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3. AUTHOR(S)  
(100) Cooke, T.M.  
(101) American Technical Assistance Corporation

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9. ABSTRACT  
This manual is a simple, practical guide to national nutrition planning. It was developed in Ecuador by the staff of the American Technical Assistance Corporation with the support and cooperation of the government of Ecuador. The methodology set forth is intentionally geared toward use by existing planning staffs, using existing country data. It presents an approach to nutrition planning which will assist nutritionists as well as national planners in evaluating nutrition implications of current development projects and designing new interventions to meet some part of the nutrition problem. This manual emphasizes that the power and resources to deal with nutrition problems on a national basis are in the hands of the Ministers of Finance and Planning and the ministers of the operating agencies such as Health, Education, Agriculture, and Commerce, although the actual coordination of a national nutrition program may be most efficiently conducted by a single agency. A national nutrition institute, for example, would influence planning decisions and resource allocations within the traditional ministries, so that nutrition goals become a part of the planning process, even though the management of nutrition-oriented food production programs might be best left with the Ministry of Agriculture. Nutrition planners and advocates must be ready to cut across traditional bureaucratic boundaries to make claims on the attention of national development policy planners and on the resources of existing agencies. The five sections of this manual describe the systems approach to analysis of a nutrition system; the consumer, food supply, and food distribution subsystems in a national nutrition system; selection of target groups and tentative goals; selection of types of intervention and evaluation of nutrition intervention programs; and the strategy and tactics of nutrition planning and programming. This document is also available

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PN-AAC-204

**PLANNING NATIONAL NUTRITION PROGRAMS:**

**A SUGGESTED APPROACH**

**VOLUME I—SUMMARY OF THE METHODOLOGY**

**JANUARY 1973**

**Office of Nutrition  
Bureau for Technical Assistance  
Agency for International Development**

**This report has been prepared under Contract CSD/2978 for the Agency for International Development. The generous cooperation and guidance of USAID/Quito were invaluable during the field work portion of our study. Officials of the Government of Ecuador, international organizations including Food and Agriculture Organization, World Health/Pan American Health Organizations and CARE and CRS/CARITAS provided assistance and information throughout the research in Ecuador.**

Project staff

Dr. Thomas M. Cooke

James Pines

William Rusch

Donald Swanson

Chestene Fried—Consulting Nutritionist



**AMERICAN TECHNICAL ASSISTANCE CORPORATION**

7655 OLD SPRINGHOUSE ROAD

McLEAN, VIRGINIA 22101

**A SUBSIDIARY OF GENERAL RESEARCH CORPORATION**

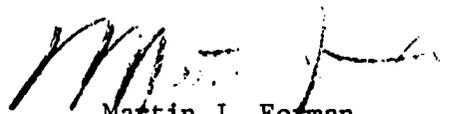
## P R E F A C E

As the planner has become more concerned with the problem of malnutrition, he has expressed a need for a systematic way of addressing the problem.

Beset by a confusing array of recommendations, he has sought guidance on how to determine the nature and degree of the problem; how to pick from among the many suggested program approaches; how to calculate costs and predict the consequences of program actions, and how to compare the relative effectiveness of program strategies.

This manual is a partial answer to these questions. It was developed in Ecuador by the Staff of the American Technical Assistance Corporation with the support and cooperation of the Government of Ecuador. In October 1972, a draft version of the methodology was reviewed in depth by 16 planners from developing countries. Revisions were made to accommodate the recommendations of these planners. The result is a simple, practical guide to national nutrition planning. The methodology is intentionally geared toward use by existing planning staffs, using existing country data. It should be adapted to any planning situation and should help to make the planning of a malnutrition reduction program more orderly and efficient.

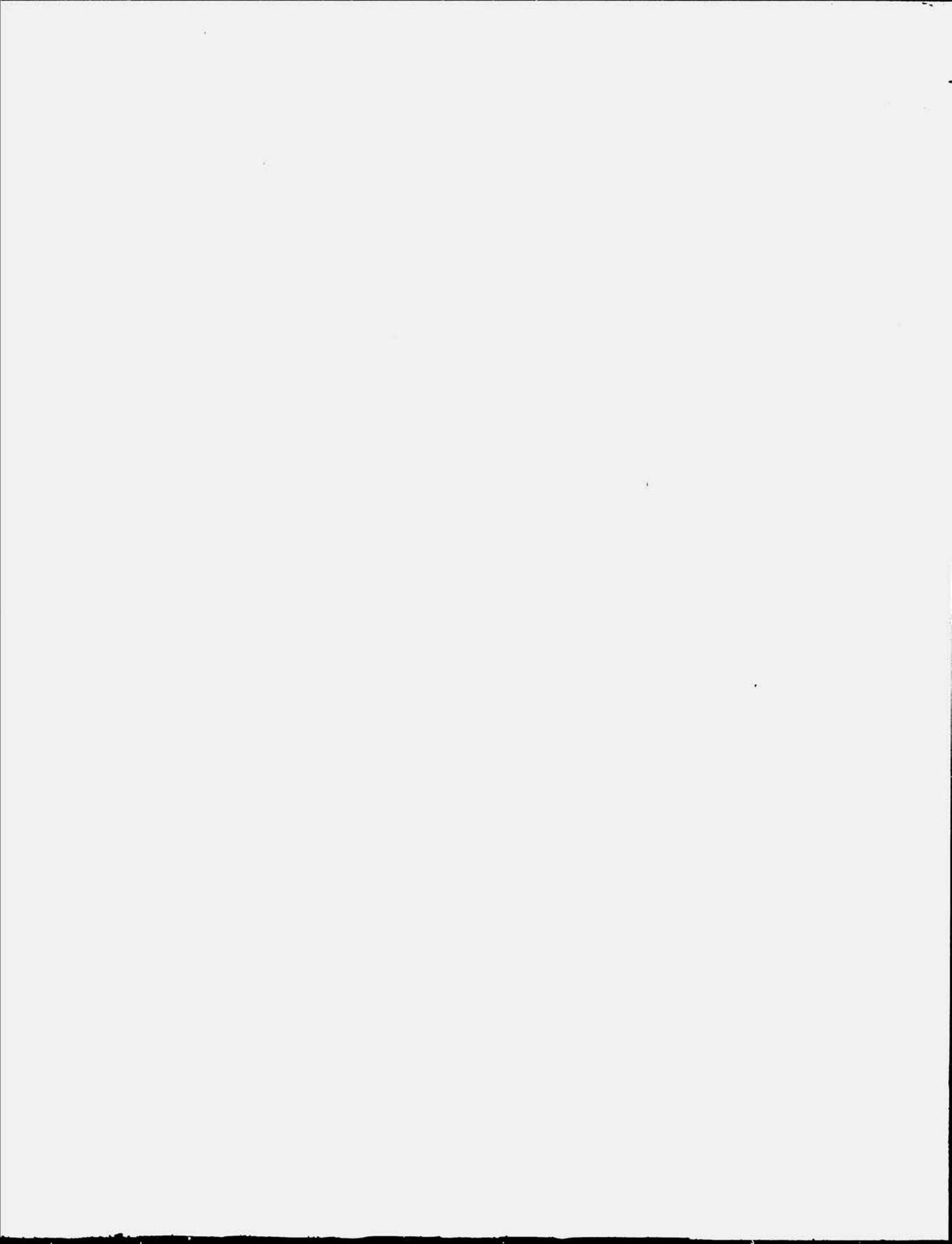
As experience is gained in the adaptation and application of the methodology, it may be further refined. In the meantime, it offers a sensible approach to Planning National Nutrition Programs.



