XD-AAQ-190
ISN = 34807

9 31 06 5

CORNELL NUTRITIONAL SURVEILLANCE PROGRAM

Working Paper Series

Division of Nutritional Sciences
New York State Colleges of Human Ecology & Agriculture and Life Sciences
Statutory Colleges of the State University of New York
Cornell University
Ithaca, New York 14853

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DEFINING NUTRITIONAL DATA NEEDS

by

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December 1983 No. 25

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The CNSP is supported by Cooperative Agreement # AID DSAN CA-0240 between the Office of Nutrition, Bureau for Science & Technology, USAID, and the Division of Nutritional Science, New York State Colleges of Human Ecology & Agriculture and Life Sciences, Cornell University, Ithaca, New York 14853.

A report of research of the Cornell University Agricultural Experiment Station

INTRODUCTION

When widespread public concerns arises over problems affecting human well-being, the formation of policies to address these begins with a variety of different perceptions of the nature and extent of the problem, and what to do about it. This has been true - to take well-known examples from the recent past - for population growth, for environmental pollution, for resource (e.g. oil) availability, and for food and nutrition. The usual evolution of this concern begins with attention-catching revelations or events: for example in population, with doom-laden projections in the late sixties and early seventies; for food and nutrition, with the droughts (e.g. Sahel and Ethiopia), wars (e.g. Biafra) and consequent famines of the same period, one expression of which concern was the World Food Conference of 1974.

The result of this concern is a mobilizing of political and scientific efforts, and of public opinion. The problem is, as yet, not defined; and thus calls for action vary from radical to palliative depending on perceptions of causality, feasibility of action, and political standpoint. The process develops as one of deciding that a problem is worth worrying about, figuring out what the problem really is, what can be tried, what works and what to do next. For excellent reasons, tension arises between those who want to define the problem better, and carefully work out what to do - which takes time and money for absolutely no alleviation of the problem; and those who want to do something now, based on best guesses and "doability". A divorce thus arises between "data" and "action".

In the maturing of concern and its translation into action, a longish phase usually occurs when data are collected and analyzed, and general conclusions about the nature and extent of the problem are reached. This brings focus and better understanding, often bringing the problem within seemingly more manageable bounds. The World Fertility Survey is one example; the WHO Collaborative Study on Breastfeeding another: both these brought moderation to the more extreme fears of imminent crises, and pointed the way toward rational actions. In nutrition, the national-scale surveys launched after 1974

(e.g. AID assisted surveys in 14 countries (1)) have led us now to have a much clearer idea of the types and prevalences of physical malnutrition. Theory and analysis - notably the functional classification concept (2) - have recently demonstrated that malnutrition is not pervasive in the sense that all population groups are indiscriminately affected in poor countries, but that malnutrition varies many-fold between different people, depending on poverty, ecology, etc.

The body of knowledge in nutrition is now at the stage that there are decreasing returns from gaining fresh data for general purposes of understanding the problem - we know fairly well what is going on. Data are, to be sure, needed to follow and account for changes in nutrition, and to plan in specific circumstances. We feel that resources for data collection and analysis now need to be much more closely focussed on where there are specific data needs for policy, programming, and evaluation. Put the other way around, the response to proposals for fresh data collection should now lead to a close examination of the "action needs". The touchstone, we suggest, is to define the decisions that cannot be made (adequately) without new data. This process would reconcile the competing demands for "data" and "action".

This paper is addressed to ourselves as much as anyone else. It is relatively easy to decide to undertake a new survey or other data collection exercise. It is much more difficult to define why, and to ensure the data are used. Everyone is tempted in this direction, either when faced with not knowing quite what to do, or because research is relatively safe, interesting, and respectable. We suggest that the thought processes and inquiries described below should always be applied when considering a fresh survey. The end-point is intended to be a rational decision as to whether new data are needed, if so why, what data, when, etc.

Making the best decisions obviously involves the assembly of relevant information about the problem of concern, and about existing and potential activities directed towards dealing with them. But the process of deciding what data are required to produce such information and how to obtain them itself needs careful planning. This paper therefore outlines an approach to the initial assessment of nutritional data needs in developing countries which may be

useful to planners who are considering nutritional survey or surveillance activities as part of the planning process for improving nutritional status of high-risk populations in their countries.

