POLICIES AFFECTING THE FOOD AND AGRICULTURAL SECTOR IN PERU, 1970-1982: AN EVALUATION AND RECOMMENDATIONS

by

David Orden, Duty Greene
Terry Roe and G. Edward Schuh

Department of Agricultural and Applied Economics
University of Minnesota

Prepared for the USAID Mission, Lima, Peru
USAID Contract 527-0166-C-00-3001-00
"Agricultural Sector Planning-Peru"
October 6, 1982 - December 6, 1982

FINAL VERSION

TABLE OF CONTENTS

PREFACE

This report is based on an intensive review of policies affecting the food and agricultural sector of Peru during the month of October, 1982. All four members of the University of Minnesota study team arrived in Lima on October 10, 1982. Visits were held with various agencies in the Peruvian government and the basic design of the study was outlined during the next three days. Terry Roe and G. Edward Schuh then returned to the U.S., but Duty Greene and David Orden remained in Lima for the next three weeks to work with the Peruvian Working Group in assembling information and data on the food and agricultural sector and on policies applicable to that sector. They also began drafting part of this final report. Drs. Roe and Schuh returned to Lima during the week of October 25 to review the information and material assembled, to help write the draft of the overall report, and to provide feedback to the Minister of Agriculture and representatives from the Ministry of Economy and Finance and from the Prime Minister's Office of Nutrition. The entire team returned to the University of Minnesota at the end of October and completed a draft of this report during November. The draft report was sent to Lima for review by knowledgible people there. Comments were sent back to the University of Minnesota and Professor Schuh made this final revision based on these comments.

Obviously, this has been too short a period of time to make a definitive analysis of the policies affecting the food and agricultural sector of Peru. A great deal of information and data collection is still needed, together with a great deal more analysis. However, we believe the preliminary conclusions we have reached have relevance to issues faced by policymakers in Peru. They also point to further research and analysis that is needed.

The authors of this report are David Orden, Duty Green, Terry Roe, and G. Edward Schuh. Dr. Schuh is Professor and Head, and Roe, Greene and Orden are members of the faculty and staff in the Department of Agricultural and Applied Economics, University of Minnesota, St. Paul, Minnesota. We are indebted to the many people who assisted us in the preparation of this report. Among those to whom we would like to give special thanks are David Flood and David Bathrick of the AID Mission and Dr. Jorge A. Torres Zorrilla of the Junta del Acuerdo de Cartagena, Lima, Peru, and the members of the Peruvian Working Group assigned to the project:

-Ing. Guido Arturo Soto Toledo
Sub-Director de Productos el Estado Natural, Direccion General de Agroindustria y Comercializacion

-Ing. Marco Antonio Segura Romero
Director en Sistemas Administrativas I - Oficina de Programacion

-Ec. Paulino Moises Lapa Ortiz
Especialista en Precios en Chacra, Oficina de Estadistica Agricola

-Ec. Jorge Fano Rodriguez
Dir[illegible] Administrativo I, Oficina de Planificacion Agropecuario

-Ing. Pedro J. Flores Cutulo
Coordinador Tecnico, Oficina de Orientacion Financiera Agraria.

We would like to thank all others who in one way or another provided us with information or attempted to answer our questions.

Responsibility for errors of judgment or fact belong to the authors.

LIST OF FIGURES

LIST OF TABLES

POLICIES AFFECTING THE FOOD AND AGRICULTURAL SECTOR IN PERU; 1970-1982: AN EVALUATION AND RECOMMENDATIONS

I. INTRODUCTION

This report provides a baseline study of prices and price policy for crops and food imports of principal importance in the Peruvian economy. In April 1982 a Presidential Agricultural Task Force arranged jointly by President Belaunde and President Reagan visited Peru for two weeks. The Task Force reviewed a wide spectrum of issues affecting Peruvian agriculture and identified the key influence of domestic agricultural, food, and trade policies on performance of the agricultural sector. The Task Force recommended that review of these policies be given high priority.

This report follows upon that recommendation. The objectives of the study on which it is based were to characterize the evolution of price regimes during the past decade and describe their effects, to identify further policy changes with potentially large payoffs to the economy, and to assess areas of conflict among policy objectives.

II. A PERSPECTIVE FOR THE ANALYSIS OF AGRICULTURAL POLICY

It is customary in addressing problems of food and agricultural policy to take a sectoral approach to the analysis. The food and agricultural sector is treated as if it were a closed economy and in isolation of the rest of the economy. The policies considered are those that impact directly on consumption or production, and are usually referred to as food policies or agricultural policies. The impact of trade politics tends to be ignored, as is the effect of policies affecting the value of the nation's currency. Moreover, should trade and exchange rate policies be considered, they are considered for agriculture alone, ignoring the fact that there may be differential trade and exchange rate policies among sectors of the economy.

That approach to the analysis of food and agricultural policy is in most cases misguided, and may well conceal more than it reveals. A more proper approach is to analyze the food and agricultural sector in the context of the total economy, and to consider the full range of policies that might be impacting it, including trade and exchange rate policies for both agriculture and the rest of the economy. To take this broader perspective is to try to understand the food and agricultural sector as it actually exists - intricately embedded in and inter-related with the total economy.

Relative Social Profitability

There are a number of reasons why this broader perspective is important. In the first place, policies such as tariffs, export quotas, export embargoes, and distortions in the value of a nation's currency tend to be pervasive in the economy, and affect many or all sectors of the economy, either directly or indirectly. Second, from a policy perspective, what is needed is to know how policies affect agriculture, for example, relative to other sectors of the economy.

Two examples will illustrate the importance of this broader perspective. For one thing, it is typical in many developing countries to provide high levels of protection for the industrial or manufacturing sector as a means of promoting import-substituting industrialization, while at the same time providing little or no protection for agriculture. Such a combination of policies will obviously affect the relative profitability of the two sectors, and may have a strong impact on the flow of investment funds within the economy.

Similarly, it is very common for countries to overvalue their currencies. This may be part of an intentional policy to help promote industrialization, or it may be nothing more than the tendency to resist devaluations that in practice tend to raise the cost of living for politically important groups, or stimulate inflation generally in the economy. In any case, an over-valued currency can have important and pervasive effects on resource use and the distribution of income in society because it is in effect an implicit tax on exports. If the country is relatively unimportant in its export markets, that export tax will be extracted from domestic producers, causing those producers to receive less for their products than their opportunities in foreign markets, and making it possible for consumers to acquire the product at lower prices than they otherwise would have to pay. In this sense the tax can be a significant disincentive to producers, and a significant subsidy for consumers. The net effect can be a significant redistribution of income within the domestic economy.

Overvalued currencies also constitute a subsidy for imports. If the country has a domestic sector which produces in competition with the imports, the over-valued currency again may be a significant disincentive to

domestic producers, and a subsidy to domestic consumers. Again, there may be both a significant production effect and a significant redistribution of income away from producers and towards consumers.

It is entirely possible that the tax associated with an over-valued currency can be so great as to shift a country from being a net exporter of a particular product to being a net importer. The important point, however, is that a distortion in the value of a nation's currency affects the price of traded goods - either exports or products that compete with imports - relative to the price of goods and services that are not traded. Hence, such a distortion can have a significant effect on resource use and on the distribution of income in the society.

In many countries the effects of different levels of protection among sectors by means of tariffs and other trade restrictions, combined with the effects of distortions in the value of the nation's currencies, will far outweigh the totality of effects of what is conventionally referred to as food and agricultural policies. Yet, the conventional approach to the analysis of food and agricultural policies, which neglects the effects of trade and exchange rate policies, will ignore these important effects.

We have emphasized the relative effects of these policies among the respective sectors of the economy. This relative effect is important for a variety of reasons. In the first place, those who do take account of the effects of trade and exchange rate policies often do it by comparing domestic prices to their border price equivalents, where the border price refers to the FOB price (in terms of the foreign currency) for exports and the comparable CIF price in the case of imports. The important point about such comparisons is that they tell only part of the story. For example,

cultural products, but if high levels of tariffs and other restrictions to trade cause the price of industrial products to be significantly above their border price equivalents, then there still remains a distortion in relative prices of the agricultural and industrial products.

This points to another consideration. In attempting to assess investment policy or to understand the flow of investment funds within the economy, it is relative social profitability that matters. Prices for the agricultural sector, for example, may well be set at their border price equivalent and agriculture still be unprofitable in a relative social sense. That would be the case if there were substantial protection of the industrial sector. This difference in relative social profitability explains why it is possible to "have the prices right for agriculture," as the saying goes, and there still be a lack of investment in agriculture. The point is that the protected sector will be relatively more profitable.

A final problem with the narrow sectoral approach so commonly used is that it fails to account for the various linkages by which food and agricultural policies in the conventional sense affect other important variables. These include the size of government budgets, the size of government deficits, the rate of rural-urban migration, the level of employment and unemployment, and the external balance of payments. In light of the importance of these variables in the design of overall economic policy, analyses which fail to include these linkages are clearly inadequate as a means of understanding the overall consequences of food and agricultural policy.

Two additional points further emphasize the importance of the policy perspective taken in the present study. The first is the relative impor-

tance of food as a wage good in low-income countries. This relative importance means that policies which affect the price of food can have a significant effect on the distribution of income within the society. Moreover, they have important implications for wage policies, and in turn employment and industrialization policies. Policies which cause food prices to be low, for whatever reason, make it possible for employers to pay relatively low nominal wages, thereby affecting the profitabiity of economic activities in general. This can affect the comparative advantage of the nation in the international economy.

In addition, the trade and exchange rate policies we have discussed can have a significant effect on the domestic terms of trade - the relative price between agricultural products and other goods and services in the economy. This, in turn, can have a significant effect on the rate of rural-urban migration, and the rate at which migrants from the rural sector pile up in urban cities.

The domestic terms of trade are important, despite the fact they have not received the same attention as changes in the external terms of trade. They are important because they influence resource use and resource flows within the economy. They are important because they influence relative social profitability among sectors. And they are important because they affect the relative distribution of income.

The Situation in Peru

During the past decade Peru has experienced several different policy regimes. Early in the decade, policy involved the nationalization of many enterprises, an emphasis on import substitution with high tariffs for the

industrial sector, a fixed and overvalued exchange rate, and low agricultural prices. This was followed by a progressive relaxation of many of these policies, with a tendency to let external market realities be reflected in the domestic economy. At the time this study was undertaken, the Peruvian economy was marked by reduced import restrictions, lower tariffs, continual devaluation of the currency to adjust for the differential between domestic and world inflation rates, greater reliance on markets for the allocation of resources, higher producer prices for some agricultural commodities, and substantial consumer subsidies for some food staples.

The effects of these very different policy regimes on Peruvian agriculture, and the general policy issues now confronting Peru provide a perfect example of the need to take a broad perspective on the agricultural sector and on food and agricultural policies. Policies usually considered to be food and agricultural policy, such as fixed output prices, food subsidies, credit subsidies, and other distortions in agricultural input and product markets, would tell only part of the story. Tariff policy and implicit taxes and subsidies provided by means of distortions in the value of the currency are at least as important.

The Effective Protection Perspectives

One of the problems in assessing the effects of policies effecting the food and agricultural sector, or any other sector for that matter, is the multiplicity of policy instruments which governments use to affect the economy. As noted above, these may range all the way from what are generally recognized as conventional food and agricultural policies, such as price supports, price ceilings, subsidized interest rates, and input subsidies, to

trade and exchange rate policies. And within each category, these various policy instruments may be used.

The difficulty is in knowing how to sum up the effects of these policies into a net affect. Economists have developed a rather simple framework for making such a judgment about the net effect of all policy interventions. This framework is referred to as the concept of effective protection.

The effective protection framework was originally conceived to take account of the fact that just assessing the protection, subsidy, or taxes on product prices was not adequate because there might be other policies which affect the absolute and relative price of inputs used in the sector. Hence, it was necessary to measure the combined effects of policies affecting both input and product prices. More generally, however - as will be seen below - the effective protection perspective permits the analyst to assess the <u>combined</u> effects of all policies affecting the sector in order to determine the net effect of all policies combined. This effective protection framework will be used as the framework for part of the analysis which is to follow.

III. BACKGROUND

This brief background is designed to provide the setting for the analysis which is to follow in the following sections. Topics covered include the macroeconomic performance of the economy, an overview of the performance of agriculture, and a brief synthesis of agricultural and food policies. More details on these topics can be found in Appendices C, D, and E.

The military government in 1968 initiated several programs designed to redirect the Peruvian economy. Among these programs were land reform, worker participation in the management of business affairs, the creation of several public parastatal firms, and the development of a complex system of tariffs and subsidies to protect and encourage the development of a more modern industrial sector. The economic reform implied by these programs induced, at least in the short run, inefficiencies in resource allocation in several sectors of the economy. These programs also required large financial outlays which necessitated public borrowing from both domestic and international sources.

Macroeconomic Performance in the 1970's and Early 1980's

The economic consequences of the government's attempt to reform the economy is in part reflected in the overall performance of the economy during the 1970's. Growth in real (adjusted for inflation) GDP fell from 7.1 percent in 1970 to 3.1 percent in 1976. In 1977 and 1978 real growth in GDP was negative, declining by -1.2 and -1.8 percent, respectively. Budget deficits emerged, and the deficit as a share of GDP increased from 1.4 percent in 1970 to 7.5 percent in 1977. Inflation also burgeoned out of control, increasing from 4.2 percent in 1972 to 73.7 percent in 1978. With

the nominal value of the sol fixed relative to the dollar, the nation's currency became increasingly overvalued in foreign exchange markets. This in turn contributed to an increasing deficit on the country's trade and service account.

These problems induced the government to embark on a stabilization-cum-economic-recovery program with the support of the IMF and the World Bank. The recovery program aimed at strengthening finances, stimulating exports, stemming the loss of currency reserves, and promoting a more efficient use of private and public resources. A major component of the program was the devaluation of the sol in 1976, followed by successive devaluations through 1978 in real terms. While deficits on the current account persisted between 1976 and 1978, they declined significantly. The current account showed a positive balance in 1979 and 1980.

The austerity measures imposed were not without their costs. The economy entered into a recession in 1977 and 1978. And although inflation declined from 1978 to 1980, it still remained at a high level (60.8 percent in 1980).

The change in government in 1980 led to policy changes to decrease government intervention and to increase the role of the private sector in the economy. These changes came at a time of worldwide recession and shrinking markets for Peru's major exports. Budget deficits recurred in the early 1980's, as did deficits on the trade accounts. The real value of the sol rose relative to the dollar, at the very time the value of the dollar was rising at an unprecedented rate. Since February 1982, however, an accelerated rate of devaluations for the sol has caused it to decline in real terms.

The Performance of Agriculture

Agriculture now constitutes a small and declining share of the nation's GDP (14 percent in 1972 and 12.6 percent in 1982). This small share is in part misleading, however, since it reflects policy discrimination against the sector which leads to an undervaluation of the output of this sector (while protection of the manufacturing sector causes an overvaluation of the output of that sector).

Growth in agricultural output has averaged less than 2 percent per year since 1972, substantially less than the estimated population growth rate of 2.7 percent.

Agricultural exports accounted for approximately 20 percent of total exports in value terms from 1972 to 1977, but thereafter fell to 5.3 percent in 1981. The major agricultural exports during the last decade, in order of importance, were coffee, sugar, cotton and wool.

The share that imports of grains make up of total agricultural imports in value terms increased from 52 percent in 1970 to 87 percent in 1980. Wheat accounts for the largest component of this total, and imports of this commdity have increased rapidly - an average of 35 percent per year from 1970 to 1975. Imports of this grain declined during the years of austerity, but since 1978 have recovered to grow at a rate of 8.5 percent per year.

Peru has for the most part been self-sufficient in rice. However, in 1979 and 1980, imports of rice accounted for 18.4 and 20.3 percent, respectively, of the total value of agricultural exports. Hence, in 1979, wheat and rice accounted for 70 percent of total agricultural imports.

With the exception of milk, imports of livestock products tended to decline during the last decade. However, growth in the domestic beef and poultry sectors led to large increases in the imports of corn and soybeans.

Fertilizer imports have tended to remain fairly constant since 1974, with the exception of urea, which has declined significantly.

An Overview of Agricultural and Food Policies

The objectives of food and agricultural policy in most countries are set within the framework of priorities regarding overall macroeconomic growth and social welfare. And that appears to be the case in Peru as well.

However, the basic objectives of agricultural policy - which in the case of Peru appear to be to increase food output, reduce production costs and achieve higher net returns to land and management - may conflict or compete with other government objectives. In Peru these other objectives appear to include development of the industrial sector, maintenance of high employment and low inflation, the reduction of government deficits and adverse balance of payments problems, reduction in perceived international dependency, provision of higher incomes (especially to low income groups), and achievement of greater regional decentralization. Selecting a course of action in terms of particular policy instruments (i.e., price policy, exchange rate policy, etc.) requires the acceptance of tradeoffs among these various objectives.

The massive direct state intervention in the market economy of Peru by the Velasco government during 1969-75 illustrates the costs of government efforts to manipulate a great number of policy instruments to achieve con-

flicting policy objectives. Agricultural sector policy during this period was characterized by the agrarian reform, which converted the latifundio land tenure system into one of agrarian cooperative enterprises of various types. The state-owned agricultural institutions EPCHAP, EPSA, and ENCI were created to control the marketing and distribution of basic agricultural inputs and outputs. Special programs of direct state financing for the agrarian reform enterprises and ever greater subsidies to the Agrarian Bank were granted. These initatives contributed to the large annual deficits in the budget of the central government and to the severe balance of payment problems that characterized this era, and which eventually forced a shift in policy orientation.

While the present administration has lessened the degree of state intervention in the economy, ENCI and ECASA still control the prices of basic agricultural commodities such as wheat, rice (ECASA), corn, cotton, vegetable oils, and dried milk, all of which are traded on the international market. Policies are presently being considered to relax the state's monopolistic control over the marketing of some of these commodities by allowing private enterprise to compete with ENCI; for example, in the marketing of cotton and fertilizer. A relaxation of state control should serve to decrease the cost to the Peruvian economy of performing these marketing services.

The continued existence of state-owned marketing institutions has been given renewed legal sanction through Article 15 of Legislative Decree No. 2 (The Law of Agricultural Promotion and Development) of 1980. This article mandates that certain state institutions have the right to

establish price controls and set regulations on agricultural products. This law requires that these controls and regulations be reviewed at least once a year.

Since the enactment of the above decree, a periodic list of basic food products and inputs subject to price controls has continued to be published. The list of August 1982 included the crops of rice (unpolished), corn (hard yellow), wheat for flour, vegetable oils, and milk. The August 1982 decree also transferred the authority for fixing the level of prices of agricultural outputs and inputs from the Ministry of Economy, Finance, and Commerce (MEFC) to the Ministry of Agriculture (MAGR) and, more specifically, to the General Direction of Agriculture and Livestock (Direccion General de Agricultura y Ganaderia, DGAG). The significance of this transfer is unclear since MEFC continues to exert a leadership role in all areas concerned with the direction of the general economy, the magnitude of government deficit, and the trade account balance.

In order to fix the level of prices of those agricultural products controlled by the government at the farm level, the DGAG uses as a guide nationwide average cost of production budget studies--one prepared internally with real costs of inputs at official prices and one prepared for the given product by a national commodity group. These budget studies include the costs of labor, machinery, and financing as direct costs, the costs of administration and financing as indirect costs,[1] and a "fair" profit

---

[1] This inclusion of financing as both a direct and indirect cost seems strange without more detail to explain it. However, this is the way Ministry of Agriculture documents describe it. The study team was not able to reconcile the disparity in the time available.

