiency.

The room in which discussions take place must be comfortable, and the work should be uninterrupted. Participants should not be permitted to come and go: they need to be fully involved. A blackboard will be needed (or a generous supply of paper with markers). If one of the participants already has experience of model-building, he or she should lead the exercise. If not, a moderator must be elected, who will stand at the blackboard. A secretary must also be appointed to write down comments and to make a tidy drawing of

the model after each session. It may be desirable to rotate these roles since it is difficult to contribute to the discussion and record things at the same time.

Preliminary discussion

The exercise begins with a general, unguided, and free discussion on the presumed causes of malnutrition in the population under consideration. The debate should be restricted to factors acknowledged to be important or highly probable causes of malnutrition, and generalities should be avoided: the discussion-leader will have to remind the group of this fairly often. Ideally the discussion should deal with the most immediate factors, since the more fundamental aspects will come up anyway as model-building progresses.

The factors suggested by the participants are written on the board in the order in which they are mentioned and as long as the rest of the group agrees; no attempt to rank them is made at this stage. The following example refers to the situation in a particular rural area:

Factors contributing to malnutrition

poverty	no potable water
poor feeding practices	high price of fertilizer
lack of land	drought
insufficient food production	measles
ignorance on the part of mothers	too many children to feed
food lossess	credit too expensive
exploitation	health care too far away
diarrhoea	

The list of factors should be as specific as possible. Terms such as "poverty", "poor sanitation", "socioeconomic conditions", or "low production" are too general and should be replaced by more precise definitions of the factors recognized as contributing significantly to malnutrition in the population.
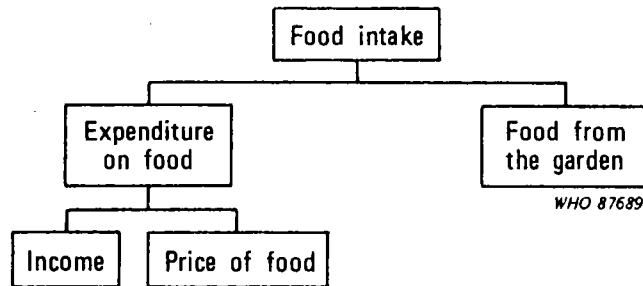
If the moderator is familiar with the type of model under discussion or is well prepared for the role of moderator, he or she will be able to point out that many of the factors proposed by the group are actually linked to each other. One factor may be influenced by another (expenditure on food is influenced by income) or influence another (expenditure on food influences food intake). Such factors can be connected sequentially, as links in a chain.

Example:

Income ⟶ Expenditure on food ⟶ Food intake

WHO 87688

41
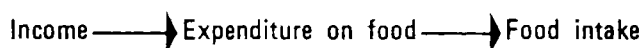
But food intake can be influenced by many other factors, such as the amount of food coming from the garden or the price of food (which, in turn, affects expenditure on food). This can be represented diagrammatically in the following manner:
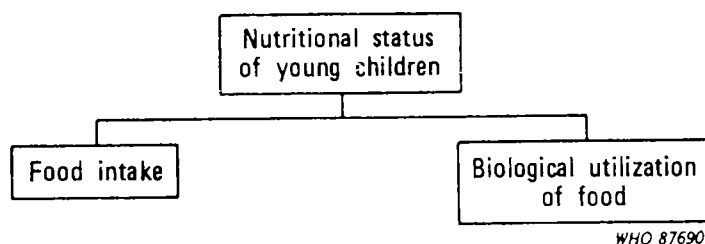
```
                     ┌──────────────┐
                     │ Food intake  │
                     └──────────────┘
              ┌─────────────┴──────────────┐
      ┌───────────────┐            ┌───────────────┐
      │  Expenditure  │            │   Food from   │
      │   on food     │            │  the garden   │
      └───────────────┘            └───────────────┘
       ┌──────┴──────┐                  WHO 87689
  ┌─────────┐  ┌──────────────┐
  │ Income  │  │ Price of food│
  └─────────┘  └──────────────┘
```

In this new representation the dependent variable is at the top. This is broken down into two variables one line below. The box "expenditure on food" is then broken down further. Arrows are unnecessary once the convention that causality flows upwards is established. (In fact, the use of arrows should be discouraged because they create confusion.) Thus, causal chains are a series of causal hypotheses, ranked in logical succession, branching out when needed. Causality is presented as an upwards movement from the most remote and basic causes at the bottom of the complete model, to the more immediate causes, and finally to the dependent variable. Each hypothesis can be expressed in a simple sentence ("expenditure on food is one of the factors that affects food intake", or its equivalent "food intake is affected by, among other factors, expenditure on food"). The model is a set of hypotheses linking probable and proved causal factors of malnutrition with each other, in a consistent, logical, and easily understood manner.

Since it is convenient to use a diagram for both building and representing the model, this method is widely favoured.

Starting to build the model

Model-building starts by considering the dependent variable: for example, the nutritional status of young children. Malnutrition in young children can be explained—so the first hypothesis goes—by two factors: the amount of food they eat, and the proportion their bodies actually utilize.

This can be represented diagrammatically in the following manner:

```
           ┌─────────────────┐
           │ Nutritional status │
           │ of young children  │
           └─────────────────┘
                    │
        ┌───────────┴───────────┐
  ┌───────────┐         ┌──────────────────┐
  │ Food intake │       │ Biological utilization │
  └───────────┘         │      of food          │
                        └──────────────────┘
```
WHO 87690

This is a very simple model of malnutrition. It provides more information than a mere statement of the prevalence of malnutrition, because it offers the beginning of an explanation. It shows that malnutrition can be caused by factors that eventually lead to an inadequate intake of food, or to poor utilization of food, or both.

Food intake and utilization can both actually be measured (at least in experimental situations) and this double hypothesis could therefore in theory be tested. Each of three boxes can be expressed through the use of indicators that are specific to it.

Examples

nutritional status: — percentage of children with weight for age more than 25% below standard
                           — mortality
food intake: — percentage of children with energy intake more than 10% below recommended allowance
utilization: — proportion of children who do not utilize protein adequately.

This first box was broken down into two components. Each component can now, in turn, be the point of departure of a new breakdown, as shown in Fig. A1.1. The building of the model thus proceeds as a succession of breakdowns. The process of construction moves from the top towards the bottom of the graph. Each box can be considered as the dependent variable towards which all the breakdowns beneath it converge. A causal model is thus made up of a number of linked sub-models.

Certain characteristics of hypothetical causal models, and the basis of some of the rules for building them, cannot be developed here, although they are part of the general methodology (the nature of the breakdowns which are sometimes logical sums or products; the rejection of feedback loops; the non-consideration of horizontal links, etc.).[1]

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[1] *See:* BARTIAUX, F. ET AL. La mortalité aux jeunes âges: un essai d'approche explicative interdisciplinaire. In: *Infant and child mortality in the Third World.* Paris, Comité International de Coopération dans les Recherches Nationales en Démographie/WHO, 1983, pp. 161–176.