It is important at the outset to distinguish between "data" and "information". What planners require is relevant, timely, and reliable **information** about the type, extent, and severity of the nutritional status of the population, and how and why nutritional status is changing. **Data** are the raw material that can be used to produce such information. One writer on management information systems offers this definition: "Information is data that has been processed into a form that is meaningful to the recipient and is of real or perceived value in current or prospective decisions." (3)
When decisions have to be made without information that would have been valuable, the problem is sometimes that the data, the raw material for that information, were never collected. Very frequently, though, the problem is that existing data were not processed, analyzed, summarized, and reported to the right people, in a form they could use, in time for them to use it. The paradoxical situation in which there is a lot of data, but managers and planners operate without information, is very common, especially in large organizations, be they public or private, in developing countries or developed ones. Before setting out to collect more nutritional data, it is good practice to look critically first at the information needs of decision makers, then at the way in which information is or is not reaching them. It may, or may not, turn out that more data, or different data from that currently available, are needed. If more data are needed, then the subsequent questions:

- how much accuracy is needed?
- what part of the population should be covered?
- how should the data be collected?
- how often should the data be collected?

can be addressed from the perspective of the information needs of the intended users.

Of course, basic research is often needed. Researchers are never fully able to decide what it is that they do not know. It is always possible that a

large-scale exercise in data collection will turn up some new finding worthy of future investigation, but a familiar problem is that it is much easier to order that new data be collected than to analyze and interpret them when they come in. Institutional pressures tend to operate in favor of excessive data collection, since it is easier to get everyone concerned with a given policy problem to agree to collect more data than to get them all to agree on a course of action. This would be no problem if data gathering were a costless activity, but it is not. It takes time, money, the work of skilled technical and administrative staff, and various other resources. It is a valuable discipline, then, to start from the decisions to be made and the information needed to improve decisions, and work through to a consideration of what data to collect and how.

This whole process of improving the quality and quantity of nutritional information for planners is described in terms of a series of steps. These are not strictly sequential, though. At each step there is a need to go back and reconsider the purposes of the whole exercise to see what should be done. These steps involve addressing four major issues:

1. What are the nutritional problems of concern?
2. What existing or potential policies and programs of the government are relevant to those problems? Who makes decisions about them and what are the specific decisions?
3. What information is needed to make the decisions? Is the information currently getting to the decision makers in time and in useable form? If not, is the problem a lack of data or poor processing of data into information? Would existing data be adequate with better communication? If not, what alternatives for new data collection are available? What would it cost to collect new data? Is the benefit from new data collection (in terms of improved outcomes of decisions) worth the cost?
4. Finally, if it is decided that new data are essential, the type of data required needs to be defined.

Each of these issues is discussed in the following sections. Taken together, we suggest that a review of these issues will provide the planner with a useful

initial assessment of nutritional information needs, and of alternative strategies for obtaining the required data.

DEFINITION OF NUTRITIONAL PROBLEMS OF CONCERN

Malnutrition is caused by a variety of intersecting factors and has a variety of manifestations in different age groups and in different environments. The process of identifying the prevalence, severity, and underlying causes of the nutritional problems affecting a population benefits from some standardization of procedure. A conceptual framework such as that outlined in Table 1 can help to characterize nutritional problems effectively.

The series of questions given in Table 1 also helps to define how far the characteristics of the nutrition problem are known, and how much more knowledge is required for action. A first step is to compile a rough description of the nutritional situation in these terms for the area of interest (often national), based on general knowledge and readily available existing data. Later, further analysis of such existing data may be indicated. But the question to keep returning to is "what would we do differently if we had more or better information?" The questions put forward are described in more detail below.

An important initial question in identifying nutritional problems is to define what type or types of malnutrition exist in a given population. Making a specific identification of the type of nutritional problem will assist in making decisions about the most appropriate interventions. For example, the activities which will address the problem of protein calorie malnutrition may be quite different from those which are relevant for the alleviation of vitamin A deficiency or iodine deficiency.

