Integrating Nutrition into Agricultural and Rural Development Projects

A Manual

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
NUTRITION IN AGRICULTURE

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Traditionally nutrition has been regarded as a separate activity in agricultural and rural development projects. In recent years it has been increasingly recognised that nutrition considerations must be integrated fully into the larger scale investment and area development projects being undertaken in rural areas if sustained improvements in food consumption and nutrition are to be realised. This manual has been prepared to provide to planners and nutritionists a methodology specific to linking nutrition directly with the planning of agricultural and rural development projects. As such it is the culmination of efforts which began in FAO in 1977 in response to Resolution 8/77 from the Nineteenth Session of the FAO Conference. In this Resolution, it was recommended that the Director-General:

"suggest methods for ensuring that nutritional considerations are, as appropriate, adequately included in FAO's planning and execution of agricultural projects and programmes."

Subsequently, the World Conference on Agrarian Reform and Rural Development (WCARRD) in 1979 enunciated in its Key Principles for Operational Guidelines that:

"nutritional considerations should be explicitly considered in the planning, design and implementation of rural development projects."

Up to this point, the Food Policy and Nutrition Division of FAO had been principally concerned with considerations of planning for improved nutrition at the national level. Following these resolutions, guidelines were prepared which demonstrated how nutrition objectives could be integrated into the main project objectives during the planning process. This approach gained the support of the FAO Committee on Agriculture in 1979 and was tested with the cooperation of six countries (Haiti, Kenya, Peru, Philippines, Sri Lanka and Zambia) in which agricultural and rural development projects had been recently undertaken or were in the planning phase. The specific experience gained in these case studies is being published as a separate volume in this series.

As part of the case study activities a workshop was held in Rome in February 1980 at which consultants and host country staff met to discuss the practicability of the methodological approach to be taken in these case studies; at the same time, field staff in other countries reviewed the guidelines in the light of their local situations.

In addition to these activities, there has been a growing awareness within FAO of the need to incorporate nutritional considerations into field projects. Other multilateral and bilateral agencies have also begun to gain experience with the guidelines.

These experiences have shown, however, that although this methodology is relatively straightforward, there is likely to be a serious constraint in its wide adoption and implementation in developing countries. This is due to a lack of people trained in this field and able to apply the approach. Therefore, this manual should also prove useful for in-service training of government staff and in higher education. It is designed to be of assistance to member countries to build up their capacity for trained manpower to carry out the planning procedures ensuring that agricultural development does improve the nutritional status of the poor. There is a need to extend the methodology and concepts
discussed in this manual into university curricula and in other institutions so that local staff are trained in the areas of planning, surveillance and evaluation.

A very large number of individuals has contributed to the development of this manual, too many unfortunately, to mention individually. In addition to staff of the Nutrition Planning, Assessment and Evaluation Service and other staff of the Food Policy and Nutrition Division of FAO, a large number of consultants provided ideas and assistance at all stages of the investigations. During the development and execution of the case studies some twenty-five local and international consultants gave guidance and assistance in the collection, analysis and interpretation of data. Some of the case study investigations were partly financed by the Swedish International Development Agency.

Dr. Marguerite Burk was responsible for the difficult task of drawing together all of the experiences and ideas and in formulating the manual, which she did with considerable devotion and hard work. The manual benefitted greatly from her own wide experience. It was subsequently revised by Richard Longhurst of the Food Policy and Nutrition Division.

Comments and experiences from using the methodology and concepts in this manual would be most welcome. FAO is anxious that the manual be tested in a variety of situations and that this experience be shared with users in subsequent editions.

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INTRODUCTION

This manual is to help planners to integrate food consumption and nutrition considerations into agricultural and rural development projects. It is designed for use not only by nutritionists and food economists but also by anyone engaged in planning projects, who has some knowledge related to nutrition and food or has access to professionals in these areas. It covers all phases of the work involved, but it does not necessarily have to be used in its entirety. Planners are advised to select only that part which is suitable for their needs and to vary the sequence or numbers of tasks according to the time and information available.

1.1 OBJECTIVES OF THE MANUAL

(1) To provide a methodology whereby the planner can integrate food consumption and nutrition considerations into agricultural and rural development projects, by giving guidelines, suggesting methods and giving detailed descriptions and checklists of the steps which may be taken;

(2) To help nutrition planners understand the stages and processes in the cycle of a development project so that they can coordinate their work with other planners;

(3) To encourage communication among planners, administrators and recipients in development projects.

This manual contains a methodology for planning to influence project design and for organizing available information and seeking more. However, it can only serve to sharpen and supplement the judgement of those on the project site, not replace it. The information required for integrating food and nutrition aspects into projects concerns four main areas of investigation as outlined below:

(1) What is the extent of malnutrition? Who is malnourished, for which nutrients, by how much and when?

(2) What is causing malnutrition and what is the trend in its incidence?

(3) What is being done already about malnutrition in terms of government planning and project interventions?

(4) What can be done in this project about these nutrition problems?

The answers to these questions might be sought by reference to available documentation, by collecting subjective information in discussions with local people on the project site or by organizing a special survey to collect data of a more objective and quantitative nature. The amount of information that will be available will vary considerably from location to location. It is the task of the nutrition planner on a project team to pose and answer these questions, to identify objectives, to assess the extent to which they might be achieved and to influence the design of the project so as to achieve them. National planners will often already have knowledge of such matters as national objectives and food and nutrition problems and the whereabouts of data. Discussions with the intended beneficiaries of the project will give insights into their problems and enable their ideas to be incorporated into project design. But whatever the circumstances and the amount of information available, any investigation carried
out by the planner must be linked to the project and must be aimed at meeting
the project's needs and demands.

1.2 NUTRITION AND DEVELOPMENT

It is not the role of this manual to be an advocate for the importance of
nutrition in national development. It is assumed that this manual will be used in
circumstances where this is already appreciated but that the means of how to
incorporate it in investment projects is what is under debate. However, the
following comments may be helpful to a nutrition planner who has to build a case
for nutrition in a project.

Improved nutrition has important production and equity benefits. The
former includes increased adult work productivity through better health,
resistance to infection and more energy available for expenditure; improved
receptivity of children to education and better physical growth, and in the long
run decreases in child mortality that are expected to lead to stabilization of
family size and hence population growth. Although efforts to measure these
benefits in quantitative terms have been tentative, what has been done suggests
that returns in improved nutrition could be high.

Frequently it has been argued, however, that the equity benefits - of
ensuring an adequate diet for all - are sufficient to outweigh any uncertainties
there may be over precise rates of return. Evidence of this view is found in
many statements in national development plans. If project beneficiaries do not
have access to a sufficient and constant supply of food then they will not be able
to take full advantage of other project components. Apart from the production
'losses' mentioned in the previous paragraph (poor health, etc.) they may not
adopt project innovations fully because of their need to devote time and other
resources to obtaining food for consumption.

Most project planners do not need to be convinced of the importance of the
benefits of improved nutrition; however, much still needs to be resolved over the
practical means whereby nutrition considerations are to be included in a project
without seriously increasing costs and thereby reducing the ratio of measurable
production benefits to costs. The methodology in this manual is a means of
integrating nutrition into the general structure of projects so that these issues
can be discussed, investigated and resolved in the project context.

1.3 THE INCORPORATION OF NUTRITION PLANNING IN A PROJECT

Most efforts to combat malnutrition in the past few decades have involved
forms of intervention focused on target groups. Examples are food distribution
and subsidy schemes, fortification or enrichment of food, and rehabilitation of
the severely malnourished, but their impact was limited. These forms of
intervention have often proved of little value because they did not influence the
underlying causes of poverty.

A very large proportion of malnourished people are the rural poor, and if
development efforts are to reduce malnutrition effectively, nutritional consider-
ations must be incorporated into projects for agricultural and rural development.
This suggests that such projects should contain components to increase income,
and be concerned with subsistence food production (so often a vital factor but
ignored or greatly underestimated by planners), with security of access to food
at all seasons, and with the improvement of the environment to reduce disease.
These are the major means in which benefits from development can be translated
into long-term improvements in nutritional status of the rural poor. Moreover,
developments in agriculture directly or indirectly also affect the malnourished in
urban communities. Thus, the responsibility for nutritional improvement falls heavily upon agricultural planning.

Project plans and procedures can lead to improved nutrition in other ways. Generally, priority can be given to projects with objectives and outputs likely to benefit people most affected by malnutrition. Conversely, those expected to have a detrimental effect in the long term can be modified. Projects or their components can be designed so as to increase the number of malnourished people who will participate in the benefits while considering the trade offs involved and possible changes in the rate of return. Ongoing management or future expansion can be influenced through monitoring and evaluation of nutritional effects.

1.4 LINKAGES BETWEEN RURAL INCOMES, AGRICULTURE, FOOD AND NUTRITION

In the design of an agricultural project that leads to nutritional improvement, several linkages between different factors have to be described. These are represented in a simplified flow chart, shown in Fig. 1. Only the most important factors have been included or otherwise the chart becomes too confused. Improving the nutritional status (measured by indicators discussed in Chapter 5) of the target group is the ultimate nutritional objective of the project. This in turn is influenced predominantly by two factors - food consumption levels and public health and sanitary environment. Since the translation of project benefits into a measurable change in nutritional status indicators is often a long process, the improvement of food consumption levels will be a more acceptable shorter-term indicator of progress. There are the several linkages for food consumption and nutrition with the rural and agricultural sectors: food production, income generation and the ways in which programmes can influence these. It is the role of the nutrition planner to clarify the nature of these linkages: how, for example, the nutritional status of under fives in a specific geographical location might be influenced by a marketing project that leads to a change in the domestic foods available in the market. It will be necessary to articulate the pattern of both intra- and inter-household allocation of resources if the nutritional status of specific family members is at issue. In the former case many other factors or determinants (which have not been included in Fig. 1) become important in the analysis such as sexual division of labour, family size, occupational status, educational background and feeding practices within the household.

1.5 THE POTENTIAL IMPACT OF AGRICULTURAL AND RURAL DEVELOPMENT PROJECTS ON FOOD CONSUMPTION AND NUTRITION

It should be the aim of the nutrition planner to quantify the linkages between the factors relating to agricultural and rural development and household food consumption and the nutritional status of persons. Of course project investment can influence only a few factors in a specific location. Over the last 15 years a great deal of research and practical experience has begun to clarify the nature of these linkages. What follows is a summary to suggest to project planners what impact on nutrition might be expected from certain types of project investment. As malnutrition is most prevalent among the poor then project design and investment must be intended primarily for them.

The linkage between food availability and household food consumption

If the household is in food deficit but controls land then efforts to increase production - by providing inputs, effort-saving technology, securing ownership - should lead to increases in consumption. Unless the disposal of the product is
FIG. 1
FACTORS INFLUENCING NUTRITIONAL STATUS: DIRECT AND INDIRECT PROJECT EFFECTS

Food produced

Food available in the market

Prices

Household purchases

Household income

Food available in the household

Changes in household stocks

Nutrients obtained by the family member

Nutritional status of individual

Income

Housing
Water
Sanitation

Infection


controlled solely by one person or group, then the household as a unit will benefit. In some cases increasing production and consumption of the staple is not what is required (except to provide a surplus for urban areas and the rural landless) but to increase the consumption of other foods such as oils and meats. This has to be achieved through increasing rural incomes. Cash crop income is important in this regard but the provision of facilities for non-food crops should not be such as to discourage food production. The reduction of storage losses will also increase availability and therefore consumption, provided the prevention of losses is cost effective. In all cases the means of increasing food crop production must be appropriate to the malnourished target group: the technology, the financing and the administration must be in a form they can adopt.

If the food deficient household is landless then it is reliant on the market place and its own purchasing power. Increases in job opportunities and wages without decreases in food availability or rises in prices will all improve household food consumption. More productive employment for women will have food consumption benefits for themselves and children. The converse is equally important: the project should not reduce employment for the landless in the longterm.

If the analysis of the nutrition problem has shown that the deficiencies are seasonal then project strategies to improve crop marketing and storage, encourage crops which fill seasonal gaps (such as cassava and vegetables) and farming practices such as intercropping and mixed cropping, and develop water management would be appropriate. If the nutrition problem is one other than of energy deficit but of nutrients such as protein, iron or vitamin A then the encouragement of crops or crop products that provide these nutrients is required.

