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WORK PLAN PROPOSAL  
FOR A NUTRITIONAL FUNCTIONAL CLASSIFICATION STUDY  
OF PERU 1985

prepared by:

Sigma One Corporation

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## I. INTRODUCTION AND OBJECTIVES

For several decades Peru has been experiencing serious conditions of poverty and malnutrition which, in recent years, have been aggravated by economic conditions of inflation and recession. The national government has recently issued pronouncements promoting the fight against poverty, emphasizing the necessity of increasing efforts in the areas of production and other economic areas as well as in the areas of health and food and nutrition. In recent years, analyses have begun to yield valuable information about health and nutrition and which permit the identification, description and quantification of those social and economic problems that determine the levels of malnutrition affecting different population groups. These analyses can notably improve the ability to effectively address the problems of food and nutrition, through the correction of their conditional factors.

This document presents the Work Plan for a Nutritional Functional Classification Study in Peru, using data from the National Health and Nutrition Survey, (ENNSA) which was undertaken in 1984 by the National Institute of Statistics and the Ministry of Health. The general and specific objectives of this classification are the following:

### A. General Objectives

1. Assist the Food and Nutrition Planning process by providing information that will permit the reorientation and rationalization of food and nutrition programs and projects toward those areas and population groups that are the most poor and malnourished.

2. Improve and serve as a permanent instrument of multisectoral communication and coordination, at the political level as well as technical levels.

## B. Specific Objectives

1. Strengthen the actions of food and nutrition within the Primary Health Care strategy.

2. Guide and encourage existing nutrition activities, as well as the new initiatives being developed on a multisectoral level, for the sustained improvement of health and nutrition of the Maternal-Child groups.

3. Serve as a practical instrument to guide the formation and training of multidisciplinary personnel in Food and Nutrition at all levels.

4. Provide essential information for the establishment of a system of food and nutritional surveillance of those population groups and geographical areas with greater prevalence of malnutrition.

## II. THE FOOD AND NUTRITION PROBLEMS

In Peru, the food and nutrition situation has been an important and constant preoccupation, which has received greater attention during the present period of economic crisis. In recent years, food availability appears to have been marginal and recently, the diversity of diets has deteriorated. This general situation has been widely documented (Franklin et al., 1983) and it has become evident that the majority of the population have diets that are marginal to inadequate in food intake. This reality implies malnutrition, which has become a severe problem due to the high prevalence of transmittible diseases and low coverage of potable water, waste disposal and health services. In effect, several studies (Collazos et al., 1959; Reutlinger y Alderman, 1979; Amat y Leon et al., 1977, 1981) have pointed out the serious and chronic food and nutrition problem in the country, which are consistent with anthropometric findings indicating a high prevalence of chronic malnutrition with a

regional distribution very similar to the distribution of deficient diets (Parillon et al., 1983).

In the last three decades, the composition of the diet has shifted towards carbohydrates and away from proteins from animal sources. Fruits, vegetables and potatoes play a slightly smaller role in providing the available energy, and cereals a larger role in providing calories. An increasing role for poultry has only in part compensated for a declining role for meats and dairy products as sources of proteins. These changes in consumption habits require extensive analysis to determine their economic and financial consequences in aggregate food demand and their effects in the national productive process and in the level of imports. In the decade of the sixties it was already clear that the national food supply was not keeping pace with the growth of the population and with the growth of effective demand. Coutu and King (1966) report that the cause of such a situation was more centered on agricultural policy than on natural factors. Agricultural policies tended to favor urban consumers at the expense of the rural sector where it has generally been thought that households have been able to overcome the effects of multiple crises, since they produce a large proportion of their foods and that through this process they are able to maintain adequate nutritional levels. The evidence on the current situation, however, indicates that the rural population suffers nutritional problems which are more severe than those of the low income urban population. The reason for this is that the rural population suffers not only from food deficiencies but also from deficiencies in the health and sanitary system and the transport

and food marketing system and from the scarce opportunities for salaried employment. In Table 1, it can be observed that the greater prevalence of malnutrition is concentrated in the lower income strata, with the prevalence being greater in the jungle and mountain regions than in the coast and Metropolitan Lima. In summary, the food and nutrition problem in Peru has affected the poor in rural areas as well as the poor in urban areas for many years; the severity of the problem in recent years has increased for many families due to the economic and ecologic crises.

Generally, most children in urban areas are able to recover from acute episodes of malnutrition more efficiently, although sufficient growth retardation occurs such that they continue to be classified as mildly or moderately malnourished. Rural children exhibit substantial growth retardation that is sufficiently important to classify them as chronically malnourished and a greater number of rural children are at more severe levels of malnutrition. Table 2 presents several socioeconomic variables, such as income, education, and infant mortality which are related to nutritional status. The close relationship among these variables indicates a general condition of deprivation and poverty, which in addition to the low incomes directly associated with it, also presents low levels of education and greater mortality and morbidity. This environment will make it possible to identify population groups with serious food and nutrition problems and those who are at greater nutritional risk.