(utilidad) to management. These studies are therefore presumed to provide a national average "fair" farm price for the product. This may be viewed as including at least a partial return to land since the value of land is not included as a cost.

It is unclear, however, what weight is actually given to these costs of production studies in the final setting of producer prices. For example, the price of unpolished ordinary (corriente) rice actually set by the government on June 18, 1982, was 200 soles per kilogram while the cost of production estimates in official prices were 220 soles for the DGAG and 320 soles for the national rice producers.

The actual process by which the government-decreed price is actually established is rather difficult to understand, as bureaucratic processes tend to be for outsiders. What appears to happen is that, based on their own cost of production studies, the various producer groups initially submit their own suggestions for commodity prices. At the same time the Ministry of Agriculture submits its own suggestions for each commodity. These are then percolated through the Ministry of Finance, which takes into account such things as budget costs and balance of payments implications. Ultimately, the decision is made by the President, in conjunction with the pertinent Ministers of State. It is at this higher level that consumer interests come into play.

More detail on pricing policies and the marketing system are provided in Appendix E. The six principal agricultural commodities considered there include rice, wheat, corn, cotton, sugar, and potatoes. Policies affecting important agricultural inputs are described in Section V.

IV. AGRICULTURAL AND FOOD PRICES

The outcomes of Peruvian policy interventions as reflected in historical trends in prices of six agricultural commodities are evaluated in this section. The commodities considered are wheat, corn, rice, cotton, sugar and potatoes. The effects of world prices, exchange rate policy, and domestic agricultural and food price policies on the level and movement of Peru's prices of these commodities over the past thirteen years are evaluated and discussed.

The section is divided into four main parts. The first part provides an analytical framework for understanding the later data that are to be presented. That is followed first by an overview of the price relatives for the six commodities considered, and then a more detailed discussion of each individual commodity. A discussion of prices at the consumer level is then presented. The section ends with a brief summary of the results.

An Analytical Framework

Given world prices for the commodities it produces, a country can - within limits - use trade restrictions and taxes and subsidies of various kinds to set whatever domestic prices it chooses for the products it produces or imports. Once those prices are set, producers will try to maximize their incomes given the prices and production technology they face, and consumers will try to maximize their utility given their budget constraints and the prices they face. In general, of course, the prices consumers face will be different than the prices producers face.

If domestic prices depart from world prices for reasons other than transportation costs and competitive marketing margins, domestic producers may choose to produce quantities and mixes of outputs that do not maximize

national income compared to the international trading opportunities it faces. Similarly, consumers may not consume the bundle of goods and services that is consistent with maximum national income given the trading opportunities the nation faces.

This raises the question of what is a proper criterion for determining whether a country "has its prices right", or has efficiency prices. It is a well known principle of economics that for traded products - those a country either imports or exports - a country will maximize its national income if it fixes its prices at what are referred to as border price levels. For products it exports, the prices are the FOB prices at its exporting ports. For products it imports, the prices are the CIF prices at the importing ports.

The plausibility of this criterion as a basis for price policy can be seen in the following way. Border prices represent the trading opportunities the nation faces. If a country pays its producers less for an export commodity than they would receive in international markets, the nation is clearly undervaluing the resources used to produce that commodity, sacrificing income potential in the process. If it pays domestic producers more than they would receive at the border price export level, they cause consumers to pay more for the product than they would otherwise have to pay, again sacrificing potential income. Similarly, for import commodities, domestic prices set lower than CIF import levels may result in paying domestic producers less than the nation is willing to pay foreign producers.

Policies which cause domestic prices to depart from these border or efficiency price levels therefore tend to cause the country to sacrifice national income, and therefore to experience a slower rate of economic

growth than it would experience if proper prices had prevailed. There are important exceptions to this principle, such as the protection of infant industries, but most of the exceptions involve a willingness to sacrifice short-term losses in economic efficiency in order to have an expected longer-term higher rate of growth, or because of national security issues. The important point is that such departures need to be explicitly justified, because they do tend to sacrifice national income for the nation as a whole. Care also needs to be taken that short-term distortions are not stretched out to become long-term drags on a nation's economic growth.

In the analysis which follows, this efficiency price criterion is used as the basis for evaluating price and trade policies pertinent to the commodities being considered. Departures from this criterion obviously have effects on the distribution of income in the economy. The income distribution issues raised by various policy options are discussed in Section VII.

The distinction we make in the balance between domestic prices and world prices highlights an important distinction in the determinants of domestic prices over time. On the one hand, Peru faces shifts in world prices over which it has little or no influence. On the other hand, given movements in world prices, Peru's trade, exchange rate, agricultural, and food policies also affect domestic price levels. These latter effects and their implications lie at the heart of our policy analysis.

To clarify these relationships, consider the case of a country that has no explicit agricultural price policies. In this case, domestic prices of traded agricultural commodities are world prices, say in U.S. dollars, adjusted for transportation costs and converted to domestic currency via the prevailing nominal exchange rate. That is:

$$\left(\begin{matrix}\text{Nominal World}\\ \text{Agricultural Price}\end{matrix}\right) \times \left(\begin{matrix}\text{Nominal}\\ \text{Exchange Rate}\end{matrix}\right) = \left(\begin{matrix}\text{Nominal Domestic}\\ \text{Agricultural Price}\end{matrix}\right)$$

Changes in world prices and in the exchange rate would be reflected directly in agricultural prices. Similarly, in deflated terms one would have:

$$\left(\begin{matrix}\text{Real World}\\ \text{Agricultural Price}\end{matrix}\right) \times \left(\begin{matrix}\text{Purchasing Power Parity}\\ \text{Adjusted Exchange Rate}\end{matrix}\right)^{1/} = \left(\begin{matrix}\text{Real Domestic}\\ \text{Agricultural Price}\end{matrix}\right)$$

This expression shows the effect of exchange rate policy on the agricultural sector. If the domestic currency is overvalued, real domestic agricultural prices would be lower than they would be with an equilibrium exchange rate.[2/] As has already been pointed out, such an exchange rate policy creates an implicit tax on the agricultural sector, and causes resources to be forced out of the sector over time.

Now, in the case of a country with explicit agricultural and food price policies, the strict equality between domestic agricultural prices and world prices multiplied by the exchange rate may be changed, so that:

$$\left(\begin{matrix}\text{Real World}\\ \text{Agricultural Price}\end{matrix}\right) \times \left(\begin{matrix}\text{Purchasing Power Parity}\\ \text{Adjusted Exchange Rate}\end{matrix}\right) \begin{matrix}<\\ \geq\end{matrix} \left(\begin{matrix}\text{Real Domestic}\\ \text{Agricultural Price}\end{matrix}\right)$$

In this case, changes in world prices and in the value of the exchange rate over time may or may not be reflected directly in domestic prices. However, large deviations from equality may bear a high cost in terms of direct subsidies if the government bears the cost of a difference between world and domestic prices.

1/ The purchasing power parity or "price level adjusted" or "real" exchange rate is: (nominal exchange rate)(foreign price index/domestic price index).

2/ An equilibrium exchange rate is the one that would prevail if there were no government intervention and competitive market forces alone determined the value of the currency.

An Overview of the Price Relatives

Historical trends in the real domestic prices of wheat, corn, rice, cotton, sugar and potatoes during the period 1970-1982 are presented in Figures 4.1 through 4.6. As a basis of comparison, two world price series have been computed. The first series is the real world price in U.S. dollars converted to a domestic value at the real exchange rate effective during each year. The second is the domestic value of the world price assuming that the 1978 real exchange rate had prevailed throughout the period.

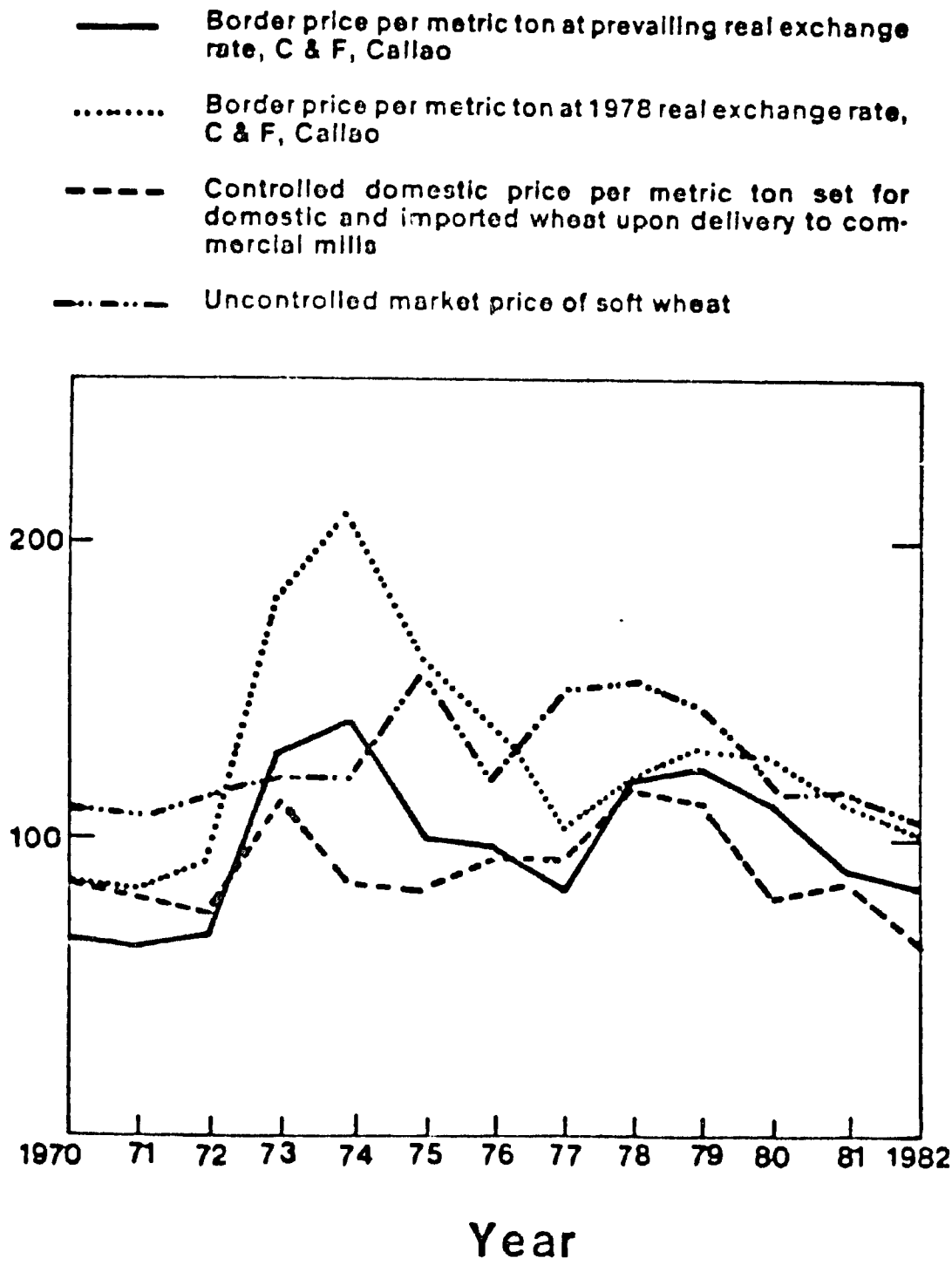
The real exchange rate in 1978 was 65.2 soles/dollar, substantially greater than a low of 40.8 in 1975, or the June 1982 value of 55.4. At the higher exchange rate Peru had a net surplus on its goods trade account, while at the lower rates it has run substantial trade deficits (see Table C.1). For this reason we choose to treat the real exchange rate in 1978 as the equilibrium level. This rate is also consistent with the concept of an equilibrium exchange rate based on Central Reserve Bank perceptions that the sol is now 10 to 15 percent overvalued.[1]

With a constant real exchange rate, shifts in the domestic values of commodity prices are accounted for by changes in world prices only. For wheat and corn, rice, cotton and sugar these prices exhibit very similar

---

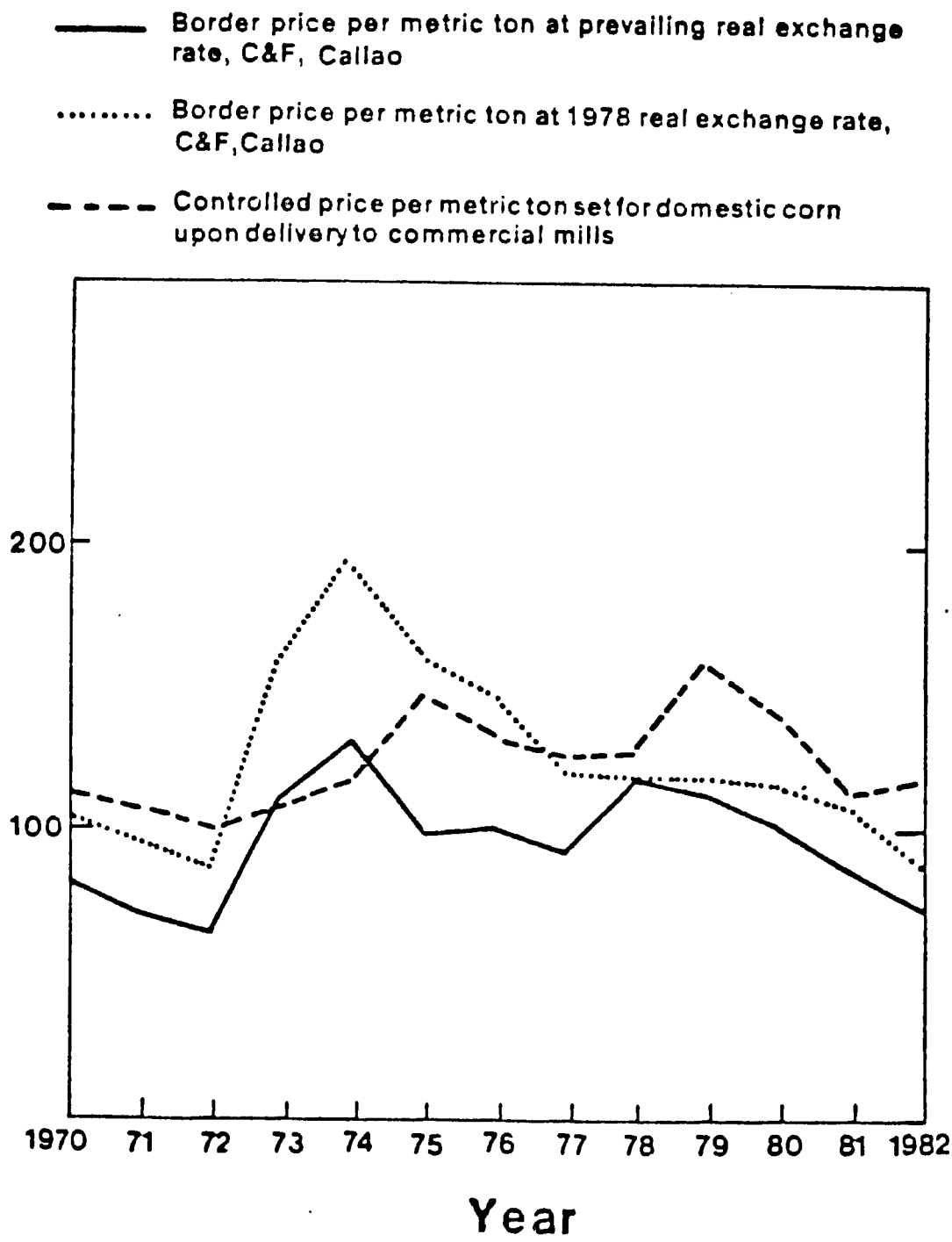
[1] The real equilibrium exchange rate is determined by a nation's underlying productivity. This does not change significantly in a short period of time. Hence, for purposes of the kind of analysis conducted herein, it doesn't do great violence to the facts to treat the underlying real exchange rate as constant.

Figure 4.1. Border and Domestic Prices of Wheat, Constant 1975 Soles, Peru 1970-1982†



†Border price at prevailing real exchange rate in 1975 (6,773 soles/MT) set equal to 100. All other prices adjusted to scale.

Figure 4.2. Border and Domestic Prices of Corn, Constant 1975 Soles, Peru 1971-1982†



†Border price at prevailing real exchange rate in 1975 (5,671 soles/MT) set equal to 100. All other prices adjusted to scale.

(For further references on price series see Table 6.2)

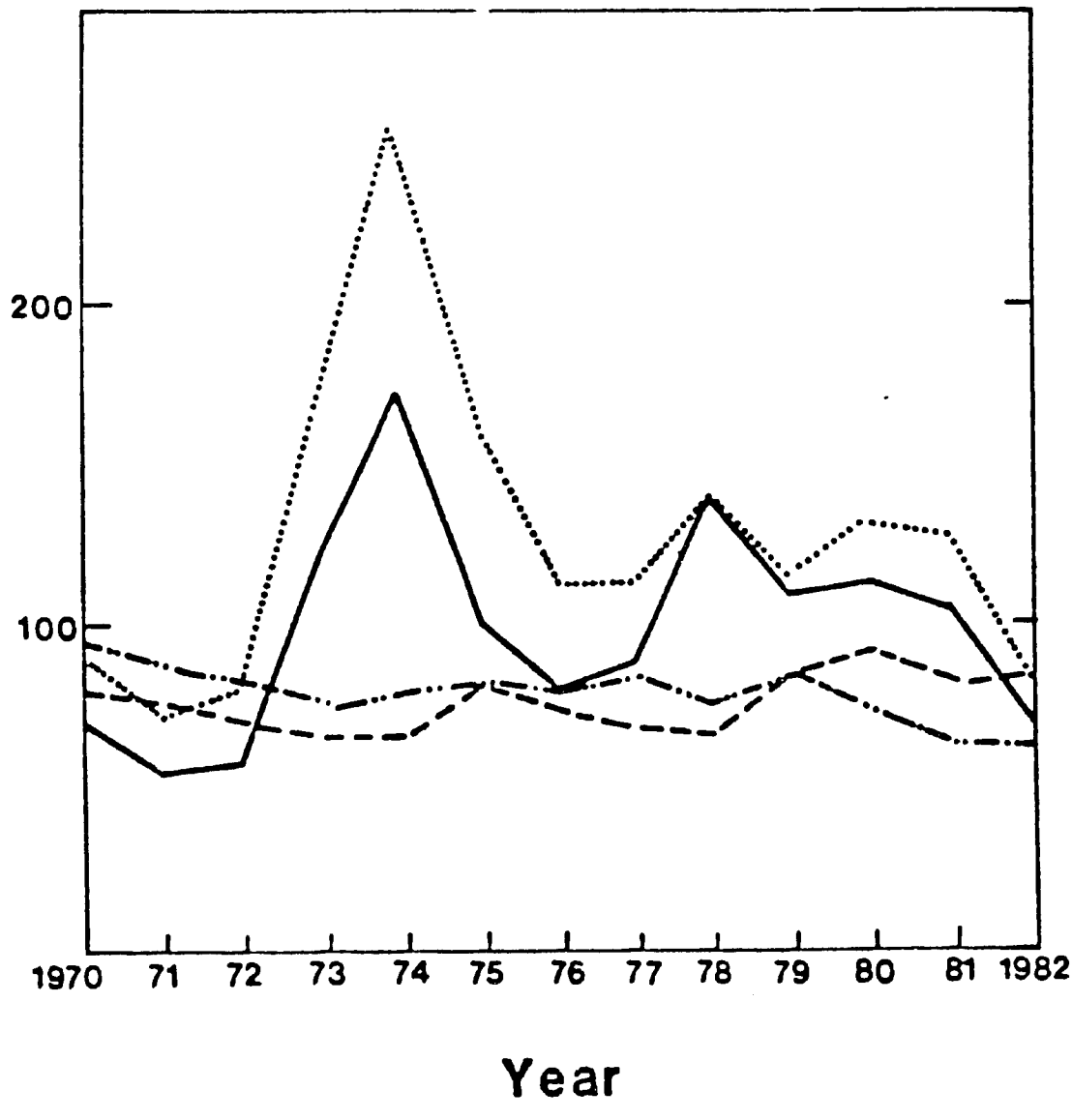
Figure 4.3. Border and Domestic Prices of Rice, Constant 1975 Soles, Peru, 1970-1982†