Where food supply in the project area is thought to be adequate, then demand for food will have to be increased by income generating activities, or by means which improve food processing - by reducing drudgery and costs, or by encouraging new feeding patterns.

The linkage between household food consumption and nutritional status

Increased food consumption is the most important means of improving malnutrition as indicated by poor nutritional status. In addition infection levels also influence nutritional status, especially of children, which suggests that provision of health care and immunizations will directly affect this variable. Poor nutritional status of children in the presence of adequacy of food availability at household level is frequently attributed to maldistribution of food within the household and poor weaning practices. The project response is then to include a component for nutrition education. In some cases this may be appropriate but experience has shown education to have hidden resource demands on the family and not be effective unless the general level of incomes rises. For the nutritional status of children and women to improve, project innovations have to reach the poorest families and, in some cases - by recognizing the sexual division of labour and control of product - the poorest members within families.

The aim of the project should be therefore:

A. To avoid negative impacts: not to undermine subsistence food production or reduce the purchasing power of the poor for market food; not to reduce employment and wages for poor families; not to add to the household work­load of women; not to add to the infection levels of children or adults by innovations that encourage, for example, standing water; not to undermine the strategies that people employ to provide a security of access to food.
B. To develop positive impacts: increase the availability of food for consumption by interalia advice, new seeds and complementary inputs; increase the amount of food available in the market; encourage the participation of local people in the project decision-making; provide appropriate technology for farm and household work; provide improvements in sanitation and health conditions.

1.6 THE TIMING OF NUTRITION PLANNING

In the next chapter the various components of the nutrition planning exercise are discussed in relation to their timing within the project cycle. The project cycle has seven sequential stages of Reconnaissance, Identification, Preparation, Appraisal, Approval, Implementation and Evaluation (see Fig. 2). A maximum of three stages or types of nutrition planning investigation is proposed in this manual: the Desk Review which should always be carried out, usually and ideally at the Reconnaissance or Identification stage; the Initial Assessment which also should always be carried out but at the Identification or Preparation stage; and the In-Depth Study which is usually carried out at the Preparation stage if time and funds permit, and in addition, monitoring should be carried out during Implementation and evaluation of the nutrition impact should be carried out at the Project Evaluation stage.

The earlier that nutrition considerations are injected into project design, the better. As the stages progress it becomes more difficult to influence project design. If a project is to be expanded, the most suitable stage for nutrition planning is during the discussions on rephasing.

1.7 THE CONTENT OF THIS MANUAL

This manual has been organized into six chapters. In Chapter 2 the project cycle is described with the relationship to it of the stages in nutrition planning. Each of these stages is then discussed: the Desk Review (Chapter 3), the Initial Assessment (Chapter 4), the In-Depth Study (Chapter 5) and Monitoring and Evaluation (Chapter 6).
Chapter 2

THE PLANNING OF DEVELOPMENT PROJECTS

The projects for which this manual is designed are those involving substantial investment, development and management of resources, and area development.

Investment projects involve providing resources to agriculture, forestry and fisheries. Resource development and management projects provide direct support to land and water management, crop or animal production and development of forestry resources. Area development projects have many aspects and include rural development.

The seven stages commonly used by United Nations agencies and others for the planning of a project are shown in Fig. 2. In some cases the first stage here - Pre-Identification - is not formally recognized. If an ongoing project is expanded its design may undergo revision in another preparatory stage. The cycle is then continued with Appraisal.

2.1 PROJECT STAGES

Pre-Identification 1/

The proposal for a project may come from a government agency, from a national development plan, or from economic studies by international agencies. Project ideas may arise, for example, from consideration of an inadequate food supply or from the need to develop a depressed area or region. However they originate, it is essential that a proposed project concerns a sector of the national economy given high priority and strong commitment by the government. Ideas

for the project are examined by a team involving government experts and often experts from international and/or bilateral agencies.

The corresponding function of the nutrition planner at this stage is to carry out a Desk Review.

The Desk Review (see Chapter 3) involves an examination of all reference materials and staff knowledge related to nutrition and the potential project area. From the Desk Review it may be possible to derive some answers to the questions posed in Chapter 1 on the extent and causes of malnutrition and existing efforts to combat it. Tentative project ideas are screened for relevance to nutrition problems in the area. Project objectives and flexibility for altering the conception and design are reviewed to ascertain potential contributions to improvements in the nutrition of the most disadvantaged people. Available evidence of government interest in nutrition is considered because of its critical importance. The time taken to complete this stage will depend on the amount of reference material available and the time needed to locate it. Generally it will involve one to two weeks.

**Project Identification**

This is the basis for decisions on the scope of the project and on whether to proceed with its preparation.

The group develops a broadly described proposal which must give the reason for the project, identify its objectives, the participants, activities, management, inputs and outputs, and assign preliminary priorities to them. What, and how, possible alternatives were considered must be shown. (Key criteria used in examining alternatives will probably be government priorities, technical and administrative feasibility, and financial, economic and social viability).

The technical viability of the project is assessed. Any constraints are identified. Costs are estimated and financing is suggested. The planners must also suggest which activities, if any, might be undertaken by the country on its own and what government agencies should be involved in management, monitoring and evaluation. The need for external assistance and sponsored activities is tentatively determined.

Problems may be: the lack of information, organization and management for the project, the infrastructure, finance, appropriate technology for agricultural groups, marketing, social feasibility or the ecology. There may be differences between the priorities of the government (or among government agencies) and those of the proposed financing agency.

The outcome of this stage is usually a report to the government with plans of terms of reference, a timetable for further studies, and the manpower requirements in order to prepare the full project proposal. Then the Project Identification group must discuss the proposal, particularly the policy issues and problems, the allocation of responsibilities for further work, and the timetable and funding for formulating the project, with interested government agencies and the proposed funding agency. The report is changed according to what is agreed.

The corresponding stage in nutrition planning is the Initial Assessment (see Chapter 4). Further information is gathered on the food and nutrition situation in the area. A preliminary appraisal must be made of the
potential impact of the project on food supplies and demand of the population groups worst-off nutritionally, and suggestions made for including nutritional considerations in various aspects of project design. Discussions are held with government officials and those financing the project. The need for continuing the nutrition investigations into the third phase (In-Depth Study) must be assessed. Consideration must be given to the availability of country experts for all these tasks and to the necessary efforts to obtain community involvement in deciding on the activities of priority for the project. A visit to the project area for discussions with potential beneficiaries is essential. The Initial Assessment would normally require three to four weeks. If required, it may have been preceded by a brief Site Visit of about one week in order to locate more information and hold preliminary discussions with local officials.

Project Preparation

This stage involves much more thorough investigation of proposals made at Identification including the project in all its technical, economic and social aspects and involving detailed costing of investment items. Sometimes the team engaged on this stage is not the same as the group which identified the project. For rural development projects there may be several individuals or groups conducting feasibility studies for separate components of the overall design. The end product is a report on the basis of which a government or financing agency can appraise the project.

During the intensive work at this phase the nutrition planner may make an independent feasibility study or In-Depth Study (see Chapter 5) of food consumption and nutrition to get new information specific to the needs of the project. It may involve a survey or re-analysis of existing data. The scope and activities of this study evolve from Project Identification, supplemented by questions raised with government officials and local beneficiaries as the project design is formulated. Data will be required for use in making decisions on project objectives, participants, inputs, activities and outputs. The groundwork for monitoring and evaluation is laid (see Chapter 6). It should lend objective evidence to the subjective impressions derived in the Initial Assessment, and indicate the impending impact on food consumption and nutrition. During this phase, discussions between the nutrition investigators and the project planners must deal with how to balance projected nutrition and social benefits with possible economic and political costs. If this is achieved at a very early stage in the feasibility studies for the project and continued during subsequent design work, nutritional considerations can be included successfully. An In-Depth Study (which usually lasts for six to nine months) is not essential and should be carried out only when available data are inadequate for this project stage.

Project Appraisal

At this stage the data, procedures and conclusions are checked for validity by the financing agency. The report on the Appraisal reviews the proposals at the policy, technical and financial levels. It lays down the assurances to be obtained from the government at the time of negotiation and the conditions to be fulfilled before the proposed loan from the financing agency becomes effective. Aspects which require attention during Appraisal are likely to be the proposed organization and management of the project and the financial aspects, whether they refer to project funding, or to cost recovery from project beneficiaries.
The role of the nutrition planner is largely over by this stage.

Approval

This follows negotiation between the government and the financing agency; sometimes considerable time elapses before all conditions are met and the financing is arranged and approved.

Implementation

Implementation is the responsibility of the government or its contractors. It may involve preliminary work on further preparation and always involves staffing, putting project plans into operation for inputs, activities and outputs as scheduled, and monitoring. During this stage the financing agency exercises control or supervision over the parts it finances.

Both parties use monitoring to get feedback from the ongoing implementation process so that any necessary revisions in management, inputs, activities and outputs can be made. This ongoing evaluation assesses the progress of the project.

Ex-Post Evaluation

After the project is completed it is evaluated. There is a critical examination of the design itself and of experiences, results and effectiveness in carrying out the design.

Evaluation, particularly ex-post, is separate from monitoring and should be conducted by persons who were not closely associated with formulating and implementing the project so as to provide a fresh and independent assessment. The evaluation team usually includes representatives of the government and of both the financing and the executing agency if the latter is separate from the former.

Project revision or expansion

Near the end of the original project period the government may wish to extend and expand the project. New objectives and activities may be desired and some of those in the original design may not be completed. The planning for an expanded project follows the same sequence as the original cycle and comparable studies and documentation must be prepared.
Chapter 3

THE RECONNAISSANCE STAGE: DESK REVIEW

The Desk Review is the first approach to the project idea or proposal and considers the potential of proposed development efforts to improve nutrition in the project area. The Desk Review uses reference materials, government policies and any personal knowledge of the project area. It is essential to review all available documentation before visiting a project site as it is a discourtesy to local people not to be aware of what has been done already. Also, a great deal can be concluded in many cases, on the basis of this past experience.

3.1 OBJECTIVES OF THE DESK REVIEW

In a broad sense, the Desk Review attempts to determine:

(1) the preliminary assessment of the nutrition problems in the area;

(2) the degree of government interest in improving the nutrition of those who are most disadvantaged;

(3) the expertise and resources available to contribute effectively to solving the nutrition problems, including a review of ongoing efforts.

If information is already available on the project proposal, then the Desk Review should determine:

(4) the extent to which the project deals with the problems of disadvantaged rural people in terms of their assets, productivity and income;

(5) the potential of the project to improve the nutrition situation through one or more of the following:
   
   (a) increasing food supplies, particularly supplies of traditional staples and foods high in critical nutrients;
   (b) improving local marketing of food supplies, particularly to poor, isolated population groups;
   (c) contributing to local food security;
   (d) building infrastructures, such as roads and health and other centres and services;
   (e) promoting specific activities to improve the nutrition of the disadvantaged;

(6) the potential for influencing the concept or design of the project to introduce nutritional considerations.

3.2 INTERPRETING AVAILABLE DATA

The data with which to assess the nutritional problems are likely to be very patchy. Data will vary between carefully conducted micro studies by academics covering very small areas and broad surveys carried out by governments and external agencies. Some of the most important data needs such as food consumption levels may be missing entirely.

The nutrition situation can be assessed by:
(a) nutritional status indicators of growth (the anthropometric measurements of weights and heights, usually of children) and clinical data where available. All will be described with reference to internationally accepted standards;

(b) levels of food consumption at family or individual level, also judged in relation to a standard of adequacy;

(c) infant and child mortality rates;

(d) incidence of nutrition-related deficiency diseases.

Data will be available in varying amounts on these indicators from various Ministries (e.g. Agriculture, Health, Economic Planning). Other data may be available which are less directly indicative of nutritional status or food consumption levels but extend the analysis into likely causes of malnutrition. These data are:

(a) food availability in terms of crop yields per hectare or man-land ratios; incomes and food prices (available from farm management surveys and household budget studies);

(b) health status in terms of immunization levels, morbidity incidence (available from health statistics);

(c) sanitation levels as described by number and nature of latrines, nature and sources of drinking water (available from community health surveys);

(d) access to services e.g. extension, credit, clinics, etc.; levels of education;

(e) cultural and social aspects, habits and beliefs as might be obtained from anthropological studies.