CUADRO 1  
PREVALENCIA DE DESNUTRICION EN NINOS MENORES  
DE SEIS ANOS SEGUN EL INDICADOR  
POR DIVERSOS ESTRATOS DE INGRESO

	ESTRATO DE INGRESO (Bajo) Desnutrición					ESTRATO DE INGRESO (Medio) Desnutrición					ESTRATO DE INGRESO (Alto) Desnutrición				
	Normal	Total	1°	2°	3°	Normal	Total	1°	2°	3°	Normal	Total	1°	2°	3°
REPUBLICA	50	50	34	13	3	59	41	30	9	2	65	35	27	7	1
Lima Metropolitana	76	24	21	3	*	85	15	14	1	0	87	13	12	1	0
Costa	56	44	33	9	2	70	30	24	5	1	83	17	15	2	0
Norte	46	54	39	12	3	60	40	32	7	1	77	23	22	1	0
Centro	61	39	34	5	*	80	20	17	3	*	89	11	10	1	0
Sur	68	32	25	6	1	73	27	21	5	1	86	14	12	2	0
Sierra	39	61	39	17	5	45	55	37	14	4	56	44	31	10	3
Norte	29	71	48	19	4	36	64	46	15	3	52	48	34	10	4
Centro	41	59	36	15	8	43	57	37	15	5	49	51	35	14	2
Sur	50	50	29	17	4	57	43	28	11	4	67	33	23	7	3
Selva	31	69	43	22	4	42	58	41	14	3	55	45	33	10	2
Alta	37	63	41	18	4	47	53	37	13	3	56	44	32	10	2
Baja	75	75	46	25	4	37	63	45	15	3	54	46	36	9	1

Fuente: "La Alimentación en el Perú", Amat y Leon, y Curonisy, (1981)

Quadro 2. Malnutricion e Indicadores Socioeconomicos en el Peru

Region	Distribucion de la Poblacion Total	Prevalencia de Desnutricion		Porcentaje con Ingestion Calorica Menor de 90% de Los Requerimientos	Mortalidad Infantil por 1000 Nacidos Vivos	Porcentaje de poblacion de edad de 15 anos a mas sin escuela primaria	Distribucion Porcentual del ingreso familiar mensual	Porcentaje de viviendas sin agua potable
		Total	2 y 3 Grado					
Republica	100.0	44	16	52.2	114	66	100.0	75
Lima Metropolitana	20.1	19	3	46.7	46	48	43.6	40
Costa	20.5	35	11	45.3	63	70	22.2	68
Sierra	50.8	56	22	56.4	156	81	26.9	91
Selva	8.6	62	26	56.8	128	82	7.2	90

Fuente "Un Analisis de la Situacion Alimentaria-Nutricional en el Peru". Parillon y Col. (1983) pag. 22.

In Peru, the evidence is clear. Individual and institutional poverty have been extended to all regions of the country and have contributed to the high prevalence of illness and low coverage of services, principally potable water, waste disposal and health. This has aggravated the food consumption situation of a large number of families with marginal and inadequate diets, all of which has been a consequence of economic, social and administrative policies which for a long period of time have favored a small sector of the population at the expense of the majority. It is necessary then to define consistent levels of well-being for the country, that are expressed in terms of health, food, nutrition, housing, education, production, employment, income, participation, etc. for all of the society and particularly for poor families and families at greater nutritional risk.

### III. FUNCTIONAL CLASSIFICATION METHODOLOGY.

Because malnutrition is a problem of economic and social development, the analysis of its' conditional factors and its' solutions should be approached in a multisectoral and a multidisciplinary manner. This methodology which was principally developed by Joy and Payne, (1975) and Valverde et al., (1978) is opposed to the view of food and nutrition planning that supposes that if the rate of food production increases more rapidly than the rate of population growth, the nutrition problem will be resolved. Malnutrition is not just a problem of food availability, but it is a function of poverty. In th's manner, though is is necessary to increase food supplies, the effort of

food and nutrition planning should be directed more to the reduction of the causal factors that lead to malnutrition, thus integrating itself into development planning.

Like other methodological approaches, this is begun by defining and diagnosing the problem, but in this case, this definition should analyze not only the proximate conditional factors and the clinical signs of malnutrition, but also should design more profound and underlying levels of causality. The means of developing this analysis is the Nutritional Functional Classification, which relates patterns of nutritional deficiency with spatial, ecological, social, economic and demographic characteristics of population groups with deficient nutritional status.

