PROGRESS REPORT

Consumption Effects of Agricultural Policies: Peru
Evolution of Food Consumption Patterns

Raleigh, North Carolina
February 1984

SIGMA ONE CORPORATION

Progress Report

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Presentation

This progress report presents preliminary and partial results on the consumption effects of agricultural policies (CEAP) study being undertaken in Peru under the sponsorship of the Office of Nutrition of the Agency for International Development. It is being carried out in collaboration with the USAID Mission to Peru and certain Peruvian institutions. This study is one of the so called "Short Term Policy Impact Studies" of the CEAP Project. The purpose of this series of short term policy impact case studies in various countries--Cameroon, Jamaica, Panama, Peru, Senegal, Sudan and Tanzania--is to promote interest in deeper and more complete analyses relating the incidence of economic and agricultural policies on the consumption of food by population groups which are at risk of malnutrition.

In principle, the short term policy impact studies work with existing data in the various countries and seldom is new information to be collected. The reason for this is that one of the purposes is to demonstrate that conventional information generated by the statistical systems of the various countries can be interpreted from the food and nutrition point of view. Through this effort it is not intended to negate the value of the importance of food consumption and income expenditure surveys, but rather to help identify information gaps which might be further complemented with data collected at the household level through such surveys. Nevertheless, it is emphasized that much of the existing information is useful for establishing trends and gross estimates of the nutritional situation of the population groups in the countries in which subsequent food consumption surveys of nationwide coverage can serve to confirm and give validity to such preliminary analyses.

This report, as its name indicates, is a progress report with data that the authors have been able to accumulate in the first few months of effort since the CEAP-Peru project began. It is hoped that it will serve as the basis for discussion with colleagues in Peruvian institutions with interests in food and nutrition policy. It is hoped that from these discussions will evolve clearer interpretations and suggestions as to how the more quantitative and analytical tasks are to proceed. As a working document it in no way represents the official position of the Agency for International Development, its mission to Peru, or any Peruvian institution. The responsibility for the data presented and the interpretations therefrom rests solely with the authors.

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1.0 Introduction and Overview

Concern for the food and nutrition situation in Peru constitutes one theme which receives great attention and debate. Recently, this concern has increased because the present economic crisis may have aggravated the country's food problems. Different aspects of the food consumption situation have been the object of many studies, analyses, seminars and policy statements in the last few years. Almost no one doubts that a majority of Peruvians have existed for long periods of time with levels of food consumption which are considered marginal or inadequate in energy and nutrients. What is frequently doubted, however, is that conditions of marginal food availability in the aggregate reflect themselves as a significant prevalence of malnutrition among the members of the Peruvian population. Even among those that accept that Peru has a serious malnutrition problem there exists controversy over the causes of the problem.

The principal focus of the CEAP study is to perform applied policy research on the likely effects that agricultural policies (particularly those related to prices) have had on food consumption and how these policies have interacted with international trade and other economic policies to (partially) determine the levels and composition of food consumption for different groups in the population. The time perspective for this study is the period since World War II, but the primary interest is to contribute reliable information that can be used to

formulate forward looking agricultural and economic policies. The expectation is that these analyses and information can contribute to the improvement of the food and nutrition situation.

This report presents the facts that are known about the evolution of food consumption in the period of reference. Later stages of the CEAP study will attempt to analyze the economic causes underlying the intertemporal and cross-sectional distribution of nutrients. This report summarizes information on consumption patterns from the National Food Consumption Survey of 1972 (ENCA), and presents analysis regarding the food consumption situation in the period of 1977-1982. The fundamental purpose is to present the best information available on the current food consumption situation and the changes which are likely to have occurred during the period of reference.

Table 1 presents the composition and adequacy of national food consumption for selected years since 1947. The availability of calories has on the aggregate been below 90 percent of the level of 2400 calories that is recommended for Peru by the Food and Agricultural Organization of the United Nations (FAO). In 1958, for example, 15 percent of the population on the coast were consuming half of the recommended energy levels and 16 percent of the people in the Sierra and 3 percent of the jungle were consuming diets equal to only half of the recommendations (Collazos et al., 1959). Reutlinger and Alderman (1979) reported that in 1973 more than half of the population was consuming below the RDA and that approximately 40 percent was consuming below 90

Table 1. Composition and Adequacy of National Food Consumption for Peru in Selected Years Between 1947 and 1982

Percentage shares of per capita calories

	YEAR										
	1947[a]	1952[a]	1956[a]	1959/61[b]	1963[c]	1967/70[d]	1972/73[e]	1974/76[f,g]	1977/78[f]	1979/80[g]	1981/82[g]
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	-	-	-	-	-	-	-	1	2	2	2
Eggs	*	*	*	*	*	*	*	*	*	1	1
Beef & other meats	4	4	3	3	5	5	6	6	3	3	3
Fish	1	1	1	1	1	1	1	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	2061	2359	2190	1997	2261	1941	2067	2175

* less than 1 percent

a ICNND, 1959

b From King & Coutu citing USDA Food Balance Sheet

c Calculated from data reported in Estadistica 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

percent of the recommendations. Amat y Leon and his collaborators found that based on the 1972 ENCA survey, 52 percent of the households in the country were below caloric recommendations and that more than a third of the population was deficient in protein and other nutrients. All of this information points to a serious and chronic food problem for the country. This information is also consistent with the available anthropometric information, that is, the Peruvian population suffers from conditions of chronic undernutrition.[1]

In the last three decades the composition of the diet has varied to include more carbohydrates and less proteins of animal origin. Cereals have become the most important source of calories. Fruits, vegetables and potatoes have played a decreasing role in the Peruvian diet. Regarding animal sources of protein, it appears that an increase in consumption of poultry products has at least partially compensated for a decrease in the consumption of meats and dairy products.

The inadequacy of food consumption in Peru is not a recent situation. For example, in 1949 a research report (Lancet, 1949) stated: "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." Generally, it has been thought the households in rural areas have

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[1]For a more complete discussion of this point, see the nutrition strategy report by Franklin et al., 1983.

been able to overcome the effects of multiple crises, since they produce a large proportion of their foods, and that through this process they are able to maintain adequate nutritional levels. The evidence on the current situation, however, indicates that the rural population suffers nutritional problems which are more severe than those of the low income urban population. The reason for this is that the rural population suffers not only from food deficiencies but also from deficiences in the health and sanitary system and the transport and food marketing system.

In the decade of the sixties it was already clear that the national food supply was not keeping pace with the growth of the population and with the growth of effective demand. Coutu and King (1966) report that the cause of such a situation was more centered on agricultural policy than on natural factors. Agricultural policies tended to favor urban consumers at the expense of the rural sector. Yet even with a bias in favor of the urban population, Lima had one of the most unequal distributions of income of the capital cities in South America at that time (Musgrove, 1978). This implies that the distribution of nutrients was also concentrated, although the maldistribution was not as severe as that for income. The ECIEL data (used in the analyses reported by Musgrove) for Lima indicates that in 1968 the distribution of expenditures on all types of food, with the exception of roots and tubers, was concentrated in the richest families of Lima and that the lowest quartile of the population was consuming disproportionately fewer quantities of dairy products, meats, fish, seafood and fruit. Given the marginality of

the average diet for the country, the maldistribution of expenditures indicates, without doubt, that the diets of the poor in Lima were quantitatively and qualitatively inadequate.

The food and nutrition problem in Peru is not a new problem; it has affected the poor in rural and urban areas for many years. The problem of food consumption in Peru is closely linked to the distribution of income. The pro-urban bias in the development policy of the post-war era has not prevented the incidence of nutritional problems in the urban zones, and may have been the cause, at least partially, of the income and food consumption problems for the rural population. This is the working hypothesis for the CEAP project. This report presents information and analysis on the outcome variable food consumption as it has evolved in the period of reference. Subsequent reports will present the economic analysis to identify the policy determinants of the food consumption situation so as to test the hypothesis and develop policy-relevant information.

2.0 The ENCA Studies on Food and Nutrition

The National Food Consumption Survey (ENCA: Encuesta Nacional de Consumo de Alimentos), which was undertaken from August 1971 to August 1972, is the most complete source of consumption and nutritional information. The analyses which were undertaken by the Ministry of Economics and Finance and by Carlos Amat y Leon and his colleagues (1977, 1981) suggest that Peru had serious nutritional problems at the beginning of the 1970's.

Estimates of the prevalence of malnutrition in preschool age children, as measured by a weight-for-age criterion, are presented in Table 2. The table indicates that, by that criterion, 44 percent of the ENCA sample's preschool aged children had weights below the corresponding standard for their age so that they were formally classified as malnourished. These findings are consistent with the patterns of malnutrition revealed by other selected samples over the period of reference. Franklin et al. (1983) concluded from this and other sparse data that the available anthropometric evidence reveals a historical pattern of acute malnutrition (weight loss) which recurs with varying frequency in all areas of the country. Urban children are generally able to recover from such acute episodes so that weight appears normal for height, although sufficient growth retardation occurs that according to weight-for-age measures they would continue to be classified as mildly or moderately malnourished. Rural children, on the other hand, exhibit sufficient growth retardation to be classified as stunted as a result of a pattern of chronic undernutrition.

