

FAO - A. F. E. - 1988
USA - 1988

FOOD AVAILABILITY AND CONSUMPTION INDICATORS

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June 1988

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OICD/USDA

Under funding from
Office of Nutrition
S&T/AID

Summary

Improvement in food consumption is a basic goal of agricultural development. Agricultural development aimed at increases in production and income will not necessarily lead to improvement in food consumption of the poor in developing countries. In rural households in particular, the production of agricultural products and the "production" of well-nourished people is highly integrated.

In choosing a food consumption indicator there are three major questions to address: what will the indicator be used for; what population group must it cover; and what definition of food consumption will be most cost effective? The first two questions are generally self-evident, the third question cannot be answered simply. Two strategies for measuring food consumption exist: the direct method and the indirect method. Direct methods aim to collect information at the household or individual level on actual food consumed. The indirect method uses a definition which is more remote from the direct meaning of food consumption.

Foreword

The Nutrition Economics Group (NEG) was created in 1977 with funding from AID's Office of Nutrition. The NEG staff of economists help AID implement a program of applied research and technical assistance designed to assist developing countries in integrating food consumption and nutrition concerns into their agricultural planning, programming and policy making processes. Located within the Technical Assistance Division of the Office of International Cooperation and Development (OICD) within the Department of Agriculture, the Group can draw on a wide variety of other specialists from within the Department as well as the U.S. Land Grant university system to complement its work. Dr. Patricia O'Brien-Place is an agricultural economist on the NEG staff. Mr. Timothy R. Frankenberger, University of Arizona, is Principal Investigator of the Nutrition in Agriculture Cooperative Agreement funded by NEG.

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FOOD AVAILABILITY AND CONSUMPTION INDICATORS

I. Introduction

In February, 1987, the U. S. Agency for International Development (AID) presented a new focus for AID's Agriculture, Rural Development and Nutrition account in the fiscal year 1988 Congressional Presentation:

"AID's agriculture, rural development and nutrition program is designed to increase the incomes of the poor and to expand the availability and consumption of food--while maintaining and enhancing the natural resource base."*

Efforts to implement and monitor the intent of this statement have created a demand for information on income, food availability, food consumption and natural resources in developing countries. This paper surveys the type of information available on food consumption, and some of the issues involved in choosing specific indicators.

A. Why Collect Consumption Data?

Interest in food consumption derives from a desire for a well nourished population who can move ahead with economic development. Experience in agricultural projects also highlights the importance of attending to the effects of changes in agricultural technology on food consumption and nutrition. Two reasons can be cited as to why these concerns should be addressed. First, consumption goals of farmers may act as constraints to the adoption of technology, and these constraints are usually not recognized. Such constraints include the need on the part of farmers to protect family food supplies; competition for household labor among maintenance activities such as food processing, preparation and agricultural production; and food quality preferences. Secondly, changes in agricultural technology have effects on food consumption both for the families of producers and for consumers. Changes in farm management and production technology have not always been beneficial for the food consumption status of producers. Thus, it is important to understand the linkages between production and consumption in choosing development alternatives. Some of the more important linkages include: 1) seasonality of production (food availability, malnutrition, human

*AID Congressional Presentation Fiscal Year 1988, p. 29.

energy expenditure, incidence of disease; and terms of trade for the poor); 2) crop mix and minor crops (subsistence versus cash, non-food crops); 3) income (regularity, kind and recipients); 4) the role of women in production; 5) crop-labor requirements; and 6) market prices and their seasonality.

Thus, attention to food consumption concerns is important in both promoting the adoption of new technology and for protecting and promoting access to food for rural populations. Moreover it is fundamentally tied to the development and transfer of agricultural technology and should be incorporated into the design and implementation of agricultural research and development. If one of the major goals of development assistance is to enhance the well being of project participants, then consumption impact must be taken into account. Appendix A presents some methods for incorporating food consumption issues in the design of agricultural projects specifically addressing the data issues.

B. Conceptual Issues

To address nutritional and food consumption issues in agricultural development requires an understanding of the possible indicators for food consumption. In choosing a food consumption indicator there are three major questions to address: what will the indicator be used for; what population group must it cover; and what definition of food consumption will be most cost effective?

1. Choice of Indicator

Food consumption indicators are gathered for a specific goal. Whether that goal is to evaluate a project or to develop a strategy for the country will to a large extent dictate the choice of indicator. The end use of the data should drive the choice of the indicator. For example, a food consumption indicator which is sufficient for designing a project may not be appropriate to evaluate the project.

Time and money are generally both limited; and only marginally interchangeable in data collection and analysis. The more emphasis that is placed on accuracy (i.e. how close your defined valuable is to actual food consumption) or precision (i.e. how well you are measuring the chosen definition of food consumption), the more time and money will be necessary. Given that precision is a problem with all data, especially

in the developing country context, it is sometimes preferable to choose an indicator which is less accurate, but for which a more precise estimate can be derived.

In general, indicators can be grouped into one of two types. These are direct indicators and indirect indicators. Direct indicators of food consumption include those indicators which are closest to actual food consumption rather than to marketing channel information or medical status. To be direct indicators they should be quantified and be gathered at fairly low levels of aggregation (e.g. the household level). Indirect indicators of food consumption are generally used when direct indicators are either unavailable or too costly (in terms of time and money) to collect. Indirect indicators are the result of alternative definitions or approximations for food consumption (see below).

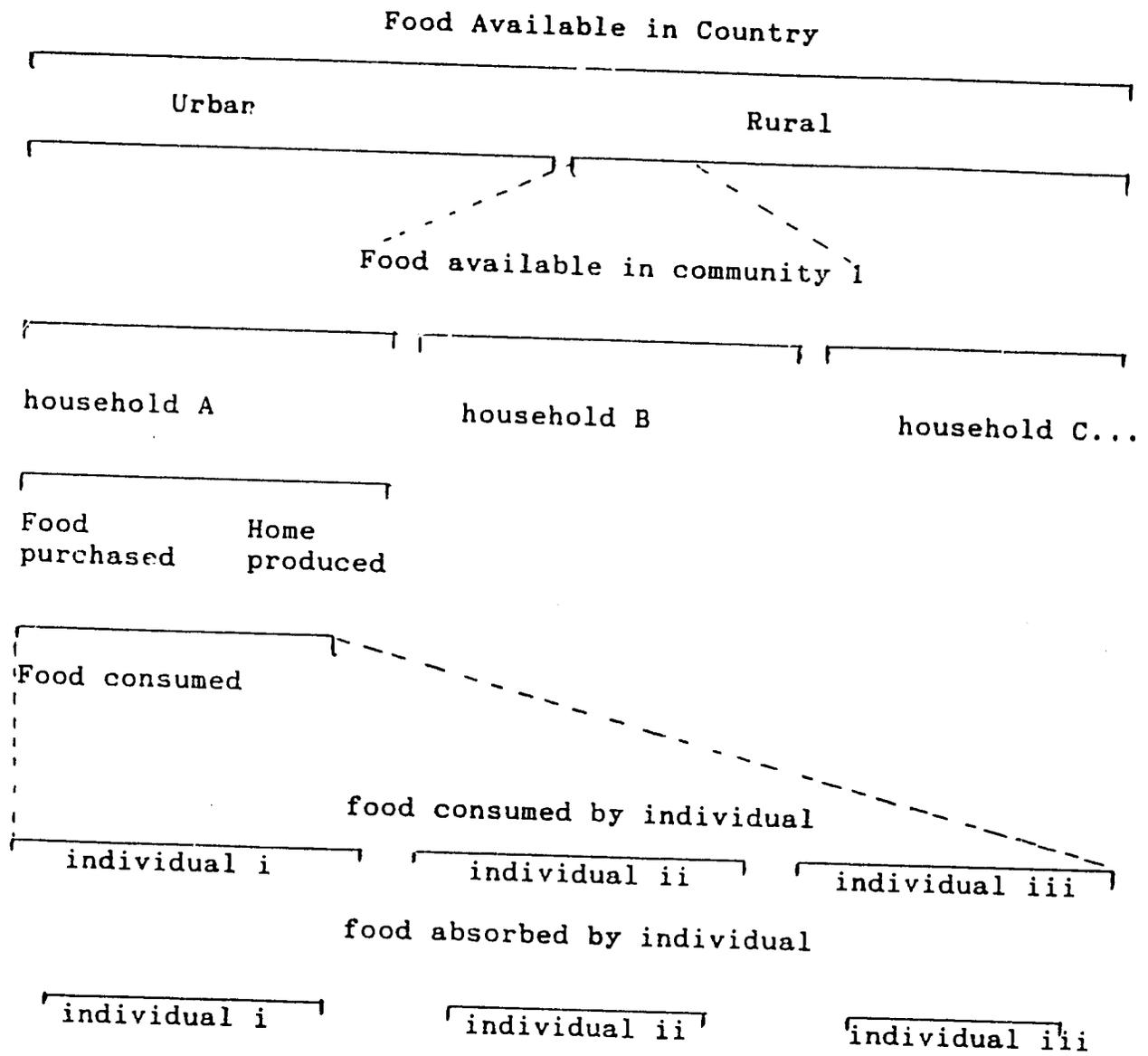
2. Population Group

The choice of population group will largely be based on two factors: the purpose of collecting the data; and the level of food consumption data available. For example, if you need to monitor food consumption within a project area and plan to compare this data with project costs per household, household level food consumption data within the project area would be preferable. However, village level data may be the only information available and costs per household may have to be aggregated in order to achieve comparability. If the indicators are to be compared with national level production estimates, then national food consumption indicators are needed.

