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**AN ASSISTANCE STRATEGY**  
**TOWARDS THE IMPROVEMENT OF NUTRITION IN PERU**

Prepared for  
The United States Agency for International Development:  
Mission to Peru

Lima, Peru  
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**SIGMA ONE CORPORATION**

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TOWARDS THE IMPROVEMENT OF NUTRITION IN PERU

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Foremost in our sense of gratitude is the generous and open collaboration of the children, women and men of Peru who shared their lives and problems with us during the field work. To the people of the Cities, the Sierra, the Jungle and the Coast we dedicate this modest effort at understanding their courage and creativity in responding to the challenges of their lives.

## 1.0 INTRODUCTION

The nutritional status of an individual is the consequence of the human body's attempt to establish an equilibrium between an inflow of nutrients and the use of nutrients. Nutrients are used by the body for skeletal growth, the development and maintenance of body mass and as energy for activity. The equilibrium between nutrient intake and usage can be affected by nutrient losses to disease. When nutrient intake in the diet is inadequate for the level of utilization and loss, the process of malnutrition is induced. This imbalance first leads to biochemical depletion, to biochemical lesion, to pathological change and eventually to illness and perhaps to death. Early clinical signs of malnutrition are found through blood and urine biochemical analysis. Only at later stages are the external symptoms manifested. One of these is weight loss and growth retardation as an adaptation to protein and calorie deficits. This biological process of malnutrition evolves within the context of the physical, socioeconomic and behavioral environment of the malnourished individual.

At any point in time the observed nutritional status of individuals is the result of human behavior which seeks to achieve the maximum possible well-being under conditions of resource scarcity and competing objectives. Such behavior is in response to perceived incentives and constraints which are present in the physical, economic, political and cultural environment. Since the household is the main environment in which the allocation and utilization

of human and material resources takes place, it is the behavior of household decision makers in the presence of resource constraints that determines the causes and consequences of malnutrition in humans.

This report presents recommendations for an assistance strategy by which the United States Agency for International Development may contribute towards improving the nutritional health of the people of Peru. The strategy and the analysis on which it is based were prepared within the philosophical framework of the previous paragraph. This modern view of nutrition recognizes that human behavior at the household level is the proximal determinant of the nutritional status of individuals as they respond to incentives and crises presented by the environment; ultimately it is the enhancement of the resource base available for allocation by household decision makers that can lead to long term improvements in the nutritional health of a society. In this view nutrition policies and programs can only attempt to improve the nutritional status of individuals by changing the physical and socioeconomic environment through enhanced incentives, resource transfers, information, services, and sometimes the provision of goods such as food.

This perspective means that, except in cases of specific pathology, malnutrition occurs as a consequence of poverty and its eradication involves the eradication of poverty. Poverty itself, however, has many expressions, particularly in Peru. Some of the poor are poor because they lack effective demand over market goods and services, others are poor because they lack access to publicly provided services, and others because they lack the human or physical capital necessary to engage in more productive activities.

Because poverty in Peru is widespread and has many causes including

endogeneous policies and exogeneous events such as world market conditions for commodities and ecological accidents (earthquakes, floods, droughts and erratic ocean currents), the recommendations for a nutrition strategy are directed at incorporating explicit nutritional considerations into the various development and policy initiatives of the government and the cooperating international organizations. As such the strategy has been developed within the framework of the "A.I.D. Policy Paper on Nutrition" (AID, 1982). Specifically, good nutrition is viewed both as a cause and a consequence of successful developmental programs and policies. As such, nutrition is not ancilliary but central to general and sectoral developmental activities. The focus of the strategy is, therefore, to seek ways for enhancing the positive nutritional impact of existing developmental activities and to identify those programs and policy areas which may be subject to modification in the light of nutritional considerations. This is not to imply that specific nutrition activities were excluded from consideration, but to emphasize that, wherever possible, consideration was first given to modification and focusing of on-going or proposed developmental efforts. Only in cases of specific issues arising from the needs of particular population groups or informational gaps were "stand-alone" nutrition activities considered.

Throughout the development of the strategy two additional principles were invoked: 1) that to the extent possible the elements of the nutrition strategy should be sustainable through the private actions by households and communities and that public action should be directed only at stimulating and complementing private initiative; and 2) that the elements of the nutrition strategy be feasible within the existing institutional and political framework

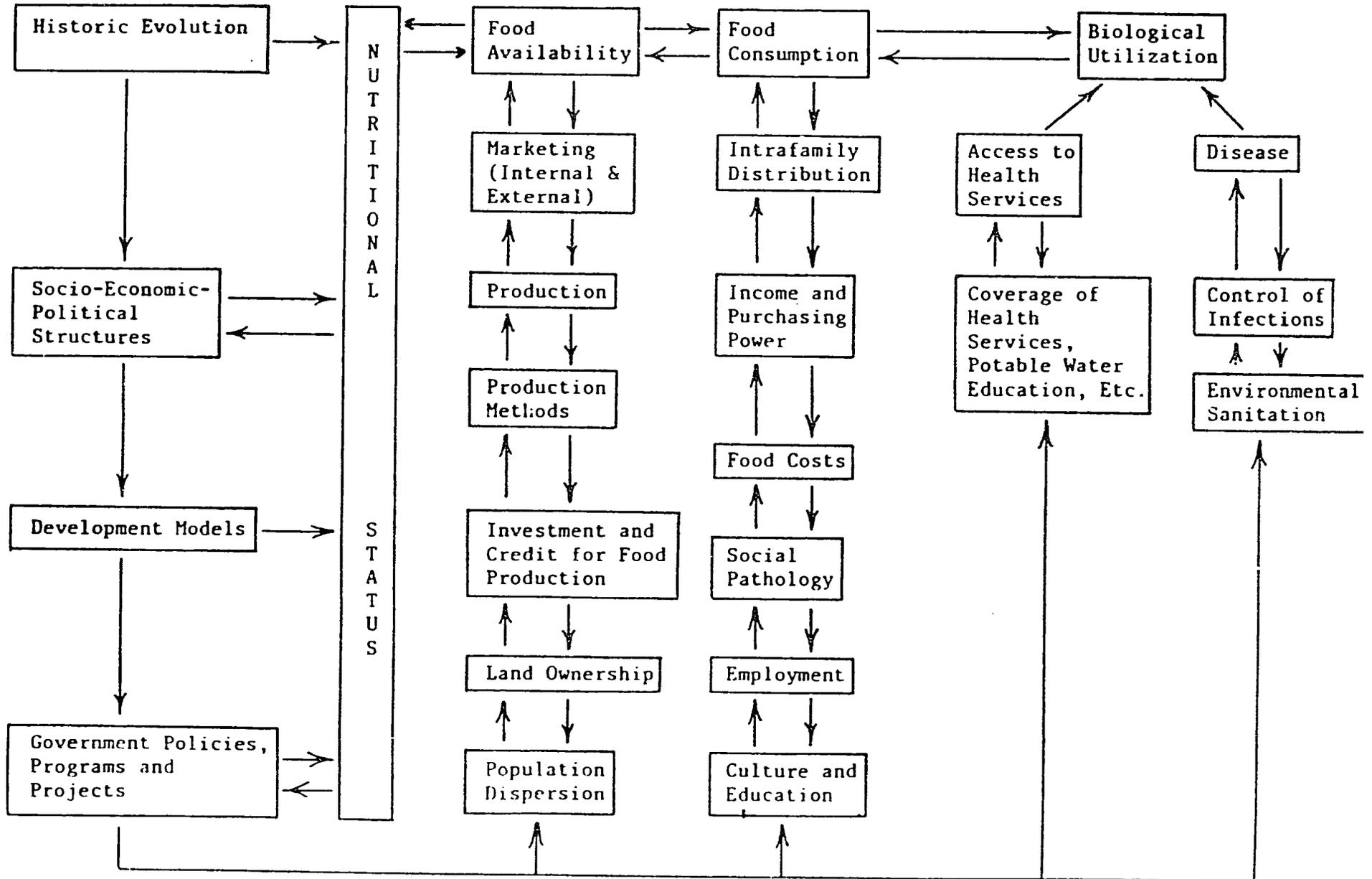
of Peru. The strategy is focused on policy dialogue to enhance the structure of incentives facing the largest component of the private sector --the household sector, and on enhancing and strengthening existing institutions; the elements of the strategy do not require the creation of new institutions.

### 1.1 THE ASSESSMENT APPROACH

The strategy was developed through a twin approach of analysis of available documentation and direct field observations. A team of anthropologists, economists, biostatisticians and a medical nutritionist developed an assessment protocol that guided the research on documentary sources and the field work. The field work focused on the appreciation of the nutritional problems at the household level in every region of the country and on assessments of how the existing institutions were helping or hindering the ability of households to respond to their nutritional problems. In addition, the means through which these institutional resources might be enhanced towards contributing to the improvement of the nutritional health of the population were also investigated. The research on documentation was directed at establishing a long run perspective on the nutritional situation and towards linking the present nutritional situation to the development policies of the post-World War II era with an emphasis on the last decade.

The research and assessment protocol is included as an annex to this report. The research protocol was based on the nutrition causal model implied by the schematic diagram presented in Figure 1.

Figure 1. CAUSAL MODEL OF NUTRITIONAL STATUS



The specific objectives of the protocol were:

1. to compile available information on the food and nutrition situation at the national, departmental, provincial, district and community levels,
2. to provide quantitative and qualitative information through direct field observations including an assessment of the perception by household members of existing institutional efforts regarding food and nutritional matters, and
3. to assess the potentials of the existing institutions to deliver nutritional related information and services and to assess the potential responses by different population groups to policy and institutional innovations directed at nutritional improvement.

The results of the field work have been synthesized into a number of field reports which serve as part of the information base for this report; they are included in an annex volume in support of the strategy recommendations. Field work was undertaken by one or more team members in the following areas:

- Lima: Pueblos jovenes
- Coast: Ica, Ancash, Lambayeque, Piura, Cajamarca
- Sierra: Arequipa, Puno, Cuzco, Junin, Ancash, La Libertad, Cajamarca, Pasco
- Selva: Loreto, Ucayali, San Martin, Junin.

The field assessment work was complemented with bibliographic and documentation research of published and unpublished sources. These included

review of pertinent laws and decrees, official memoranda and position papers of ministries and other public sector offices, as well as a review of public sector plans and budgets. Archives of Peruvian and U.S. universities were searched for current and historical information from published research reports on nutritional status assessment, food consumption patterns and statistics and reports of previous interventions or projects.

## 1.2 ROLE OF PERUVIAN INSTITUTIONS IN THE DEVELOPMENT OF THE STRATEGY

Many Peruvians in the public and private sectors participated in the development of the strategy. Foremost among them were the many private individuals in the households visited during the field work. They served both as informants and as evaluators of suggested approaches to nutrition improvement.

Officials at various levels of government (national, departmental, provincial and local) contributed insight, documents and data during the diagnostic stages. Several officials in various ministries continued to serve as informal reviewers of the process and its output; in most cases their collaboration was sought in their individual professional capacity rather than in their official capacity. In this manner, it was intended that the exchange of views would be more complete. For this reason neither the persons nor their institutional affiliations are identified in this report. Every statement made in this report is the responsibility of the Nutrition Strategy Team and thanks are extended to our informants with apologies for any misinterpretation.

## 2.0 EXECUTIVE SUMMARY

Peru continues to experience a nutrition problem of major proportions. Half of the population in both urban and rural settings suffer from chronic undernutrition as a consequence of inadequate diets. These conditions are aggravated by recurrent episodes of acute malnutrition arising from frequent illnesses and economic and ecological crises. The proximal causes are widespread poverty and a dysfunctional public health system. These in turn are a consequence of long standing development policies. Public institutions, particularly in the health sector, have been ineffective in implementing their stated objectives and have failed to prevent or ameliorate the impact of diseases. These effects are manifested as high mortality and growth retardation in the survivors.

Evidence from the last three decades indicates that many persons in all regions of the country have adapted to conditions through stunted skeletal growth. Many that failed to adapt died at an early age. The adult population has failed to achieve its genetic potential in stature. Presently, Peru suffers from yet another, but extreme, crisis as part of a pattern of economic and ecological crises which frequently affect the country. Food consumption is inadequate in energy and nutrients, unemployment and underemployment have increased, and the health of the population has deteriorated. Several regions are experiencing disaster conditions which require immediate humanitarian

action to prevent mass starvation and death. The disasters and the economic crisis are further deteriorating the human and physical productive base. There is an urgent need to respond to the present crisis and to assist Peru to address the longstanding causes of its chronic nutritional problem.

This strategy has been developed from a multidisciplinary nutritional assessment which included field work in every region of the country and an extensive review of documentation. It is based on the concept that the symptoms of malnutrition are a consequence of the human body's attempt to equilibrate between nutrient intake and the use (or waste) of nutrients by growth, activity and disease. This process occurs within a physical, social, economic and behavioral environment where persons seek to achieve the maximum possible well-being under conditions of resource scarcity. Human behavior at the household level is the proximal determinant of nutritional status as a response to incentives and constraints; public policy and programs can, therefore, seek to improve the nutritional status of a society through enhanced incentives, information, services and sometimes the provision of goods such as food or productive resources.

The strategy is directed at placing nutrition at the center of the social and economic development of Peru, because nutritional status is both a cause and a consequence of development. The focus of the strategy is to seek ways for enhancing the nutritional impact of developmental activities and to identify policy and program areas which may be subject to modification in light of nutritional considerations. The strategy is aimed at promoting self-sustaining private and community based improvements to nutrition. The strategy was developed in recognition of the constraints of the present economic crisis

and the government's efforts to achieve internal and external balance. The strategy seeks to strengthen existing institutions so that these can help to mobilize private domestic resources. Implementation of the strategy will require entrepreneurship and leadership on the part of USAID and the use of Agency resources for policy leverage.

The strategy consists of five main elements. Many of the elements of strategy can be accomplished through refocusing or increased emphasis on part of the existing and planned USAID portfolio. The strategy calls for five new projects to be initiated within a five year horizon. The elements of the strategy are:

1. Establish Nutrition as central to the development process.
2. Prevent the diseases that cause and aggravate malnutrition.
3. Increase food consumption and production.
4. Mobilize community and private resources.
5. Improve the operational efficiency of the health system.

USAID is encouraged to place nutrition at the center of the development process through policy dialogue based on rigorous policy analysis. This policy analysis should quantify the direct and indirect impacts that economic and sectoral policies and programs have on the nutritional behavior of private individuals. This requires that USAID assist in developing the institutional and information base for this analysis. A National Nutrition Development Project should be implemented to complement the Agricultural Policy Project and other policy and institutional development activities. This project should support the development of the information base for analysis and serve to coalesce USAID's Nutrition Advocacy role.

The prevention of nutritional related disease is focused on extending the coverage of potable water in urban and rural areas, on immunizations and on promoting environmental sanitation. Increased consumption and production of food should be focused on the poverty in all regions with emphasis on the urgent problems of the rural population. This effort would seek to increase food consumption and to increase incomes through improved rural employment. Labor market issues and the problems of unemployment are central to the low effective demand for food and services everywhere. Research on labor economics as well as on the economics of food consumption is highly encouraged. Projects for food production in the Sierra and to improve the agricultural marketing system are proposed.

It is proposed that the health and agriculture related actions be promoted and developed through community based self-help approaches. These should be coordinated by the regional development corporations to promote the needed process of decentralization. This strategy will require a community development project which should be complemented with a technical assistance and training project to improve the operational efficiency of the health sector. This latter project should be implemented after the present health sector pipeline problems are solved. Both projects should be designed on the basis of information and analysis developed through the National Nutrition Development Project.

### 3.0 A NUTRITIONAL ASSESSMENT OF PERU

A large proportion of the Peruvian population has lived (and died) under conditions of marginal to inadequate food intake for a long period of time. The diets of the poor are inadequate in calories and other nutrients and even the diets of the middle income levels are marginal and occasionally inadequate. The foods that are available for the diets in different parts of the country are varied; in most cases, diets with sufficient energy would be sufficient in most or all other nutrients. This long standing marginality of the average diet is periodically and frequently aggravated by nationwide, regional and household level crises, which interact with a skewed distribution of income to create significant and appreciable food problems for many in the population.

Poor health and sanitary conditions further aggravate the food consumption situation for individual households and for entire communities. These factors combine to present a pattern of chronic under-nutrition with recurrent episodes of acute malnutrition arising from frequent illnesses and economic and ecological crises. This pattern manifests itself as high mortality and growth retardation in the survivors. The anthropometric evidence, while sparse, suggests that many persons in all regions of the country have phenotypically adapted to these conditions through stunted skeletal growth so that their body size fails to achieve even a modest

estimate of their genetic potential.

The number of persons existing under these inframarginal nutritional conditions is large: perhaps more than half of the population is at risk. There exists great regional variation in the extent of the problem, but no region nor city is exempt. For example, Reutlinger and Alderman (1980) estimated that in 1973 approximately 40% of the population had diets below 90% of the recommended energy levels for Peru; Amat y Leon et al (1977) reported that in 1972, 44% of the country's pre-school aged children were underweight for their age. The Nutrition Strategy Team has estimated that 25% to 40% of Lima households were not spending enough to purchase a nutritionally adequate diet in 1977/1978. Currently Peru is suffering from a deep economic recession and from the effect of climate related disasters of flooding in the northern coastal areas, prolonged drought in the southern highlands and reduced catches by the fishing industry. As results, households are facing the double insult of decreased real incomes and food supply short falls.

It is this phenomenon of chronic undernutrition and frequent acute episodes of malnutrition arising from diverse origins to which the strategy is directed. At the start of the field work, great care was exercised in attempting to separate the effects of the present crisis from longer run or "normal" conditions; later it was recognized that periodic crises are "normal" to Peru. The present crisis is an extreme expression of what has been a pattern of living for Peruvian households. Agriculture, including the irrigated sector, is drought prone; the performance of the fishing industry is erratic; natural disasters are not uncommon; the economy is fragile and highly dependent on the variability of commodity markets for exports and imports; and

within these wider phenomena, low and middle income households are exposed to the periodic crises of disease, death, unemployment and under-employment and sometimes erratic changes in the structure of economic incentives.

Accordingly, the nutrition problem of Peru is viewed as a problem affecting different population and occupational groups differently at different times, but persistently affecting large numbers of households repeatedly over the years. The nutrition problem is therefore not restricted to particular age groups or locales but rather to whole families within their functional and geographic insertion into the productive and socio-cultural processes of the country. This chapter will detail the analysis underlying the foregoing diagnosis through a review of the available anthropometric evidence, a presentation of the food consumption situation and through an analysis of the health system.

### 3.1 NUTRITIONAL STATUS INFORMATION

Indicators of nutritional status, whether based on anthropometric, biochemical, clinical, food intake, morbidity or mortality data, are a biological integration of all the factors and processes that determine the ingestion and use of nutrients by the body. Any indicator is only a proxy for the "true" nutritional status of an individual, because "nutrition" is a consequence of complex interactions between biological, physical and social systems. Anthropometric indicators are considered to be the most direct measures of nutritional status, because one of the less ambiguous results from a process of malnutrition is its impact on body size and development. This section focuses on anthropometric measures as the basis for a nutritional

assessment of Peru. A background discussion on various indicators is presented because there is "popular" controversy on the extent and nature of malnutrition in Peru, particularly as measured with weight and height information.