Table 2. Prevalence of Malnutrition in Children Under Six According to Weight-for-Age Criteria and Percentage of Households Not Satisfying Calorie Needs

Region	Percent[b] Not Satisfying 90 Percent of Calorie Needs	Low Income Stratum[a]					Middle Income Stratum[a]					High Income Stratum[a]				
		Normal	Malnourished				Normal	Malnourished				Normal	Malnourished			
			Total	1°	2°	3°		Total	1°	2°	3°		Total	1°	2°	3°
Metropolitan Lima	39.0	76	24	21	3	*	85	15	14	1	0	87	13	12	1	0
Coast	45.3															
North		46	54	39	12	3	60	40	32	7	1	77	23	22	1	0
Center		61	39	34	5	*	80	20	17	3	*	89	11	10	1	0
South		68	32	25	6	1	73	27	21	5	1	86	14	12	2	0
Total		56	44	33	9	2	70	30	24	5	1	83	17	15	2	0
Sierra	56.4															
North		29	71	48	19	4	36	64	46	15	3	52	48	34	10	4
Center		41	59	36	15	8	43	57	37	15	5	49	51	35	14	2
South		50	50	29	17	4	57	43	28	11	4	67	33	23	7	3
Total		39	61	39	17	5	45	55	37	14	4	56	44	31	10	3
Jungle	56.8															
High		37	63	41	18	4	47	53	37	13	3	56	44	32	10	2
Low		25	75	46	25	4	37	63	45	15	3	54	46	36	9	1
Total		31	69	43	22	4	42	58	41	14	3	55	45	33	10	2
Country	52.2	50	50	34	13	3	59	41	30	9	2	65	35	27	7	1

[a]The low stratum represents 50 percent of households, the middle stratum represents 40 percent, and the high stratum represents 10 percent.

[b]Percentage of families that do not satisfy at least 90 percent of their calorie requirements.

Source: La Alimentacion en El Peru, C. Amat y Leon and D. Curonisy, 1981

The ENCA estimates of the prevalence of malnutrition are consistent with aggregate estimates of calorie intake deficits as derived from the ENCA data on per capita calorie consumption for different regions. This can be observed by the percentages of households not satisfying at least 90 percent of their calorie requirements, which are presented in Table 2. In 1972, 52.2 percent of all households in the ENCA study consumed at or below this level, with the Sierra and jungle regions having the higher prevalences of diets which were deficient in calories. In the northern Sierra, 65 percent of preschool aged children were malnourished, and in the low jungle 68 percent were malnourished to some degree.

Patterns of food consumption based on the daily share of calories which each food or food group contributes to total daily calorie consumption are presented in Table 3. Cereals, as a group, were the most important source of calories throughout most of the country. Roots and tubers were also important in the diet, especially in the Sierra, where potatoes were most important, and in the jungle, where cassava was most important. In all of the regions, cereals and roots and tubers contribute from 50 percent to over 70 percent of per capita calorie consumption, with the Sierra and jungle having the higher percentages; this indicates less diversity in the diets in those regions. Table 3 also shows that daily per capita calorie consumption for each of the regions was below the FAO recommendation.

Table 3. Percentage Distribution for Sources of Calorie Intake for Peru in 1971/1972

Food Groups	Region										
	Metropolitan Lima (Income Strata)			Coast			Sierra			Jungle	
	Low	Medium	High	North	Center	South	North	Center	South	High	Low
Cereals	43.0	38.9	36.0	40.5	43.3	44.2	46.7	47.6	43.6	25.3	21.7
Roots & Tubers	9.3	8.3	6.6	7.9	8.2	7.9	20.8	23.1	33.1	40.3	44.1
Meats	5.5	7.4	9.3	5.4	6.3	6.5	2.4	4.4	6.1	6.1	6.1
Seafood	2.1	2.2	1.8	2.8	1.9	1.6	0.5	0.3	0.2	0.5	0.3
Fresh Water Fish	-	-	-	*	*	*	*	*	0.2	1.3	6.5
Dairy Products	6.0	8.7	12.0	3.6	4.6	6.2	1.9	2.3	2.1	1.8	1.6
Eggs	0.7	1.4	1.6	0.4	0.6	0.5	0.4	0.3	0.1	0.5	0.4
Pulses	4.2	3.6	2.6	6.6	5.1	5.0	7.9	4.5	4.8	5.9	3.7
Vegetables	2.9	3.2	3.1	1.5	1.9	2.3	0.9	1.6	1.0	0.9	0.6
Fruits	2.9	4.5	5.0	2.2	2.5	2.6	0.8	1.1	0.5	2.3	3.2
Oils	10.6	10.6	10.9	12.3	10.6	10.0	5.7	5.4	2.9	5.3	3.7
Sugar	11.7	10.0	9.2	14.8	13.3	11.3	11.0	8.0	3.9	8.0	7.1
Soft Drinks	0.6	0.8	1.0	1.1	0.6	0.5	0.7	0.7	0.5	0.9	0.2
Beverages	0.3	0.4	0.2	0.7	0.8	1.0	0.2	0.6	1.0	0.7	0.7
Nuts	0.1	0.2	0.2	0.1	0.2	0.3	*	0.1	*	0.1	0.1
Condiments	0.1	0.1	*	0.1	0.1	0.1	0.1	*	*	0.1	*
Total Daily Calories Per Capita	**1813**	**2098**	**2011**	**2123**	**2278**	**1978**	**2075**	**1907**	**1838**	**2438**	**1798**

*Less than 1 percent.

Average daily per capita consumption of calories was 1944 for Lima, 1907 for large cities, 2110 for small towns and 2114 for rural areas.

Source: Niveles de Vida, Analisis de la Situacion Alimentaria en el Peru, Ministerio de Economia y Finanzas, Peru, 1977.

The share of total income or expenditures allocated to food is a useful indicator of nutritional adequacy; households with a large share (more than half) of income devoted to food are likely to be at nutritional risk. Food budget shares are presented in Table 4 and show a national average of 50 percent with progressively higher shares for the more sparsely populated areas. Similarly, the two principal sources of calories represent a larger share of the total budget for rural areas than for urban areas. A comparison of the foods consumed in greatest quantity in Lima and the rural areas revealed that potatoes were the single most important food in both, though the rural households consumed over three times more potatoes per capita than did Lima households (0.49 kgs. per person per day versus 0.13 kgs.). Rural households consumed just under 50 percent of all the roots and tubers in the country. After potatoes, the five foods consumed in greatest quantity in Lima were fresh milk, rice, bread, sugar and evaporated milk. Rural households consumed potatoes, fresh maize (choclo), cassava, plantains, rice and barley.

One issue that has received a lot of comment is the high import content of foods consumed in Lima. The proportion of imported foods which were consumed in Lima greatly exceeded the proportion of the population residing in Lima. Lima consumed a greater than proportionate share of oils, noodles, French bread, fresh milk, evaporated milk, chicken and beef, and among foods produced domestically, Lima consumed a greater share of rice and white sugar. Rural areas consumed a larger share of those foods produced domestically, principally potatoes, maize, cassava,

Table 4. Food Budget Shares by Area of Residence, 1972

Area	Food Expenditures as a Percentage of Total Household Expenditures	Expenditures on Cereals as a Percentage of Total Household Expenditures	Expenditures on Roots and Tubers as a Percentage of Total Household Expenditures
Rural	63	14.8	11.7
Small Towns	55	9.3	3.9
Large Cities	49	7.6	2.5
Metropolitan Lima	40	5.4	2.1
Peru	50	-	-

Source: La Alimentacion en El Peru, Carlos Amat y Leon and D. Curonisy, Lima, Peru, 1981.

plantains, beans, wheat grain, quinua, and brown sugar. Of the major foods, rice and noodles were the most equitably distributed among urban and rural areas. These differences in consumption patterns between urban and rural areas have led many analysts to say that Peruvian food policy has been directed towards supplying the urban needs and that this effort has become increasingly dependent on imported commodities. Samaniego (1979) and Lajo (1982) are among the many that suggest that this process has been detrimental to the development of Peru's agriculture.

Amat y Leon also estimated the consumption patterns and budget shares of well nourished and malnourished families in the different areas. Table 5 presents monthly per capita consumption of cereals and roots and tubers and the total cost of all foods in well and malnourished families. Over 90 percent of cereal consumption by well nourished Lima families came from rice and wheat products, while less than 50 percent of cereal consumption in well nourished rural households came from rice and wheat products. Well nourished rural households consumed significantly greater amounts of roots and tubers than did well nourished urban households. The cost of an adequate diet was 60 percent less in rural areas than in Lima. Malnourished families consumed significantly less of each of these foods than their well nourished counterparts. In Lima, the food budget of malnourished households was two-thirds of the food budget of well nourished households. In all other areas, the food budgets of malnourished families were approximately 50 percent less than their well nourished counterparts. The differences in consumption between

Table 5. Monthly Per Capita Consumption and Cost of Diets in Well Nourished and Malnourished Families, 1972

Food	Monthly Per Capita Consumption (Kg) in Well Nourished Families[a]				Monthly Per Capita Consumption (Kg) in Malnourished Families[b]			
	Metro Lima	Large Cities	Small Towns	Rural	Metro Lima	Large Cities	Small Towns	Rural
Cereals	7.8	8.1	10.1	11.2	4.9	4.4	4.3	4.2
Rice	3.3	3.5	3.5	1.8	1.6	1.3	1.2	0.7
Bread	2.9	3.1	3.0	1.2	2.3	2.4	2.1	0.9
Noodles	1.1	1.0	1.0	0.8	0.7	0.5	0.4	0.4
Wheat	-	-	0.5	1.2	-	-	0.2	0.5
Barley	-	-	0.4	1.4	-	-	-	0.4
Maize	0.5	0.5	1.7	4.3	0.3	0.2	0.4	1.2
Quinua	-	-	-	0.5	-	-	-	0.1
Roots and Tubers	5.8	6.1	9.1	18.4	3.4	2.8	4.2	7.9
Potatoes	4.5	4.8	7.7	14.0	2.7	2.3	3.3	6.2
Sweet Potatoes	0.7	0.5	0.4	0.4	0.3	0.2	0.2	0.2
Cassava	0.4	0.8	0.8	2.2	0.2	0.3	0.5	0.8
Others	0.2	-	0.2	1.8	0.2	-	0.2	0.7
Total Food Expenditures	635.0	527.6	530.4	372.1	415.9	287.7	239.1	178.7

[a]Well nourished families consume at a level above 90 percent of calorie requirements.