The definition of family groups (functional groups) constitutes a practical decision, oriented towards the possibility of relating the different groups with policies, programs and projects, through which the assistance can be prioritized to large population groups with known problems of poverty. The objective then of a functional classification, is one that assists planners by providing diagnostic information that identifies and locates population groups with important food and nutrition problems: in this way, pertinent solutions to the causality of detected problems can be identified. The basic methodology consists in identifying and locating within geographical and political-administrative areas, those population groups with a similar pattern of economic, social and cultural problems and of available resources, the purpose of which is to

associate these common characteristics with the causes of food and nutritional problems. This type of analysis allows for making policy and planning decisions in a more disaggregated manner, which makes those decisions more realistic under the assumption that families in each group respond to and are affected in a similar manner to specific policies, programs and projects. In this way, existing policies and programs, and those which are being developed can be reviewed in terms of their possible nutritional, economic, social and cultural impact on different groups of poor families in specific geographical areas or political-administrative units.

Functional classification identifies, defines and characterizes different groups of poor and malnourished families according to their participation in the productive sectors of the economy, approximating the number of people affected in order to direct specific actions in the national economic and social development plans to these priority groups.

In review, the fundamental aspects of functional classification are the following:

a) define different categories of groups left behind and of poverty groups (functional) according to their participation in the productive sectors of the economy (occupation of head of household)

b) locate these groups within geographical areas or political-administrative units of a region or country

c) describe the social and economic characteristics that determine the conditions for these groups.

#### IV. DEFINITION AND CHARACTERIZATION OF THE FUNCTIONAL GROUPS

##### A. Conceptualization and Hypotheses

The health of a society is a result of the articulation of a

series of biological, economic, social, cultural and political factors which define that society's level of socioeconomic development and consequently its quality of life. This consideration of health requires the conceptualization of an individual within his or her environment, family and community.

The state of health that is considered well-being is not static. The interdependence of the human body with the dynamics of its environment is the basis for a process of adaptation and the equilibrium of this process is affected by biological inheritance factors as they interact with factors in the physical, biological, cultural and economic environment. It is the product of an ongoing struggle, whose results determine the level of well-being and health which are closely linked to socioeconomic development. When this equilibrium occurs in order that biological and psychological needs are met, the resulting process is said to be a state of good health. The failure of the adaptive process to lead to a biologically and socially acceptable equilibrium can originate in pathology endogenous to the human organism or in hostile conditions in the environment. Regardless of origin, the linkage of pathological states to the environment is always present, because the vital functions of the organism depend on an internal metabolic process for which outcomes, if not causes, can only be perceived through interaction with the environment. The expression of cause and/or outcome for any pathological state is therefore always in terms of conditions observable in the environment. At times, these expressions will occur in the proximal biological environment and

at other times in more distal environments such as the economic or the cultural environment.

In all populations, there exist individual families<sup>1</sup> and households<sup>2</sup> whose opportunity to become ill, or to die is greater than for other members of the population. The reasons for such greater vulnerability to disease, malnutrition or death can usually be associated with specific characteristics of the biological, social, economic and physical environment, since nutritional status does not constitute a direct phenomenon but is the resulting consequence of equilibrium or balance between: a) Supply and Availability, b) Demand and Consumption, and c) Biological Utilization of foods and nutrients for the individual. The difference then between nutritional status and an indicator of nutritional status is that the latter also reflects influences which are not nutritional (i.e. genetical). Malnutrition is an expression of disequilibrium that is reflected in the nutritional status indicator that is used. Among those indicators most frequently used are weight and height measurements. Undoubtedly, genetics are an important factor in the determination of body conformation, however in any specific case that presents delayed development or in the particular sector of population that is selected, it is very difficult to know to what degree the problem is associated to hereditary factors or to food and nutritional deficiencies.

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<sup>1</sup>Family: group of persons related by some legal kinship or that by act form a household and regularly live in one house.

<sup>2</sup>Household: the person or group of persons, whether related by kinship or not that regularly live in one house and that share meals and other basic necessities.

Alternatively, one can confidently blame nutritional factors when it is possible to detect alterations in the quantity and quality of food consumption. Evidence indicates that the environment exercises a powerful effect on physical growth and explains the major part of differences in growth in the first years of life. Delayed growth indicates severe biological harm that is carried through generations by the "transgenerational adaption to malnutrition" of individuals that live in an ecology lacking many necessities and that adjust body size and weight to their level of consumption as a mechanism for survival. The concept of adaptation has been used to explain the participation of children in the work force, since as a consequence of their small stature, they can realize diverse tasks expending less energy. It is in this manner that in some groups, the division of labor is characterized by assigning tasks relative to required energy expenditure. This situation, which Thomas (1973) calls "sociotechnological adaptation" is complemented by mechanisms of "demographic adaptation." Demographic responses such as high infant mortality serve as regulators of equilibrium between productive resources and the exploited population. In reality, the adaptation process reflects the biological, physical and cultural environment in which individuals develop. Among those which can be distinguished are: poverty groups, classified as such due to external conditions (type and quality of housing, sanitary conditions, availability of potable water, level of education, etc.) and groups living in conditions of misery (in addition to the above mentioned factors, they also experience other factors which are difficult to observe and which function

primarily within the household such as poor hygiene, poor child care and inadequate consumption, etc.). What results is social, economic and cultural deprivation which causes the families in these groups to be incapable of providing the minimum necessary conditions for normal development and integration into society. It is important to consider that the household is the environment and the family is the economic agent which in large part determine the causes of malnutrition in children.