The choice of population group may be based on more than one factor. Some of these factors include geographic divisions (e.g. region or rural versus urban), income (or expenditure) classes, socio-economic classes (e.g. education level, ownership of durable goods), and basic consumer group (e.g. village, household, or individual). Figure 1 illustrates some of the levels of data which can be gathered to describe population groups from the national down to the individual level.

The question of which population group to observe should take into consideration the need to describe the most vulnerable groups. The

FIGURE 1: Food Flow Chart



vulnerable groups are those most at risk of malnutrition or inadequate food consumption levels. This will generally be the lowest income group, but could be further disaggregated to a specific type of individual (e.g. pregnant women) or socioeconomic group (e.g. plantation workers).

3. Definition of Food Consumption

Choosing a definition for food consumption has the same problems as those inherent in designing survey questions. Any one definition of food consumption is going to be limited by the necessity to minimize sampling error (accuracy), minimize measurement error (precision), and maximize the information obtained (Pacey, 1981). Food consumption can be defined anywhere on the continuum from food in the market (or field) to food within the body of an individual (see figure 2). Depending on the situation, food consumption can be defined as food availabilities, food purchase or expenditures, food eaten, or nutritional status.

Given the various technical methods behind these definitions, not all of them can be gathered at all levels of aggregation (e.g. nutritional status using heights and weights has to be gathered at the individual level). However, most of these measures can be aggregated upward once the data is gathered at the lowest necessary level. The level of quantification of the chosen food consumption definition can vary from obtaining exact weights and measures to approximating the food eaten in a household.

Given the conceptual issues regarding food consumption indicators, different strategies for measuring food consumption can be pursued. The discussion now focuses on some alternate direct and indirect indicators of food consumption.

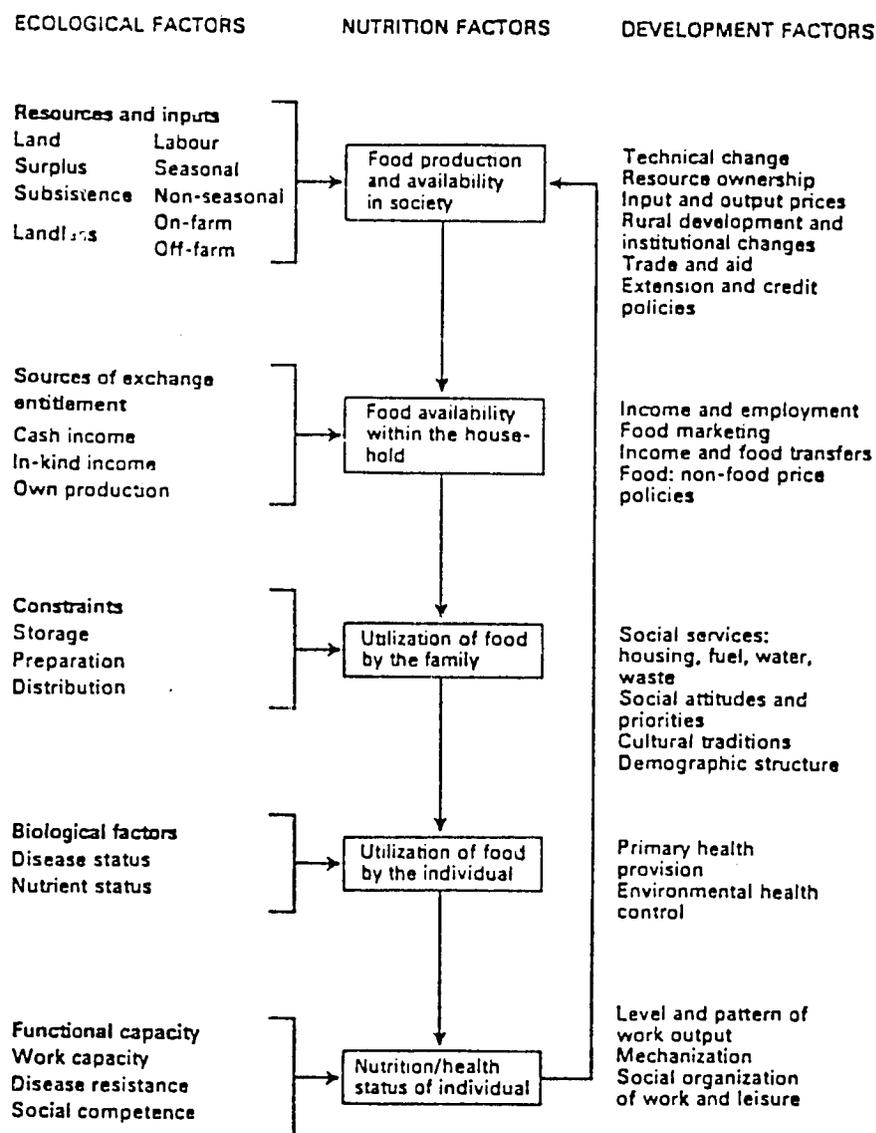
II. Direct Indicators of Food Consumption

As stated earlier, direct indicators are measures of food purchases and food consumed. Some of the more familiar methods are presented below.

A. Expenditure or Budget Surveys (macro)

Direct indicators of food consumption at the macro level depend on the existence of national level

FIGURE 2: Ecological, Nutritional, and Development Factors in Food Consumption



SOURCE: Payne, 1985, p. 5.

expenditure, budget, or consumption surveys.* Given the time and resource demands of these surveys when done nationally, we do not advocate performing such a survey if data are not already available**. We do suggest analyzing existing survey data which may have been collected, but not analyzed. In particular data should be disaggregated in order to provide income level specific data.

Data on food expenditures can be converted to quantities of food consumed by use of price/unit information available in the surveys. Given that food is a composite of several different items, aggregation is limited by a choice of common denominators. Two methods are generally used: limit consideration to food grain consumption or convert all food items to their calorie content.***

We suggest a two-tiered approach: present foodgrain consumption in kilograms per capita per year and, if possible, food consumption converted to calories presented per capita per year. These indicators should be derived at different income levels (e.g., lowest, third, middle third and highest third) given the high variability of food consumption with income. These will provide quantity indicators for the diet.

This indicator of food consumption will be limited because these surveys are only available at the most every ten years. For some countries, there is only one survey available.

The food consumption estimates from these surveys are the most direct indicator of what is happening with food consumption for the nation as a whole. These estimates can be used to compare food consumption situations across countries. More detailed analysis of the food consumption data could provide information to policy makers on the likely impact of different agricultural development programs on food consumption

*FAO produces a book which lists all available food expenditures or budget surveys currently available, the book is periodically updated.

**An alternative is to investigate some short-cut methods to the national consumption survey as described in recent papers (Zalla 1988 and Senauer 1988).

***Conversion factors for food items to calories are generally available from FAO or other sources for all major food commodities.

by different income or locational groups*. An example of these survey data is presented in table 1. These data from Indonesia were analyzed by Iowa State University for the AID mission in Jakarta to explore the food consumption impact of agricultural policies (Iowa State University, 1987).

B. Shortened Consumption Surveys (micro)

At the level of a project or a region, food expenditure or consumption data is less likely to be available. However, collection of a shortened consumption survey becomes easier with the smaller area. The "shortened" survey can be achieved several ways: cutting down on the number of food items which are on the survey (e.g., only asking about the ten food items which make up 90% of the diet), aggregating items by food groups, cutting down on the level of precision desired (e.g., get measures by cups instead of tablespoons), and asking for frequency of consumption of a food item rather than the quantity of consumption. All of these are methods which attempt to hasten the process of gathering data and are all valid depending on the circumstances.**

We suggest a shortened 24-hour recall survey of household consumption be used. Enumerators would collect staple consumption (grains, bread, roots and tubers) in local units and a frequency count of other food items consumed by the household in the last day. Socioeconomic data on household members and their resources would also be collected. Results should be presented as calories per capita from staples. Since income data would not be available, presentation of the data by other relevant socioeconomic groups (e.g., landless laborers and tenant farmers) is suggested.

This type of data is especially useful for tracking the impact of localized agricultural development programs. By performing these quick surveys on a seasonal basis every few years, changes in

*The Nutrition Economics Group (see Foreword) has supported such work in several different AID countries over the last years.

**The most useful work in this area is unpublished, see the articles by Villere, Chavez et al., and Young listed in the bibliography. For a good review of the methods see page 217ff of D. Sanjur Social and Cultural Perspectives in Nutrition, Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1982 or "Section 1" of S. Quandt and C. Ritenbaugh, Training Manual in Nutritional Anthropology, American Anthropological Association, Special Publication No. 20, 1986.