Martin J. Foxman  
Director  
Office of Nutrition  
Bureau for Technical Assistance  
Agency for International Development

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## INTRODUCTION

Malnutrition has only recently been recognized as a barrier to national development and governments are beginning to include nutrition goals in national development plans. While traditional nutrition programs have not reduced the problem, newer solutions have been developed, tested, and are being applied in a few countries. In addition, many solutions exist within programs developed for agriculture, health or education and only need simple adaptations to nutrition goals. To design these solutions, national planners need methods to assess the nutrition problem and to plan programs which will reduce the problem at least cost. The purpose of this document is to suggest an approach to nutrition planning which will assist nutritionists as well as national planners in evaluating nutrition implications of current development projects and designing new interventions to meet some part of the nutrition problem.

The nutrition problem is the result of numerous factors: (1) food supply (food production, distribution and processing); (2) the characteristics of the consumers (health, income, location, and education); and (3) other groups of factors such as those relating to foreign trade and the domestic economic systems. All of these factors interact to cause the nutrition problem. Systematic planning, as suggested here, forces attention to all of the factors causing the problem, sets goals for reducing the problem, and compares the costs and benefits of alternative programs to reduce the problem. Planners are encouraged to consider solutions that go beyond traditional nutrition projects. The systematic approach places a high premium on the imagination of the planner in devising new programs, in seeing possible solutions which adapt programs and resources from other sectors to nutrition goals, and in considering all costs and benefits of any proposed activity.

The authors are not proponents of particular solutions, nor does this document propose an ideal nutrition program. Each country must make the hard choices of how much of its resources can be allocated to

nutrition; and each must decide, in light of its own problems and environment, which programs have the greatest promise of success.

The document emphasizes that the power and resources to deal with nutrition problems on a national basis are in the hands of the Ministers of Finance and Planning and the Ministers of the operating ministries such as Health, Education, Agriculture, and Commerce, although the actual coordination of a national nutrition program may be most efficiently conducted by a single agency. A national nutrition institute for example would influence planning decisions and resource allocations within the traditional ministries so that nutrition goals become a part of the planning process, although the management of nutrition-oriented food production program for example, might be best left with the Ministry of Agriculture. Nutrition planners and advocates must be ready to cut across traditional bureaucratic boundaries to make claims on the attention of national development policy planners and on the resources of existing agencies.

The document is divided into two parts. The first presents the methodology. It is brief, intended for busy planners who want to understand the principles of the systematic planning approach as suggested here. At the conclusion, the authors describe likely costs of such a planning effort. In general, the approach assumes that the planning process can be started quickly and inexpensively--with data already existing in the country. Bibliographical notes are provided at the close of each chapter, suggesting key sources for additional information. On page 38, a decision flow diagram presents a model nutrition policy planning process. The reader may find it helpful to refer to this chart to keep particular analytical techniques and steps in the perspective of the total planning task.

The second part of the document is a case study, based on the experience of applying the systematic approach to Ecuador. References are made throughout Part One to illustrations of programs and analytical methods contained in the Ecuadorian study.

Both volumes of this study benefitted from the constructive comments of participants in the Workshop on Nutrition and National Planning sponsored by the Office of Nutrition, Agency for International Development in October, 1972. Since most of them held high positions in planning, agriculture or health agencies, they were able to assess the feasibility of this planning method to their own situation and to suggest improvements that have made our approach to nutrition planning more understandable and practical for planners in developing countries.

## II. THE SYSTEMS APPROACH AND THE NUTRITION SYSTEM

### A. THE PRINCIPLES

Nutritional planning and programming can use the same techniques as other fields of development planning, although there are some distinct application problems. The Systemic Approach uses some of the techniques included in the discipline called systems analysis. Although definitions of systems analysis vary widely, the principles emphasized in the handbook stress the need for:

- Making goals specific and quantifying them, if possible;
- Considering all causes or factors, recognizing causes affect on each other--they are interrelated;
- Comparing all costs and benefits of alternative solutions;
- Measuring performance and feeding back information to improve analysis and planning.

The approach requires nutrition planners and policy makers to undertake five major sequential steps:

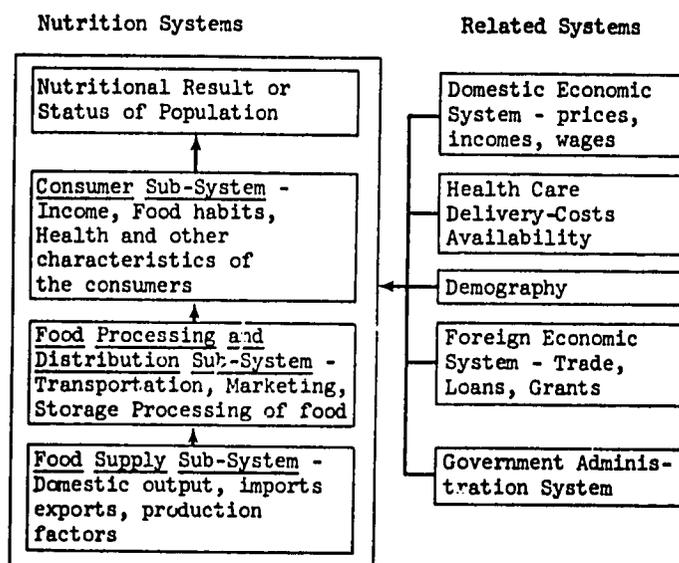
- Description of the national nutrition system, quantifying to the extent possible all factors that appear to influence the nutritional status of the population. The description must include at least characteristics of the consumers and their nutrition problems, factors in the areas of food processing, distribution and production that affect consumption, and in other fields such as public health, economic policies and conditions that affect directly or indirectly nutritional status.
- Selection of target groups, priority objectives, and tentative goals. This step builds on the information gathered and analyzed in the descriptive phase.
- Identification of points of intervention within the system already described which will cause a positive change toward the goals.
- Comparison of alternative points of intervention and alternative interventions at each point.
- Development of implementation plan, including final selection of goals and design of evaluation plans for interventions selected.