——— Border price per metric ton at prevailing real exchange rate, C & F, Callao

..... Border price per metric ton at 1978 real exchange rate, C & F, Callao

– – – – Polished rice equivalent of controlled price per metric ton set for unpolished domestic rice upon delivery to commercial mills

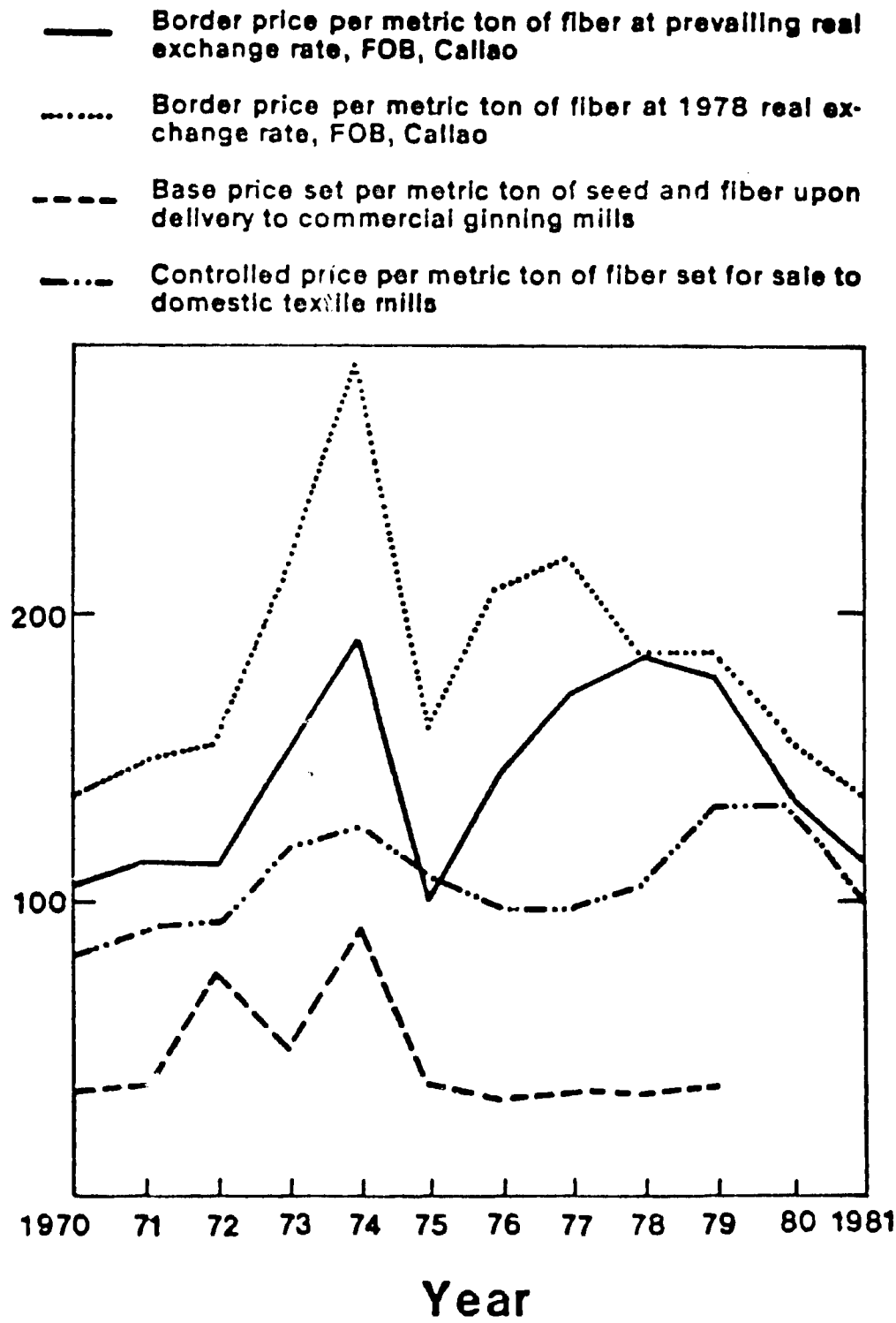
..—..— Controlled retail price per metric ton set for ordinary grade polished rice.



† Border price at prevailing real exchange rate in 1975 (18,809 soles/MT) set equal to 100. All other prices adjusted to scale.

(For further references on price series see Table 6.3)

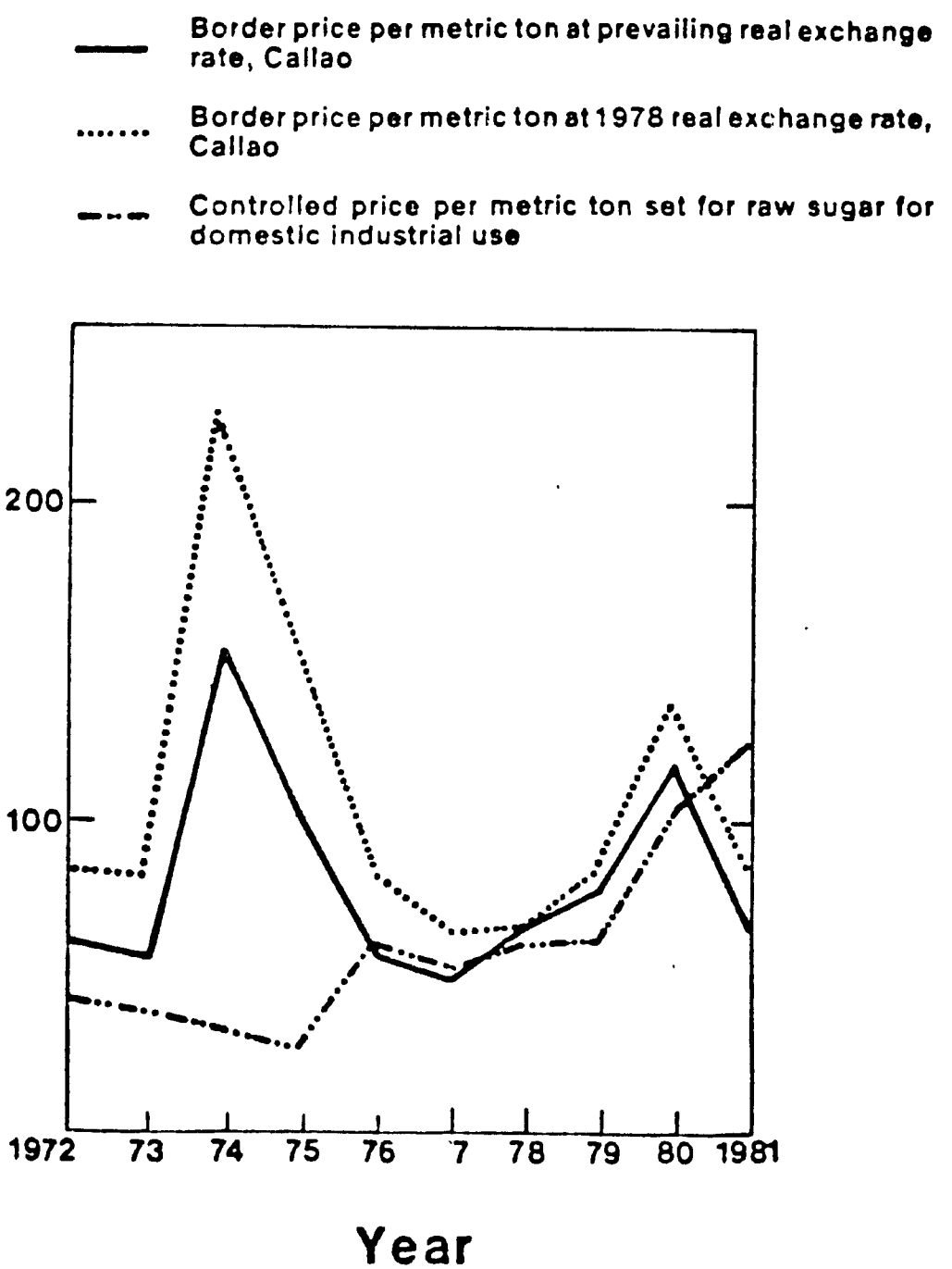
Figure 4.4. Border and Domestic Prices of Tanguis Cotton, Constant 1975 Soles, Peru, 1970-1981†



†Border price at prevailing real exchange rate in 1975 (51,367 soles/MT) set equal to 100. All other prices adjusted to scale.

(For further references on price series see Table 6.4)

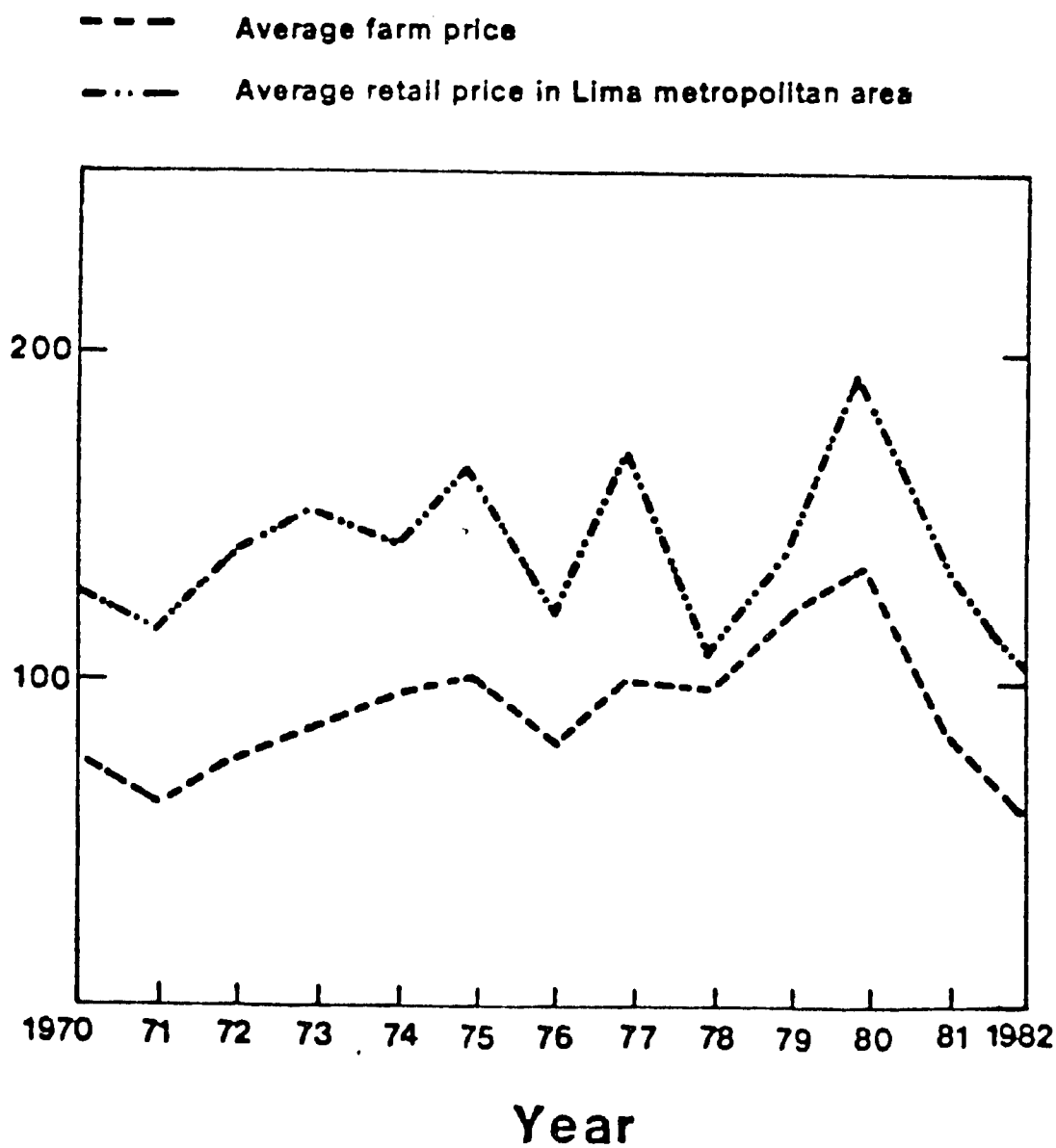
Figure 4.5. Border and Domestic Prices of Raw Sugar, Constant 1975 Soles, Peru, 1972-1981†



†Border price at prevailing exchange rate in 1975 (18,768 soles/MT) set equal to 100. All other prices adjusted to scale.

(For further reference on price series see Table 8.5)

Figure 4.6. Domestic Prices of Potatoes, Constant 1975 Soles; Peru, 1970-1982†



†Average farm price in 1975 set equal to 100. All other prices adjusted to scale.

(For further references on price series see Table 6.6)

trends.[1] Essentially for each commodity, prices were relatively low and stable through 1972, rose in 1973 and 1974, fell for a period of several years, then recovered moderately, and have fallen steadily since 1980. World prices are not shown for potatoes, which have been treated as a non-traded good due to their perishability and high per-unit-value transportation cost.[2]

At the prevailing real exchange rate, domestic values of world prices reflect changes in both world commodity price and Peru's exchange rate policy. Generally, domestic values of world prices at the prevailing exchange rate have been substantially below constant 1978 exchange rate levels, particularly in the early 1970's when the sol was most overvalued. For the entire 1970-1982 period, a net real depreciation of the sol of 6 percent would have brought the two price levels somewhat closer together.

The prevailing-exchange-rate-price series follows cyclical patterns over time similar to those of world commodity prices at the constant exchange rate. However, there are notable periods in which the exchange rate effect dampens, magnifies, or even reverses the movement in the commodity price. For example, during the 1972-74 period real world wheat prices in dollars rose 228 percent,

---

[1] For wheat and corn, which are imported, the world price is based on FOB Gulf ports plus transportation. For cotton and sugar, which are generally exported, world price is FOB Gulf Ports minus shipping. The sugar price is based on the U.S. market price, which is supported above world levels, so it is only an approximate price in so far as the Peruvian export quota is nonbinding. The world rice price is based on FOB Bangkok plus shipping. The Bangkok rice price is substantially below U.S. rice prices, so the price series computed is not necessarily equal to prices paid for imported U.S. rice under PL-480. None of the world prices include unloading or port to mill transportation cost. Similarly, domestic producer prices do not include farm to mill transportation. For further discussion of the world price series see Appendix B.

[2] For these reasons the international market for potatoes is not a reliable market. Under these conditions the border price is not a reliable basis for comparison.

but appreciation of the sol in real terms by 8 percent kept the sol price increase to 210 percent.[1/] Conversely, from 1977 to 1978 world wheat prices rose 13 percent and rice prices rose 20 percent; devaluation of the sol by 27 percent during this period resulted in increases of 43 percent and 52 percent, respectively, in the sol values of these world prices. Looked at another way, if the currency had been at its real 1978 level during 1977, domestic values of world agricultural price would have been 27 percent higher. Again, this comparison serves to point out that Peru's exchange rate policy, along with changes in world prices, have had a significant effect on farm prices and corresponding income flows.

Detailed Discussion

Wheat

In the case of wheat prices, the uncontrolled domestic producer price of soft white wheat produced primarily in the Sierra, and the controlled price for wheat delivered to domestic flour mills, are illustrated in Figure 4.1. Throughout the 1970-82 period the controlled price to domestic mills was below the uncontrolled market price. Aside from variety considerations, the importance of which is easily overstated, it is not surprising that with free market prices above prices paid by millers, little domestic wheat was delivered to commercial mills. Further, the comparison of domestic prices with international prices suggests that the controlled domestic price of wheat has been consistently below world levels at the constant 1978 exchange rate, and also below world levels at the prevailing exchange rate in all years except 1970-72 and 1977. This implies that price policy has pushed more resources out of wheat production than would have been the case without distortions in agricultural prices and exchange rates.

[1/] In the limit if a x b = c then the proportional change in c is the sum of proportional changes in a and b. However, with discrete data this relationship does not hold as a perfect equality; rather $\int a \times \tilde{} b = \int \tilde{} c$.

It is interesting that cyclical movements in the soft wheat price series generally parallel the movements in the prevailing-exchange-rate world price, with allowance for some lags or significant deviations for short periods of time. The principal changes in world prices and in the prevailing real exchange rate are apparently passed through to agricultural prices in the uncontrolled domestic market. This relationship is particularly strong in the latter part of the decade. For example, from 1976 to 1978 world wheat prices in dollars fell 14 percent, and the sol depreciated 43 percent, implying an increase in the sol value of the world price of 23 percent. Producer prices increased by exactly the same proportion. Similarly, from 1978 through 1981, the sol value of world price fell 25 percent and producer prices declined 24 percent. This close correlation suggests that world market forces are a significant factor affecting price levels in domestic markets. Uncontrolled markets in Peru have not been insulated from changes in world prices and will almost certainly respond to future changes in world prices. This suggests that price policy should also be designed with the need for this type of flexibility in mind.

Corn

The price of corn paid to farmers for domestic production is shown in Figure 4.2. This price is controlled upon delivery to commercial feed mills. This controlled price has been above world price at the prevailing exchange rate in almost all years. The domestic corn price has also exceeded the world price at the constant 1978 exchange rate in all years except 1972-1977. Consequently, more resources may have been attracted to the production of corn than would have been the case had world prices prevailed in domestic markets, other things being equal. Nevertheless, corn production has declined, as shown in Table A4.3.

Rice

Comparison of the hulled rice equivalent producer price with world prices illustrates quite a different outcome of agricultural price policy than that described above. Movements in the controlled domestic producer's price suggest that the domestic market has been substantially insulated from fluctuations in world prices. The domestic producer price has been substantially below the domestic value of world prices at either the prevailing or constant-1978-real-exchange rate since 1971, though it may have been above world levels in 1982.[1/] Thus for rice the use of agricultural price policy as a separate policy instrument has driven a substantial wedge between world prices and exchange rate policy, on the one hand, and domestic producer prices on the other hand. For example, from 1976 to 1978 the world dollar price increased 21 percent. Combined with a real depreciation of the sol of 43 percent, this would have implied an increase in the sol value of world prices of 73 percent. In contrast, domestic producer prices actually fell 9 percent. Conversely, from 1978 to 1981 the sol value of the world rice price fell 26 percent, but the domestic producer price rose 22 percent.

---

[1]The domestic producer price for rice does not account for milling costs which may be as much as 10 percent of product value. Thus the domestic price series shown in Figure 4.3 may be too low for direct comparison to world prices for milled rice. Acounting for this factor would tend to reduce the discrepancy between domestic producer and world prices when domestic prices are below world levels and increase it when domestic prices are above world levels.

Cotton and Sugar

Evaluation of world versus domestic producer prices for cotton and sugar is complicated by the multiple products produced from the basic commodity for which the farmer is paid. For example, the farmer in Peru is paid for cotton fiber and seed together, but world cotton prices are for fiber only. Similarly, farmers are paid for sugar cane, while it is raw sugar that is traded internationally.