In this way quantifying the magnitude of the food and nutrition problem acquires greater relevance when it is considered within the concept of nutritional risk<sup>1</sup> by seeking answers to questions of who are?, how many?, where are?, and what factors are associated with the food and nutrition situation of those population groups at high risk of malnutrition. In addition to identifying the characteristics of the malnourished, this approach identifies examples of deprivation within the economic and social development process and seeks the most effective actions to help improve the situation within the established development philosophy.

The interrelationships within the multiple causes of malnutrition constitute a "causal model", which is a collection of operational hypotheses that describe the probabilistic relationship between risk factors and outcomes, helping to

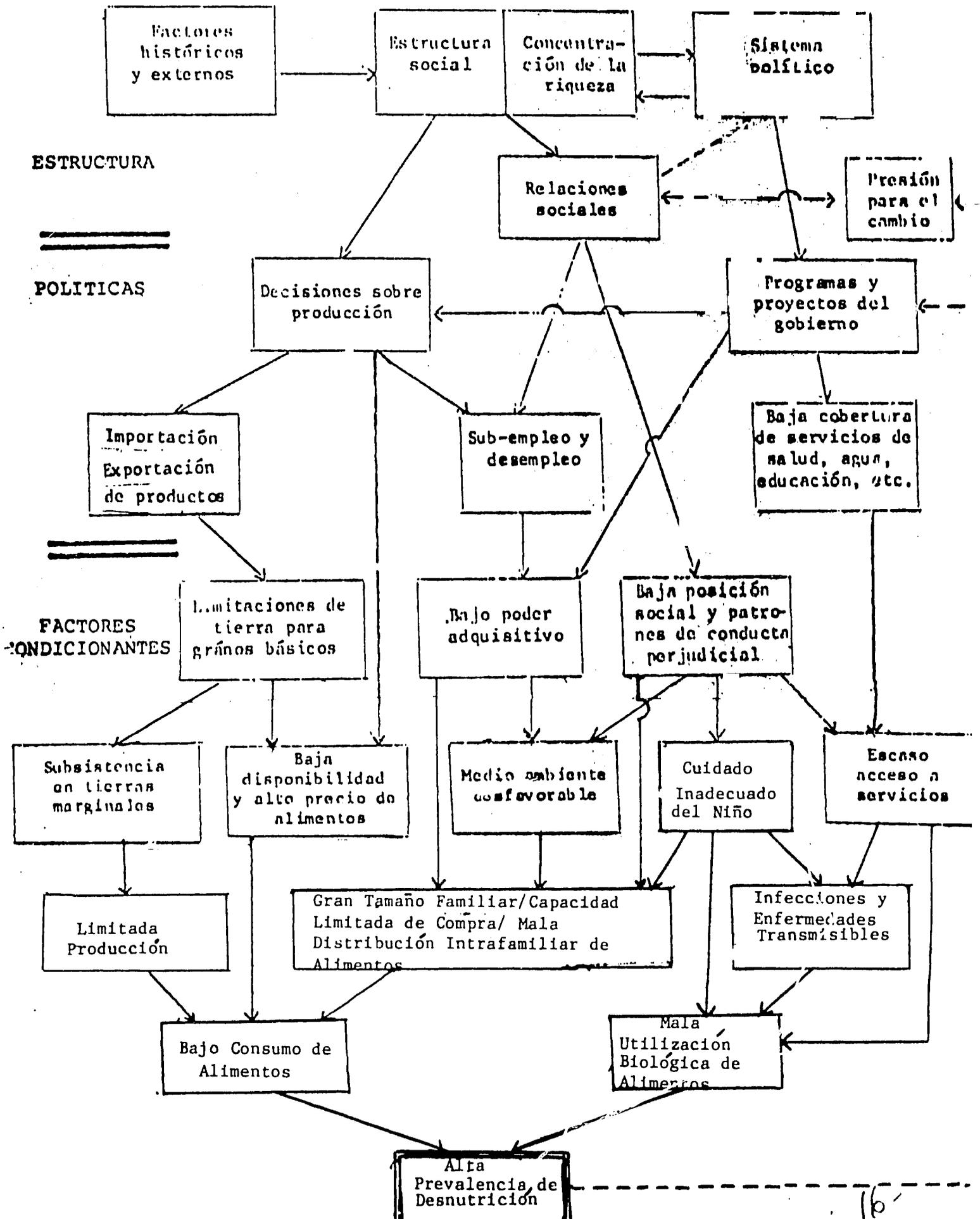
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<sup>1</sup> Probability of malnutrition given a risk factor defined to be an observable characteristic of an individual or group of individuals which is hypothesized to be causally or statistically related to a higher probability of an undesirable outcome for that individual or group than for those who do not exhibit the characteristic.

conceptualize the food and nutrition problem as well as to define the population groups at greatest risk. These models are used as operational tools and the causal relationships are a property of the model and not a property of the reality that is being described. In this sense, a causal model is simply an abstraction used to guide the statistical data analysis, of which, a considerable amount exists in the literature (INCAP, 1981).