B. THE NUTRITION SYSTEM: A FRAMEWORK FOR ANALYSIS

The nutrition system is a set of relationships (interactions among factors) that result in the nutritional status of the population. The nutrition system as conceived here has three parts, three sub-systems: 1) food supply, 2) distribution and processing, and 3) consumption, which describe the flow of nutrients in foods from the farm to utilization by the consumer. Other related systems or groups of factors such as the foreign and domestic economic system also affect, directly or indirectly, nutritional status; for conceptual clarity they are not considered as part of the nutritional system, though they may interact with one or more parts of it. The diagram below shows the major components of the nutrition system.

THE NUTRITION SYSTEM

FIGURE 1



The interaction of elements in the sub-systems and related systems affect the supply and flow of nutrients to the consumer, and his ability to purchase and utilize the nutrients

Even from considerations of this simplified figure it is apparent that there are dozens of factors that may affect nutritional status, ranging from food habits to fertilizer prices. However the planner is limited in his analysis by time, talent, resources and the responsiveness of the factors to the types of programs which his government is likely to undertake for nutritional purposes. Improving descriptions of these

factors and their connection to nutritional status is a continual task, but policy-makers need answers today; they cannot wait until all research is completed. Thus the nutrition planner must carefully choose the elements of the system that merit his study.

1. Selecting Important Relationships

Selection of the variables in the nutrition system for study is the first task in describing the relationships between causes such as food production, and the effect on nutritional status of the population. Even the most sophisticated computer-assisted technician can deal with only a portion of all the causes or factors. Nutrition planners working manually are even more limited. Ultimately the appropriate pattern of investigation depends on the interests of planners, government priorities, and resources available; however, the following guidelines should assist the planner in selecting subjects for data collection and analysis:

a. Choice of Target Groups and Nutrition Goals

The segments of the population that are to benefit from the nutrition programs and the kind of change desired determine the choice of relationships for review. The relationship of school feeding delivery systems, for example, is likely to be of limited importance when improved nutrition of industrial workers is the goal. Similarly, study of protein production and consumption relationships would have minor importance if the nutrition goal concerns increased Vitamin A consumption. Furthermore the time period in which the goal is to be achieved influences the aspects of the nutrition system considered. In the near term drought relief program planning is likely to be more interested in storage facilities for imported foods than in irrigation schemes or ground water surveys.

b. Degree of Causal Connection

The analyst must limit his investigation to those elements which are most closely connected to the nutritional status changes desired in the target group. "Closely connected" in this sense means that there is a high degree of probability that change in one element of the system will cause change in another. For example, the price of non-food goods influences nutritional levels by affecting real incomes of consumers and the relative attractiveness of food items, but this relationship is unlikely to be as important to nutritional status as staple food prices.

However the planner must not limit himself to a few rigid categories of issues. By looking, without preconception, at the entire system and its relationship to target group goals, being critical of panaceas and traditional approaches, the analyst may discover innovative solutions.

c. Amenability and Responsiveness to Change

The relationships identified as both associated with the target group and goals and closely connected to the desired change must be susceptible to change by government before they merit study. For example, family income is one of the most important factors influencing nutritional status, yet it is one of the most difficult to change. Food taboos offer another example.

2. Expressing Relationships

The identification and statement of relationships in the nutrition system is an attempt to describe the workings or engine of the system, i.e. how a change in one element causes changes throughout the system, finally impacting on the nutritional status of the target group. Through successive stages of description and analysis of relationships, the nutrition system (described schematically in Figure 1) becomes a framework for the identification and comparison of alternative interventions.

Statement of the relationship should be specific and quantified, if possible. For example, in Appendix I, Ecuadorian data on income, staple food prices, and food habits have been combined to show the number of families that are unable to afford an adequate diet. Other relationships, for which complete data are not available, are more vaguely stated, yet the Ecuadorian planner has attempted to estimate the magnitude and nature of the connection. Obviously the possibility for error exists when working with incomplete and poor quality data, but an estimate of the relationship can be made at the outset of the planning process, subject to change in later stages.

These suggestions relate to a static picture of the nutrition system, yet one of the most important tasks of the planner is to project or predict the consequences of alternative policies over time. When the data necessary to make multi-year projections are not available, the planner can still explore the trends in production, income, consumption or population growth. This process is particularly useful in assessing the limits of intervention. For example, when per capita income is growing at 2 percent per year, a nutrition program which anticipates a 10 percent annual growth rate is not practical.

In the absence of data for projections, the planner may make a series of assumptions about the most important conditions affecting nutritional status, subjecting these assumptions to continual scrutiny as more data become available. In either case the planner should establish a base year to which he compares data for subsequent years. This technique gives him a bench-mark against which trends in the nutrition system can be assessed.

The process of selecting relationships in describing and analyzing a nutrition system is presented in the Ecuadorian example, found in Appendix I.

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## II. DESCRIBING THE NATIONAL NUTRITION SYSTEM

In this section, important relationships are outlined, first, for the consumer sub-sector, and then for the production and the distribution and processing sub-sectors.

### A. THE CONSUMER SUB-SYSTEM

National nutrition status, malnutrition problems, and the characteristics of the consumers can be described by examining the consumer sub-system. This description leads to the selection and analysis of relationships within the sub-system that affect nutritional status, to the narrowing of target groups, and to the selection of tentative goals. Figure 2 illustrates the consumer sub-system and some important relationships.

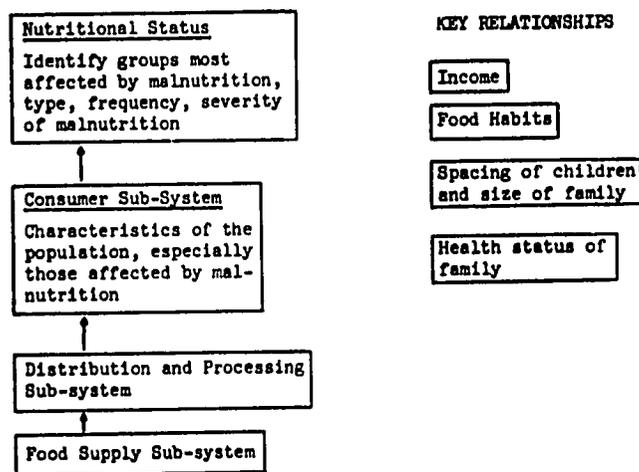


Fig. 2. Consumer Sub-system

1. Describing nutritional status and consumer characteristics

a. Mapping malnutrition. Describing the location, severity, frequency and type of malnutrition and the characteristics of those at greatest risk is the first step. To assist data gathering and analysis, a country can be divided into subdivisions based on political boundaries, ecological or cultural differences, reflecting differences in problems or likely solutions. Distinct food habits, food production patterns, and other regional variations within a country will suggest that no one program will solve a nutrition problem for all the people.