TABLE 1: Household Survey Data Example from Indonesia

<u>Weekly Per Capita Food Consumption (kg) for Households by Location and Expenditure Group</u>							
<u>Indonesia</u>	<u>Rural</u>	<u>Urban</u>	<u><7,200</u>	<u>7,200-11,400</u>	<u>11,401-19,000</u>	<u>>19,000</u>	
<u>Foodgrain</u>							
Rice	2.30	2.39	2.19	1.98	2.47	2.59	2.63
Rice products	0.56	0.53	0.58	0.44	0.52	0.68	0.76
Corn, fresh	0.82	1.04	0.50	0.75	0.69	1.21	0.81
Corn, dried	1.37	1.58	0.81	1.45	0.84	1.53	0.37
Corn, grain & flour	1.26	1.43	0.59	1.30	1.07	0.81	0.69
Wheat	0.16	0.18	0.17	0.11	0.16	0.22	0.59
<u>Total Foodgrains</u>	6.49	7.15	4.84	6.03	5.75	7.04	5.85
<u>Calories</u>	1912	2029	1767	1545	1951	2250	2567
<u>Household size</u>	5.1	4.8	5.4	5.4	5.1	4.7	4.1

SOURCE: Tables 3.09, 3.10, 3.11 in Evaluating Food Policy in Indonesia Using Full Demand Systems, Center for Agricultural and Rural Development, Iowa State University, September 1987 (funded by AID/S&T/Nutrition). Data is from 1980 SURGASAR by government of Indonesia.

food consumption related to changes in agricultural production should be visible. The method needs to be fin-tuned to the particular project and culture so as to be sure to collect the relevant data.

These surveys are limited in their level of precision and in the lack of expenditure data for estimating incomes and elasticities. This type of survey has been tested in Mauritania on the Agricultural Research II Project (O'Brien-Place, 1988). Table 2 presents some preliminary data from that survey.

III. Indirect Indicators of Food Consumption

As stated earlier, indirect indicators of food consumption are generally used when direct indicators are either unavailable or too costly (in terms of time or money or both) to collect. Some of the more familiar methods are presented below.

A. Food Availability (macro)

Food availability is an estimate of the "disappearance" of food within the country. The assumption is that all the food which is produced or imported and not stored or exported is consumed. At the national level, food availability estimates are reported by FAO and can be obtained on virtually every country (United Nations, FAO, 1987). These figures are also estimated by other agencies such as USDA and AID in the process of deriving food aid needs. We suggest use of the FAO estimates given they are estimated for the largest number of countries. Any biases in these estimates would hopefully be consistent across countries, thus allowing for cross-country comparisons. These estimates are usually given as calories per capita per day.

The FAO estimates are useful for tracking a country's food security situation over the years and estimating food aid needs. The limitation is that they are really tracking production for the most part. Actual distribution of food between regions, income classes or within families is ignored. Therefore, these availability estimates on a per capita basis must be higher than recommended requirements to allow for maldistribution. Table 3 presents some representative data on food availabilities from FAO.

A second set of estimates on availabilities will usually be provided by the Ministry of Agriculture for the country. These estimates, particularly if they are provided on a regional basis should also be collected.

TABLE 2: Food Consumption for Eight Villages in Mauritania

Average Foodgrain Consumption

<u>Village</u>	<u># in HH¹</u>	<u>Adult Male Equivalents²</u>	<u>Kg/#</u>	<u>Kg/Equivalents</u>
Doubel Doubai	6.0	4.2	0.5	0.7
Diadjibine Chorfa	6.1	4.4	0.9	1.2
Seyenne	7.2	4.8	0.6	0.9
Taasoor Lootooke	8.9	6.5	0.6	0.8
Ganki	8.5	6.0	0.6	0.8
Dawalel	10.9	7.8	0.7	1.0
Solou	18.2	12.6	0.6	0.9
Ouloumbouny	26	19	0.5	0.7
AVERAGE	11.5	8.2	0.6	1.0

¹HH is an abbreviation for "household".

²Household size was redefined using adult male equivalents to allow for differences in consumption levels by age-sex category.

TABLE 2 (continued)

Meal and Food Frequency Averages by Village

<u>Village</u>	<u># of Meals</u>	<u>Per Day</u>				<u>Per Week</u>		
		<u>Legumes</u>	<u>Fish</u>	<u>Vegetables</u>	<u>Fruit</u>	<u>Oil</u>	<u>Meat</u>	<u>Milk</u>
Doubel Doubai	2.7	1.8	0.6	1.6	0	0.5	0	3.2
Diadjibine Chorfa	3.0	0.5	0.7	2.5	0	0.6	2.0	16
Seyenne	3.0	0.8	1.1	3.1	0	0.9	0	20
Taasoor Lootooke	3.0	1.0	1.1	3.0	0	0.8	0.4	16
Ganki	3.1	2.8	1.1	3.5	0	0.8	0.1	15
Dawalel	3.4	2.0	1.4	8.2	0	1.0	1.1	16
Solou	3.8	2.2	1.8	6.3	1.2	0.6	2.2	15
Ouloumbouny	3.1	2.0	0.9	2.9	1.1	0.1	0.3	1.3
AVERAGE	3.1	1.6	1.1	3.9	0.2	0.7	0.8	11

SOURCE: O'Brien-Place, 1988, tables 1 and 2.

TABLE 3: Food Availabilities in Selected Countries in Calories Per Caput Per Day

	<u>1961-63</u>	<u>1969-71</u>	<u>1979-81</u>	<u>1983-85</u>
<u>World</u>	2316	2449	2599	2666
<u>Africa</u>	2055	2103	2204	2129
Botswana	2033	2138	2139	2164
Cote d'Ivoire	2151	2369	2569	2448
Kenya	2250	2245	2192	2162
Lesotho	2012	2020	2347	2346
Mali	1827	1836	1752	1793
Mauritania	1998	1988	1998	2076
Senagal	2305	2371	2389	2339
Sierra Leone	1617	1956	2049	1834
Zaire	2155	2253	2127	2154
Zambia	2092	2192	2203	2123
<u>Latin America</u>	2381	2517	2677	2700
Belize	2332	2463	2711	2546
Bolivia	1793	1971	2084	2114
Dominican Republic	1862	2083	2316	2468
Ecuador	1818	1957	2063	2031
Guatemala	1946	2101	2220	2298
Haiti	1999	1920	1904	1843
Jamaica	2055	2531	2572	2576
Peru	2226	2289	2179	2144
<u>Asia & Near East</u>	1916	2086	2301	2437
Bangladesh	1938	2013	1850	1859
India	2038	2021	2104	2161
Nepal	1878	1996	1974	2048
Pakistan	1704	2027	2221	2186
Philippines	1837	2053	2355	2313
Syria	2312	2355	2880	3198
Yemen	1993	1841	2197	2254

SOURCE: United Nations, Food and Agricultural Organization (FAO), FAO Production Yearbook 1986, volume 40, 1987, table VII.

These regional availabilities will be useful at providing more detail on the distribution of food within the country, possibly indicating regions needing food aid. No availability estimates can actually warn of possible famines. As shown in Mabbs-Zeno (1987), famines are generally the result of a lack of resources to purchase food, not a lack of food available. This is why the actual food consumption estimates described above are so crucial to any real understanding of the food situation in a country.

B. Market Prices (intermediate)

An intermediate level of information on food consumption can be derived by observing market prices, especially for the major staples (or food grains). These prices will generally be gathered by the government on a regular basis. If they are not being gathered already, a simple market survey of prices and stocks can be run every four to six months in each of the major regions of the country with very little effort (Holtzman, 1986).

If prices are collected on a regular basis, movement over season and years will give some indication of increases and decreases in availabilities.

C. Household Availability (micro)

For households the question of food availability becomes a question of food access, this complicates the definition and thus the data collection. Households have varied methods for obtaining access to food. Classifying households as to whether they are producers of food, consumers of food, or both can help determine which data is necessary. For households which are both producers and consumers estimates of production, storage, and other resources will be needed. For these producer/consumer households an informal estimate of availability could be derived by using the same formula as FAO uses for countries (production + storage - sales + purchases). However, the amount and quality of data required for this formula may not be worth the effort. In this case, approximate indicators can be derived.

For households which are just consumers, household resources available for obtaining food will be the most important in determining access. The discussion below emphasizes rural households which are a mix of production and consumption. For urban households which are only consumers, the section on resources can be redirected to that sociological context. However, for

these urban households, estimates of food consumed or purchased are likely to be more accurate and useful than estimates of "availability".

The uses of household availability indicators will be mostly for project design, monitoring, and evaluation because of their nature as micro-level information. Most of these indicators cannot be aggregated easily in a quantitative sense other than by percentages (e.g. 25% of households sold an animal just prior to harvest to obtain food). Except for those indicators (such as production estimates) where data may already be available, most of these indicators will have to be collected. The most efficient method for collecting this information is a reconnaissance effort backed by a secondary data search. Appendix B provides categories of data which may be needed for this type of dietary assessment. These categories are meant to be used as a "menu" from which a researcher can choose based on their needs. The "justification" given for each type of data provides some information on why you may want to collect a particular piece of data.