It was beyond the scope of this study to carefully evaluate these individual markets, but some comparisons are presented for cotton in Figure 4.4. For Tanguis cotton, of which 80 percent is used domestically and 20 percent exported, it appears that cotton fiber is sold to local textile mills at a price below the level received by ENCI for export sales. Since prices received by Peruvian farmers are based on final sales prices, with individual adjustments based on quality, this subsidy to domestic textile mills appears to depress domestic farm cotton prices. This has the effect of pushing resources out of cotton production. An export tax of 25 percent also depresses the price received by farmers for the exported portion of their cotton.

Potatoes

Finally, trends in domestic producer prices for potatoes are shown in Figure 4.6. Prices have tended to fluctuate around a fairly constant real value during the period studied, while production has declined (see Table A4.5). Since potatoes are treated as a nontraded good and there is no domestic price intervention in the potato market, no international comparisons are made in Figure 4.6. and there are no direct policies to consider. However, policy distortions in other markets will have an impact on the potato market. On the one hand, one might expect low producer prices for wheat, rice and cotton (relative to their respective levels had world prices prevailed at an equilibrium exchange rate) to shift production out of these crops and into alternatives including potatoes. One might also expect that low consumer prices for wheat and rice (discussed below) would shift consumption away from potatoes compared to consumption levels that might have been attained had wheat and rice consumer prices been at world levels. These production and consumption shifts would tend to depress the real price of potatoes.

On the other hand, domestic corn prices have generally exceeded world levels, tending to draw resources towards the production of corn. Further, exchange rate theory suggests that short run equilibrium with an overvalued exchange rate is attained at home good/traded good price ratios that are higher than would prevail with an equilibrium exchange rate. This would

suggest higher rather than lower real prices for nontraded goods.[1] Thus, further analysis needs to be done to draw definitive conclusions concerning the indirect policy effect on the potato market.

Consumer Prices

Turning to consumer prices, there are three issues to consider in examining the price data.[2] The first is the extent to which consumer prices of domestically produced goods are subsidized relative to domestic producer prices. This subsidy contributes to the country's internal government deficit. The second issue is the extent to which consumer prices of imported goods are subsidized relative to world prices at the prevailing exchange rate, creating yet another source of budget deficit and causing an additional drain on governmen' holdings of foreign reserves. Finally, one can consider the relation of consumer price to world price at the constant 1978 exchange rate. To the extent that the 1978 real exchange rate approximates an equilibrium level, this comparison provides a measure of the magnitude of the distortion in agricultural consumption prices relative to an optimal base frame of reference.

In the case of wheat, the appropriate consumer price is the price paid for wheat by flour mills, which is set by the government. This price (shown in Figure 4.1) is the same for imported wheat as the price which is paid to domestic

---

[1] To the extent that potatoes are an inferior good they may provide an exception to this rule, since the exchange rate argument is based in part on consumers spending more in relation to their income at the lower price level induced by an overvalued currency than they would at the higher price level associated with an equilibrium exchange rate. See Anne O. Krueger: "The Role of Home Goods and Money in Exchange Rate Adjustments," 1973.

[2] The more general issues of the effect of food prices on nutrition, income distribution, and employment, and the long run implications of subsidized consumer prices for staple foodstuffs are considered in Section VII.

producers upon delivery of wheat to commercial mills. Since essentially all wheat for commercial flour mills is imported, the relevant comparison from the point of view of considering the government deficit is between the controlled price and the world price at the prevailing real exchange rate. In all years except 1970-72 and 1977, the mill price was significantly below the world price, with the difference being 24 percent of the world price in 1982.[1] The discrepancy between domestic prices and world prices at the constant 1978 real exchange rate is even greater.

Low domestic prices, of course, serve to help the poor meet their basic nutritional needs. However, these low prices stimulate consumption and serve to subsidize wealthier segments of the population as well. Furthermore, low food prices tend to cause low nominal wages, which allow otherwise inefficient industries to continue in business.

In the case of rice, another basic consumption staple, a substantial subsidy has emerged, particularly since 1979, with controlled consumer prices being below both domestic producer prices and world prices at either the prevailing or the constant 1978 real exchange rate. Since the domestic producer price does not include milling costs, the domestic producer versus consumer price differential underestimates the magnitude of the subsidy provided out of government revenues. Even so, the subsidy has risen to an average of 30 percent of the producer price during the 1980-82 period, based on the producer price series utilized in Figure 4.3. The total cost of the rice subsidy was over 20,000 million soles or 14 percent of the government budget deficit during 1980.[2]

---

[1] The full extent of the subsidy exceeds the stated value since unloading and port-to-mill transportation are not included in our world price series.

[2] More recent figures were not available.

For raw sugar, government controlled prices for domestic commercial use are presented in Figure 4.5. Domestic sugar prices for retail consumer use are also controlled and tend to be lower than industrial prices, as shown in Table E.3.[1] Hence, differences between industrial-use domestic prices and world prices underestimate the subsidy provided to consumers for direct utilization of sugar. The data suggest differentiating, at least for industrial use prices, between the early and latter parts of the 1970-82 period. Up until 1976, domestic industrial raw sugar prices were well below world levels at either the actual or constant 1978 real exchange rate. From 1978 through 1980, domestic price movements closely parallel world movements, with the domestic price somewhat below world levels. The sharp drop in world sugar prices in 1981 was not reflected immediately in domestic prices, which went above the world price level. Data for 1982 are not yet available.

In the case of cotton, the effect on producer prices of the low fiber prices granted to domestic mills has already been discussed. No direct government subsidy is involved, but protection is provided to domestic textile mills relative to their international counterparts, while domestic cotton producers are discriminated against. Domestic consumers do not necessarily benefit, however, since the domestic textile industry is also protected by high tariffs that raise domestic fabric prices above world levels. Effective protection created by trade policies is discussed in Section VI.

Finally, there is no direct intervention in the potato market so consumer to producer spreads reflect marketing costs and local market conditions.

[1] The magnitude of this differential over time was not determined for this study.

Consumer potato prices exceed producer prices in each year considered, as expected.

Summary and Conclusions

To summarize, a comparison of domestic versus world prices for six agricultural commodities during the 1970-82 period suggests several important policy issues. First, it illustrates the distinct but often reinforcing roles of exchange rate policy and domestic agricultural price policies in determining the degree to which domestic agricultural prices deviate from a reference price based on world price levels. Second, it suggests that in the mid-1970's, domestic producer prices tended to be substantially below world levels, thereby imposing rather severe discrimination against agriculture.

Real devaluation of the sol and falling world prices have reduced these discrepancies during the early 1980's particularly for corn and rice, while the domestic price of hard wheat for flour remains significantly below the world level. For export crops, such as cotton, a high degree of price distortion may also still prevail due to existing domestic pricing and trade policies.

Finally, despite relatively low real world rice prices during the past few years, the movement of domestic producer prices to world levels has been accomplished only with the simultaneous subsidization of consumer prices. If world commodity prices should recover from their current depressed levels, a major policy dilemma may emerge. On the one hand, if domestic producer prices rise concurrently with world prices but consumer prices are

held constant in real terms, then the cost of the food subsidy would increase. On the other hand, if producer prices are held low in the face of rising world prices, then the degree of discrimination against agriculture would be increased and domestic incentives for expanded production would be repressed.

It is clear that exchange rate and price policies have resulted in discrimination against agriculture, the overall result of which has been the movement of resources out of agricultural production. At the same time, subsidized consumer prices and the overvalued currency have increased the demand for certain domestic and exported foods. For Peru to attain a more efficient use of resources and experience a higher rate of economic growth, these distortions need to be corrected. Specific recommendations for policy changes are discussed in detail in Section VII.

A more complete analysis of these data would seek to understand what the supply and consumption responses to changes in domestic prices would be. That is beyond the objectives of the present study and would require substantial resources to carry out. The supply response for individual commodities, for example, would require a statistical analysis of the price of individual commodities relative to prices of other commodities, together with an analysis of the impact of changes in prices of modern inputs such as fertilizer and the technology base for the individual commodities.

V. AGRICULTURAL INPUT POLICIES

Since the primary focus of this report has been on the analysis of agricultural product prices, time did not allow a thorough investigation of pricing and policy issues for agricultural inputs. Time series data on agricultural inputs (e.g., land, fertilizer, water, machinery, labor) and related costs were not available. Nevertheless, discussions with various people in government, universities and the private sector provided the basis for some general observations on pricing policy for agricultural inputs.

Land

There has not been an active open market for the private sale or rental of agricultural land since the Agrarian Reform Program of the Velasco Administration in 1969. The majority of the land which has been expropriated since 1970 has passed from private land-owners to the state and has been redistributed to collectively managed Agrarian Reform enterprises. These Agrarian Reform enterprises were held responsible for paying the indemnification costs to the former owners. As of January, 1976 these costs were 13,225 million soles (292.9 million dollars) of which 2,915 million soles was to be paid in cash and 10,310 million soles were to be paid in Agrarian Reform bonds with no escalator clause for inflation. Reportedly, in recent years there has been progressively more reparcelization of Agrarian Reform lands into private parcels--used by individual members. Selling or renting of the land is apparently still prohibited.

A second major source of land exchange during the past decade has been the government colonization efforts in the northern "frontier areas", close to the Ecuadorian border, in the Ceja de Selva, and in the Amazonian areas. Presently, there is little information on the cost of colonizing these lands. Similarly, no complete economic investigation has been undertaken concerning farm-land values and government tax and subsidy policies affecting this basic economic resource.

It is worth noting, however, that an open market for the transfer of land is vital to making efficient use of the nation's agricultural resources. Such an open market may make it possible for a larger share of the land to move into the hands of those most able to make productive use of it, especially if inflation should be brought under control and a viable domestic capital market created. Similarly, an open market for land would help establish a price for this important resource, and thus enable those using it to combine it more efficiently with other resources.

Water

Since 1969, the General Direction of Water (Direccion General de Aguas, DGA) has been the primary government agency determining irrigation water tariff rates. The DGA has had final authority over rates which are initially set at the irrigation district level. In addition to tariffs, water users have had to pay a fixed annual quota to cover the maintenance and periodic improvement of irrigation infrastructure in their district.[1]

---

[1] Water levies are described in detail in the 1977 IBRD report (Annex 6, which is based on USAID's project paper, "Program for Improved Water and Land Use in the Sierra" (AID-DLC/P-2132, December 1975).

As is often the case, there are many problems of cost recovery and of optimal water allocation under the levy system. Data describing payments for water use by region and crop were not obtained for this study, nor were payments for water compared to costs. This information would be necessary in order to complete an analysis of subsidies to the agricultural sector, particularly on a crop by crop basis. In the absence of such an analysis, one can only surmise that some producers may tend to overuse irrigation water for which they are not charged the full cost, while other producers do not have access to sufficient water. If this is true, some producers and crops which use water relatively intensively (e.g., rice) receive an implicit subsidy. Further empirical research needs to be done on the cost and economic value of irrigation water for crop production in Peru and its impact on crop substitutions in different regions.

Fertilizer

In October 1982 the National Enterprise for the Marketing of Inputs (Empresa Nacional de Commercializacion de Insumos, ENCI) had monopoly control over the importation and domestic wholesale marketing of fertilizer. In 1975, ENCI had been given the authority to market all imported fertilizers and the domestic production of PETROPERU (Urea), CACHIMAYO (Ammonium Nitrate) and PESCAPERU (Guano de Islas). In March 1976, fertilizer production of FERTISA (Ammonium Sulfate and Ammonium Nitrate) and INDUS (Simple Calcium Superphosphate) were added to their internal marketing authority. By 1980, ENCI hauled 72,500 metric tons of fertilizer (13 percent of the total volume) using their own trucks, and stored 70,400 metric tons (12 percent of the total volume)

in their own warehouses. The remaining storage and transportation were performed under contract by private firms.

Since 1970, a uniform nationwide price series of fertilizers has been established by Congressional decrees. This series is adjusted periodically. Official prices from 1969 through July, 1982 are shown in Table 5.1. Charging a nationwide uniform price has provided a subsidy to agricultual producers in the Sierra and Selva who use fertilizer and who would otherwise pay higher transportation costs. The proportion of farmers in the Sierra and Selva who used fertilizer is relatively low compared to the Costa, based on evidence available from the 1972 Agricultural Census.

From 1975 through 1979 the government had a policy of directly subsidizing fertilizer use by requiring ENCI to sell fertilizer to producers at a price below their acquisition cost. Table 5.2 indicates that the largest subsidy was provided on imported Triple Calcium Superphosphate (61 percent) in 1975, and on imported 12-12-12 N-P-K (82 percent) in 1976. This table also shows that the average subsidy on fertilizers had fallen from 45 percent of cost in 1975 to 31 percent in 1977.

Since October 1979, the direct government subsidy to fertilizer users has not been reestablished. This policy change, along with the drought of 1979-80, has caused the recent decline in the use of fertilizers. The present fertilizer pricing and trade policy of the Belaunde Administration needs further investigation to compare domestic farm level producer prices with CIF border prices, and the recent increase in the tariff rate from 3 to 15 percent. In January, 1983 the monopoly control given to ENCI for the importation and domestic marketing of fertilizer was

Table 5.1. Average Annual Fertilizer Prices, Peru, 1970-82[1/]

Fertilizer	1970	1971	1972	1973	1974	1975[2/]	1976	1977	1978	1979[3/]	1980	1981	1982[4/]
	soles per metric ton												
Urea (45/46%)	3,200	3,100	3,125	4,635	11,110	12,105	9,129	11,661	20,689	46,543	65,877	93,833	165,625
Ammonium Sulfate													
Imported (21%)	2,100	2,100	2,100	3,638	6,502	6,274	4,121	5,580	11,578	31,270	49,935	74,333	109,500
National (21%)				2,560	3,262	3,402	4,001						
Ammonium Nitrate													
Imported (33.5)	2,850	N.A.	N.A.	N.A.	11,800	9,944	6,114	8,353	15,442	33,337	61,813	94,083	160,250
National (33.5)[5/]	2,475	2,600	2,780	2,780	4,728	5,118	5,802						
Ammonium Phosphate													
Imported (18.46.0)	4,700	4,700	4,800	7,200	13,670	14,461	10,080	11,437	24,679	58,830	95,375	157,667	247,250
Simple Calcium													
Superphosphate (20%)	2,100	2,160	2,290	2,290	3,596	3,857	3,364	4,083	7,583	25,263	36,252	52,833	84,375
Triple Calcium													
Superphosphate Importe (20%)	3,800	4,000	4,000	6,200	6,200	9,591	7,208	9,530	16,371	38,513	66,750	114,333	185,375
Potassium Chloride (60/62%)	3,300	3,400	3,500	3,500	4,261	4,341	5,569	7,125	11,908	28,267	49,510	88,833	136,125
Potassium Sulfate (50/52%)	4,000	4,100	4,200	4,400	5,988	6,122	6,000	8,283	17,563	48,760	74,600	108,000	190,625
Mixed N P-K (12-12-12)													
Imported	--	--	--	--	13,150	9,001	5,940	7,683	14,082	35,863	56,825	92,500	153,250
National	3,600	3,600	3,850	3,850	5,085								
Guano de Isla													
10-10-2	2,600	2,600	2,730	2,800	4,210	2,870	4,843	5,917	10,195	24,380	36,752	N.A.	120,000

1/ Annual averages computed by weighting the regulated price by the months in effect.
2/ Fertilizer subsidy not including transportation cost to producer went into effect.
3/ Fertilizer subsidy to producer removed.
4/ Average producer price as of August, 1982.
5/ Average producer price of sales from Fertisa and Cachimayo.

Source: Ministry of Agriculture (DGAIC).

Table 5.2. Fertilizer Subsidies, Peru, 1975-1977

Product	Total Cost			Price to Farmers			Subsidy (percent of cost)		
	1975	1976	1977	1975	1976	1977	1975	1976	1977
	soles per metric ton								
Imported Ammonium Sulfate	7,412	5,760		3,901	4,062		3,511 (47)	1,698 (29)	
Imported Calcium Ammonium Nitrate	8,382	8,290		4,687	4,655		3,695 (44)	3,635 (44)	
Imported Ammonium Nitrate	12,450	12,328		6,387	6,298		6,061 (48)	6,030 (49)	
Imported Triple Calcium Superphosphate	17,181	16,849		6,753	7,279		10,628 (61)	9,570 (57)	
Imported Mixed N-P-K (15-15-15)	13,885	14,047		8,073	7,649		5,812 (42)	6,398 (46)	
Imported Mixed N-P-K (20-20-20)	16,251	15,403		7,195	7,563		9,056 (56)	7,840 (51)	
Imported Mixed N-P-K (12-12-12)	10,573	32,400		5,778	5,902		4,795 (45)	26,498 (82)	
Ammonium Nitrate Cachimayo	7,081	11,391		6,124	6,039		757 (11)	5,352 (47)	
Imported Urea (45%)	16,466	11,232		12,695	8,530		0 (0)	2,702 (24)	
National Urea (45%)	9,104	9,371		10,866	8,549		0 (0)	822 (9)	
AVERAGE	10,358	10,248		5,631	6,734		4,727 (45)	3,514 (34)	
	millions of soles								
TOTAL	918	2,899	4,965	499	1,908	3,429	419 (45)	991 (34)	1,536 (31)

Source: Memoria 1976 and 1977, ENCI, Lima, Peru.

scheduled to be eliminated. ENCI was expected to continue its operations, but private firms were to be allowed to compete in fertilizer markets. The impact of this change in policy should be to lower the cost of government outlays to ENCI, reduce the producers' price of fertilizer in real terms, and improve the efficiency of timely fertilizer delivery.

Other Agricultural Inputs

The pricing and wage policies of other agricultural inputs, including machinery, tools, seed, non-fertilizer chemicals, and labor, will not be analyzed in any detail. The majority of sales of agricultural machinery, tools, and non-fertilizer chemicals appear to have been handled through private marketing channels during the past decade. Little analysis has been done on the distribution and prices of these inputs, or on taxes and subsidies affecting their use.[1]

The distribution of some improved seeds (e.g., rice and cotton) has been handled by government parastatals. A complete economic study of the pricing and marketing policy on seeds, including the costs and returns to developing new varieties was beyond the scope of this study. Similarly, analysis of agricultural wage policy and wage earnings for landless and off-own-farm workers has not been undertaken for this report, nor has other research on these topics been identified.

---

[1] A useful starting place for the analysis of input use would be: Billone, Carbonetto and Martinez, Terminos de Intercambio Ciudad - Campo 1970-1980, Precios y Excedente Agrario, 1982.

Credit

The primary lender to the agricultural sector has been the Agrarian Bank of Peru (Banco Agrario del Peru, BAP). The value of loans and their distribution by region, purpose, and crop are shown in Tables A4.16 - A4.19. The maximum interest rates that commercial banks and the BAP were authorized to charge on short-term loans (less than a year) during the period 1970-82 are shown in Table 5.3, and compared to annual increases in the consumer price index (CPI). Although the annual rates of interest actually paid by agricultural borrowers have probably been considerably higher when commissions, risk premiums, and other loan charges are included, rates of inflation have been significantly greater than interest rates in most years. This situation has provided a substantial subsidy to crop production and, along with low rates of borrower payback, has caused a decapitalization within the agricultural banking system. This decapitalization has led to greater reserve placements in the BAP by the Central Reserve Bank so that agricultural credit could be expanded. Table 5.4 indicates the significant increase in the Central Reserve Bank's reserves going to the BAP since 1980, compared to funds allocated to banks for the industrial and mining sectors.

It should be noted that providing subsidized credit to a sector such as agriculture makes it difficult to control the money supply so as to control inflation.