[b]Malnourished families consume at a level below 90 percent of calorie requirements.

Source: La Alimentacion en El Peru, Carlos Amat y Leon and D. Curonisy, Lima, Peru, 1981.

well and malnourished households in the different areas appeared directly linked to income. The authors of the various ENCA publications have interpreted the differences between the malnourished and well nourished households to be fundamentally that the malnourished households spent a smaller share of smaller incomes on food and more on housing and transport (Amat y Leon et al., 1981). They categorically state that in 1972, malnutrition was an income problem. This can be extended to say that food price differences were not likely to be a major cause of the food intake differences between the well nourished and the malnourished; the cost per calorie differences between malnourished and well nourished households was less than 7.5 percent, whereas the urban-rural difference was 83 percent in 1972. While the malnourished households pay slightly more per calorie, these differences were swamped by urban-rural differences in food costs.

The higher prevalences of malnutrition were found in the rural areas and in particular in the Sierra, where 50 percent of the severely malnourished children were concentrated, even though that region had only 32 percent of the country's children. Rural diets were approximately equivalent in energy to urban diets (if one accounts for higher energy requirements in the highlands) and urban diets were more dense in protein and other nutrients, although marginally so. With average diets approximately equivalent and food costs lower in the rural areas, the differences in the prevalence of malnutrition can be explained by either lower average incomes or by higher prevalence of health related

correlates of malnutrition, or both. The 1983 Nutrition Strategy Team (Franklin et al., 1983) documented that health related correlates of malnutrition are and have been more prevalent in the rural areas than in the urban areas. It was also true and has generally been true that incomes are significantly lower in the rural areas.

In the 1972 ENCA data, diets of approximately equivalent nutritional value were 50 to 80 percent lower in cost in the rural areas than in the urban areas, and per capita rural incomes were less than 50 percent of per capita urban incomes. In fact, per capita incomes in the Sierra were approximately one-third of the per capita incomes in metropolitan Lima and approximately one-half of the national per capita income. While comparison of "monetized" incomes for households with different consumption patterns is always subject to question, because the income differences could be more apparent than real, the fact that the differences in income are so much greater than the differences in food costs does imply that the effective demand over food and other goods and services was substantially lower for the rural dwellers than for the urban dwellers. Not only were rural incomes lower in "real" terms than urban incomes, but the inequality in the distribution of incomes was greater for the rural areas than for the urban areas. Amat y Leon and Leon (1981) calculated various measures of inequality or concentration of income for the various regions of the country. As a rule, rural incomes tended to be more unequal (concentrated) than

income in the cities, with the distribution of incomes substantially more unequal in the Sierra and jungle. This maldistribution of income in rural areas could, therefore, in part account for the higher prevalence of malnutrition in the rural areas, because the maldistribution of incomes would imply the maldistribution of food among the rural dwellers.

These findings of the ENCA studies are somewhat counter to what, even today, is the "conventional wisdom" about income and nutrition in Peru. This conventional wisdom revolves around the notion that rural dwellers, particularly in the Sierra, are principally subsistence households who produce much of what they consume, and that income comparisons are biased because it is difficult to impute the "true" value for consumption of goods produced within the households. Yet, rural dwellers in 1972 were highly dependent on markets for their products, their labor and their consumption. While much of what was produced by farm households was in fact consumed by the households, and this represented a large share of total food consumption (e.g., 63.4 percent for all rural areas and 71.8 percent for the Sierra), a substantial portion of rural household incomes was derived from labor earnings from outside the farm household. Table 6 presents the composition of incomes for rural households in various regions of the country. The share of subsistence consumption in relation to total income is highest in the central Sierra (21.2 percent) and is generally less than 15 percent for other regions. This means that rural dwellers in all regions were highly dependent on product and factor market conditions for the determina-

Table 6. Composition of Incomes for Rural Households in Peru: 1972

Region	Percentage of Income			
	Wage Work	Entrepreneurship	Own Consumption	Other
Coast				
North	64.6	25.8	0.7	8.9
Central	58.8	27.2	1.7	12.3
South	59.0	30.5	1.3	9.2
Sierra				
North	40.2	37.1	13.3	9.4
Central	38.0	34.6	21.2	6.2
South	28.7	47.6	14.8	8.9
Jungle				
High	24.5	56.8	12.5	6.2
Low	27.9	51.4	12.6	8.1

Source: Distribucion del Ingreso Familiar en El Peru, C. Amat y Leon and Hector Leon, Lima, Peru, 1981.

tion of their incomes in 1972. The evolution of market prices for the products that rural households produce and consume and the evolution of wages in rural areas would be the proximal determinants of real incomes for these households.

What all this implies is that in 1972 the majority of rural households were unable to produce enough food to achieve nutritional adequacy, nor were they able to earn enough from market activities to purchase food sufficient to fulfill nutritional needs. The fact that they consumed a lot of what they produced and they produced a lot of what they ate does not mean that they were able to achieve nutritional adequacy.

The ENCA studies have served to establish that malnutrition was widely prevalent among urban and rural dwellers in 1972, and that low incomes were the principal determinant of low levels of food consumption among the malnourished. Rural and urban incomes were unequally distributed so that the poor lacked effective demand over food and other needs. What requires emphasis is that labor and product market conditions were the proximal determinants of incomes for rural dwellers, and therefore the determinants of malnutrition in rural as well as urban areas.

3.0 Incomes and Consumption in Recent Years

The link between changes in the distribution of incomes and changes in the nutritional status of the urban poor and the rural population is illustrated by the sparse data available for the period 1977-1982. Since 1977, the amount of national income per capita available for distribution has declined by at least 1.3 percent per year in real terms (INE, 1983). Whether this diminishing income is distributed functionally or by household income strata, it is the nutritionally vulnerable groups who have fared the worst.

3.1 Distribution of Income

The report of the World Bank's 1980 Economic Mission to Peru (Thumm et al., 1981) analyzed the changes in the level and distribution of income for the period 1970 to 1979. According to that report, white and blue collar workers in Lima suffered declines in real income of 36.4 and 10.6 percent, respectively, during the seventies. Among the self-employed, nonagricultural entrepreneurs expanded their share of national personal income while farmers experienced a drop in their share, particularly in 1978 and 1979. From 1971/72 to 1979, the distribution of household incomes became even more concentrated; real incomes of the lowest half of the distribution dropped by 18 percent, for the middle income stratum the decline was approximately 15 percent, and the incomes of the highest ten percent of the income distribution increased by 10 percent.

A sharp decline in real per capita income during 1975-1979 was distributed unevenly across regions. Lima and other urban

areas in the coast suffered the worst decreases in real incomes because the decline in real wages and salaries primarily affected urban blue and white collar workers in the middle and lower middle income groups. The continuing influx of rural emigrants exacerbated this decline in per capita income in the coastal regions. Real incomes in the Sierra also decreased during this period, although the decrease was mitigated by heavy rural out-migration and by this region's reliance on agriculture as a source of income. Real incomes in the jungle fluctuated more than in the Sierra because of the substantial in-migration that occurred over this period.

Real disposable incomes of the urban poor, particularly in Lima, declined significantly during the latter half of the 1970's. Incomes of the rural poor also deteriorated over this period. The trend in incomes of workers in agriculture (the bulk of the rural poor) is shown in Table 7. Real per capita agricultural income fluctuated around a declining trend line from 26.8 thousand (1973) soles in 1970 to 20.1 thousand (1973) soles in 1982 (2.6 percent per year). The total labor force in agriculture (wage workers plus independent and subsistence farmers) increased from 2.0 million in 1970 to 2.3 million in 1981, representing a trend growth rate of 1.2 percent per year. The steady increase in rural out-migration was offset by a population growth rate that averaged 2.5 percent per year. Even with growth in the labor force, the <u>total</u> real personal income generated in the agricultural sector declined at a rate of

Table 7. Evolution of Personal Income in Agriculture and the Agricultural Wage Bill in Real* Per Capita Terms, 1970 to 1982

	Personal Agricultural Income Per Person Employed	Number of Persons Employed (thousands)	Agricultural Wage Bill Per Worker	Number of Persons Employed (thousands)
1970	26,803	(2,011.9)	22,503	(451.8)
1971	25,353	(2,027.3)	26,114	(448.2)
1972	24,109	(2,043.0)	28,336	(444.9)
1973	25,475	(2,067.9)	30,097	(443.5)
1974	26,341	(2,093.7)	31,008	(441.9)
1975	27,653	(2,119.7)	30,494	(440.0)
1976	25,063	(2,146.1)	28,764	(437.5)
1977	24,816	(2,171.8)	25,461	(434.5)
1978	20,905	(2,197.3)	21,486	(430.5)
1979	20,201	(2,222.4)	18,181	(425.8)
1980	18,371	(2,248.0)	15,173	(419.7)
1981	18,931	(2,272.3)	13,090	(413.7)
1982**	20,124	NA	13,915	NA

*1973 Soles

**Sigma One Corporation estimate

Source: Cuentas Nacionales Del Peru 1950-1979 INP, Lima, Peru, 1980 and Cuentas Nacionales Del Peru Anexo, INE, Lima, Peru, 1982.

approximately 1.4 percent per year from 1970 to 1982.