1. Production Estimates

In most cases production data are already being gathered by the Ministry of Agriculture or the development project personnel. Estimates of production can be gathered specifically for estimating food availabilities using the same techniques (estimates of yield just prior to harvest, farm sales data, etc.) production projects have used. These production data can be used by including them in the formula for availability or by relating them directly to the size of the household (kilograms per person) and using this as an approximate indicator.

2. Storage Estimates

Estimates of food in storage at the household level can be more difficult to obtain than production estimates. This is due to the reluctance of some people to discuss food in storage (superstition or pride) and the ability to obscure how much food is in storage (more than one type and location). Perhaps a more useful approach to food in storage (and production as well) is to ask questions such as "given the amount of your last harvest, how long will the household be able to eat from it?". A second possibility is to concentrate on amounts in storage only at critical times of the year such as just prior to harvest. Here the relevant question

might be "do you have any grain in storage, if yes, for how long will it last?" When asked how long the harvested grain would last in Mauritania, female heads of household were very quick at estimating the number of months, indicating they already had thought through the situation. Estimates ranged from six months to two weeks (O'Brien-Place, 1988).

3. Estimating Other Resources

Access to food is determined by how much a household produces (sometimes none), plus how much a household can obtain from other resources. An alternative to direct production estimates is to use land area per household member as an indicator of resources. This data would usually already be available within the agricultural project. An improvement upon this ratio is the subsistence potential ratio (SPR) which in "its simplest sense...is simply the ratio of the household's ability to feed itself to its need to feed itself" (Whelan, 1983). The data needed for calculating this ratio are size of farm, expected yield, and age and sex composition of the household. The SPR compares the amount of food (calculated in energy) which a household can produce over a year with the energy requirements of the entire household for the year. The SPR can be refined (depending on the availability of data) to include resources other than land (e.g. wages).

Resources other than land include wages, liquid assets (livestock, jewelry), and coping strategies. Estimating wage income can be a difficult process depending on the willingness or ability of a household member to disclose this information. In general, the significance of employment or unemployment of a family member is probably sufficient information for ranking the food situation of a household. In other words, the actual amount earned may not be as significant as whether the person has been able to find work or not.

Liquid assets can be estimated by questioning or observation, neither of which is very reliable given the reluctance of households to discuss these issues. Here again, estimates of existence/non-existence of resources at a critical period such as just prior to harvest may be more significant than actual amounts of resources. The household which still has livestock or jewelry just before harvest is obviously better off than

those which don't. A variation of this is to ask whether an animal (or jewelry) has been sold within the last month in order to obtain food (grain). These questions have been tested in Mauritania and are still under analysis, but appear to be quite promising (O'Brien-Place, 1988).

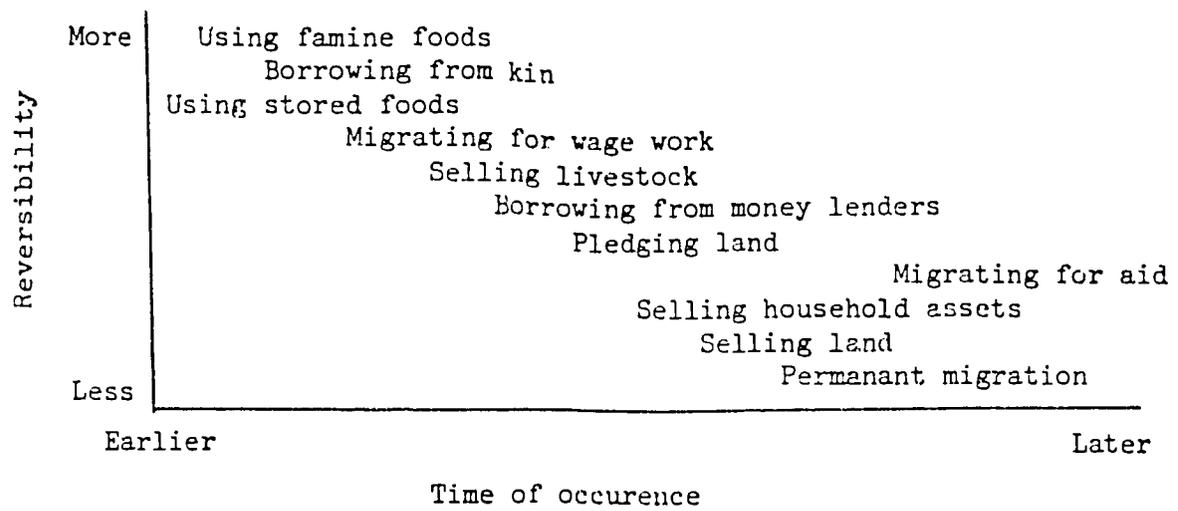
Coping strategies refer to methods households use to achieve food access when the more conventional methods of production and purchase are unavailable. These strategies include social methods, such as, borrowing from relatives or neighbors, and physical methods, such as, gathering wild food items. These strategies can be derived through the use of rapid reconnaissance methods developed by anthropologists (Frankenberger, 1985). A chart of these strategies can be derived which relates these indicators to the severity of the problem (Watts quoted in Gow, 1987 and Mabbs-Zeno, 1987). Figure 3 presents a chart which ranks household coping strategies as to how reversible they are. Such information could be very useful in quickly estimating the extent of food aid needs in an area. Only data on these indicators would be needed to classify households during food shortages. Depending on how finely the stages are defined, this method could be used to classify households as to their food situation in "normal" as well as famine periods.

D. Nutritional Status

Nutritional status defined by anthropometric (i.e., weight and height) indicators can show the impact of food consumption and other factors on nutritional status. Anthropometric indicators provide a more exact definition of the nutritional situation, but less exact information as to food consumption effects because nutritional status is a result of several factors only one of which is food consumption. These other factors include health status (e.g., diseases which are present or diarrhea), sanitation, and level of activity of the individual.

Anthropometric measures require data on weights, heights, and age of children, usually those under five years of age. Some of this data will be available through the Ministry of Health if growth monitoring is a part of the maternal and child health system in the country. A second source is a national nutritional survey if one has been done for the country.

FIGURE 3: Reversibility of Consumption Strategies by Famine Victims



SOURCE: Mabbs-Zeno, 1987, p. 8.

Anthropometric data will usually be presented as weight/height, weight/age, and height/age ratios. The weight/height data precludes knowledge of age (which is the most unreliable variable to measure) and describes present nutritional status. The weight/age data indicates whether the child is presently well-nourished for their age. The height/age data indicates whether the child has been well-nourished for its age over recent years. However, without further information, the usefulness of such data is limited. You may not know whether the nutritional status is due to food availability, food habits, sanitation, disease or access to resources. Despite this shortcoming, these measures can be used on populations to indicate overall changes in well-being and for food consumption between countries. Since the interest is in changes in nutritional status, the growth pattern is what is important. Table 4 provides an illustration of data gathered in a rapid survey of four Mauritanian villages (Cassidy, 1988).

When anthropometric data are unavailable, a secondary level of information on nutritional status can be derived from data on infant mortality and child death rates. These are both usually presented as "so many per 1000" infants (or children). These data will usually be available from the Ministry of Health and are gathered every ten years by WHO. A recent volume from the United Nations (United Nations, ACC/SCN, 1987) presents these data in graph format. Figure 4 is an excerpt from this volume which illustrates a useful format for presenting information on food production and availability, as well as, nutritional indicators.

The infant mortality rate is a good indicator of maternal nutritional status and the child death rate is a good indicator of children's nutritional status. For child death rates, if detail is available on the cause of death, those deaths attributable to measles or other "minor" infectious diseases are particularly indicative of the level of malnutrition.

All of the nutritional indicators mentioned above are limited to describing overall nutritional status, largely due to calorie (and protein) intakes. If specific nutrient deficiencies are being addressed by a country or project, then nutrient deficiency indicators will need to be gathered. The most likely nutrient deficiencies to be addressed through general development and food consumption efforts would be

TABLE 4: Distribution of Normal and Abnormal Growth for Children in Four Villages in Mauritania

<u>Growth Pattern</u>	<u>Doubel</u>	<u>Ganki</u>	<u>Seyenne</u>	<u>Solou</u>	<u>All</u>	
	N	N	N	N	N	%
Normal	17	31	27	21	96	64.4
Normal with past history of hunger	8	3	2	6	19	12.8
Recent weight loss	0	1	4	1	6	4.0
Continuing weight loss	3	4	9	5	21	14.1
Chronic growth failure	1	1	1	4	7	4.7
	29	40	43	37	149	

This table simultaneously compares height/age, weight/age, and weight/height.

Normal = H/A, W/A, W/H values all normal, where normal is defined as > -2 SD of median

Normal with past history of hunger = W/H is normal, W/A is either low or normal, and H/A is low, where low is defined as < -2 SD.