By arraying data showing (a) who consumes, (b) how much of, (c) what foods, in (d) what places, and at (e) what prices, and comparing them with nutrient requirements, the planner can describe and quantify nutritional status and the resulting problems of specific population groups. These data may be less precise at first since they serve only to point out the most vulnerable groups and the nature and extent of their malnutrition. As the analyst begins considering alternative programs, nutritional status descriptions should be refined since they are the basis on which goals are set and against which progress toward reaching them is judged.

In Appendix I, section 1, this descriptive exercise was undertaken for Ecuador. The appendix also illustrates ways to display the data and relationships. Data used are typical of those available in other countries. While the picture of nutritional status is incomplete, it is adequate for identification of the type of nutrition problems affecting specific groups of the population.

In addition to describing current nutritional status, the resulting picture is useful in identifying causes of malnutrition or relationships in consumer sub-system that are closely connected with nutritional status. These "causes" may become bases for intervention.

2. Relationships or causal factors in the consumer sub-system

The choice of relationships to be included depends on the knowledge, experience, and information available to the analyst as well as the criteria stated on pages 6-7. However, in assessing the importance of any relationship or cause, the analyst should remember that this event or condition is itself an outcome of other factors. For example, family income is an important factor in food intake, but it is, in turn, affected by employment, wages, land tenure patterns, prices, and so on.

Important relationships of the consumer sub-sector include:

a. Income distribution. Personal income limits the food choices people can make. The analysis in Appendix I, shows that many Ecuadorian families would not be able to buy adequate nutrients even with extensive modification of food habits. Highly desired and nutrient-rich foods are usually priced too high for regular consumption by low-income families.

If a national food consumption survey has not been conducted, typical diets, based on food habits and keyed to current food prices and compared with family incomes, will provide estimates of income limitations. This technique is demonstrated in Appendix I, Annex 1.

b. Food habits. Within the limits of income, people buy food for its pleasing taste, texture, aroma, and appearance, or the status associated with it in conformity with food habits. These habits are strongly embedded in the culture and highly resistant to change. Since nutrition programs which attempt to influence food choices must take into account the durability of food habits, the analyst should catalog them by regions and ethnic group. Although this may be the outcome of a nutrition survey, other, more informal means may be used. See Appendix I, Annex 1.

(1) Intra-family distribution and family size. A family like a country may have an adequate aggregate supply of nutrients and still find members with deficient intakes because of poor distribution. Because few countries have specific data on intra-family distribution,

circumstantial evidence must be used to link this pattern with malnutrition. In Ecuador, morbidity and mortality rates are higher among young children than adults. This suggests that food available in the family, even if adequate, is not distributed according to physiological needs, but is distributed according to custom in which the adults and older children get first choice.

Family size also influences the overall level of nutritional status, if family income is held constant. This is particularly true among families with several pre-school children whose needs for protein-rich foods are especially high.

c. Health status of the family. The health status of the individual affects the rate and effectiveness of food utilization. If diets are only marginally adequate for young children, febrile diseases and intestinal disorders may cause malnutrition, making recovery more difficult. The planner may want to collect data on the frequency of these diseases among groups whose diets appear to be inadequate.

## B. FOOD SUPPLY SUB-SYSTEM

The description of the supply sub-system is divided into two major parts: (1) production output: a description of agricultural and fishery production, supply trends, location of production, diversions from human consumption (for example, waste, seed, and animal feed), and imports and exports of nutrients and production costs; (2) production input: a description of production factors, i.e., land, labor, capital, and technology. The analyst will find it helpful to gather data on production factors and their costs according to specific commodities and according to the size of landholdings since small farmers will undoubtedly compose a major part of the malnourished population.

These data are used to explore three important relationships:

- the comparison of food available for human consumption with national nutrition requirements

- rates of productivity and factors affecting them
- the costs and elements of costs of production of selected commodities

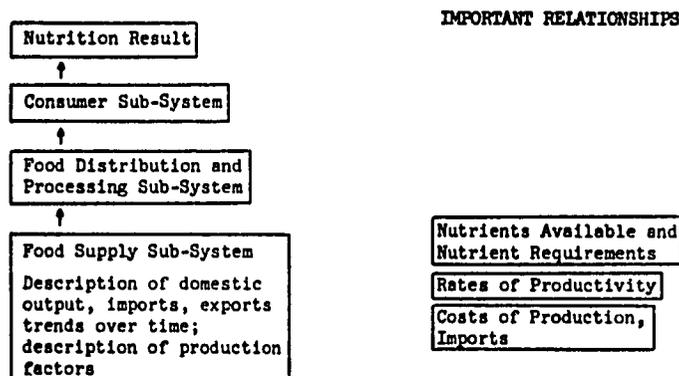


Fig. 3. Supply Sub-system

1. Agricultural Output, Food Availability, and Nutritional Requirements

Food balance sheets developed by national ministries of agriculture or the Food and Agricultural Organization of the United Nations describe quantitatively food production as modified by exports, imports, waste, seed, and animal feed. These data result in an estimate of total food available for human consumption. By expressing these foods in terms of nutrient content and comparing them with the total national nutritional requirements, the planner is able to estimate the adequacy of the aggregate supply. It is important to note that these data reflect total national availability and not the disparities in distribution according to region or populated group. Furthermore, the standards assume the population is healthy; a population with widespread, chronic infection will have higher nutrient requirements. The data collection and analysis process described on page 12 above defines these data in combination with others, allowing the analyst to specify regions and population groups that experience chronic inadequacies.

Agricultural output should be described in greater detail and over a longer time period than permitted in a food balance sheet. Because

agricultural production data may be in relatively greater abundance than data for other parts of the food system, the analyst must choose carefully among the data available. Obviously, one set of data should describe the production of staple foods for the target groups. Foods which appear to be promising sources of needed nutrients or which may be vehicles for fortification programs should also receive special attention. A third category of data on production should treat those products which are the principal output of low-income or subsistence farmers, from their own farms or from those on which they labor.

In Appendix I, data have been gathered for selected commodities in Ecuador which illustrate the process of selection among available data. The target groups chosen in Ecuador helped limit the data gathering and analysis task.

## 2. Production Factors and Costs of Production

Data on production factors and costs of production describe how food is produced and the constraints under which farmers operate, such as credit, land tenure, water supply, seed varieties, and cultivation practices. By assigning costs to production factors of the commodities produced under different conditions, the analyst can calculate how much nutrients cost to produce. Data showing actual costs should be supplemented by estimates of costs of increasing production of nutrients from different commodities. Since deficits in total supply of some nutrients plague most developing countries, calculation of costs of increasing supply may be a vital first step for agricultural and nutrition planners. In the Appendix, these data have been collected for selected commodities in Ecuador.

Understanding the relationships in the production sub-system may assist production increases, but there is no assurance that the increased supply will actually reach the target group. The systematic approach to nutrition now links the production and consumer sub-systems through the processing, transportation, storage, and marketing activities of the distribution sub-system.