Table 7 also shows the real agricultural wage bill per worker from 1970 to 1982. The real wage bill increased steadily from 22.5 thousand (1973) soles in 1970 to 31.0 thousand (1973) soles in 1974 and then declined throughout the rest of the period to 13.9 thousand (1973) soles in 1982. The trend in the real wage bill shows an annual decrease of 3.8 percent per year. This deterioration of real incomes in the agricultural sector reduced employment opportunities for wage workers; this is reflected in Table 7 as a steady decrease in the number of workers employed from 451.8 thousand in 1970 to 413.7 thousand in 1981. Since the population was growing at approximately 2.5 percent annually, the trend decline of 0.6 percent per year in agricultural wage workers indicates the magnitude of rural out-migration over this period.

The interaction of forces affecting the distribution of incomes between the urban and rural populations has resulted in large discrepancies in real per capita GDP across departments, as shown in Table 8. Per capita GDP in 1973 soles is reported for each department for 1961, 1972, and 1981. Per capita GDP for the country rose slightly from 26.7 thousand soles in 1972 to 28.3 thousand soles in 1981. While per capita incomes of most departments rose slightly over this period, there was virtually no change in the relative distribution of incomes by department. For instance, the 1971 per capita GDP for rural departments in the Sierra, such as Apurimac, Ayacucho, Cajamarca and Puno, ranged from 7.5 to 7.9 thousand (1973) soles, well below the

Table 8. Gross Domestic Product by Department in Real[a] (Per Capita) Terms, 1961, 1972, 1981

	GDP Per Capita (Soles)			1981 Dollars[b]
	1961	1972	1981	
Total Country	22,153	26,661	28,314	731
Department				
Amazonas	12,527	8,687	10,469	270
Ancash	16,392	13,414	14,362	371
Apurimac	11,405	7,474	7,835	202
Arequipa	24,378	28,628	26,944	696
Ayacucho	11,265	7,782	8,071	208
Cajamarca	12,325	7,929	9,314	240
Cuzco	16,027	10,762	10,506	271
Huancavelica	12,428	9,308	13,025	336
Huanuco	11,053	11,014	11,810	305
Ica	26,520	29,678	26,599	687
Junin	19,423	25,405	25,855	668
La Libertad	18,191	20,205	19,071	492
Lambayeque	19,581	20,641	19,315	499
Lima y Callao	42,418	53,564	52,758	1363
Loreto y Ucayali	12,907	16,344	20,459	529
Madre de Dios	18,283	11,449	12,826	331
Moquegua	30,342	24,676	111,838	-
Pasco	22,999	24,415	26,413	682
Piura	18,336	15,863	19,634	507
Puno	13,965	7,938	8,113	209
San Martin	10,836	11,023	11,999	310
Tacna	40,855	121,448	57,186	1477
Tumbes	20,112	10,448	10,873	281

[a] 1973 soles

[b] Converted to 1973 dollars at the 1973 official exchange rate.

Source: Informe Estadistico, Instituto Nacional de Estadistica, Lima, Peru, August, 1983.

national average of 26.7 thousand soles and less than one-sixth of per capita GDP in Lima department. By 1981, the per capita income for these departments ranged from 7.8 to 9.3 thousand (1973) soles, which was still approximately one-sixth the per capita GDP of 52.7 thousand soles in Lima. Incomes in the relatively richer coastal departments of Ica, Lambayeque and Piura did not improve significantly in comparison to Lima department over this period either. Per capita GDP in 1972 in these departments ranged from 15.9 to 29.7 thousand soles; by 1981, income variation had narrowed so that per capita GDP ranged from 19.6 to 26.6 thousand soles, which was less than 50 percent of per capita GDP in Lima department.

Income distribution throughout the 1970's and early 1980's reflects deteriorating incomes for both the urban and rural poor, as well as a continuing and significant discrepancy in income distribution across departments and regions. Estimates of the income elasticity of food expenditures, of food consumed or of calories consumed range upward from 0.3 to nearly one (Van de Wetering et al., 1964; Musgrove, 1979; Amat y Leon and Curonisy, 1980). The worsening income distribution, therefore, must have produced significant effects on food consumption, particularly in the late 1970's and early 1980's. Food availability and the resulting food consumption patterns during this period are discussed in the following section.

3.2 Per Capita Food Availabilities

Per capita availabilities of the major foods in Peru for the years 1972 to 1982 are presented in Table 9. The aggregate

availability of calories improved by at most 5 percent during the period. Though there has been an increase in the per capita availability of rice, there has also been a sharp decline in the per capita availability of potatoes. The per capita availabilities of wheat products and sugar saw little variation throughout the entire period. Large increases in poultry were offset by declines in beef and other meats, milk and legumes. Urban food consumption in per capita terms increased between 1972 and 1978, and per capita consumption declined in rural areas during this period. Food consumption by the urban poor in 1978 was approximately equivalent to 1972 levels, i.e. no improvement in an inadequate situation. This implies that the urban non-poor improved their diets while the diets of the poor throughout the country remained inadequate or deteriorated.

3.3 Consumption Analysis Using 1977/1978 ENAPROM Survey

The National Multiple Purpose Household Survey of 1977/78 represents the other major data collection effort related to household expenditures, income and food consumption. The principal purpose of the ENAPROM survey was not to develop nutritional information; nevertheless, it is useful for deriving important insights on food consumption patterns in recent years.

Expenditure shares for total food and cereals and roots and tubers are presented in Table 10. With the exception of metropolitan Lima, all cities exhibit average food budget shares in the range of 48 to 58 percent. Expenditures on cereals as a percentage of total food expenditures range from 13 to 24 percent

Table 9. Per Capita Food Availabilities, 1972-1982

	Consumption Per Capita (Kg/yr)										
	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Rice	22.27	24.31	22.32	23.79	25.44	24.71	24.54	24.28	26.95	28.83	29.0
Wheat Grain	72.01	62.75	57.30	60.66	58.78	57.40	52.31	60.40	54.19	62.36	61.1
Potatoes	92.22	89.67	87.19	80.86	80.12	74.02	78.22	76.34	59.92	72.08	74.0
Legumes	7.27	7.16	7.20	6.71	6.61	6.25	5.84	6.03	5.43	5.74	6.3
Milk	76.79	73.97	70.27	62.33	68.22	64.35	54.22	55.93	56.08	58.48	60.2
Chicken	5.66	6.11	7.41	8.88	9.33	9.29	7.51	7.31	8.63	10.72	10.8
Beef	7.78	6.68	6.44	6.35	6.04	5.93	5.72	5.47	5.17	6.00	5.7
Sugar	--	34.90	36.81	37.78	38.33	35.24	34.65	33.90	33.94	33.85	35.7

Source: Plan de Abastecimiento Alimentario Nacional, Office of the Prim Minister, Lima, Peru, May 1983.

Table 10. Expenditure Shares for Total Food and Cereals and Roots and Tubers, 1977/1978

City	Average Household Food Expenditure Shares (Percent of Average Household Expenditures)	Average Household Cereal Expenditure Shares (Percent of Average Household Food Expenditures)	Average Household Roots and Tubers Shares (Percent of Average Household Food Expenditures)
Arequipa	48.73	16.86	6.84
Cajamarca	48.89	24.33	7.28
Chiclayo	49.59	20.20	4.33
Chimbote	47.76	20.96	5.56
Cuzco	56.45	18.10	9.06
Huancayo	50.73	22.60	7.28
Ica	53.29	21.65	3.56
Iquitos	49.72	12.51	1.93
Piura	54.97	19.38	3.67
Puno	58.34	18.81	13.09
Tacna	47.89	15.37	6.01
Trujillo	48.99	20.25	5.58
Lima	42.63	14.40	4.11

Source: ENAPROM, Nos. 1-13, INE, 1980, 1981

among the thirteen cities. Expenditures on roots and tubers represent a smaller percentage of total food expenditures, yet cities in the Sierra exhibit higher shares than cities elsewhere.

The distribution of total expenditures among households reveals a very low level of expenditure by lower income households compared to the remainder of the population. The lower 50 percent of households spend only 26.6 percent of total expenditures in the thirteen cities of the ENAPROM Survey. The upper 10 percent of households spend 24.9 percent of total expenditures. This reflects the skewed distribution of incomes in all urban areas of the country.