It should also be standard procedure to investigate the actual or potential relationship of the proposed new project to earlier or current ones. These may already have made it clear that it will be difficult to reach the disadvantaged groups. Previous projects may have changed local conditions. For example, another project may have resulted in large migrations out of or into the area, or it may have changed cropping patterns.

3.3 RECOMMENDATIONS OF THE DESK REVIEW

The absence of any of the following must be regarded as a serious constraint on recommending the integration of nutrition planning into the project design: (1) government interest in nutrition improvement through agriculture, (2) food and nutrition expertise in the country, (3) the possibility of a significant nutritional improvement from the project. If these are lacking, other ways of solving the nutrition problem might have to take priority, such as institution building and training.

If, however, the reviewer sees a real need and possible success for the project in benefitting the disadvantaged, a recommendation for further action should be made.
3.4 STEPS IN THE DESK REVIEW

The following is a list of steps to be taken. They may be varied or omitted, according to the judgement and needs of the planner. They correspond to a more detailed checklist which follows and which serves to remind the nutrition planner of the various information which should be sought in the course of the investigation.

Step 1. Identify and classify the project (Checklist items 1-12).

2. Check on government interest in nutrition improvement (Item 13).

3. Check on the availability of background information (Items 14-18).

4. Check on relevant earlier, current and prospective projects in country and area (Items 19-21).

5. Specify as far as possible the nutritional benefits or possible negative effects of the project on major groups (Items 22, 23).

6. Check with government staff and consultants on availability of national personnel needed to undertake further investigation in nutrition (Items 24-27).

7. Develop recommendations for further nutrition investigation and potential of project for incorporating nutritional considerations (Items 28-29).
CHECKLIST FOR DESK REVIEW

A. Identifiers

1. Project name _____________________________
2. Department ______________________ 3. Project no. ______________________
6. Area in country _________________ 7. Proposed sponsor ________________

B. Project classification

8. Type of field project ___________ 9. Type no. ________________
10. Types of assistance required (Please rank by order of importance - 1 - most important)
   ___ a. Planning assistance
   ___ b. Advisory assistance
   ___ c. Operational assistance
   ___ d. Investment in infrastructure
   ___ e. Financing inputs
   ___ f. Other? _______________________________

11. Current stage in project development
   ___ a. Preliminary idea and proposal
   ___ b. Project identification
   ___ c. Project preparation
   ___ d. Project appraisal
   ___ e. Implementation
   ___ f. Project expansion

12. Types of objectives identified
   ___ a. Integrated area development
   ___ b. Increase food supplies _____ cash crops? _____ traditional?
   ___ c. Improved marketing
d. Contribute to food security

---

e. Infrastructure: types?

---

f. Environment components

---

domestic water
sanitation
fuel
housing

---

g. Improve nutrition of poorest groups

---

C. Government interest in nutrition improvement through agriculture


---

a. Policy declaration

---

b. National nutrition strategy published

---

c. Financed earlier nutrition programme or project

---

d. Cooperated with donor in earlier nutrition programme or project

---

e. Food and nutrition unit in planning agency

---

f. Food and nutrition unit in Ministry of Agriculture

---

g. Food and nutrition unit elsewhere. Where?

---

h. Don't know

---

D. Availability of background information. Check if yes.

14. On national food production and distribution

---

a. Trends in production of cash/food crops

---

b. Trends in production of all major foods

---

c. Measures of total supplies of all major foods

---

d. Measures of domestic food consumption

15. Sample survey data on food consumption

---

a. From nationwide household food consumption survey. Year?

---

b. Area subsamples available?
c. For urban only? ______ Rural only? ______
d. Only small household food consumption
e. Only limited individual food consumption
f. Part of national household budget survey. Year? ______
g. Part of area sample household budget survey. Year? ______
h. Don't know

Measures of nutritional status for young children

a. Nationwide sample survey. Year? ______
b. Project area sample survey. Year? ______
c. Non random sample survey. Large scale ______
   Small scale ______
d. Don't know

Measures of income levels of population groups

a. Nationwide household budget survey. Year? ______
b. Area household budget survey
   Urban ______ Rural ______ Area of project?

Indications of nutrition and nutrition-related health problems among poor families in proposed project area

a. Reported by nutritionists
b. Inferred from very low income levels
c. Reported by health authorities

Relationship of this project to others in same area with any nutritional relevance

Development project in the area:

Earlier?    Yes ______ Sponsor ________________
            No ______ Don't know ________________

Current?    Yes ______ Sponsor ________________
             No ______ Don't know ________________

Prospective? Yes ______ Sponsor ________________
               No ______ Don't know ________________
20. **Nutrition project or programme in the area:**

<table>
<thead>
<tr>
<th>Earlier?</th>
<th>Yes</th>
<th>Type</th>
<th>Size</th>
<th>Sponsor</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current?</td>
<td>Yes</td>
<td>Type</td>
<td>Size</td>
<td>Sponsor</td>
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<td>Don't know</td>
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<tr>
<td>Prospective?</td>
<td>Yes</td>
<td>Type</td>
<td>Size</td>
<td>Sponsor</td>
<td>No</td>
<td>Don't know</td>
</tr>
</tbody>
</table>

21. **Environmental project or programme in the area:**

<table>
<thead>
<tr>
<th>Earlier?</th>
<th>Yes</th>
<th>Type</th>
<th>Size</th>
<th>Sponsor</th>
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<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current?</td>
<td>Yes</td>
<td>Type</td>
<td>Size</td>
<td>Sponsor</td>
<td>No</td>
<td>Don't know</td>
</tr>
<tr>
<td>Prospective?</td>
<td>Yes</td>
<td>Type</td>
<td>Size</td>
<td>Sponsor</td>
<td>No</td>
<td>Don't know</td>
</tr>
</tbody>
</table>

F. **Possibilities of significant nutritional benefits or negative effects**

22. **For low-income people**

<table>
<thead>
<tr>
<th>a. Beneficiary?</th>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. In what way?</td>
<td>____________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. How probable?</td>
<td>Very</td>
<td>Somewhat</td>
<td>Little</td>
</tr>
<tr>
<td>d. Negative effects?</td>
<td>Yes</td>
<td>No</td>
<td>Don't know</td>
</tr>
<tr>
<td>e. In what way?</td>
<td>____________________________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. How probable?</td>
<td>Very</td>
<td>Somewhat</td>
<td>Little</td>
</tr>
</tbody>
</table>
23. For higher-income people
   a. Benefit? Yes _____ No _____ Don't know _____
   b. In what way? ________________________________
   c. How probable? Very _____ Somewhat _____ Little _____
   d. Negative effects? Yes _____ No _____ Don't know _____
   e. In what way ________________________________
   f. How probable? Very _____ Somewhat _____ Little _____

G. Availability of national personnel with needed expertise. Check categories that apply.

<table>
<thead>
<tr>
<th>Trained and experienced in:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any one?</td>
</tr>
<tr>
<td>a</td>
</tr>
</tbody>
</table>

24. Nutritionists
   25. Food economists
   26. Social analysts
   27. Planners

H. Recommendations regarding further action

28. Relevance of project for nutritional considerations
   a. Much _____ b. Some _____ C. Little _____ d. None _____

29. Are there strong reasons for proceeding at once with Initial Assessment for Project Identification? Yes _____ No _____

   Why? ________________________________
   ________________________________
The Initial Assessment is a most important stage in practice in the nutrition planning sequence. It is carried out at the Project Identification stage when firm ideas about the project design are being formulated. The nutrition planner, briefed with the results of the available literature and possibly with the experience of a brief visit to the project site for discussions with local officials, is now interacting with other members of the Identification team. The planner is trying to specify and communicate to them the nature of the linkages between agriculture, rural development and nutrition; in other words to desirable areas of the conceptual framework shown in Fig. 1. It is essential the planner spend as long as possible in the project area, gaining information from the project participants themselves.

Therefore, the Initial Assessment is the first approximation of the potential impact of the development project on the nutritional status of the proposed participants and non-participants, carried out in conjunction with other project planners.

4.1 OBJECTIVES OF THE INITIAL ASSESSMENT

(1) To specify the apparent major food and nutrition problems in the project area:

There appear to be four general types of food and nutrition problems: (a) those related to inadequate food consumption because of inadequate supplies, low subsistence food production, high prices and/or low purchasing power; (b) those caused by food insecurity; (c) those related to shortages or poor utilization of particular nutrients, e.g., vitamin A; (d) those which are combinations of the first two problems with environmental problems (e.g., water, pollution) and disease. Food consumption, nutritional status and health statistics, either from large-scale surveys or small-scale studies (e.g., on infant morbidity and mortality) should provide information on these problems. Family income and expenditure surveys may also be helpful. National aggregate data on food production, imports and exports will give some sense of the relative importance of particular foods;

(2) To specify the population groups particularly at nutritional disadvantage in terms of their demographic, socioeconomic and geographic characteristics i.e. functional characteristics (see Joy and Payne, 1975);

After defining the problem as far as possible, the planner will be ready to identify the groups probably at risk. Information on their characteristics must be combined with data from censuses of population and agriculture and economic surveys in order to estimate the numbers of different types of families (e.g., according to occupation, farm size, family size and structure, type of enterprise) likely to have serious food and nutrition problems. These estimates will indicate the need for other data of particular kinds specific to the project. They will also give a good idea of the nutritional objectives which might be incorporated and how the project might be designed;

(3) To identify any relationships of such problems to government (or local) agricultural production, price, export and import policies and controls;

In most cases possible relationships of the problems to government policies and programmes can be studied only in general terms, for example, with
information from national agricultural surveys and time series of food production, foreign trade and food prices and with inferences from studies in other areas and countries. However, the judgements of agricultural economists familiar with the area are essential at this stage. They may identify factors such as local conditions, price controls, subsidies for particular crops (possibly cash crops being encouraged to increase exports), criteria for credit, and so on, which increase the variations in income or lower farm output and the consumption of subsistence foods. This information can then be applied to identify the disadvantaged groups by income, employment or other socioeconomic characteristics.

During meetings with government officials there are likely to be references to other policies, programmes and plans which could have impact on nutrition. These must be examined in order to appraise the strength of government and community interest in nutritional considerations.

During such meetings questions should be asked of government officials to determine their awareness of food and nutrition problems in the project area, what factors they believe contribute most to them and how they think improvements might be made. The nutrition planner should try to get evidence of and encourage their willingness to involve local people in suggesting, considering and deciding on project objectives and components and their inputs and activities.

The planner should also discuss government food and nutrition policies and ongoing activities to improve nutrition of the poor with senior food and nutrition staff members in the agricultural and health ministries. One reason is to understand whether public policy statements are implemented in programmes and projects and to what extent they think such activities are effective. Discussions should cover food production, distribution and price policies, food or income subsidies and past, present, proposed or needed nutrition intervention projects;

(4) To formulate nutrition objectives for the project to be integrated with other objectives being developed during this phase:

The kinds of project objectives generally compatible with nutritional improvement have been discussed in Chapter 1. If there is any conflict, then it is at this stage that the government's commitment to nutrition will become clear. It is, however, the onus of the nutrition planner to show how the nutrition component can be carried out - the mechanics of design and reaching target groups - without adding substantially to the project cost;

(5) To develop preliminary suggestions of ways in which the project could benefit population groups worse-off nutritionally for discussion with other members of the planning team and government experts;

There can be no single assessment of the project's impact on nutrition because changes will continue during both the Identification and Preparation stages. So the planners must actively participate in team discussions and be continuously on the lookout for possible small but important changes to increase food consumption. Poor people's ability to buy may be increased by more income from employment or from sales of their produce; they may be able to produce more traditional foods (especially vegetables, fruit, small animals) for their own use. The quantities and nutritional quality of food available in the marketplace may well be much greater because of more agricultural inputs, higher yields, improvements in marketing.

The nutritional benefit from environmental improvements such as wells,
piped water, sanitary facilities, wood lots for fuel, improved housing, could be significant (reduced water-borne diseases; more time for women to care for their children, gather wild food and produce and prepare food at home);

(6) To continue to search for existing data and ascertain whether additional data should be collected and analysed. If the Initial Assessment cannot fill all data requirements for the project, then an In-Depth Study during Project Preparation may be required.