The "conventional wisdom" of casual observers and even some researchers is that there are no visible signs of a major nutritional problem in the population since by superficial observation Peruvians appear well proportioned in terms of body structure, though patently short by international standards. These casual observations have been used to discount reports of measurements which yield high prevalences of indicators of retarded growth; this discounting is based on the notion that the Peruvian population is naturally short for genetic reasons.

Undoubtedly, inheritance is an important factor in determining adult body size, yet, in specific cases or in selected samples of persons with retarded growth it is difficult to ascertain the extent to which such is due to heredity or to a lack of nutrients (Chavez and Martinez, 1979). In dealing with population groups or samples which are representative of these groups, however, it is difficult to blame growth retardation on genetics if a large number of persons show signs of failure to achieve the potential of that population group. Only in isolated population groups such as the Pygmies of Africa, the Massai of East Africa, and perhaps the aboriginies of Australia, is it reasonable to believe that genetic factors would be the principal determinant of achieved body size. If a population group has both tall and short persons, it is not plausible that a disproportionate number of persons would be either tall or short since pure genetic expression would lead to a

clustering around the mean.

Alternatively, there is little risk in attributing growth retardation to environmental factors when it is also possible to demonstrate low levels of food intake and or poor health and sanitary conditions. For example, Martorell et al (1975) assert that the literature clearly shows that the marked differences in body growth between Third World populations and those of the developed countries are due principally to environmental factors such as inadequate feeding and to disease. Growth retardation can be transmitted across generations through a process of inter-generational adaptation to malnutrition (Chavez and Martinez, 1979). By this process, population groups adjust their body size to the available food supply to thus enhance their probability of survival. Given the popular controversy on the anthropometry of the Peruvian population it is important to ascertain the nature of anthropometric indicators and their possible relationships to environmental factors.

### 3.1.1 Anthropometric Indicators of Nutritional Status

No one anthropometric measure has been accepted as the optimal indicator of nutritional status, especially when applied to cases of mild to moderate malnutrition (See Appendix A). Often conflicting results occur when different criteria based on different measurements are used. For example, the recent

analyses of anthropometric data from 123 Peruvian children of ages 2-19 years stated that, "on the basis of height for age, using a United States norm, almost all of the population would be classified as undernourished. On the basis of weight for age, the most common classification, many fewer but still the majority would be classified as undernourished. On the basis of weight for height the great majority would be classified as overnourished. These marked discrepancies require explanation and call for caution in generalizing about the causes of poor growth and in selecting standards by which to classify the growth and nutritional status of poor children" (Graham, et al, 1979).

The pattern of low height for age, low weight for age and normal or high weight for height observed in the sample of Peruvian children cited above has also been reported for Egypt, Nepal, Guatemala and Panama. This pattern has been termed "nutritional dwarfism" by Jelliffe and "chubby stunted" by Graham. Most authors interpret stunting of linear growth (low height for age) as indicative of chronic malnutrition coupled with repeated insults within the child's environment, i.e. infections, lack of food availability, poor water, etc. (Habicht et al, 1974; Wray and Aquirre, 1969). The effect of these unfavorable conditions on growth is dependent on the duration and severity of the insult as well as the age at which the insult occurs. A child who suffers for a short period of time from an illness or starvation is able to return, or at least approach, his regular course of growth when conditions improve. Should the condition of repeated environmental injuries to the child's well being be constant or deteriorate rather than improve, the child's "catch-up" growth is never realized. Thus the magnitude of the deficit in height for age is often considered as a measure of the duration of the bout of malnutrition

(Seoane and Latham, 1971). On the other hand, weight loss is a short term response to unfavorable environmental conditions, and thus an indicator of acute cases of malnutrition. Weight loss has been the most generally used indicator because it is relatively easy to measure and the now famous Gomez criterion has become the standard for international and intertemporal comparisons.

### 3.1.2 Anthropometric Assessment of Peru

One of the earliest reports on the nutritional status of Peru revealed that, "Peru is an area of extremely deficient nutrition where quantitative hunger is associated with specific qualitative deficiencies. Approximately 73% of inhabitants of Lima possess clinical symptoms of nutritional deficiency with mortality rates twice that of the northern hemisphere of America. It is clear that social factors, rather than natural factors, are responsible for the precarious and insufficient food supply of the continent" (First Latin America Conference on Nutrition, 1951). Some of the first anthropometric measurements of the nutritional status of Peru were conducted in the 1950's by the Department of Nutrition at Harvard's School of Public Health in cooperation with the Department of Nutrition of the Ministry of Health in Peru and the Servicio Cooperativo Interamericano de Salud Publica. These studies, which measured the nutrition and care of rural Peruvian children from birth

through the weaning stage, were conducted in six communities: in San Nicolas, a cotton hacienda on the coastal plain; in Chacan, a farming community of the southern Sierra; in Carquin, a fishing village on the Coast; in Vicos, a large hacienda in the northern Sierra; in Yurimaguas, a jungle town and in Iquitos.

Table 1 presents the estimates of malnutrition as measured by conventional weight for age (Gomez) criterion by region for the 1950's and 1972. Approximately 30-50% of the rural children were moderately or severely malnourished in the early 1950's as compared to 20-40% in 1972, dependent on the specific region under study. The regional patterns of the malnutrition are consistent in the twenty year span, ie, the Sierra and Selva pre-schoolers, are more severely affected than the coastal children, and the children in Lima are significantly better nourished than children in other coastal cities.

A limited amount of weight for age data from studies of central Sierra communities in the 1965 to 1969 time period (n = 2323) and a more complete study for Lima in 1965 (n = 24000) confirms the pattern of the 50's and 72 data of wider coverage. The Sierra samples indicated that 32.9% of the pre-school aged children in those studies were classified as either severely or moderately malnourished by the Gomez weight for age criterion, whereas the Lima sample indicated that only 5.3% were classified as severely and moderately malnourished. Over 80% of the Sierra children exhibited some alteration in weight and 30.0% of the Lima children showed signs of mild and moderate malnutrition by the weight for age criterion implying that for Lima severe malnutrition was diagnosed in only 0.3% of the pre-school aged children.

Table 1. Percentage of Malnutrition in Peruvian Preschoolers by Conventional Gomez Criterion of Weight for Age Between 1950's and 1983

	N	1950's <sup>a</sup>			N	1972 <sup>c</sup>			N	1978-1983		
		Normal	Grade 1	Grades 2 and 3		Normal	Grade 1	Grades 2 and 3		Normal	Grade 1	Grades 2 and 3
<b>COASTAL</b>												
Lima	16728 <sup>b</sup>	70	25	5	-	81	17	2	123	72	20	8 <sup>d</sup>
Northern (Carquin)*	48	63	33	4	-	54	35	11	-	-	-	-
Southern (San Nicolas)	61	57	33	10	-	72	24	4	-	-	-	-
Total Region	-	-	-	-	-	65	28	7	-	-	-	-
<b>SIERRA REGION</b>												
Southern (Chacan)	12 <sup>b</sup>	8	50	42	-	43	36	21	86	35	23	42 <sup>e</sup>
Central	459 <sup>b</sup>	20	48	32	-	43	36	21	-	26	42	32 <sup>f</sup>
Northern (Vicos)	16	31	44	25	-	35	44	21	15	27	40	33 <sup>g</sup>
Total Region	-	-	-	-	-	44	37	21	-	-	-	-
<b>SELVA REGION</b>												
High Jungle												
(Yurimaguas)	17	29	53	18	-	44	38	18	-	-	-	-
Low Jungle (Iquitos)												
Private School	111	45	53	2	-	32	45	23	-	-	-	-
Public School	164	2	43	55	-	32	45	23	-	-	-	-
Total Region	-	-	-	-	-	38	41	21	-	-	-	-
<b>TOTAL REPUBLIC</b>	-	-	-	-	-	56	31	13	-	-	-	-

\* Where possible, for comparison purposes, the nomenclature of ENCA 1972 was used; specific locales surveyed in the 1950's are given in parentheses.

a Sigma One Corporation estimates obtained from anthropometric measurements in: Trulson, M.F. et al, 1956, Huenemann, R. and C. Collazos, 1954, Huenemann, R. et al., 1954.

b 1965-1969 Survey. Eider, Ravines, and Ramirez, 1969.

c ENCA, 1972

d Flora Tristan, 1978; Anderson et al., 1980.

e Waqra, 1978; Anderson et al., 1980.

f Hernandez, V. and G. Arnauld, FAO, 1981.

g Sigma One Corporation Nutrition Strategy field work, 1983.

Data on the nutritional status of Peruvian children in the last decade is extremely limited. Several small studies have been conducted since the 1972 ENCA survey; no countrywide or even total regional specific measurements are available, however. Recent 1978 findings from a study in urban Lima and the rural Sierra community of Waqra (Anderson et al, 1979) indicate that the prevalence of malnutrition in the rural children as measured by the criterion of weight for age, was significantly higher than that of the urban children. Over half of the preschoolers in Waqra were malnourished to some degree with approximately 40% of the children moderately or severely malnourished (Table 1), in comparison to the urban children from a Lima community, Flora Tristan, which had 8% of the children moderately or severely malnourished.

Data collected in the 1980's are primarily from the Sierra region, particularly the southern Sierra. Estimates of moderate to severe malnutrition in the Sierra region correspond to 30-40% of the pre-school population.

There are limitations of the weight for age measurement, particularly its confounding of acute with chronic malnutrition. To remove this confounding, the prevalence of chronic malnutrition is measured by height for age indicators and acute malnutrition is measured by weight for height indicators. Unfortunately, heights are seldom obtained in large field surveys. For example, the height data for the ENCA survey have not been classified.

Height data for the 1950's are presented in Table 2. The categories of mildly, moderately and severely stunted have been defined to correspond to one, two and three standard deviations, respectively, below the median of the World Health Organization (WHO) anthropometric standards (WHO, 1980). The WHO cutoff value of one standard deviation below the median is approximately equal to the

Table 2. Percentage of chronic malnutrition in the 1950's as measured by the Height for Age Indicator in relation to the World Health Organization norm.

	n	Height-for-Age			
		normal	mild	moderate	severe
<b>COASTAL REGION</b>					
Carquin (Northern)	48	18.7	25.0	41.7	14.6
San Nicolas (Southern)	61	29.5	34.4	31.2	4.9
<b>SIERRA REGION</b>					
Chacan (Southern)	12	0.0	8.3	50.0	41.7
Vicos (Northern)	15	46.7	6.6	0.0	46.7
<b>SELVA REGION</b>					
Yurimaguas	17	17.6	17.6	17.6	47.2
Iquitos					
Private School	111	36.0	52.3	11.7	0.0
Public School	164	0.0	28.9	71.1	0.0

Source: Sigma One Corporation estimates obtained from anthropometric measurements in: Trulson, M. F. et al., 1956, Huenemann, R. and C. Collazos, 1954, Huenemann et al., 1954.

Table 3. Percentage of Malnutrition in Peruvian Children as Measured by Weight for Height Between 1950's and 1983

	N	1950's <sup>a</sup>			N	1975-1976 <sup>b</sup>		N	1981-1983		
		High	Normal	Low		High or Normal	Low		High	Normal	Low
<b>COASTAL REGION</b>											
Lima 0-2 yrs.	-	-	-	-	-	95.2	4.8	-	-	-	-
Lima 2-6 yrs.	-	-	-	-	-	98.5	1.5	-	-	-	-
Lima 2-19 yrs.	-	-	-	-	123	88.0	12.0 <sup>c</sup>	113	23.0	43.4	33.6 <sup>d</sup>
Northern (Carquin) (school age)	48	37.5	58.3	4.2	-	-	-	-	-	-	-
Southern (San Nicholas) (school age)	61	13.1	80.3	6.6	-	-	-	-	-	-	-
<b>SIERRA REGION</b>											
Southern (Chacan) 0-3 yrs.	12	8.3	50.0	41.7	-	-	-	36	10.0	84.4	5.6 <sup>e</sup>
Northern (Vicos) 0-3 yrs.	15	13.3	46.7	40.0	-	-	-	-	-	-	-
Total Sierra:											
0-2	-	-	-	-	-	83.8	16.2	-	-	-	-
2-6 yrs.	-	-	-	-	-	94.3	5.7	-	-	-	-
pre-schoolers	-	-	-	-	-	-	-	3000	23.0	68.8	8.2 <sup>f</sup>
<b>SELVA REGION</b>											
Yurimaguas 0-3 yrs	17	0.0	88.2	11.8	-	-	-	-	-	-	-
Total Selva:											
0-2 yrs	-	-	-	-	-	80.6	19.4	-	-	-	-
2-6 yrs	-	-	-	-	-	93.6	6.4	-	-	-	-

a. Sigma One Corporation estimates from 1950 references stated in Table 1.

b. Stickney, Robert, Informe de Consultoria. USAID (Mission in Peru) Percentage of children with weight for height below the 10th percentile of WHO standards which is approximately 1.5 standard deviations below the WHO reference median. Some authors state that malnutrition is significant in cases where percentage is above 10%, i.e., Sierra and Selva children below 2 years.

c. Graham et al., 1979

d. Trowbridge 1983 (3 Lima Pueblos Jovenes)

e. Puno, 1983, Sigma One Corporation Nutrition Strategy Field Team.

f. Cuzco, 1981. German Technical Cooperation Society Project.

25th percentile of other historical standards of reference (i.e., the Stuart Standards used in the 1950's, the Boston or Harvard standards used in the 1960's and the NCHS or INCAP standards used in the 1970's). This cutoff was selected for the analysis in order to differentiate the Peruvian children who are below their "genetic potential" in height at the 25th percentile of the Boston standards (Graham, et al, 1979), from the children who are below an accepted norm but above their genetic potential in height. Therefore, the category of "mildly" short in stature can be interpreted as within the genetic potential of a Peruvian child. The moderately and severely short in stature children are well below acceptable norms or the Peruvian norm (genetically determined) and could be classified as "stunted" in growth or chronically malnourished. Other than for Iquitos, more than 50% of the rural preschoolers in the 1950's samples were stunted.

More recent analyses from Graham, et al (1980) and Frisancho, et al (1980), indicate that the prevalence of children having skeletal stature well below acceptable norms is extremely high in both the rural and urban areas of Peru. Graham, et al (1979, 1980) found that more than 50% of the 123 children between the ages of two and 19 years could be classified as "stunted" with heights below the 3rd percentile of the Boston reference. The urban to rural differences in stature revealed that children from rural areas were stunted in height and underweight for height and Lima children were not. "The apparent severe fall in the growth rates of infants in both urban and rural settings, despite marked differences in feeding practices, calls for further investigation into its causes. Undoubtedly infection, particularly intestinal, plays a prominent role and its control might well take priority over any other

'nutritional' measures" (Graham, 1980).

In two distinct ethnic populations in the town of Lamas, Frisancho et al (1980), found in a 1974 study of 1202 Quechua and Mestizo children aged 6-19 years that childhood differences in stature were related mostly to differences in calorie (measured by body fat) and protein (measured by body muscle) reserves and that ethnic or genetic differences played a minor role. Based on their findings and those of Johnson et al (1975, 1976) the authors conclude that the role of genetic factors in growth in height is more important in adolescence than at earlier ages. The authors state, "the respective contribution of genetic and environmental factors on phenotypic variation depends on the developmental stage of the organism, and in general the earlier the age, the greater the influence of the environment" (Frisancho, 1979). Frisancho also states "the fact that adolescent Quechuas and Mestizos of poor nutritional status are significantly shorter than their counterparts of good nutritional status indicates that under conditions of poor nutrition, the role of genetic factors on growth in height is overridden by the influence of environmental factors. In other words, only under conditions of good nutrition is the genetic role on adolescent growth in height manifested".

Weight for height is used as an indicator of severe acute malnutrition where marked weight loss leads to disproportion between weight and height. Weight for height measures, however, are less useful for diagnosing long term nutritional deprivation where both weight and height have been affected. The majority of the children (50 to 80%) measured in the 1950's had average or above average weights for heights with the exception of the Sierra preschoolers of ages 0 to 3 years. Approximately 40% of these preschoolers

were classified low weight for height. This result indicates that in the 1950's the Sierra children were acutely as well as chronically malnourished. Anthropometric data collected in 1975-1976 reveal that the pattern of acute and chronic malnutrition in Sierra children has remained somewhat constant during the twenty year span. In 1975-1976, 16% of the Sierra children under 2 years old were classified as having values of weight for height below the WHO 10th percentile (Table 3). The Selva region also had a relatively high percentage of children with low values of weight for height in both the 1950's and 1975 (12% and 19% respectively for children under 2 years old).

The sparse evidence is consistent throughout the last three decades: children in the Sierra have been found to exhibit the growth retardation effects of chronic malnutrition leading to permanent stunting for nearly half of the surviving population. Children in the urban coastal areas, suffer less severe cases of acute malnutrition and appear to recover.

Limited observations by the field teams indicated that children throughout the country appear to be suffering from acute cases of malnutrition as a result of disease and low food intake which have resulted from the present crises. This present picture is consistent with a historical pattern that can be presented in stylized form as follows: acute cases of malnutrition develop around the age of two and recur with varying frequency as a function of economic and health conditions; most urban children are able to recover so that weight appears to be normal for height, although sufficient growth retardation occurs that weight for age measures continue to be classified as mildly or moderately malnourished; rural children, particularly in the highlands and jungle, exhibit substantial growth retardation to be classified

as "stunted" or chronically malnourished. The effects in rural children are believed to persist beyond the age of ten so that achieved adult heights are substantially below the genetic potential of the population.