The ENAPROM results were used to derive an estimate of total urban consumption of cereals and roots and tubers. The 1978 population of these thirteen cities represented 64.52 percent of the total urban population in Peru in 1978. Consumption per capita by the remaining 35.48 percent of the urban population was assumed to be the same as that in the ENAPROM cities. The estimation of total urban consumption of cereals and roots and tubers in 1978 is presented in Table 11. Consumption of cereals by the urban population (principally as bread, rice and noodles) totaled 1,183,152 metric tons and the consumption of roots and tubers, principally potatoes, totaled 811,282 metric tons. Metropolitan Lima consumed 45.4 percent and 44.1 percent of the total urban consumption of cereals and roots and tubers, respectively.

An estimate of rural consumption of cereals and roots and tubers can be derived by subtracting total urban consumption from

Table 11. Urban Consumption of Cereals and Roots and Tubers, 1978

Cities	Number of Households[a]	Population[b]	Cereals[c] Average Annual Expenditures Per Household	Cereals[c] Consump. (MT)	Roots and Tubers[d] Average Annual Expenditures Per Household	Roots and Tubers[d] Consump. (MT)
Arequipa	65,400	346,993	25,651	40,355	10,405	38,144
Cajamarca	8,790	55,806	34,936	7,387	10,460	5,154
Chiclayo	37,170	236,758	28,978	25,911	6,217	12,953
Chimbote	34,970	203,980	30,279	25,472	8,024	15,729
Cuzco	25,470	133,756	28,469	17,443	14,249	20,343
Huancayo	23,720	131,352	32,665	18,639	10,522	13,990
Ica	13,390	73,358	29,892	9,628	4,910	3,685
Iquitos	19,510	121,387	23,995	11,262	3,707	4,054
Piura	28,320	175,176	23,515	16,020	4,694	7,451
Puno	9,200	48,796	31,980	7,078	22,258	11,478
Tacna	13,250	67,115	30,874	9,841	12,066	8,962
Trujillo	54,350	307,914	28,558	37,338	7,866	23,964
Lima	--	4,506,947	25,088	536,996	7,168	357,532
Total		6,409,338		763,370		523,439
National Urban[e]		9,933,489		1,183,152		811,282

[a] 1977 estimate included in published ENAPROM results; estimate for Lima was for total population.

[b] Population = number of households x average household size of ENAPROM sample.

[c] Average price of cereals, October 1977 - September 1978 was 41.57 soles/kg.

[d] Average price of roots and tubers, October 1977 - September 1978 was 17.84 soles/kg.

[e] Represents ENAPROM total adjusted by (1/0.6452).

Source: ENAPROM, Nos. 1-13, INE, 1980, 1981, 1972 Census, 1981 Census, Sigma One Corporation and Boletin Estadistico del Sector Agrario 1968-1982, Ministerio de Agricultura.

total disappearance after accounting for losses, waste, seed and stocks. Estimates of total disappearance and rural consumption of cereals in 1978 are presented and described in Table 12. These estimates reveal that the rural population, which represented approximately 37 percent of the total population in 1978, consumed only 26 percent of the total quantity of cereals available for consumption. Cereals would have provided 42 percent of the daily (FAO) calorie recommendation in urban areas and only 25 percent of the recommended level in rural areas.

Estimates of total disappearance and rural consumption of roots and tubers in 1978 are presented and described in Table13. Most production of roots and tubers occurs in the Sierra, though some coastal regions produce potatoes, sweet potatoes and cassava, and jungle regions produce cassava. The residual of total disappearance less total urban consumption is 910,685 metric tons, which is an estimate of total rural consumption. These results differ markedly from those for cereals in that the rural population consumed nearly 53 percent of all roots and tubers in comparison to only 26 percent of all cereals. Potatoes represent nearly 70 percent of total disappearance of roots and tubers and probably represent greater than 70 percent of total urban consumption of roots and tubers. Urban consumption of roots and tubers represents 8 percent of a daily calorie recommendation, and rural consumption represents 16 percent of the recommendation.

The following chart reviews the contribution of cereals and roots and tubers to daily calorie recommendations for urban and

Table 12. Total Disappearance and Rural Consumption of Cereals, 1978

Type	Total Production (MT)[a]	Total Available For Consumption (MT)
Wheat Products[b]		
Bread[c]	-	622,553
Noodles[c]	-	207,634
Rice[b]	-	387,713
Maize (amilaceo)[d]	220,725	165,544
Maize (choclo)	134,756	134,756
Barley[e]	137,855	76,165
Quinua[d]	10,455	7,841
Canihua[d]	2,298	1,379
Total Disappearance (consumption)		1,603,585
Total Urban Consumption		1,183,152
Total Rural Consumption		420,433

[a]Production for all cereals except wheat products and rice is an average of total production in 1977 and 1978.

[b]Average per capita availabilities of wheat grain and rice were 53.58 kg. and 24.6 kg., respectively, as reported in "Plan de Abastecimiento Alimentario Nacional" for 1977/1978. Per capita availabilities are multiplied by total population to provide a total amount of wheat grain, which is converted to wheat flour with a 0.75 extraction rate. Approximately 75 percent of wheat products are bread and 25 percent are noodles.

[c]1 kg. wheat flour provides 1.43 kg. bread; 1 kg. wheat flour provides 1.05 kg. noodles.

[d]Extraction rate = 0.75.

[e]15 percent of national barley production is used in beer production; barley imports are used in beer production or animal feed. All remaining national production is assumed to be used for human consumption, though some is used for animal feed. Extraction rate = 0.65.

Source: Sigma One Corporation

Table 13. Total Disappearance and Rural Consumption of Roots and Tubers, 1978

Type	Total Production (MT)[a]	Total Available For Consumption (MT)[b]
Potatoes	1,655,453	1,191,926
Cassava	411,979	296,625
Sweet Potatoes	155,460	111,931
Oca	60,581	43,618
Olluco	65,196	46,941
Arracacha	16,947	12,202
Mashua	12,730	9,166
Pituca	13,275	9,558
Total Disappearance (consumption)		1,721,967
Total Urban Consumption		811,282
Total Rural Consumption		910,685

[a]Production is an average of total production in 1977 and 1978.

[b]10 percent waste, 20 percent seed rate, quantity available for consumption = production x 0.72.

Source: Sigma One Corporation

rural areas in 1972 and 1978.

Food	Percentage of Daily Calorie Recommendations			
	Urban		Rural	
	1972	1978	1972	1978
Cereals	36	42	34	25
Roots and Tubers	7	8	18	16
Total	43	50	52	41

In 1972, cereals and roots and tubers provided 43 percent of daily calorie needs in urban areas and in 1978 they provided 50 percent, an increase of 16 percent in the daily calories provided by these foods. The urban population had access to milk, sugar, vegetable oils and chicken with which to fulfill the remaining 50 percent of energy needs. Cereals and roots and tubers provvided 52 percent of daily calorie needs for rural areas in 1972, but only 41 percent in 1978, a decrease of 21 percen' in the daily calories provided by these foods. The rural population would have to rely principally on grain legumes and other vegetable products to attempt to fulfill an additional 59 percent of energy needs.

These changes in the contribution of cereals and roots and tubers to daily calorie recommendations for the urban and rural population are reflected in the changes in per capita daily consumption of these foods between 1972 and 1978, as shown in Table 14. A comparison of the consumption of cereals and roots and tubers for the years of the ENCA survey, 1971/1972, and the

Table 14. Average Daily Per Capita Consumption[a] of Cereals and Roots and Tubers, 1972, 1978

	Urban		Rural	
	1972[b]	1978	1972	1978
Cereals	0.255	0.327	0.263	0.198
Roots and Tubers	0.196	0.224	0.496	0.428

[a]Consumption in kilograms per person per day.

[b]Urban consumption in 1972 is a weighted average by population of Lima, large cities, and small towns as presented in the analysis by Amat y Leon, 1981.

ENAPROM survey, 1977/1978, reveal that average per capita consumption of cereals and roots and tubers increased in urban areas and decreased in rural areas over this time period.

Consumption by the poor in Lima also declined. Grados and Miranda (1980) repeated ENCA procedures for a small sample of Lima households in 1978 and compared the low income stratum in Lima in 1972 (ENCA) with their counterparts in 1978 (ENAPROM). Their general finding was that quantities of food consumed had decreased by about 6 percent for the low income stratum in Lima. Despite the decrease in quantities consumed, the low stratum was seen to maintain daily per capita calorie consumption near the 1972 level, though that was also inadequate in terms of calorie needs. This maintenance of energy levels in diets with smaller quantities of food reflects a shift to rice from bread and other foods. Middle income and high income households consumed more food in 1978 than in 1972, 5 and 14 percent, respectively, and daily per capita calorie consumption in the middle and upper income strata also increased significantly over this period. From 1972 to 1978, the diets of the urban poor maintained caloric levels, albeit below recommendations, and declined qualitatively. The diets of the rich and not-so-poor improved qualitatively and quantitatively, particularly in Lima. Since the national diet remained nearly constant, these results also imply that the rural diets deteriorated quantitatively and qualitatively. The principal mechanism for this further aggravation in the maldistribution of food energy and nutrients was the further deterioration in the levels and the distribution of incomes.

Contrary to popular belief and earlier reports (Franklin and Wadman, 1980), rural dwellers were not able to isolate their food consumption from the deteriorating economic situation; rather, they gave up a larger share of the production of cereals and roots and tubers to be consumed by urban dwellers.