C. FOOD DISTRIBUTION AND PROCESSING SUB-SYSTEM

This sub-system comprises all the activities and conditions that affect food from the time it leaves the primary producer or is imported to when it is purchased by the consumer. The description of this sub-system should proceed in two stages: (1) describe the flow of commodities from the primary producer to the consumer, quantifying the effect that each step has on the commodity (such as marketing margins, waste, and nutrient loss through processing), (2) describe significant cross-commodity activities or conditions that affect several different foods. These may include storage, credit, excise taxes, labor problems, or retail practices.

The study of relationships within this sub-system must consider:

- the effect of the sub-system's activities on the price per unit of nutrients as they are derived from different foods;
- the effect of these conditions on the supply of nutrients to the target group families.

The figure below presents the food distribution and processing sub-system in relation to others.

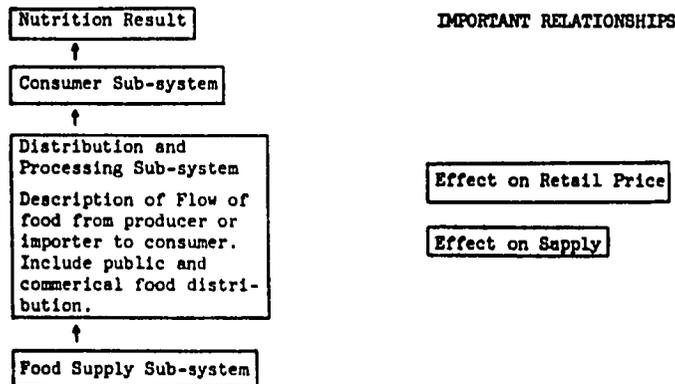


Fig. 4. Food Distribution and Processing Sub-system

Public delivery systems, such as school lunch, maternal and child feeding, and food for work programs are part of the distribution sub-system. The analysis of these programs can be conducted using many of the same general questions as for other parts of the sub-system.

The specific descriptive data categories and relationships for this sub-system will be different for each country and will depend in each on the target group and goals selected. For example, the subsistence farmer has an entirely different, though not unimportant, relationship to the market than has the urban family who must rely entirely on the marketplace for its food supply.

The distribution, processing, and transportation activities in Ecuador are presented in Appendix I.

#### D. RELATED SYSTEMS

Other systems that affect directly the nutrition system must be taken into account by the nutrition planner so that proposals will reflect all important relationships that may enhance or inhibit program success. Some of the most important related systems are foreign and domestic economic systems, health, and population dynamics. Others which might be included are public administration practices and capabilities and public communications.

##### 1. Foreign Trade

The export of nutrients or of non-food crops produced instead of food, or the curtailment of food imports to allow entry of capital goods is a condition common to many developing countries. These policies directly affect the food available for domestic human consumption. Description of the relationships between foreign trade and the rest of the nutrition system enable the planner to compare the advantages of (1) retaining currently exported nutrients for domestic consumption, (2) increasing agricultural and other exports to import more nutrients,

(3) substituting food imports for other current imports, and (4) producing additional nutrients domestically to substitute for current food imports.

## 2. Nutrition and the Economic System

Personal incomes, food prices, and costs of food production all play a part of the general economic system. As discussed above, each of these factors affect nutritional status and are important areas for intervention. Description of the nutrition system must include data permitting assessment of the interdependence between the nutrition system and the rest of the economic system.

a. Income. Economists have traditionally assumed that economic development, by increasing incomes, will eventually eliminate most malnutrition. While this may happen in the long run, a national policy that gives high priority to income growth may be an inefficient way of solving a malnutrition problem. For nutrition planners the distribution of increased income is as important as the growth itself, since widening gaps between rich and poor may cause similar disparities in high quality food distribution. Furthermore, relative increases in income for lower groups may not be spent to improve nutrition.

However, the slow pace of income growth, regardless of its distribution, makes it an intervention with limited application for the nutrition planner. The dimensions of this limitation should be calculated for each country. The method for this analysis is demonstrated in Appendix I, Annex 1.

b. Food Prices, Production, and Distribution Costs. Changing the conditions and costs of production, processing, and distribution affect nutrition through their influences on prices. However, agricultural and market economists usually ignore nutritional effects when assessing the impact of alternative policies on food prices and farm income. By calling attention to nutritional consequences, the nutrition planner may modify production and price policies in nutritionally favorable ways.

Some of the conditions that are often considered in agricultural and market planning are presented below, together with some of their possible nutritional consequences. The nutrition planner will want to develop additional lines of inquiry to test the consequences of policies and actions related to:

- Food production increases for large farmers through better technology or additional credit may yield lower retail prices, but adversely affect the income of small farmers selling the same product. If prices drop far enough, all farmers may be reluctant to continue production in subsequent seasons.
- Better prices for one crop, such as an export crop, may encourage farmers to replace food production for domestic needs with the other. This may affect on-farm consumption by the small farmer as well as the total domestic nutrient supply.
- Better prices for foods produced by small farmers increase income that may be spent in part on food, but may also encourage the small farmer to sell more of his production rather than keeping it for home consumption.
- Prices of non-food items may decrease relative to food, encouraging a larger expenditure on these goods rather than food, or freeing income for additional food outlays.

### 3. The Health Sector

The interdependence of nutrition status and health status of the population is generally recognized, but, in spite of this, health and nutrition planners often do not seize the opportunities for joint interventions.

The emphasis of this handbook on interdependent relationships that affect nutrition status should encourage nutrition planners to look beyond conventional programs associated with health. Curative clinics and rehabilitation wards for severe malnutrition cases may absorb large portions of the budget for nutrition programs, but because of the high cost per patient, few can be attended. Direct feeding programs, such as sponsored by CARE and World Feed Program extend further, but coverage and impact are still limited. However, malaria eradication,

environmental sanitation, water purification and inoculations against infectious diseases--all programs usually considered as health measures--also contribute to improved nutritional status. Because they can cover large groups of the population quickly, such activities may be justified almost entirely on nutritional grounds.

Careful description of the health status of the population, giving emphasis to the diseases most frequently related to malnutrition, may show the nutrition planner alternative interventions that should be compared to activities more generally recognized as nutrition-related.

#### 4. The Population System

Incidence of malnutrition is influenced by the balance between resources and population, age and sex distribution, family size and survival, pregnancy, and birth spacing. Other things being equal, including income, larger families do not eat as well as smaller ones, and large numbers of young children and pregnancies bunched together place added burdens on the nutrient supply. This holds true for national populations as well as families.

Making these links between nutrition and demographic characteristics explicit may help the analyst to uncover some previously obscure, yet important, opportunities for intervening to affect the nutritional status of a given population. Furthermore, an understanding of these relationships will aid the planner in making a more persuasive case for nutrition goals in overall national planning. For example, there is some evidence that the number of pregnancies is related to the survival experience of the mother with earlier offspring. In this sense, a nutrition program which decreases infant mortality may have the additional benefit of decreasing the number of wasteful pregnancies and may ultimately slow population growth.