### 3.2 FOOD CONSUMPTION

Archeological evidence (Antunez de Mayolo, 1981) suggests that the pre-colombian dwellers of Peru had achieved food sufficiency and security through the domestication of a great number of edible vegetable and animal species which allowed them to exploit the great ecological diversity of the terrain. In the last three decades, adequacy of food availability appears to be marginal and recently even the diversity of the diet has deteriorated. Table 4 presents the composition and adequacy of national food consumption for selected years since 1947. The level of food energy available has averaged less than 90% of the level of 2,400 calories per capita per day which is the level which the Food and Agriculture Organization of the United Nations recommends as adequate for Peru. While food consumption is seldom as skewed as the income distribution, the income distribution in Peru has been sufficiently skewed (World Bank, 1981) that is safe to say that in most years in the last three decades more than half of the population was significantly below recommended energy intake levels. In 1958, in particular, 15% of rural coastal Peruvians were receiving half of the recommended calories as compared to 16

Table 4. Composition and Adequacy of National Food Consumption for Peru  
in Selected Years Between 1947 and 1982

Percentage shares of per capita calories

	YEAR										
	1947 <sup>a</sup>	1952 <sup>a</sup>	1956 <sup>a</sup>	1959/ 61 <sup>b</sup>	1963 <sup>c</sup>	1967/ 70 <sup>d</sup>	1972/ 73 <sup>e</sup>	1974/ 76 <sup>f,g</sup>	1977/ 78 <sup>f</sup>	1979/ 80 <sup>g</sup>	1981/ 82 <sup>g</sup>
Cereals	52	43	39	53	41	34	42	49	50	46	46
Rice	6	7	8	-	-	-	-	13	16	12	13
Wheat and other	46	36	31	-	-	-	-	36	34	34	33
Legumes	7	4	3	3	4	4	5	3	-	3	2
Roots and tubers	16	25	23	14	17	22	17	-	-	-	-
Potatoes	8	17	14	-	-	-	-	7	10	7	7
Other tubers	8	8	9	-	-	-	-	-	-	-	-
Poultry	-	-	-	-	-	-	-	-	-	-	-
Eggs	*	*	*	*	*	*	*	1	2	2	2
Beef & other meats	4	4	3	3	5	5	6	6	3	3	3
Fish	1	1	1	1	1	1	2	2	2	2	2
Milk and deriv.	3	3	5	3	5	6	4	3	4	4	4
Fruits	2	3	4	2	3	2	3	1	1	2	2
Vegetables	2	2	2	1	1	1	2	1	1	1	1
Fats and Oils	3	4	6	6	12	13	7	12	11	11	11
Sugar	9	11	14	14	11	12	13	15	16	16	17
Other foods	-	-	-	-	-	-	-	-	-	2	2
Total Per Capita Calories											
	2062	2123	1983	2449	2400	2190	1997	2261	1941	2067	2175

\* less than 1 percent

a ICNND, 1959

b Derived from U.S.D.A. food balance sheet

c Calculated from data reported in Estadística Agraria, Peru, 1964, CONESTCAR

d FAO, Production Yearbook, 1971

e ENCA, 1972

f Ministerio de Agricultura

g Plan de Abastecimiento Alimentario Nacional, Office of the Prime Minister, May, 1983

and 3% in the Sierra and Selva communities, respectively. The daily protein consumption in 1958 was less than half of the normal requirements for 4% of households in the coastal cities and for 16% of households in rural coastal areas; deficits of this magnitude were present in 2 and 4% of the urban and rural families, respectively, living in the Sierra and in 5% of the urban Selva families (JAMA, 1958). Reutlinger and Alderman (1980) reported that in the sixties and early seventies aggregate calorie availability was approximately 97% of recommended levels and they estimated that in 1973 more than half of the population was eating below recommendations and that approximately 40% were at 90% of the standard or below. Amat y Leon and his colleagues have reported on the 1972 ENCA data and found that 52% of households in that large national sample were below calorie recommendations and that over a third of the population was deficient in protein and most other nutrients.

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 failed to compensate for a declining role for meats and dairy products as sources of proteins.

The problem of food inadequacy has not been and is not currently specialized to the rural areas. A 1949 research report stated that "Lima is expanding rapidly. The birth rate is high and immigrants are coming in from the countryside to work in new industries. But the population seems to have already outgrown its food supply, its housing, and its sanitary system" (Lancet,

1949). The average Lima diet in 1972 consisted of 1,944 calories per person per day whereas the rural diet consisted of 1,958 calories per person per day. Each of these was at approximately 82% of recommended levels when consideration is made of the higher energy requirements in the Sierra. The trend of real income growth has been stagnant and its distribution has worsened since 1972; therefore, it is reasonable to believe that an even greater percentage of the population is consuming below recommended levels. While the national diet would probably still be adequate in other nutrients if it were adequate in energy, the field observations indicate that many households have responded to the present crisis through further specialization to cereals in the form of wheat products and rice. In many cases, these foods provide almost all of the nutrients that families are consuming. The present conditions for many families throughout the country are that diets are extremely poor in both quantity and quality.

### 3.2.1 The Distribution of Food Consumption

There is great variance in adequacy and composition of the diet across regions. Table 5 presents the average per capita food consumption for different regions for several years. Not one location appears to be exceptionally better or worse off than any other, however. Reports of dietary patterns from the 1950's (Collazos et al, 1959) indicate that regional dietary patterns varied greatly with the region as a function of locally available food stuffs. Field observations in June and July of 1983 by the Nutrition Strategy Team indicate that diets throughout the country have become more dependent on a few commodities particularly rice, bread and noodles. This

Table 5. Inter and Intra Regional Variation in Per Capita Calorie Consumption for Several Years

	Year			
	1950 <sup>a</sup>	1972 <sup>b</sup>	1976 <sup>c</sup>	1979 <sup>c</sup>
<u>COASTAL REGION</u>				
Coastal Cities	-	2,051	2,277	2,203
Lima	-	1,945	1,933	1,872
Tumbes	2,228	-	-	-
Tacna	2,658	-	-	-
Coastal Towns	-	2,051	2,211	2,141
Pampa Grande	1,577	2,278	-	-
San Nicolas	1,944	-	-	-
Carquin	2,095	-	-	-
Rural Coast	-	1,978	2,037	1,986
Pachia	2,577	-	-	-
Calama	2,680	-	-	-
<u>SIERRA REGION</u>				
Northern Sierra	-	2,075	1,914	1,856
Hacienda Vicos	1,788	-	-	-
Recuayhuanca	1,925	-	-	-
Southern Sierra	-	1,838	1,926	1,860
Chacan	1,467	-	-	-
Puno	2,204	-	-	-
Pancarolla	1,818	-	-	-
<u>SELVA REGION</u>				
Low Jungle	-	1,798	1,941	1,880
Iquitos	1,627	-	-	-
Mendoza	2,722	-	-	-
High Jungle	-	2,436	-	-
Yurimaguas	1,833	-	-	-

a Collazos, et al., 1959

b ENCA, 1972

c Estimated values from income data, World Bank, 1981 (Franklin and Wadman, 1980)

behavior is seen as a response to declining real incomes and shortfalls in the supply of other domestically produced foods.

It has generally been thought that households in rural areas were able to withstand economic shocks, because they produced a high proportion of their own food. The fieldwork and research by scholars of rural life in Peru, however, indicate that the rural population is highly dependent on the market place for its food and for its income. Throughout the country rural dwellers are highly dependent on rural labor markets or on migratory work for their incomes (Figueroa, 1978) and even many land owners in rural areas are dependent on the market place for their food. Agricultural product and factor market conditions are important determinants of food consumption, even by so-called subsistence households.

The Nutrition Strategy Team collected food price information in retail markets in almost all of the sites that were visited during the field work. Table 6 presents the team's estimates of the costs of nutritionally adequate diets to feed one person for one day for several cities and towns in the various regions of the country. The diets were selected to provide adequacy in energy and other nutrients from the food patterns observed in each region; for each food group, the lowest cost source available in the region was selected unless the observed dietary pattern indicated otherwise. For example, noodles within the cereal group are a relatively expensive source of calories vis a vis rice or bread, yet they are a common staple throughout the country.

Table 6 also presents the number of minimum daily wages ("salarios minimos vitales") which would be required to purchase a nutritionally adequate diet for a family of six in each of the sites for which diets were computed.

Table 6. Cost of a Nutritionally Adequate "Low Cost Diet"  
For Selected Areas in Peru in July 1983

	<u>Soles per persons per day</u>	<u>Number of Minimum Daily Wages required to feed a family of 6</u>
<u>COAST</u>		
Lima: Pueblos Jovenes	992	2.5
Chiclayo	1,039	2.8
Trujillo	1,004	2.7
Chimbote	983	2.7
<u>SIERRA</u>		
Huancayo	915	2.5
Huaraz	880	2.5
Arequipa: Pueblo Joven	825	2.1
Cuzco: Rural markets	894	2.6
Puno: Rural markets	890	2.6
Puno: Pueblo Joven	1,071	3.1
<u>SELVA</u>		
Tarapoto	1,196	3.3
Yurimaguas	1,330	3.3
Iquitos	1,321	3.3
Pucallpa	974	2.7

Source: Sigma One Corporation, July 1983

Two striking insights evolve from the table; on the one hand, diets of different composition (e.g. quinoa, canihua in the southern Sierra and wheat and rice in Lima) are similar in cost throughout the country; on the other, the dietary adequacy requires incomes of at least 2.5 minimum salaries per household. What this indicates is that the distribution of nutritional adequacy is directly dependent on the distribution of income and that the deterioration in personal incomes which has occurred as a result of the present recession and climatological crises has undoubtedly aggravated a pre-existing maldistribution of a barely adequate food supply. The regional disparity of incomes is great. The percapita income in Lima is over five times greater than in the rest of the country. For example, less than 8% of the population in the department of Puno is believed to earn incomes equal to or higher than the minimum wage. Under-employment is estimated at 49% of the labor force. This means that market dependent households would need to engage over half of their members in the labor force to provide income to purchase nutritional adequacy. This implies that even school aged children would have to engage in income earning activities.

The maldistribution of food consumption is further illustrated in Table 7 which compares the calorie content and composition of diets in Lima for low and middle income households in 1972 and 1978. The diets of the low income stratum changed by less than ten percent in adequacy, but the middle income stratum was consuming significantly more food in 1978 than in 1972. Since national food supplies were nearly constant, these numbers imply that Lima was receiving an even greater disproportionate share of the national food supply at the expense of other areas. Even so, we have estimated from the ENAPROM income

Table 7. Composition and Adequacy of Food Consumption for Metropolitan Lima in 1972 and 1978

	Percentage Shares of Per Capita Calories			
	1972 <sup>a</sup>		1978 <sup>b</sup>	
	Lower Income Strata (0-50th)	Middle Income Strata (50-90th)	Lower Income Strata (0-50th)	Middle Income Strata (50-90th)
Cereals	43.1	38.8	42.7	37.7
Rice	-	-	16.8	14.7
Wheat and other	-	-	25.9	23.0
Legumes	4.2	3.6	2.0	1.8
Roots and tubers	9.3	8.3	8.6	7.8
Poultry	-	-	1.6	2.8
Eggs	0.7	1.1	0.8	1.5
Beef & other meats	5.5	7.4	3.1	5.5
Fish	2.1	2.2	0.9	0.8
Milk and derivatives	6.0	8.7	6.5	6.6
Fruits	2.8	4.6	1.1	1.7
Vegetables	2.9	3.2	1.4	1.5
Fats and oils	10.6	10.6	16.0	14.1
Sugar	11.7	10.0	15.3	18.2
Other foods	1.1	1.5	-	-
	1,813	Total Per Capita Calories 2,098	1,942	3,005

a ENCA

b ENAPROM: LIMA and Sigma One Corporation Estimate Using Income Elasticities from Amat y Leon, C. y Dante Curonisy

distribution data for 1978 that at least 25% of Lima households were consuming below 80% of requirements and at least another 25% were below 90% of requirements in Lima. This result is perhaps an under estimate of the number of households with poor diets since the sample may have excluded the very poor.

Since 1978, there has been a short lived increase in domestic food supplies (81/82) which was snuffed out by the current floods and drought induced crisis. Since 1978 real wages and salaries have declined by an average of 22% (4% annual) while the reference minimum wage has increased by total of 7%. Furthermore, real national per capita income had declined at least 0.6% per year to the end of 1982 (See the Statistical Appendix to this Volume), and the rate of declines has increased to mid-1983 as a result of the recession and the disasters. First semester 1983 reports indicate a decline in output of 13% (El Comercio, August 23, 1983). The recession and the changes in relative compensation between wages, salaries and the minimum wage all imply a worsening of the income distribution. One of the mechanisms has been increased unemployment as evidenced by the growth of the informal sector's share of national income. Manufacturing, commercial and construction sectoral outputs are down by more than 15% in the first half of 1983 from the comparable period in 1982 (El Comercio, August 25, 1983). All this suggests, that even with the increased output of rice, pork and poultry which was experienced in the 1981/1982 period, that prior to the present crisis the poor in Lima had not been able to improve their diets. With the crisis, the consumption by the poor in Lima has certainly worsened.

The production of traditional crops such as beans, potatoes, cassava, and

of meats other than poultry has either declined or at least failed to keep pace with population growth. This suggests that rural incomes have also declined on a per capita basis and that the consumption by farm households and other non-Lima households may have on average also declined prior to the present crisis. During the time period (1978 to 1983) the domestic terms of trade between agriculture and non-agriculture improved while the price of food at retail increased even faster than other agricultural products at wholesale. All this implies two things, 1) that the effects of improved prices for agriculture were captured by the producers of rice, poultry, maize, and export crops and 2) that households that depend on the market for their food faced an increase in the real price of food relative to non-foods. One further implication may be that marketing margins increased in the food distribution system. One process by which marketing margins (from farmgate to first sale) appear to be increasing related to the practice of "forward sales" to obtain credit from informal sources. Under present rapid inflation, farmers have been unable to maintain the real price of their commodities, while the traders/creditors can. Neither the increased output of rice and poultry nor the maintenance of a high level of subsidization were able to prevent the rise in the real price of food. This has affected all regions of the country since most households in rural areas are dependent on the market for a large portion of their food.

The foregoing analysis is clear; the food consumption situation in Peru has been marginal or inadequate by national averages at least since the post-World War II period and in the last ten to fifteen years the increasing maldistribution of food consumption has worsened the quality and quantity of the

diets of the urban and rural poor -the majority of the population. The benefits of any recent improvements in agricultural output or agricultural incentives have been captured by a relatively small number of households and these may generally not have been the poor. Peru has had a serious food problem for many years and recent events have increased the severity of the problem so that today a majority of the population suffers from diets that are quantitatively and qualitatively inadequate to permit them to achieve their genetic potential in physical growth or their biological potential in labor effort. These conditions of chronic under feeding and frequent food crises are reflected in the sparse anthropometric evidence.

Peru, therefore, appears to conform to the process outlined by Professor Beaton "all existing populations (except those in a stage of temporary acute famine or other food shortage) are adapted to their food supply. If we say they are in deficit, we mean that their adaptation to a lower than recommended level of intake occurs at an unacceptable social and health cost, whether you measure these costs as high morbidity and mortality, low socioeconomic standards, low economic growth rate or other parameters... The main way that populations adapt is by adjusting: a) the growth rate of children and adult size; and b) physical activity including both occupational and non-occupational activity" (Quoted in Reutlinger and Alderman, 1980).

The evidence for Peru is that the population adapts to marginal food intake; the costs are high mortality and morbidity and perhaps lower productivity in the labor force. This adaptation is frequently misinterpreted to say that there is little or no serious malnutrition in Peru; what should be considered is that this adaptive process imbeds within it a high loss of

private and social opportunity.

### 3.3 HEALTH AND BIOLOGICAL UTILIZATION OF NUTRIENTS

The synergism between health status and nutritional status is well known. Diseases interfere in the utilization of nutrients directly and through the effect on the eating (and feeding) habits of individuals. In turn, the malnourished individual is more susceptible to disease and suffers greater damage from specific episodes than the well nourished individual. In particular, even mild or moderate malnutrition can interfere with the body's response to infectious disease so that diseases such as measles which are usually non-fatal can lead to high mortality among malnourished children.

In Peru, data on morbidity, mortality and other functional characteristics of the health system are notoriously unreliable. The statistical system for the health sector is dysfunctional. The coverage of the health system facilities is biased in favor of metropolitan areas so that even if the information system worked, a large segment of the population would not be represented. The available data, however, does not present an optimistic picture for the health of the population and is consistent with the diagnosis that repeated illnesses aggravate the persistent problem of chronic undernutrition for a majority of the population of Peru.

### 3.3.1 Morbidity Information

Communicable diseases represent the most serious threat to the nutrition and general health of the population. Among these are those which are transmitted orally through the intake of contaminated water and foods, those that are transmitted through airborne pathogens such as respiratory diseases and those that are transmitted through direct contact between host and carriers or vectors. Illnesses associated with gastro-intestinal and respiratory diseases represent the principal cause of contacts with the health system (35.6%) whereas preventive health activities are minor (5.9%). The principal reasons for hospitalization are maternity (41%), other causes (29%), communicable diseases (16%), accidents and violence (8%), cardiovascular disease (3.5%) and malignancies (2%). Gastrointestinal problems of all origins constitute the largest source of reported morbidity.

The composition of morbidity has changed; during the sixties approximately 15% of the morbidity was represented by diseases subject to prevention by vaccinations and 28% by diseases associated with poor environmental conditions; in the seventies the first type has declined to around 11% and the latter has increased to over 36%. Non-potable water, inadequate waste disposal and physical crowding would appear to be increasing their role in the transmission of diseases.

The apparent decline in the morbidity from diseases subject to prevention by vaccination should not be viewed optimistically; the absolute rates are still very high by international standards. The percentage of children fulfilling a normal course of vaccinations has been less than 20% in the last several years. Without a doubt, the greater majority of cases of morbidity in

the last two decades could have been prevented. The high morbidity has aggravated the inadequacy of marginal diets and the marginal nutrition has increased susceptibility to disease.

### 3.3.2 Mortality Information

General mortality has declined between the sixties and the seventies from around 18 to 11 per thousand inhabitants. Still, the Panamerican Health Organization estimates that this rate is high in comparison to other South American countries (7.1 for Colombia, 7.7 for Chile, and 6.0 for Venezuela). The mortality statistics for Peru are also of doubtful quality but a few interpretations are possible.

That upper respiratory and infectious diseases represent the principal cause of general mortality, could be interpreted to say that the population is undernourished and unable to resist illnesses which are usually non-fatal to a well nourished population. These diseases represent approximately half of all deaths in the country.

In Peru, infant mortality information is widely believed to be under-reported; the rates are very high by modern standards. The Ministry of Health reports that the infant mortality rate has declined from 160 per thousand live births in the early sixties to approximately 100 per thousand in recent years and that infant mortality represents 26% of all deaths in the country and over 60% of childhood mortality. It is worth noting that the advances in the control of epidemics through vaccination, etc., have led to general declines in infant mortality through out the world, but Peru is lagging in this regard.

Neonatal deaths are principally associated with low birth weights

(premature and small-for-term). Since in Latin America only 9% of low birth weight children are truly premature (Mata, 1972) these deaths are probably also associated with poor maternal nutrition. Reportedly (Graham, Personal Communication), birth weights for Peruvian children tend to be adequate because there exists customs for pregnant women to "eat for two". Institutional births represent less than a third of all births so that there are no reliable data on birth weights. Adequate birth weights and high mortality rates imply that environmental factors such as poor sanitation and contaminated water and foods are a major primary cause of infant deaths.

Other neonatal and infant deaths are associated with gastro-intestinal and infectious diseases, which are either caused by or cause malnutrition prior to death. While nutritional problems are seldom recorded as the primary cause of death, infant mortality statistics from the Children's Hospital in Lima indicate that nutritional problems constitute the second largest cause of infant deaths that occur there.

High prevalences of infant and childhood mortality are widely accepted as evidence that nutritional problems of important magnitudes exist. While the statistical systems for Peru are inadequate, the overall picture is alarming. Furthermore, a less generally known index of mortality —the ratio of deaths during ages 0-5 years to all deaths— indicates that the problems of childhood mortality and its nutritional correlates vary by region of the country but all regions are considered as having high childhood mortality rates (Table 8).