3.4 Food Consumption Since 1978

Domestic food supplies increased in 1981/1982 as a result of increased domestic production; however, this increase was short-lived due to the weather-induced crises of 1983. Any improvements as a result of increased agricultural output have been captured by a relatively small number of households, and these generally have not been the poor. Per capita availabilities of the major foods have remained fairly constant since 1978, with the exception of 1983.

The distributions of estimated per capita rice and potato consumption by departments for 1982 are presented in Table 15. These distributions were calculated from departmental rice quotas and estimated interdepartmental flows of potatoes in 1982 as developed by the Ministry of Agriculture. Actual availabilities of both rice and potatoes were slightly lower than the estimated availabilities. Five of the six departments with per capita rice consumption greater than the national average consumed approximately 72 percent of all rice consumed in the country. These five departments, Lima, La Libertad, Lambayeque, Ica and Piura, all have populations which are greater than 65 percent urban, and represent 50 percent of total population.

Table 15. Distribution of Per Capita Rice and Potato Consumption by Departments in 1982

Department	Rice		Potatoes		Rice and Potatoes
	Daily[a] Cons. Per Capita (Kg)	Percent of Daily Calorie Req.	Daily[b] Cons. Per Capita (Kg)	Percent of Daily Calorie Req.	Percent of Daily Cal. Req.
Amazonas	.031	4.52	.042	1.54	6.06
Ancash	.067	9.77	.297	10.89	20.66
Apurimac	.020	2.92	.382	14.01	16.93
Arequipa	.076	11.08	.167	6.12	17.20
Ayacucho	.027	3.94	.264	9.68	13.62
Cajamarca	.036	5.25	.155	5.68	10.93
Cuzco	.037	5.40	.398	14.59	19.99
Huancavelica	.010	1.46	.409	15.00	16.46
Huanuco	.037	5.40	.472	17.31	22.71
Ica	.156	22.75	.148	5.43	28.18
Junin	.058	8.46	.404	14.81	23.27
La Libertad	.123	17.94	.217	7.96	25.90
Lambayeque	.157	22.90	.051	1.87	24.77
Lima	.129	18.81	.149	5.46	24.27
Loreto	.086	12.54	.006	0.22	12.76
Madre de Dios	.212	30.92	.079	2.90	33.82
Moquegua	.065	9.48	.287	10.52	20.00
Pasco	.030	4.38	.390	14.30	18.68
Piura	.097	14.15	.033	1.21	15.36
Puno	.032	4.67	.458	16.79	21.46
San Martin	.079	11.52	.016	0.59	12.11
Tacna	.070	10.21	.293	10.74	20.95
Tumbes	.134	19.54	.038	1.39	20.93
Ucayali	.074	10.79	.020	0.73	11.52
National Weighted Average	.088	12.83	.207	7.58	20.41

Daily calorie requirement is 2,400 per person.

[a]Calculated from departmental rice quotas set by the Ministry of Agriculture, Programa de Abastecimiento de Arroz, 1982.

[b]Calculated from estimates of departmental consumption from the Ministry of Agriculture, Programa de Abastecimiento de Papa, 1982.

Source: Sigma One Corporation

They are all principally located in the coastal region and economic activity in each is dominated by a major city. Those departments which are more than 60 percent rural, Ayacucho, Cajamarca, Huancavelica, Apurimac, Puno, Cuzco, Huanuco and Amazonas, all have a per capita rice consumption which is less than 40 percent of the national average. Most of the area within these departments is in the Sierra region, and these eight departments represent eight of the ten departments with the lowest per capita GDP in 1981.

The departments with the highest per capita potato consumption are principally those departments which produce potatoes. These include six of the eight mostly rural departments and the departments of Junin, Ancash and Pasco, which are more than 40 percent rural. In terms of calorie consumption, it is the mostly urban departments which derive calories from rice at greater than the national average and the mostly rural departments which derive calories from potatoes at greater than the national average. The sum of the calorie shares of rice and potatoes reveals that the mostly rural departments and the jungle departments are those consuming below the national average and it is these departments which have the lowest per capita incomes.

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. However, fieldwork for the Nutrition Strategy Project (Franklin et al., 1983) and research by scholars of rural life in Peru indicate that the rural population is highly dependent on the market place for much of

its food and for the majority of its income.

Analysis by Ferroni (1980) of ENCA data for southern and central Sierra populations concluded that "rural smallholders typically need to generate a significant part of their livelihood through market transactions" and that higher subsistence households tended to demonstrate a higher prevalence of calorie deficient diets. In a study of maize production in three different regions from 1976 to 1978, Benjamin (1980) found that one-third of the primarily small subsistence farmers devoted more time to off-farm than to on-farm activities.

The high dependence of rural households on rural labor markets or on migratory work for their incomes and on the market place for food is further highlighted by a study of 306 households in eight rural communities in the southern and central Sierra in 1978 and 1979 by Adolfo Figueroa (1981). In these eight communities, own-farm consumption accounted for approximately one-half of household income. Those communities with lower subsistence levels had higher levels of income. Figueroa discovered that even very remote households had high levels of market integration and concludes by decrying the theme of "self-sufficiency" which is applied to the majority of rural households.

In another study of rural households and small communities in Cuzco in 1977/1978, Gonzalez (1981) discovered a large maldistribution of income. This study further reports that an average of 37 percent of household income is accounted for by

own-farm consumption, and that an average of 74 percent of total household expenditures are represented by expenditures for industrial or processed goods, which indicates the degree of participation in the market place by these households.

Field observations by the Nutrition Strategy Team in 1983 tended to confirm the increasing participation in the market by rural households. These field observations were made in both urban and rural areas in fifteen different departments. Because most agricultural production in the coastal region is of a commercial nature and is undertaken by cooperatives, most rural households there are almost entirely dependent on markets for food. The rural Sierra populations have more typically been labeled as subsistence; however, field observations in June and July of 1983 revealed that in two of the major potato producing regions of the central Sierra, potato producers were marketing 80 to 90 percent of their production. Household interviews conducted during the same period indicate that diets throughout the country have become more dependent on a few commodities, particularly rice, bread and noodles, which are purchased in the market place.

Field researchers also collected food price information in retail markets in almost all of the sites that were visited during the fieldwork and discovered that retail prices for the major commodities, rice, bread and potatoes, were remarkably uniform throughout the country. For example, potatoes cost 500-600 soles/kg. in producing regions, and 600-700 soles/kg. in coastal urban markets. Rice prices were 400-500 soles/kg. in

most urban markets and 500-700 soles/kg. in most rural markets. 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 are presented in Table 16. 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 bread or rice, yet they are a common staple throughout the country.

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 is also presented in the table. Two striking insights evolve from the table; on the one hand, diets of different composition (e.g. quinua and potatoes in the southern Sierra, and wheat and rice in Lima) are similar in cost throughout the country; on the other hand, the dietary adequacy requires incomes of at least 2.5 minimum daily salaries per household, in rural as well as urban areas. The percentage of the rural labor force which is considered adequately employed, i.e. employed at a wage level equal to or higher than the minimum vital wage, continued to decline in 1983 as a result of the continuing economic crisis and the climatic disasters.

We estimate that the average income for all persons employed

Table 16. Cost of a Nutritionally Adequate "Low Cost Diet" For Selected Areas in Peru in July 1983

	Soles Person Per Day	Number of Minimum Daily Wages Required To Feed a Family of 6
Coast		
Lima		
Pueblos Jovenes	992	2.5
Chiclayo	1039	2.8
Trujillo	1004	2.7
Chimbote	983	2.7
Sierra		
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
Pueblo Joven	1071	3.1
Selva		
Tarapoto	1196	3.3
Yurimaguas	1330	3.3
Iquitos	1321	3.3
Pucallpa	974	2.7

Source: Sigma One Corporation, July 1983

in agriculture in 1983 would only feed 2.3 persons. Even if all agricultural income were allocated to food, each person employed in the sector could on average feed 3.7 persons. Persons employed as wage workers in agriculture could feed only 1.7 persons if household incomes were allocated to food in the same proportions as in 1972. If all of the 1983 agricultural wage income were allocated to food, each wage worker could feed 2.75 persons. From the 1981 census, we have estimated that each rural wage worker would need to feed 3 persons. It is clear that rural households that are dependent on rural wage markets cannot feed themselves adequately. It is also highly likely that the majority of the population that is dependent on agriculture cannot afford a nutritionally adequate diet. Given the highly concentrated distribution of incomes in rural areas, it is also clear that a large proportion of the rural population is consuming diets that are grossly deficient in both quality and quantity.

These results appear to be the consequence of long term economic conditions, and the periodic climatic crises only exacerbate the income and food consumption situation for the rural population. Orden et al. (1982), in a study by the University of Minnesota known as the "Schuh Report", concluded that recent agricultural and commercial policies continued the post-war bias against agriculture in favor of urban dwellers. The distortions to resource allocation arising from these policies maintain rural incomes, particularly in the Sierra, below what they would be in the presence of a more neutral

structure of incentives. Tables 17 and 18 present the evolution of real prices for potatoes (retail and producer), wheat products, rice and the overall food price index for Lima. The retail price of potatoes grew at a trend rate of nearly 4 percent per year from 1973 to 1983, and the producer price at 2 percent per year. At the same time, potato production declined by an average of 1 percent per year, so that total real revenues of producers remained stagnant while per capita revenues declined.