Table 3 presents a causal model which graphically demonstrates the principal hypothesis of the Nutritional Functional Classification of Peru, which is that the high prevalence of malnutrition in the country is the result of decisions and orientations given to the socioeconomic development strategy through the political, economic and cultural systems and structures, which translate into pressure for change. This hypothesis takes into account others for the analysis, considering nutritional status (malnutrition) at three important levels: household, community, and geographic-ecologic.

It is important to consider the malnourished within their household and family which functions for the protection, maintenance and reproduction of its' members, since malnutrition is not something completely exogenous to the decisions of human agents. The decisions which a family makes regarding nutritional status and the general well-being of its' members begins with the selection of a mate. The decision to have children and to feed, bathe, dress, educate and give health and happiness to them are all under the influence of economic variables for the couple, their children and the community. Others which are also

Cuadro 3. Modelo Causal



important are those corresponding to purchasing power and purchasing decisions, intrafamily distribution of food, household environment, child care, use of health services, etc. Many decisions are limited because of the lack of purchasing power and scarce resources. Even though the time available to love, care, and feed children is limited, a mother's time and her ability to receive and process information adequately is considered fundamental for each one of her activities. This plants the hypothesis that the household and the family are the environment and the economic agent which in large part determine the causes and consequences of malnutrition in children.

It is also important to consider the malnourished within the community, considering that the family is a producer of foods and services for the market and is a socially reproductive unit of consumers. In other words, the family is an economic agent. The most operational form for the analysis is to determine how the family fits into the productive sectors of the economy and to identify the category and occupational group to which they belong. The first of these will help to know the relationship with the modes of production and the second will indicate in a more "gross manner", the opportunities available to them and their level of income. A hypothesis derivable from this is that the prevalence of malnutrition is determined in an important way by the manner in which the family participates in the productive sectors of the economy and their participation in the social organizations of the community (cooperatives, unions, committees, societies, etc.).

Additionally, the relationship between malnutrition and the

geographical-ecological situation will be examined since the local production and distribution of foods as well as the biological utilization of foods can be affected by altitude, climate variations, precipitation, sanitary conditions of the environment, transportation, communication, and the infrastructure of health, education, potable water and agricultural services. This analysis will identify those political-administrative areas with greater malnutrition problems and those at greater nutritional risk.

It is important for this analysis to consider the strong migratory movements which have brought about a mixture of cultures, traditions and technologies whose ecological impacts on health, consumption and nutrition may have been significant. This situation may have aggravated poverty conditions and increased instability in the supply and availability of foods, not only on a local level, but also at the regional and national level.

At this level, any hypothesis is based on the effects of economic policies on levels and utilization of foods by the population. Different prevalences of malnutrition in different areas, sectors or regions can be observed based on the impacts of these policies and according to ecological phenomena and geographical realities. However, the central hypothesis indicates that the geographical-ecological differences in the prevalence of malnutrition in children are determined by the effects that the policies of distribution, income, and investment have had on them.

## B. Definition

The definition of the functional groups constitutes a practical tool for the prioritization of attention to large groups of the population with known social and economic problems. The basic variable of this definition is the occupation of the head of household, with the head of household being the most important economic provider.

For this stage of the analysis, agricultural statistical reports of the Statistics Office of the Ministry of Agriculture along with the field work and experience of the Sigma One Corporation staff which assisted in the development of a nutrition strategy for Peru in 1983, have been used. In an initial pass, a list of approximately 120 occupations was accumulated in an attempt to identify the most prevalent and important occupations in both the urban and rural sectors. The functional groups for this study will be defined based on both the amount of land available for cultivation and agricultural production, and the occupation of the head of household. The functional groups proposed for this analysis are the following:

1. Farmers with less than 5 hectares
2. Farmers with between 5 and 10 hectares
3. Farmers with more than 10 hectares
4. Small farmers without land
5. Farmers of Specific Crops (if applicable)
6. Farmers with Employees
7. Agricultural Workers

8. Agricultural Workers of Specific Crops (if applicable)
9. Agricultural Day Laborers
10. Cooperative or agricultural association members
11. Small, self-employed workers
12. Patron, financier
13. Salaried Rural
14. Skilled Workers
15. Employees
16. Transportation
17. Businessmen, Banking, Finance
18. Professionals
19. Retirees and Pensioners
20. Unemployed

Some of these groups are linked to the rural sector, others to the urban sector and some can be found in both sectors.