Fig. A1.1 Example of a hypothetical causal model
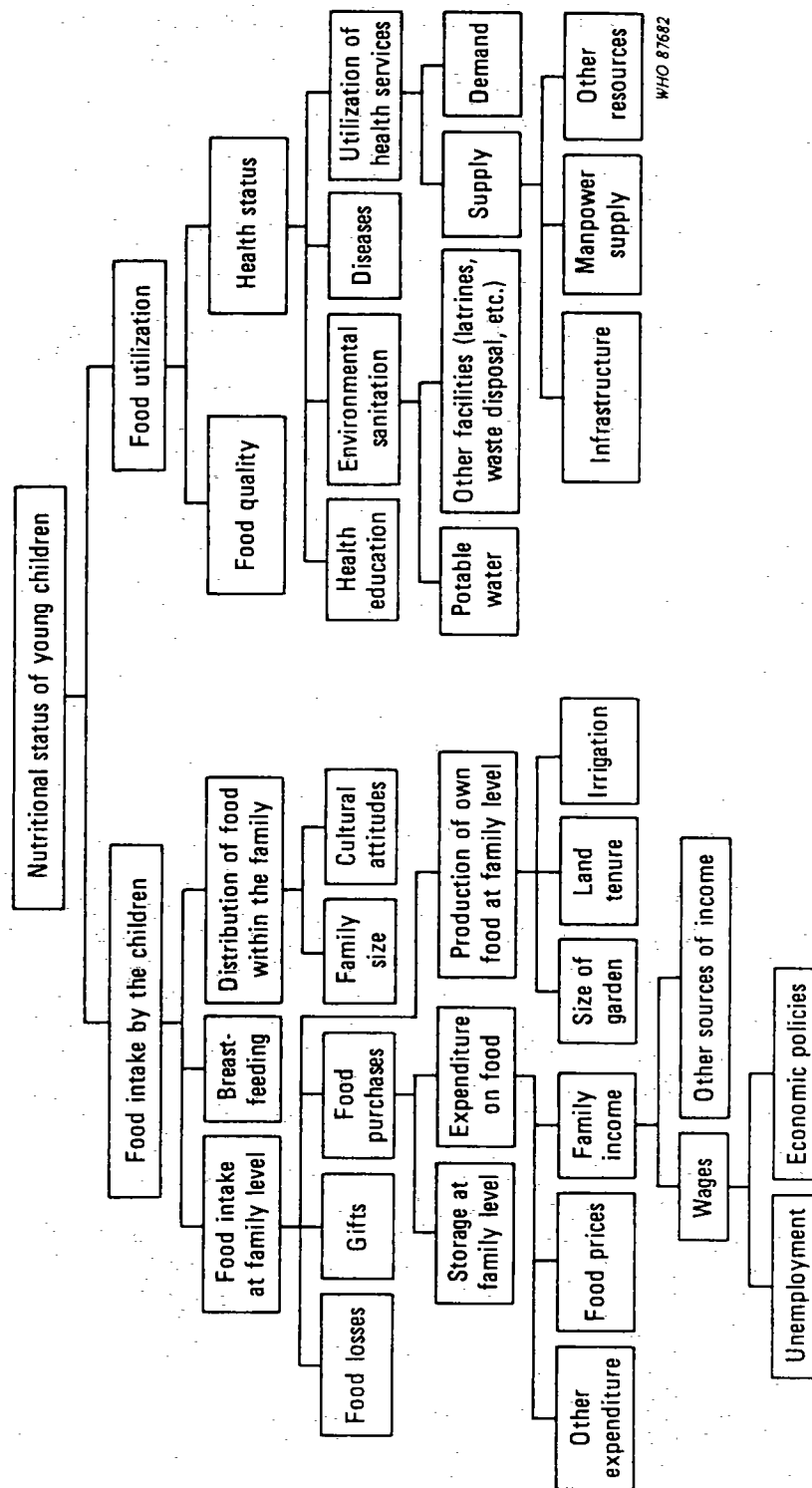
WHO 87682

Completing the model

To avoid major omissions or logical errors, a few general rules must be respected.

(*a*) The construction of the model should, as far as possible, proceed line by line. It is not appropriate to develop one or more chains on one side of the model before completing all the horizontal lines above. The upper parts of the model deserve particular attention.

(*b*) Identification of indicators is necessary whenever new boxes are being added. When the group is agreed upon a new breakdown, indicators for quantifying the newly identified factors will be selected and written down. If the selection of indicators is left until a later stage (i.e., to the end of the model-building procedure), inconsistencies will appear and extra work on corrections will be required. Further-more, if indicators are identified as the model is being built, the content of each box is made more precise; any misunderstanding within the group as to the meaning of each factor represented by the box will thus be avoided.

(*c*) People unfamiliar with such models tend to cite as causes factors that do indeed influence the variable under consideration, but only in a very indirect manner.

For example, a low wage can be given as one of the causes of low food intake by children. This is basically correct. However, the model requires more than this kind of statement: it aims at providing an *explanation*, an understanding of the *mechanism* involved. It is therefore essential to identify all possible intermediary steps. In our example the chain can be broken down at least into the following intermediate links: low wage—low family income (also influenced by other sources of income)—low purchasing power (also influenced by prices)—low level of food purchases (also influenced by other uses of money)—low food intake by family (also influenced by intake of food that has not been purchased)—low intake by children, etc.

Only the factors that are deemed important by consensus should be kept. Participants alone can decide on this matter, since they will have to assemble and analyse the data. Time and resources being scarce, the choice of variables must, of necessity, be extremely selective.

(*d*) A common mistake is the inversion of causality resulting from an effect rather than a causal factor being written under a given box. This is due in part to difficulty in grasping the logic of the deductive approach, but probably even more to the unusual situation in which the construction of the model goes "backwards" from effect to cause.

If not detected and corrected immediately, such mistakes may block discussion and lead to a considerable waste of time. This is a serious cause of delay in model-building and often tends to occur at the end of working sessions, when participants are beginning to feel tired. This is a reason for spreading the exercise over a number of short sessions.

(e) Inevitably in a well elaborated model, some boxes cannot be quantified and the team will struggle to identify indicators. Such boxes fall into two categories:

— boxes or factors that cannot be quantified because of their nature (those reflecting a propensity, a capacity, a desire; for example, appetite, capacity to produce breast milk); and

— others that can be measured under experimental conditions, but not under the usual conditions of an assessment (for example, biological utilization of nutrients).

Although no indicators will be identified for these boxes, in some cases the model builders may prefer to keep them for the sake of clarity. There is no objection to their doing so.

(f) Loops are ignored in this type of model (i.e., feedback effects of one variable on one of its causal factors). This is a compromise for the sake of simplification; it should be remembered that the procedure is designed to clarify a complex set of mechanisms and to permit more rational selection of variables.

(g) Similarly, horizontal lines are deliberately discarded. If the same factor appears in different places in the model, it is simply repeated, but broken down only once, at the place where it would seem most relevant. A good example is "level of education", which may appear to be a causal factor in activities such as distribution of food within the family, purchase of food, utilization of the health services, use of potable water, etc. In fact, a closer look will show that even if "educational level" appears in many places, the content of the box will be different in each place. There is a very positive trade-off from this observation: at the time of selecting interventions and, for example, deciding to implement education, the content of the intervention will be determined by the place(s) "educational level" occupies in the model. In our example, the education component of the intervention would aim at: (i) changing the attitudes and behaviour of the people towards the type of food purchased and distribution within the family that would be more adequate to the children's needs; (ii) ensuring a better use of the health centre or the maternal and child health clinic; and (iii) promoting cleanliness and care in the use of drinking-water.

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(*h*) Another common cause of perplexity among model-builders is deciding where to stop the analysis; if the construction of the model was unrestricted, it would come close to a full-scale model of socioeconomic development! Where to stop depends on the following considerations:

— *The level at which the model is to be applied* (the geographical area and/or the level of decision-making). Chains can be broken down until they reach factors that, to be changed, would require decisions to be taken at a different level. Anything beyond the decision-making capacity of the level under consideration (i.e., in the lower part of the model) should be acknowledged as a constraint for the purposes of the assessment or project, and not be analysed further.

— *The purpose of the analysis.* Relevance and feasibility will limit the choice of indicators. When the analysis is a preliminary one prior to a sectoral programme or intervention, the areas of the model that correspond to the sector will be developed further.

— *Political feasibility.* In some cases it would not be politically acceptable to pursue the analysis beyond a certain point; for example, where it puts into question fundamental political choices or basic structural aspects of the social and economic system. Whether or not to accept such limitations—or under what conditions to tolerate them—is an ethical problem of great importance.

In sum, the value of the method lies in the fact that it allows the use of the upper part, or one side, or one area of the model only, and still remains consistent.

(*i*) The need to remain faithful to the local situation cannot be overemphasized. The team must stick to reality and resist the natural temptation to generalize. The moderator must be aware of this and prune out what is not clearly relevant and important. If this is not done, the model will become too complicated, and hence confusing, and too many variables will need to be collected or assembled, which wastes time. Oversimplification is generally a lesser evil than overcomplication (see Annex 3 for an example of a very simple model, developed for Honduras).