Table 5.3 Average Interest Rates for Agricultural Loans by Commercial Banks and the Agrarian Bank of Peru, 1970-1982

Year	Commercial and Savings Banks[1/]	Agrarian Bank of Peru[1/]	Increase in Peruvian Consumer Price Index
1970	N.A.	10	--
1971	N.A.	10	--
1972	N.A.	10	4.2
1973	N.A.	10	13.8
1974	N.A.	10	19.1
1975	12.0	10	24.0
1976	15.5	14	44.7
1977	17.5	16	32.4
1978	22.3	21.0	73.7
1979	32.4	32.5	66.7
1980	32.5	32.5	60.8
1981	48.2	49.5	72.7
1982	47.5	47.5	70.0*

1/ Maximum interest rates authorized on loans of less than a year.

*Estimated.

Source: Central Reserve Bank of Peru.

Table 5.4. Placement of Reserves of the Central Reserve Bank of Peru in Sectorial Development Banks for Agriculture, Industry, and Mining, 1970-1982

Year	Agrarian Bank of Peru	Industrial Bank of Peru	Mining Bank of Peru
	millions of soles		
1970	950.	1,017	206
1971	1,294.8	1,065	416
1972	1,896.0	2,448	540
1973	2,632.4	4,364	874
1974	3,155.0	5,904	1,234
1975	4,875.0	7,883	1,650
1976	8,000.0	13,621	3,818
1977	10,594.0	17,359	5,384
1978	13,504.0	22,749	6,284
1979	19,804.0	30,846	4,915
1980	46,614.0	35,846	6,415
1981	98,814.0	47,240	9,415
1982[1/]	250,000.0	57,746	11,342

1/ Based on January-May.

Source: Central Reserve Bank of Peru.

Transportation

One of the primary stated objectives of the Belaunde administration is to develop the Selva and Sierra. One of the basic means of furthering this objective has been to increase road construction in these regions. Transportation costs to and from these regions have also been subsidized by uniform nationwide prices for inputs and outputs. This subsidy causes a regional shift in resources and production by providing incentives for producers in the Selva and Sierra to use subsidized inputs (e.g., fertilizer) and to plant those crops which command a relatively high price (e.g., corn). The full cost of these regional subsidies has not been evaluated, nor has the optimal mix of products been determined on a regional basis.

VI. EFFECTIVE PROTECTION

A comprehensive approach to assess the treatment of the agricultural sector within the Peruvian economy would be to consider a broad framework of effective protection provided to private domestic resources utilized directly in each economic activity. The construction of such a framework would take into account taxes and subsidies arising from trade and domestic policies on both the output-price and input-cost sides of production.

The present study has to this point focused on only two of these issues. First, the discussion of domestic producer and consumer prices for several agricultural commodities has provided a means of assessing the degree of discrimination or subsidization that has existed in the narrow sense of domestic prices being different from their international counterparts. Second, the review of agricultural input policies has suggested cases in which production costs have been subsidized by land, fertilizer, credit, water, and transportation policies.

What these two approaches fail to consider is the extent to which relative prices between sectors have been distorted away from world levels. Even if domestic prices in a particular sector are equal to their world levels, a sector may be discriminated against. If trade and price policies directed at other sectors raise their output prices relative to world prices, domestic price ratios shift against the first sector when compared to world levels. A common means of creating such a distortion is for certain sectors to be protected by high external tariffs.

A similar argument applies to inputs. A particular sector may be "protected" by input subsidies even if there are no interventions affecting output price. Conversely, discrimination against a sector created by shifts

in relative output prices may outweigh input subsidies received by the sector, with the net effect being to leave an apparently subsidized sector relatively disprotected.

In this section the analysis is extended to consider intersectoral protection provided by trade policies.[1] The role of domestic price policies is ignored. That is, the effects of trade tariffs, duties, exemptions, and quotas are considered as if world prices would prevail in their absence. This is clearly not the case in the agricultural sector. To the contrary, this paper has highlighted the discrepancies between domestic and world prices created by exchange rate policy and domestic price policies. Thus, on its own, the analysis presented in this section is still inadequate to provide a complete characterization of the treatment of the agricultural sector. However, extending the analysis to consideration of a broad range of trade policies provides useful insights.

The level of nominal protection provided in 1973 to sixteen categories of industries are compared in Table 6.1. The arithmetic average of official ad valorem tariffs charged on the imports in each category is presented in column (b). Additional duties and fees of various types are added to obtain the total official tariffs presented in column (c). Exemptions and deductions allowed on specific items are then subtracted to obtain the actual applied tariff levels in column (d). Total nominal protection is computed by also

---

[1] The analysis in this section draws on the work of Jorge Torres Zorrilla of the Junta del Acuerdo de Cartagena. In two related articles Dr. Torres has compared nominal and effective protection between sectors in the years 1973 and 1981. See references for complete citations.

Table 6.1. Nominal and Effective Protection Created by Trade Policies, by SITC Divisions, Peru, 1973

SITC	Division	Number of Items	Nominal Protection: Official Ad Valorem Tariffs	Nominal Protection: Total Official Tariff	Nominal Protection: Actual Applied Tariff Level	Nominal Protection: Tariff and Nontariff Protection	Effective Protection: Tariff and Nontariff Protection
11	Agriculture	119	--	55	52	61	75
12	Forestry	45	--	68	45	45	45
13	Fish	9	--	88	26	46	46
21	Charcoal and Coal	11	--	47	29	29	35
22	Petroleum	2	--	29	8	8	2
23	Metallic Minerals	31	--	41	0	0	-19
29	Other Minerals	53	--	61	40	40	55
31	Processed Food and Beverages	409	--	75	75	107	312
32	Textiles and Clothing	288	--	161	160	215	491
33	Wood and Furniture	67	--	96	91	106	218
34	Paper and Printing	133	--	78	69	77	127
35	Chemicals	1,459	--	52	34	35	46
36	Non-metallic Products	150	--	79	49	56	78
37	Basic Metal	231	--	65	38	42	75
38	Machinery and Equipment	1,420	--	59	38	40	55
39	Diverse Industries	146	--	105	105	123	216
	Total	4,647	55	69	52	61	113

Source: "Protecciones Effectivas y Sustitucion de Importaciones en Peru," Jorge Torres Z., Publicacion 33, Centro de Investigaciones Sociales, Economicas, Politicas y Anthropologicas, Pontificia Universidad Catolica del Peru, Lima, Peru, December, 1976.

considering nontariff barriers. This is presented in column (e). Nominal tariff and nontariff protection averaged 61 percent in 1973. This level of tariff protection continued through 1978.

In 1979 preliminary steps to liberalize international trade were undertaken. Import prohibitions were eliminated on 775 items, as shown in Table 6.2. During 1980 and 1981 the current government continued and extended this change in trade policies. Nontariff restrictions were lifted on over 1000 additional commodities. Nominal tariffs were also reduced on many goods and the maximum allowable tariff of 60 percent was established. Average tariff levels in 1981, by category of industry, are presented in Table 6.3

A comparison of Tables 6.1 and 6.3 illustrates the change in regimes that has occurred in the past two years. Compared to 1973, by 1981 the average level of nominal protection on all goods had fallen from 61 percent to 32 percent. The current government is committed to achieving further tariff reductions, but as of October 1982, such policy action was stalled. In fact, in early 1982, a temporary tariff surcharge of 15 percent of the initial tariff level was enacted. Legislation for 1983 proposed to extend the surcharge another year and raise it to 20 percent of the initial tariff level.

From the data presented in Table 6.1 and 6.3, and recalling that domestic price policies are ignored, the average tariff level on agricultural goods appears to be at a middle level -- above forestry, fishing, coal, petroleum minerals, chemicals, non-metallic products, and machinery and equipment, but well below important domestic industries such as food and beverage, textiles and clothing, wood and furniture, and the residual category of diverse industries.

Table 6.2. Nontariff Barriers, Peru 1973-1981

Number of Items:	1973*	December 1979	July 1980	December 1980	December 1981
Unrestricted	2,734	3,745	4,745	4,979	5,069
Restricted	1,051	1,258	343	118	131
Prohibited	786	9	9	7	7
Total	4,571	5,012	5,097	5,104	5,207

*Provided by Jorge Torres Z.

Source: Memoria, 1981, Central Reserve Bank of Peru.

Table 6.3 Nominal and Effective Protection Created by Trade Policies, by SITC Divisions, Peru, 1981

SITC Division		Number of Items	Nominal Tariff Protection 1/	Effective Tariff Protection
11	Agriculture	215	24.0	30.0
12	Forestry	45	24.0	22.0
13	Fish	9	29.0	22.0
21	Charcoal and Coal	14	11.0	9.0
22	Petroleum	2	10.0	10.0
23	Metalic Minerals	32	12.0	10.0
29	Other Minerals	47	19.0	19.0
31	Processed Food and Beverages	438	43.0	107.0
32	Textiles and Clothing	371	56.0	104.0
33	Wood and Furniture	78	43.0	76.0
34	Paper and Printing	139	27.0	57.0
35	Chemicals	1,495	23.0	27.0
36	Non-metalic Products	160	39.0	54.0
37	Basic Metal	285	25.0	38.0
38	Machinery and Equipment	1,412	33.0	41.0
39	Diverse Industries	168	51.0	80.0
	Total	4,910	32.0	51.0

1/ Nontariff barriers not included.

Source: "Protecciones Effectivas y Sustitucion de Importaciones en Peru, 1981," Jorge Torres Z., Centro de Investigaciones Sociales, Economicas, Politicas y Anthropologicas, Pontificia Universidad Catolica del Peru, Lima, Peru, forthcoming.

For many of the latter categories nominal tariff and nontariff protection exceeded 100 percent in 1973 and, even after the reforms of the past two years, still averages almost 50 percent. These data are indicative of a pattern of high protection for certain domestic industries, moderate tariffs on important imported inputs, and relative disprotection of export-oriented sectors such as mining, agriculture, and petroleum.

This pattern is confirmed if the trade-policy-induced effective protection of domestic resources utilized in each industry is computed. This computation considers both the nominal protection received for outputs and the additional input cost created by input trade policies. Such results, based on the input-output matrix of the Junta del Acuerdo de Cartagena, are presented in the last column of Tables 6.1 and 6.3. For all goods, trade-policy-induced effective protection averaged 113 percent in 1973 and 51 percent in 1981. The relative ranking among industries is quite similar to their ranking on the bases of nominal tariff and nontariff protection, but disparities among industries are often increased. For example, on the basis of nominal protection, agriculture received 28 percent of the protection received by textiles and clothing in 1973, but the ratio of effective protection of agriculture to textiles and clothing was only .15. In 1981 the ratio of nominal protection was .43 and of effective protection .29. In general, levels of effective protection tend to exacerbate distortions in relative output prices created by Peru's tariff policies.

The protection levels presented in Tables 6.1 and 6.3 represent arithmetic averages for each industry. The underlying data suggest rather wide dispersions around these means so that the averages may be somewhat misleading. For example,

the average 1981 tariff level for 215 agricultural goods includes 52 with ad valorem tariffs of 15 percent or less and 56 with a 60 percent tariff. Tariffs tend to be low on basic foodstuffs and high on unusual specialty items. As illustrated in Table 6.4, tariff levels are relatively low on milk and cattle products, cereals, and vegetable oils, and quite high on fruits and nuts, horticultural products, processed foods and cheese.

Effective protection among these commodities follows a similar pattern. Further, export products such as cotton or sugar receive negative effective protection as a result of the tariffs paid on imported inputs. This suggests a high level of discrimination against export crops in particular, which reinforces the conclusions from previous analysis comparing domestic and world output prices.

Table 6.4. Nominal and Effective Protection Created by Trade Policies, Selected Agricultural Commodities, Peru, 1973 and 1981

Code	Commodity Description	Value Added	1973 Nominal Tariff and Nontariff Protection	1973 Tariff and Nontariff Effective Protection	1981 Nominal Tariff Protection	1981 Tariff and Nontariff Effective Protection
1.01	Milk Products	.270	.150	-0.439	.185	.144
1.01	Cattle Products	.250	.350	.391	.264	.380
2.02	Cereals	.510	.430	.662	.226	.307
2.04	Fruits and Nuts	.660	1.110	1.455	.232	.252
2.05	Horticultural Products	.560	.840	1.142	.299	.361
2.0[illegible]	Vegetable Oils	.520	.240	.290	.144	.143
14.09	Canned Fruits and Vegetables	.240	1.910	6.324	.610	1.625
14.14	Flour and Prepared Flour	.180	.920	3.348	.417	1.255
14.03	Natural and Processed Cheese	.110	1.220	6.875	.610	2.762
2.0[illegible]	Cotton	.460	0.0	-0.336	0.0	-0.195
14.19	Raw and Refined Sugar	.340	0.0	-1.002	0.0	-0.532

Source: "Proteciones Effectivas y Sustitucion de Importaciones en Peru," Jorge Torres Z., Publicacione 31, Centro de Investigaciones Sociales, Economicas, Politicas y Anthropologecas, Portificia Universidad Catolics del Peru, Lima, Peru, December, 1976.

"Protecciones Effectivas y Sustitucion de Importaciones en Peru, 1981," Jorge Torres Z., Centro de Investigaciones Sociales, Economicas, Politicas y Anthropologicas, Pontificia Universidad Catolics del Peru, Lima, Peru, forthcoming.

VII. FURTHER ANALYSIS, CONCLUSIONS, AND RECOMMENDATIONS

The analysis of this report has addressed five basic issues: (a) Are there substantive differences between macroeconomic and agricultural sector policy objectives to the extent that current policies are working at cross purposes? (b) Does trade and exchange rate policy in Peru discriminate against agriculture in the aggregate by shifting the domestic terms of trade against the sector? (c) Does economic policy discriminate against agriculture in the narrower sense that producers receive prices lower than equivalent world price levels? (d) Are there consumer food subsidies of sufficient importance to have significant implications for such things as income distribution, rural to urban migration and wages? and (e) Are there problems or distortions in agricultural input and marketing policies that have implications for the food and agricultural sector or for macroeconomic policy more generally?

In this section, which is organized according to these topics, an attempt is made to flesh out the analysis of previous sections, draw the major conclusions, and to make policy recommendations.

Policy Objectives

Consideration of anticipated developments in the world economy are appropriate as a background for discussion of policy objectives. Although the international economy is recovering, prospects do not appear good for a strong recovery. If that outlook proves to be valid, prices of Peru's primary mineral exports are likely to remain at relatively low levels and demand for these exports will remain sluggish. In addition, Peru is likely to encounter increasing difficulty marketing its

nontraditional goods, which have grown from 5.9 percent to 21.5 percent of total exports during the past decade. Thus policymakers can not anticipate an exogenous boost from the trade account to moderate the consequences of domestic economic problems, as occurred during the early 1970's.

With respect to world agriculture, sluggish economic growth and large supplies have created low commodity prices for the past three years, especially in dollar terms. Barring an unanticipated severe production shortfall or a large monetary disturbance as occurred in the 1970's, prices of agricultural commodities are likely to remain low for some time.

The implications of this situation for Peru are two-fold. First, revenue from coffee, cotton and sugar exports will probably continue to be depressed. Second, the cost of wheat, corn, and other agricultural imports are also likely to be relatively low, and the drain on government finances associated with current food subsidy policies will be lessened.

In this context the extent of the prevailing macroeconomic crisis in Peru is quite ominous. Real economic growth was negative in 1977 and 1978, rose to 3.9 percent in 1981 but was projected to be only 2.0 percent in 1982. The decline in export earnings has severely affected revenue from parastatal enterprises. Efforts to reduce the government deficit to 4.2 percent of gross domestic product have consequently proven ineffective. For 1982 the deficit was estimated to be closer to 6.0 percent of GDP. One consequence is that inflation remains at a very high level.

Such a macroeconomic environment makes it difficult to adopt policies that are conducive to development of the agricultural sector. For example, the depressing effect of an overvalued currency on domestic prices of

traded agricultural goods was noted above. Peru has been experiencing a domestic inflation rate around 65 percent above the average of its major trading partners. Just to maintain a constant real value for its currency therefore requires nominal devaluations that are rather substantial. These devaluations are quite likely to be perceived by the public as contributing to, rather than a consequence of, domestic inflation, and support for such a policy is likely to wane. Continuation of current Central Reserve Bank of Peru policy aimed at modest real depreciation of the sol is thus threatened and the likelihood of a reversal in exchange policy increased.

Movement towards liberalization of trade policy is also thwarted by low rates of real economic growth, since lowering trade barriers will cause short-run adjustment dislocations that are not easily absorbed. Recently, one aspect of Peruvian trade policy has been to raise the very lowest tariffs to a uniform 15 percent. The underlying presumption is that a uniform tariff has less distortionary effects on resource utilization than do diverse tariff levels. One result was that tariffs on fertilizer rose by 12 percent. In general, however, tariff levels for agricultural commodities tend to be lower than those on other consumption goods. Hence, in a relative sense, agriculture stands to gain from further trade liberalization.

Continuing government budget deficits also create strong pressure for fiscal reforms. Direct subsidies become an obvious target of government budget directors, while export taxes and other tax sources are unlikely to be changed. The disincentives affecting agriculture which are related to overvaluation of the currency or differences in tariff rates are rather subtle, but many forms of subsidy to agriculture are direct and overt. With pressure on the fiscal

budget these subsidies tend to stand out. However, removal of these subsidies without concurrent adjustment of policies which create disincentives for agricultural production is likely to reduce agricultural output.

Stagnant economic growth and high inflation that make for falling real per capita income create greater pressure for low food prices than would exist in a growing economy with stable prices. The recent emergence of large food subsidies in Peru is closely associated with the post-1978 era of slow growth and rapid inflation.[1] By way of comparison, in the early 1970's when the economy was growing in real terms at six percent and inflation averaged less than ten percent, domestic food subsidies were much smaller even though domestic food prices were at or above world price levels. Explicit consumption subsidies of course, directly conflict with efforts to control the government deficit and improve the trade account.

This discussion suggests that the confluent effect of likely monetary, trade and fiscal policies in the current macroeconomic environment of Peru bodes poorly for the agricultural sector. There are three aspects to be considered. First, macroeconomic policies obviously impinge on agriculture. Second, macroeconomic considerations may constrain the set of feasible options concerning policy instruments specific to the agricultural and food sector. Finally, a potential viscious cycle may result in which the economic situation stimulates the adoption of policies that create inefficiencies in the domestic economy. These inefficiencies are counterproductive in generating economic growth since they create further demands on government

---

[1] It should be noted that heavy subsidies existed long before 1978-79, and many were greater than those established in that period.

resources and increase the imbalance in external accounts. In turn, a new economic environment is created in which initial problems are exacerbated.

What emerges is the clear implication that future vitality of the agricultural sector depends on restoration of macroeconomic stability and higher levels of real economic growth. It is beyond the scope of this report to make detailed suggestions as to appropriate macroeconomic policies to be pursued. However, two comments concerning the interface between sectoral and general economy policy are in order. First, macroeconomic policymakers should evaluate direct agricultural subsidies in the context of comparative explicit and implicit taxes that arise from trade and exchange rate policies. Macroeconomic policymakers should recognize also that some agricultural subsidies, such as those affecting consumer prices for rice and wheat, are in large part induced by weakness in the general performance of the economy. To try, for example, to reduce inflation by reducing the drain on government resources created by food subsidies may be a less appropriate strategy than to reduce inflation by other means. With lower inflation the need for consumer subsidies is less pressing and the consequent drain on government revenue is less severe.