Much effort must go into searching for information, studying and discussing available data and getting additional data or preparing for a special sample survey. It is unlikely that nutritional data (food consumption, nutritional status) specific to the project area will be found. However, area-specific food and health data should be available. Qualitative nutrition information should be sought from health specialists and any nutritionists familiar with the area, such as nutrition problems of particular groups, seasonal weight changes and breastfeeding and weaning practices. Other possible sources are university faculties in agriculture, marketing, economics, public health and home economics.

Because of the close relationship between nutritional deprivation and poverty, the planner needs to examine any available family income and expenditure data and equate these to the nutritional situation. If problems result primarily from maldistribution of income and purchasing power, it will be particularly important to stay abreast of the project team’s ideas on participants and on the potential effects on employment and income.

Where few country or area data are available, reference can be made to data for ecologically or economically comparable areas: for example FAO holds food consumption and nutritional status data from about 15 countries and the scientific literature will contain the results of other surveys.

4.2 VISITING THE PROJECT SITE

It is essential that the nutrition planner visit the rural setting of the project. The subjective impressions and the qualitative data collected are as important as the quantitative planning data in the formulation of objectives and project design. It is now understood that biases operate so that there is little contact between planners and the problems of the rural poor: planners are urban based, and when they do travel to rural areas do so on tarmac roads (where the richer people live) during the dry season and meet only the more influential, usually male, members of the communities. The nutrition planner must seek to counteract these biases and try to listen to the observations of the genuinely poor.

It is becoming recognized in the literature that the Rapid Rural Appraisal (see Chambers & Carruthers, 1981 and Longhurst, 1981) despite its apparently subjective nature and brief duration, can be structured to provide vital insights into project planning. The planner should seek to talk to a wide range of rural people, with a minimum of fuss yet recognizing all the necessary courtesies. If a week is available for such a visit, a survey may be possible although its value will be to give the investigations a structure (e.g. visiting every tenth household) rather than provide statistically valid estimates of parameters. Indeed at this stage insights are more important than estimates.

Listed below are areas that might be investigated and questions which might be asked (based partly on Collinson, 1981):
A. Agricultural resource use

Crops grown and livestock kept - for all types of farmers? What are end uses of these crops and livestock? How are they prepared, processed or sold? What are the most popular crops and livestock and why? Who controls (sells, consumes) the product? How common is hired labour? Who works as hired labour? What are the arrangements for hire? How do cropping patterns vary and why? What are the methods of land preparation, planting, cultivating, pest control and harvesting? How do they vary between farmers? Use of chemical inputs? What is the system of land tenure? What are the variations in land holdings? What sort of crop yields do they expect? How much access to extension services? Access to credit?

B. Agricultural resource constraints

Ask for a summary of the cropping calendar. Is labour a constraint due to out-migration? What are the busiest months? How do farmers ensure they have food all year round? How do crops overlap? Is there a hungry season? For whom? How do farmers get more land? When do farmers have to sell/buy food? Do they have to labour for cash? Where do they borrow money?

C. Food consumption

What are the main foods consumed? Does the food consumed vary during the year or during the week? What are the preferred foods? When are foods available from farm products, when are supplies uncertain, when are they not available from the farm? Which foods are always purchased? What did farmers do when they last ran out of food? Are any new foods becoming more popular? How do prices of food vary during the year? Do all family members consume all foods? How is food shared around? How much snacking is there? How is food prepared, what is the usual meal pattern? How and when does it vary?

D. Water and health

What is the usual water source in wet and dry seasons? How far away is the water? How is water brought to the household? How far away is the firewood? What is the usual source of firewood? What was the last illness in the household? What happens when people are sick? What are the changes in feeding during sickness? How are children fed? How much access to health services, immunizations, etc?

E. Attitude toward innovations

What ideas and material resources have come from the outside in the last five years? What do people need most for their farming? How would they use new resources? What does the village need most? Why? When are the major inputs purchased? What organizations/institutions do people have which could be used for their development?

These questions are necessarily open-ended and the list could be lengthened. Some of the answers given by respondents should be treated with caution. However, if sufficient people are interviewed, questions modified and other lines of investigation developed, then the planner should get a good impression of resource use and constraints, and thereby an insight into the effectiveness of the proposed project design. In addition, the planner should
sound out local officials and others in the project area on their awareness of any problems, suggestions for doing something about them and their willingness to participate.

Information is needed to assess the possible connexions between the way the community is structured and (a) the activities and outcomes envisioned by the planners, (b) the likelihood of getting the community to participate in decisions on the project design, and (c) their attitudes to changes in work situations, economic and social status, and food production and consumption patterns.

4.3 PREPARATION FOR THE NEXT PHASE

Assessment and discussion culminate in appraisal of the overall impact, issues to be considered in the next stage, and more precise identification of the data required, together with suggestions for obtaining them (further analysis of existing data or collection of additional data.) The plans for data processing and analysis have to be set forth. The relationship and possible linkages of the In-Depth Study to proposed feasibility studies should be explored. Finally, national experts should be identified to help in analysing available data or in conducting a survey to obtain new data, then to process and analyse them. If possible the In-Depth Study should be planned to add to the country's expertise by providing experience and on-the-job training of country professionals.

The Initial Assessment concludes with preparation of material for the team's report. It describes the planning work still remaining before the Project Preparation stages and recommends if an In-Depth Study is needed. The following should be included:

(a) preliminary conclusions on the main food and nutrition problems of the area;
(b) the likely short-term effects on food consumption, the longer-term impact on nutrition and how design modifications might influence these;
(c) recommendations and specifications for further data needs and analyses, hypotheses to be tested, suggestions for data collecting and processing;
(d) preliminary identification of indicators to monitor and evaluate the project's effects on food consumption and nutrition;
(e) appraisal of existing nutrition and health interventions which might reinforce the impact of the project, possibly a recommendation for a nutrition intervention.
4.4 STEPS IN THE INITIAL ASSESSMENT

A checklist is provided at the end of the chapter.

Step 1. Review the identification and classification of the project (Check list items 1-13).

2. Investigate government policy declarations or directives on project activities relevant to increasing nutritional benefits (Items 14, 15).

3. Undertake a visit to the project site to evaluate local conditions.

4. Search for evidence of efforts to involve the community in planning (Item 16).

5. Search for, study and use several types of food, nutrition and socioeconomic data and qualitative information (Item 17-20).

6. Make preliminary assessments of the potential effects of the project on food consumption of various nutritionally disadvantaged groups (Items 21-26).

7. Discuss with other members of the mission the project plans and how they relate to information gathered (Items 27-29).

8. Investigate the availability of national personnel with the needed expertise to carry out further data collection and analysis (Items 30-32).

9. Investigate any other issue that may have been raised.

10. Work with others on the team to prepare recommendations for Project Preparation and In-Depth Study, if needed (Items 33-34).

11. Prepare material for the mission report, including an annex on the nutrition work noting activities, findings, issues raised and recommendations.
CHECKLIST FOR INITIAL ASSESSMENT

A. Identifiers

Recheck items 1-7 in Part 1. Add dates for Initial Assessment ______

8. Investigator for Initial Assessment

Name

Affiliation

B. Project classification

13. Recheck items 8-12 in Part 1 and revise if necessary.

C. Government interest in nutrition improvement through this project.

14. Check if yes

Yes  Maybe  No  Don't know

a. Meeting(s) between food and nutrition officers and project planners

b. Memorandum from government agency re nutrition objectives received by project planners

c. Pronouncement by government officer that project would improve nutrition of people in area

d. Possibility of features in project design to improve nutrition of the disadvantaged

15. Government willingness to finance extra project costs to achieve nutrition benefits. (Check).

D. Efforts to involve community people in planning process

16. Efforts by:

Substantial  Some  Minor  None observed

a. National officials

b. Regional officials

c. Planners
### E. Available information

17. Recheck data availability identified in Desk Review Checklist but focus on project area

<table>
<thead>
<tr>
<th>Information</th>
<th>Yes</th>
<th>Note adequacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Census data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Food balance sheets</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Household budget survey data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Household food consumption data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Individual dietary data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Nutritional status of young children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Health data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morbidity of young children</td>
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<td></td>
</tr>
<tr>
<td>Mortality of young children</td>
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<td>h. Water and sanitation data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domestic water: rural poor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sanitary facilities: rural poor</td>
<td></td>
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</tbody>
</table>

18. Data to specify major food and nutrition problems in project area

<table>
<thead>
<tr>
<th>Problem</th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td></td>
<td></td>
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<tr>
<td>c.</td>
<td></td>
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<tr>
<td>d.</td>
<td></td>
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<tr>
<td>e.</td>
<td></td>
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<tr>
<td>f.</td>
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</tbody>
</table>

19. Data on relationships of problems specified in Item 19 to government policies and controls

<table>
<thead>
<tr>
<th>Relationship</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
<td></td>
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<tr>
<td>b.</td>
<td></td>
<td></td>
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<tr>
<td>c.</td>
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<tr>
<td>d.</td>
<td></td>
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<tr>
<td>e.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
20. Data on characteristics of population groups particularly at nutritional disadvantage in project area
   a. Location ____________________________________________________________
   b. Economic characteristics ____________________________________________
   c. Other characteristics ______________________________________________

F. Preliminary assessment of nutrition impact of project components on nutritionally disadvantaged. Evaluate impact as high, medium, low, none, or don't know (DK).

<table>
<thead>
<tr>
<th>Will project affect:</th>
<th>Probable effect on food consumption of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>21. Food supplies?</td>
<td></td>
</tr>
<tr>
<td>a. Traditional foods?</td>
<td></td>
</tr>
<tr>
<td>b. Non-traditional foods?</td>
<td></td>
</tr>
<tr>
<td>22. Food marketing channels?</td>
<td></td>
</tr>
<tr>
<td>23. Prices of traditional foods?</td>
<td></td>
</tr>
<tr>
<td>24. Incomes and thus demand for food?</td>
<td></td>
</tr>
<tr>
<td>25. Food patterns?</td>
<td></td>
</tr>
<tr>
<td>26. Despite expected benefits from project, the need for specific nutrition component in project for population group (identify)</td>
<td></td>
</tr>
</tbody>
</table>

Will be:
High ______
Moderate ______
Low _____
Don't know _____
G. Based on discussions with other project planners, identify:

27. Types of tentative recommendations you made
   a. ____________________________________________
   b. ____________________________________________
   c. ____________________________________________
   d. ____________________________________________

28. Responses to your recommendations by others on planning team

<table>
<thead>
<tr>
<th>Types</th>
<th>Explanation given</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td></td>
</tr>
<tr>
<td>b.</td>
<td></td>
</tr>
<tr>
<td>c.</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
</tr>
</tbody>
</table>

29. Apparent flexibility remaining in project design to take nutrition objectives into account:
   _____ a. Much flexibility
   _____ b. Some flexibility
   _____ c. A little flexibility
   _____ d. No opportunity remaining

H. Availability of national experts

30. For In-Depth Study

<table>
<thead>
<tr>
<th>Yes or no</th>
<th>Affiliations</th>
</tr>
</thead>
</table>
   a. Nutritionist with survey experience |   |   |
   b. Economist with food survey experience |   |   |

31. For selection of nutrition intervention, nutritionist with experience in dealing with rural people
32. For food and nutrition survey as part of project monitoring and evaluation, availability of nutritionist:

_____ a. Well-prepared
_____ b. Needs training
_____ c. Probably none available
_____ d. Don't know

I. Recommendations regarding further action

33. Specify critical questions and issues for the In-Depth Study

a. ____________________________________________

b. ____________________________________________

c. ____________________________________________

d. ____________________________________________

34. Recommendations to meet data needs

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
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<tbody>
<tr>
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<td></td>
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</tbody>
</table>

a. Data available, need analysis

b. Collect nutritional status data
   1. As part of another survey for project
   2. Separate survey

c. Collect some food consumption data
   1. As part of another survey for project
   2. Separate survey

d. Other data needs?
   Specify ______________________________________

e. Country needs help in data processing and analysis
In general, due to lack of suitable information at project area level an In-Depth Study will be necessary for meaningful nutrition planning. It allows for an analysis in greater detail than the Initial Assessment and, unless existing data can be re-analysed, it includes the organization, collection and analysis of additional nutrition and nutrition-related data. The In-Depth Study together with the recommendations from the Initial Assessment, supplemented by information from government officials and project planners, will provide a complete nutrition assessment of the project area that can be used in project design, implementation and evaluation. The In-Depth Study provides a firmer base on which to proceed to give suggestions and guidance for the project's preparation.