Subsidies to rice and wheat caused the retail price of these products to decline (-1.2 percent per year for rice) or to increase moderately (+1.4 percent per year for wheat). During the last three years, commercial rice production has been highly subsidized as has the consumption of cereal products by urban dwellers. Furthermore, the prices of inputs for agricultural production have also increased in real terms and public investment in agriculture has also declined and been concentrated in the coastal and jungle areas. Thus, it would appear that agricultural policy has reflected an urban bias in general, and that within agriculture, large scale capital intensive agriculture has been favored and peasant agriculture has suffered. Through its effect on the level and distribution of income, this long-standing pattern has failed to improve the quality of diets for the urban poor, and may have been an important cause of the deteriorating nutritional conditions for the rural population in <u>all</u> regions of the country.

Table 17. Potato Prices, 1970-1982

Year	Real [a] Consumer Prices (Soles/Kg)	Real[a] Producer Price (Soles/Kg)	Total Production ('000 MT)	Total Revenues (millions of soles)
1970	-	2.82	1929.5	5441.2
1971	-	2.54	1967.9	4998.5
1972	-	3.08	1713.4	5277.3
1973	6.12	3.42	1713.1	5858.8
1974	4.68	3.89	1722.4	6700.1
1975	6.72	4.08	1639.6	6689.6
1976	4.88	3.32	1667.0	5534.4
1977	6.97	4.04	1615.6	6527.0
1978	4.43	3.99	1695.3	6764.2
1979	5.66	4.80	1695.1	8136.5
1980	7.95	5.53	1397.6	7728.7
1981	5.61	3.39	1705.0	5780.0
1982	7.72	2.00	1796.1	3592.2

[a] 1973 soles.

Source: Sigma One Corporation

Table 18. Real Retail Prices
(1973 Soles/Kg)

Year	Potatoes	Rice	Bread	Noodles	Index All Foods
1973	6.12	8.80	8.75	10.97	100.0
1974	4.68	9.03	10.69	12.66	101.6
1975	6.72	9.12	9.95	12.64	109.2
1976	4.88	9.40	11.02	12.31	108.0
1977	6.97	9.52	10.29	17.77	109.8
1978	4.43	8.69	11.62	15.29	111.1
1979	5.66	9.60	11.67	15.60	115.4
1980	7.95	8.41	9.36	11.88	115.1
1981	5.61	7.31	10.39	12.29	115.7
1982	7.72	8.03	10.50	12.97	114.5
1983*	9.30	8.53	12.40	15.50	113.3

*To June 1983.

Source: Sigma One Corporation

4.0 Policy Issues and Future Work

The central hypothesis of the Peru CEAP Study is that for most of the post-World War II period, agricultural pricing policies (including price controls and subsidies) interacting with exchange rate and trade policies have depressed agricultural output as a whole and within the agricultural sector have favored commercial rather than household-based agriculture; as a result urban diets are more dependent on imported foods while rural diets and incomes are smaller than they would have been under a more neutral structure of incentives. This hypothesis generates two collaries. First, the incidence of subsidies and price controls in the markets for food has been regressive among both consumers and producers, and therefore the consumption effects of this policy have been minimally effective in preventing a chronic problem of undernutrition among the poor segments of the urban and rural populations. Second, the income and food consumption levels of the rural poor in the highlands has continued to decline as a result of the policies to subsidize commercial rice production. These hypotheses and others will be tested with the development of analytical models which, after estimation and calibration, will be made available for use by Peruvian institutions.

4.1 Analytical Approach

The analysis will be based on a model of the agricultural sector with two subsectors. The markets for traded agricultural products, represented by rice and cotton, will constitute one sector and the market for nontraded agricultural output,

represented by potatoes, will constitute the second sector. In addition, the analysis will concentrate on specific production areas in Peru. The Canete Valley will be used to represent the cotton subsector as well as the coastal potato producing region. The rice subsector will be represented by the northern coastal region, including Lambayeque and La Libertad. Rice production in the jungle will be treated as an exogenous variable. The Mantaro Valley and the region around Huancayo will represent highland (peasant) production of the nontraded commodity, potatoes. Restricting the analysis to the two important crops of the traded agricultural sector and the primary food crop of the nontraded agricultural sector will highlight the important interactions among agricultural policies, production, consumption, and trade issues in both subsectors, and exogenous effects such as world market conditions.

The traded agricultural sector will be modelled by estimating or synthesizing a production function for rice and for cotton. Each production relation will be a function of labor and purchased inputs; the demand for each of these factors will depend on both factor prices and the relevant price of output. The total sectoral demand for each factor will be obtained by summing the subsectoral (rice and cotton) demands. The value of output of the traded agricultural sector is a crucial element of the analysis because it captures the important relationships between macroeconomic and agricultural policy variables and the returns to the factors of production in the traded sector,

particularly labor incomes.

The nontraded agricultural sector will be modelled by specifying a production function for potatoes embodying peasant labor and purchased inputs. Demand for labor in potato production will be a function of the domestic price of potatoes, the labor wage rate, and the price of inputs. The wage rate (and hence, labor incomes) will be the product of labor's cost share, potato production, and the domestically determined price of potatoes. The demand for potatoes will have three components in the analysis. One component is the home consumption of potatoes by peasant producers; this will be estimated using a household production model similar to that developed by Sigma One Corporation in The Potential Effects of Alternative Structures and Pricing Policies in the Markets for Maize in Tanzania (February 1983). A second component of demand is the demand by consumers in the traded agricultural sector, while a third component is the demand in the non-agricultural sector. The demand for potatoes outside of the nontraded sector is a function of the real domestic price of potatoes and of consumer incomes.

This system can be solved and a reduced form can be derived that gives the domestic price of potatoes as a function of the exogenous variables in the system: the price of inputs to each subsector, the exchange rate, the world prices of cotton and rice, the proportional measures of protection for cotton and rice, and nonagricultural output. Thus, changes in the price of potatoes, which affect home consumption and peasant incomes, will be directly linked to changes in macroeconomic and agricultural

policy variables, as well as to changes in world market conditions.

The synthesizing and estimation of such a model requires the identification and development of time series data for several economic and social variables to be used in the analysis. Such information is sought for a period dating at least from the mid-1960's to the present. This information includes production, costs of production, export, import, and nominal/real producer and consumer price data for the major agricultural commodities. Other time series data which has either been identified or is being developed includes information concerning income and employment, population, exchange rates, national accounts, food aid, food subsidies and parastatal marketing. Since most of the time series sources of data available do not specifically cover the time period considered, it will be necessary to develop consistent time series data from the various sources to cover the time period of the study.

4.2 Summary of Policy Issues

The models described above will be used to assess the potential impacts of several possible policy initiatives. The impacts of interest include the supply responses of producers of potatoes, rice, and cotton, the resulting real producer and consumer prices for these commodities, the changes in producer incomes, and the consumption consequences for the urban and rural poor. The impacts of the policy initiatives on the balance of trade, as well as the fiscal and budgetary consequences, will

also be addressed.

The policy initiatives that will be considered fall into two broad groups. The first group consists of subsidy policies, such as eliminating the subsidies on imported foods and transferring domestic rice producer subsidies to consumers. The second group of policy initiatives will encompass trade liberalization measures such as eliminating export quotas and taxes on tradeable agricultural products.

Some of the impacts of the policy initiatives will necessarily be addressed in a qualitative rather than a quantitative manner. For example, while the models treat the exchange rate as an exogenous variable, it actually reflects in part the effects of past economic policies and will change in response to future policies. These changes will have to be addressed qualitatively, given the structure of the models. Nevertheless, the models will aid in developing insights into the relationship between agricultural policies and consumption effects of those policies in a macroeconomic context.

BIBLIOGRAPHY

Alvarez, Elena. Government Policies and the Persistence of Rural Poverty in Peru, 1960-1980. Dissertation. 1982.

Amat y Leon, Carlos. La Desigualdad Interior en el Peru. Universidad del Pacifico. Lima, Peru. 1981.

Amat y Leon, Carlos and H. Leon. Distribucion del Ingreso Familiar en el Peru. Universidad del Pacifico. Lima, Peru. 1981.

Amat y Leon, Carlos and D. Curonisy. La Alimentacion en el Peru. Universidad del Pacifico. Lima, Peru. 1981.

Antunes de Mayolo, S. La Nutricion en el Antiguo Peru. Central de Reserva del Peru. Lima, Peru. 1981.

Banco Central de Reserva del Peru. Resena Economica, various issues, 1981-1983. Lima, Peru.

Banco Central de Reserva del Peru. Mapa de Pobreza del Peru. Lima, Peru.

Benjamin, Alan. An Agro-Economic Evaluation of Maize Production in Three Valleys of the Peruvian Andes. CIMMYT, Mexico. 1980.

Caballero, J. M. Economia Agraria de la Sierra del Peru. Instituto de Estudios Peruanos, Lima, Peru. 1981.

Caballero, J. M. and E. Alvarez. Aspectos Cuantitativos de la Reforma Agraria (1969-1979). Instituto de Estudios Peruanos, Lima, Peru. 1980.

Collazos, C. et al. "Estado Nutricional de la Peru." J. Fac. Med. Lima. 1959.

Coutu, Arthur J. and R. A. King. The Agricultural Development of Peru. Praeger Special Studies, New York. 1969.

De Janvry, Alain. The Agrarian Question and Reformism in Latin America. Johns Hopkins University Press. 1981.