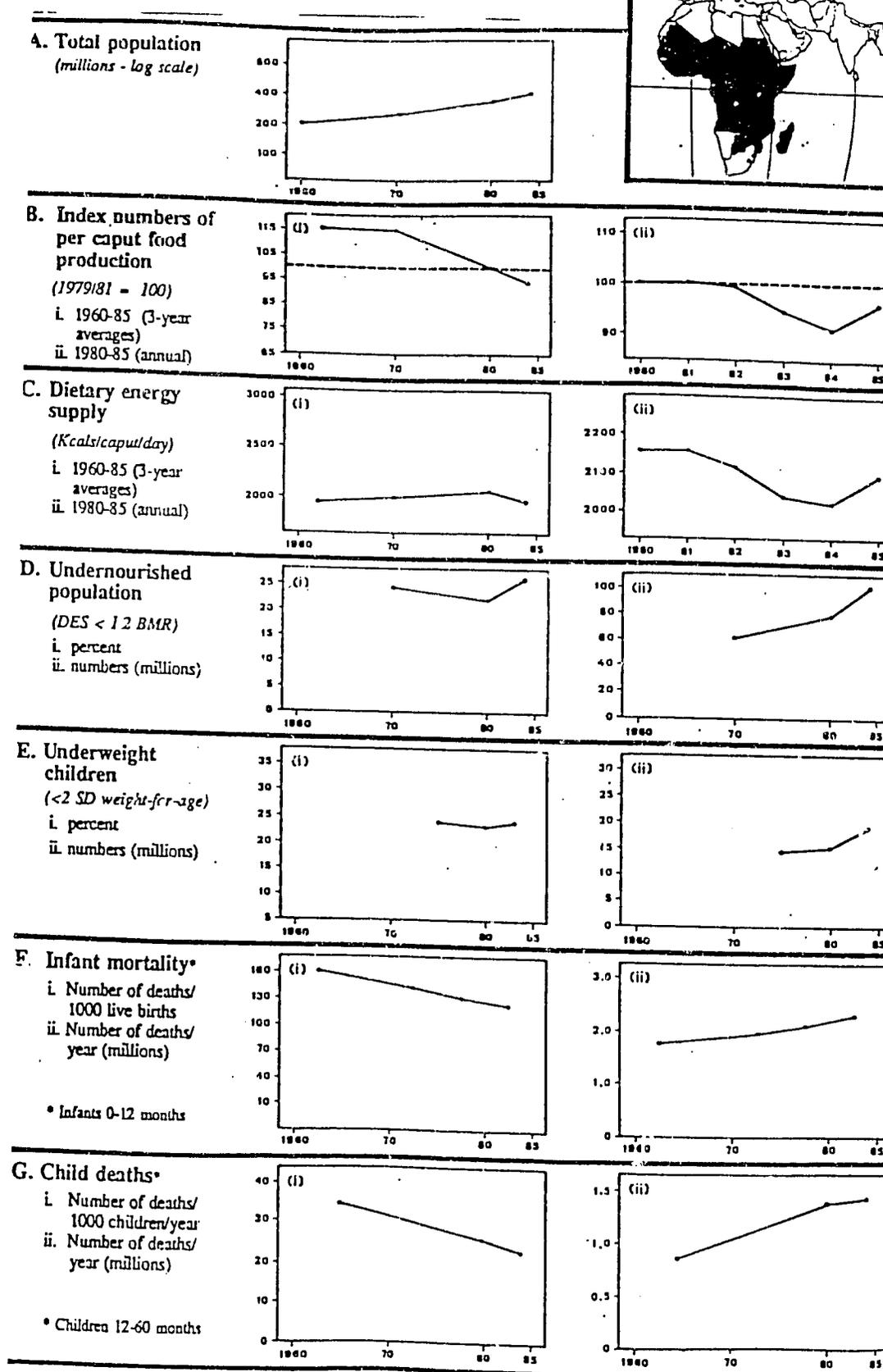
Recent weight loss (recent hunger) = W/A and H/A low or normal, but W/A is low.

Continuing weight loss (prolonged hunger) = W/H low, H/A normal, and W/A normal or low.

Chronic growth failure (stunting) = W/H, H/A, W/A all low.

SOURCE: Cassidy, 1988, table 17.

FIGURE 4: Food and Nutrition Data on Sub-Saharan Africa



SOURCE: United Nations, ACC/SCN, 1987, p. 9.

vitamin A, iron and iodine.* All of these deficiencies really require biochemical nutritional data (see Glossary) in order to precisely determine their presence or absence. Since all of these require generally intrusive techniques, they should not be performed and utilized if already available. However, certain other indicators can be used such as the presence of night-blindness in children for indicating a lack of vitamin A**, and the number of people suffering from cretinism for iodine deficiency. In general, we do not suggest the use of indicators at the level of specific vitamins, until food consumption indicators are better understood and utilized.

IV. Conclusions

Food consumption indicators can be obtained through several approaches. The methods and strategies for collecting the data vary from time consuming and detailed approaches to rough approximations. The choice of indicator will depend upon its intended use and secondarily on constraints such as time limitations.

Food consumption data can be used in designing agricultural projects to choose a target population or to choose agricultural interventions (Tripp, 1984). Projects can also use food consumption indicators for monitoring and evaluating their efforts.

National or regional food and agricultural planning relies on food consumption data for knowledge of the nutritional and food consumption status of the population, and for forecasting future food consumption needs. These planning efforts are intricately involved with decisions about government policies. Government policies on everything from foreign exchange rates to fertilizer subsidies all have an eventual impact on food consumption. Food consumption data can be used to estimate the effects of present and proposed policies.***

*See United Nations, 1987, pp. 32-42 and Appendix C of this paper.

**Work is also being done on a dietary method for indicating vitamin A deficiency based on a frequency count of specific vegetables eaten by households (Barbara Underwood, National Eye Institute).

***Figure 2 notes a few of the policy variables which have a direct relation to food consumption.

Glossary

Biochemical Indicators as determined by tests on blood and other bodily fluids show the impact of food consumption and other factors (as discussed above) on the individual. Biochemical status is a direct method of finding out the levels of specific vitamins and minerals in the individual. However, this method does not provide estimates of the calorie status of an individual which is the most general indicator of food consumption within the realm of nutrition. Biochemical indicators do give a more exact estimate of some aspects of the nutritional status of an individual than anthropometric indicators, and are especially useful in cases where vitamins and mineral deficiencies are the main nutritional problems.

Food Availability is defined by FAO as food production, plus food stocks at the beginning of the period, plus food imports, minus food exports, minus food stocks at the end of the period. This calculates the "disappearance" of food within the country and thus assumes all of the food which "disappeared" was consumed. Sometimes food availability figures are adjusted for storage losses and waste. Food availability can be defined at any level of aggregation.

Food Purchases or Expenditures is the amount of money spent on food during a certain time period. This can be refined to include estimates of the cost of home produced food (which is consumed during the period), gifts of food, or bartered food all based on market prices. Sometimes the definition is restricted to the amount purchases and actually consumed during the relevant period, in which case stocks of food before and after the period in questions need to be determined. In this latter case, food purchases becomes a household estimate of availability.

Food Consumption is the amount of food as prepared in edible form at the household level or the amount eaten by individuals. The latter definition requires the weighing of individual portions of food and any individual waste. This is a highly invasive method of estimating food consumption and can have major effects on food habits depending on the cultural situation. The usual approach is to obtain household estimates of food prepared, a

list of the people who ate the meal, and possibly an estimate of waste. This will provide an estimate of the food eaten at the household level.

Measuring Food Consumption:

7-day recall of food purchases: the person who does the household marketing is asked to provide by memory the quantity and price (or expenditure and price per unit) of food purchases for the past week.

24-hour recall of food consumed: the food preparer is asked to provide by memory the amount of food used in the household during the last day, the prices may also be asked of the food preparer or gathered by direct market survey.

7-day recall of food consumed: this is the same as for the 24-hour recall except for the longer period of time.

Weighing and measuring: an enumerator is present at each meal and weighs each portion and the related waste for each individual.

There are trade-offs in choosing one of these methods, between the amount of time required of the enumerator and household and the likelihood of obtaining imprecise answers.*

*For a fuller discussion of the pros and cons of each of these methods, see M. Pekkarinen, "Methodology in the Collection of Food Consumption Data", World Review of Nutrition and Dietetics, Volume 12, pp. 145-171.

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APPENDIX A

FOOD CONSUMPTION CONSIDERATIONS
IN DESIGN OF AGRICULTURAL PROJECTS:
THE WITH/WITHOUT CHART¹

Including food consumption considerations into an agricultural project requires a minimum of extra time and manpower. The With/Without chart outlines how easily this can be done. The "Without" side of the chart highlights the usual questions asked during the process of an agricultural development project. The "With" side of the chart illustrates the type of additional personnel, questions, and issues, a different set of which will need to be addressed depending on the specific agricultural project, to include consumption considerations.

Beginning with the problem of appropriate personnel on the design team, the chart leads the user through defining project area food consumption/ nutrition problems, collecting and analyzing data to developing goal and purpose statements for project logical framework. The final section suggests ways to integrate food consumption concerns into traditional project activities. Each section shows which additional activities, data sources, questions, or methods are necessary for making a project sensitive to the consumption half of the economic equation. With/Without's design assists project managers to ask those questions which deal with the projects food consumption effect.

Project designers should use the chart as a point of departure in their work. The chart can be used at the design, implementation, and evaluation phase of projects as a guideline to ensure that the project is achieving its food consumption objective. Implementors and evaluators can utilize the With/Without as a framework for determining if a project is achieving food consumption objectives by charting change over the life of the project. During implementation the With/Without may highlight problem areas in need of new strategic approaches. Country and area specific issues require consideration in each project instance. Staff can utilize the chart as a check list during project implementation and evaluation.