## II. DESCRIBING THE NATIONAL NUTRITION SYSTEM

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### III. SELECTING THE TARGET GROUPS AND TENTATIVE GOALS

Description of the nutrition system and identification and quantification of key relationships are necessary for narrowing the choice of target groups and tentative goals. But the system does not dictate goals; these must flow from decision-makers who are influenced by political pressures, restricted resources, and prejudices as well as nutrition system data. The task of the planner is to present data clearly and completely so that the policy-maker will understand the implications of alternative goals, regardless of the basis for choice.

#### A. ANALYTICAL ASPECTS OF TARGET GROUP AND GOAL SELECTION

##### 1. Characteristics of a Nutrition Goal

Nutrition goals, whether for local, regional or national planning, should be stated so that:

- . the improvement expected in nutritional status or food intake is specified and linked with an already identified problem;
- . the goals identify the population groups that are to benefit from the program; and
- . a specific time period for accomplishment of the desired change is indicated.

Nutrition goals must make explicit and specific the changes expected in the target group. Some program goals, especially those for public feeding programs, often go no further than to describe the amount of food to be delivered to a community, school, or number of families. Nothing is said of the consequences of this action. Nutrition goals can be stated in one of several levels of generalization.

- . food or nutrient intake;
- . nutritional status; or
- . the beneficial consequences of improved nutritional status, e.g., decreased morbidity or mortality rates.

It is especially important to include a statement of consequences because this may assist the nutrition planner in getting his goals accepted

as part of a national development strategy. Excessive claims of beneficial consequences will detract from the planner's case.

## 2. How Goals Are Selected

Goal selection begins during the description phase of the analysis and continues throughout the entire planning process. As data are gathered about the malnutrition problem, the analyst will begin to narrow the target group from "all malnourished people" to a more precise and manageable number. As he begins to understand some of the relationships in each of the sub-systems, he will refine the changes in nutritional status that he can reasonably expect as a result of an intervention. As the feasibility of alternative interventions is examined, he may again have to change goals and target groups, until he arrives at a realistic goal for the constraints under which nutrition interventions will operate. Finally, goal and target group modification may occur after an intervention has been underway when the planner realizes that his expectations of change had been unrealistic. In summary, data from four areas are continually modifying goal and target group selection:

- . extent and severity of the problem
- . benefits from solving the problem
- . feasibility of solving the problem within the constraints
- . program performance data.

The decision flow chart (Figure 5) illustrates how the analytical findings may modify goal and target group selection.

III.

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#### IV. THE ART OF INTERVENTION

This handbook has presented two major steps in the development of a national nutrition plan: (1) definition and description of the nutritional system and key relationships and (2) selection of tentative goals and target groups. On the basis of these steps, the analyst can now identify factors affecting nutrition status, begin to narrow the choice among the opportunities for influencing these causes, and design and compare programs which will bring about the desired change.

"Intervention" is a term describing a program which breaks into a chain of cause/effect, intended to cause positive change in the target group while altering relationships throughout the system. For example, a government may intervene by eliminating import duties on food processing machinery in order to lower costs of processing. The effect of that policy is felt by both producers and consumers, as well as processors. The "point of intervention" is the relationship in the nutrition system on which the program is focused.

Comparison of interventions take place on two levels. First, the analyst may compare the points at which intervention may begin. For example, in order to increase the consumption of fresh fish, interventions might take place in preservation and display practices in retailing, consumer attitudes, or in fishing techniques. Secondly, the analyst may compare alternative programs to begin at the same point. For example, he might contrast a program to supply refrigeration units to retailers with a program of opening modern state-owned fish markets.

##### A. TYPES OF INTERVENTION

Interventions can be classified by their general approach to changing nutritional status, but these categories are not rigid since most programs will include elements of more than one type.

1. Nutrient Source Specific

Throughout this study commodities have been viewed as nutrient sources as well as outputs of production or the objects of commerce. Viewed as nutrient sources, specific foods, rich in a particular nutrient, may be linked to an identified nutritional deficiency. In the course of describing the malnutrition problem and reviewing current production patterns and practices, points of intervention related to specific foods containing needed nutrients may merit further investigation. For example in Ecuador, protein shortages among low income highland families who rely on corn, barley and beans for a large part of their protein intake caused the planner to look carefully at opportunities for lowering retail bean prices and encouraging on farm consumption. Analysis of several nutrient source interventions in Ecuador is presented in Appendices II-V.

2. Functional or Cross-Sectional

Efforts to increase production may be functional, designed to influence output from all sources by expanding or improving some aspect of the production process rather than directed at a particular source of nutrients. Credit and irrigation programs discussed in Appendix VII are examples of this type. Agrarian reform and fertilizer subsidy programs could also be addressed to improving nutrition by their overall effect on nutrient production.

3. Specific to a Target Group

Most programs that are called nutrition programs are directed at a specific target group to the exclusion of other sectors of the population. Examples are maternal and child feeding programs, school lunch and industrial feeding programs. A program which lowers the retail price of corn, on the other hand, will benefit all those who consume corn, including adequately nourished families and industrial users as well. The analyst will soon recognize that the savings of directing additional nutrients to a specific group, excluding the participation of others, may often be offset by extra administrative costs.

#### 4. Non-food System Interventions

Interventions in sectors outside the food system are rarely nutrient-specific. For example, an immunization project makes utilization of many nutrients more efficient. The distinction between programs designed specifically for nutrition purposes and those to which nutrition objectives are ancillary is especially important since sectors outside the food system have seldom been considered as impacting on malnutrition problems.

##### B. IDENTIFYING POINTS OF INTERVENTION

Identification of intervention points is the first step of the planner in developing alternative programs and comparing them. Intervention points occur throughout the nutrition system and many are readily apparent to the analyst after the system has been described. In the analyst's task of narrowing interventions to those most effective and feasible, he can draw upon the same criteria used to investigate relationships. These are:

- . Responsiveness to change
- . Probable impact on goals and target group
- . Time requirements
- . Resource constraints

##### C. COMPARING INTERVENTIONS

Having selected a point in the nutrition system for an intervention, the analyst then arrays possible interventions that would achieve the goal. Comparison of the alternative programs is based on the consideration of several factors: constraints, the general restriction placed on all nutrition programming or class of programs; conditions, the necessary factors if a particular intervention is to succeed; and cost comparisons.

## 1. Constraints

Some of the constraints are the following:

Funds - Calculating total public and private expenditures on nutrition programs is one guide to this limitation. These expenditures must be drawn from several budgets, including public and private food distribution programs, nutrition research, and nutrition education. The planner using his analysis of the nutrition system as a guide can search in other ministries for nutrition-related projects on whose budget he might make claim. The review of resources available is not meant to confine the planner to consideration of only miniscule projects, but to avoid grandiose plans that have no reasonable possibility of ever being implemented.