### 3.3.3 Environmental Sanitation

Clean water for drinking and cleansing and the safe disposal of human and

Table 8. Percentage of Deaths in Children Five Years Old and Younger  
As a Fraction of all Deaths by Department in 1979

DEPARTMENT	PERCENTAGE	RATING
Amazonas	46	High
Ancash	40	High
Apurimac	44	High
Arequipa	38	High
Ayacucho	43	High
Cajamarca	42	High
Cuzco	45	High
Huancavelica	57	Very high
Huanuco	48	High
Ica	45	High
Junin	47	High
La Libertad	36	High
Lambayeque	43	High
Lima	35	High
Loreto	43	High
Madre de Dios	63	Very high
Moquegua	53	Very high
Pasco	53	Very high
Piura	47	High
Puno	36	High
San Martin	46	High
Tacna	42	High
Tumbes	55	Very High
PERU	42	High

Source: Sigma One Corporation estimates from Ministry of Health Data.

other wastes are vital to health. Their absence causes diseases that are wasteful of ingested nutrients. In Peru, over half of the population does not have access to safe water. In some departments less than 10% of the households are connected to a potable water system. Furthermore, in rural areas most existing systems are considered unsafe. The picture is worse when the disposal of human wastes is concerned. Only 28.9% of the country's households have a connection to a sewerage system. This is particularly alarming since 65% of the country is classified as urban. Eleven of the 24 departments have less than 10% of their households connected to a sewerage system and even in Metropolitan Lima over 40% of households are not connected to a sewerage system. It is not surprising, therefore, that most morbidity and mortality is associated with communicable diseases. The statistics also imply that marginal diets are rendered inadequate since nutrients are wasted by diseases.

An additional issue regards the direct ingestion of contaminated foods. Zoonotic processes, improper handling and improper storage can lead to unsafe foods of both animal and vegetable origin. In Peru, there is an inadequate system for controlling the safety of marketed foods and contaminated fresh and prepared foods can be an important medium for the transmission of disease. For example, unsafe foods are one of the principal means for transmission of typhoid fever and Peru experienced an epidemic of this disease in 1979. Dairy products and seafood are considered the principal sources of contamination through marketed food, but unsafe eating establishments in urban areas and zoonotic diseases are also important health problems which would contribute to poor nutrition among the population.

### 3.4 PROBLEMS ADDRESSED BY THE STRATEGY

The nutrition problem in Peru is one of inadequate food and inadequate health for a majority of the population; its roots are poverty and the skewed distribution of incomes and public services. Accordingly, the strategy is directed at placing nutritional issues at the center of developmental activities and public policy. While undoubtedly many specific problems exist, among different population groups the thrust of the strategy is to seek self-sustaining solutions and to avoid specific interventions as elements of strategy. (This is not to say that interventions could not be used as "tactics" within a general strategy.) The strategy is directed at resolving the overall problem of food and health inadequacy and not at any specific nutrient deficiency. The strategy is directed at solving the nutritional problems of households and communities and not specific age groups. Nonetheless, specific interventions targetted to selected household members or nutrients might serve as tactical vehicles for the solution of more general problems.

To say that the roots of the problem are poverty and poor health is an empty phrase unless further specification is given. To this end, it is important to note that poverty and poor health can each have multiple causes and expressions. What is needed, therefore, is a scheme for identifying population groups with similar conditions and possible similar responses to

policy or program intervention. Such a scheme is being developed for nutrition planning under the rubric of "Functional Classification". The appropriate data base for applying such a technique is not yet available for Peru; the assessment field work of the Nutrition Strategy Team did obtain preliminary insight into a possible structure for a functional classification of Peru.

#### 3.4.1 The Functional Classification Approach

The purposes of a nutritional functional classification study are to provide diagnostic information to assist planners and service providers in locating and identifying population groups with important nutritional problems. The basic approach consists of identifying the geographic and political-administrative location of population groups whose sociodemographic characteristics are causally or statistically related with the prevalence of important nutritional problems. The methods are a planning rather than an analytical tool because they permit an identification of the characteristics of population groups which allow the targetting of specific remedial activities, and estimate the number of persons in each group and setting to facilitate the estimation of costs and level of effort required to deliver services or other remedial actions and to facilitate the deployment of resources.

The technique differs significantly from conventional nutrition planning approaches in that these latter have been based principally on sociodemographic and physiological or health characteristics of persons at nutritional risk. The targetting of remedial actions has therefore required prior screening through health and other types of measurement. The cost and

difficulties involved in medical screening to detect persons with nutritional problems have usually led to the use of very gross targetting devices, such as age-sex distributions, i.e. populations at risk are the pre-school aged children and pregnant mothers. In contrast, the functional classification approach permits a finer reticulation of the characteristics of the population with nutritional problems, so that remedial actions can be targetted to those with a very high risk as opposed to large population groups that may, or may not, have serious nutritional problems. As such, the technique reduces the common problem of leakage of resources from the intended beneficiaries to other members of the population. An important fact is that the functional classification technique attempts to relate the prevalence of malnutrition in each identified functional group by characteristics of that functional group that are associated with their connection to the productive process in the economy. In this manner, the interventions or remedial actions that can be instituted include those which can be promoted through policy mechanisms. For example, important determinants of functional group categories include the occupation of the head of household and employment, geographic location, and other economic characteristics pertaining to how the household is inserted into the productive process. With this information, it becomes possible to design remedial actions or interventions that create incentives for the malnourished to solve their own problems. The functional classification technique can thus serve to enhance the possibility of designing remedial actions which are self-sustaining and not requiring continuous resource transfers from society at large to the populations at risk.

The technique does not, in and of itself, provide the prescription for

required remedial action. The technique is principally directed at providing information so that nutrition planners and other experts can establish the basis for an analysis of the causes of the existing nutritional problems and the likely impact of alternative remedial actions which might be directed at ameliorating the food and nutrition problems which particular functional groups have in their settings. The types of remedial actions that may be undertaken are selected from those remedial actions which have been known to be effective under similar conditions in other settings, and are in accord with the policy framework of the country or region in question. They can include remedial actions such as specific interventions, i.e. a feeding program, and they can also include the incorporation of food and nutrition objectives in general development activities, such as road building, the building of a dam, or the establishment of an agricultural research and extension system, etc.

A functional classification study identifies, quantifies, and localizes groups of families according to their life pattern, social, economic and cultural problems and the level of resources that are available to them. They are clustered according to these characteristics under the assumption that they will respond in a similar manner to specific policies and programs.

Such a study is needed for Peru; the following approximation, however, is intended to identify the nature of the specific nutritional problems faced by readily identifiable and relatively large population groups. More data is needed before the categorization presented can be used for planning any specific activities, e.g. not all cooperative members in the Coast have nutritional problems, some do.

### 3.4.2 Population Groups with Nutritional Problems

The Nutrition Strategy Field Team identified some major population groups as likely to have important nutritional problems. They represent the majority of households in the country, but the list is not complete nor are the categories mutually exclusive. The list is presented and then each group is described according to their likely nutritional problems. In general, these groups would fall below the median in the distribution of income.

#### Lima and larger cities:

Salaried employees

Workers in the informal sector

Unskilled workers

Unemployed

#### Coast:

Unskilled urban workers

Workers in informal sector

Small private farmers

Landless agricultural workers

Salaried employees

Cooperative members

Fishermen and Fisheries' workers

Sierra:

Unskilled urban workers  
Subsistence farmers  
Highland pastoralists  
Subsistence farmers/laborers  
Mineworkers  
Petty traders  
Landless agricultural workers

Selva:

Non-agricultural unskilled workers  
Petty traders  
Small scale transport workers  
Subsistence farmers (river populations or tribal populations)

Lima and Large Cities

Lima's and large cities' salaried employees, informal and unskilled workers, and the unemployed suffer primarily from low effective demand for food. Over the course of time, some will suffer from declines in food availability due to factors such as unemployment or other economic shocks. Those in the lowest quartile of the income distribution are likely to be the unemployed and the unskilled workers who also experience unstable employment. In addition to their income problems, they may also suffer from crowded and

unsanitary living conditions in established neighborhoods or from unsanitary conditions, poor housing, lack of potable water and difficult access to the health care system if they live in the so called "young towns" or shanties of the urban periphery. For all of these --even the unemployed-- time is a very scarce resource because the distances to work or job search are very long through a crowded and complex public transport system. They also spend much time queuing for public health services when they are ill.

Most of them buy their food in makeshift markets near their dwellings, often paying higher prices for the "controlled" commodities than do their better-off neighbors in the rest of Lima. For example, during the recent rice "shortage" these smaller markets were selling subsidized rice only through tie-in sales; very low income households were unable to buy "cheap" rice because they could not afford to buy the more expensive tie-in commodity, e.g. soap. They spend most of their meager incomes on food but must also spend about 20% of their income (or more) for fuel, transport and sometimes water. Water in the shanty towns and in some more established neighborhoods can be very expensive if bought from tank trucks; this water can also be a source of infections since it is frequently stored in unprotected vessels. The high costs of water and fuel inhibit the use of hygienic practices in cooking and personal grooming and thus contribute to disease. At least one million persons in Lima alone live under conditions which are life threatening to at least some of their family members. The diets of even very poor people seem varied, and it is reasonable to believe that if the diets met calorie adequacy they would also provide adequacy in other nutrients. Beans, oil, meat and milk, however, play a minor role in the diet currently, and the diets are inadequate

in energy and most nutrients.

In Lima, Trujillo and Arequipa the main problems are low incomes due to unstable employment and low skill levels. INE estimates that as much as one-half of the urban labor force is under-employed, i.e. earns less than a minimum wage on a monthly basis. Most households would, therefore, require that three or more members seek some form of income. These households attempt to solve this problem by participating in the informal sector as self-employed craftsmen or as petty vendors. The working day for these persons is very long and often the food consumption for each day is dependent on the days earnings. Others seek employment in construction jobs and are often unemployed between contracts.

The long term solution to these problems involves economic recovery and employment generation. There is great need for in-depth analysis of the urban labor markets and the incentive structure for employment generation in labor legislation and in industrial promotion policies. Furthermore, there is a need to create incentives for the poor to invest in skill acquisition and human capital accumulation.

In the short run, there is also a need to review the impact of food subsidies on the diets of the poor and to seek more effective alternatives for increasing the food consumption levels of these poor households. An accelerated effort at providing safe water at reasonable cost must also be sought. Finally, the important role of women in the labor force, particularly, as vendors and petty traders must be recognized, and programs to facilitate these productive activities through credit and transportation systems must be considered.

### Coastal Areas

Smaller urban areas for the Coast are not greatly different from Lima and the other large cities except perhaps that access to public services is more difficult, or in some cases, non-existent, particularly since the recent flooding in the North. Many people of these areas in the North are suffering from acute malnutrition due to the recent disasters. In the rural areas of the Coast the more serious problems are centered on agricultural workers without land and some cooperative members whose earnings are insufficient to purchase even minimally adequate diets. These groups also suffer from almost non-existent or ineffective public health, water and sewerage services. Even for many that have access to land, agricultural production is risky since water yields in many irrigated areas depend on annual rainfall in the highland watersheds. A significant number of farmers do not have access to credit and agricultural services for food production since "de-facto" if not "de-jure" these services are rationed so as to favor non-food or exportable production. Many cooperative members and small farmers are highly dependent on the market for their food and their incomes are at or below the minimum wage. Diets are therefore highly specialized to rice and wheat products purchased in the market.

Additionally, approximately 36% of the working age population represents landless agricultural workers who depend on agricultural factor markets for their income and on agricultural product markets for their food. This group is particularly hard hit by the impacts of the disasters since plantings in both the North and South Coast are estimated to be down by as much as 35% in 1983

as a result of the floods in the North and lack of water for irrigation in the South. A possible long term solution for the problems of this group is to promote the development of high unit value and labor intensive agriculture in the irrigated Coastal areas. Industrial development policy must also be reviewed with a view towards decentralizing future development to smaller cities and towns along the Coast.

The problems of fisheries workers, particularly in Chimbote, are desperate; efforts to convert some to agricultural work have been frustrated. This situation is one more expression of a desperate employment situation throughout the country.

In the small cities and rural areas, much needs to be done towards improving the coverage of safe water, sanitation and towards providing effective curative and preventive health care services. The cooperatives of the Coast also pose special problems which require attention in the short run. Many are poorly managed and under capitalized; for many, their members have become low paid salaried workers rather than true participants. Credit problems lead to late payments and therefore to low or unstable levels of food consumption. Consideration should be given to promoting the production of food for members' consumption in those areas where the production emphasis is towards cotton, maize and sorghum and other "cash" crops. The field teams reported that the food marketing systems of the Coast were costly and contributed to food insecurity for all of the Coastal population.

### Sierra Regions

Sierra dwellers suffer the same problems as their occupational counterparts in the cities and Coast, except that the inadequacy of incomes and of public services is even more extreme. Important government officials consider the Sierra dweller, particularly the peasant, as a lost cause or strictly a "welfare case". The agricultural households suffer from low incomes because land holdings are small and the structure of agricultural incentives has been biased against their products through price controls, over valued exchange rates, industrial protection and subsidies to farmers in other regions. Food supplies are insecure because many subregions are drought-prone and agricultural crops subject to plant diseases. Life in the highlands is made more precarious because the cold climates contribute to crowding and unsanitary living conditions as well as demand a higher level of caloric intake. Information is a very scarce resource and its lack adds to the riskiness of all economic activity. Transport and communication are costly and difficult. It is widely reported that even highland diets have become dependent on rice and imported wheat products. It is unlikely that calorie adequacy could be obtained with these diets since for many bulk would be limiting unless more nutrient dense foods and calorie sources such as oil are added to the diet. Specific nutrient deficiencies are leading to problems such as anemia and goiter.

The highland population has historically exhibited the most serious nutritional and income problems and the present crisis is affecting this population most severely. While the population of the Southern Sierra is directly affected by the prolonged drought, serious problems exist for various population groups in the Northern and Central Sierra regions. Conditions in the Southern Sierra are disastrous and urgent action is required to prevent famine. Most of the population is consuming grossly inadequate diets that fill only a one-half to two-thirds of energy needs. For some households, food assistance programs represent the only source of food, and there is an urgent need to increase the rations provided by these various emergency relief efforts.

Beyond the present crisis, the region is undergoing a rapid process of decapitalization which will affect incomes, and nutritional wellbeing for a long time into the future. Assistance to slow this process is urgently needed and substantial efforts are underway from USAID and other donors. These efforts will hopefully prevent major disaster involving mass starvation and deaths. The residuals of the present crisis must be taken into consideration in addressing the nutritional problems of the highland populations.

Subsistence farmers and landless agricultural workers are suffering the most from the present drought conditions. Many households in these groups have responded to the crisis with the outmigration of their working age males. Some have migrated to nearby jungle areas others to Arequipa and to Coastal areas. Highland pastoralists will suffer the greatest long term damage since herds are being sold off at low prices to prevent greater loss through the death of animals. This will result in the depletion of the sources of meat and wool and

will require long term investment to re-build the depleted livestock herds.

Subsistence farmers, landless workers and petty traders in other regions of the Sierra also live under precarious conditions which reflect the "normal" conditions of the whole highlands.

From a half to three-fourths of the highland populations of the various regions depend directly on agriculture for their livelihood. The problems of low agricultural productivity and improved agricultural incentives must be a priority effort to address the nutritional problems of these population groups. Because of the high market dependence in both factor and product markets, agricultural output and marketed surplus must both rise by perhaps 50% in order to ameliorate the conditions of extreme poverty that prevail throughout the Sierra regions. Agricultural promotion and marketing services must be greatly increased in the short run to assist these populations to produce and market more food. These services must be delivered hand in hand with an improved structure of incentives regarding the prices of highland food crops and animal species.

A population group with special problems is the group of mineworkers. These households consume some of the poorest diets and live under harsh environmental conditions. Since the mineral sector is not likely to recover soon, this group will continue to suffer from very low incomes and poor nutrition. This group and other workers of the highlands must be assisted in developing higher productivity employment in areas other than mining and agriculture. A labor market study of the highlands is urgently needed to help find ways of increasing value added in the highlands themselves, since the capacity of other regions to absorb labor is also limited.

## Jungle Regions

Selva conditions vary widely since there are several eco-systems contained within that vast expanse of land. Most populations, even the urban, live in isolation. Only recently have roads penetrated the Eastern foothills of the Andes to the so-called high jungle. Native populations practice primitive slash and burn agriculture or live at near subsistence levels as hunters, fishers and farmers along the many rivers. For these populations food supplies are insecure and access to health services prohibitively difficult. Recent migrants to certain areas are suffering from health problems because their imported hygiene practices are not suited for the hot and humid tropical conditions. Currently some high jungle areas are benefitting from subsidies to maize and rice production; it is not certain that production is sustainable in the absence of the subsidies or improved cropping systems which are better adapted to the fragile environment. This latter point could present a serious threat to food security of these populations and of those that become dependent on their output, e.g. urban rice consumers. In many cases, the diets are low in protein since energy is derived primarily from rice, cassava, and plantains. Surprisingly, fruits play a small role in the diet. Therefore, specific nutrient deficiencies are likely, and unlike the rest of the country it is not likely that energy adequacy would lead to nutritional adequacy.

The problems of employment, income, food acquisition, public services, health, transport and communication are all in principle similar for these groups but both qualitative and quantitative differences even within major groups will require a variety of innovative approaches for their solution.

From five to seven million humans live under precarious or life threatening conditions related to food inadequacy and insecurity as aggravated by poor environmental health; the magnitude is such that the solution of problems must be based on policy rather than palliative interventions. Within the policy arena, it is clear that the priority must be towards improving labor productivity in all sectors with the highest priority given to increasing labor productivity and output in the food production sub-sector.

#### 3.4.3 Problems Not Addressed

Given the magnitude of the problem, the strategy should encompass all nutritional problems. The team, based on review of the available data, chose to exclude certain specific problems from inclusion in the strategy among them are breast feeding and weaning practices, micro-element deficiencies and the possible use of enriched foods. In the case of breast feeding, its duration seems appropriate in most cases among the low income populations. Weaning practices are not themselves believed to be the proximal cause of early childhood malnutrition but that malnutrition first results from exposure to the harsh environment and not as a result of inappropriate weaning. The problem with weaning diets is that for most households the diet is inadequate for everybody. Specific deficiencies and the need for enrichment cannot be ascertained without biochemical studies; except for iodine and iron in sick persons it is likely that other specific nutrient deficiencies would be solved if diets were calorically adequate and composed of the variety of foods

available. Because the Mission had invested substantial efforts in considering a weaning foods project, the questions of breast feeding and weaning foods are reviewed in the following paragraphs.

Breast feeding is used as the exclusive source of food for infants up to four months in age by more than three-fourths of Peruvian mothers. Regional patterns in infant feeding practices vary, but the practices themselves are appropriate throughout the country.

For example, Hernandez and Arnauld (1981) report in an F.A.O. evaluation of child feeding programs in the Department of Ancash that breast feeding continues until almost age two years for more than 40% of the children, that supplemental milk is introduced around five or six months of age for over 50% of children and that solid foods are introduced by age nine months for all children. Cereal based greuls and diluted evaporated milk are the principal supplements to mothers' milk. Children are usually weaned to the family's diet. The authors of the F.A.O. report indicate that there are significant but nutritionally inconsequential differences between urban and rural sites in this Central Sierra locale.