¹The source of the material in this appendix is J. Merriam, Strategies for Incorporating Food Consumption Activities in AID Agricultural Projects, Nutrition Economics Group, OICD, USDA, April 1985, unpublished.

Putting Together the Design Team

Project design teams should have at least one member with a background in food consumption issues

Agriculture Economist	Consumption Economist/Social Scientist
Financial Analyst	
Agricultural Scientists	Nutritional Anthropologist
Rural Sociologist/Anthropologist	Home Economist or Nutritionist
Planning Economist	Market Specialist
Post-harvest specialist	Food Technologist

Defining the Problem

Identifying food consumption issues requires that additional questions are asked when defining those problems to be addressed by the project.

Crop Production

What crops are grown?
 What are the current farming practices?
 What are the farming problems?
 What is the system of land tenure?
 What inputs are used?
 How are inputs acquired?
 How are crops irrigated?
 What are the harvest and post harvest practices?
 How extensive are post harvest losses?
 How is food stored/preserved?
 What quantities and types of livestock are kept?
 How are livestock used?
 What are local:
 - pests?
 - soil conditions?
 - climatic conditions?
 Are current crops the most appropriate agronomically?
 What is the potential for new crops?
 What is the potential for irrigated crops?

Food Production Issues

Can widely acceptable foods be grown in sufficient quantity to fulfill dietary needs?
 What other food crops that can be grown would be locally consumed?
 Is the diet supplemented by the gathering of wild plants?
 Will expanded production reduce availability of this dietary supplement?
 Would health/nutrition problems be exacerbated by irrigation projects (e.g. water-borne diseases)?
 What foods are widely consumed?
 Of these, which are locally produced?
 Does the diet meet local needs?
 How much of the food consumed by a project family does the family grow itself and how much does it purchase?
 Which foods are preferred?
 Is meat an important part of the diet?
 What "non-traditional" foods are being consumed?
 How do food consumption patterns change on a seasonal basis?

How is food prepared?
 When and why do food preparations change?
 What are some of the cultural food beliefs and taboos?

Labor

Who provides farm labor?
 - family members?
 - which ones?
 - paid laborers?
 - communal labor?
 How are farm tasks divided?
 Are certain tasks considered exclusively male or female?
 How is extra labor paid?
 What are peak labor times?
 Is labor sufficient during peak times?
 What are the sources of off-farm employment?
 What is the impact on labor patterns of male migration to the cities?

Services/Institutions

Do farmers have access to:
 - improved inputs?
 - credit?
 - extension?
 - new technology?
 - other sources of agricultural information?
 - markets for their produce?
 How extensively do farmers utilize those services available to them?
 Which institutions will facilitate project operation:
 - national level (Ministry of Agriculture)?
 - local level (district office)?

Labor

Who performs a specific agricultural task?
 - farmer (male, female)?
 - women (not head of farming household)?
 - children?
 - communal labor?
 - migrant laborers?
 - landless laborers?
 How are laborers paid?
 - cash?
 - in kind?
 Is more labor available if needed?
 From where?
 Is there a relationship between amount of work done and amount of food eaten by each worker?
 Will increased food production offset increased energy requirement of project labor inputs?

Market

Are the foods available in local markets sufficient to provide a balanced diet to the target group?
 Which foods are imported to the area?
 Are these foods affordable?
 How do food prices fluctuate during the year?
 Who buys the food (food preparer, head of household)?
 Which foods, if any, are subsidized?

- community level (farmer cooperatives)?
- at every level (transportation, market network and infrastructure)?

Food Distribution and Food Habits

How is the food distributed:

- in the family?
- in the community?
- in the region?
- nationally?

How does seasonal change affect food distribution and availability?

What are local food habits?

What are their nutritional implications?

Nutrition Issues

What is per capita food availability?

What are the specific nutritional problems and needs?

Which demographic groups have the greatest nutritional problems?

Who should the target group be?

What are local sanitary conditions?

What is the source of drinking water and where is it located?

Collecting and Analyzing the Data

Collection of consumption data can occur simultaneously with collection of agricultural data. Food consumption data gathering requires that different sources be consulted, different data types be considered and that different people be interviewed using food consumption oriented questions. The three following sections highlight the differences.

Data Sources	<u>Published Data</u> <ul style="list-style-type: none"> - National and regional data - Data compiled by other donors - Existing survey data - Data compiled by AID - Project documents 	<u>Published Data</u> <ul style="list-style-type: none"> - FAO/WHO/UNICEF publications - PVO publications - Food consumption survey data - Household expenditure survey data - Food balance sheets
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Field Interviews

- Farmers (men & women)
- Ag. extension agents
- Ministry of Agriculture officials

Other Data

- Unpublished survey data
- Project survey (high cost.)
- Rapid reconnaissance
- Key informant survey
- Field trip

Types of Data

Market Data

- Per capita income
- Market access
- Imports
- Prices: farm-gate, producer subsidies

Types of Data (Cont.)

Production Data

- Production levels
- Input usage
- Yield levels
- Post harvest losses
- Agronomic data
- Climatic data
- Crop mix
- Labor requirements
- Production levels
- Farm management
- Technology Mix
- Availability of inputs
- Access to improved technologies and rate of adoption

Examples of Field Interview Questions

Of Farmer

- What do you grow?
- What inputs do you use?
- Where do you get the inputs?
- How is labor divided?
- How much land do you work?
- How many crops do you get per year?

Field Interviews

- Food preparers
- Food purchasers (men & women)
- Storekeepers/owners and middlemen
- Market economist
- Ministry of Health officials
- Ministry of Education
- Ministry of Rural Development

Other Data

- same as "without"

Market Data

- Local and regional food availability
- Types of food available
- Prices: market, consumer subsidies
- Food distribution channels

Food Consumption Data

- Food consumption per capita
- Types of food consumed
- Seasonality of consumption

Nutrition Data

- Nutritional status
- Caloric intake
- Caloric expenditure
- Caloric availabilities
- Morbidity
- Mortality
- Food storage, preparation, and consumption habits

Of Farmer

- What do you eat?
- How much of what you eat do you grow?
- What do you do with what you grow?
- How does what you produce vary with changing seasons?
- Of Food Preparer
- When do you eat a specific food?
- When do you eat?
- How is food stored?
- What on-farm food processing occurs?
- Who prepares the food?
- How is food prepared?
- Do you have time to prepare food?
- How is the food distributed in the family?
- How much of the family budget goes to food?

Of Store Owner

What foods do you sell in your store?
 Do you have access to other foods?
 What do people buy?
 How do people buy? Cash? In kind?
 What items do people buy the most of?
 How do you set your selling price?
 What items do people continue to buy
 despite significant price increases?
 What are those items whose sales fall
 off the most quickly when prices
 increase?

Institu- Ministry of Agriculture (MOA)
 tions/ Extension Service
 Experts to Agricultural Research Groups
 Consult Ministry of Rural Development
 Bureau of Statistics
 National/Agricultural College/
 University
 Research Laboratories
 International Research Institutions
 Other donors
 Other projects

Ministry of Health
 Health, Nutrition, and Home
 Economics Extensionists
 Marketing Groups
 Market Experts
 Nutrition Experts
 Ministry of Education

Defining the Goals and Purposes

Project Goals/ Purposes/ Strategy	<p>What are project goals? Do they coincide with national policies, project purposes, and project strategy? What are project (short-term) purposes? Are purposes in concert with national policies and strategies? Can the purposes be quantified? How can a long-term improvement in production best be accomplished?</p>	<p>How can the project improve/maintain improved food consumption patterns? How can a long-term improvement in consumption best be accomplished? Which nutrition/food consumption problems require immediate attention? What are national food, agriculture, and development policies and how do they affect nutrition/consumption? What levels of food consumption can be obtained in the short-term?</p>
Examples	<p>Improve the quality of life of the rural poor Socioeconomic uplifting of the rural poor Increase income of rural poor through increased production</p>	<p>An improved quality of life for the health, diet, agricultural productivity and higher income levels Improved access to food, health care, agriculture inputs and national markets for the rural poor</p>
Examples of Purposes	<p>Farmers using improved inputs Distribution of technological packages to farmers Improved yields</p>	<p>Increased production of nutritionally desirable and culturally acceptable foods Improved yields of widely consumed</p>

Improved access to national market	foods
Construction of improved storage facilities	Reduction of protein/calorie deficiency through increased yields in subsistence grains
Increased yields of cash crops	Improved regional distribution of foods resulting in improved food consumption for rural farmers
Operating farmer organizations	Increased food availability due to improving storage facilities
	Increased food consumption resulting from income generated by cash crops

Developing the Project Strategy and Individual Project Activities

Many agricultural project components can be designed to address food consumption issues, or re-designed to address food consumption issues. It may be necessary to design components of the project which reflect changes in project goals as discussed above. The traditional approach has been to design separate nutrition oriented components such as home economics and nutrition training. It may even be more effective to redesign agricultural activities in light of the project population's food consumption needs.