Talent or Manpower - Lack of adequately trained manpower can doom a project to failure so that the planner may have to assume a fixed resource of talent in his projects, because time and money constrain further training in the near term.

Foreign Trade - For many planners, the problem is not "how can we improve nutrition?" but "how can we improve nutrition without net damage to our balance of payments?"

Other Constraints - Political conditions, social mores, and availability of administrative capabilities are among the other factors which may limit the programs proposed by the planner.

## 2. Conditions

The planner must develop his own basis for judging the feasibility of each class of intervention, since advocates of particular interventions are rarely explicit about the conditions that must exist for their remedies to be effective. The examples below illustrate the investigation of required conditions.

a. Commercial Weaning Foods

- . production must be technically and commercially feasible
- . the product must be consistent with the target group's food preferences
- . the target group must be part of the market economy
- . transportation, storage and marketing systems must be able to make the product available to the target group
- . consumption of the product should not reduce breast feeding or consumption of lower cost-per-unit-of-nutrient foods

b. Genetic Improvement for High Nutrition

- . extensive and well-trained agricultural extension force
- . land tenure system should encourage innovation and increased production by small farmers
- . current outputs of the crop must be limited by plant quality and not by level of agricultural practices
- . current consumption of the crop must be below physiological and cultural limits
- . storage, processing, and marketing networks must be adequate to handle the new variety

These two examples illustrate the cross-disciplinary analysis required for judging the feasibility of any proposed solution. The nutrition planner cannot be expert in all the fields, but must call upon others qualified in technical fields to assist him.

In Appendix IV, an example of a fortification intervention is given. Conditions necessary for this type of program are presented.

3. Cost Comparisons

Proposed solutions must ultimately be judged by how the ratio between costs and benefits compares with other activities with the same purpose. The systems approach encourages the planner to review all benefits, all costs, and all assumptions about conditions necessary for a successful intervention. This step in comparison requires a rigorous listing of the effects throughout the nutrition system of any

proposed program, the costs associated with these effects, and the anticipated benefits. For example, an intervention that encourages small farmers to produce and market more beans, so that low income consumers in towns and cities will increase consumption has costs and benefits at several stages. Some of these are illustrated below:

<u>Level of Activity</u>	<u>Cost</u>	<u>Benefit</u>
<u>Production</u>		
Irrigation	\$ _____/Hectare	Increased bean yields; other crops also get water; value \$ _____

Funds for irrigation for the small bean farmer is the intervention. However, investigation reveals that other investments are needed.

Marketing

Storage (Required because of increased production)	\$ _____/MT	Reduces waste of beans; other crops reduce waste; value \$ _____
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Consumption

Advertising or Education	\$ _____	Increased consumption of beans from 10 grams/capita daily to 20g/capita daily, yielding _____ grams of additional protein
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(This expenditure proved necessary to achieve consumption levels in the target groups and at the same time keep prices to farmers from falling to disincentive levels.)

The nutrition planner must set forth in detail his estimates for effects and costs in all parts of the system, taking into account risk and uncertainty, and discounting for time, so that decision makers can make best choices.

Traditional project analysis relies almost exclusively on cost/benefit analysis, listing original project costs such as the construction of a dam and irrigation system and then comparing them with the value of

resulting increased production. The indirect benefits such as improved nutrition as a result of greater food supply are not taken into account. A nutrition planner however must consider several goals, not only greater food production, but also others including increased food consumption, improved nutritional status, and reduced infant mortality.

Without the use of sophisticated computer techniques, the nutrition planner is forced to rely on estimates of optimum mixes of programs and resources in achieving several goals simultaneously. In spite of inaccuracies in estimations, the exercise of comparing costs at all levels within the system, not merely of the initial investment, with the values of multiple outcomes provides decision-makers with guides for policy making. Even with the most advanced techniques certainty is not possible in resource allocations for social programs; the approach in this study makes no claim for precision, but it requires the consideration of all consequences throughout the system.

#### D. EVALUATION OF NUTRITION INTERVENTION

Planning for evaluation of intervention results is an essential part of nutrition planning. Only through evaluation can programs of dubious value be eliminated and effective programs receive recognition.

The steps in nutrition project evaluation are similar to those for other programs, but the planner should be aware that clinical signs and vital statistical evidence may require many months or years to appear. Therefore short-term indicators assume added importance. Evaluation steps are sequential, so that data from initial steps can influence later evaluation activities. For example, on the evaluation of a food distribution program, if it is found that the free food never reached the distribution center, it would be fruitless to look for nutritional consequences among the target group.

From knowledge of the nutrition system, it is apparent that there is no one cause of nutritional status, therefore it follows that it will be difficult without carefully managed control groups to attribute to any one program a change in nutritional status. Nevertheless, planners should include in the design of the intervention methods for collecting data to assist in determining the program's contribution toward achieving goals.

#### IV. ART OF INTERVENTION

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V. STRATEGY AND TACTICS OF NUTRITION PLANNING AND PROGRAMMING

The development of conceptually neat, logical and practical nutrition interventions does not guarantee their inclusion in national plans. Simultaneous with the development of plans, the nutrition analyst may have to argue before ministerial and national planning boards for the consideration of nutrition interventions. Furthermore, he may be asked to define his relationships to existing ministries and planning agencies. Finally, he will certainly be asked to describe how the proposed nutrition programs are to be financed. Each of these issues must be dealt with in the context of the country, but some general guidelines will be helpful to the planner.

A. THE VALUE OF NUTRITION INTERVENTIONS

Describing the benefits of good nutrition and costs of malnutrition is a first step in advocating inclusion of nutrition interventions. These considerations may be classified in four general areas:

1. Productivity

It is generally recognized that better nutrition means higher productivity for previously malnourished workers, and that higher productivity has a money value. The planner may select a high priority labor intensive crop such as sugar cane as an example of the impact of nutrition on productivity.

2. Human Capital

If children are better fed, they increase their chances for development of sound bodies, improved intellectual ability and greater receptivity to learning. All these improvements combine to make them more productive workers, better human capital. Conversion of these assertions into money values lags because of the economic uncertainties associated with assessing yields of human capital. Nevertheless, the planner can look at the group of children from 6 months to 16 years as the total human capital susceptible to development from improved nutrition. He can then explore the productivity consequences of having this group at

satisfactorily nutrition levels, making clear his assumptions about employment, wages, technology and other economic considerations.

3. Cost Reduction

Private and public health expenditures can be reduced through better nutrition. The link between nutritional status and maternal and infant morbidity and mortality has been accepted. The planner may wish to calculate the cost per hospital day of all attended nutrition-related illnesses and deaths. Other data may include savings realized when improved nutrition enhances the effectiveness of campaigns against infectious diseases.