As suggested in Table 1, the next useful question is to ask "who is malnourished?" A biological classification such as children under 5 or pregnant and lactating women is a start. However, a "functional classification" may be far more useful in that it directs attention to specific, localizable populations with specific nutritional problems, such as anemia in coastal plantation workers or goiter and protein calorie malnutrition in highland subsistence farmers. The description of who is malnourished will later facilitate the identification and

targeting of intervention measures. The criteria for classification are specific to the type of intervention contemplated. For example, public health measures are usually targetted geographically; but agricultural development may be relevantly defined with respect to ecology, cropping pattern, etc.

There has been a growing recognition of the importance of seasonal variations in malnutrition, raising the question of when malnutrition is most severe during the year. There may be important relationships of malnutrition to the rainy season when infectious disease rates are often high. In the pre-harvest season in subsistence farming populations food stocks may be particularly low so that nutritional problems may be at their peak. An understanding of seasonal peaks for specific kinds of malnutrition in specific populations facilitiates designing interventions to meet nutritional needs.

The most fundamental question which needs to begin to be addressed concerns why malnutrition occurs. Here, it is easy to get lost in a complex web of possible causality. At some level, everything from distribution of assets through household decision making to child rearing practices is a potential cause of malnutrition. There are two devices which help to sort out the initial consideration of causality. The first is to realize that possible causal factors act as a hierachy. This can be expressed as a flow diagram (Fig. 1). This helps to lay out the possible important causal factors, how they operate, and eventually what information might be needed on them. The second device is again to apply the criterion of use for decision-making. Causal factors, however important, that cannot be modified by some intervention generally have little practical relevance to decisions.

The next stage of the process involves deciding who needs what information for what purpose. Initial considerations based on commonly available knowledge and views should be compiled early on, to guide the rest of the process, and to form a basis to come back to as the process continues. Clearly, understanding the specific factors which contribute to different types of malnutrition in defined population groups at certain times of the year provides the most adequate basis on which to plan relevant interventions - but an important intent of this paper is to question the extent to which this

understanding is really essential for decision-making, and hence what data are needed.

This process of defining nutrition problems is iterative, essentially seeing how far the relevant questions (e.g. as outlined in this section) can be answered, and need to be answered, in order to adequately guide and plan the necessary actions to improve nutrition.

IDENTIFYING USES AND USERS OF NUTRITIONAL INFORMATION

Armed with some working knowledge of the nutritional problems to worry about, the next step is to then look at government activities (programs or policies) that could affect these problems. Here, a useful device is to identify the potential users of information - those people, departments and agencies actually making decisions with nutritional consequences.

Public sector activities relevant to nutrition could be grouped into four broad categories:

1. Famine or drought relief programs, required to overcome acute malnutrition in some population, usually defined by geographic area, or to prevent a further deterioration.
2. Programs whose specific purpose is to alleviate chronic malnutrition among some identifiable beneficiary population for which information about nutritional status would be a primary measure of program outcomes. These could include direct interventions (supplementary feeding, nutrition education, micronutrient dosing, food fortification) or programs designed to increase food purchasing power or decrease the relative price of particular foods (food coupon or subsidy programs).
3. Programs with broader objectives of generating employment, improving health and living standards, and increasing incomes of the poor. For these, nutritional status would be one good measure of the success of the attack on poverty. These might include rural development programs (some of which might involve food-for-work), agricultural extension and input subsidies, water supply and

sanitation improvements, infrastructure development in urban squatter settlements, etc.

4. Programs and policies whose primary purposes are not stated in terms of nutrition, but which can affect nutritional status nonetheless. These could include general food price policies, minimum wage laws, exchange rate policies, and the like.

The types of decisions to be made about these programs determine nutritional information needs. What sorts of decisions are made?

The most frequent types of decisions made for all the program types (1-4) listed above, concern the allocation of resources. This involves allocating resources by area, or by type of activity. For example, a given set of activities such as improvement in water supply can be shifted from one area to another; or it may be decided that a water supply intervention is no longer needed, and the resources might be shifted to other public health measures.

A related set of decisions concerns the design, redesign, or even discontinuation of programs. In practice for nutrition, this relates primarily to program types 2 and 3 above. While resource allocation in terms of targetting are likely to be subject to decisions made in central ministries or their local government counterparts, the question of design or redesign of programs may involve the formulation of conclusions based on more complex information, thereby including research institutions in the de facto list of users.