5.1 OBJECTIVES OF THE IN-DEPTH STUDY

(1) It allows for the more precise determination of the nutritional status, food patterns and the socioeconomic situation of those who are most disadvantaged;
(2) It contributes to more rational decisions on project objectives, participants, inputs, activities, outputs and means of evaluation;
(3) It provides information that permits an analysis of projected nutrition and social benefits with possible economic and political costs;
(4) It permits the identification of special nutrition components or interventions that may be needed to complement broader strategies that improve income and consumption in the longer term.

5.2 GENERAL COMMENTS ON THE SCOPE OF THE IN-DEPTH STUDY

The In-Depth Study should fill the gaps in existing information and by this means is tied directly to the needs of the project. It should be operational rather than academic in scope.

If possible, subsamples of earlier large-scale surveys of nutritional status, food consumption or even of household expenditures for food and main categories of non-food items might be used, the latter indicating the most important staples.

This re-analysis of existing data was possible in two of the six case studies carried out by FAO using the methodology described in this manual. For a rural development project in Peru it was necessary only to re-analyse segments of the national food consumption survey relating to the project areas. From this it was possible to estimate the extent of energy and protein-intake deficiency and of child malnutrition. A multivariate analysis related them to information about family income, and land area farmed, occupations and food consumption pattern. Also, in an integrated development programme in Kenya, existing national data pertaining to the project area were re-analysed. The analysis included the cross-tabulation of nutritional status with socioeconomic variables. Wasting and stunting were cross-tabulated with the following variables: morbidity (defined in children who were reported to have been sick within the two weeks prior to the interviews); cattle holding (as a proxy variable for wealth); land area; distance to sources of wet-and dry-season water; income (defined as income from sale of crops); maize production and consumption, and highest school grade attained by any male in the household. This analysis showed the proportion of children wasted and stunted and also showed, for example, that wasting was lower among
children of cattle owners than among those who relied exclusively on agriculture. Stunting, on the other hand, appeared to have no relation to the wealth variable.

It is usually desirable to go back to data for individual households, to recombine items and to incorporate updated estimates of the distribution of the population by urban/rural categories and by economic level.

Food patterns generally change slowly, so usable working approximations can be developed from the data collected five to ten years earlier (which should be checked for validity.)

The planning of special surveys to obtain data is obviously dictated by the current availability of data and by the analytical needs of the project preparation. Information is needed on the actual situation, on factors contributing to it, and how various aspects of the project design might affect it. Suggestions for key indicators are given below.

The sampling procedure for any new survey should be developed with help from country sampling statisticians and in coordination with surveys being conducted for feasibility. Most of the measures used separately or in combination as indicators would require a sample survey of households; some measures (e.g. local health services) refer to the village as a whole so the information could come from village leaders. The proposed measures and related questions should first be discussed with the team, with country experts, and with at least a few local leaders. The investigator should collect only a minimum of data reflecting the needs of the project preparation and existing and proposed national and regional data.

Another prerequisite for a well planned survey is at least one small-scale pilot test of the questionnaire (conducted by trained local interviewers) and the organization for data processing.

If the agricultural economist or another member of the team is planning to make a farm management survey, the household survey should be joined with it or at least related to it. This was done with the FAO case study in Haiti. The data developed in the survey when combined with existing data might also serve as baselines for monitoring and evaluation.

5.3 SUGGESTIONS FOR APPROPRIATE INDICATORS

Nutritional status indicators

The minimal three nutrition indicators are children's weight for age, height for age (which when below the norm indicates 'stunting', and points to long-term deprivation), and weight for height (which when below the norm indicates 'wasting', showing short-term status). Weight for age is a less precise indicator of nutritional status than the other two (e.g. it does not differentiate between 'stunting' and 'wasting') but is more commonly available, especially from clinics and hospitals. Morbidity questions should be confined to the last seven days before the interview and be evidenced by high fever and/or diarrhoea. These minimal indicators should be supplemented by information on how long each child under three was breastfed wholly or partially, and on weaning practices. The mothers should be questioned about when each child under three was first fed solid foods, the kind of solid foods fed during and after weaning and how these were prepared.

Another significant measure is the mortality rate for children under five. Mothers should be asked for the number of children born in the last five years,
including any who died at birth, then for the number who are still living. These are questions which should be asked with sensitivity. In some countries, clinic cards or home records are held by each household. They are the only source of birth weight data which should be recorded for each child under five. One must, however, always be cautious of the representativeness of clinic records.

Food consumption indicators

Information on household consumption of major staples will give a general indication of variations in food energy supplies among poor households because the staples are likely to supply at least a large proportion of food energy. If it appears that certain nutrients are often deficient, a few food frequency questions should be asked about their principal source.

There are likely to be some problems with infant feeding. Local experts in child nutrition can suggest questions to identify factors in child malnutrition (e.g. breastfeeding practices, weaning foods and how they are prepared, how frequently given) for comparison with morbidity and nutritional status data.

Demographic and cultural characteristics of households

Such information is obtained in personal interviews with the head(s) of the household. Data on sex, age and physiological status of each member are critical for evaluating nutritional needs and variations among households. Family size and dependency ratio (workers: dependants) are also required. Civil status, ethnic and religious affiliations provide clues to cultural food patterns. Degree of urbanization (at least urban or rural identification) and migration in the last few years indicate ongoing changes. Those with local knowledge may suggest questions to reveal family roles in producing, procuring, processing, preparing and allocating food.

Socioeconomic characteristics

As it is difficult to obtain valid and reliable measures of total, cash and subsistence income, it is wise to include alternative measures such as key household possessions, type of house, land or livestock holdings. With the help of country experts and local people, such information can be converted into an ordinal measure (preferably with as many as five levels) by use of weights based on their judgement of the relative importance of each type of information. (See Voelkner, 1981.)

It is difficult to estimate the equivalent in money of subsistence (home) food produced for own use, but it is very significant for current and prospective changes in the nutrition situation and in planning for economic development, particularly for cash crops and marketing. Variability in home produced supplies (which include foods collected, such as fruits and leaves) over a year or even a week, and lack of any records, usually result in sizeable underestimations of amount, value and relative importance for both income and consumption. Subsistence farmers and fishermen may produce as much as 90 percent of their own food.

Estimating amounts and values of non-purchased foods is time-consuming and should be undertaken only after pilot testing and in a full-scale food consumption survey. These costs of collecting such data probably outweigh their benefits for a development project.

Other characteristics to consider in conjunction with indicators for food consumption are education levels of male and female heads of households (e.g. 

-32-
years of formal schooling), availability and use of public services (health, extension, credit), and production-related characteristics such as tenure, size of farm use of purchased inputs, kinds of crops grown and livestock raised, and availability of services.

Finally, it is often helpful if the interviewer who has subjectively gained an impression during the interview appraises the family's socioeconomic level on a scale of 1 to 5 as a supplementary check.

Food supplies, marketing and prices

The investigator needs information on major staples bought, prices paid and their seasonality; on price controls, any special feeding or distribution programmes, and marketing problems (distance, transport, credit) faced by the households, particularly the poorest. Appropriate questions should be developed for response by the male head if he is the buyer, but they should also be put to the female head in order to get her point of view.

Health, sanitation and related environmental factors

It will usually be necessary to conduct inquiries at both the village and household levels. Regional and area health specialists, other experts who have worked in the area and local people will suggest key questions and provide guidance. Health specialists are obvious sources for information about common diseases and their relationship to nutrition.

They may also have information on mortality among children under five or six. Villagers can readily provide information about drinking water and other water. They can also describe local toilet facilities and guess at the proportion of households with each type. At the household level, questions about water availability, toilet facilities and distance to the water source also need to be asked.

Finally it is desirable to get information on accessibility to health care, a significant factor in nutrition problems which a development project can alter by, for example, road construction. The mothers can quickly identify the kinds of health care facilities available and say how far away they are. To find out if they use such facilities, the time period should be limited to the past month. If there is more than one in the area, ask how often anyone in the family visited each type.

5.4 GUIDANCE FOR ANALYSIS 1/

A large range of statistical techniques is available to the nutrition planner, especially now that microcomputers and powerful calculators are available in developing countries. However, the nutrition planner should always use a technique appropriate to his needs and resources. In some cases, sophisticated methods may not be required. For example, a re-organization of tabular material may suffice. The drawing up of dummy tables at the beginning of the analysis is a good means of deciding what needs to be done.

Nutritionists have generally paid less attention to analysis and interpretation of their data than to problems in measuring food consumption, nutrient intakes and nutritional status. The availability of calculators and computers means that investigators are able, if they wish, to do more than calculate, for

1/This section is based partly on Burk and Pao, 1980, where a more detailed examination of these topics is provided.
example, subgroups' averages for indicators. Distributions within subgroups and multivariate analyses are possible as they can assist in obtaining (1) a picture of differences in severity of the problems and in factors contributing to such differences, and (2) develop projections of the impact of inputs and activities on consumption and nutrition of particular groups under alternative assumptions.

**Analysis of variations**

The first step in analysing data is to categorize households by the characteristics selected as indicators (e.g. location, major occupation, size of landholding), counting the number of sample cases in each broad category and subcategory. The proportions in each category should then be calculated in percentages by dividing the individual counts by the total sample. These proportions outline the profile of population groups in the area and are needed for design decisions. For those indicators measured in categories, either by name (nominal) or by ordinal ranking (large, medium, small landholders), only frequency distributions and medians can be calculated, not means or the usual measures of dispersion.

Most anthropometric measures of nutritional status are developed in quantitative terms such as kilogrammes and centimetres, and need to be compared with growth standards by calculating percentage of the standard to provide weight/age, height/age and weight/height. Therefore, means and standard deviations could be calculated.

**Measurement of relationships and relative importance of factors**

Analysis of the relationships between indicators of nutritional status (dependent variables) and indicators of factors contributing to variations in nutritional status (independent variables) in the form of cross-tabulations can identify different degrees of malnutrition among main population groups, e.g. functional categories (Joy and Payne, 1975). This provides basic information for selecting participants, but only suggests possible causality needed for other design decisions.

The next step where time and resources permit in analysing such relationships is to undertake multivariate analyses so that the effects of particular factors can be measured separately while others are taken into account. Thus the analyst can rank the factors in relative importance and estimate the potential impact on nutritional status of possible changes in project inputs and outputs.

**Comparison of tentative project plans and nutritional needs**

As the planners design different parts of the project, they will be estimating how many and which people with different socioeconomic characteristics are likely to participate in each. The planner needs to compare this information with that derived for households by level of indicator of nutritional status cross-tabulated by the same set of socioeconomic characteristics. This analysis will reveal to what extent the nutritionally disadvantaged might participate in the project.

Another useful approach is to subdivide the sample of households used in the investigation into several groups based on the level of nutritional status of the young children, and then identify their families' demographic, socioeconomic, food-production and other characteristics, matching those used in the feasibility studies for the project. This analysis will clarify even more any needs for the changes in plans for participation as well as needs for supplementary inputs and
activities and perhaps for special nutrition interventions for some subgroups of people. In the FAO case studies the usual form of analysis was to relate indicators of nutritional status to socioeconomic indicators: in Sri Lanka, the analysis tested for differences in nutritional status of households characterized by farming backgrounds and experience, settlement period and production levels; for an integrated area development project in the Philippines, nutritional status of preschool children, food consumption, morbidity and mortality and sanitary conditions were related to village information on location and topography and household data on incomes, farm size, and housing; and in Zambia a close relationship was found between nutritional status and distances to shops.

Therefore, study of the variations in nutritional status among households grouped by the important factors (type of production, employment, income) can give preliminary indications of possible effects on nutrition of changes in such factors.

Measuring impact on food consumption and nutrition

If reliable data on total income per caput (cash and subsistence) can be developed from the farm and household surveys, along with food consumption data, regression analysis can be used to develop income elasticities although the situations in which this might be done are quite rare. All the important variables must be included in the regression model, not just income, and if possible, curvilinearity allowed for. For example, variations in family composition as well as size must be taken into account. Calculating meaningful equivalents, e.g. adult male equivalents, is difficult, although this is a better approach than using per-caput estimations.

It should be noted that a number of the variables which should be included in the basic analysis are categorial in level of measurement (e.g. rural vs. urban or mountainous vs. coastal plain), and may often vary in degree of correlation with other independent variables such as household size or age composition.