In other parts of the Sierra the infant feeding practices are similar; Vemury (1979) reported for the southern highlands that milk and greuls are given as supplements around age four to six months and the adult diet is introduced by age 16 months. At the time of this study, cows' milk was the supplement for over 40% of infants. The nutrition strategy field person for the southern Sierra, E. Karp-Toledo (1983) reported that as a result of the present crisis, "only a few drops of milk are given to the infants"; while lactation persists to age two years, the children are introduced to small

portions of the family diet at age one year.

The coastal and Jungle assessment teams reported high incidence of breast feeding also, but earlier weaning ages (one year) with the family diet constituting the weaning foods. These latter are first introduced as supplements in the form of soups and purees at around age three months. Cows milk is available as a supplement to mother's milk in only a very few cases. This pattern of supplementation and weaning is inappropriate because the diet of the whole family is inappropriate. For example, in rural coastal areas, only the young children get any milk.

Anderson et al (1979) reported that 11% of babies in a shanty town in the south of Lima were bottle fed and the rest breast fed. Supplementation and weaning patterns were similar to the rest of the Coast. An additional insight, however, revealed that bottle fed babies tended to be those born in institutions rather than at home. Mother's work did not seem to affect the incidence of breast feeding, because working women tend to be employed as petty vendors and can take their nursing infants to work with them. This result and the overall panorama of infant feeding practices in urban areas in Peru seems consistent with the results of a recent Sigma One Corporation study for urban Panama and Cali, Colombia, that breast feeding is a highly effective response to poverty and that it can only partially protect infants for unhealthy environmental conditions and the inadequacy of the household's diet (Franklin and Harrell, 1983).

The teams appreciation of the infant feeding situation is that neither breast feeding promotion nor the introduction of commercially produced (and subsidized) weaning foods are warranted. Appropriate infant feeding practices

should of course form part of all outreach and educational efforts, but the problems of inadequate diets and poor health for the whole household must be the primary focus of the strategy and its tactics. At the present time, the diets of a majority of households are bulky and of low caloric and nutrient densities. Oil, eggs and dairy products as sources of energy and lipids need to be added to the family diet. Eggs, dairy products, meats and legumes need to be added to family diets as sources of protein. All these foods can be readily added to infant diets at appropriate times. If any efforts are to be focused on infant feeding they can be based on increasing the availability of these foods to the whole household.

#### 3.4.4 Information Needs

While the review of secondary information and direct field observation has provided an acceptable basis for the design of a strategy, its implementation will require an extensive and intensive updating of information on nutrition and its causal factors at the household, community, regional and national levels. Ultimately, an integrated and standardized system is needed for health, labor, agricultural and other statistics. The design and implementation of such systems form an element in the strategy itself. In the short run, reliable information is needed on morbidity, health problems, health system use, income and expenditures, food consumption, occupations, agricultural prices, marketing margins, costs of producing food in different parts of the country, etc.

Initiatives are underway which will resolve some of these problems in a short run manner. They should not detract from building a solid and

sustainable information base. Further discussion of the data needs is presented as part of the strategy itself. The USAID, GTZ, and World Bank are supporting a national nutrition survey to provide anthropometric, health practice and limited economic data which should permit a detailed diagnosis of the nutritional status of the various population groups as well as important information for policy and program formulation. The USAID supported rural household survey will also provide important information on the economics of agricultural production and farm incomes. Regretably, neither effort will provide the minimal information regarding food consumption by households. Such information is needed to address one of the priority issues of the strategy- a nutrition oriented food policy for all in Peru.

#### 4.0 THE POLICY ENVIRONMENT

The economy of Peru is at internal and external disequilibrium; public sector deficits have averaged 6.6% of gross domestic product for the last ten years, the deficit for the last two complete years has averaged 8.5% of GDP and the current account in the balance of payments has been in deficit in each of the last ten years. Peru has had to resort to borrowing on international markets to finance its public sector deficits and its import bill. Much of the international debt has been on a short term basis, and only recently has the country received some respite on its debt service obligations through renegotiation of terms at the so-called Club of Paris. The public sector deficit has also contributed to rapid domestic inflation which is currently at approximately 100% annually. At the same time, attempts are being directed at maintaining purchasing power parity with the U.S. dollar, which have required a progressive series of almost daily devaluations. These mini-devaluations have been proceeding at a rate faster than the domestic inflation.

These conditions of external and internal imbalance are a consequence of endogenous policies and their impact on the allocation of domestic resources as well as exogeneous factors which determine market conditions for Peru's traditional exports. Among the policies which have contributed to the present situation are past exchange rate policies, restrictions on and taxation of international trade, consumer price controls, agricultural pricing policies

which have distorted the incentives facing agriculture as a whole and the intra-sectoral structure of incentives and an overall industrialization and import substitution policy which interacted with other economic factors to transmit distortions to labor markets and sectors producing tradeable products. These policies have had multiple objectives regarding employment, consumption and the distribution of income. Their general effect has been to favor the migration of resources from agriculture to other sectors and to stimulate the consumption of imported foodstuffs relative to the level which would have prevailed under a more neutral structure of incentives.

The fiscal and monetary authorities have been attempting to bring the economy into equilibrium through a number of austerity measures which have exacerbated the impact of the recent world recession. One of the principal impacts of the corrective measures has been to create a liquidity problem for the private banking system and to dry up private investment. This and the decline in demand for Peru's exports has placed the country in conditions of domestic recession; estimates of the decline in real output were projected to be between 5 to 10% at the beginning of 1983. At mid-1983, output is estimated to be down by 13%. The recession and inflation have worked together to reduce the real incomes of wage earners and salaried employees. Measured unemployment has increased from 7 to 8.3%, only 41% of the labor force is considered as fully employed, and the participation in the informal sector by discouraged workers has also increased.

The prospects for a rapid recovery are not optimistic; the world economy appears well on the way to recovery but demand for Peru's traditional exports is likely to lag, particularly for copper. Furthermore, the floods in the

North and droughts in the southern Sierra have accelerated a serious de-capitalization of the agricultural productive base and of public infrastructure. Prior to this crisis, the irrigated sector was suffering from administrative and environmental management problems.

The fiscal austerity measures manifest themselves in many forms; one important manner is that budgeted expenditures are delayed or foregone so that public sector activities are also either delayed or foregone. Two important impacts of this are that counterpart funds for development projects are delayed to cause disbursement problems for international assistance efforts and public sector services are rendered ineffective because of lacks in supplies or de-moralized employees. Furthermore, the economic crisis creates pressures to forego "social" expenditures in favor of "economically productive" expenditures so that sectors such as health and education are likely to receive low priority for funds viz a viz other sectors.

It is within this context of economic imbalance and crisis that the nutrition strategy has been developed. By Latin American standards, Peru could (or should?) spend a greater share of its gross domestic product on social sectors including nutrition, perhaps an additional 1% of GDP (Selcowsky, 1979; World Bank, 1981). The current environment is such that this action is not likely in the near future, particularly since there is much to be gained from a more efficient use of the existing fiscal and donor resources. For example, the budgets under the direct control of the ministries of health, labor and education have dropped to below 4% of gross domestic product for 1984. As will be discussed further in this chapter, food subsidies, food marketing, private

sector involvement in preventive care and community cost sharing in public services are issues that warrant discussions in policy dialogues. The areas for policy dialogue between USAID and the government center on making effective use of available resources and on improving the structure of incentives so that private initiatives can contribute to the solution of the country's serious nutrition and health problems.

#### 4.1 FOOD POLICY

The agricultural economy of Peru has, during the last 15 years, undergone a series of dramatic changes which began with the economic policies of the military government in 1968; these included extensive land redistribution and parastatal intervention in the marketing of food commodities and other products. In July of 1980, the military government was replaced by a popularly elected civilian government which instituted its own economic policies. Some of these were designed to remove the infrastructural apparatus for market intervention which had been instituted by the military government and to promote trade and commercial liberalization. This latter strategy had as a partial goal the amelioration of severe balance of payments and inflationary problems which had dominated the last five years of the military government; the principal goal, however, was to promote growth and economic recovery. These various economic events have impinged directly and indirectly on the availability and cost of food for different population groups in Peru.

Peru has not had an explicit nutrition-oriented policy; rather, it has pursued what is essentially a cheap food policy for urban consumers. The motivations are undoubtedly multiple, including control of the effect of food

prices on real wages and the cost of living. This is widely reported to have led to an increased dependence on imports to fulfill urban food needs.

The apparent increasing dependence on imported foodstuffs may have been a consequence of the supply shortfalls in domestic production caused partly by the resource allocation consequences of the agrarian reform and the parastatal control of agricultural markets. The need for imports may have also been the consequence of a consumer-oriented food subsidy scheme which may have combined with supply short-falls to create conditions of excess demand in the markets for foodstuffs. Currently, Peru imports one billion dollars worth of foodstuffs annually. Little analysis exists on whether or not this is near a social optimum in level or composition.

During the seventies, efforts were undertaken by the military government to restructure the agricultural sector through two major thrusts --factor market interventions, including land reform, and parastatal intervention in product markets. These efforts were part of an import substitution-industrialization approach to economic development. It was expected that redistributing the factors of production, particularly land, would improve incomes for the rural population and increase the productivity of the agricultural sector. At the same time, the agricultural sector, which was to benefit from these public interventions, had to provide reasonably priced foodstuffs for the urban areas and had to contribute to foreign exchange earnings through expanded agricultural exports. It is not clear whether or not this created an export versus food crop dilemma, but it is noteworthy that by 1974 it became a legal requirement that 40% of all land be sown to food crops. A secondary, but important socioeconomic goal for the agrarian reform was to

incorporate the highland peasants into the national economy. Additionally, the government provided subsidized credit, equipment and agro-chemicals to the various types of reform enterprises in an effort to increase agricultural output. On the consumers' side, price controls and direct involvement by parastatals in food marketing sought to maintain adequate and low cost food supplies, particularly in urban areas. These efforts later included substantial subsidization of imported grains . Increasing subsidies became necessary to maintain domestic prices at low levels when international prices rose rapidly in the mid-1970's.

About 40% of the total farm land was redistributed from large landowners to peasants and rural workers. It was expected that the change in land ownership and the creation of the cooperative sector would automatically lead to increased production and productivity. The impact of the land reform has been studied widely by a number of Peruvian scholars (Caballero, 1967; Caballero and Alvarez, 1980). There are, however, few studies that are clear on the success or failure of the agrarian reform regarding the goals of increased production and productivity. Most of the studies that have been undertaken relate more to the political and broader economic consequences of the land reform. It is uncertain what the income distribution impacts of the agrarian reform were, but it has been recognized in Peru that the production impacts were not substantial. This may not have been a consequence of the land reform per-se, but rather a consequence of the depressed structure of incentives which was facing agricultural production in general. It is even possible that the land reform may have increased productivity on the non-reform areas, since much of the human capital and some of the financial

capital was transferred from larger to smaller land holdings which were subsequently operated more intensively. In general, the production, income redistribution and employment effects of the 1969 reform are generally believed to have been limited. In fact, some scholars and policy-makers suggest that the disappointing production impacts of the reform led the military government to rely on price controls and marketing policies to assure cheaply priced foodstuffs to the urban areas.

The original intent of introducing parastatal control of the marketing of food commodities was to lower marketing margins so as to improve farm incomes and lower consumer prices. Parastatals entered into the marketing of rice, maize, oilseeds and oils, as well as sugar and some cash crops such as cotton. In addition to direct parastatal control of the marketing for these foods, there were rationing and price controls on other foods, including beef, fish and poultry. The extent of market control extended to the retail level, where a chain of retail outlets was operated by the parastatal EPSA (Empresa Publica de Servicios Agricolas). EPSA at first tried to control all facets of food marketing, but was later faced with the need to compete with and trade with private markets. The market for potatoes was not directly controlled, but limits on storage volumes also induced higher marketing costs for potatoes.

With the exception of rice, the parastatals were only able to capture a small part of the marketable surplus, and therefore were only able to deliver small quantities to the urban areas. This increased the requirement for food imports which through this period were all controlled directly by the government. The primary imports were wheat, maize, milk and dairy products, with wheat growing in importance throughout the decade. Wheat was subsidized

beginning in 1973 to maintain low domestic prices to the milling industry and fixed prices at the retail level for noodles and bread. Maize supplies were imported and also procured domestically through transport subsidies for jungle production. Maize imports were subsidized as a consequence of the high international prices during the world food crisis of the mid-1970's. In addition to the direct subsidies paid by the treasury for the import of foods, the domestic inflation caused an overvaluation of the sol, which led to implicit subsidies for the imported food supplies. The droughts of the mid-1970's and perhaps the parastatal control of the market for rice led to the need for imports during much of the 1970's. In the case of rice and other domestically produced commodities, the imports may have been required because the over-valued exchange implicitly taxed domestic producers and favored imports.

By the end of the military government in 1980, the value of direct subsidies from the treasury on imported foodstuffs was approximately 180 million U.S. dollars, and these were being allocated to wheat, sugar, rice, vegetable oils and dairy products. The effect of these subsidies was to decrease the consumer prices for these foodstuffs by an average of 15% (Franklin, 1980). Even in the presence of these food subsidies, nutritional problems were significant throughout the period. This occurred in part because the non-controlled commodities rose in price and the controls on some of the controlled commodities were not effective. For example, a system of grading for rice was introduced, but only the high price grades were readily available.

The civilian government that was elected in mid-1980 has implemented a

number of policies which sought to promote economic recovery within a framework of relative financial stability. The policies have included moves towards trade liberalization and a shift of the subsidies on imported foodstuffs to domestically produced foods, particularly rice. Other public sector initiatives have been directed at improving public sector revenues and government administrative effectiveness. In the agricultural sector, investments are being directed at revitalizing the agricultural extension and research services. Official and parastatal involvement in input and credit distribution remains, as does the subsidization of transport for jungle production. These latter efforts notwithstanding, there exists the thrust towards reliance on market forces and the private sector for the allocation of domestic resources.

The consequences of economic policy actions designed to place the economy on the path to recovery and stability may have exacerbated the nutritional situation in the last two or three years. It is apparent that the stabilization goals are not being met; inflation continues at a rapid rate and fiscal restraint measures may be reducing the real incomes of certain population groups. The response of the agricultural sector to improved incentives, particularly production, transport and credit subsidies led to a spectacular burst of output in the 1981/1982 time period, but was snuffed out by the recent ecological crisis. Even without the ecological crisis, however, the structure of incentives appears to have remained biased in favor of commercial agriculture. For example, the share of on farm consumption in total cereal disappearance declined as a result of high levels of imports and higher marketed surpluses in 1981 and 1982 (see the Statistical Appendix).

A possible explanation for higher marketed surpluses could be that more of domestic cereal production is being produced on commercial rather than subsistence or family farms. This in turn could be the result of the subsidies to rice production and other promotional efforts such as transport subsidies which are being directed towards supporting commercial agriculture in the jungle. Furthermore, the increases in domestically produced cereals could be the result of improved rainfall conditions in 1981 and 1982. Finally, these increases in domestic production and marketed surplus could be the joint result of improved incentives for commercial cereal production and improved weather. It is also important to note that with the 81/82 spurt, agricultural output did not reach the levels of the early 70's.

The overall decline in the consumption of cereals by farm households could be the result of multiple phenomena, such as increased rural to urban migration and depressed incentives for subsistence or small scale production. The possibility that small scale agriculture is either lagging or stagnant is suggested by the production data on potatoes and beans. The output of these two crops has remained nearly constant over the last 15 years; the bulk of the production of these crops comes from highland small farms, although some production comes from commercial production under irrigation in the coastal regions. The bias against small scale highland agriculture is deeply imbedded in the agricultural development policy. The main thrust of agricultural development has been to expand the "agricultural frontier" through bringing desert lands in the Coast under irrigation and promoting crop agriculture in the high jungle. This horizontal expansion of land is being accomplished through projects with very high costs per unit of land brought under

production. These investments and agricultural price distortions lead to misallocations of domestic resources. Water charges are too low in the irrigated schemes and therefore inefficient use is made of that scarce resource (USAID Irrigation Sector Assessment, 1983). Agricultural research extension and other services are only now being revitalized after suffering a severe decapitalization during the 1970's. There are few apparent efforts to make a more effective use of the human resources in highland agriculture; the new research and extension initiatives are focused on the Coast and Jungle, with minor exceptions (INIPA, 1982; 1983).

A recent study by a University of Minnesota Team has reviewed the recent agricultural policies and concluded that trade policy in Peru continues to discriminate against agriculture, that placing tradeable crops at real import parity prices could result in higher potato prices and improved incomes for small Sierra farms, food price subsidies create distortions to domestic resource allocation and contribute to the budget deficit and inflation and that food subsidies are an inefficient manner for providing income and nutritional support to poor people (Orden, et al, 1982). The results of the Minnesota analysis and our own discussion reflect the fact that there has not been a clear focus for food policy in Peru. The food problems are viewed principally as problems of dependence on imports and different analysts blame different forces as the cause. Some blame market imperfections and monopoly control by the food processing industry, others blame the weather, others blame the lack of credit and still others blame inefficient public sector institutions. There is a little analysis of policy alternatives. Proposals by different public sector offices frequently conflict with each other and may

also be internally inconsistent. For example, calls for self sufficiency do not recognize that self sufficiency may come at higher domestic resource costs than acquiring imports through the sale of those commodities in which Peru has international comparative advantage. In the emphasis on production in the jungle no analysis has been made of the foreign exchange costs of transporting inputs to the jungle and transporting the product back to the consumption centers. Should the jungle feed itself or the cities, what are the comparative costs?

An important aspect of official pronouncements on food policy is that the problem is viewed principally as one of supply and increased output and only occasionally is concern expressed for rural incomes and seldom are consumption or nutritional issues considered. When consumption/nutrition issues are considered in food and agricultural policy discussion they are treated as tangential issues, rather than central. At a recent high level meeting to discuss agricultural planning for the future, the issue of food needs of the population was fourth in a list of four guiding principles. In that same discussion, nutrition policy was seventh of seven in the policy agenda. When discussion of nutritional issues was finally touched it was in the context of providing surpluses for the supplementary feeding programs and of promoting the consumption of products from in the highlands. More analysis is needed on the best use of scarce domestic resources, the role of various foods in regional diets, price responsiveness in supply and consumption by different producer and consumer groups and on the income effects of alternative and agricultural policies. One policy that screams for analysis is the one on subsidies.

#### 4.1.1 Impact of Food Subsidies

Food subsidies as an instrument for providing nutritional assistance to low income consumers have been demonstrated to be of low cost effectiveness (Reutlinger and Selowsky, 1976) and perhaps regressive (Franklin and Wadman, 1980; Franklin et al, 1982; Franklin, 1983). Analysts, therefore, call for targetted approaches such as food stamp programs or self targetting by selecting commodities that only the poor will eat (Berg, 1981); implicitly these latter tend to have low income and price elasticities of demand. Scobie and Perrin (1979) showed that it is very difficult to achieve significant nutritional impact with such schemes. In their example for Colombia, maize was the cost efficient commodity, and low income consumers would have had to be bribed to consume enough to close the observed calorie gaps. The above notwithstanding, many countries rely on explicit and implicit subsidies on food as a matter of public policy to favor urban consumers (Amat y Leon and Leon, 1983; Keeler et al, 1982).