(*j*) Lastly, it is recommended that the moderator use the general rules (*a*)–(*i*) above as a checklist at the end of each session to help organize the work for the following session. Provision should be made for this extra work, especially if one person takes on the role of moderator throughout the exercise.

Some remarks on the diagrammatic presentation of the model

The diagrammatic mode of presentation, whereby the dependent variable is placed at the top and the causes are broken down in successive horizontal layers, has proved to be the most convenient. The model can, of course, be built from left to right, in which case the causal chains are roughly horizontal, but this is generally less convenient.

Rectangular boxes have the advantage of clarity and tidiness. The use of different shapes as symbols representing boxes of different kinds only complicates matters. The same applies to dotted, sharp, or darkened lines, etc.

Since the type of organizational chart used here seems to be the best for communication, it should be strictly adhered to. All lines should be either horizontal or vertical, and cross at right angles. Oblique lines and curves tend to generate confusion.

The model should not necessarily be shown on one sheet of paper only, but broken down over as many sheets as are required for clarity of presentation. Seeing a complete model all at once can discourage an inexperienced reader, and most models are unsuitable for reproduction as a whole (they have either to be reduced—in which case they become illegible—or folded, and then they become impracticable). In breaking a model down, any box can be used as the top box on the new sheet, although it is better to be selective so that as far as possible each sheet represents a self-contained submodel. It is important to link each sheet clearly with the previous sheets, either by repeating a few boxes at the top, or by using code numbers or letters (see the example from Ecuador in Annex 2).

Nevertheless, it is useful to have a copy of the whole model on the wall of the room in which the assessment team meets and works. Large letters should be used so that everyone can read it from his or her seat.

CHOICE OF INDICATORS FOR NUTRITIONAL ASSESSMENT

This annex contains:

— a list of indicators commonly found in assessment documents;

— an example of the use of a causal model to select relevant indicators; and

— a procedure for organizing data collection and the distribution of tasks.

Commonly used indicators

The list of indicators presented in Table A2.1 is based on the observation that, in published assessment and survey reports, a certain number of indicators are almost always present (because they respond to the needs of most assessments or because they are easy to collect and therefore generally available (whether relevant or not), or simply because of tradition). A few less common indicators have been added to this basic list, reflecting the fact that nowadays a causal analysis may use factors that were given less prominence in the past.

For the sake of presentation, the indicators are grouped into major categories which correspond, broadly speaking, to individual sectors. In each particular situation, a strict choice of indicators must be made to save time and money and avoid undue complexity. The selection is based in the first place on the relevance of the indicator to the local situation, and secondly on the feasibility of gathering information in a satisfactory manner.

Relevance is best assessed by referring to the causal model built for the situation under study. This point is illustrated below.

Use of a causal model for selecting indicators

The causal model reproduced on pages 53–55 (Fig. A2.1) was designed by the local multidisciplinary team in charge of a rural development project in the mountain area of Ecuador in 1982. No attempt has been made to correct the few obvious mistakes, though minor modifications have been made to ensure consistency.

Table A2.1. Commonly used indicators

Category	Factor	Data to be collected	Indicator and suggested cut-off points[a]
nutritional status	growth retardation	birth weight	percentage of infants born alive with a birth weight ≤ 2.5 kg
		weight for age	percentage of children with a weight <75% of standard weight for age (or more than 2 s.d. below standard or <3rd percentile)
		height for age	percentage of children with height (length) <90% of standard height (length) for age
			percentage of 7-year old school children with height <90% of standard height for age
		weight for height	percentage of children with weight below 80% of expected weight for actual height
		arm circumference	percentage of children with less than 75% of expected arm circumference for age or for height; percentage of children in red and yellow zones, if tape being used
	clinical malnutrition	presence of clinical signs of malnutrition	prevalence (percentage of people examined with clinical signs present): goitre, xerophthalmia, bilateral oedema of lower limbs, night blindness, etc.
			percentage of recognized cases of malnutrition diagnosed as marasmus, kwashiorkor, or marasmic kwashiorkor
		observed morbidity	percentage of children under 5 with diagnosis of malnutrition at first visit, or on admission to hospital, regardless of the reason for consultation or hospitalization
	biochemical alterations	blood haemoglobin	percentage of individuals with haemoglobin below standard level for age, sex, and physiological status
		plasma retinol	percentage of individuals with retinol below 200 µg per litre
	mortality	preschool mortality rate	deaths of children aged 1-4 years per 1000 children in the same age group
		case-fatality rate	percentage of children who die in hospital, malnutrition being mentioned as the basic or associated cause of death, out of total number admitted for or with malnutrition
		proportional mortality	percentage of deaths of children aged 1-4 years (or under 5 years of age) over total number of deaths
		infant mortality rate	deaths of children aged 0-11 months per 1000 live births

food intake	breast-feeding	weaning age	average age at weaning (age at which 50% of the infants no longer receive breast milk)
			percentage of children still breast-fed at 3, 6, 9, or 12 months
	food intake of the young child	daily calorie and protein intake	percentage of children with calorie intake below recommended daily allowance
			percentage of children with protein intake below recommended daily allowance
	food intake of the household	daily calorie and protein intake	percentage of families eating on the average less than the "family basket"
	biological value of food	protein quality	average net protein utilization (NPU) rate of average diet
			percentage of calories of protein origin (group average)
health factors	health status	morbidity	percentage of children with at least one attack of diarrhoea during the preceding month
			percentage of consultations (admissions) for diarrhoea over total number of consultations (admissions) in age group
	health services	mortality	infant mortality and mortality rates for children aged 1-4 years (see above)
			hospital beds per 1000 inhabitants
			doctors per 1000 inhabitants
			health personnel (total) per 1000 inhabitants
			percentage of villages (municipalities, communes, etc.) with a health facility
			average number of contacts (preventive and curative) per person per year
			percentage of immunizations completed among target group (per vaccine)
			pregnant women attending antenatal clinic per 1000 births
			admissions to maternity wards per 1000 births
			admissions to hospitals per 1000 inhabitants per year
	sanitation	water	percentage of households with tapwater laid on
			percentage of households less than 200 m from a clean water source
		latrines	percentage of families with latrines (per category of latrine)
education and culture	formal education	literacy rate	percentage of population ⩾ 15 years with elementary school completed (total or women only)
			percentage of population ⩾ 15 years, who know how to read and write (total or women only)
		school attendance	percentage of children of school age who are registered at (or who actually attend) a school
	food habits	frequency of meals	percentage of families in which children receive 2 meals or fewer per day

Table A2.1 Continued

Category	Factor	Data to be collected	Indicator and suggested cut-off points[a]
demography	family size	family size	average family size
	mortality		see data on preschool and infant mortality
economic factors	food prices		average price of basic cereal (or legume) over period of observation (in US$)
			average price of "family basket" in US$ or as percentage of minimum legal wage
	food expenditure		average family expenditure for food in US$ or as percentage of total expenditure
	income		average family income per capita (all sources) in US$ or as percentage of minimum legal wage.
			percentage of families below the minimum legal wage, or twice or three times the minimum legal wage or below "poverty" level
	general prices		increase in index of prices as percentage of increase in minimum legal wage or "real" wages
	employment		percentage of active population gainfully employed
			percentage of mothers working outside the home
			distribution of population by occupational category
			average time available to mothers for child care
food production	production	home production	kg of basic food (cereals, legumes, etc.), produced by the household per year value, in money, of total home food production, per year
		productivity	kg of basic food (cereals, legumes, etc.) produced by the family, per hectare per year
	factors affecting production	arable land	hectares of arable land per person
			percentage of households with less than a given area of arable land per person in the family
		rainfall	average annual rainfall in mm

[a] Cut-off points are suggested for a number of indicators. They correspond to values generally accepted in the literature. For the other indicators cut-off points should be established according to local situations.