Second, agricultural policy makers must recognize that the economy is the summation of many sectors. To the extent that public resources are committed to agriculture, either directly or indirectly, these commitments should be assessed in terms of their contribution to production and growth. When viewed in a larger perspective, some subsidies currently benefiting agriculture may prove too costly.

Discrimination Against Agriculture

The evidence presented in Section VI suggests that trade policy in Peru continues to discriminate against agriculture relative to other domestic industries, although the liberalizations undertaken since 1980 has alleviated this discrimination to a modest degree. Extractive activities such as mining and petroleum receive the least protection from trade policy. Agriculture and industrial input-creating activities such as chemicals, basic metals, machinery and equipment receive, on average, a moderate degree of tariff protection. Industries such as textiles and clothing, processed food and beverages, and wood and furniture receive the highest degree of protection.

Abstracting from other domestic taxes and subsidies, and the effects of monetary policy and the exchange rate, trade policy causes domestic capital and labor resources to shift into the latter categories of economic activities compared to the former. Within the agricultural sector, the tariff structure creates negative protection for export products, low levels of protection for basic food staples, and high levels of protection for specialty commodities. Consequently, the average level of tariff protection overstates the protection of Peru's major domestic agricultural products. In addition, of course, agriculture has to purchase goods from sectors of the economy that are highly protected.

One of the important implications of the shift in relative prices among sectors that is created by trade policies is that tariff-protected high industrial prices are transformed into relatively high industrial wages. Consequently, labor is drawn out of rural activities into urban-based manufacturing activities at the same time that the shift in the domestic terms of

trade against agriculture provide impetus for labor to leave that sector. High rates of rural-urban migration, over which concern is often expressed, are therefore in part induced by trade policies. The lack of social services in rural areas and other considerations also contribute to rural-urban migrations.

A second implication of the tariff structure is that net investment in agriculture is reduced relative to that which would be undertaken without tariff distortions. Efficient new technology is often embedded in capital goods such as machinery. In other cases, increases in productivity available through improved inputs such as seeds or fertilizers can only be effectively captured with simultaneous investments in new equipment. Consequently, reduced investment in agriculture is likely to be associated with slow growth in the productivity of all agricultural resources. Thus, trade distortions may account in part for productivity gains in Peru's agriculture being well below levels obtained in many other countries over the past decade.

The tariff-related shift in relative prices also implies that official accounts understate the importance of sectors of the economy receiving low levels of protection. This in turn may influence the commitment of public resources to these sectors, which further discriminates against their development. Agriculture in particular may suffer from this indirect bias in policy making.

When export taxes are considered together with tariffs on imports, the degree to which domestic prices are shifted against exported commodities often becomes quite severe. Export taxes tend to provide an administra-

tively tractable source of government revenue. Granting this point, export tax policies are often influenced by well-intended but misguided perceptions. For example, with respect to agriculture, export commodities are often believed to be produced by large estates, with the result that the incidence of export taxes is expected to be on the wealthy. In Peru, this is not the case, since the land reform of the 1970's turned the large export crop plantations into cooperative enterprises.

More fundamentally, exports are often viewed suspiciously, especially when basic foodstuffs are being imported. This form of suspicion very likely contributed to the adoption of the "pan levar" laws in Peru which require that a minimum of 40 percent of all land holdings be used for domestic food production. The same suspicion contributes to enactment of export taxes which have a similar, if indirect, affect on resource utilization. What is not recognized is that if a given set of domestic resources can produce a higher value of export commodity than of import-competing commodity, then the country is better off to produce the export commodity and trade for the imported commodity.

A final aspect of discrimination against the agricultural sector concerns the overvaluation of the sol. The effect of an overvalued currency is to lower the prices of traded goods relative to prices of non-traded goods. For a country that is small in terms of world markets, an overvalued currency affects prices of exported commodities and imported commodities uniformly. The net effect on specific domestic industries depends on the value added by domestic resources.

Since 1980 substantial steps have been taken to reduce price distortions created by trade policy in Peru. Domestic inflation might have been even higher had it not been for these measures. Over time these changes in trade policy should result in a more productive allocation of domestic resources. The growth of nontraditional exports over the past decade confirms that the world economy, in addition to import substitution, can provide an avenue for further growth. We recommend that the government reaffirm its long run commitment to a uniform tariff level well below the current average tariff. Even if further tariff reductions are currently infeasible, the effect of a credible long run commitment would be to direct investment planning and new investments towards activities that would be more productive in the long run.

More specifically one vehicle for directing the evolution of trade policies is the recently established commission on tariffs and protection (CONAPA). At this time we understand that the agricultural sector is not specifically represented on this commission. We recommend that the Minister of Agriculture endeavor to insure that agricultural interests are represented on CONAPA in the future and that the influence of alternative trade policies on agriculture be regularly raised for consideration by the commissioners.

With respect to export taxes on agricultural commodities, consideration should be given to whether other forms of taxation would lead to a better allocation of resources within the sector. To illustrate, some misutilization of land and water inputs may occur due to undertaxation of these resources.

Finally, we recommend that Peru continue its current policy of adjusting the real value of the sol to an equilibrium value. The short run benefits

of an overvalued currency, which are created in part by overstating the country's real wealth, are quickly swamped by the necessity of repaying foreign loans from a reduced base of export-goods production. This was the experience of Peru during the mid-1970's. Restoring the sol to an equilibrium value illustrates the policy-strategy selection problem discussed above.

Devaluing the sol is an appropriate macroeconomic response to the macroeconomic problem of the balance of payments. The consequences of this policy, in the absence of offsetting distortions, will be to create improved incentives for the production of all traded goods. Overall, the agricultural sector stands to gain from this approach. An alternative policy, such as a tariff on imports, which might also improve the current account balance, would have a deleterious effect on relative prices of agricultural goods.

International and Domestic Prices

The question of whether price policies discriminate against agriculture in the narrow sense that prices received by domestic producers are below equivalent border prices was addressed in earlier sections. For exported commodities the appropriate comparison is between domestic producer prices and prices FOB Callao, since the FOB price represents the local value of the commodity on world markets. For imported goods the appropriate comparison is with prices CIF Callao, which represents the cost to Peru of alternative supplies.

Both the form of price intervention and its consequences differ among commodities. For wheat, rice, and corn domestic prices are set directly upon

delivery from farms to commercial mills. The data indicate that in the early 1970's domestic wheat and rice prices were above border equivalents at the prevailing exchange rate and approximately equal to border prices at the real exchange rate of 1978, which was taken to represent a long-run equilibrium level. Domestic corn prices, on the other hand, were above border levels at either exchange rate.

In the mid-1970's, the sharp upswing in world commodity prices and increasing overvaluation of the sole reversed these ratios. The domestic corn price fell below world levels in 1973 and 1974, but has been set above the border price at the prevailing exchange rate since 1975, and above the border price based on the 1978 real exchange rate since 1977. Domestic wheat and rice prices were substantially below border price levels from 1973 to 1975. This gap was almost reduced as world commodity prices fell in 1976 and 1977, but grew again as world prices rebounded in 1978. During the next three years domestic prices remained well below border levels despite falling world prices. In 1982 the domestic price for rice appears to be slightly above its border equivalent at the prevailing real exchange rate, while domestic wheat price was still well below the border level.

Comparison of domestic to border prices for cotton and sugar was complicated by differences between the product sold by farmers and the processed products traded internationally. Domestic producer prices of these commodities are not set directly, but instead reflect prices received for the final product. The analysis in these two cases focused on comparing prices received for domestic sales of cotton fiber and raw sugar for industrial use to prices received for international sales. In the case of cotton, the per unit

price set for sales to domestic textile mills has been consistently below prices received FOB Callao for exports. Domestic raw sugar prices were substantially below border levels from 1970 to 1975, and slightly below border levels most years since 1976. During the latter period, domestic prices followed closely those of world prices until 1982, when the sharp decline in world prices was not reflected in domestic prices. The domestic raw sugar price was, therefore, above the border price in 1982.

With the possible exception of corn, during the past decade agricultural price and trade policies have kept average domestic producer prices of the five traded agricultural commodities considered in this study well below border levels at prevailing real exchange rates. Domestic prices have only approached or exceeded border levels in periods of low world agricultural prices (i.e., 1970-1972, 1976-77 and 1982 for grains, 1975 and 1980-81 for cotton, and 1976-77 and 1981 for sugar).

The distortion is even greater when domestic prices are compared to border prices based on a constant 1978 real exchange rate. This additional distortion reflects the role of an overvalued currency in depressing border prices of traded goods. In conjunction with trade policies, which shift domestic relative prices against agriculture on the basis of border price levels, the distortions created by agricultural price policy and the overvalued currency sum to a rather severe policy discrimination against the agricultural sector.

One consequence of agricultural price policy in Peru has been to stabilize domestic producer prices compared to world prices by reducing the magnitude of variations in these prices over time. This stabilization is particularly evident for rice, a basic food commodity.

The option of stabilizing domestic prices is a preference frequently encountered in agricultural policy. This may contribute to a sense of national security about a basic economic activity on the part of governments and individuals. However, it should also be recognized that fluctations of world prices, in response to changing supply and demand conditions, serve as signals to producers and consumers. These signals help them adjust production and consumption to respond to changes in their environment - increasing production and reducing consumption when prices are high and reducing production and increasing consumption when prices are low. After unusual price fluctuations, these producer and consumer responses make it possible for prices to return rather quickly to their historical trends.

A second aspect of agricultural price policy is that prices have been set well below border levels on average. Whatever the benefits of price stability, having average domestic prices below world levels creates a disincentive for agricultural production. The relatively stagnant performance of the agricultural sector during the past decade is almost surely due at least in part to these policies.[1]

Interestingly, the greatest distortion in relative prices appears to have been in the case of corn, with the price of corn relative to other agricultural commodities having been higher than equivalent world price ratios. Consequently, domestic farmers may have produced more corn and less

---

[1] The lack of an adequate agricultaural research capacity to produce a flow of new production technology for the sector was also undoubtedly importanta, as were other aspects of general economic policies.

of other commodities than they would have produced had border price ratios prevailed.

A related issue is the effect on the uncontrolled price of potatoes of agricultural policies directed towards other commodities. Preliminary assessment suggests that the net effect of policies directed at other crops has been to reduce domestic potato prices relative to the level they would have attained in the absence of agricultural price policies. Because potatoes are produced primarily on small Sierra farms this price shift works against efforts to raise incomes in rural mountain areas.

The basic premise underlying the comparison of domestic to border prices is that the aggregate income of Peru would tend to be maximized if both domestic producers and consumers face relative prices equivalent to those at which the country can trade internationally. To this end, we recommend that agricultural prices be set at world levels and adjusted flexibly over time. If it is deemed desirable to stabilize domestic prices and cushion the most severe swings in world prices, then domestic prices should be set so that on average they are equal to world prices, with domestic price movements following world price movements but with proportionately smaller variations. Either of these policies would represent a dramatic departure from price policy during the past decade.

In particular, such a policy could be implemented for hard wheat by raising the price paid to domestic producers to its border level. Even a small response by domestic producers would result in savings of foreign exchange. Domestic producer prices for wheat would rise without affecting the total cost of current wheat consumer subsidy programs.

A pricing policy for corn based on world prices would result in lower average domestic producer prices. This would lower feed costs and stimulate expansion of domestic livestock production. One option would be to remove the quota restrictions on corn imports, thereby creating competition between domestic and international producers. Since there are no consumer subsidies on corn, the entire storage and marketing process could be handled by the private sector. An additional advantage of this approach would be the savings in government revenue associated with eliminating the quota system.

For rice, as for wheat, it is not feasible for storage and marketing to be handled completely within the private sector so long as consumer subsidies are provided. We recommend that producer rice prices, which are now close to border price levels, be linked to international prices. This would provide incentive for future investments and expanded production of rice. If international prices rise significantly, policymakers would be faced with the option of increasing current consumer subsidies or raising domestic consumer prices proportionately. Such a policy issue would focus attention on the true cost of the consumer subsidy and stimulate evaluation of policy alternatives, without eliminating policy options.

Finally, current pricing policy discriminates against domestic cotton producers through export taxes and sales of cotton fiber to domestic textile mills at prices below FOB export prices.[1] Given the nominal tariffs on inputs and final products, trade policy appears to favor the textile

---

[1] It also appears that price policy discriminates against domestic sugar producers, but further analysis is needed to justify policy recommendations.

industry compared to agriculture. The data also suggest that domestic price policy further subsidizes the textile industry through artificially low fiber prices.

While recognizing that recent liberalization of trade policies has created difficult adjustments for the textile industry, we recommend that domestic textile mills be required to bid for cotton fiber on a competitive basis. The establishment of a cotton exchange is already being considered as part of a possible shift in domestic marketing policy. We anticipate that such an exchange could be highly successful in attracting domestic and foreign buyers. Bidding could be conducted electronically without the physical presence of buyers, if sales were based on well defined grades and rigorous enforcement of contracts. Insuring the smooth operation of such an exchange could be an important role for government. At the same time, allowing the private sector to manage other aspects of the farm to market process would improve marketing efficiency. In particular, a private marketing system might help eliminate delays associated with the current base price and rebate system.

In all of the above discussion of agricultural price policy, a key issue is the response of producers to the proposed changes in prices. There are those who argue that producers do not respond to changes in prices and that therefore price policy and/or markets are a poor basis for the allocation of the nation's resources. In the case of Peru, the stagnation of the corn sector in the face of prices set at above border price levels is sometimes cited as a case in point.

We were not able to find previous studies of supply elasticity for the agriculture of Peru, and a careful investigation of this issue was beyond the terms of reference of the present study. However, a number of points seem relevant in this context. First, the evidence from other countries that farmers respond positively to changes in the prices of their crops and livestock is overwhelming. The particular response depends on the production and technological alternatives they face. The evidence suggests that this response may be anywhere from 2 percent to greater than 10 percent for a 10 percent change in price.

It is important to note that it is the change in relative price that matters. The price has to change relative to other production alternatives. This point has been the cause of much confusion. Observed changes in price may be the result of a general change in prices, with no change in the price relative. Under these circumstances there would be no expectation that the output of a particular commodity would change.

Another issue is the time permitted for response. In the very short run, within a crop year, typically there will be very little response. However, as time passes and a change in price persists, the response will be larger. For intermediate lengths of run of up to three years, an elasticity of 1 is a good general rule. That is, the response in supply will be approximately proportional to the change in price.

For longer lengths of run, the response can be even greater, since there will be time for investments in capital to mature and for new production techniques to be discovered. The importance of the particular production technology cannot be over-estimated in this context. For example, an

important characteristic of the high-yielding rices and wheats is that they are more responsive to use of modern fertilizers. With higher fertilizer consumption, supply will be more responsive to price.

Expectations also have a great deal to do with the responsiveness of producers to changes in price. If producers expect prices to prevail for a sustained period of time, they are likely to be more responsive to changes in price than they would be if prices demonstrated a great deal of instability. In a broader context, the overall ambiente that governments set for policy has a great deal to do with the responsiveness of the private sector to price signals. Producers who have confidence that basic policy perspectives will prevail and policies themselves will be stable will commit resources and make changes in production plans with greater ease than if policies and governments are perceived to be unstable.

Consumer Subsidies

The analysis presented earlier suggests the importance of consumer subsidies of wheat and rice during the past four years. Prices charged to domestic mills for imported wheat were 24 percent below border costs at the prevailing exchange rate in 1982. Domestic rice was being purchased by ECASA at prices averaging 30 percent above prices charged to consumers, expressing both prices in terms of polished rice equivalent. Milling and transportation costs were also subsidized by the government.

The rice subsidy has induced increases in the per capita consumption of rice beyond levels that can be explained by changes in per capita incomes. The annual growth in per capita consumption of rice since 1970 has averaged 4.2 percent per year. Consumption has ranged from a low in 1970 of about

20 kilograms per capita to an estimated high of 29.7 kilograms per capita in 1982. Since the implementation of larger subsidies in 1979, growth in the per capita consumption of rice has accelerated to about 9.5 percent per year.

The per capita consumption of wheat dropped from a high of about 56.7 kilograms per capita in 1972 to a low of 46 kilograms per capita in 1977. However, the real price of wheat has been declining since the implementation of major subsidies in 1979. Accordingly, the per capita consumption of wheat has been increasing at about 2.7 percent per year since 1979, and has reached an estimated level of about 50.5 kilograms per capita in 1982.

Some appreciation of the magnitude of consumer food subsidies can be obtained from data available for 1980.[1] The Central Reserve Bank reports total food subsidies to have been 87,471 million soles. Subsidies for wheat and rice accounted for 29.9 and 23.4 percent of this total, respectively. Other subsidized products included sugar, fresh milk, oils, imported corn, and evaporated milk. The total value of the subsidy amounted to 2.7 percent of total consumer expenditures of 3,239,688 million soles, or 1.8 percent of gross domestic product of 4,962,461 million soles.

The Central Bank estimated that 53.7 percent of food subsidies benefited low income groups, 33.3 percent benefited medium income groups, and 13.0 percent benefited high income groups. These estimates suggest that the value of food subsidies received by low income groups in 1980 was 46,971 million soles.

---

[1] Data concerning the magnitude and distribution of food subsidies are provided by the Central Reserve Bank of Peru and reported in USAID Mission: Briefing Book for the Presidential Agricultural Mission to Peru, March, 1982.

Data pertaining to total expenditures during the year are not available by income groups. However, the World Bank estimated that the lowest two quartiles of the population received 9.93 percent of all income and accounted for 11.3 percent of consumer expenditures in 1971-72. Applying these proportions to 1980 consumer expenditures, total expenditures by the half of the population with the lowest incomes would be approximately 366,085 million soles. If this portion of the population is roughly equivalent to the low income group identified by the Central Bank, then the value of food subsidies for this group was 12.8 percent of their total expenditure. Therefore, changes in consumer food subsidy policies would have a significant effect on real income for low income groups.

Further insight into distributional issues can be attained by distinguishing between low income persons in urban versus rural areas. The World Bank estimates that among the lowest two quartiles of the population based on income, 39.3 percent live in urban areas and 60.7 percent live in rural areas. Both groups spent approximately 60 percent of their income on food, but for the rural group, two-thirds of this food is self-produced. Subsidies are not applied to self-produced food. If the distribution of income between the urban and rural low income population is proportional to their population numbers and consumer preferences of the two groups are approximately the same, then it could be assumed that the urban poor make two-thirds of the food purchases of low income persons. If the food subsidy is assumed to be distributed proportionately to purchases, then the value of food subsidies to urban poor would be 31,240 million soles. This represents 21 percent of the value of the urban poor's expenditures. For the rural poor, in contrast, the subsidy implied is 15,310

million soles or 7.2 percent of their total expenditures. These are rough estimates since the available data is only precise enough to provide broad guidelines on the distribution of subsidies within low income groups.

An important issue, of course, is that policies that discriminate against agriculture as a relatively easy way of keeping food prices lower to urban groups works a serious hardship on the rural poor. The loss in income of the rural poor due to lower prices for the output they produce in most cases probably outweighs any benefits they receive as consumers.

Hence, Peru has discovered, as have other countries, that altering food prices is a rather blunt instrument for dealing with income problems or addressing the needs of the nutritionally deprived. The subsidization of food has uneven effects among the poor and at the same time provides a subsidy to wealthier groups of the population that do not require assistance to meet their nutritional requirements.

There are also more general undesirable effects of food subsidies, especially when they are provided by distorting relative price ratios. Among these are: (a) they tend to induce a larger migration from rural to urban areas than can be explained by the possibilities for employment and other services that are more readily available in urban areas, (b) they tend to encourage laborers to accept low wages which result in artificially lower costs for the industrial sector, and (c) they tend to develop consumer preferences for a diet of preferred foods (i.e., foods with higher income elasticity of demand relative to root and tuber crops) that is costly to maintain after subsidies are reduced.