As a third example, the setting up of pilot programs, and decisions to extend or terminate these, may be shifted further towards research or experimental institutions.

At the same time as the actual decisions concerning nutrition are identified through discussions with those making them, some assessment of the current information base for these decisions is needed. This is not easy. It is complicated by the fact that even if information is available, it may not be used for the decision-making; or the decision may in fact be made in the face of information indicating that there are, in nutritional terms, better alternatives available.

At a later stage in this process, in fact what is being done is some form of informal cost-benefit analysis. In effect, the question that should be asked is "is it worth further expenditure of funds and time to improve the information base for these decisions, in terms of more efficient use of resources, for (in this case) a better nutritional outcome?" This informal cost-benefit assessment should not go as far, obviously, as interposing a complicated analysis of government operations. The objective should be to get a tentative idea of what types of information decision makers are using, what they need, with what priority, and what difference it would really make. The next section discusses the evaluation of existing information in the light of the needs of the users which should progressively become better defined as the procedure continues.

SPECIFYING ADDITIONAL INFORMATION NEEDS FOR THESE DECISIONS.

The first step here is to get a better understanding of the type of information actually being used, or necessary, for the decision-making outlined in the previous section. A brief description of the usual types of information involved follows (more details are given in (4).

For purposes of early warning of food crises and targetting of preventive and curative measures (program type 1), the timeliness of information is usually the greatest concern. Drought committees, famine relief planners, or refugee camp organizers need information in time to initiate appropriate interventions, one tradeoff being that earlier warning signals usually contain more false alarms than do more routine reports. The information needed can include anthropometric indicators of nutritional status, for screening individuals or for targetting services. "Leading" indicators that are not direct indicators of nutritional status related to causes of a food crises (e.g. rainfall) or correlated with one (e.g. unusual migrations to seek wage labor or to beg), are likely to be just as important.

There is usually less urgency for information to make decisions connected with programs of types 2-4. For type 2, nutrition interventions aimed at chronic or recurring malnutrition, decisions include the targetting of existing programs to those who need them, evaluation of field trials or pilot programs,

and routine monitoring or evaluation of large programs. Both in assessing needs and evaluating the net impact of nutrition interventions, information about the causes of malnutrition becomes important. Policy-level decisions (institution of new programs or replication of expansion of pilot programs) that call for causal research and impact evaluations tend to be rare. When such evaluations are needed they typically require special investigations outside the routine program reporting sytems. Regular monitoring and evaluation for program managers relies more on built-in reporting systems and periodic collection of quantitative or qualitative data.

Policies and programs with broader development aims are less commonly influenced by nutritional information. Those making decisions about large agricultural or health programs are often unaccustomed to interpreting data on nutritional status and trends; nor are the connections between the outputs of their programs and nutritional improvements easy to explain or to measure. Since more and more countries are attempting to expand primary health care, which often entails maternal and child nutrition components, there is likely to be more demand in the future for nutritional information for the planning and evaluation of health services. Agricultural and rural development project planning and evaluation is also beginning to take nutritional considerations into account. Again the information could take the form of assessments of need, impact evaluation for small-scale programs, or routine monitoring and evaluation of established programs.

To focus in now more specifically on the information needs, a useful device is to actually write out the specific questions that need to be answered to better-inform the decisions. Examples are as follows. Does area A have a substantially higher prevalence of malnutrition than area B? Is there an effect on nutrition on producing export crops? Would a clean water program be a better bet in terms of health and nutrition than building a clinic? Clearly rather different types of information are needed to answer these different questions. Moreover, and crucially, the degree of certainty required in the answers will vary. For example, considerable certainty may be needed to switch program resources aimed at building health centers in favor of

investment in clean water supply; less certainty might be needed for extending a supplementary feeding program from one area into another where it is likely that there is a substantial prevalence of malnutrition anyway. Again, if it is suspected that producing export crops is having a deleterious effect on nutrition, it is important to know at the outset whether further evidence for this effect would be utilized in modifying agricultural policies, or, more likely, in making the case for implementing compensatory measures and what these measures should be.