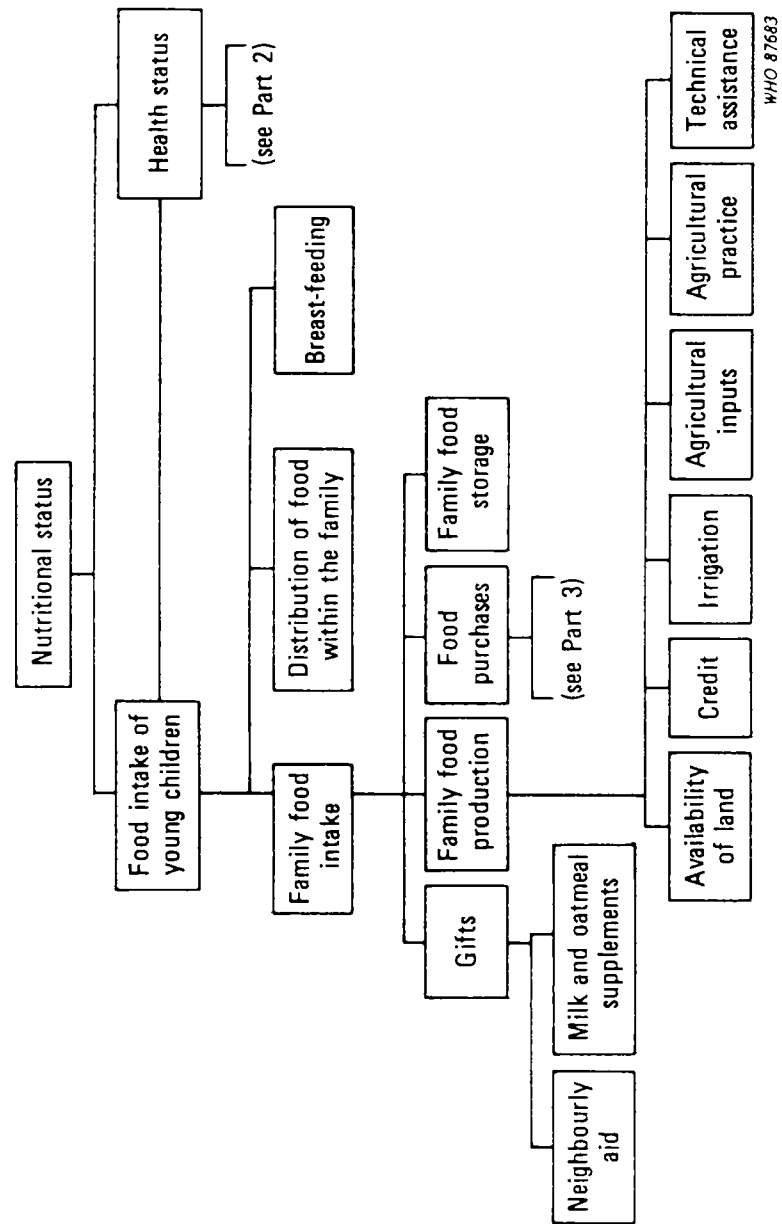Fig. A2.1 Example of a causal model
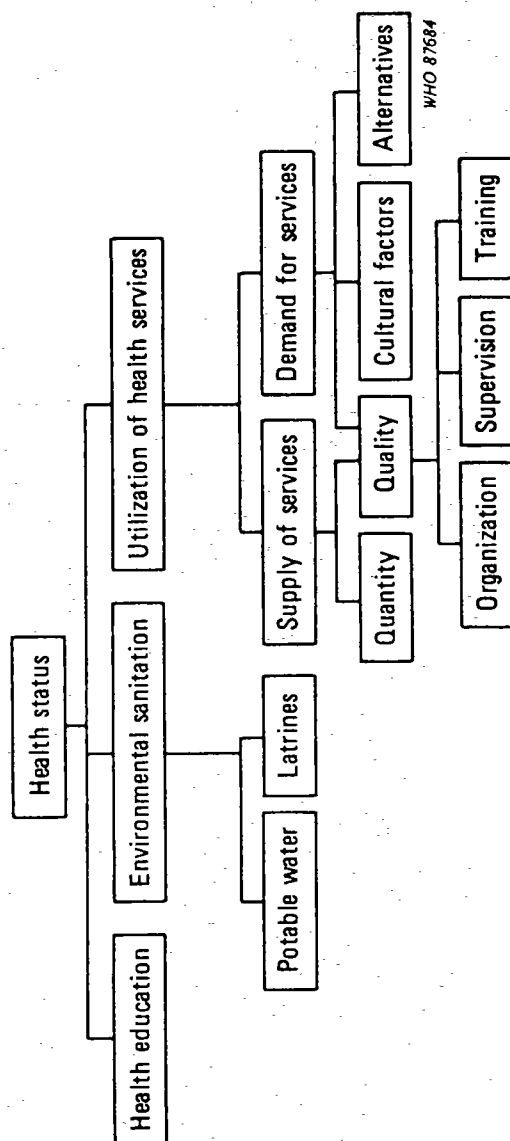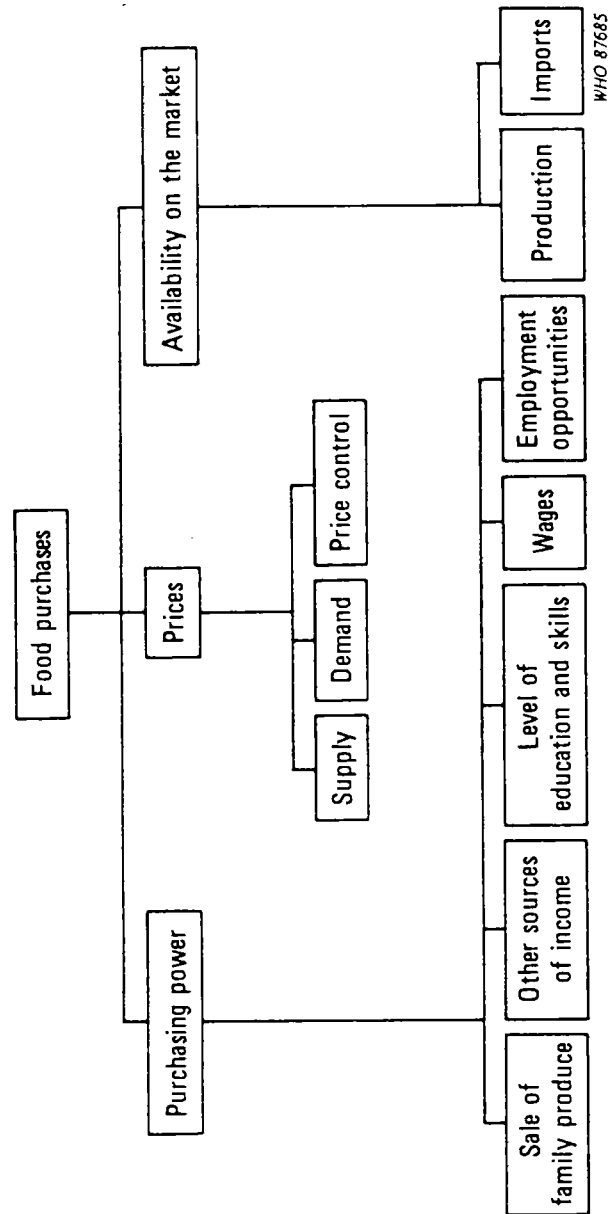
Part 1

WHO 87683

Fig. A2.1 (continued)

Part 2

Health status

- Health education
- Environmental sanitation
  - Potable water
  - Latrines
- Utilization of health services
  - Supply of services
    - Quantity
    - Quality
      - Organization
      - Supervision
      - Training
  - Demand for services
    - Cultural factors
    - Alternatives

WHO 87684

Fig. A2.1 (continued)

Part 3

WHO 87685

From the model a prospective list of indicators was derived. Table A2.2 presents, for each of the three parts of Fig. A2.1, a few examples of indicators that correspond to selected boxes in the model. The purpose here is to show how, for each box, one or more indicators can be identified and listed.

As one gets lower and lower in the model (which of course could be developed further—both horizontally and downwards), indicators that belong to disciplines other than nutrition predominate; economics, agriculture, education, sanitation, public health administration, demography, management, political sciences, etc. To consider such indicators is beyond the scope of this guide. In the field, specialists in these disciplines would be called in.