Probably the greatest difficulty in using econometric procedures to develop projections of potential impact arises from the problem of estimating the income of rural families in developing countries. If reliable data are not available it is possible to use an ordinal measure and obtain a regression equation to use in estimating approximate effects.

5.5 THE OUTPUT OF THE IN-DEPTH STUDY

The results of the nutrition investigation are used to contribute to the decisions on project design. The results of the In-Depth Study should appear in the Project Preparation report including a summary of inter alia the investigation in terms of the problems identified, measured variations in consumption and nutrition in the area and factors related to them, the relative importance of such factors, and description of how specific components of the proposed project are expected to contribute to nutritional improvements among specified groups.

If any special adaptations or variations in project activities in order to improve nutrition are proposed, possible extra costs should be calculated with a description of the benefits. The technical and administrative viability of these activities should be discussed. Assignment of responsibilities for administration and supervision during project implementation should be proposed. The report should contain suggestions on the basis for, conduct and uses of monitoring and evaluation of the food and nutrition impact of the project.

The report should also describe how the In-Depth Study was organized.
administratively, who participated (agencies, people) and what procedures were followed. An account of problems encountered and how they were handled would be useful to subsequent investigators.

**Preparation of nutritional recommendations**

Several different kinds of nutritional recommendations should be prepared and discussed with other planners during Project Preparation. Subjects include objectives to be combined and coordinated with other project objectives, criteria for participation, special inputs needed, special activities to involve the households at high nutritional risk, expected outputs and scope for monitoring and evaluating (see Chapter 6).

**Planning for monitoring and evaluation**

The groundwork for monitoring and evaluation is laid during Project Preparation. Plans should indicate the kinds of data to be used, collection procedures, plans for processing and analysis, and how the information could be used by project managers and even participants. The data would indicate the impending impact on food consumption and nutrition. They would also serve as indicators of impact of the project on particular categories of participants, such women, subsistence farmers and cash crop farmers.
5.6 STEPS IN THE IN-DEPTH STUDY

Step 1. Re-check the identifying information and classification, supplementing them where necessary (Checklist items 1-13).

2. Identify types of information needed for project preparation, using an operational framework (Items 14-16).

3. Consider possible alternative ways to obtain the information (see Sections 5.2 and 5.3).

4. Obtain both quantitative and qualitative information (see Sections 5.2 and 5.3).

5. Analyse the data to determine (a) major variations in nutritional status and, if possible, in consumption of the most important foods, (b) major socioeconomic factors related to them, (c) the relationships between (a) and (b) (Item 17).

6. Analyse the activities of the project as it is now being conceived in the light of Step 5.

7. Develop projections of probable changes in consumption of major staples and, if possible, of food energy and perhaps other critical nutrients related to specific inputs and activities (Item 18).

8. Examine government directives on project participation, objectives and components in terms of inputs and activities in order to effect nutritional improvements (Item 19).

9. Prepare and discuss with the team and government representatives aspects of the project relevant to nutrition objectives as shown by the nutrition planning process. This will include estimating nutritional impact of project components, assessing trade-offs and presenting alternative ideas for project design (Items 20-26).

10. State if a nutrition intervention in addition to modification to project design is required and identify it; assess its place in the plans and discuss with other planners and government agencies (Items 27, 28).

11. Submit recommendations indicated by the investigation; re-examine the contributions of the earlier stages (Desk Review, Initial Assessment) in the light of better data.
CHECKLIST FOR IN-DEPTH STUDY

A. Identifiers

Recheck items 1-7 in Part 1. Add dates for In-Depth Study ______

8. Investigators for In-Depth Study

<table>
<thead>
<tr>
<th>Names</th>
<th>Affiliations</th>
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<tbody>
<tr>
<td>a.</td>
<td></td>
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<td>b.</td>
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</table>

B. Project classification. Review at end of In-Depth Study, insert and circle any changes from Initial Assessment. Note particularly any changes in objectives bearing on nutrition improvement.

9. Type of field project __________ 10. Type no. __________

11. Types of assistance required (please rank by order of importance - 1 = most important)

   ___ a. Planning assistance
   ___ b. Advisory assistance
   ___ c. Operational assistance
   ___ d. Investment in infrastructure
   ___ e. Financing inputs
   ___ f. Other __________

12. Current stage in project development

   ___ a. Project preparation
   ___ b. Project expansion

13. Types of objectives identified

   ___ a. Integrated area development
   ___ b. Increase food supplies

       cash crops ___
       traditional ___

   ___ c. Improve marketing
   ___ d. Contribute to food security
C. Identify data relevant to nutritionally disadvantaged populations used or developed during In-Depth Study

Data on: Analysis of Collected and
existing data analysed new data

14. Nutritional status of

   a. Young children
   b. Adolescents
   c. Adults

15. Food consumption

Describe briefly

16. Socioeconomic factors

Describe briefly indicators used

17. Key relationships between food and nutrition indicators and socioeconomic indicators
18. **Projections of probable changes made for:**

<table>
<thead>
<tr>
<th>Food item</th>
<th>Projection based on</th>
<th>Time period</th>
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<tbody>
<tr>
<td>a. Consumption of:</td>
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</table>

b. Food energy per person _____ Yes _____ No

D. **Government interest**

19. **Were there any government actions or directives to project planners?**

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<thead>
<tr>
<th>Regarding:</th>
<th>Yes</th>
<th>No</th>
<th>Don't know</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Participation of nutritionally disadvantaged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Adding nutrition objectives</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Altering objectives to improve nutrition</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Altering activities to improve nutrition</td>
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<td></td>
<td></td>
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<tr>
<td>e. Providing special inputs to meet needs of nutritionally disadvantaged</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Identifying separate nutrition intervention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g. Specifying desired outputs</td>
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<td></td>
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</tbody>
</table>
E. Recommendations on project design to improve nutrition of the disadvantaged:

<table>
<thead>
<tr>
<th></th>
<th>Made</th>
<th>No</th>
<th>Accepted</th>
</tr>
</thead>
<tbody>
<tr>
<td>20. Add nutrition objectives</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>21. Participation criteria to include more nutritionally disadvantaged</td>
<td></td>
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<tr>
<td>22. Provide special inputs for nutritionally disadvantaged</td>
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<tr>
<td>23. Expand activities in components to meet their needs</td>
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<tr>
<td>24. Add project output measure for improved nutrition</td>
<td></td>
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<tr>
<td>25. Set up monitoring system for food consumption and nutrition</td>
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<tr>
<td>26. Provide for evaluation of changes in food consumption and nutrition</td>
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</table>

F. Recommendations for nutrition interventions being selected with assistance of nutrition advisor

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<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. Type of nutrition intervention to be made for project participants, if determined</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Reaction of government</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reaction of donor</td>
<td></td>
<td></td>
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</tbody>
</table>

28. Any nutrition recommendations made for non-participants?  


It has already been stated that an output of this planning methodology is to provide guidance on any Monitoring and Evaluation (M & E) of the project that may be carried out. If the data base is good, as indicated particularly by the Desk Review, information collection by the nutrition planner can provide an adequate base for future M & E. Therefore, the comments in this chapter are not intended as a comprehensive commentary on the principles and methodology of M & E but to provide selected ideas on how methods described in previous chapters might relate to M & E. The interested reader is referred to the bibliography for references that provide a more wideranging coverage of the topic (in particular, see Petry and Clayton, 1981).

6.1 THE RELATIONSHIP OF THE NUTRITION PLANNING PROCESS TO M & E

The planning process so far followed will have four important contributions to the M & E process:

1. It will have generated interest in food consumption and nutrition and alerted those implementing the project to the importance of using nutrition data in its monitoring. Levels of food consumption and nutritional status of children are important indicators of the manner in which the project is influencing the welfare of the project recipients;

2. It will have uncovered all the relevant data relating to food consumption and nutrition and, in the process, a great deal more relating to poverty and resource allocation among target groups between and within families. The latter include women and children who are not always considered by planners in so far as the family is regarded as the unit to be benefitted by the project;

3. In conjunction with (2) above, the Initial Assessment and In-Depth Study will have collected new data, or re-analysed existing data, and it is this which may provide a basis for future M & E. If a national nutrition, food consumption or household expenditure survey has been carried out in the project area within the last five years, this will probably have been re-analysed during the In-Depth Study. As such, it will provide an ideal baseline to monitor changes in food consumption or nutritional status. However, it should be emphasized that the data to be collected during M & E will be determined by the objectives of the project and need not be a repeat of data collected in project planning. Village studies or small-scale surveys carried out by academic institutions may also be available. These will have been carried out to test hypotheses or theories, rather than be linked to policy considerations per se. However, they could still be used to provide monitoring information of different kinds, either to evaluate how well the project has performed in that specific locality, to investigate causes, or to compare it with similar villages outside the project area in ad hoc surveys. They also provide important case study material; to provide important insights that cannot be uncovered by large surveys;

4. The nutrition planning process will not only have generated interest in nutrition from the earliest stages of the planning cycle but also have built up a cadre of trained staff who could carry out subsequent M & E. They
would be trained in assessing the nutritional status of children, food consumption of families and indicators (e.g. wealth of families) related to these. Further they would be experienced in communicating concepts and interpreting the levels of indicators to planners.

In a general sense, the nutrition planning methodology will have provided valuable experience in order to decide what data to collect for M & E, how much and when. It will have provided insights into how much time is required to reach isolated groups, to collect information with acceptable sample sizes and how to interpret data provided by respondents. Much of the formulation of M & E activities will be dictated therefore by common sense.

6.2 GENERAL COMMENTS ON ORGANIZING M & E ACTIVITIES

Two important issues will be discussed here: these are how much data to collect and what types of data are needed.

The amount of data to be collected is determined by a major factor: the information must be available in a form that can be used at the right time by the persons (e.g. project financiers or management) who need it. Information that cannot be used to influence decisions as they are being made is useless. Therefore, the time needed to collect, analyse and present data is the main determining factor. Staff and other resource availability must also be considered. The difficulties of logistics in developing countries usually mean that the amount of data collected should be small and the temptation resisted to keep adding in more. Project management and financiers will be interested mainly in whether the project is meeting its physical targets (input distribution, construction of capital structures, disbursement of funds) and project objectives which might include reaching specific groups and nutritional improvement. In the latter case, with the strict time constraints it will be necessary to estimate only changes, not causes in levels of indicators. This means that the data collection process should aim for high sample sizes collecting only short term output indicators (e.g. recipients of agricultural inputs, attendances at project services, changes in market prices of food), longer term output indicators (e.g. nutritional status, food consumption levels) and data identifying the respondents (e.g. project participant/non participant, names, location etc.) to facilitate return visits and assessment of project targeting. A list of factors believed to be influencing those output indicators may not be essential. To carry out a survey to describe associations and ascribe possible causes of changes in nutritional status suggests a different type of survey (one that is more academic in scope) to derive information that is interesting, but not strictly required for project staff.

Strong subjective evidence of causes and the impact of the project can be gained by village-level information and by comments given out by respondents. The Rapid Rural Appraisal technique can also be used as an aid to project evaluation.

Advice on survey design, sample size, matching participants with non participants, etc. should be sought from local qualified statisticians. It should always be kept in mind, however, that data collection be kept to a minimum compatible with the objectives of the evaluation.
Annex A

BRIEF INTRODUCTION FOR NUTRITIONISTS TO FOOD ECONOMICS AND
STATISTICS FOR USE IN NUTRITION INVESTIGATIONS 1/
by M. Burk

This annex identifies important economic concepts, data and
statistical procedures for use in nutrition investigations for
development project planning. However, it should be noted that
complex concepts and relationships are treated only briefly and no
attempt has been made to include their theoretical background.

A.1 SELECTED ECONOMIC CONCEPTS AND RELATIONSHIPS

Economists use the concepts macro and micro to distinguish two
levels of aggregation, but there is no clear dividing line between
them. At the macro or highly aggregated level are national and
regional totals and averages for food supplies and consumption.
At the micro level are factors related to the food consumption and
nutrition of particular families and individuals. A major difficulty
in nutrition investigations for project planning is to disaggregate
food supply and distribution data, as well as other types of economic,
social and health statistics, so as to reveal economic and social
relationships underlying undernutrition and malnutrition. Therefore,
it is often necessary to work from the micro end. Investigators
collect data from individual families and even information on indi-
viduals, then aggregate them for subgroups to permit generalizations
about the behaviour of different groups of people. But a nutrition
investigator must also assemble and use several types of aggregated
data, identified next.