It should be clarified that these functional groups are defined based on preliminary examination of the ENNSA data and are subject to further refinement during the analyses, which may result in increasing or decreasing the number of groups. With the data analysis, some of the groups may be grouped together and others separated according to the similarities or differences observed. In the case of agricultural producers, it would be ideal to classify them according to the specific crops grown, however, it is not possible due to a lack of essential information.

C. Nutritional Status

For the purpose of this analysis, nutritional status will be established at the household level, determined as the nutritional status of children less than six years old. If any child within the household is considered to be malnourished according to anthropometric indicators, this household will be considered as "malnourished." The indicator of malnutrition for each child is a function of two measurements, height for age and weight for height. For each antropometric measurement, three values will be assigned for each child: low, normal and high values<sup>1</sup>. The resulting variable will measure the effect of chronic and acute malnutrition according to the following scheme:

Weight for Height	Height for Age		
	Low	Normal	High
Low	Acute	Acute	Acute
Normal	Chronic	Normal	Normal
High	Chronic	Normal	Normal

Children with low values of weight for height, which measures actual malnutrition, are "acutely malnourished";

<sup>1</sup>The anthropometric measurement of Height for age will compare child's actual height with a reference standard (WHO) and be classified as Low (2 or more s.d. below reference standard), Normal (within 2 s.d. of reference standard), and High (2 or more s.d. above reference standard). In a similar manner, the weight for height measurement will be classified as Low, Normal and High. This criteria is more strict than the conventional Gomez classification.

children with normal and high values of weight for height and with low values of height for age are "chronically malnourished"; and, children with normal and high values of weight for height and of height for age are classified as "normal." For the purpose of this study, the high values in both measurements will be classified as normal, since the indicator of "malnourished" households was used to identify the households and families with the highest possibility to be at risk of malnutrition. Health problems associated with obesity and overweight problems will not be considered in this study.

#### D. Socioeconomic Characteristics

The principal source for the socioeconomic variables to be used in this analysis are the variables included in the National Health and Nutrition Survey (ENNSA). The social variables that will be used in the analysis are the following:

- housing/household conditions
- sex of head of household
- age of head of household
- education of head of household
- age of mother (wife or companion)
- family structure
- family size and composition
- migration
- health conditions
- perceptions regarding health problems and community participation

Housing conditions will be measured by the household type

and whether or not the household has public water and sewer service. The household conditions will be indicated by the type of floor existing in the house, by the means used to obtain drinking water, by the type of hygienic service in the house and by the type of fixtures and utensils in use by the household.

The characteristics of household members will be analyzed by the structure, size and composition of the household. The variables of household structure include the age, sex and marital status of the head of household and the age of the mother (wife or companion). The size and composition of the household will be defined as total household size (i.e. the number of all members in the household) as well as disaggregated into the number of adults, adolescents, school aged children, and children under six years of age.

Educational information solicited by the National Health and Nutrition Survey for persons greater than six years old, included the completed years of education and whether or not the individual could read and write. For this analysis, the data measuring the completed years of education by the head of household and by the mother will be divided into four categories: (a) None; (b) Primary; (c) Secondary; and (d) Superior (college, university). A migration variable for this analysis will be defined using the place of birth and the length of time each child has lived in the household.

Health conditions will be analyzed by morbidity, pre-natal care, infant feeding practices, mortality among mothers and children less than six years old, and the access to and use of health services. Morbidity includes the general morbidity of the

household, complications arising during pregnancy or delivery, morbidity among children due to diarrhea, respiratory illnesses and other infections. Health care for pregnant women will be measured by the number of pregnancies, prenatal care and professional care during delivery. The variable which measures infant feeding practices will be based on the breastfeeding practices, weaning age, and the food consumption patterns given for the youngest child in the household under six years of age. Mortality among mothers relates to death as a result of delivery and mortality among children less than six years old includes mortality among age groups and those symptoms evidenced prior to death (Initial examination of the data notes that these variables are scarce on the observed sample of mothers.) The variable which defines the use of and access to health services includes whether or not the household benefits from social security, whether or not the children have vaccination cards, how many vaccinations they have had, and where and from whom they received attention for illness, accident, pregnancy, delivery, or death of some household member. Undoubtedly, in the access to and use of health services, some economic variables should also be considered. Perceptions regarding health problems and community participation take into account the opinion of the head of household as to what are the most important health necessities in the community, how should these problems be resolved, and whether or not some household member has participated or participates in some community activity or project. It should be noted that this variable measuring the household's perception of health care may

be questionable due to the experience in the field in collecting this variable and the design of the questionnaire, therefore it may not be used in the analyses, pending further consideration.