Table A2.2   Examples of indicators derived from the causal model (Ecuador)

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1.   *Indicators corresponding to Part 1 of Fig. A2.1*
(*a*)   Nutritional status of children aged 0–5 years:
   — percentage of children aged 0–5 years having their weight for age, weight for height, height for age, or arm circumference below an agreed cut-off point;
   — percentage of newborns with weight at birth $\leq$ 2.5 kg;
   — age-specific mortality rate in children aged 1–4 years;
   — infant mortality rate.
(*b*)   Food intake of children:
   — percentage of children receiving a diet below the recommended daily allowance for calories and/or protein.
(*c*)   Family food intake:
   — percentage of families with intake below the recommended daily allowance for calories and for protein;
   — percentage of families that consume less than the daily "family basket".
(*d*)   Breast-feeding:
   — percentage of infants still breast-fed at 3, 6, 9, and 12 months.

2.   *Indicators corresponding to Part 2 of Fig. A 2.1*
(*a*)   Health status:
   — infant mortality rate.
(*b*)   Environmental sanitation:
   — percentage of households with water supply laid on;
   — percentage of households with latrines (by type of latrine).
(*c*)   Health service utilization:
   — total number of contacts with health services (preventive and curative) per person per year;
   — same indicator for children aged 0–1 years, and those aged 1–4 years;
   — number of hospitalizations per inhabitant per year.

3.   *Indicators corresponding to Part 3 of Fig. A2.1*
(*a*)   Food purchases:
   — quantity of food purchased by the family in grams per person per day;
   — average expenditure on food per person per day in monetary units;
   — family food expenditure as percentage of total expenditure.
(*b*)   Purchasing power:
   — family income (all sources) per person per day in monetary units;
   — percentage of families with an. income below the minimum legal wage.
(*c*)   Prices:
   — average market price of basic foods (during the observation period).

Table A2.3. Example of listing showing data to be gathered with characteristics and source

Category	Data to be gathered	Level of dis-aggregation	Periodicity	Source	Remarks
nutritional status	weight, height, age	individual	at least once a year	health centres	
	deaths in age group 1-4 years, population in this age group	district	annually	Institute of Statistics	
food intake	food intake of young children by age	individual	depends on the survey	surveys by the Nutrition Institute	sample
	food intake of family, composition of family	household	twice a year	household consumption and expenditure surveys by Institute of Statistics	sample
food production	cultivated area (for each basic food)	district	annually	Ministry of Agriculture	
	yield/ha (for each basic food)	district	annually	Ministry of Agriculture	
utilization of health services	total number of visits to health centre, population	health district	annually	regional health office	

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Table A2.4. Example of listing of responsibilities of institutions for providing data for a nutritional assessment

Institution providing the information	Data to be provided	Level of disaggregation and periodicity	Precise source of information	Person responsible for supplying the information	Remarks
Ministry of Health	weight, height, age of young children	individual, annually	Maternal and Child Health Division	Mr X.	
	total number of visits to health centres, population of health district	health district, annually	Directorate of Health Services	Dr Y.	
Institute of Statistics	deaths in age group 1–4 years	district, annually	Vital Statistics Division	Ms Z.	
	population in age group 1–4 years				
	family food intake, family composition	household, twice yearly	National Survey Office	Mr W.	household sample in selected areas

Final selection of indicators

A framework such as that provided in Table A2.3 is useful in establishing the final list of indicators. Feasibility is assessed and only those indicators that it is possible to gather and that also meet the requirements of quality, disaggregation, etc. are included.

From Table A2.3 can be derived a table (Table A2.4) indicating the responsibility of each institution in providing data. Although Table A2.4 is basically another way of presenting the information contained in Table A2.3, it is considered useful, from an operational point of view, by representatives of the different sectors involved in model-building and the selection of indicators.

CASE STUDIES

From more than 20 assessment and survey reports reviewed during the preparation of this guide, three have been selected to illustrate some of the major points made in the text.

The Honduras assessment (1975) is presented as an early prototype of the kind of assessment described in the guide. Its main characteristic is that it was based on a causal model which was utilized throughout the period of data collection and analysis and formed the framework for the final report.

The Guyana national survey (1971) has very different characteristics, but is useful for two reasons—the quality of the data and the manner in which the final report is presented.

The Zimbabwe report (1982) represents a compromise whereby, in an attempt to maintain quality and meet the deadline, immediately available data were used alongside highly selective, newly collected data. Attention was given to causality, although there was no thorough causal analysis.

In addition, brief notes on documents from Guatemala (1976–77) and Bangladesh (1978) are included, mainly for their historical interest.

Nutritional assessment in Honduras

In 1975 the Government of Honduras undertook a diagnosis of the population's nutritional problems. The work was coordinated by CONSUPLANE, the Secretariat of the National Council for Economic Planning, which requested the technical support of INCAP (Nutrition Institute of Central America and Panama). The United States Agency for International Development (USAID) provided the funding for external experts.

The diagnosis was carried out in two stages. The first, strictly speaking, corresponded to an assessment and resulted in the drafting of a preliminary document with a limited circulation. This state lasted 17 weeks (1 August to 30 November 1975).

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The second stage consisted of the revision of the preliminary document, which was completed, corrected and brought up to date for publication in October 1976.[1]

Twenty-four people were employed in the study, full-time or part-time, for a total of 111 person-weeks; they included external specialists, whose total cost (salaries, travel, and associated expenses) was roughly US$ 40 000.

Description of the study

Purpose

The purpose of the diagnosis was to identify, from a nutritional standpoint, priority regions and possible solutions to their problems. This involved:

— carrying out an analysis that would take into account the different characteristics of the situation in rural and in urban communities;

— analysing the existing programmes set up to correct the nutritional deficiencies of risk groups;

— proposing new projects, integrated into coherent programmes.

Methodology

(a) *Training of a multidisciplinary team.* The diagnosis was carried out by a multidisciplinary team with a view to attaining multisectoral coordinated action from the outset, up to the finalization of the selected interventions.

(b) *Data utilized.* The diagnosis was based on existing data, which were sometimes confirmed through interviews and, for the purpose of identifying the priority regions, disaggregated where possible by municipality (*municipios*)

(c) *Research into causal factors.* A causal model was used to identify the essential factors most likely to influence the nutritional state of the population (see Fig. A3.1).

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[1] SISTEMA DE ANALISIS Y PLANIFICACIÓN DE LA ALIMENTACIÓN Y NUTRICIÓN. *Evaluación de las areas prioritarias del problema nutricional de Honduras y sus posibles soluciones.* Tegucigalpa, Honduras, Secretaria Técnica de Consejo Superior de Planificación *Económica,* 1976.