Brief remarks on these effects will highlight some of the problems of Peru's food subsidies. In the case of migration, Peru is experiencing a rural to urban migration rate in excess of five percent per year. Since it is unlikely that in the near future jobs can be created at a sufficient rate to accomodate this inflow, urban unemployment and underemployment can be expected to increase. One side effect will be to create pressure for even greater food subsidies. Since food expenditures are significant relative to income, wages become sensitive to these prices and subsidies. Large food subsidies to primarily urban areas, as in Peru's case, can be expected to distort nominal industrial wages downward.

This effect on wages can have two effects. In the first place, they should have a positive employment effect. In the second place, they may create problems of a longer term nature which may make it difficult to change policies at a later date, or create significant costs when the policies should be changed. Low wage rates induce plant structures and firm organization that make greater use of labor. Those firms will be inefficient if the price and wage policies are later changed. Similarly, firms and industries may stay in operation that otherwise would not have been sustainable. Again, if price and wage policy should later be changed, these firms and industries will face significant adjustment problems.

Experience from other countries concerning consumer preferences has shown that if prices are used to subsidize foods consumed primarily by the low income groups of the population (i.e., foods having low income elasticities of demand), then prices tend to be a somewhat more effective instrument in targeting food subsidies to the poor. In this case, higher income groups of the population will tend to consume relatively less of the subsidized food because, given their

income levels, they prefer to spend a larger portion of their incomes on meats, fruits and preferred grains. Cereals such as rice and wheat products are preferred as income rises, so using price subsidies for these commodities is not well targeted. Also, the subsidization of rice and wheat prices serves to develop a consumer preference by the poor for foods that can only be maintained at considerable expense once the subsidy is removed. The implication is that if Peru is to continue using food prices as an instrument to help meet the needs of the poor, then consumer price subsidies should be placed on those foods having low income elasticies of demand, for example, root and tuber crops.

The Peruvian government has recognized many of the problems associated with price subsidies and has taken some steps to better target food subsidies. These steps include attempts to implement a food stamp program and to subsidize rice varieties that are more likely to be consumed by low income groups, but which are consumed by upper income groups as well. Recently, a high level commission for the formulation of a national food plan has also been established. Efforts to target food subsidies will need to be increased if Peru is to remove the distortions created by food price subsidies, while at the same time addressing the needs of the nutritionally deprived.

A major difficulty of administering a targeted food subsidy program is to identify the nutritionally deprived and then to find an administratively cost-effective means of addressing their food needs. Government administrative costs will tend to be lower if normal marketing channels can be used to target food subsidies. Invariably, the development of an effective program will require information on such consumer characteristics as family size, family composition, location, sources of income, assets, and seasonality of nutritional status. An effective program will invariably employ several means to target

food subsidies. The means employed in urban areas will also vary from the means employed in rural areas.

Alternative means to target food subsidies employed in other countries include (i) food for work programs, (ii) food stamp-ration books, (iii) fair price shops, and (iv) the targeting of food subsidies directly to individuals such as pregnant and lactating mothers, and children. Food for work programs often involve employment in public works projects such as road construction and maintenance. Instead of being paid the full minimum wage, workers receive part of their payment in food (generally cereals). Although establishment of a food stamp program has been unsuccessful in Peru, other countries, such as Sri Lanka, have been successful in administering their food subsidy program using ration books. Ration book holders are required to submit a comprehensive set of data, such as occupation, income, land cultivated, and family composition, in order to have their ration books revalidated. In the case of ration books, care must be taken to prevent an urban bias.

Fair price shops are stores located in low income areas that generally sell only subsidized foods. A rationing mechanism, such as coupons, may be used to limit purchases. Fair price shops appear to work more effectively in urban areas, where the poor tend to be more segmented, than in rural areas.

The use of schools as a vehicle to distribute food has received somewhat less attention than other targeting mechanisms in low income countries. One variant of this scheme is to simply provide nutritious lunches, insuring that children receive their minimum nutritional requirements. Another variant of this approach is to actually "pay" children to attend school by giving them food

parcels--such as a sack of rice--if their school attendance is adequate for a specified period of time. The food parcel serves as an incentive for children to attend school and, thus, contributes to the creation of human capital as well as nutritional assistance. This approach has the advantage of helping to offset the high opportunity costs of attending school of many low income children. These children often need to work to help sustain the family.

Imports of PL-480 commodities, under either Title I or III, are attractive in many situations because commodities imported under this program represent a resource transfer in kind. However, the usefulness of PL-480 imports, as a resource transfer to the growth and development of an economy, declines and can become negative, if the imports distort producer incentives. In this case, excessive PL-480 imports may have become an implicit tax on the production of competing domestic agricultural crops. Peru is the largest importer of PL-480 shipments of rice. Yet, in recent years it is not clear that these shipments have been needed. If it were not for the resource transfer implicit in these shipments, they probably would not have been requested.

We have not been able within the constraints of this study to unequivocally discern whether PL-480 shipments of rice have given rise to farm level price distortions for rice. Historically, domestic producer prices have been well below their world market counterparts. However, in 1982 domestic producers were receiving a price at or above world levels. At the consumer level, real prices for rice were receiving an increasing consumer subsidy at the time of large PL-480 imports. The PL 480 shipments of rice have served to delay the point in time when the government must address the issue of consumer price subsidies. These imports may have also actually

distorted consumer prices for rice downward in order that the larger stocks of rice could clear the market. In any case, if Peru is to address its food subsidy problems, PL-480 commodity imports may need to be reprogrammed. During the last few years Peru may have imported more rice than would otherwise be required. Larger imports were needed because of the demand induced effects of the rice subsidy.

PL-480 shipments of food should be introduced into the food system in such a way that they help build human capital and, at the same time, have minimal disincentive effects for producers. PL-480 shipments can be used in this way if they are distributed as income transfers to the poor by means of one or a combination of the targeted programs mentioned above.

Peru does not have a comparative advantage relative to the United States in producing wheat for use in noodles and flour products requiring a high gluten content. On the other hand, Peru is nearly self-sufficient in rice production. If consumer price subsidies were decreased and producer prices were maintained at world levels, it is quite likely that Peru could be self-sufficient in rice. Under these circumstances, and in light of the previous discussion, on the basis of economic considerations we recommend that Peru increase its imports of PL-480 wheat and decrease its imports of PL-480 rice in order to minimize the potential for price distortions and to facilitate the removal of food subsidies.

In any case, care needs to be taken so that neither producer nor consumer wheat prices become further distorted as a consequence. One way to do that would be to use the imported grain as part of targeted feeding programs rather than to sell it into the market. Such programs might

include a combination of school lunch programs, fair price shops, and food stamps. Used in these ways, the concessional imports would have minimal price distorting effects, and at the same time induce useful institutional innovations that have value over time.

In devising a proper food strategy, the role of rural development as a means of dealing with both the poverty and nutritional problem in Peru should not be neglected, nor should the role of current policies in contributing to those problems be neglected. Research in Brazil has shown that the incidence of distortions in the exchange rate similar to those in Peru were primarily on the rural poor. Removing those distortions would improve the income situation of the rural poor. And the rural poor constitute a majority of the income problems in Peru. A combination of more rational price policies for agriculture and targeted feeding programs for the urban groups may be an ideal combination.

Which of the various targeted programs would be best for Peruvian conditions is difficult to know. School feeding programs have great merit since they can be an important subsidy to schooling. Beyond that, Peru may need to experiment with food stamps, fair price shops, and other variants to determine which system will work best.

Inputs and Marketing

The discussion of pricing policies for agricultural inputs in an earlier section suggests that the prices of several important resources do not reflect their market values. These distortions in input prices have resulted in the misuse of agricultural resources, inefficiencies in the

production level and mix of agricultural commodities, and disincentives for long-run capital investment in the agricultural sector.

Among the primary disincentives for long-run capital investment in Peru's agricultural sector have been the instability of the land tenure structure and the absence of open land sales and rental markets. The absence of a free market pricing of land leads to an undervaluation of this basic resource. Investments in complementary inputs tend to be reduced, especially those of long-term maturation such as those associated with erosion and salinity control and irrigation infrastructure. Further, land cannot be used as collateral for agricultural loans of any type, so the entire level of investment in agriculture is reduced. The issues of agricultural land valuation and processes for the redistribution and taxation of land as existing land tenure structures continue to evolve merits more thorough, ongoing investigation.

In addition to the absence of a land market, the loan policies of the Agrarian Bank of Peru (BAP), which have given priority to subsidized short-term crop production loans, have contributed to reduced long-term agricultural investments. As a result of the negative real interest rates on these loans the agricultural sector has received an implicit subsidy. These subsidized agricultural loans have primarily benefited annual crop production activities in the Costa, particularly rice and cotton producers.

The subsidized interest rates of the BAP have been lower than the rates at which private commercial banks could profitably extend loans to the agricultural sector. Thus, there has been substantial crowding out of commercial bank loans, especially in low risk, short-term production loans for crops in the Costa. A BAP policy of reducing the subsidized credit going to coastal

rice and cotton producers and reallocating this capital to either higher risk small farm producers in the Sierra and Selva or to longer-term irrigation, marketing and agro-industrial projects would direct subsidies to priority development areas and lead to more short-term commercial bank lending to the agricultural sector. However, in the short-run, because of potentially high payback defaults, such a policy might result in an even higher rate of decapitalization in the BAP and the need for larger government support to underwrite these losses. In this respect, greater consideration should be given to the crop insurance program and technical assistance package now under discussion in Peru. Interest rate policies which tend to increase savings also deserve increased attention.

The pricing policies for water and fertilizer have reflected a relatively high degree of inconsistency since 1970. Data on the pricing and collection of water levies are very difficult to find, but there are indications that the collection of water levies has been quite low and has varied widely among irrigation districts. Farmers who have not had to pay the full levy have probably overused water or, at least, not used it as efficiently as they otherwise would. This would partly explain the tendency to plant crops which use more water (e.g., rice) and the lack of incentive to invest in maintenance and repair of irrigation systems which would provide greater efficiency in water use. Another explanation is the failure to charge rates for water that recover costs in the long run. A more consistent policy for pricing and collecting irrigation water levies among irrigation districts would greatly increase the efficiency in the use of this resource.

The preliminary review of fertilizer prices given in an earlier section indicates that fertilizer pricing policy was also changed substantially through the 1970's. Early in the decade, price differences between domestically produced and imported fertilizers existed, especially for ammonium nitrate. In 1974, these price differentials were increased significantly. Then in March, 1976 these price differentials were eliminated and ENCI completely monopolized the marketing of domestic and imported fertilizers. Uniform fertilizer prices, set for the entire country, created subsidies for the users of fertilizers who would ordinarily have had to pay higher prices due to transportation costs. In addition, substantial direct subsidies were reported by ENCI to have accrued to fertilizer users from 1975-1979.

While recognizing that the removal of the direct fertilizer price subsidy implies a decrease in the use of this input, data are lacking on who received the primary benefits of this subsidy program. Hence, the effects of fertilizer subsidies on efficiency and equity cannot be fully evaluated.

The Belaunde Administration is taking positive steps to limit parastatal intervention in fertilizer marketing. Allowing more competition in marketing should reduce government outlays to ENCI, lower on-farm fertilizer costs in real terms, and improve the efficiency of timely fertilizer delivery. If the government continues to set national prices for fertilizers and to subsidize the cost of transportation to the Sierra and Selva, we recommend that fertilizer prices be set and adjusted using international border price as a point of reference. The costs and benefits of subsidies should be carefully targeted and monitored.

Probably the most important investment that Peru can make to increase agricultural productivity is the financing of agricultural research and extension. During the 1970's, the amount of technical assistance provided to farmers from agricultural research and extension was substantially reduced when greater emphasis was given to the social and political organization of the Agraria Reform enterprises. The number of technically trained agricultural researchers, extensionists, and field statisticians were decreased during the military administrations. Greater productivity in the agricultural sector will occur in the long-run as farmers learn how to use productive new technology. We recommend that applied agricultural research and extension education be increased in the 1980's.

As concerns marketing, it has been pointed out that various state enterprises (i.e., ENCI, ECASA) have played key roles in implementing government pricing policy. It is unlikely that the private sector could have been induced to distribute fertilizer at subsidized prices, to import wheat and make it available to millers at prices below world market levels, or to market rice at retail price levels that are below farm level prices. As other countries have discovered, the creation of public enterprises to implement price policy has had the undesirable effect of inducing economic inefficiency in the performance of marketing functions. That is, in addition to the direct effects of price policy itself, the resources allocated by public enterprises to perform transportion, storage, processing, and sales functions tend to be allocated inefficiently compared to the efficiency of performing these functions by the private sector. However, as Peru permits farm and retail level prices to approach the levels of their world market counterparts, the need for state

enterprises to perform the various agricultural marketing functions will, with some exception, diminish accordingly. We recommend that the government take advantage of policies which diminish the distortion in domestic prices by permitting the private sector to take on a greater role in performing agricultural marketing activities.

While it was beyond the scope of this study to rank those marketing activities performed most inefficiently, it is clear that resources are being inefficiently allocated in transportation, storage, and, to a lesser degree, in the processing of agricultural commodities. It also appears that public wholesale facilities, especially in Lima, need to be renovated and enlarged to permit more competition among wholesalers and retailers.

Fertilizer, rice, and corn are among the fairly high volume products for which virtually equal geographic prices are mandated. In order for this mandate to be carried out, ENCI and ECASA must either contract haulers or supply their own transport carriers so that regional demands are satisfied at set prices. This policy amounts to a subsidy to the more remote, high transport cost regions and a tax on the lower transport-cost regions of the country. Transporting fertilizer to and corn from the Selva is the most outstanding example of an area receiving a transport subsidy.

There are two closely related distortions to which a transportation subsidy can give rise. The first distortion is that it induces the region receiving the subsidy to overcapitalize (i.e., to overinvest in capital, land, and human skills) in producing commodities that it could not produce profitably without the subsidy. Conversely, the region being taxed tends to decapitalize in producing those commodities. If the transportation subsidy cannot be maintained

in perpetuity, then its phasing out will impose unnecessary adjustment costs on both regions.

This problem appears particularly significant for the case of fertilizer and corn. The subsidization of transport costs for fertilizer has been justified in some countries on the grounds that a subsidy is required to induce farmers to experiment with and learn how to use fertilizer efficiently. The validity of this argument for farms in the Sierra and Selva regions has not been evaluated in this report.

The second problem that subsidized transport causes is that the cost of the subsidy, in terms of recurrent expenditures, competes for public funds that could otherwise be allocated to improving main roads, feeder roads, and rail facilities. These latter investments serve to stimulate sustainable long-run growth by making markets more accessible to farmers. Investments in roads and other transport structures which serve to increase the accessibility of markets to farmers are clearly a function of the public sector since the private sector lacks the incentives to make these investments.

A second marketing inefficiency occurs in storage activities. In principle, a closed economy should experience seasonal commodity price variation. The magnitude of the variation should be just sufficient to cover the costs of storage. The costs of storage include the interest payments that could be received if the crop were sold and the revenue invested in its next best income earning alternative, costs due to spoilage, and costs due to the capital invested in and maintenance of the storage facility. Those commodities that are more easily stored, such as grains, should experience smaller seasonal price variability than perishable commodities (e.g., potatoes). Interventions

such as anti-hoarding laws or seasonally constant mandated retail prices serve to discourage the private sector from investing in storage facilities. The public sector is thus required to maintain larger inventories than would be the case if some modest seasonal variability in prices were permitted.

It should be made clear that government intervention to stabilize seasonal prices is generally considered to be appropriate when seasonal prices vary in excess of the amount required to earn a fair return to storage costs, or when it is necessary to prevent low income families from becoming nutritionally deprived. The solution in this latter case, as discussed previously in this report, is to target food policies to the nutritional deprived.

It has been pointed out that the milling of rice and wheat is primarily a function of the private sector, but regulated by the government. Some evidence exists to suggest that efficiency gains can be realized in grain processing also, although further investigation is required to substantiate this possibility. Areas of possible efficiency gains lie in the method of payment to millers and the practice of assigning quotas to mills. It appears that millers are not required to bid for government contracts, and are permitted to operate based on a quota system. The quotas are based on the quantity of grain the mills have processed in the past and mill capacity. This practice encourages mills to build additional capacity. The contracting method also fails to reward the low cost firms by increasing volumes of grain milled in their plants, while decreasing or eliminating entirely the processing of grain in the higher cost plants.

Agricultural markets in particular are "information intensive". For any single commodity, spatial and temporal surpluses and deficits exist, but the judgement of a myriad of producers and consumers are required to discern these imbalances. At the same time, the attainment of financial gain must be permitted in order for the private sector to accept the risks of market arbitrage and storage to correct these imbalances. No public institution has yet been devised which can pool, utilize, and manage such large amounts of information in as an effective way as do markets. This is not, however, to imply that the removal of public enterprises from agricultural markets would lead to a resolution of all of the apparent inefficiencies in Peru's agricultural marketing sector.

We recommend that as public enterprises are phased out of the marketing of agricultural commodities, public investments in market information and infrastructure (e.g., roads and public wholesale facilities) should be increased. Perhaps the first priority should be given to the development of a market information system. In the absence of government announced prices, producers, in particular, need to know the prices paid for commodities in other markets. Because truckers and other middlemen are "closer" to retail market activity than are producers, they have access to more information regarding spatial and temporal imbalances in product supply and demand. Hence, producers are likely to be at a disadvantage when negotiating with intermediaries regarding the terms of sale for their products.

Information should also be made available on production commitments other producers appear to be making. In the case of potatoes, for instance, Peru has had the experience of apparent shortages leading to over-planting

and then a surplus the following period. Providing information to producers on national stocks, regional weather conditions, and regional production commitments will serve to decrease the errors farmers are otherwise likely to make in the produc tion of various crops. In the case of commodities whose prices can be affected by international trade (e.g., feed grains, wheat, export crops) farmers should be given access to up-to-date forecasts of world market conditions and their implications to domestic markets.

Markets tend to function more efficiently according to the extent to which producers have access to them. Unfortunately, financial incentives do not exist for the private sector to invest in roads, rivers, and rail facilities which serve to provide this access. Consequently, it is recommended that investments be expanded in road, rivers, and rail facilities which would yield the highest net social returns and serve to give farmers in the Sierra and Selva better access to markets. Plans must also be developed for meeting the recurrent cost of maintaining these investments.

XIII. SUGGESTIONS FOR FURTHER STUDIES

The policy recommendations emerging from this study fall into four broad categories: (1) increase awareness of the effects of macroeconomic policies on the agricultural and food sector and of the role of the sector and sector-specific policies in a macroeconomic setting; (2) link domestic agricultural producer prices to world price levels; (3) target consumer food subsidies towards the low income segment of the population; and, (4) improve the efficiency of the agricultural and food sector by revising input pricing policies, expanding private sector participation in marketing and storage, and increasing public expenditures for marketing infrastructure, price information systems, research and extension.

Perhaps the most distinguishing feature of this policy perspective is its requirement that Peruvian agriculture be re-integrated into the international economy and that it take advantage of its comparative advantage in that economy. The analytical and research needs that emerge from this new perspective may require the development of new research and analytical capability if the information and knowledge needs of policy makers are to be met.

We will therefore divide our remarks in this section into two parts: (1) institutional needs, and (2) suggestions for additional research.

Institutional Needs

1. The Ministry of Agriculture and the USAID in Lima are proposing the establishment of an Agricultural Policy Analysis Group in the Ministry of Agriculture. Such a policy analysis group is urgently needed. It will strengthen the hand of the Minister of Agriculture as he par-

ticipates in the inter-agency bargaining within the government. Currently, other Ministries have analytical capacity to back them up; the Ministry of Agriculture typically has little or none.