The economic variables to be used in this analysis are the following:

- total monthly household income
- monthly per capita income
- monthly income of the head of the household
- percentage of total monthly household income represented by the monthly income of the head of the household
- household expenditures for social services

Total monthly household income will be represented by the sum of all income of all household members that work, according to the following sources of income asked in the National Health and Nutrition Survey, where applicable:

1. Monthly salary
2. Monthly wages
3. Distribution of earnings
4. Ownership of land
5. Value of animals
6. Value of agricultural machinery
7. Net income from sale of agricultural production or animals
8. Income from non-agricultural activities
9. Net income from other sources

The remaining income variables are based on the above sources and correspond to the income of the head of household, the monthly income of each household member, monthly income from

agricultural activities, as well as the proportion of total household income from the agricultural sector. The variable for household expenditures on social services includes expenditures for: rent or purchase of house; consumption of potable water; and among those related to health, for medicines, transportation, consultation and time necessary to arrive at and wait for the consultation. Preliminary analyses reveal that these expenditures are missing in a large number of questionnaires, therefore they may not be available for the analyses.

The importance of the concept of income should be emphasized, since rural income is generally considered to be a combination of income from salaried or wage income and income from agricultural activities, and urban income to be primarily from salaried or wage sources. For that reason, the definition of income for rural and urban households is different, and because of that, no aggregate analysis of income between rural and urban households will be undertaken. Analysis of this type will be between regions or areas within each sector: urban or rural.

An important component of rural household incomes is the value of own-farm consumption. The difficulty that this presents is how to value own-farm consumption of the household if it is not directly specified. In the present case, data from the health and nutrition survey only states whether agricultural production is principally for household consumption or whether it is principally sold to the market. This is a limiting factor in the effort to create an income variable within the concept previously discussed. It will be necessary then, to approximate

the value of own-farm consumption taking into account the quantity of land cultivated and/or the number of animals owned by the household. This approximation will depend in great part on the survey data and will be defined only if at all possible with the survey data.

#### E. Methodology for Analysis

In general, the information provided by the analysis of the functional groups will be presented in tabular form, frequently ordered to highlight those geographic areas and functional groups with the more acute and prevalent problems, in order to rank the priorities for remedial action. Standard analysis of variance techniques, and ranking techniques to rank the functional groups within particular geographical areas according to severity order will be employed in the analyses. One statistical technique for analyzing the effects of independent variables on a binary (i.e. yes or no response) dependent variable is logistic regression. This technique is useful to explain the possible relationships between the dependent variable, an indicator of malnourished children in the house, and the socioeconomic, demographic, housing and occupation characteristics of the particular household as well as the functional groups. All analyses will be conducted using the sampling weights given on the data tape in order to generalize to the entire country and specific regions within the country.

The specific areas of analysis presented in tabular form, are:

identification of the functional groups,

- identification of the districts with high prevalence of malnutrition,
- tabulation of households with malnourished children and the particular functional group to which the household is a member,
- employment statistics by male/female breakdowns within urban/rural sector,
- employment statistics within urban/rural sectors by sector of employment.
- socioeconomic characteristics of households within each functional group, and
- health care utilization for households within each functional group.

The initial analyses will examine households with preschoolers in order to relate malnutrition indicators of households of similar family structure (i.e. a preschooler present) to each functional group. Households without preschool children may also have nutritional problems and it is important to compare these households to those with preschoolers, using analysis of variance techniques to examine the possible differences in socioeconomic variables, (e.g. income, family size, access to health services, etc.). In this way, all of the data can be utilized rather than eliminating a significant percentage of the households from the analysis.

Tables 4-8 are a few examples of the tabular format to be presented in the final analyses. The functional groups will be presented in descending order of the combined prevalence of acute and chronic malnutrition among households with children less than six years old. Table 4 presents the prevalence of malnutrition for each functional group, whereas Table 5 presents the socioeconomic variations for each level of nutritional status.

Table 6 compares various socioeconomic variables by functional group and Table 7 presents the health experience and health access characteristics for each functional group. In this sense, the functional classification approach provides a diagnostic and targetting tool for nutrition planning.

In addition to describing the characteristics of the groups vulnerable to malnutrition in Peru, analyses of the geographical distribution of these groups by region will provide a valuable planning tool. The areas with the highest prevalence of malnutrition will be presented in Table 8. This comparison of the areas with malnutrition will aid planners in establishing priorities for assistance. Following the description and localization of the functional groups with the highest prevalence of malnutrition, policy issues (e.g. food, employment, health access, etc.) will be addressed based on the results of the analyses. The policies to be discussed are dependent on both the results of the analyses and the political environment within Peru and the Ministry of Health.