Fig. A3.1 Assessment model, Honduras
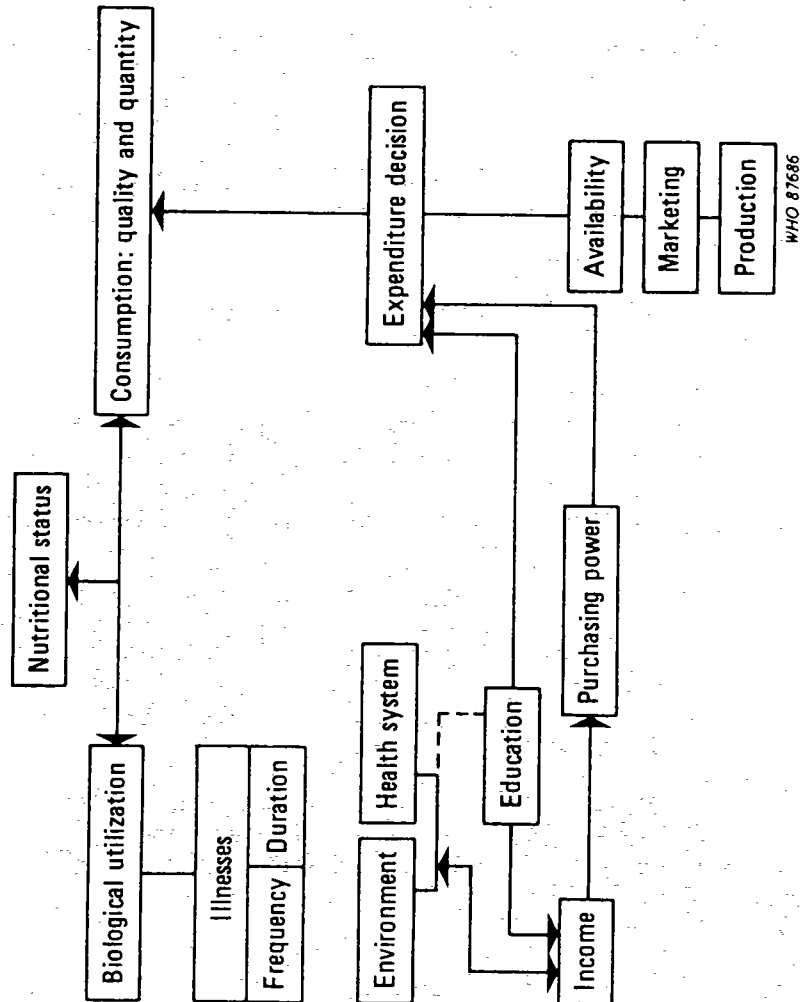
The model considered nutrition as being mainly conditioned by two factors: on the one hand, the quantity and quality of food consumed, which depend on production and availability, and, on the other, the biological utilization of this food, which depends on the social environment and health structures. Both are influenced by the level of income and education of the consumer.

The group formulated the hypothesis that each factor—corresponding to a specific box in the model—plays a part in conditioning nutritional status.

For example, the participation of the health sector in the improvement of nutritional status was based on the following hypotheses:

— The presence of a health structure does not necessarily decrease the prevalence and incidence of illness, even though it helps decrease mortality and the duration of illness. Its preventive activities influence the frequency with which an illness recurs.

— Symptomatic, metabolic, and cultural factors can lead to decreased intake and increased needs.

— Many environmental factors condition the nutritional and health status of a population (availability and utilization of water, elimination of waste, living conditions, etc.).

— It is recognized that a relationship exists between water supply and diarrhoea, and between diarrhoea and nutritional status. However, it is difficult to foresee whether an improvement in the water supply would decrease the prevalence of malnutrition.

(*d*) *Selection of indicators.* The model was used to choose the indicators characterizing each factor, and the final choice was determined by the availability of data.

The nutritional status of children under 5 years of age was utilized because the relevant data were available. Data on the nutritional status of other risk groups (pregnant and breast-feeding women) were not available.

Table A3.1 shows the indicators used by the assessment team.

(*e*) *Objective of Government programmes and consideration of ongoing projects.* The report briefly describes the objectives of the national development plan with special emphasis on those relating to agriculture, health, and education. It also reviews current projects (mainly those relating to food marketing).

Table A3.1. Indicators used by the assessment team in Honduras

Factor	Indicators	
	direct	indirect
nutritional status	anthropometry	mortality
food consumption, quantity and quality	dietetic surveys	food balance sheets
illness		causes of death reasons for seeing a doctor
sanitation	housing census	beneficiaries of the system
health system coverege		accessibility number of visits to doctor per person
income	expenditure and consumption survey elasticity of demand	minimum wage occupational index consumer price indices dispersion of rural population
education	illiteracy school enrolment per year	number of primary schools
availability, marketing, and production of food	food production per municipality (food balance sheet)	land tenancy technical assistance credit accessibility

Analysis and interpretation

(a) *Identification of limiting factors.*

A detailed analysis was carried out for each factor. An example is the following global analysis of the factors that play a determining role in the nutritional situation:

— Agricultural production is not considered to be the principal factor in the nutritional problem. The analysis showed that national production is sufficient to cover the needs of the country.

— The limited purchasing power of the population and the lack of elementary commercial networks greatly influence food availability.

— The population is dependent on producing sufficient food for its needs, but, partly because of the system of land ownership, productivity is low. In other words, the population can neither produce nor acquire the food it needs.

— More than 80% of the population has less than one-third of the national revenue, and most of the low-income group live in rural areas.

— In addition to low food consumption, the precarious state of health of most of the population contributes to less efficient absorption of food.

(*b*) *Identification of priority regions*

(*i*) It was found that, in 105 of the country's 282 municipalities, more than 20% of total deaths are in the age group 1–4 years. (Data on mortality were preferred to the available anthropometric data, which were out of date, having been compiled in 1966.)

(*ii*) Some of the 105 municipalities were grouped according to the following criteria:

— state of health: municipalities with both insufficient health services and a low level of environmental sanitation;

— level of education; areas where less than 50% of school-age children are registered in primary schools, the education factor being considered to play an important part in food consumption, the use of existing services, and the level of income (see model);

— availability of food: municipalities where the production of maize and beans (basic food) is insufficient to cover local needs.

The choice of indicators was limited and dependent on numerous constraints, including the quality of the existing data and the time available to analyse the relevant factors.

(*c*) *Associated factors*

Research was undertaken on the association between risk factors (health, education, food availability) by superimposing transparent maps. This process identified the municipalities where two or three such risk factors were combined. In a limited number of municipalities (19 out of 105), no association between these factors could be observed.

In this way, the group identified eight municipalities where the nutritional problem was associated with health, educational, and production problems.

Of these, five were in the same province, which should therefore be considered a priority area.

Conclusions and recommendations

The report's conclusions and recommendations were based on the causal analysis, taking into consideration the Government's objectives and current projects.

Comments

Merits

This study possesses most of the attributes of a genuine assessment:

(*a*) A good justification for the study is provided in the report and objectives are clearly defined.

(*b*) Risk groups are also clearly identified and characterized.

(*c*) The study was carried out over a short period of time, at reasonable cost (even if the external experts are included in the cost calculation), by an interdisciplinary team using existing information.

(*d*) The study was based on a simple and functional hypothetical causal model, from which indicators were selected and which served as a point of departure for the analysis as well as for the distribution of tasks.

(*e*) The organizational set-up, involving various sectors, included a pre-established work plan and timetable, and provision was made for regular meetings to discuss progress.

(*f*) The results did indeed permit the identification of priority areas, thereby successfully meeting one of the study's prime objectives.

(*g*) Existing policies and programmes were given due consideration, and realistic and specific recommendations were made.

(*h*) The final report, revised and completed during the second stage, was published one year after the diagnosis was finalized. This was made possible by the establishment of the "diagnostic team" on a permanent basis and its integration into a "System for Food and Nutrition Analysis and Planning", composed of representatives of the different ministries.

Shortcomings

A major drawback, however, was the generally poor quality of the data. This, of course, is often the case when reliance is placed on existing information for the most part collected routinely by

unmotivated personnel. In this instance, a thorough reading of the text and the tables casts doubt on the validity of much of the data provided.

The causal model was not an interdisciplinary effort, but provided by external experts. This may partly explain why it was not used efficiently. The voluminous final report is full of data that are often incomplete and/or irrelevant, and as a result, the report is difficult to use.

However, it should be recalled that the Honduras study was the first exercise of its kind at the national level in which a causal model was used systematically for selecting the variables, distributing the work, and analysing the results. As such, it is a prototype of the kind of assessment described in this guide.

The National Food and Nutrition Survey in Guyana[1]

This survey was carried out in 1971 by the government of Guyana and the Caribbean Food and Nutrition Institute, assisted by academic institutions and supported by the Pan American Health Organization and the Food and Agriculture Organization of the United Nations. Field work lasted $2\frac{1}{2}$ months (April–June). A technical workshop in March 1972 examined the data and drafted preliminary recommendations, which led to action. The final report was presented to the government in January 1973, i.e., 21 months after the survey began. A working group met in the same month to formulate the basis for a food and nutrition policy.

The survey was a sizeable enterprise: no less than 115 people participated, more than 900 households were studied, and 2500 individuals were examined.

Description of the survey

Objectives

The document does not explain why such a large survey was necessary to formulate a national food and nutrition policy, and execute nutrition-related activities.