Project Components	Agricultural Training	Expand training activities to include food consumption issues	
	Agricultural Extension	Agricultural and home economics or health/nutrition extension	
	Research	Identification of other widely consumed food crops for future research	
	Crop Production	Production of widely consumed food crops including grains, fruits and vegetables for sale and household consumption	
	Horticultural Production	Horticultural production of culturally appropriate crops which are nutritionally desirable	
	Institution Strengthening	Include capacity to deal with food consumption issues	
	Improved Inputs/Technologies	Improved inputs/technologies which are neither a net cash or net caloric burden to target group	
	Marketing	Include activities to increase availability of nutritionally important foods for purchase in rural markets? Improve marketing network so that local producers can sell surplus or high value crops thereby increasing income and purchasing power.	
	Target Group	Small holder farmers	Expand target group to include small holder farm families
		Landless laborers	Landless laborers and families with incomes below that level needed

to purchase a minimal diet and/or
with caloric consumption levels
insufficient to energy needs

APPENDIX B

CATEGORIES OF DATA FOR DIETARY ASSESSMENT

DATA	JUSTIFICATION
I. SECONDARY DATA (see appendix C)	Preliminary information necessary to provide an informed choice of which further questions to ask, what to emphasize, possible problems, cultural barriers to face in questioning people, etc.
II. SOCIOECONOMIC INFORMATION FOR THE VILLAGE	Background information to provide a social and economic context for the dietary assessment, these data will also allow assessment of why certain problems exist and how they might be cured within the project context.
A. Resources	Present resource base allows identification of possible (and impossible) points for interventions.
1. Land	
2. Well(s)	
3. Community buildings	
4. Education	
5. Health care	
6. Communications	
7. Transportation available	
8. Agricultural extension available how often?	
B. Markets	Markets are the intermediary between production and consumption for the majority of individuals, thus markets function at the heart of food availability, food price, and income (for farmers) issues.
1. Location	
2. Facilities	
3. Food prices	
III. SOCIOECONOMIC INFORMATION ON THE HOUSEHOLD	Allows for looking at resource constraints at the household level instead of just at the village level. This in turn means interventions can be targeted to the household as opposed to village level.
A. Members of the Household	Necessary for per capita food figures, labor availability
1. Age	
2. Sex	
3. Migration patterns in and out of the household	

- B. Occupations of the Household Members Covers possible income sources: wage and self-employment
1. On-farm
 2. Off-farm
- C. Education Shows limitations/possibilities for training (e.g. nutrition education at what level of complexity could it be given? could written materials be used?); identifies lack of education as possible basis for nutritional problems; and lets you know if self-surveys by households are possible
1. Head of household
 2. Caretaker of the children
 3. Oldest child still at home
- D. Resources Identifies the realm of possible changes given the present resources of the farm household
1. Size of farm
 2. Capital goods such as plows, etc.
 3. Off-farm income (if estimates likely to be reliable)
 4. Livestock
 5. Major possessions such as radios, etc.
- E. Ethnic and Religious Identity Can have a large impact on food choices (both production and consumption), holidays, food sharing systems
- IV. HOUSEHOLD FOOD SUPPLY Necessary to provide information on the consumption abilities of the household and relate them to the production possibilities
- A. Food List or Inventory(see attached) Knowledge of major food items consumed will allow focus for rest of question and ensure no important food item is missed
- Foods eaten by the family: to be presented by food group with the following sections in one table or separate tables depending on your major questions
- B. Food Purchases
1. Who purchases food? Can affect choice of foods and amount of income available for food
 2. Where do you purchase food (roadside market, village market, from neighbors) Effects price and quality; can be a bottleneck to food availability
 3. How far do you go to purchase food? Increases cost, illustrates scarcity (if any)
 4. How do you get there? is there a cash cost? Same

5. Are these trips combined with other necessary trips? If yes, indicates no additional direct cost in getting food
6. Which items do you usually buy? Amount of reliance on market
7. How often do you have to purchase them? Same
8. Are these acquired by barter or money? To what degree are they tied to cash economy
- C. Home Production
- How free of the market are they, that can they subsist mostly on their own production if necessary? and what are their staples for home consumption which need to be maintained
1. field crops Same
- a. which crops are for household consumption?
- b. which are cash crops?
- c. what are utilization patterns, i.e. is the crop sold immediately or is part stored?
- d. what household labor is used on these crops?
2. livestock
- Level of investment in livestock and whether it can be used to carry them over the hungry season
- a. what types of livestock?
- b. how much stock of each animal do you usually have?
- c. how much stock of each animal do you have by the end of the "hungry season"?
- d. who cares for them?
3. garden
- Is this extra source of food being exploited at present or can it be developed?
- a. what is produced?
- b. who tends the garden?
- c. does the garden provide much in the way of basic caloric staples?
- d. what garden produce is sold, shared, or exchanged and with whom?
- e. when the garden is producing, do they still need to purchase additional vegetables (or other garden items)?
- f. what are the major constraints to gardening?
4. gathered food
- Can indicate possible sources of food that need protection or that need further development?
- a. what kinds?
- b. from where?
- c. how often? is it seasonal?
- d. by whom?

5. water and fuelwood? Possible limits to certain types of cooking or food items, thus could be intervention point
- a. where located?
 - b. collected by whom?
 - c. how often?
6. hunting and fishing Alternative sources of food which may need protection in order to maintain them in the face of technical changes in production activities
- a. what?
 - b. by whom?
 - c. when or how often?
 - d. where?
- D. Food Sharing/Exchange Locates additional food needs or sources of the household
1. To or from local relatives
 - a. what?
 - b. how often?
 2. To or from local non-relatives
 - a. what?
 - b. how often?
 3. To or from relatives in the city
 - a. what?
 - b. how often?
- E. Food Donations Are present programs reaching the needy? How much is needed?
1. From whom (government or non-government agencies)?
 2. what?
 3. for what member(s) of the family?
 4. how often?
- F. Storage and Preservation Techniques The capabilities of the household in storage and preservation can show need for possible interventions which will get them over hungry season just by improving their retention of production
1. What is stored?
 2. Where is it stored?
 3. What is the usual amount in storage?
 4. Are seeds stored? Are they separated from food?
 5. Do (or when do) stores run out?
 6. How much is in storage just prior to harvest?
 7. What are the major causes of losses during storage?
 8. What food preservation techniques are commonly practiced and by whom?
- V. TYPES OF FOOD Provides a simple listing of what foods are important or unimportant and why

- A. What are the staples? Given most agricultural projects deal with staples, it is important to know people's attitudes towards them as well as their needs for them
1. What is (are) the main cereal grains?
 - a. How often are they eaten per day?
 - b. What are the desirable qualities for cereals, e.g. glutinous, mealy, etc.?
 - c. How much of the staple is necessary per day for the household to be satisfied?
 2. What staple would they eat more of, if they could afford it? How much of it do they eat now?
 3. What would they eat less of, if they could afford some other food? How much of this undesirable food do they eat now?
- B. What are the complements to the staples? Although the cereal staple is the most important item in the diet according to bulk, the food eaten with the staple is also important
1. Pulses? Provide vegetable protein
 - a. which kinds?
 - b. how often are they eaten?
 2. Vegetables? Provide vitamins and minerals, also can act as a buffer source of nutrients during the hungry season
 - a. which kinds?
 - b. how often are they eaten?
 3. Root crops? Can provide a back-up source of calories to the main staple (or sometime is the main staple); some root crops (e.g. sweet potatoes) are also an excellent source of vitamins
 - a. which kinds?
 - b. how often are they eaten?
 4. Livestock? Provide investment for hungry season
 - a. what types?
 - b. how many owned just prior to harvest?
 - c. how often are livestock slaughtered?
 - d. how often are they milked?
 5. Poultry? Same
 - a. which kinds?
 - b. how often are they eaten?

6. Eggs? Good source of nutrients, especially for small children because of its digestibility
- a. which kinds?
 - b. how often are they eaten?
7. Fish? Good source of protein
- a. which kinds?
 - b. how often are they eaten?
8. Fats and oils? High calorie source
- a. which kinds?
 - b. how often are they eaten?
- C. Food Preferences: Which food items are? Places limits on what food items could be used in a successful project or which ones may require education in order to gain acceptance
1. preferred and generally available
 2. preferred but not generally available
 3. disliked even though available
 4. traditional
 5. introduced food items
- VI. FOOD PREPARATION This is an effective mechanism for confirming the main food items eaten
- A. List of major dishes
- B. Preparation techniques Provides data for looking further into fuel and water constraints, and provides a basis for suggesting technical improvements to food preparers
1. Who prepares the food and with whose help?
 2. When is the food prepared?
 3. time spent
 - a. preparing
 - b. cooking
 - c. how often? i.e. how many times per day?
 - d. gathering fuel wood?
 - e. getting water?
 4. Food preparation equipment, e.g. pans
 5. Where is food prepared?
 6. Are cereals milled at home?
- C. Recipes of major dishes
1. ingredients (include water)
 2. time

VII. FOOD HABITS

Provide a more complete investigation of habits which may be contributing to present nutrition problems

A. Eating Patterns

Timing of meals can indicate a lack (or surplus) of food or time of the food preparer; these patterns can also indicate who might not be getting sufficient food within the household

1. Time of major meals
2. Household members which participate in each meal
3. Who eats with whom?
4. Who eats first?
5. Who eats what?
6. Usual content of each meal
7. How much of the staple do you need to "fill" all the people in the household?
8. Are there days (or other periods of time) when you do not have enough staple?
9. Are there days or times of the year when some meals stop?
10. When you do not have enough at a meal, who eats less?
11. Are snacks eaten? If so, what and how often?
12. How are foods served, e.g. one plate for everyone?