Since 1969 the average annual food subsidy budget of the central government has averaged close to \$100 U.S. millions in real 1973 dollars; the 1983 fiscal budget allocates the equivalent of approximately \$200 U.S. millions to subsidize food consumption. The subsidy budget represents 20% of the fiscal deficit. Rice represents 53% of the subsidy budget; imported wheat represents another 32% of the subsidy budget; milk represents another 11%; and the rest is absorbed by soy oil and maize. Franklin (1980) estimated that in 1980 for Metropolitan Lima the lowest 25% of the income distribution was receiving only 20% of the subsidies going to Lima. Furthermore, Lima receives

a disproportionate share of the subsidized commodities: with less than 30% of the population it receives more than 50% of the consumer subsidies. Calculations by the Central Reserve Bank indicate that through 1980, subsidies on food tended to transfer income from the middle income group (50th to 90th percentile) to the lower half and to the upper 10% of the income distribution. Franklin estimated that the subsidies depressed the retail price of cereals by about 15% and increase calorie intake from cereals by about 2%. These two results, together, suggest that subsidies are ineffective as an income redistribution instrument and as a nutritional instrument, since the very poor do not yet participate as fully in the subsidies as the not so poor.

Since 1980, the subsidies have been directed towards domestically produced rice and the incidence of the subsidy to rice may be even more regressive with respect to income distribution than the subsidies on imported commodities. Table 9 presents an analysis of the incidence of the subsidy on rice using data from ECASA for the first half of 1983. The incidence of the rice subsidy on producers and consumers was estimated with the official prices that were in effect on the 30th of March 1983. The calculations are performed according to the method based on comparing the consumers' and producers' prices at import parity placed in Lima. The analysis is performed for two grades of rice "superior" and "corriente". The higher grade rice, "superior", is more likely to be equivalent to imported rice. To adjust for the quality differences, the import parity price is adjusted down by 30% for the comparison with "corriente". The producers' price is converted to a "border price" to compare with import parity by adjusting for a milling extraction rate and transport, milling, storage and packaging costs. "Superior" is compared with American

Table 9. Incidence of Subsidies to Rice According to Production Region and Grade of Rice Using Prices in Effect First Half 1983

Price in \$/MT at average official exchange rate

	Imported American	Superior		Corriente	
		Coast	Selva	Coast	Selva
Producers Price Milled Equivalent Placed in Callao	N.A.	369	405	369	405
Import Parity Price	407*	407*	407*	240**	240**
Price to Re- tailer	289	330	330	229	229
Producer's Subsidy %	N.A.	-9.3%	-0.5%	54%	69%
Consumer's Subsidy %	29%	19%	19%	4.6%	4.6%
Retailers Margin as % of Retail Price	8.4%	9.2%	9.2%	0.3%	0.3%

\* Based on current PL 480 Contract: Source ECASA

\*\* Quality adjusted price for purchases from Burma and Pakistan

Source: Sigma One Corporation, 1983

PL480 imports and "corriente" is compared with 70% of the C.I.F. value of Asian rice.

In relative terms consumers of high quality imported american rice, provided through PL480, receive the highest level of subsidization and consumers of domestically produced low quality rice receive the lowest level of consumer subsidies while domestic producers of high quality rice are taxed relative to import parity and domestic producers of low quality rice receive the highest relative subsidization.

The structure of incentives in the rice market is further distorted by the very low margins which are allowed to retailers of "corriente" rice. These very low margins induce retailers to either not handle the lower quality rice or, if they do, to attempt to raise the effective margin through tie-in sales. The multiple tier pricing structure of the rice market provides incentives that would tend to bias the effect of the consumer component of the rice subsidy away from the poor since "corriente" rice is generally not available in retail markets at the official price and, if available, it is of extremely low quality.

If there existed a single quality of rice, and if it were comparable in quality to rice imported from Asia, the impact of the subsidy on rice would still be somewhat regressive. Under these assumption, the \$101 U.S. million budgeted for subsidies on rice would be distributed as follows:

	In million US dollars
Producers	48.6
Consumers in Lima:	
High 33% of Income Distribution	9.5
Middle 33% of Income Distribution	9.1
Lowest 33% of Income Distribution	8.8
TOTAL LIMA	27.4
Consumers in rest of country	25.0

This latter computation is optimistic in terms of the incidence of the rice subsidy on low income consumers in Metropolitan Lima; as such it would increase rice consumption by a maximum of 9% from the combined price and income effects and results in an increase of approximately 1% of the calorie intakes of the poor in Metropolitan Lima. It is possible however, that the market structure, e.g. tie-in sales and shortages totally erode even this small impact.

The foregoing analysis should not be used to argue for the elimination of rice subsidies because the impacts in the analysis are calculated relative to a free trade alternative at current low world market prices for rice. The analysis merely seeks to demonstrate that food subsidies are instruments of low cost effectiveness and that their incidence is not always clear. A recommendation on subsidies for food can only be formulated after careful analysis of a whole array of policy instruments related to the markets for the

subsidized commodities. For example, "free trade" in rice would transmit the instability of a volatile world market to producers and consumers --such a result might involve high social and political costs. Furthermore, more analysis is needed on the role of ECASA and ENCI and whether total control of the relevant markets is warranted. Work at Sigma One Corporation has shown that parastatal marketing organizations can be de-stabilizing and can magnify the impact of world price and domestic supply fluctuations (Franklin, 1983; Keeler et al, 1982). Furthermore, parastatal control and other controls over the last two decades have undoubtedly de-capitalized the private marketing system. Before the present system is modified analysis on required private and public investments must be also undertaken.

Further analysis is warranted, because the subsidy budget is large and could represent a more productive resource if applied to other areas of public expenditure, particularly if it were better directed towards the nutritional needs of the poor in urban and rural areas. e.g. improved food marketing systems.

#### 4.1.2 Food Marketing Policies

Another aspect of food policy that has received much comment but little analysis relates to the marketing and distribution system for domestically produced food commodities. Indirect evidence suggests that marketing margins have increased in recent years. If so, domestic producers and consumers have both suffered at the expense of so called middlemen. Field observations revealed remarkably little geographic dispersion of retail prices for most commodities, including the perishables. Reportedly, however, the uncertainty

created by inflation and the lack of credit in rural areas have combined to create a situation where farmers are forced to borrow against their future harvest from truckers and other marketers. These "forward sales" occur at fixed nominal prices so that the real price received by farmers is substantially less than his expectations at planting time. Past public interventions in the marketing system may have destroyed informal communications channels and other infrastructure. There appears to now be a need for a clear statement of policy on the role of the state in marketing and for clear signals to be transmitted both to producers and consumers. The absence of such policy statements and observance of the rules of the game create incentives for speculative behavior rather than control of such activities. Such policy initiatives require a careful study of the role of ECASA, ENCI, the Agrarian Bank and of the directorate of Marketing within the Ministry of Agriculture. Late payments by the parastatals and bank are a serious disincentive for market production. Our estimates indicate that approximately 75% of income requirements for Sierra farmers should come in the form of cash, and therefore well organized markets can make an important impact on the lives of Sierra dwellers.

#### 4.2 THE NEED FOR A NUTRITION POLICY

As was discussed in the previous section neither a food subsidy policy nor a food supply policy can address the nutritional needs of the majority of the population. Obviously under present conditions more food is better than less, particularly if it can be purchased with the incomes of the urban and

rural poor. A pure food supply policy may be aggravating the income problems of the rural poor farmers and agricultural workers. Furthermore, the structure of incentives in other sectors could also be impeding the solution of nutritional problems of the urban and rural poor. For example, industrial protection coupled with incentives for the importation of capital equipment and over-valued exchange rates can lead to an anti-employment bias in the industrial sector. Labor protection laws may also serve as a disincentive for labor use by potential employers. Consumer protection regulations, particularly price controls, can lead to the generation of "black" and "gray" markets, these latter usually punish the poor.

The existence of diverse food assistance programs and of a food subsidy scheme also serve to divert attention from the central problem since they contribute to the notion that nutrition and food are synonymous. On the other hand, our analysis should not be interpreted to mean that nutrition in Peru is not a food problem but an income problem. It is both and more! Food policy and income and employment policies each have important roles to play, but each will be limited in their impact. If food subsidies could be targetted to the lower half of the income distribution and applied to milk, cereals, sugars, oils and grain legumes, the average price of these commodities would drop by at most an additional 15%. If the demand by the poor is as income elastic as estimated by Amat y Leon et al (1981) and price elastic (say an elasticity of 1), calorie consumption by the poor would increase from inadequate to marginal, by increasing at most 20%. The true elasticities are probably much lower so that the impacts would be substantially lower. Attempting to close the nutrient gaps with income growth or income transfers would require a

growth in personal incomes between \$80 to \$200 U. S. in real terms depending on where people are on the income distribution scale. With the present income distribution that would require an increase of nearly \$225 U.S. per capita per year in real terms. The growth rates implied by this figure seem unlikely from the present perspective of declining aggregate growth and the de-capitalizing impacts of the disasters.

What is required is a multiple front attack to increase labor productivity in all sectors, but particularly in agriculture, and public and private actions to make maximum use of the available food resources through improvements in the marketing system and most importantly by preserving the nutrients that are ingested by the poor through an improved health system. Thus all sectoral policies need to be reviewed for their nutritional impact.

In the area of health, policy efforts must be aimed at redirecting the operations of the health system towards implementing the policy as already written. Presently the system is demand driven by contacts initiated by the poor after they become ill. The provision of services by the public health system is free, in principle, but rationed by queuing and inaccessibility. The policy as written and pronounced is oriented towards preventive health, but its implementation is deficient. The public and private delivery systems are oriented towards curative services; both sectors require a re-structuring of incentives so that preventive health becomes the focus. Here too lies another important area for policy dialogue since the present resources could be more effectively used to assist the household sector to be the first level of prevention for the diseases that waste nutrients and interfere with productive activities.

In the area of public health and public services, there is a populist notion that these services should be "free" for the poor. Many times the way in which the poor pay for "free" services causes the poor to pay more than the not poor. Take the case of water in Lima, inflation and nominally fixed tariffs mean that the real tariffs are ridiculously low (less than US\$1 per month for a quarter million dollar home with a swimming pool). These tariffs cannot cover costs and current users must be subsidized from general funds which add to the deficits and to inflation. Effectively, the poor without water services subsidize the not so poor. Additionally, the poor without water pay a lot! The price in Lima shanty towns is 30 cents US for 50 gallons or roughly one half the cost of feeding one person for one day.

In the area of "free" health services, the situation is more complex but similar. Not only are there real costs through queuing, but also the real costs of ineffective services provided by physicians who have a conflict of interest. We have received many reports during the field work that public system providers refer their public patients to private clinics and pharmacies owned by the very same public health personnel that made the referral. USAID should seek an active role in the forthcoming IBRD study on "willingness to pay". USAID should collaborate with the Bank and the government to measure the extent to which the poor do and can pay for public services and then seek alternatives to full public financing of health and other services. Such analyses and alternatives should form part of the development of a national nutrition policy.

## 5.0 INSTITUTIONAL FRAMEWORK

It is not surprising that since there is not a nutrition policy in Peru that there is also not an institutional framework for addressing nutrition related policy and program issues. Many institutions have nutritional objectives in their mandates and many individuals within these institutions endeavor to fulfill or even go beyond those mandates, but the simple fact is that nutritional problems are not being directly or effectively addressed by any institution capable of making a substantial impact. All this is not to ignore that food and nutrition issues have been and continue to be the object of seminars, scholarly and popular publications, official pronouncements and the work of high level official groups. The Constitution of 1980 and several presidential and legislative decrees directly speak of the need for an integrated focus on the nutrition and food needs of the population and several high level committees and commissions have been formed from time to time. These efforts have not, however, resulted in effective nationwide action to solve the country's nutritional problems.

At the present time, the creation or operation of a high level nutrition commission would detract from the responsibility of each sector to address nutritional issues. USAID will have to rely on its

entrepreneurial capacity and its wide array of existing and planned projects to promote dialogue with each sector on nutrition related issues. If USAID were to build a strong nutritional focus into its own development strategy it may create the incentives for the various sectors to compete for project resources by including sound nutritional components into their project proposals.

The office of the Prime Minister should be encouraged to continue a role as a motivator for nutritional concerns, but care should be exercised that USAID does not promote a planning nor executive role at such a high level. Rather, the prestige of the office should be used to promote the decentralization of development activities through the departmental development corporations. Of all the institutions reviewed these seemed to be the ones with institutional capacity to deliver the types of programs which might be implemented at the community level to promote nutritional wellbeing. The potential role of the development corporations is discussed further as part of the chapter on the strategy and action plan.

An institution that appears to have capability but little clout is the National Institute of Planning (INP), it could perhaps be given a significant role in carrying out some of the policy analyses that form an important part of the strategy. The National Statistics Institute (INE) appears to be competent. These two institutions should be able to contribute substantially to the information development phase of the action plan.

The present fiscal crises has rendered most institutions even less

effective. This is complicated by the need to come to Lima to plead for resources. USAID should encourage all efforts towards decentralization, budget delegation and realistic budgeting.

During the field work, we saw many pilot projects; they do not address fundamental issues and should be avoided. The multiplicity of externally funded pilot projects frequently tax the capacity of regional institutions. Within the private sector the Universities can contribute to analytical and informational tasks and the churches and the PVO's can deliver services. In many cases, the churches and their voluntary organizations appeared as the most effective organizations working at the community level. The roles of the Ministries of Health, Education and Agriculture are vital, but each of these has serious operational or philosophical problems. Part of the strategy involves the re-orientation of the operations and philosophy of these ministries. The problems and potentials of the Health and Agricultural sector are fundamental, they are therefore discussed in detail.

#### 5.1 INSTITUTIONAL ASSESSMENT OF THE MINISTRY OF HEALTH

The budget of the Ministry of Health absorbs more than 1% of the gross domestic product and nearly 5% of the central government budget. It currently has a reputation of being ineffective in executing its mandate. This view is reported by government officials and by the intended beneficiaries. Present high level officials appear sincerely interested in making substantial improvements in the operations of the various ministry activities, but without an explicit frontal attack

aimed at re-orienting the philosophy of service there is little hope for substantial contributions towards improving the nutritional health of the population.

The public health system is concentrated in urban areas and centered around hospitals; health centers and health posts are viewed as extensions of the hospital system. The system is passive or demand driven, i.e. it waits for the sick to come to it. Professionals within the system have an outdated clinical view of nutrition rather than an understanding of nutrition as a consequence of social and economic, as well as biological processes.

Medically trained professionals with public health expertise are of the opinion that the staffing levels would be adequate to make a major impact on the nutritional health of the population. The existing staff lacks current knowledge on applied nutrition at the household and community level. The existing staff is also inappropriately deployed regionally and within communities. A lack of administrative skills and disorganization lead to wasted time for professional resources. Such disorganization leads to poor targetting of services and contributes to community and user resentment of the system. The public health system is not well integrated with the private system even though many of its professional and paraprofessional personnel serve in both systems. This phenomenon is a present conflict of interest; it could become an asset. Currently, only about 20% of the demand is served, the rest goes without, or pays up to \$10 US per visit for care that is frequently inappropriate or too late.

The norms as published and the official pronouncements for the system are focused on preventive care and community outreach; implementation is hampered by a lack of operational knowledge on the management of such systems and apparently by fear on the part of physicians that they might lose revenues to an alternative system. There is, therefore, a need to develop skills for the management of public health delivery systems and to develop a structure of economic incentives that rewards private and public physicians for preventive as well as curative activities. As an example of the management problems consider the case of the effort to incorporate private midwives into the primary care system; after the initial training there was no effective provision for supervision and follow up. During the present crisis in the North, the response was inadequate; the physicians stayed in the hospitals and few efforts were undertaken to prevent epidemics.

Regarding preventive care, only 20% of the children have had a full course of vaccinations against childhood diseases. At the present time, the Ministry lacks the management and operational systems to launch a massive vaccination campaign. Potable water could be the single most important contributor towards improving nutritional health. As is well known, the Ministry has been unable to effectively administer a program to extend the coverage of rural potable water systems.

USAID and other institutions are attempting to improve certain aspects of the delivery of preventive services. The Nutrition Strategy Team believes that these efforts are steps in the right direction, but

at the present time, are too focused on commodities and logistic administration without sufficient emphasis on human resources and management. Administration focuses on things while sound management seeks to act through people; such re-orientation is needed.

## 5.2 INSTITUTIONS WITHIN THE AGRICULTURAL SECTOR

Agricultural Sector policy and initiatives are centered on large scale agriculture of the Coast and Jungle. The focus is on capital intensive development and on expansion of the "agricultural frontier" through the incorporation of new lands. While land and water are undoubtedly scarce resources, there is too much emphasis on these factors and too little on the human resources in agriculture. In both large scale and small scale agriculture the institutional systems need to be oriented towards agricultural development that seeks to save the scarce resources and make more effective use of the plentiful resources -agricultural labor.

Research, extension, credit and marketing policies should first reflect this reality of Peruvian agriculture. Only now is the policy analysis capability beginning to be built. The institutions that implement these policies need to review their operational plans and administrative procedures for possible biases against labor and against small scale agriculture. The teams assessment is that such biases pervade the agricultural sector institutions because the structure of agricultural incentives has induced such as bias. There is pressing need for policy analysis that assesses the labor market and income

effects of all agricultural pricing, research, extension, marketing, and credit policies. This analysis is needed so that sectoral actions can be redirected towards increased rural incomes as well as increased food and agricultural supplies.

### 5.3 FEEDING PROGRAMS AND THE NATIONAL OFFICE FOR FOOD SUPPORT

The National Office for Food Support (ONAA) and private voluntary organizations (PVO) administer and execute a large number of food assistance programs. Together these programs reach about one million persons during some part of each year. Some of these are supported with domestic resources and with resources from the World Food Program. Three private voluntary organizations (Catholic Relief Services, Seventh Day Adventist World Service and Church World Services) administer feeding programs that are supported with commodities provided through USAID under the PL 480 Title II Food-for-Peace Program. The Title II program reaches approximately 630 thousand beneficiaries per year through food for work and maternal and child health projects.

At the time that the field work for the Nutrition Strategy was underway, an evaluation team which was contracted by AID-Washington to evaluate the PL 480 Title II programs began its field work in Peru. Under guidance from USAID the Nutrition Strategy Team de-emphasized its institutional assessment of the feeding programs to avoid a duplication of effort. The final draft of the report from the team evaluating the PL 480 programs was not available at the time of writing the final draft of this report. The following represents an overview of the feeding programs and the institutions that implement them.

The Nutrition Strategy Team held several meetings with the directors of the National Office for Food Support, visited various regional operations of ONAA and the PVO's, and interviewed beneficiaries of feeding programs in almost all the field sites. While the assessment of institutional capacity for these organizations is based on very limited information, a few issues are clear. Feeding programs are not a sustainable solution to Peru's widespread and chronic under-nutrition problem. Less than 10 percent of the people in need are reached by what is a rather large program; even if additional food resources were available, the public and private organizations are near their operational limit and could not effectively expand or improve the coverage of the feeding programs. If additional food were available it would be directed at increasing the ration size. Such an action seems warranted, particularly in the disaster zones. In general, there is much confusion on the part of beneficiaries as to the operation of the feeding programs. There are many complaints that targetting on bases other than need leads to resentment within the communities in which these programs operate. While this problem appears greater for programs supported by ONAA, all programs are affected, at least by association with ONAA. ONAA programs are viewed as unreliable, so that the communities have learned not to depend on them.