Sampling

A stratified sample was selected consisting of rural and urban households from the coastal area and based on the 1970 census. In

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[1] The report of this survey is available as: *The national food and nutrition survey of Guyana*. Washington, DC, Pan American Health Organization, 1976 (Scientific Publication, No. 323).

addition, four locations in the interior of the country were selected on the basis of representativeness, cost, and feasibility. The sampling procedure is clearly described in the report.

Data used

All information, apart from the census data and the food balance sheet, was collected during the survey itself through questionnaires, physical examinations, collection of blood, urine, and stools, and direct observation of food intake. More than 200 variables were covered. Table A3.2 summarizes the types of investigation, the methods used, the data collected, and the size of the major samples.

Most of the data collected were broken down by locality (rural, urban) and by ethnic group (East Indian, African, and others).

Comments

Merits

Although the survey does not correspond to an assessment as defined in this guide, it nevertheless has certain merits that are worthy of note.

(a) The presentation is functional and remarkably concise (106 pages). The generous use of tables and graphs helps readers to understand the nutritional situation in Guyana. Each major area of investigation is presented in a special chapter (characteristics of the household, feeding of young children, food production, etc.). The recommendations are discussed in a separate chapter of the report and conveniently presented, by sector, at the front (food economics, importation, and development; food production; clinical procedures; education and the promotion of nutrition; facilities and services; and further investigations). For each recommendation, reference is made to the chapter and subsection of the report in which the corresponding data are analysed. This makes it possible for specialists to assess the validity of the information on each sector without having to read the full report. Furthermore, the recommendations are clear and concise and seem realistic.

A brief section on the history of Guyana and a general description of the country make it easier to grasp the situation and, by putting the country into context, are helpful for interpreting the results.

(b) The data are of high quality (specially trained personnel were used, delicate laboratory tests were carried out abroad, few cases were lost, detailed information is given on the sampling procedures, etc.). Disaggregation is given much consideration and, in all cases, is clear and explicit. Statistical procedures are described.

Table A3.2. Food and nutrition survey in Guyana: investigation, methods, sample size, and data collected

Type of investigation	Method, sample size (in parentheses)	Data collected and collated
biomedical	anthropometric measurements (2518)	children under 5 years old: weight for age, weight for height, height for age, triceps fat fold, arm muscle circumference
		other children and adults: weight for age, triceps fat fold, arm muscle circumference
	biochemical and haematological tests (1758)	haemoglobin and erythrocyte volume fraction (haemotocrit) (performed in Guyana)
		mean corpuscular haemoglobin concentration, serum albumin, cholesterol, lipids, vitamin A, folate levels (subsample of 500 for each test, performed in New York)
	clinical signs (2512)	33 clinical signs
		current infections: respiratory, etc.
		dental examination: teeth decayed or filled, mottled enamel
sociocultural	household questionnaire (922)	location, ethnicity, residence, tenure, mobility, size and social structure, family budget, main providers, reading and listening habits
		ecological factors related to nutrition:[a] housing and sanitation (number of rooms per household, water sources and latrines, cooking facilities, kitchen equipment); dietary attitudes (foods used, desired or prohibited); child care, education, and health
	questionnaire on feeding of young children (507)	breast-feeding, supplementation (cow's milk), weaning foods, breast-feeding and pregnancy, meal frequency
	pregnancy and lactation questionnaire (473)	diet in pregnancy, diet in lactation, use of medical services during pregnancy and lactation, ideal family size
food consumption	household inventory method (416)	mean energy and nutrient intakes (8 nutrients)
	household weighing method (416)	contribution of different foods to energy and nutrient intakes, cost-nutrient value of 26 principal foods available in Guyana
food production	kitchen garden questionnaire (269)	principal garden vegetables and their nutrient composition
		fertilizer used, sources of seeds, utilization of household produce
	farm questionnaire (200)	land tenure and use, farm labour and employment, irrigation and drainage facilities, utilization of farm production (for 10 products), application of fertilizers, insecticides, and manure, agricultural extension, farm tools and machinery, agricultural credit

[a] In the document, ecological factors are assembled in a specific chapter.

(c) The survey is undoubtedly useful as a baseline for future surveillance or evaluation or for selecting short-term interventions. It also points out clearly where further research is needed.

Shortcomings

However, even if allowance is made for the fact that it is not actually an assessment, some negative aspects of the survey need to be mentioned, since they illustrate certain key points in this guide.

(a) Objectives are not defined. The reasons for the survey are not given. Thus, the relevance of its components cannot be assessed here.

(b) Although the cost of the survey, in money and personnel, is not given, it is obvious that considerable resources were required in order to coordinate so many institutions and examine such a large number of people and households. In view of the absence of precise objectives, this is an observation of some importance.

(c) The causal analysis is quite unsatisfactory, in sharp contrast to the authors' manifest concern with causes. It seems that no attempt was made prior to data selection to develop a written causal model, as proposed in this guide, including hypotheses regarding causes.

Attempts to establish associations are incomplete and inadequate. The following is a quotation from the report: "An enormous amount of very diverse information was collected during the survey. It is important to try to determine what sociological, behavioural, economic, agricultural, personal and other factors influence the nutrition of the people of Guyana and how these factors interrelate with one another. Identification of such factors assists in the wise selection of potentially effective intervention programmes. To this end, the information has been graded into categories, and associations between these various categories of different types of information have been determined. Chi-square tests have been carried out on each association."

This quotation illustrates what may be the weakest point of the study; the presentation of 200 associations of pairs of variables, of which 89 were found to be significant, without a clear analytical plan or even a conceptual framework.

There is no discussion of potential sources of error such as:

— the fact that some associations may be significant only by chance;

— the bias introduced by confounding variables;

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— the fact that all associations are given the same weight, whereas they may differ widely in importance.

It is clear from the document that a conceptual framework for the study existed. However, the associations found were not incorporated into a global model of causation.

Under these circumstances, it is difficult to assess the relevance and usefulness of such a document for policy formulation.

Such criticisms, it must be pointed out, can apply to many assessments and surveys that do not possess the qualities of the Guyana study. They are emphasized here because of their general interest. The attractiveness of the Guyana report is further enhanced by its being issued as a PAHO Scientific Publication. This fact, plus the quality of the presentation and the care taken by the authors to include a brief introduction to the country, render the report interesting beyond the confines of Guyana, and also *accessible*—which is rare with documents of this kind.

Malnutrition in Zimbabwe

This study was undertaken by a World Bank mission in April–May 1982 as part of a larger population, health, and nutrition sector study. The report was published two months later (July 1982), and a revised version appeared in December 1982.[1]

At the time of the study, malnutrition was recognized to exist in Zimbabwe, but opinions as to its severity, nature, distribution, and causes diverged substantially.

Description of the study

Type of data used

The study used existing data to the maximum. An impressive number of documents were consulted, almost half of which—i.e., more than 80—were unpublished reports, notes, theses, papers, etc. However, since the available data were scarce, fragmentary, and often of doubtful quality, these were complemented by new data and information collected during the brief period of the study, including:

— subjective "best judgements" (based on questionnaires and interviews) on the nutrition situation and on the sufficiency of food in different areas by 55 health staff; and on causal factors by 94 agricultural extension field staff;

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[1] BERG, A. *Malnutrition in Zimbabwe. Nutrition sector study.* Washington, DC, World Bank, 1982.

— field surveys and reports from 5 areas of the country by fifth-year students of the University of Zimbabwe Medical School;

— "snapshot" surveys of the nutritional status of samples of the population in two non-drought communal areas where socioeconomic and agriculture data were being collected.

Data collected for three field surveys conducted in conjunction with the World Bank's agricultural sector study were also used.

Main points

The main points are summarized in the first three pages of the report. They are clear and relevant, and they refer conveniently to numbered paragraphs in the text.

Nature and magnitude of the problem

Although the data are of uneven quality and from diverse sources, a thorough and careful examination of them reveals a generally consistent pattern indicating that malnutrition is a significant problem among children aged 7–24 months, stunting being more marked than wasting. The children of workers engaged in commercial farming and those of peasants on communal land are more seriously affected than others. Seasonal variations are observed. Among diseases associated with micronutrient deficiencies, endemic goitre and pellagra are significant.