B. Special Food

Limits those food items which can be introduced, but can also point out a food which is "self-targeting" to a nutritionally vulnerable group

1. Food only eaten by certain groups, e.g. children
2. Food taboos, e.g. religious, or for pregnant women, etc.
 - a. for which household members?
 - b. when?
3. Foods necessary for rituals or celebration
4. Other food beliefs
5. Food classification systems, e.g. hot-cold divisions

VIII. GROUPS NUTRITIONALLY AT RISK

Can provide a preliminary idea of whether there are nutrition or health problems; this would need to be followed by a more formal nutrition or health survey

A. Children

Provides information on feeding practices and illnesses of children which can be the first signs of deeper problems

1. Are they breastfed?

- a. for how long?
 - b. if not, why not?
 - c. if not, what are they given?
2. What are the qualities of breastmilk that distinguish it from milk from other animals and from commercial formulas?
 3. What are weaning foods? When are they started?
 4. What foods should not be given to a child?
 5. Who feeds the child?
 6. How do you know the child is hungry? or full?
 7. Does force feeding of children occur? If so, for what age and sex?
 8. How often does the child have diarrhea?
 9. Are the episodes seasonal?
 10. What is the treatment for diarrhea?
 11. What food (if any) is given during diarrhea episodes?

B. Mothers

The health of the mother (particularly while pregnant or lactating) directly effects not only herself, but her child (children) and possibly the whole family given her food preparation activities

1. How many children has the mother had?
2. How many are living?
3. What is the spacing between children?
4. Do mothers have any concerns in relation to feeding their children?
5. How do they see child feeding practices now differing with how their mothers fed them?

IX. SEASONALITY OF CONSUMPTION

One of the major problems for households is the variation in food availability (prices) over the year; these data can point out (along with some of the above information) the severity (or not) of the potential problems

- A. What foods are in short supply and in what seasons?
- B. What are the coping strategies of

the household? i.e. are there
 substitute foods? additional outside
 work?

X. HEALTH

These issues can be a contributor to or the overriding cause of
 malnutrition if food availability are sufficient; in order to rule them
 in or out some data should be gathered

A. Sanitation

1. Water supply source, plus variations
 by seasons
2. Sewage disposal
3. How often and where do people bathe?
4. Is animal waste localized? or found
 anywhere?

B. Disease: Incidence by Family Member

1. Chronic
2. Endemic
3. Seasonal
4. Childhood
5. Other
6. What do they perceive as the cause and
 cure of diseases?

APPENDIX C

Secondary Data Sources for Food and
Nutrition Status Indicators

There are two types of nutrition (or malnutrition) indicators: direct and indirect. Direct indicators are generally percentages of the population (or population subgroups) suffering from a specific form of malnourishment e.g. 40% of pregnant women are anemic. Indirect indicators can attest to the likelihood of malnourishment, and to an extent, its form, e.g. mortality and morbidity data by disease and age group. The direct indicators provide information on the cause as well as the extent of malnutrition and are thus preferable when available.

Amongst both types of indicators there are different levels of specificity. Since nutrition interventions are generally target-oriented, the more specific an indicator is the better. Specificity can apply to whether an indicator is related to one deficiency, or whether it is available by a relevant age (and sometimes sex) grouping.

Indirect indicators are either from food data sources and/or health sources. Direct indicators can be determined from clinical examination (as part of a nutrition survey or during routine health care) or biochemical tests. Since the clinical exam (at least weight and height measurements) is simpler it is more likely to be available. Clinical signs can be less definitive than biochemical tests.

A listing of the indicators, their usefulness, and source is in table C-1. Nutritional disorders other than those listed exist. However, they are either of much lower prevalence or are less injurious. Table C-2 compares deficiencies in the world providing an estimate of the prevalence, impact, and possibilities for prevention.

Table C-1: Secondary Data Sources and Uses

Indicator	Usefulness	Expressed As	Source
Food Balance Sheets	Not very reliable source, lowest specificity.	Tons of food per year or calories, protein (grams), fat (grams) per day	FAO and countries
Country Nutrient Intake Averages	These are from either food balance sheets or consumption surveys. Sometimes given by income class. Nutritionists consider them unreliable, economists use them.	Units of the particular nutrient per day (usually only calories)	Country Consumption Surveys or FAO
Infant Mortality	Infant deaths can be due to many non-nutritional problems. This is more an indicator of the health situation in general and possibly maternal nutritional status.	Deaths per 1000 live births.	Ministry of Health, WHO, World Bank (Year of the Child Atlas).
Toddler Mortality	Deaths of children 1-4 are a generally reliable indicator of nutritional status of the population because they are a high risk for group malnutrition. In LDC's most deaths in this age group can be directly or indirectly related to nutritional status.	Deaths per 1000 one to four year olds.	Ministry of Health.
Mortality Rate	If this is available for the population as a whole, it is too general. However, if data are available on deaths by disease and/or age, this can be helpful. For example, deaths by children from measles is usually a manifestation of malnutrition.	Deaths per 1000.	Ministry of Health.
Morbidity Data	Sometimes these include nutritional disorders. If not, the existence of many cases of certain other diseases can indicate an "at risk" population.	Cases per 1000.	Ministry of Health, or WHO.

Indicator	Usefulness	Expressed As	Source
Protein-Calorie Malnutrition (PCM)	This is generally given by age group and can be determined on a clinical and/or bio-chemical basis.	Percentage of the population (or age group) affected.	Nutrition Survey, possibly health clinic data.
Grading of PCM	In some cases the PCM will be designated as grade I, II, or III. This is a method of denoting the severity on a weight for age basis with III being the worst. Other grading systems exist, but this is the most common.	Percentage or number of cases seen at clinic.	•
Type of PCM	Kwashiorkor and Marasmus are the two types of sever PCM: the former more due to lack protein, the latter to lack of calories. Actually, PCM is a continuum and at times it is very difficult to designate its type. This typology is useful to an extent in planning interventions.	Percentage or number of cases treated at clinic or hospital.	•
Vitamin A Deficiency	Deficiency can be determined (in moderate to severe cases) clinically. Night Blindness can be used as an indicator of mild or early cases. Sometimes all that is available is "an informed judgement" that a certain percentage of the population are vitamin A deficient.	Number of cases or percentage of	•

Indicator	Usefulness	Expressed As	Source
Vitamin A Classification (clinically)	If clinical evidence is available, the cases might be designated by what signs are present. These vary from night blindness (X ₁) to conjunctival xerosis (X _{1a}) to keratomalacia (X _{1b}). Destruction of the eye is reversible up to stage X _{1a} (corneal ulceration). This is useful in knowing the severity of the problem.	Number of cases or percentage of the population.	Nutrition Survey, possibly health clinic records.
Vitamin A Deficiency (biochemically)	Most clinical signs are in children. Adults with mild deficiencies can only be detected by biochemical tests.	Micrograms of vitamin A per 100 ml of serum.	Nutrition Survey.
Anemia Clinically	Clinical evidence (pale mucous membranes) is not very reliable. A "best" judgement or case estimate can be useful if no other data is available. Lack of diet sources for iron is a good indicator anemia is likely.	Percentage of the population or of pregnant/lactating women. Number of cases seen at maternal & child health clinics.	Nutrition Survey, local nutritionist, or health clinics.
Anemia Biochemically	There are several blood tests that can be used with varying degrees of accuracy. Where a high prevalence is expected measurements of hemoglobin and hematocrit are sufficient.	Hemoglobin: grams/ml, Hematocrit (packed cell volume): percentage. Generally the percentage of the population at certain levels is given.	Nutrition Survey.
Goitre (Iodine Deficiency)	Clinical evidence of goitre is the simplest method for determining iodine deficiency. Goitres are sometimes grouped by size with group III the largest. This can indicate the severity of the problem.	Percentage of the population. Percentage in each group.	Nutrition Survey, possibly health statistics.
Prevalence of Cretinism	Since mothers with goitre are directly associated with cretin children, this is an important indicator of iodine deficiency and severity.	Number of children affected.	Nutrition Survey, possibly health statistics.

Table C-2: Prevalence, Fatality, Significance, and Ease of Prevention of the Major Nutritional Disorders

	Prevalence	Case Fatality Rate	Social Significance	Ease of Prevention
PCM	++++	+++	++++	+
Vitamin A	+++	++	++++	+++
Anemias	++++	+ or ++	+++	++
Goitre	++	+ or +	++ or +++	++++
Caries	++++	-	++ or +++	++ or +++
Beriberi	++	+	++	+++
Pellagra	++	+	+++	++
Rickets	++	+ or ++	++	+
Riboflavin	+++	-	+ or -	++

SOURCE: M. Latham, Cornell University. (1979)