Regarding the PL 480 Title II programs, it is the Team's view that too much reliance is placed on "make-work" projects within the food for work programs. Some food for work projects have limited

developmental impact and what developmental impact is embodied within them, is frequently diffused over the community at large. There is a risk that with the relatively low compensation that the current rations imply, these programs may be exploiting the cultural tradition of community cooperation to the detriment of the intended beneficiaries. Either more emphasis must be given to identifying communal projects of high developmental impact (e.g. potable water, small scale irrigation, community food production, agricultural extension) or increasing ration sizes, or both. There is some risk that some food for work activities may be extracting private resources away from more productive activities. The food for work programs need to be designed with better knowledge of the labor market opportunities of the intended beneficiaries. It should not be presumed that food for work programs contain within them a "market test" that implies that the rations compensate the participants for the opportunity cost of their time.

The food assistance being provided to the disaster zones, particularly in the Southern Highlands, is a valuable resource for preventing famine and further de-capitalization of the productive base. The impact of these activities could be maximized by maximizing the income value of the ration through the selection of commodities of high economic value. In the longer run, food assistance efforts should be incorporated into supporting the development of community self-help approaches towards sustainable nutritional and economic improvement. The Nutrition Strategy Team believes that such capability does not exist within ONAA; that the PVO's and the churches have the potential to develop such capability,

but that such must be coordinated. The evolving capability at the regional development corporations appears to offer the best potential for implementing a re-focused developmental approach for the feeding programs.

## 6.0 STRATEGY AND PLAN OF ACTION

The United States Agency for International Development and its Mission to Peru face a unique opportunity to apply their entrepreneurial comparative advantage as a development assistance agency for the long term benefit of the population of Peru. The magnitude of the nutrition problem is such that only through leverage on domestic and other donor resources can significant impact be achieved. The multilateral banks and financial institutions may be able to provide substantial financial resources through their lending activities and other donors may be able to execute highly effective specific projects, the Agency, however, has the size and mandate to help re-direct economic and sectoral policies towards a focus on the nutritional wellbeing of the population.

As was stated earlier the strategy is based on the concept that the nutritional wellbeing of a population is a basic barometer for the success of the development of a society since it integrates the outcomes of many if not all social and economic processes. The central element of the strategy is the focus on the household and the community as the actors principally responsible for the prevention and amelioration of the country's nutritional problems. A country's human resources are its primary sources of wealth and development. Public policy must provide the framework and incentives whereby the informed choices of individuals can lead to their achievement of their maximum

potential wellbeing without encroaching on the wellbeing of other members of the society. Obvious components of such a framework are legal systems which protect basic human rights and are clear regarding the rights of ownership of material goods. Beyond this there are many areas where the public sector must act in behalf of the wellbeing of the society. Public health and education are obvious areas where the society at large benefits from the wellbeing of individuals. Transport, communications and other areas where large economies of scale exist are also common areas for public rather than private initiative. Because so many factors have incidence on the nutritional status of individuals and because the health and productivity of individuals can affect the wellbeing of society, nutrition, too, is a valid area for public action, but only through how public actions affect the nurturing choices of individuals.

With this view, the five components of the strategy are as follows:

1. Establish Nutrition as central to development process:
  - A. Implement policy dialogue
  - B. Promote policy analysis
  - C. Develop the information base
  - D. Operate the information systems.
  
2. Prevent diseases that cause or contribute to malnutrition:
  - A. Extend the coverage of potable water in urban and rural areas
  - B. Immunize against childhood diseases
  - C. Promote environmental sanitation

3. Increase food consumption:
  - A. Increase food consumption and production by rural households
  - B. Increase food production in the Sierra
  - C. Increase agricultural employment and agricultural incomes
  - D. Improve the food marketing system
  - E. Promote urban employment generation.
  
4. Use community and private resources:
  - A. Promote community and household self-help approaches
  - B. Use the private sector.
  
5. Improve the operational efficiency of the public health system.

The first component is the key component for Peru; Nutrition must be moved from a tangential to a central role in the development process. The first element of this strategy is to implement policy dialogue with all sectors so as to promote the acceptance of nutritional outcomes as important as other measures of performance of the economic and social system. For example, the Central Bank and the Economics and Finance Ministry should report parameters such as the number of households spending more than half of their income on food, the income of the lowest quartile of the population, the number of persons consuming below 90% of the recommended energy levels, etc. These measures should be as important as statistics on sectoral and national output and the balance of payments. To make such policy dialogue effective policy analysis must be undertaken to determine how broad economic policies, sectoral policies and

employment policies affect the food consumption and other nurturing choices of households and how the structure of economic incentives can be directed towards mobilizing resources in nutritionally beneficial directions. Such policy analysis and dialogue in turn require improvements on the information base on which public and private decisions are based. The approach has short run and long run components. In the short run, USAID can contribute towards enhancing the analytical and information base upon which public decisions are based. In the longer run, USAID should assist in developing self-sustaining information systems so as to affect the optimizing behavior of households and private enterprise. These information systems should then be used for continued policy analysis leading to enhancements in the structure of incentives so that employment and food consumption effects are maximized. This will require analysis of industrial protection and commercial and trade policies as well as agricultural factor and product price policies.

The second component of the strategy focuses on the most acute problem, the high incidence of preventable diseases that waste nutrients and exacerbate the conditions of chronic malnutrition. Approaches for rapidly extending the coverage of potable water to urban and rural communities must be developed. Also, Peru needs assistance in extending the coverage of immunization for childhood diseases, particularly measles with urgency. Declining morbidity from these causes could release household resources and public resources for other more productive activities and declining mortality could reduce fertility rates. Systems

for safe disposal of human and material waste are urgently needed throughout the country, current disposal systems contribute to the propagation of parasitic infections that contribute to malnutrition. The third component of the strategy addresses the fundamental development problem for Peru, chronically inadequate or marginal diets for the majority of the population. The basis for this problem is inadequate effective demand due to low labor earnings and unstable employment. The prospects for substantial income growth in the near term are dismal. Accordingly, the households with the most severe consumption and income problems must be assisted to produce more food for consumption at home and for the market. Furthermore, many rural dwellers are dependent on the agricultural sector for employment and many farmers seek employment on other farms; there is therefore, a need to find sources of employment and increased incomes in agriculture. It goes without saying that urban incomes and employment must also be raised. Finally, the marketing system needs to be made more efficient.

The ultimate test of the strategy is the extent to which the private actions of individuals, acting in behalf of their families and communities, result in self sustaining improvements the food consumption levels and nutritional health of the population. USAID should use its present portfolio and future projects to promote self help measures through the various public agencies that have contact with the population at large. For example, the Ministry of Health should develop the means to train mothers and other caretakers in the diagnosis, treatment and referral of illnesses which can be managed at home and the agricultural

extension service could promote the production and preservation of nutritious foods for at home consumption. These efforts could be coordinated by community promoters under the leadership of the departmental development corporations. With this, USAID would both exploit and contribute to the much needed process of decentralization.

The fifth component of the strategy involves operational research to increase the effectiveness of service delivery by the public health system within existing budget constraints. An important consideration will be the possible devolution or sharing of responsibility between the public institutions and communities and households so as to increase the effective coverage of the services.

Some of these strategy elements imply the continuation or re-focusing the ongoing USAID activities or slight modifications of proposed activities. In most cases these elements imply substantial change or re-thinking of operational philosophies within governmental institutions. Accordingly in the early phases of the strategy, USAID will have to play a leadership role. To enhance its credibility in this leadership role USAID should review its own sectoral strategies for assessment of their nutritional relevance and reflect a central role for nutrition as an outcome and cause of development in its forthcoming "Country Development Strategy Statement". Beyond this, each office should have a designated "nutrition advocate" to insure that nutrition issues are included at an early stage of project development activities.

## 6.1 NUTRITION STRATEGY ACTION PLAN

Some of the elements of strategy have a short run and a longer run component. Short run efforts are those which can be reasonably complete by the end of the 1985 fiscal year and the longer run components are those that would begin in fiscal year 1986 and beyond.

### 6.1.1 Nutrition as central to Development

#### A. Policy Dialogue

USAID can begin to implement this element of strategy immediately through emphasis of the nutritional dimensions of all of its portfolio but particularly those related to health, agriculture, area development and private sector development. USAID can also use its economic support and PL480 resources for leverage on policy dialogue to move nutritional and human resource issues to the center of attention in the economic and sectoral planning and policy considerations of the government of Peru. Policy analysis will have to be rigorously developed by (and with) Peruvian institutions; USAID should support this development and the development of the information base on which to base these analyses. The early implementation of a National Nutritional Development Project is the best approach towards furthering the development of the information base

and promoting the policy analysis and dialogue.

#### B. Improve the Information Base

The mission is to be commended for having begun the effort to improve the information base related to nutrition, health and agriculture. The national nutrition and health status survey being undertaken by the National Statistics Institute (INE) with USAID support and in collaboration with the World Bank and the German Society For Technical Cooperation will develop data which will be of high value in refining the diagnosis of the nutritional situation and in establishing a baseline with which to plan and evaluate future developments.

This cross sectional data base and the data to be developed by the rural household survey through the Agricultural Policy Project will also serve to develop the foundation for much needed continuous information systems in the health and agricultural sectors. Neither of these surveys is designed to obtain food consumption information. Such a circumstance is unfortunate. Priority attention should be given towards completing a food consumption survey of national coverage as close to the completion or at the same time that the two other surveys are undertaken. Given the seasonality of agricultural production such a survey should cover four quarters of an agricultural year. To the extent possible its sampling design should enable cross referencing with the health and nutrition and rural household survey at least at district level aggregates.

These three data bases should be used for the following minimal analytical tasks prior to the end of 1985:

1. Prepare a highly disaggregated tabulation of the prevalence of malnutrition in all ages and sexes for anthropometric measures of chronic and acute malnutrition.
2. Perform a functional classification study at the provincial level to relate the indicators of acute and chronic malnutrition to occupational, geographic, demographic, income, health and environmental variables as well as agricultural production variables for the rural areas.
3. Describe the food consumption patterns in terms of food budget shares, calorie and protein sources and calorie and nutrient adequacy.

These data sets should be cleaned and well documented so that they can be used for analysis by public and private entities, particularly the university community in Peru.

The food consumption survey should be contracted through INE and technical assistance should be sought from INCAP in Guatemala. A steering committee from public and private institutions should be formed. The steering committee should include a representative from the private sector agribusiness area since such a survey could also be used for product marketing analyses. Others forming part of the steering committee should include but not be limited to the Central Bank, the National Institute for

Planning, the National Office for Food Support, the Ministries of Agriculture, Economics and Finance, Health, the National Institute for Agricultural Research and Promotion, and the university community.

Approximately, three million dollars should be reserved for the execution and analysis of the food consumption survey. If the proposed National Nutrition Development Project is approved, the survey should be funded and directed technically through that apparatus. Otherwise it is recommended that it be incorporated into the Agricultural Policy Formulation Project.

There should not be a separate nutrition information system but nutrition related information should be incorporated into each of the much needed continuous information systems in health and agriculture. Consideration should be given to establishing both systems to be operated within INE to assure that the information is collected with appropriate periodicity and to standardized criteria. For the health system, the information system should routinely survey communities on a rotating basis to validate the health system's reporting of morbidity and mortality data as well as data on the prevalence of malnutrition. In agriculture such a system should contain crop forecasts and current market price data. Both systems should be financed from central government resources to assure sustainability, but USAID project assistance could be directed at providing start up costs and technical assistance. Project funds should provide about 10 person years of technical assistance and start up costs for software, printing and other equipment and materials. Total USAID funded resources should not exceed five million dollars in a three year period. This

activity could be funded through the National Nutrition Project if the project were located at the multisectoral organization such as the National Planning Institute (INP), the Prime Minister's Office or the Central Bank.

### C. Nutrition Policy Analysis

The information base developed with the surveys and existing secondary information should be carefully analyzed to empirically demonstrate the direct linkage between nutrition and sectoral policy variables. This will help promote an awareness within each sector of the role that sectoral issues have in promoting the improvement of nutrition. This element is seen also as a short run priority to be implemented in the 1984/1985 time frame. Many issues need to be addressed and several efforts are already underway or beginning in this regard. For example, the World Bank will use data from the health and nutrition survey to study alternatives to public financing of health care. The agricultural policy formulation project will study a number of price and other agricultural policy related areas. The centrally funded project on the Consumption Effects of Agricultural Policy (CEAP) will study the role of agricultural and economic policies on the levels and composition of food consumption by different segments of the population.

These efforts should be complemented with research on agricultural and rural labor markets to assess the employment and hence nutritional effects of agricultural price, marketing and research policies. Likewise in the urban area there is a need to study the determinants of employment and labor force participation to better understand the role of industrial protection policies and labor legislation on the employment and incomes of

urban dwellers. In this regard, the ever increasing importance of the informal sector needs to be understood in terms of its impact on maternal and child nutrition since many of those engaged in the informal sector are women of child bearing age. These are all activities which could be funded under the proposed Nutrition Development Project during its grant phase. Much of this research should probably be undertaken outside of government within the university community.

#### D. Nutritional Measures as System Performance Measures

This element of strategy could evolve naturally from the previous element on information. Much interest exists within certain sectors to use such types of information for planning and evaluation of public policy. What is needed here is a technical effort to define precise and unambiguous nutritional criteria for each major sector. The operation of such a system for evaluating public performance against nutritional criteria first requires that the measures be straight forward and easy to collect and interpret and secondly, that each sector accept that its actions can independently affect the particular indicator. For example, the Ministry of Agriculture might be encouraged to report quarterly on the cost of a minimum food basket for each rural and urban region of the country. The Ministries of Economics and Finance, Labor and/or Industry might be required to report on the number of households in each sector which are estimated to spend more than half of their income on food. The health sector could be evaluated with anthropometric measures of the prevalence of malnutrition and with morbidity and mortality statistics for preventable

diseases. This component could be subsumed within the policy analysis or information development components for purposes of funding so no additional funds are recommended if such activities can be supported through the proposed national nutrition development project or as part of established information systems.

#### 6.1.2 Prevention of Diseases

While it is recognized that the current project to extend the coverage of potable water is a troubled project, the mission is encourage to redouble efforts in the area of providing safe water to the whole population. The medical nutritionist on the team is convinced that no single action could provide the nutritional and health impact more than maintaining a constant supply of safe water to the whole population. The policy analysis components of the strategy and the policy dialogue should be used to seek innovative ways for financing such systems through the communities' ability to pay.

Community water systems would appear to be an area of emphasis for the private voluntary activities that are supported through PL480 Title II resources. The mission should consider encouraging the submission of proposals by PVO's that seek to more effectively establish rural water systems. These should improve on the CARE OPG experience.

The mission should also consider additional urban and rural water projects in the post FY85 time period, if alternative financing and private sector participation schemes could be developed. Expenditure levels of 30 to 50 million dollars in fiscal years 86, 87, 89 and 90, at approximately 10

million per year, could easily be warranted if tariff and cost sharing structures could be developed so that further extension of coverage and system maintenance could be financed through realistic user charges. Such an effort may require that responsibility for small rural water systems be removed from the Ministry of Health and placed within the purview of the regional development corporations.

Regarding immunizations, USAID should consider re-programming part of its present health sector resources to assist in mounting a massive immunization program. Financial resources would be needed for establishing and supporting a "cold chain" to insure the viability of the vaccines. A possible tactic is to establish the program through the private sector providers of health services, doctors, midwives, "injectors" and pharmacists. Technical and management assistance would also be required from USAID funded resources. The Ministry of Health and USAID should explore the possibility of obtaining logistic support for the effort from Peru's military establishment. Cooperation should also be sought from the current activities of other bilateral and multilateral donors. Such a massive effort would help emphasize the "preventive" care role of the public health system.

Existing and future project resources should also be used to communicate and promote the need for safe waste disposal. Safe water and waste disposal efforts would have a better chance of success if they were incorporated into well managed and integrated community self-help approaches.

### 6.1.3 Increase Food Consumption

The food consumption problems in Peru are principally the consequence of

an anti-employment bias in all sectoral and economic policies and of an inter-sectoral structure of incentives that has punished agriculture and other primary sectors for the sake of industrialization. Within agriculture the bias against human capital in favor of physical capital is accentuated by the intra-sectoral structure of incentives of pricing and investment policies. Small scale agriculture has suffered from the twin disadvantage of disincentives for food production and the lack of jobs in commercial agriculture. Price incentives and service institutions need to orient themselves to a more neutral structure of incentives that does not implicitly tax food production and agricultural labor. With improved incentives will come a need for production and marketing systems and technology; two areas of AID comparative advantages.

While improved incentives should lead to increased production, improved rural and urban employment opportunities are needed to provide the effective demand with which to absorb the increased food output. All USAID project assistance should be reviewed for possible enhancements of their employment effects, particularly the urban development strategy and the agricultural research and extension project. Beyond that and the policy analyses, to this end, that should evolve from the Agricultural Policy Project there is need for two additional projects within the agricultural sector and both need to be implemented as soon as possible.

A project to improve the Agricultural Marketing Systems of Peru is long overdue. The official interventions of the last two decades have only served to decapitalize the private marketing system and to make food supplies less secure. The marketing project would have a grant component to perform analyses

and feasibility studies beyond those undertaken by the agricultural policy project. A loan component to capitalize an evolving private sector could be implemented in FY86 after the analysis during FY85. Grant resources of two million and loan resources of 15 million dollars should be provided. The project would be directed at: improving technical and economic efficiency in the system and reducing marketing costs and possibly at finding more cost effective manners for providing food aid to the poor than through subsidies and feeding programs. The analysis and financing would consider the possibilities of devolving the marketing parastatals (ENCI and ECASA) to the private sector as well as providing resources for capitalizing small scale urban and rural marketers who are primarily women. One possible scheme could involve the use of petty traders in a multi-tier or ration shop approach for targetting food assistance to the poor.

The food and income needs of the rural poor of Peru, particularly in the highlands are extremely urgent. A project to support food production promotion is desperately needed. These needs include the Coast and Jungle but priority must be given to the Sierra. Farming systems technologies for the multiple crop environments of the highlands must be developed and promoted in an integrated rural development approach that includes strong nutritional components. These efforts should be based on the AID experiences in the highlands of Guatemala and Colombia and the IBRD experiences of Mexico and Colombia. A five year 20 million dollar project is envisioned and priority should be given towards using Title I resources to assure necessary counter part funds. Given the administrative and budgetary constraints at INIPA, serious consideration should be given towards contracting the project on a

turn-key basis to a private sector firm such as Experience Inc., IADS or Development Alternatives Inc. The institutional development aspects are secondary the income and food consumption needs are urgent.