Having defined the questions, the next logical step is to actually draw up blank or dummy tables demonstrating the information required. This we see as a crucial turning point in the process of deciding what data are needed. We would emphasize that no additional information production, either by analysis or by new data collection, should be contemplated without presentation of dummy tables illustrating the data outputs required to answer specific questions. The dummy tables then provide a framework for investigating the adequacy of existing data and defining what new data are needed.

The next step therefore is to begin to try to fill out these dummy tables from existing data. This readily indicates the extent to which desired data are not available or are inadequate. Usually, apart from often being not fully up to date, existing data might not identify the groups affected (the who, what, when discussed above); they may not represent the population group of interest; and they may not give a set of data which is integrated or linked such that the association of malnutrition with other variables, for classification or investigation of causality, can be studied.

Filling out the dummy tables will indicate gaps and inadequacies in existing data. However, finding inadequacies in the data does not necessarily mean that one should collect new data. It is essential to consider the cost and cost benefit of new data collection along with institutional capabilities for such data collection activities and the opportunity cost involved in undertaking data collection activities at the expense of activities which otherwise could be undertaken with the staff and resources available. Examining existing data will lead to a consideration of priorities for new data collection should this be

feasible, and will help to identify which data are most relevant to decision-making needs.

At this stage, particularly when the cycle is iterated through defining the problem, identifying the uses and users, specifying questions and dummy tables, a fairly clear picture of what is needed in terms of new data should emerge.

With an increasingly clear idea of the situation with regard to data needs, a number of practical issues need to be examined. One of these is that the institutional capability for additional data analysis and possibly collection needs to be assessed. Clearly it is all too easy to plan for an extensive collection of new data, which is either not feasible with the institutions and individuals available, and/or is too expensive.

DEFINING CHARACTERISTICS OF THE DATA TO BE COLLECTED

By this stage, the purpose the data are intended to serve must be clear. To reiterate, data may be collected for providing early warning of deteriorating nutritional status in high-risk populations, for the long-term evaluation of trends and the planning of relevant nutrition interventions, or for the evaluation of program effectiveness. The types of indicators which will be appropriate, the level of indicator reliability required, the sources of data, the frequency of data collection and the resulting cost of the nutrition data system will all depend on the intended purpose which the data must serve. These issues are described below.

Selection of Indicators. Generally speaking the indicators to be used for assessing nutritional problems will be of two types: (1) indicators of nutritional status and (2) indicators of causal factors which affect nutritional status. Nutritional status indicators can include anthropometric measurements such as height or weight, biochemical measurements such as hemoglobin, and clinical assessment indicators such as the frequency of diagnosis of specific types of malnutrition (vitamin A deficiency, protein calorie malnutrition, etc.) in health centers or hospitals. Rates of infections such as diarrhea which are closely correlated with nutritional status may also serve as status indicators of

nutritional relevance. Causal factor indicators may be formed from data such as income or food prices in a market economy where these factors will be important determinants of the ability of poor people to purchase adequate food. In a subsistence economy, indicators based on estimates of agricultural production, rainfall, or family food stores may be more relevant. Finally, the relevant classifying variables such as location or occupation must be defined.

In selecting status and/or causal factor indicators, the underlying principle should be to identify the simplest and least expensive group of indicators which can meet the intended purpose of the data collection activity. The selection of indicators must again be carefully related to the specific types of nutritional problems and the particular target groups which are to be assessed.

Defining the Required Level of Indicator Reliability. In the clinical setting the assessment of an individual's nutritional status can be quite detailed and a very complete description of nutritional status can be made. However, for public health purposes where one is making a population-level assessment of nutritional status and causal factors it will usually not be possible to collect more than simple descriptive data which will be less exact and possibly less reliable in defining nutritional problems. This reality indicates the need to define the minimum level of reliability which will be adequate for characterizing public health nutritional problems at the population level. The issue can be conceptualized in terms of the need for adequate sensitivity or specificity of indicators (5, 6). Indicators must be sufficiently sensitive to detect individuals or groups with significant nutritional problems, but at the same time must be sufficiently specific to exclude individuals or groups without nutritional problems of sufficient magnitude to require intervention. Where feasible, indicators should be specifically evaluated to determine their reliability (7).