Food supplies, distribution, expenditures and consumption

For study of the general pattern of food consumption in a country,
it is helpful to start with data on the production of food crops,
livestock and fishery products. In most countries the totals for
even major crops are underestimated because they pertain primarily to
output for sale, i.e. the commercial production, and omit most of the
foods produced for own household use, the subsistence production.
Also entering into the total domestic food supply for a given year
are imports and carry-over from the preceding period. To estimate
domestic consumption (food within the country) in the year, the
amounts of each type of food exported, non-food uses such as feed for
livestock, and waste and losses must be subtracted from the total
supply. No country has good data on edible and inedible wastes and
losses on farms, in marketing channels or in households, but the
effort to estimate them must be made for they may account for as much
as 10 to 20 percent of the food produced. These sets of data are
used in the FAO Food Balance Sheets, sometimes called supply and
distribution tables.

1/ For a more detailed discussion of the issues described in Annexes
A and B, see Burk, M. & Pao, E. Analysis of Food Consumption
Survey Data for Developing Countries. FAO Food and Nutrition Paper
No. 16, 1980.
The term 'distribution' is often used interchangeably with marketing. It generally refers to food supplies moving through marketing channels into domestic consumption. But it may refer to area-wide distribution, or distribution through the year, or among households with different characteristics. As foods move through commercial marketing channels, marketing services are needed, such as transportation, storage, processing, wholesaling and retailing, and their costs are added into the prices. Prices per unit are also increased to allow for losses due to spoilage and inedible wastes. Foods consumed by producing families do not incur most of such marketing costs, even though they are sometimes priced at retail for analytical work.

The term 'food expenditure' is used for money outlays by consumers for food consumed at home and for meals and snacks away from home. It is often interpreted also to include estimates of the value of food obtained without expense, as from home production, gifts or barter. National food expenditure data are calculated as part of national income accounting, but they are often underestimated. The same problem exists for the data derived from family budget surveys, which involve 'global estimates' of total outlays for food groups and substantial response error.

Food consumption in a country in a year estimated from the data in Food Balance Sheets may be measured in terms of farm weights or landed weights of fishery products or at the level of primary distribution which includes fresh foods in farm weights and processed foods in processed weights. If only homogeneous foods are added together, there is no analytical difficulty. If unlike foods such as fresh milk and cassava are included in one total, the total weight is meaningless because of differences in water and inedible content. To aggregate unlike foods, money values should be calculated, using either farm weights and farm prices or retail weights and retail values. Or the calorie content of food consumed at the household level may be estimated, reducing retail weights by wastes and losses, being sure to add in all home produced food, and using appropriate food energy composition factors.

The other approach to estimating food consumption is much more familiar to nutritionists because it uses data from household food consumption surveys. But such data may pertain only to food consumed at home in a day or a week at one time of the year. Although adjustments are usually made in the count of household members to allow for meals away from home to derive the number of consumer units, they rarely have a solid research base and fail to account for which meals and whose meals, and for snacks.

Data on consumption of individual foods derived from household surveys may average higher or lower than national averages from food balance sheets. They may be higher if national crop estimates do not include all subsistence foods or if the survey was made soon after harvests. They may be lower because most of the wastes and losses are excluded or because of underestimation of consumption away from home. So comparisons require great care in adjusting for such differences.
Most economists are very precise in their use of the term 'demand'. They mean the quantity of a particular item or food taken from the market at a given price in a specified period for export, processing, or consumer use. They often refer only to market demand, that is, the commercial demand, and omit subsistence supplies.

Foods may be priced at farm, wholesale or retail level for a specified unit at a particular time. But the unit may include dirt and much inedible waste at the farm level and less dirt and inedible waste at the retail level.

Economists make extensive use of price indexes in order to allow for inflation. Many countries have index numbers for retail prices, but in developing countries the price data may be collected only in the capital city. Those issued may differ among agencies, apparently because of differences in data collection and weighting procedures. The food prices may be obtained from a representative sample or retail stores and markets. Prices for different qualities of one food and types of foods are usually combined or 'weighted' by quantity data obtained in a household food survey to develop index numbers for a consumer level or retail price index. The Laspeyres formula is often used thus:

\[
\text{Average weighted value at prices of given period for base period quantities} = \left( \frac{\text{Average weighted value at base period prices of base period quantities}}{\text{Price ratio}} \right)
\]

\[
\text{Price ratio} = \left( \frac{\text{Average no. units of food A on same date} \times \text{Price per unit of food A on same date}}{\text{Average no. units of food A consumed per caput in a week of base period}} + \frac{\text{Average no. units of food B on same date} \times \text{Price per unit of food B on same date}}{\text{Average no. units of food B consumed per caput in a week of base period}} + \text{etc.} \right)
\]

\[
\text{Price per unit of food A on given date} \times \text{Average no. units of food A consumed per caput in a week of base period} + \text{Price per unit of food B on same date} \times \text{Average no. units of food B consumed per caput in a week of base period} + \text{etc.}
\]

Price ratio \times 100 = \text{index number for food prices at given date}

An index number for a single food group uses the same type of formula and aggregates across qualities of a food and items in the food group.

By the way, a comparable index for per-caput food consumption can be calculated with the same procedure using base period prices for numerator and denominator multiplied by current period quantities in the numerator and base period quantities in the denominator.

1/ Base period refers to a period of one or more years selected as the base for deriving changes in prices in a current year or series of years. In some countries the same base period is used for all series of index numbers.
Factors related to food consumption

The variety of factors affecting food consumption of individual families or households has already been outlined in this manual. Standard economic terminology is introduced here to assist the nutrition investigator. Economists generally consider the quantity of food consumed to be determined by consumers' purchasing power, their tastes and preferences, and prices of a particular food and competing or substitute foods. Consumer purchasing power is viewed as a function primarily of income, usually on a per-caput basis. There are no strict rules about the need to include nonmoney income. Economists often use urbanization (i.e., urban or rural), ethnic group, past consumption, sometimes a measure of socioeconomic status other than income, and sex and age composition as indicators of tastes and preferences.

The price of a particular food is set by the forces of supply and demand, usually at the macro level.

Conceptualizing and measuring relationships

There is a need to select direct measures or indicators for those conceptual factors affecting food consumption. In chapter 5 multivariate analysis was suggested as a means of studying relationships among several factors and food consumed. Economists generally use the term 'model' as having the same content as a conceptual framework. They often describe food consumption as a function (f) of the several factors just identified, meaning that it is determined by them. An equation such as the following represents their model in a form which could be converted into a regression equation.

$$C_A = f (I, P_A, P_B, X_4...n)$$

where:
- $f$ = function of
- $C_A$ = per-caput consumption of food A
- $I$ = income per caput
- $P_A$ = price of food A
- $P_B$ = price of food B
- $X_4...n$ = other factors such as urbanization, household size, ethnic group.

Then this functional statement can be written in the form of a regression equation, with the indicator for food consumption as the dependent variable and those for the several factors as independent variables. The regression equation is used in multivariate analyses which yields information on the relative importance of individual independent variables and relationships often used to develop projections of consumptions.

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 ...$$

where:
- $Y = C_A$
- $a$ is a constant representing the intercept on the $Y$ axis of the regression line
- $b_1$, $b_2$ etc. are arithmetic regression coefficients
- $X_1$ = income per-caput
- $X_2 = P_A$, $X_3 = P_B$, $X_4...n$ = other factors
There are some major difficulties in measuring the concepts involved in this basic economic relationship in most developing countries, especially under the conditions of Project Preparation. Even if a cross-section survey of households yields some price data for individual commodities, their variations are more likely to reflect differences in marketing services or in quality than differences in the balance between supply and consumer demand.

When discussing the relationships of consumption to income and price, economists generally are referring to changes in consumption in response to changes in income and price. That is the dynamic conceptual relationship relevant to answering questions about the impact of project outputs on food and nutrition. But the measures of relationships that can be derived using data from one cross-section survey are static not dynamic. If parts of the survey used for Project Preparation are repeated for monitoring and evaluation during implementation, with careful planning and data processing it should be possible to develop measures of dynamic relationships.

Using the regression equation set forth above and data from a cross-section survey, the variations in consumer response at one point in time can be analysed. The regression analysis will supply the value for the intercept $a$ and the average values for the $b$'s which are the arithmetic regression coefficients. Each $b$ measures the average relationship between variations of the dependent variable and variations in an independent variable. If consumption, income and prices are converted into logarithms before computing the regression equation, the $b_1$ for $X_1$, the log of income per-caput, is called an income elasticity because it measures the ratio of the percentage variation in consumption to a given percentage variation in income when other factors are taken into account concurrently by the regression equation. For example, an income elasticity of 0.15 for rice would mean that for each one percent variation in income per-caput, the per-caput consumption of rice would be 0.15 percent higher on the average.

Similarly, if the price data were used in logarithmic form, the coefficients $b_2$ and $b_3$ are price elasticities. The value for $b_2$ measures the percentage variation in consumption of food $A$ to be expected for each one percent variation in price of food $A$, e.g., if $b_2 = -0.25$, a one-percent higher price for $A$, $P_A$, would result in 0.25 percent less consumption. (As the price of a food goes up, we expect its consumption to go down. In contrast, as income goes up, consumption of preferred foods is expected to increase if prices do not change).

Most computer programmes for regression analysis produce a beta or standardized beta coefficient for each of the independent variables. The beta is calculated in the computer by multiplying the arithmetic regression coefficient by the ratio of the standard deviation in the independent variable to the standard deviation in the dependent variable. The sizes of the betas for different independent variables can be compared to determine the relative importance of the several independent variables in accounting for the total variation in the dependent variable.
Economists working on price analyses for selected major crops with which the project planning is concerned will conceptualize factors affecting food prices thus:

Retail price of food A is a function of:

- market supply of A
- consumer purchasing power
- prices of competing or substitute foods

In the form of a regression equation, this would be:

\[ Y_A = a + b_1 X_1 + b_2 X_2 + b_3 X_3 \ldots \]

where:

- \( Y_A \) = retail price of food A
- \( a \) = intercept
- \( X_1 \) = market supply of A, per-caput
- \( X_2 \) = income per-caput
- \( X_3 \) = retail price of food B

In addition to the conceptual problem with price variations, there are difficulties in obtaining quality information from consumer respondents and measuring market supplies for an area. Therefore, most price analyses for major foods utilize historical data on food supplies, prices and purchasing power. But as few developing countries have reliable data matching these concepts for more than a few years, economic analysts tend to pick up price elasticities from other countries as proxies, without adequately recognizing differences and changes in other factors, socio-economic and cultural, which may affect the average relationship.

A.2 NOTES ON SOURCES OF DATA

Macro-level data for the concepts identified in the preceding section are ordinarily developed by the statistical units in the ministries of economic planning, agriculture and health and the central statistical office. Some supplementary information on sampling, commodity and area coverage, survey procedures, and limitations of the data is essential for judging the validity and reliability of the data and interpreting trends, patterns and relationships properly.

Micro-level data such as family budget (or income-expenditure) surveys are usually made to develop weights for consumer price indexes to be used in wage negotiations so their income, expenditure and price data rarely pertain to rural areas and often only to the capital city. Market surveys conducted by private survey groups sometimes supply usable data on variations in consumption of major foods of interest to large food producing and marketing organizations, often multinational corporations. Central banks may collect and process price data for foods and some other commodities.
Family or household characteristics are commonly used as indicators of demographic, cultural and socioeconomic factors (see chapter 5), but the original questionnaires, the interviewer and data-processing instructions need to be carefully examined to determine exactly what the data measure. It is wise to discuss the survey procedures with the survey director and the field supervisor if possible.

A.3 ANALYSIS OF DATA

Some guidance for analysis of data has been provided in chapter 5 and much more information on statistical procedures is given in Burk ([1980] on analysis of food consumption data. Therefore, the concern here is more with objectives of analysis and selection of procedures to meet those objectives.

For the Initial Assessment and the In-Depth Study, the nutrition investigator's objectives are to identify and measure variations in food consumption and nutritional status among subgroups in the area population and their relationships to economic, social and cultural factors. Such information is needed to identify the people most disadvantaged nutritionally, why they are at such a disadvantage, and what might be done to change their situation. The indications of relative importance of the various factors supplied by the beta coefficients are particularly valuable for understanding the reasons for the current situation and for developing projections of possible changes to be expected from project outputs.