The causes

The discussion of causes takes up roughly one-third of the whole report. They are considered in broad categories. The first category is linked to food production and availability. Although Zimbabwe is a country with a food surplus, the report provides evidence that significant portions of the population suffer from shortages of food. Low income is another problem, particularly among the two groups already mentioned, i.e., workers on commercial farms and peasants on communal land. Remittances sent back by those working in the cities or the mines are shown to be important. As part of an attempt to examine such economic factors along with nutritional status, a preliminary effort is being made to use multiple regression analysis for determining causality.

One of the best sections in the document describes the process of modernization and its impact on patterns of food consumption. Cultural and social problems are also considered, as well as the role of infections.

Links between categories of causes are not discussed in detail, and the analysis of some of the major causes is not carried out in depth or is left to other sector studies of the World Bank.

Programmes

The study focuses on the most important among the considerable number of nutrition-related activities undertaken in Zimbabwe and discusses them in detail (consumer food subsidies, feeding programmes, nutrition education, nutrition rehabilitation, and food technology). Drawbacks, advantages, past experience, etc. are critically considered, and cost, justifiably, receives a great deal of attention.

Needs

In the short term, as the report convincingly argues, a number of policy decisions ought to be considered, including:

— formulation of a nutrition policy and creation of an organizational structure for the purpose;

— reorientation of consumer food subsidies;

— coordination of nutrition education;

— better targeting of feeding programmes.

A number of measures are discussed or proposed.

Bibliography

This contains over 180 references specifically intended to help Zimbabwean government staff and researchers doing further work in the area of nutrition.

Comments

Merits

The study is clearly presented and, by any standards, is of unusually high quality. In many respects it meets the criteria of a nutrition assessment.

(*a*) It was carried out over a short period.

(*b*) It is based mainly on existing data and provides a good example of both effective data-hunting and efficient data utilization. The extent

of disaggregation, the combination of existing and newly collected data, and the quality of the discussion are all noteworthy.

(*c*) Great attention is paid to causality. A third of the document deals with this topic—although, in our opinion, with only moderate success, as explained below.

(*d*) The study yields some clear (and clearly expressed) conclusions which are consistent with the facts as analysed: policy recommendations are made, a few interventions are suggested, and key vulnerable groups are identified. The recommendations are rather in the nature of suggestions respectfully presented to the Government as options awaiting consideration in greater depth.

(*e*) A comprehensive list of references is attached.

The study has a few additional merits, some of which have already been mentioned, e.g., a section on modernization, which is useful in that it indicates trends; a note advising caution about big surveys; emphasis on the importance of considering the cost of interventions.

The cost of the study itself, the number of people taking part (calculated on the basis of man-months), and the amount of effort involved in short surveys, analysis, and travel are unfortunately not given. These were presumably very high—probably higher than is usual in a nutritional assessment.

Shortcomings

Apart from the merits emphasized above, the study does possess a few weaknesses:

(*a*) The objectives are not clear. It is not stated why a nutrition sector study was needed, or who requested it (the Government or the World Bank). The relevance of the study is therefore difficult to judge. Nor are any reasons given as to why nutrition was taken as the subject of a separate sector study.

(*b*) Another drawback is that the study was done by an external institution, with no special responsibility on the part of the Government. In addition, there seems to have been no team-work. The reader is left with the impression that the "mission" consisted of one consultant, assisted by highly competent national professionals who acted mainly as providers of data and discussions. There is no evidence of a substantial contribution by the health, agricultural, economic, and other sectors to the selection of data and the identification of probable causes of malnutrition. It seems, therefore, that the opportunity to involve these sectors fully was lost. Perhaps

this impression is incorrect, in which case the report should have made the position clearer.

(c) The disadvantages here of the sectoral approach are closely linked to the previous point. Although an international agency such as the World Bank cannot always avoid fragmentation into sectors, in this case the drawbacks are serious. Inputs from some sectors are missed, or at least not fully utilized (input here means more than data, i.e., ideas, explanations, implications of observed facts, involvement,. commitment, etc.). Links between nutritional problems and factors listed under other sectors are omitted, or not made explicit, or left to other sectoral studies. The fragmentation of the problem precludes a comprehensive understanding of its mechanisms. The sectoral approach not only results from a lack of global vision, but aggravates it.

(d) In spite of the obvious concern of the author for the causes of malnutrition, the causal analysis may be the major weakness of the study, largely for the reasons cited above. Broad categories of causes are discussed with no justification as to why they were selected rather than others. In some cases the choice may have been influenced by the nature of the existing data. Only some causes of food shortages are analysed. Enough is known about the causes and mechanisms of malnutrition generally to go much further from the very beginning: to formulate specific causal hypotheses and postulate links between them. This has been done quickly and successfully in countries where much less information was available than in Zimbabwe.

The use of a causal model (or any other systematic and comprehensive method) would most probably have permitted a more structured and consistent analysis of causality, a list of recommendations that would be more consistent and better linked together, and a more thorough and critical discussion of the relevance of measures taken or proposed.

The aim of the above comments is to illustrate some of the key points of the guide and they do not detract from the merits of the study. The Zimbabwe study, in spite of our criticisms, remains one of the best among some 20 assessment reports reviewed.

Guatemala

The assessment in Guatemala was conducted between September 1976 and August 1977,[1] under severe time constraints, by the Government and the Nutrition Institute of Central America and Panama (INCAP), with the financial support of the United States Agency for

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[1] *Análisis del problema nutricional de la problación de Guatemala*. Guatemala City, Secretária del Consejo Nacional de Planificación Económica, Instituto de Nutrición de Centro America y Panama, 1977.

International Development (USAID). The study was part of a broader nutrition and health sector assessment and, although a rather comprehensive causal model was built and used, only data relating to nutrition and to health were assembled and analysed. Other factors were left till a later stage.

The data were generally of rather poor quality, except those coming from certain localized surveys. However, a generally consistent picture emerges from the report, showing how, despite marked development in previous years, no improvement in nutrition had been observed. The report provides little information on how the assessment was conducted and does not present the model, though it is fortunately possible to reproduce it here (Fig. A3.2). The importance of the Guatemala assessment is that, for the first time, a causal model was built by the members of the assessment team (rather than being brought in by external specialists), thus establishing the feasibility of the method and demonstrating its practical advantages (notably the fact that the model-building exercise led to the involvement of different sectors, some of which initially showed little motivation).

Bangladesh

A brief allusion is made here to two papers presented at the Third Bangladesh Nutrition Seminar in 1978.

The first paper, by G. Mostafa,[1] is an attempt to compare the districts of Bangladesh according to a small number of indicators, using existing data. The data are limited, and it is difficult to follow the author's interpretation. Still, the paper has a number of merits. The introduction provides a well articulated rationale for the need for a guide like the present one; it uses a causal model correctly (in this case the Honduras one); and, in the discussion of nutrition problems, it follows the model.

In the second paper, by S. A. Khan,[2] the same model is applied, but this time to a local situation in a prospective study. Although the above reservation about the interpretation of data would seem to apply again, this work is to be commended from the methodological standpoint.

These two papers appear to be the first published attempts to use the methodology of the guide in an Asian country.

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[1] MOSTAFA, G. Districtwise assessment of food and nutrition: use of available sources of data. In: Ahmad, K., ed. *Proceedings of the Third Bangladesh Nutrition Seminar*, Siragul Haq Bhvinya Book Promotion Press, Motigheal Dhaka, 1978, pp. 137–144.
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Fig. A3.2.   Causal model used in Guatemala

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ASSESSMENT AND SURVEY REPORTS REVIEWED

Below is a selected list of assessment and survey reports, presented in chronological order of implementation, i.e., of data-gathering and/or collecting. Only documents that provided significant insight or useful inputs to the guide are listed.

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[1] To obtain a copy of this report write to: Nutrition, World Health Organization, 1211 Geneva 27, Switzerland.

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[1] To obtain a copy of this report write to: Nutrition, World Health Organization, 1211 Geneva 27, Switzerland.