In practical terms decision-makers will need to consider the level of reliability in the measurement of nutritional problems which they would require in order

to make decisions about the need for nutrition-related actions and to judge the level of resource allocation justified by the seriousness of the nutrition problem. For example, it may be that some broad policy decisions can be made based on very approximate estimates of the prevalence of nutritional problems. In other circumstances it might be necessary to collect more accurate and detailed data in order to target nutrition interventions to very specific groups at highest risk.

Sources of Data. Data for the definition of nutritional problems may come either from existing administrative sources or from sample surveys initiated specifically for the purpose. Administrative data such as information on cases of malnutrition seen in health services, levels of income or food prices from economic reports, or data from the agricultural sector may be used to form nutritional indicators. These sources of data can provide large volumes of information allowing for disaggregation to address the prevalence of nutrition problems in sub-regions or sub-populations. However, data quality is often limited by the lack of representativeness, poor standardization in collection methods, and by delays in reporting and tabulation.

Data from sample surveys avoid many of the limitations encountered with the use of administrative data. Data from a validly drawn sample can provide more reliable and representative information on the prevalence of nutritional problems. However, the collection of sample survey data implies the need for additional resources in personnel and equipment which may make the collection of such data difficult, particularly on a continuing basis.

Frequency of Data Collection. The frequency of data collection will also depend on the specific purposes for which the data are to be used. A single, one-time nutritional survey of cross-sectional design can be useful in providing baseline data to define the high-risk groups for malnutrition and to assess the prevalence of related causal factors. Cross-sectional surveys of this type can provide an assessment of nutritional problems in times of emergency such as in

the aftermath of a drought or natural disaster. More commonly, nutritional surveys can serve as a quantitative basis from which the location and extent of nutritional problems in specific populations can be estimated and the priorities for interventions identified. Such surveys can be repeated periodically if the resources are available in order to update the survey findings.

When the need for on-going provision of data is identified, some form of routine data collection is desirable to provide surveillance of nutritional problems (8). The development of a surveillance system implies a long-term commitment to the collection and use of data related to nutrition. In practice, the collection of data through the use of a cross-sectional survey or in the context of a surveillance mechanism may not be mutually exclusive choices. It may prove most useful to undertake some rapid and well-targetted sample survey activities (9,10) in populations believed to be at-risk to define nutritional problems and assess the baseline prevalence of nutritional indicators, while at the same time developing a surveillance system which could provide for the continuing collection of relevant nutritional data. A procedure for deciding more specifically on design of nutritional surveillance systems - similar in concept to that given here - is proposed in Chapter 2 of ref. 4.

The Cost Factor. Plans for the collection of new nutritional data will ultimately be most severely limited by the cost of data collection activities. There will be real costs in terms of personnel and administrative overhead as well as the cost of equipment, field data collection, and data analysis. Beyond these visible costs there will be opportunity costs, representing the alternative activities which cannot be accomplished because of the allocation of resources to nutrition-related activities.

It will be critical for decision-makers to estimate the practical value of the data to be collected and to weigh it against these costs. It must be considered whether the new data can realistically be expected to improve decision-making at central and local levels and to result in a nutritional improvement commensurate with the costs incurred. Moreover, it must be considered

whether the costs of data collection are at a level which is sustainable if nutrition surveillance activities are to continue to function into the future.