Ferroni, Marco A. The Urban Bias of Peruvian Food Policy: Consequences and Alternatives, dissertation, Cornell University, 1980.

Figueroa, Adolfo. La Economia Campesina de la Sierra del Peru. Pontificia Universidad Catolica del Peru, Lima, Peru. 1981.

Figueroa, Adolfo. La Economia de las Comunidades Campesinas: El Caso de la Sierra Sur del Peru. Pontificia Universidad Catolica del Peru, Lima, Peru. 1978.

Franklin, D. L. et al. An Assistance Strategy Towards the Improvement of Nutrition in Peru. Sigma One Corporation. Lima, Peru. July 1983.

Franklin, D. L. and W. Wadman. An Assessment of the Nutritional Situation in Peru. Report to the World Bank/Peru. 1980.

Franklin, D. L. and M. L. Harrell. Nutrition Evaluation Methods: A Household Production Approach. Sigma One Corporation. 1983.

Franklin, D. L. and M. L. Harrell. Nutritional Functional Classification Study of Panama. Sigma One Corporation. 1982.

Gonzalez, E. "Economia Campesina y Empleo en el Cusco (Peru)." Economia Campesina y Empleo. PREALC, Oficina Internacional del Trabajo, Santiago. 1981.

Grados, Romulo, Jorge Miranda P. and Nelly More B. Situacion Socio-Economica y Nutricional de Familias con Ingresos Minimos en Lima Metropolitana, 1980.

Hopkins, Raul. Desarrollo Desigual y Crisis en la Agricultura Peruana 1944-1969. Instituto de Estudios Peruanos, Lima, Peru. 1981.

Instituto Nacional de Estadistica. Analisis del Ingreso y Gasto Familiar de la Encuesta Nacional de Propositos Multiples y Metodologia Empleada en el Calculo del Indice de Precios al Consumidode Lima Metropolitana, Lima, Peru. 1981.

Instituto Nacional de Estadistica. Peru: Compendio Estadistico 1981. Lima, Peru. 1982.

Instituto Nacional de Estadistica. Informe Estadistico. Lima, Peru. August 1983.

Instituto Nacional de Estadistica. Encuesta Nacional de Hogares de Propositos Multiples (ENAPROM). Presupuestos de los Hogares. Vols. 5-13, (Chiclayo, Ica, Tacna, Cajamarca, Chimbote, Cuzco, Huancayo, Puno, Iquitos). Lima, Peru. 1981.

Instituto Nacional de Estadistica. Censos Nacionales VIII de Poblacion, III de Vivienda, Resultados de Prioridad, Vols. 1-2, Lima, Peru. 1982.

Instituto Nacional de Estadistica. Estimaciones y Proyecciones de Poblacion. Lima. 1983.

Instituto Nacional de Investigacion y Promocion Agropecuaria (INIPA). Programa Nacional de Cereales. Documento Base. Lima, Peru. April 1983.

Instituto Nacional de Investigacion y Promocion Agropecuaria (INIPA). Programa Nacional de Arroz. Documento Base. Lima, Peru. 1983.

Instituto Nacional de Investigacion y Promocion Agropecuaria (INIPA). Programa Nacional de Papa. Documento Base. Lima. 1983.

Instituto Nacional de Planificacion. Encuesta Nacional de Hogares de Propositos Multiples (ENAPROM), Presupuestos de los Hogares. Vols. 1-4 (Lima, Piura, Trujillo, Arequipa). Lima, Peru. 1980.

Instituto Nacional de Planificacion. Cuentas Nacionales del Peru 1950-1979 and Anexo 1978-1981. Lima, Peru. 1980, 1982.

Instituto Nacional de Planificacion. Analisis del Consumo y Situacion Nutricional: Documento de Trabajo. Tarma, Peru. 1980.

Instituto Nacional de Planificacion and Organizacion de las Naciones Unidas para la Agricultura y Alimentacion (FAO). Interrelaciones Entre Poblacion y Nutricion en el Peru. Lima, Peru. 1982.

Karp-Toledo, Eliane. Situacion Alimentaria-Nutricional en la Sierra Sur del Peru. AID-Lima and Sigma One Corporation. Lima, Peru. 1983.

Lajo, Manuel, Rolando Ames and Carlos Samaniego, eds. Agricultura y Alimentacion, Bases de Un Nuevo Enfoque. Pontificia Universidad Catolica del Peru. Lima, Peru. 1982.

Maletta, Hector. La Absorcion de Mano de Obra en el Sector Agropecuario. Universidad del Pacifico, Lima, Peru. 1978.

Ministerio de Agricultura y Alimentacion. Analisis del Consumo y de la Situacion Nutricional en Lima Metropolitana. Lima, Peru. 1980.

Ministerio de Agricultura. Anuario de Estadistica Agricola 1977. Oficina Sectorial de Estadistica. Lima, Peru. 1981.

Ministerio de Agricultura. Anuario de Estadistica Agricola 1978. Oficina Sectorial de Estadistica. Lima, Peru. 1981.

Ministerio de Agricultura. Anuario de Estadistica Agricola 1979. Oficina Sectorial de Estadistica. Lima, Peru. 1981.

Ministerio de Agricultura. Boletin Estadistico del Sector Agrario 1968-1982. Oficina Sectorial de Estadistica. Lima, Peru. 1982.

Ministerio de Agricultura. Estadistica Agricola, Informativo No. 4. Oficina Sectorial de Estadistica. Lima, Peru. April 1983.

Ministerio de Agricultura. Programa de Abastecimiento de Arroz 1982. DGAIC. Peru, 1982.

Ministerio de Agricultura. Programa de Abastecimiento de Papa 1982. DGAIC. Peru, 1982.

Ministerio de Agricultura. Programa de Abastecimiento de Trigo 1981. DGAIC. Peru, 1981.

Ministerio de Economia y Finanzas. Niveles de Vida, Analisis de la Situacion Alimentaria en el Peru. Lima, Peru. 1977.

Ministerio de Economia y Finanzas. Estructura y Niveles de Ingreso Familiar en el Peru. Lima, Peru. 1977.

Ministerio de Trabajo. Empleo Rural: Conceptos y Mediciones. Direccion General de Empleo. Lima, Peru. 1981.

Ministerio de Trabajo y Promocion Social. Los Rasgos Esenciales de la Problematica de los Estratos No Organizados de la Economia. Direccion General de Empleo. Lima, Peru. 1983.

Musgrove, Philip. Consumer Behavior in Latin America, Income and Spending of Families in Ten Andean Cities, An ECIEL Study. The Brookings Institution. Washington, D.C. 1978.

Oficina del Primer Ministro. Plan de Abastecimiento Alimentario Nacional. Lima, Peru. May 1983.

Orden, David, Duty Greene, Terry Roe and G. Edward Schuh. Policies Affecting The Food and Agricultural Sector in Peru, 1970-1982: An Evaluation and Recommendations. USAID-Lima. December 1982.

Parillon, Cutberto et al. Un Analisis de la Situacion Alimentaria-Nutricional en el Peru. Sigma One Corporation. 1983.

Pulgar Vidal, J. Geografia del Peru: Los Ocho Regiones del Peru. Editorial Universo S.A., Lima, Peru. 1981.

Reutlinger, S. and H. Alderman. On the Prevalence of Calorie Deficient Diets. World Bank. 1979.

Reutlinger, S. and M. Selowsky. Malnutrition and Poverty. World Bank, Johns Hopkins University Press. 1976.

Samaniego, C. Perspectivas de la Agricultura Campesina en el Peru. Mimeograph. Centro de Investigaciones y Capacitacion de Lima. Lima, Peru. 1979.

Samaniego, C. Introduccion de Consideraciones Nutricionales en los Proyectos de Desarrollo Rural y Agropecuario en el Altiplano de Puno, Peru. FAO. Peru. December 1980.

Sigma One Corporation. Nutrition Strategy Peru: Field Reports, Annex Volume to An Assistance Strategy Towards the Improvement of Nutrition in Peru. Sigma One Corporation. 1983.

Schydlowsky, Daniel and Juan Wicht. Anatomia de Un Fracaso Economico, Peru 1968-1978. Universidad del Pacifico. Lima, Peru. 1980.

Sheahan, John. Peru: Economic Policies and Structural Change, 1968-1978. Washington, D.C. 1978.

Thorp, Rosemary. The Post-Import Substitution Era: The Case of Peru. Oxford University, World Development, Vol. 5. 1977.

Twomey, Michael. The Devaluation of the Peruvian Sol in 1967, With a Special Look at Income Distribution and the Agricultural Sector. Cornell University. 1974.

U.S.A.I.D. Nutrition. AID Policy Paper. Bureau for Program and Policy Coordination. Washington, D.C. May 1982.

U.S.A.I.D. Pricing, Subsidies, and Related Policies in Food and Agriculture. AID Policy Paper. Bureau for Program and Policy Coordination. Washington, D.C. November 1982.

Webb, Richard. Government Policy and the Distribution of Income in Peru, 1963-1973. Harvard University Press. 1977.

Webb, Richard and Adolfo Figueroa. Distribucion del Ingreso en el Peru. Instituto de Estudios Peruanos. Lima, Peru. 1975.

World Bank. Peru: Major Development Policy Issues and Recommendations, Volume 1: Main Report and Volume II: Statistical Appendix. Latin America and the Caribbean Regional Office. 1981.