The analyses have commenced on September 1, 1985 upon receipt of an analysis tape from University of New York Stonybrook. However early in the analyses, upon consultation with the staff at the Centers for Disease Control, it was discovered that the anthropometric data was not sufficiently reliable and a new tape would be sent to Sigma One Corporation upon receipt from Peru. This second tape was received on or about October 15, 1985. Throughout the analyses, the Sigma One Corporation staff is collaborating with the staff at the Center

Quadro 4. Grupos Funcionales Ordenados por su Prevalencia de Desnutricion Aguda o Cronica en Ninos Menores de Seis Anos

Grupo Funcional	Aguda o Cronica (%)	Aguda (%)	Cronica (%)	Normal (%)	Hogares sin Ninos Pre-escolares (%)	Total de Hogares (n)
Grupo 1						
Grupo 2						
Grupo 3						
Grupo X						
Total						

Cuadro 5. Variables Socioeconomicas segun Estado Nutricional de Ninos Menores de Seis Anos en el Peru : 1984

Variable	Estado Nutricional de Ninos			Hogares Sin Ninos
	Agudo	Cronico	Normal	
Promedio del Ingreso Mensual				
Tamano Promedio del Hogar				
Educacion de la Madre				
Educacion de la Padre				
Porcentaje de Hogares con el Padre Empleado				
Porcentaje de Hogares con Problemas de Acceso a Servicios de Salud				
Porcentaje de Hogares con Morbilidad Reciente				
Porcentaje de Hogares con Acceso a Agua Potable				

Quadro 6. Promedio del Ingreso y Otros Indicadores Socioeconomicos por Grupo Funcional

Grupo Funcional	Ingreso Mensual Per Capita	Tamano del Hogar	Nivel del Educacion del Jefe del Hogar	Porcentaje de Hogares con un Adulto Empleado	Porcentaje de Hogares con Ingresos Agropecuarios
Grupo 1					
Grupo 2					
Grupo 3					
Grupo X					
Total					
<del>cwb</del>					

Cuadro 7. Distribucion de Indicadores del Los Servicios Sociales Por Grupo Funcional

Grupo Funcional	Sin Desague (%)	Aqua Potable (%)	Problemas de Acceso a los Servicios de Salud (%)	Hogares con Personas Enfermas (%)
Grupo 1				
Grupo 2				
Grupo 3				
Grupo X				
Promedio Nacional				

Quadro 8. Características Socioeconomicas de las Areas con Mayores Prevalencias de Desnutricion.

Region	Tamano de la familia	Nivel de educacion del Jefe de Hogar	Ingreso Mensual Per Capita	Porcentaje de Ingreso Total de Fuentes Agropecuarios	Porcentaje con Agua Adecuada
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Area 1

Area 2

Area 100

Area X

for Disease Control, who are also analyzing ENNSA data. Based on the delay in acquiring the clean anthropometric data, a draft version of the report for the study will be prepared by mid January for discussions with USAID staff. (An outline of this report is attached). The final report will be provided to USAID in Spanish as well as English within 30 days of USAID approval of the draft report.

## APPENDIX A

### Table of Contents - Preliminary Draft

#### Executive Summary

- I. Introduction
- II. The Food Consumption and Nutrition Problem
- III. The Functional Classification Approach to the Nutrition Problem
- IV. Concept, Definition, Characterization of the Functional Groups
  - A. Conceptualization and Hypotheses
  - B. Definition
  - C. Nutritional Status
  - D. Socioeconomic Characteristics
  - E. Geographical and Political/Administrative Distribution and Quantification
- V. Functional Groups within the Context of Social and Economic Policies
- VI. Appendices
- VII. References, Bibliography

APPENDIX B: Secondary Data of the Ministry of Health and the National Institute of Statistics (INE).

In an effort to complement the Nutritional Functional Classification analysis, it will be necessary to review the pertinent secondary data about health services and the general health status of rural and urban households, and for rural households, the major crops grown, all of which should be disaggregated by Department, Province, District, etc. Such data are generally published by the Ministry of Health in publications such as "Estadística de Salud" and by the National Institute of Statistics in Urban and Rural Household Surveys.

The variables which are considered to complement the analysis are:

Hospital Statistics

- Institution
- Sex
- Age
- Social Security beneficiary
- Residence
- Residence by Department, Province, District
- Program (Maternal, Infant, Adult)
- Conditions upon release (good, died within 48 hours of release, etc.)
- Diagnosis: According to the International Classification of Disease of the World Health Organization

### Birth Statistics

- Residence by Department, Province, District
- Urban/Rural
- Birth weight
- Length of Pregnancy
- Mother's Age
- Marital Status of Mother
- Number of Children for Mother
- Number of Children Alive
- Number of Children died
- Abortions
- Level of Education for Mother
- Professional Care at Delivery

### Outpatient Statistics

- Institution
- Personnel Attending
- Social Security Beneficiary
- Sex
- Age
- Residence by Department, Province, District
- Program (Maternal, Infant, Adult)
- First, Second or Third Visit
- Nutritional Status
- Diagnosis: According to the International Classification of Disease of the World Health Organization

## Mortality Statistics

- Urban/Rural
- In Health Services or not
- Residence by Department, Province, District
- Cause of death According to the International Classification of Disease of the World Health Organization