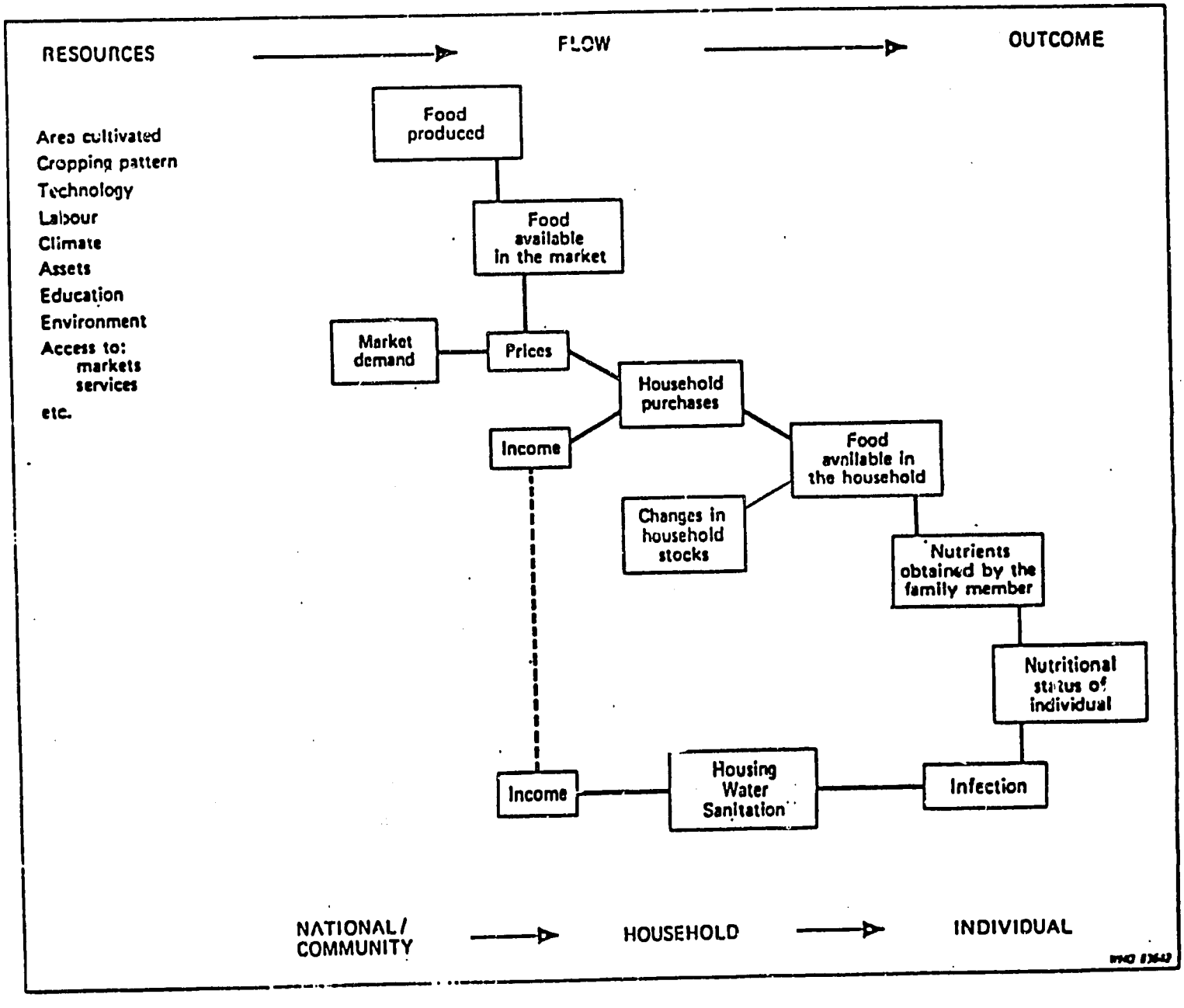
The realities of limited resources of skilled personnel, equipment, and facilities in developing countries will mean that decision-makers must carefully review proposals for the collection of new nutritional data. They must be sure that the mechanisms proposed are as simple and practical as possible, that a clear plan is made for the practical use of each of the data elements which are to be collected, and that the costs of the exercise are likely to be worthwhile.

TABLE 1

Identifying Nutritional Problems: Conceptual Framework

	Question	Examples
1.	What kind of malnutrition?	Protein calorie malnutrition Vitamin A deficiency Endemic goiter.
2.	Who is malnourished?	
	Biological classification:	Children under 5, pregnant and lactating women.
	Functional classification:	Coastal plantation workers Highland subsistence farmers Urban squatters.
	Geographic classification:	Western mountains, Central desert Urban areas, Rural areas
3.	When is malnutrition most severe?	
	Seasonal variations:	Rainy season, Pre-harvest season
4.	Why does malnutrition occur?	
	Social-economic factors:	-Recurrent crop failure -High food prices in relation to income
	Biological/environmental factors	-Lack of sanitation -Inadequate housing -Lack of health services

FIGURE 1



Source: Nutritional Surveillance (1984), World Health Organization.

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