Descriptive statistics

Although this manual has stressed the importance of multivariate analysis, a nutrition investigator must start most analytical work with careful study of variations in individual measures of variables, then proceed to bivariate analysis. The levels of measurement for individual variables must be noted, i.e., whether nominal, ordinal or interval. The level determines the choice of statistical measures and procedures to identify central tendencies and the ranges of variation, and to measure relationships. An important reason for studying univariate and bivariate data is to appraise the validity and reliability of the data. Validity refers to the relevance of the data to the concept being measured, i.e., are you measuring the aspect you really want to measure and how accurately? Reliability is often taken to mean reproducibility or repeatability. It is affected by sampling and by the ability of respondents in a survey to provide the data requested.

Procedures for multivariate analysis are recommended for study of complex relationships in which the phenomenon to be explained, e.g., per-caput consumption of a major staple, is affected by several factors concurrently, as by cultural group, urbanization, socioeconomic level, proportion of adults in the household. Whereas bivariate analyses can consider only one independent or 'causal' factor at a time, multivariate analysis provides measures of the effects of one variable while holding others constant at their means.
In analysis of food consumption, household data are usually converted to averages per-caput although household totals can be used with a separate household size variable. Many analysts have tested different ways of converting arithmetic data to other forms to take account of smaller variations in per-caput consumption of many foods with variations in income and other factors at higher levels of income. The author often uses the double logarithmic form because it gives income elasticity directly. The quantities for consumption, income and price are easily converted into logarithms by means of a computer programme.

In organizing and processing the data, it is very important to keep differences between static and dynamic relationships in mind. The statistics from regression equations computed with cross-section data are often used in making projections. The expected income per-caput can be inserted in the equation to estimate consumption of a staple, for example. But this procedure assumes that the relationships to variations in all other factors observed in the initial time period will not change. Even so, the investigator should make such a calculation initially in order to form tentative ideas. The next step in developing approximations is to insert alternative averages for other independent variables while varying the average for income.

Because of the great importance of changes in distributions of each variable, not just the averages, a reweighting procedure for making projections is suggested. It involves combining averages for subgroups with alternative distributions of households, e.g., by urbanization and by income, and comparing the weighted averages which result. As yet, economists have no all-purpose reliable procedures for making projections of food consumption when many factors are changing. Therefore, the recommended procedure is to develop alternative estimates and compare them with careful consideration of the hidden assumptions involved.
Annex B

BRIEF INTRODUCTION FOR FOOD ECONOMISTS TO NUTRITION PROBLEMS,
DATA AND PROCEDURES

by M. Burk

This annex is designed to assist food economists in work on a nutrition investigation by providing information about selected nutrition concepts and their measurements used in analysis of food and nutrition problems encountered in development project planning 1/.

It has been restricted to consideration of only those kinds of measurements and analyses feasible under project planning conditions and to use of terminology easily understood by social scientists.

B.1 MAJOR TYPES OF NUTRITION PROBLEMS IN DEVELOPING COUNTRIES

Two terms are widely used in connection with nutrition problems, undernutrition and malnutrition. Undernutrition refers to low intake of food, usually resulting in short supplies of food energy. It is the most common nutrition problem and particularly relevant to planning development projects. The seasonal incidence of undernutrition is greater than its incidence throughout the year in most developing countries.

The term malnutrition is properly applied to the physical effects on the human body of dietary intake inadequate both in quantity and quality. It is often most apparent in developing countries among infants, young children, and pregnant and lactating women because of their special nutrition needs. Both laymen and nutritionists often use the terms 'malnutrition' and 'malnourished' for both undernutrition and malnutrition as defined above.

Malnutrition is frequently related to severe deficiencies of particular nutrients. During the last 20 years or so there has been much concern about protein-energy malnutrition. However, research on energy and nutrient supplies in a number of countries has indicated that protein requirements are generally met if energy supplies are adequate.

The factors directly related to undernutrition and malnutrition are inadequate food intake in general or low intake of foods that are the principal sources of particular nutrients (e.g., vitamin A, iron, iodine), and parasitic and infectious diseases that prevent absorption, and body use or change requirements for the food energy or nutrient.

The variety of factors related to inadequate food intake is discussed in Chapter 1. Parasitic and infectious diseases reflect an area’s health and environmental problems. They are often traced to lack of knowledge of personal hygiene, insect infestation and contamination of water and food.

1/ For further information on terminology, see Food and Nutrition Terminology, FAO Terminology Bulletin No. 28/E. 1974.
B.2 KEY CONCEPTS FOR STUDY OF NUTRITION PROBLEMS DURING PROJECT PLANNING AND THEIR MEASUREMENT

The meanings of most of the concepts described below are based on definitions given in FAO's Food and Nutrition Terminology.

**Nutritional requirements and recommended allowances**

Nutritional requirements refer to the amounts of food energy and nutrients needed on the average per day by specified age and sex category to meet the needs of healthy individuals for normal functioning of the body for work and for growth. Requirement is a physiological concept. Estimates of nutrition requirements are based on metabolic studies under varying conditions. There is substantial evidence of variations in requirements with age, sex, activity, physiological state (e.g. pregnancy, lactation) and environmental conditions. Requirements have generally been stated in terms of averages taking such variations into account. Research indicates that adults adapt to undernutrition by reducing work activity and non-essential activities.

Recommended intakes, also called recommended requirements, dietary allowances or standards, are estimated by national or international committees of experts from a mixture of clinical, epidemiological and experimental evidence on physiological requirements for energy and other nutrients. They are set so as to maintain a good state of nutrition in healthy people of all ages. The recommendations for nutrients include a margin of safety to allow for individual variations and are planned to cover the large majority of individuals in the specified category. The recommended allowance for energy is set at the average level without an extra margin for safety. The requirements and recommendations are in terms of nutrient intakes, excluding amounts in food wasted or lost. Wherever national standards are available, they should be used.

Recommended intakes need to be checked by comparison with observed intakes of healthy populations because knowledge of interrelationships of foods and nutrients is far from complete. Developing countries such as those in the tropical zone need to develop recommendations based on metabolic studies and research applicable to their own people rather than rely on the recommendations of developed countries. A recent development in setting standards for nutrient content of diets is the concept of nutrient density or amount of nutrient per 1 000 kilocalories of food energy.

**Nutritional status**

This term is defined as the condition of the body resulting from the intake, absorption and utilization of food. Nutritional status cannot be measured directly. Several anthropometric indicators of nutritional status have been found to be valid and reliable, particularly for young children, and useful as indicators of variations in nutrition of families. Weight and size provide indications of body nutrient stores for specified ages. The most frequently used measurements are height, weight, and arm circumference. Measurements for a child are compared with standard distributions for the sex and age group.
Other measurements of nutritional status involve biochemical and clinical procedures. Clinical procedures pick up changes much more quickly than anthropometric measures but because of costs and technical requirements they are not suitable for nutrition investigations for project planning. If there is a particular nutritional disease in the project area, it may be desirable to ask health specialists to conduct special tests on a subsample of individuals.

Ordinarily, anthropometric indicators of nutritional status do not change much with small changes in food intake (Changes in weight occur first). Also, normal changes in growth occur among children. Therefore, interpretations of changes in nutritional status during project implementation require careful study.

Individual food intake

Food consumption of individuals is also referred to as food intake or dietary intake. It is measured in terms of food eaten or ingested and excludes inedible parts and wastage. The equivalent intakes of food energy and nutrients are calculated from food intakes using nutritive value data on the composition of each food.

Relatively few surveys of individual intakes with proper sampling have been made in developing countries. Most of the small-scale surveys have been made under non-representative conditions, as in schools and hospitals. Alternative survey procedures are listed below. The major difficulties in obtaining individual intakes are the reporting on amounts consumed by each individual, often from a common pot, and assessment of away-from-home consumption as meals and snacks. Intakes of wholly or partially breast-fed infants and children are very difficult to measure. If 24-hour recall or weighing procedures are used in the survey, interpretation of the results is further complicated by day-to-day variations and seasonality. Such variations usually differ in importance with types of food consumed.

Household food consumption

Household food consumption usually refers to the quantities of food consumed at home. The data may or may not include inedible wastes, spoilage losses and even food fed to pets. Therefore, users of such data must examine data collection and processing procedures carefully. Alternative survey methods for full-scale benchmark surveys are food accounts, list-recall, record-keeping by the household, weighing, and recording by interviewers. For developing countries in particular there

1/ Procedures in common use for obtaining individual food intake information encompass many of the following elements: recall or current information obtained from the subject or an informant familiar with subject's intake; record or structured, semi-structured or non-structured schedules, covering 24 hours or longer periods during week-days, week-ends or both, consisting of weighed, measured, estimated or counted portions; and with or without measurement aids in the latter two methods.
are difficult problems in estimating the substantial amount of home-produced food, of wild foods gathered or picked, and of small animals, fish and shellfish caught. Also, data collection is complicated by lack of usage of standard measures and biases introduced by psychological factors such as hope for rewards or subsidized food, social status and prestige.

**Nutritional adequacy**

Appraisals of adequacy of dietary intakes are commonly based on comparisons of household food consumption (adjusted for wastes and losses in the home) or individual intakes with standards such as recommended requirements or dietary allowances. Comparisons of weighted averages of such recommendations by sex-age categories of household members with estimates of the energy or nutrient content of food consumed by the household make the critical assumption that the family distributes its nutrient supply in accordance with need.

For planning purposes, nutrition experts suggest the use of the amounts recommended for the sex-age categories weighted by the sex and age composition of the households in the population subgroup to derive weighted averages for such groups. Recall that the standards for food energy are set at the average whereas those for others have safety margins. Nutrient intakes of individuals in a specified sex-age category can be compared with recommended intakes or requirements, but it is best to report distributions for the comparisons, not averages.

The general experience has been that where the mean or median intake of a population group is close to the RDA, there are unlikely to be overt deficiencies. The substitution of the term 'reference amounts' of a nutrient instead of recommended amounts has been suggested and that individuals consuming less than the reference amount be considered as potentially at nutritional risk 1/.

**Food patterns**

The term 'food patterns' has been used for a variety of meanings. For analytical use, it is wise to limit it to reference to combinations of foods eaten in a meal or even to combinations eaten in a day. Use of a limited number of food items in a survey for the nutrition investigation, as described in Chapter 5, will provide information on variations in food patterns which can be related to variations in indicators of factors related to food consumption.

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1/ Waterlow, J.C. 'Uses of recommended intakes: The purpose of dietary recommendations'. Food Policy. May, 1979, p. 114
Food composition tables

FAO has issued publications with food composition tables for regions of the world. They have the food energy and nutrient values contained in the unit weight of a given food as prepared for consumption. Research groups in agencies of the governments of the countries with more developed statistical systems conduct food research to determine such factors or have them measured under contract. However, there are problems in having the tables kept up with changes in varieties and being representative of the varieties consumed in particular areas of a country.

3.3 STATISTICAL PROCEDURES FOR ANALYSIS OF DATA

This discussion of such procedures is brief because food economists are usually familiar with relevant statistics. The objective here is to point out particular uses of certain statistics by nutritionists.

In study of single variables, either means (for interval data) or medians (ordinal or interval data) are used. It is important to examine distributions because they are often not normal. Knowledge of the shape is needed for deciding on appropriate conversions before running a multivariate analysis.

Nutritionists make extensive use of cross-tabulations of average quantities of foods consumed per-caput by subgroups of households, based first on one, then another independent variable. Such bivariate tabulations are needed in order to trace combinations of foods, e.g., how much of another food is consumed by high, medium and low consumers of staple X. It is also helpful to compare distributions for alternative measures of the same concept, such as nutritional status. Ordinal scales may be developed from interval measures of the food consumption and used in cross-tabulations to sort out characteristics of high, medium and low consumers or households with children in the high, medium or low nutritional status category, based on a measure such as weight for height.

The need for multivariate analysis is generally recognized by economists but sometimes they fail to go beyond income, prices of a particular food and its substitutes as factors affecting food consumption. Age composition of the household, education of the female head, degree of urbanization and ethnic group need to be taken into account, as well as an alternative indicator if a reliable measure for total income per-caput is not available. Also, it is desirable to use alternative types of analysis in addition to the usual regression procedure.
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