#### 6.1.4 Mobilization of Community and Private Resources

A project should be developed to contribute to the country's process of decentralization and to develop the capabilities within communities to seek solutions to their nutritional problems. It is proposed that the multi-sectorial nature of nutrition be recognized and integrated at the community level and that communities become the principal channel for any nutrition related resources that might flow from the public sector. For example, potable water and sewerage systems are desperately needed throughout the country. At the present time the centrally directed projects of the Ministry of Health are having great operational difficulty in establishing such systems. Part of that problem is that central administration and the fiscal crunch have interacted to limit the execution of this efforts. Under this project, communities would organize to seek solutions to particular problems and would partially finance such development efforts with their work and with their own financial resources. PL480 Title II programs could play a catalytic role here in replacement of some current "make work" title II programs.

The USAID project would fund the training and initial materials for community promoters that would be employed by the departmental development corporations. The community promoters would serve to inform the communities of possible public resources which might be forthcoming from the public sector,

the motivation for such resources being useful to the community and to inform the community of the start up and recurrent costs which it must be prepared to meet if a given developmental activity were to be pursued.

The focus of the project would be on nutrition related activities which could include food production, potable water, sanitation systems, morbidity, infrastructure, etc. An important component of the project would be to disseminate information to households on the solution of nutrition related health problems; the project would have strong nutrition education components as well as training in child care and pre-school stimulation of children. By emphasizing the nutritional wellbeing and cognitive development of children, households would also be stimulated to provide for the nutritional wellbeing of the whole household because its members are the principal wealth of the family and country. This project would have to be implemented after or simultaneously with a major restructuring of the health system to orient it towards preventive and outreach activities.

This project would be designed after a highly disaggregated functional classification study had been performed. With the results of the functional classification study, it would be possible to specify the types of training and number of promoters which would be needed in each area. In some cases, their work would be primarily health, in other agriculture and in urban areas education for health would be the principal focus. The main emphasis of the project would be to promote the informed choice of community members so that they choose the nutritional activities which best satisfy their priority needs. Through community cost sharing, the "wish-list" effect would be minimized. Through careful training in communications and organizational

techniques the promoters would inform the communities of the trade-offs and avoid imposing external solutions on them.

A project of this kind should have national coverage to be effective; the functional classification study should be used to establish priorities in terms of phasing geographic coverage. The USAID costs for such an effort could amount to 30 to 50 US millions (in 1983 dollars) over a five to ten year horizon. Community resources and other public resources would serve as counterpart funds. Recurrent costs to the country would be in the order of 20 million dollars.

#### 6.1.5 Operational Efficiency of Health System

The public health system currently operates as a demand driven system whose principal function is to provide curative services to sick persons. Its written and oral statements indicate that the systems focus is preventive care. USAID has a number of projects related to integrated health care and potable water for rural communities; the World Bank has a health sector loan with objectives similar to the USAID integrated health projects. In these assistance efforts the objectives are to promote operational efficiency of the system through the use of paraprofessional providers and a focus on prevention. These projects are at an early operational stage, though delayed by the lack of counterpart funds as a result of the fiscal difficulties. The Nutrition Strategy Team believes, however, that these projects are not likely to achieve success unless a fundamental re-orientation of the health care system is accomplished. In this regard, the providers in the system are currently oriented towards curative care. There must be a major educational

campaign to teach the doctors preventive care and nutritional health.

Then with new attitudes and philosophy the providers must "reach-out" to the community to convert them into the first level of care, particularly preventive care through improved household hygiene practices. Furthermore, there must be a redeployment of the available resources to where the people with needs live. Such efforts need to be directed at decentralizing health care so that it responds to community needs not to hospital and clinical biases in the provision of care. The existing cadre of physicians and other providers needs to be trained to deliver services to the community away from the health posts and hospitals. To do this and to extend the coverage of the system they need to be extended with paraprofessionals and community members themselves making the community the first level of care.

Another way in which they can be extended is through inclusion of the private sector --physicians, midwives, pharmacists, etc. in the preventive care system. To accomplish this, means must be found to create incentives for the private sector to participate in preventive care. Operational research is needed to find operational and financially feasible ways to achieve these extensions. Additionally, the deployment of resources in the system is currently sub-optimal even for its present functions. Operational research is needed to establish the optimal deployment of existing resources.

Regarding nutrition, not only is there little effort made towards preventive care, but there appears to be little capacity to manage the sick malnourished child. In-service training is urgently needed in the care of malnourished children. For example, simple techniques like home oral rehydration are not being disseminated, frequently the inappropriate care of

malnourished children places them at higher life threatening risks. The treatment and prevention of malnutrition needs to become a central focus of a restructured primary health care system that bases itself on the home as the first level of attention. The curricula of health training programs need to be reviewed for their nutrition and preventive content.

To what extent USAID can use existing project resources to obtain leverage in the re-design of the system and to what extent new project resources will be needed to effect such change awaits the next six months of action of the recently installed technical assistance team. Nevertheless a nutrition training project for health care professionals is desperately needed. Much of the training should be in-service training but a substantial number should be sent to INCAPI in Guatemala, INTA in Chile and the various applied nutrition programs in the United States.

A five year Project in the order of eight million US dollars should be placed on the FY85/FY86 planning shelf to be implemented after the present health sector pipeline problems are resolved.

## 6.2 IMPLEMENTATION SCHEDULE AND PROJECTED COSTS

The following presents the suggested implementation schedule and a projection of costs at two levels of funding: These reflect only new projects which were recommended.

FUNDING LEVEL (L.O.P.)	Low	(Million 1983 US\$)	High
Start years and Project Names:			
FY 1984 National Nutrition Development	5		10
FY 1985 Rural Food Consumption/ Production	20		10
Food Marketing	15		20
FY 86 Community Development	30		50
Operational Efficiency of Health System	8		10
FY 87 Potable Water	30		50
TOTALS	108		140

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Appendix B  
Statistical Appendix

TASAS DE INTERES DEL BANCO AGRARIO Y  
TASAS DE CRECIMIENTO DE LOS PRECIOS AL  
CONSUMIDOR (porcentajes)

Años	Tasas de Interés para préstamos de sostenimiento alimentarios <sup>a</sup> (1)	Variaciones en el IPC* de Lima Metropolitana(2)	Tasas de Interés Real
1972	7	7.2	- 0.2
1973	7	9.5	- 2.5
1974	7	16.9	- 9.9
1975	7	23.6	-16.6
1976	10 (10 4) <sup>b</sup>	33.5	-23.5
1977	10 (10 4) <sup>b</sup>	38.1	-23.1
1978	24 (24 2) <sup>b</sup>	57.9	-33.9
1979	29 (29 2) <sup>b</sup>	67.7	-38.7
1980	32.5 (30.5 2) <sup>c</sup>	59.2	-26.7
1981	46.5 (44.5 2) <sup>c</sup>	75.4	-28.9
1982	46.5 (44.5 2) <sup>c</sup>	64.5	-18.0
1983	49.5 (47.5 2) <sup>d</sup>	115.5**	-66.0

\* Índice de precios al consumidor

\*\* Julio de 1983

- a Reciben por lo menos la mitad de los recursos del BAP
- b Las figuras en paréntesis son las tasas de interés nominal, Por ejemplo, 14%.
- c El productor paga 10% y el Tesoro Público paga directamente al Banco Agrario la diferencia. Como han habido varios reajustes a la tasa de interés cobrada por el BAP, las cifras que se presentan son promedios anuales.
- d Incluye intereses más comisión (2%). Corresponde a tasa preferencial para préstamo agrícola y pecuario para la producción de alimentos. La tasa ordinaria era 47.5 2. Banco Agrario (circular No. 51/006-81-2-1; 8 junio 1981).
- e Corresponde préstamo de sostenimiento para préstamos mayores a las 20 millones de soles (hasta 12 meses), incluye arroz y maíz. Se pagó el crédito por un trimestre adelantado. Existe una tasa más baja de 46.5% para créditos de sostenimiento alimentario de montos inferiores a las 20 millones de soles, y excluyendo al arroz y al maíz. Este préstamo se pagó al generarse el ingreso. Banco Agrario (Circular No. 184/059/83-3-2 del 22 marzo 1983).

APENDICE 2

CUADRO 2.1

PRODUCCION AGROPECUARIA AGREGADA POR TIPO DE PRODUCTOS, 1972-1979<sup>a</sup> (Indice de cantidad, 1960=100)

Años	Productos de Con- sumo urbano di- recto	Productos de exportación <sup>c</sup>	Productos de Con- sumo campesino <sup>d</sup>
1972	157.4	90.4	102.3
1973	160.7	91.6	103.7
1974	173.0	93.0	104.7
1975	187.5	90.2	97.4
1976	195.2	78.2	97.9
1977	197.7	85.8	96.0
1978	178.3	90.1	97.1
1979	183.3	100.9	97.1
Promedio 1972-79	2.05	1.60	- 1.80
Promedio Global 1972-79			

a Incluye alrededor del 70% del valor bruto de producción agropecuaria

b Arroz (cáscara), frijol, carnes de vacuno, porcino, pollo y leche

c Algodón, azúcar y café

d Trigo, cebada, papas, maiz amiláceo, yuca, carne y lana de ovino

FUENTE: Alvarez (1983). En base a Estadística Agraria (varios años). Índice de Laspeyres.

CUADRO

SUBSIDIOS A LOS ALIMENTOS.

1969-1983

(millones soles)

<u>Años</u>	<u>Montos Nominales (soles corrientes)</u>	<u>Montos Reales (a precios de 1973)</u>	<u>Proporción Déficit gobierno</u>
1969-73	2,260 <sup>a</sup>	2,260	14.1
1974	2,546	2,143	15.6
1975	4,207	2,667	13.5
1976	7,145	3,428	9.2
1977	20,592	7,044	19.9
1978	4,695	1,006	4.5
1979	41,790	5,139	126.4
1980	87,471	3,912	37.3
1981	102,110	5,189	14.4
1982	160,542	4,960	13.3
1983* enero	319,297	3,389	n.d.

\* Estimados del Ministerio de Economía, Finanzas y Comercio.  
a La mayor parte del subsidio se otorgó en 1973.

FUENTES: 1969-1980; información interna del Banco Central de Reserva; 1981-1983: Plan de Abastecimiento Alimentario Nacional

APENDICE 1

CUADRO 1.2

TASAS ANUALES DE CRECIMIENTO DEL PRODUCTO BRUTO INTERNO (PBI) POR SECTORES (a precios de 1980)

Años	Agricultura (1)	Pesca (2)	Minería (3)	Total Sectores primarios (1+2+3)	Manufactura (4)	Otros (5)	PBI
1973	2.4	- 23.3	- 0.5	0.2	7.3	8.3	6.2
1974	2.3	34.8	3.4	3.9	7.5	7.7	6.9
1975	1.0	- 16.1	- 10.9	- 3.8	4.7	5.4	3.3
1976	3.3	19.2	9.1	5.7	4.2	1.6	3.1
1977	0.0	- 3.2	27.5	8.5	- 6.5	- 2.3	- 1.2
1978	- 2.9	20.0	15.0	5.1	- 3.6	- 3.8	- 1.8
1979	3.0	7.7	10.0	6.1	3.8	2.7	3.8
1980	- 5.4	- 4.8	- 2.7	- 4.2	5.3	5.3	3.0
1981	12.9	- 10.0	- 4.4	- 4.3	1.8	4.7	3.1
1982	3.5	- 2.0	6.1	4.2	- 2.7	0.8	0.7
<b>Periodos</b>							
1973-75	1.9	- 1.5	- 2.7	0.1	6.5	7.1	5.5
1976-80	- 0.4	9.8	11.8	4.2	0.6	0.7	1.4
1981-82	8.2	- 6.0	0.9	4.2	- 0.5	2.8	1.9
1973-82	2.0	3.2	5.3	3.0	2.9	3.0	2.7
					2.18		

FUENTE: Banco Central de Reserva

APENDICE I

CUADRO 1.12

ESTRUCTURA DEL INGRESO NACIONAL, 1973-1982 (soles corrientes).

	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1973- 1975</u>	<u>1976- 1979</u>	<u>1980- 1982</u>
<u>REMUNERACIONES</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>47</u>	<u>43</u>	<u>38</u>	<u>41</u>	<u>41</u>	<u>42</u>	<u>48</u>	<u>46</u>	<u>41</u>
Obremos	24	24	24	24	25	23	21	22	22	22	24	24	22
Empleados	25	23	23	23	22	20	17	19	19	20	24	22	19
<u>INDEPENDIENTES</u>	<u>24</u>	<u>23</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>25</u>	<u>26</u>	<u>27</u>	<u>27</u>	<u>24</u>	<u>25</u>	<u>27</u>
Agricultores	3	9	9	9	nd	nd	nd	nd	nd	nd	9	nd	nd
Otros	16	14	16	16	nd	nd	nd	nd	nd	nd	15	nd	nd
<u>RENTA PREDIAL</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>4</u>	<u>3</u>	<u>22</u>
<u>UTILIDADES DE LAS EMPRESAS</u>	<u>22</u>	<u>24</u>	<u>23</u>	<u>24</u>	<u>24</u>	<u>23</u>	<u>33</u>	<u>28</u>	<u>27</u>	<u>25</u>	<u>23</u>	<u>25</u>	<u>27</u>
<u>INTERESES NETOS</u>	<u>1</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>3</u>	<u>1</u>	<u>1</u>	<u>3</u>
<u>TOTAL</u>	<u>100</u>	<u>100</u>	<u>100</u>										

FUENTE: Banco Central de Reserva

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APENDICE 2

CUADRO 2.2

PRODUCCION AGROPECUARIA DESAGREGADA POR TIPO DE MERCADOS  
1980-1983 (en TM)

1. PRODUCTOS DE CONSUMO URBANO DIRECTO

Años	Arroz (Cáscara)	Frijol	Pollo	Carne de Vacuno	Carne de porcino	Leche
1980	420,371	39,342	143,467	83,800	55.0	780,000
1981	712,086	43,562	182,600	90,100	59.2	784,900
1982	765,465	43,300	204,800	83,000	58.7	805,000
TC*						
1980-82						

2. PRODUCTOS DE CONSUMO CAMPESINO, DE SIERRA O DE MONEADO RES-  
TRINGIDO

Años	Trigo	Papa	Maíz Ami- láceo	Carne de cordero	Lana de ovino	Yuca
1980	77,142	1'379,648	151,800	20,700		n.d.
1981	118,551	1'705,012	196,936	18,800		327,122
1982	100,854	1'796,124	233,223	20,400		295,097
TC*						
1980-82						

3. PRODUCTOS DE EXPORTACION

Años	Azúcar	Algodón (rama)	Café
1980	537,375	255,355	95,000
1981	478,111	285,781	95,000
1982	736,310	257,091	96,500
TC*			
1980-82			

TC\* - Tasa de Crecimiento

FUENTE: Ministerio de Agricultura

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CUADRO

GASTOS DIRECTOS DEL GOBIERNO CENTRAL EN  
AGRICULTURA Y SUBSIDIOS A LOS ALIMENTOS

1973-1983

(miles de millones soles corrientes)

Años	Total Gas- tos Gobier- no Cen- tral(1)	Gastos Di- rectos de (1) en agri- cultura(2)	Gastos en Irrigac. (3)	Subsidios a los ali- mentos(4)	(2)/(1)	(3)/(2)
1973	65	5.4	1.9	2.2	3.3	35
1974	108	7.3	3.3	2.6	7.2	49
1975	132	12.0	7.4	4.2	9.1	62
1976	133	15.0	6.3	7.1	8.2	55
1977	251	19.2	12.0	20.6	7.4	63
1978	422	25.9	11.4	4.7	6.1	44
1979	356	n.d.	21.4	45.4	-	--
1980	1,673	n.d.	33.9	37.5	-	--
1981	2,642	n.d.	n.d.	102.1	-	--
1982	4,260	44.8	n.d.	160.5	1.1	n.d.
1983 <sup>b</sup>	3,120 <sup>b</sup>	52.7 <sup>b</sup>	n.d.	319.3	1.7	n.d.

a 1969-1973

b Presupuestado, Ley del Presupuesto de la República, Ley 23556  
Lima, febrero 1983

FUENTES:

Para (1) Banco Central de Reserva, Memoria 1982; Para (2) Elías, V.m  
Governmental Expenditures on Agriculture in Latin America (Research  
Report No. 23, IFPRI), Washington, D.C., 1981, Cuadro 27; Para (3),  
Diagnóstico Sectorial Agropecuario (Lima:OSP, Ministerio de Agricul-  
tura y Alimentación, 1980), pp. 378-379. Los datos de subsidios pro-  
vienen del Banco Central de Reserva.

APENDICE I

CUADRO 1.11

SALARIOS Y REMUNERACIONES REALES<sup>a</sup>, 1973, 1977-1983

Años	Salarios			Sueldos			Salario Mínimo Vital			Indice de Precios al Consumidor <sup>a</sup> 1973:100
	Nominal	Real	Índice	Nominal	Real	Índice	Nominal	Real	Índice	
1973	5.820	5,820	100	11.061	11,061	100	2,400	2,400	100	100.0
1977	11,330	3,997	69	26,360	6,860	62	5,400	1,307	76	297.2
1978	13,210	3,528	51	23,994	5,617	51	6,900	1,377	56	516.2
1979	32,070	3,727	54	43,243	5,606	51	15,000	1,743	73	860.6
1980	55,010	4,047	69	36,339	6,243	56	25,350	1,331	76	1,383.8
1981	92,430	3,868	66	150,289	6,290	57	37,140	1,554	65	2,389.4
1982	161,997	3,353	58	254,363	5,264	48	60,000	1,242	52	4,832.1
1983										
Feb.	177,356	3,164	54	295,962	5,280	48	72,000	1,285	54	5,605.2
Jun.	207,056	2,745	47	331,558	4,396	40	108,000	1,431	60	7,542.6

a Lima Metropolitana

FUENTE: Actualidad Económica 6 (5a), julio de 1983, Lima, p. 16.

7542.9

CUADRO

TASA DE CRECIMIENTO DE LOS PRINCIPALES

INDICADORES ECONOMICOS: 1973-1982

(A precios 1970)

<u>Años</u>	<u>PBI</u>	<u>PBI Per capita</u>	<u>Consumo</u>	<u>Inver- sión</u>	<u>Expor- tación</u>	<u>Impor- tación</u>	<u>Tasa de Inflación Promedio</u>
1972	5.3	2.9	5.0	0.0	4.0	-0.4	7.2
1973	6.2	3.3	10.4	17.2	-13.3	9.7	9.5
1974	6.9	3.9	9.0	30.4	- 5.8	31.9	16.9
1975	3.3	0.5	4.3	10.0	0.4	15.3	23.6
1976	3.0	0.2	1.6	-11.2	- 6.7	-22.3	33.5
1977	-1.2	-2.9	-0.3	-22.4	16.7	- 7.9	33.0
1978	-1.3	-4.5	-6.7	-12.3	13.1	-24.5	57.3
1979	3.3	0.9	-1.9	12.1	23.6	5.3	67.7
1980	3.0	0.2	6.3	30.4	- 7.0	44.9	59.2
1981	3.1	1.0	1.5	25.2	- 4.9	10.0	75.4
1982	0.7	-2.3	0.0	- 3.3	6.3	- 7.7	64.5
Tasa de Crecim. Prom. 1972-82	3.0	0,5	2.3	6.4	3.4	4.9	41.2

FUENTE: Instituto Nacional de Estadística y Banco Central de Reserva del Perú.