4. Increased Real Income

More food means increased real income for people. When these increases are a return on investment they merit equal consideration with other public investments in competing for resources. Furthermore, more equitable distribution of nutrients is another way of distributing income.

B. THE ORGANIZATION OF NUTRITION PLANNING

There is no one "best" method of organization but effective advocacy and planning require the following:

- . adequate staff and budget;
- . legal authority for nutrition planning and if possible coordination and evaluation of existing nutrition programs;
- . sensitivity to priorities of policy-makers and opinion makers, and knowledge of points of decision in the government;
- . constant contact with the non-government sector, including voluntary agencies, trade unions, cooperatives and the food industries;
- . staff with broad backgrounds so they can communicate with technicians in other ministries.

There is no way to assure financing of nutrition projects; however, the development of a nutrition strategy, with quantified goals, and proposals based on well-documented projections of costs and benefits offers the best opportunity for getting financing for action.

For example, nutrition planners at first may be able to do little more than influence the implementation of non-nutritional projects, such as credit, irrigation or dairy herd development, so that they have a modest but beneficial nutrition impact. In other instances, the planner may be able to demonstrate that the financial benefits from a nutrition project justify investment by conventional banking criteria. In either case, the planner is more likely to be successful if he has undertaken a rigorous comparison of alternatives and set forth clearly the costs and benefits of the preferred intervention.

#### C. COST OF NUTRITION PLANNING

Appendices I-VII are an illustration of the first steps in national nutrition planning. The level of effort and talent required for this kind of study are well within the resources of nearly all developing countries. When countries are considering whether or not to begin seriously a nutrition planning program, they can be guided by some general rules about allocation of planning resources. Comments about the kinds of personnel needed may also assist countries in designing a nutrition planning unit.

Total annual resources for nutrition planning should be divided among tasks in the following general proportions:

description of system	20%
evaluation of on-going agricultural, health, trade, etc., programs for nutrition implications	30%
selection of alternatives for comparison	20%
comparison of alternatives	30%

This suggested division emphasizes that description, the easiest task, is only one part of the total; planners should move quickly from description to analysis so that planning investments yield pay-offs greater than more "diagnosis." Each of these tasks is continual and will require energies of outside experts as well as the nutrition planning staff.

The staff skills on a nutrition planning team represent several disciplines, required by an approach that assesses intervention points in all parts of the system. Nutrition planning staffs should include as full-time employees and consultants the following specialists: (1) a senior planner trained as an economist, operations analyst or social scientist who is practical, not entranced with exotic research methodologies and experienced with problems of low-income farmers and consumers, (2) junior analyst with a statistical background; resourceful; fully acquainted with the government, private and international agencies; (3) nutritionist: experienced with programs serving low-income groups; knowledgeable about food fortification, enrichment; with access to other parts of the nutrition and food technology community; (4) agricultural economist: knowledgeable about small farmers, staple crop production.

With the allocation of two-three man years annually plus clerical staff, a nutrition planning team should be able to complete description of the nutrition system and provide analysis of several alternative interventions. The team may chose to analyze proposed investments in the production or distribution/processing subsectors, review on-going programs that might be modified to improve nutritional impact, conduct evaluations of programs that claim nutrition consequences, or some mix of these activities.

The study in Ecuador, including the write-up of the methodology required about three man-years, plus clerical staff. Project staff was able to draw upon employees of several ministries for assistance in gathering descriptive data and in locating specialists for interview.

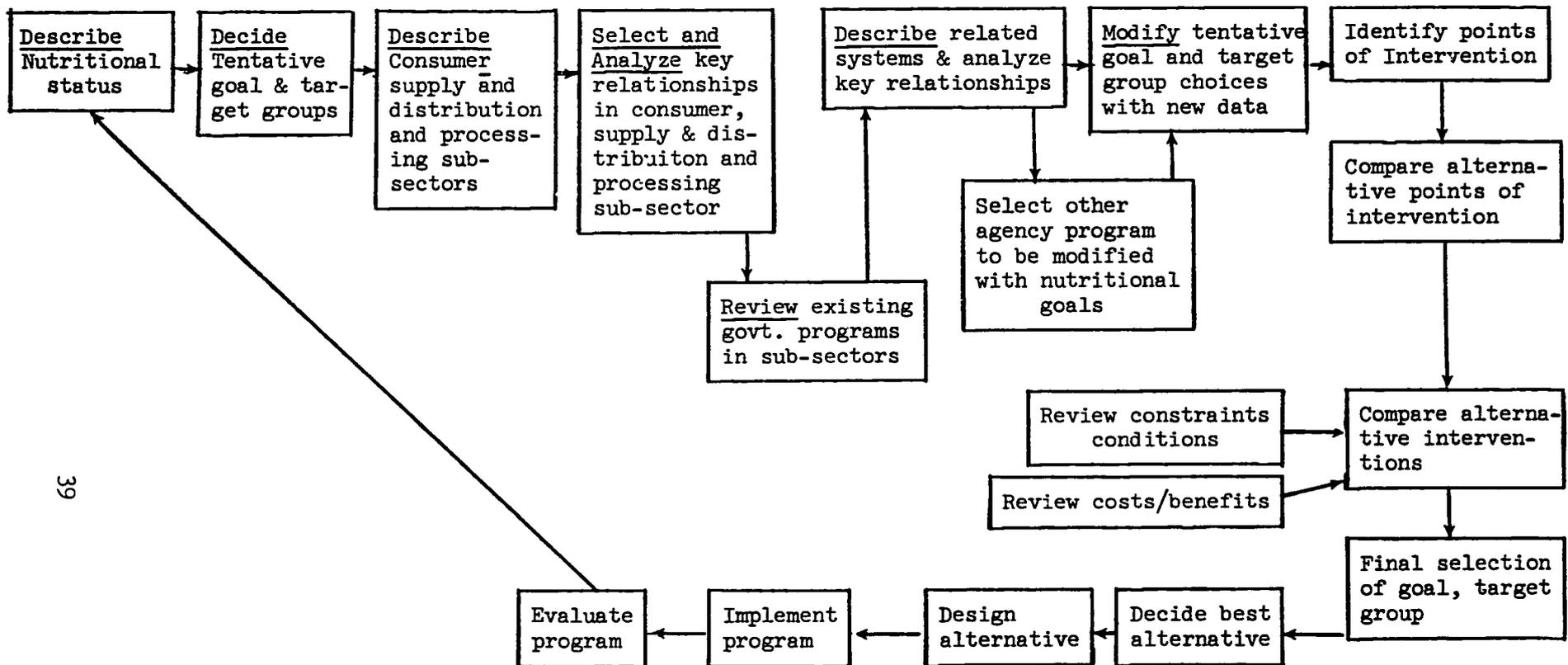


Fig. 5. Activity Flow of National Nutrition Planning

## V. STRATEGY AND TACTICS OF NUTRITION PLANNING

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