In forming this group it is important that it have people trained in international trade, monetary and macroeconomic policy, and the economics of open economies. The old concept of a closed economy with agricultural policy in the narrow sense reigning supreme is simply not appropriate any more.

2. An international commodity market analysis group is of high priority. Such a group could be located in the Agricultural Policy Analysis Group, or it could be a separate entity. Its mission should be to study international commodity markets of direct interest in Peruvian agriculture. It very likely could benefit from collaboration with the International Economic Division of the USDA's Economic Research Service.

3. To support the above two groups a statistical service group is needed. This group would maintain data banks of interest to both policy analysts and policy makers. It would also generate data on issues that are not commonly recognized in agricultural policy analysis. These include a set of equilibrium exchange rates, tariff structures, identification of trade interventions in both Peru and abroad, and so on.

4. A market information system is badly needed.

Suggestions for Additional Research

1. Knowledge on certain building blocks useful for policy analysis is badly needed. This includes supply response, demand analysis, demand for fertilizer, and the foreign demand for Peru's exports. Such knowledge is needed for the major agricultural commodities and commodity groups.
2. Knowledge on the major commodity sectors of Peruvian agriculture needs to be generated on a continuing basis. These diagnostic studies should indentify the major economic forces affecting the sector, trends in resource use and productivity, and the returns to families.
3. Creative research to design targeted feeding programs should have high priority. Connecting Peruvian agriculture to the international economy through border-price equivalents for domestic prices will have important income distribution consequences. Means need to be found to deal with this problem if the proposed policies are to be viable.
4. Similar creative design and analytical research is needed on marketing arrangements in Peru. If markets are not performing efficiently, diagnostic work is needed to identify the failure of these markets to work as expected. New institutional arrangements then need to be designed.
5. Knowledge on the linkages among macroeconomic policies and commodity markets is badly needed.
6. The reports on effective protection used in this study can only be described as preliminary. Similar studies need to done in more depth, and the range of commodities studied needs to be broadened.

7. A careful evaluation of water and irrigation policies needs to be made. Such research should be focused on institutional design questions as well.

8. Present credit policies need to be evaluated and more creative work done to design new credit arrangements.

9. The domestic dynamics of production need to be better understood. Issues of regional comparative advantage within Peru should receive high priority in ongoing research programs.

10. The design of an improved marketing and distribution sector should receive high priority.

11. More knowledge is needed on nutrient status of low-income families. There is also an important role for designing new institutional arrangements that would enable the nutritional status to be improved.

12. Research is needed to determine appropriate food policy targets and the trade-offs among them.

APPENDIX A

AGRICULTURAL PRODUCTION AND INPUT UTILIZATION

Table A4.1 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Rice, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	140.4	147.1	118.1	117.8	115.8	122.5	133.2	134.4	114.3	131.4	95.9	149.7	143.4
Total production 1/	586.7	591.1	482.3	483.5	494.2	516.8	570.4	594.0	467.8	560.4	420.4	712.1	681.1
Consumption	243.5	276.6	301.1	337.2	317.2	346.5	383.2	379.9	387.0	390.8	447.4	491.1	556.0
Imports	15.4	--	--	--	--	78.2	70.6	--	--	150.4	227.7	136.6	56.7
Exports	--	--	--	53.1	6.5	--	--	--	--	--	--	--	--
Costa (Irrigated)													
Area	84.2	88.4	69.3	73.7	75.6	80.2	87.3	88.2	61.5	69.4			
Production	420.7	428.5	340.2	351.9	364.9	405.7	426.4	459.0	316.3	384.8			
Sierra (Irrigated)													
Area	0.2	0.2	0.1	0.1	0.1	0.1	0.4	0.4	0.4	0.5			
Production	1.1	1.0	1.1	1.4	1.4	11.4	11.6	1.8	2.1	2.3			
Selva (Irrigated)													
Area	18.9	20.1	19.9	18.9	20.2	19.7	22.4	17.4	20.1	21.6			
Production	98.9	94.5	93.0	88.6	94.6	92.7	101.2	76.9	88.7	96.8			
Selva (Rainfed)													
Area	37.0	38.7	28.6	25.0	19.6	22.2	23.2	28.4	32.2	40.0			
Production	66.0	67.1	47.7	42.0	33.3	37.1	39.2	56.2	60.6	76.6			

*Estimated.

1/ Production is reported for unpolished rice and is not equal to consumption plus net trade as in the case for other crops.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.2 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Cotton, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982[a]
Total area	247.8	232.7	224.5	235.5	256.5	226.5	164.5	173.3	198.5	243.9	256.4	285.8	241.0
Total production	141.8	136.3	127.6	134.7	148.2	131.7	98.3	109.9	115.7	134.7	149.0	157.3	134.5
Consumption	76.9	85.5	77.7	87.7	100.6	97.1	62.6	88.7	97.6	114.7	116.8	125.8	
Exports	66.9	50.8	49.9	47.0	47.6	36.6	35.7	21.2	18.1	20.0	32.2	31.5	
Costa (Irrigated)													
Area	141.4	133.3	124.8	132.5	146.1	132.3	96.1	109.2	111.4	131.3			
Production	246.0	230.5	222.1	231.9	254.8	225.4	162.9	172.7	196.7	240.6			
Sierra (Irrigated)													
Area	0.2	0.2	0.1	0.2	0.2	0	0.1	0	0	0			
Production	0.1	0.2	0.1	0.2	0.2	0	0.1	0	0	0			
Selva (Rainfed)													
Area	2.2	2.8	2.6	2.0	2.0	1.3	2.0	0.7	2.3	3.4			
Production	1.6	2.0	2.3	1.5	1.5	1.0	1.5	0.5	1.8	3.2			

[a] Estimated.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.3 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Hard Yellow Corn, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	***	***	***	***	***	***	***	166.6	136.4	157.3	121.5	142.0	147.7
Total production	***	***	***	***	***	***	***	503.3	379.1	408.3	300.9	389.8	395.0
Consumption	--	--	--	--	--	--	--	674.4	528.7	535.8	786.3	748.9	
Imports	1.7	0.4	104.1	223.2	238.2	321.9	278.3	171.1	149.6	127.5	485.4	359.1	
Costa (Irrigated) 1/													
Area	107.1	112.5	110.2	94.6	90.9	107.2	121.0	116.1	76.3	79.4			
Production	318.5	347.8	345.8	314.9	314.2	362.3	417.0	414.1	273.1	272.8			
Costa (Rainfed)													
Area	--	3.2	2.5	--	--	--	0.1	--	--	--			
Production	--	2.8	3.5	--	--	--	0	--	--	--			
Sierra (Irrigated)													
Area	--	--	--	--	--	--	--	3.2	2.5	2.6			
Production	--	--	--	--	--	--	--	5.9	4.7	4.4			
Sierra (Rainfed)													
Area	--	--	--	--	--	--	--	0.8	0.7	0.7			
Production	--	--	--	--	--	--	--	1.0	0.9	0.9			
Selva (Irrigated)													
Area	--	--	--	--	--	--	--	1.0	0.8	0.9			
Production	--	--	--	--	--	--	--	2.1	1.7	1.8			
Selva (Rainfed)													
Area	--	--	--	--	--	--	--	45.7	56.1	73.6			
Production	--	--	--	--	--	--	--	80.3	98.7	128.4			

*** Information not available since before 1977 hard yellow corn statistics were combined with soft white corn (awilaceo).
1/ 95 percent of the total corn produced on the Costa during 1970-75 was hard yellow corn.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.4 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Sugarcane, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	48.4	47.9	48.9	51.0	54.5	55.3	54.9	55.6	53.8	53.9	49.1	41.6	45.0
Total production	7,591.3	8,309.4	8,611.7	8,772.4	9,183.6	8,958.2	8,791.5	8,825.5	7,970.2	7,034.2	5,598.1	5,278.9	6,800.0
Imports 1/	--	--	--	--	--	--	--	--	--	--	--	219.0*	--
Exports 1/	403.2	428.6	480.9	407.0	462.2	421.8	264.0	491.8	265.9	180.8	52.8		92.2
Costa (Irrigated)													
Area	48.2	47.8	48.7	50.9	54.3	55.1	54.8	55.6	53.8	53.9			
Production	7,562.5	8,293.4	8,587.7	8,743.6	9,156.4	8,928.2	8,761.5	8,825.5	7,970.2	7,034.2			
Sierra (Irrigated)													
Area	0.2	0.1	0.2	0.2	0.2	0.2	0.2	--	--	--			
Production	28.8	16.0	24.0	28.8	27.2	30.0	30.0	--	--	--			
Area Development													
Costa (Irrigated)	78.0	83.6	83.6	85.7	89.8	91.5	87.7	93.1	92.9	53.9			
Sierra (Irrigated)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	--	--	--			

*Estimated.

1/ Raw Sugar.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A5.5 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Potatoes, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
Total area	315.2	320.1	270.9	267.7	267.9	250.7	252.6	246.8	247.2	242.0	194.1	199.3	
Total production	1,929.5	1,967.9	1,713.4	1,713.1	1,722.3	1,639.6	1,667.0	1,615.6	1,695.3	1,695.2	1,379.6	1,678.6	
Imports	--	--	10.2	3.0	--	--	--	--	--	--	6.0		
Exports	--	--	--	--	--	2.0	4.7	6.0	--	--	--		
Costa (Irrigated)													
Area	10.2	7.8	6.7	8.2	9.7	11.0	11.3	10.6	10.7	9.4			
Production	161.1	139.0	110.3	135.1	162.6	169.3	156.9	165.0	185.3	161.5			
Sierra (Irrigated)													
Area	36.2	37.6	36.4	36.3	38.0	37.5	37.4	36.7	34.7	31.4			
Production	273.4	282.9	267.2	264.3	271.9	279.6	296.1	290.2	280.6	281.0			
Sierra (Rainfed)													
Area	268.8	274.7	226.4	221.9	218.4	201.2	202.2	198.6	200.8	198.4			
Production	1,492.9	1,545.9	1,328.4	1,305.7	1,275.9	1,184.9	1,203.7	1,154.7	1,223.0	1,247.5			
Selva (Rainfed)													
Area	--	--	1.4	1.3	1.8	1.8	1.8	1.0	1.1	0.9			
Production	--	--	7.5	7.1	10.0	5.8	10.2	5.7	6.3	5.2			

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.6 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Wheat, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	136.2	138.5	134.9	136.1	137.8	133.6	133.9	115.1	103.6	96.2	68.6	102.3	110.9
Total Production	125.4	122.2	120.1	122.6	127.4	126.3	127.5	115.4	104.4	102.1	77.1	128.6	130.9
Consumption	--	687.9	764.7	829.9	736.1	771.1	767.3	771.3	774.2	807.2	886.1	921.4	946.0
Imports	521.8	695.8	853.3	763.4	713.3	820.3	743.7	766.8	720.4	898.7	823.7	941.7	965.0
Exports	--	--	--	--	--	--	--	--	--	--	--	--	--
Costa (Irrigated)													
Area	0.9	2.7	2.1	2.4	2.8	1.6	1.9	1.9	2.1	1.5			
Production	2.0	5.7	4.4	4.7	5.3	3.4	3.8	3.7	5.3	3.1			
Costa (Rainfed)													
Area	0.6	0.6	0.6	--	--	--	--	--	--	--			
Production	0.4	0.5	0.5	--	--	--	--	--	--	--			
Sierra (Irrigated)													
Area	20.1	21.0	17.8	18.0	18.1	19.6	20.0	14.9	13.9	11.7			
Production	21.9	22.4	19.1	19.7	21.4	21.9	22.7	16.9	16.1	14.8			
Sierra (Rainfed)													
Area	114.7	114.2	114.4	115.7	116.9	112.3	112.1	98.4	87.6	83.0			
Production	101.0	93.6	96.2	98.3	100.6	101.0	101.0	94.8	82.9	84.1			

*Estimated.

Source: Oficina Sectorial de Estadística (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.7 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Coffee, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
In Production													
Total area	111.4	121.2	127.7	127.3	126.6	120.6	120.8	134.1	142.2	154.7	142.5	144.4	
Total production	65.4	70.6	70.2	70.4	69.9	65.4	65.4	80.2	88.2	105.5	95.0	95.0	98.0
Consumption	19.8	28.4	16.9	9.6	42.9	23.2	18.5	35.7	37.7	36.0			
Exports	45.6	42.2	53.3	60.8	27.0	42.2	46.9	44.5	53.5	69.5			
Costa (Irrigated)													
Area	2.0	2.0	2.1	2.4	2.4	1.8	1.7	0.4	0.4	0.4			
Production	1.1	1.2	1.3	1.4	1.5	1.0	1.0	0.2	0.2	0.2			
Sierra (Irrigated)													
Area	2.8	2.1	2.5	2.6	2.7	2.9	2.8	2.5	3.5	4.8			
Production	1.3	1.3	1.4	1.5	1.5	1.5	1.5	1.2	1.7	2.4			
Sierra (Rainfed)													
Area	--	0.8	0.8	0.8	0.8	1.0	0.9	0.7	0.6	0.6			
Production	--	0.5	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2			
Selva (Irrigated)													
Area	1.0	0.9	1.0	1.2	1.3	1.3	1.3	5.9	2.1	1.8			
Production	0.6	0.6	0.8	0.7	0.8	0.9	0.8	3.6	1.5	1.3			
Selva (Rainfed)													
Area	107.7	117.2	121.3	120.3	119.1	111.7	111.9	124.7	135.6	147.1			
Production	62.1	67.1	66.6	66.5	65.7	61.9	61.7	75.0	84.6	101.3			
In Development													
Costa (Irrigated)	0	0.1	0.2	0.2	0.2	0	0	0	0	0			
Sierra (Irrigated)	0.1	0.4	0.5	0.3	0.2	0.3	0.3	2.4	1.4	0.1			
Selva (Irrigated)	0.1	0	0.2	0.2	0.3	0.2	0.2	--	--	--			
Selva (Rainfed)	11.8	12.2	8.0	8.2	6.9	7.3	7.0	6.2	5.3	4.7			

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.8 Irrigated and Rainfed Area and Quantity of Production by Regions, Total Consumption and Trade, Beans, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982[a]
Total area	65.8	60.8	58.4	60.4	61.9	61.3	62.6	59.2	55.7	52.0	45.0	49.0	56.1
Total production	51.3	48.1	49.9	51.8	53.1	49.0	49.9	48.9	47.1	47.7	39.1	43.6	49.0
Consumption	45.1	40.9	42.4	44.0	45.1	41.7	42.4	41.6	40.1	40.5	33.4	37.0	41.7
Exports	--	1.5	1.4	2.6	2.4	--	--	--	--	1.2	0.9	1.6	1.6
Costa (Irrigated)													
Area	23.5	18.8	21.7	21.8	21.8	19.7	27.0	20.2	19.0	18.8	--	--	--
Production	24.7	21.7	27.2	26.9	27.3	22.3	21.7	22.6	21.5	20.5	--	--	--
Costa (Rainfed)													
Area	0.3	0.4	0.4	--	--	--	--	--	--	--	--	--	--
Production	0.2	0.3	0.3	--	--	--	--	--	--	--	--	--	--
Sierra (Irrigated)													
Area	3.6	3.0	3.3	3.4	3.4	4.0	3.5	3.3	3.4	4.3			
Production	3.0	3.2	3.4	3.5	3.5	3.6	3.3	3.4	3.3	4.2			
Sierra (Rainfed)													
Area	27.4	23.2	24.7	25.8	25.5	26.2	25.6	25.3	23.5	23.6			
Production	16.8	12.2	13.1	13.4	13.4	14.4	13.9	14.1	14.0	13.3			
Selva (Irrigated)													
Area	0.1	0.04	0.06	0.06	0.08	0.08	0.03	0.06	0.07	0.05			
Production	0.06	0.02	0.04	0.03	0.05	0.05	0.03	0.07	0.06	0.07			
Selva (Rainfed)													
Area	10.0	15.2	8.3	9.4	11.2	11.2	11.5	10.4	9.8	10.3			
Production	8.6	10.7	6.0	8.0	8.8	8.7	9.1	8.8	8.2	9.6			

[a] Estimated.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table 44.9 Total Area, Production, Consumption and Trade, Soybeans, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	0.4	0.7	0.6	0.7	1.4	1.0	2.0	2.0	3.4	4.4	6.3	7.6	5.3
Total production	0.4	0.8	0.6	0.9	1.8	1.5	2.9	3.1	5.0	7.3	10.7	14.0	9.5
Consumption	6.0	6.1	43.0	20.2	17.8	35.9	37.2	29.2	40.0	29.9	10.7		
Imports	5.6	5.3	42.4	19.3	16.0	34.4	34.3	26.1	35.0	22.6	--	--	

*Estimated.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.10 Total Area, Production, Consumption and Trade, Sorghum, Peru, 1970-1982

Area (thousand hectares)
Production, Consumption and Trade (thousand metric tons)

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Total area	3.6	5.7	7.4	8.3	5.9	9.8	14.7	16.8	16.9	15.8	12.0	11.7	11.1
Total production	12.2	17.7	21.5	28.1	21.7	29.4	45.9	55.2	59.0	54.7	35.0	44.3	42.5
Consumption	12.2	17.7	61.9	54.4	94.6	72.1	45.9	107.1	59.0	80.9	35.0		
Imports	--	--	40.4	26.3	72.9	42.7	--	51.9	--	26.2			

*Estimated.

Source: Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru.

Table A4.11 Total Fertilizer Sales and Utilization of Nitrogen, Phosphorous, and Potassium, Peru, 1970-1980

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980 1/
	(thousand metric tons)										
Fertilizer Sales	233.9	291.5	267.5	292.3	263.2	288.6	335.0	370.9	367.3	327.3	314.5
N-P-K Use	81.6	100.8	92.3	99.5	90.6	105.1	129.4	143.8	140.5	124.8	123.8
Nitrogen Use	67.8	86.2	75.5	79.5	70.7	83.8	100.5	109.4	104.4	91.3	87.1
Phosphorous Use	8.2	10.0	10.1	13.9	12.3	11.7	17.1	21.7	22.7	21.0	22.6
Potassium Use	5.6	4.6	6.7	6.1	7.6	9.5	11.8	12.7	13.4	12.5	14.1

1/ Given data are significantly lower than the fertilizer sales data reported in ENCI's Memorias 1976-81.

Source: Boletin Estadistico del Sector Agrario, Oficina Sectorial de Estadistica (OSE). Ministry of Agriculture, Lima, Peru, December, 1981.

Table A4.12 Fertilization Utilization by Farm Size and Region, Peru, 1972[1/]
(Number of farms and percentage of farms within farm size groups)[2/]

	Farm Size (hectares)															
	Less than 1		1 to 5		5 to 20		20 to 100		More than 100		All Sizes	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Country												
Farms using fertilizers	34,440	7	116,807	19	45,511	20	10,512	18	3,205	21	210,495	15
Total number of farms	481,150		600,425		231,840		58,011		15,081		1,389,877	
Costa												
Farms using fertilizers	9,802	15	33,494	49	16,119	58	3,298	66	1,261	85	63,976	38
Total number of farms	67,069		68,582		27,873		4,878		1,483		169,987	
Sierra												
Farms using fertilizers	24,469	6	80,791	17	26,022	17	5,666	18	1,124	15	138,619	13
Total number of farms	401,325		480,884		155,156		32,297		10,965		1,083,066	
Selva												
Farms using fertilizers	189	1	2,522	5	3,390	7	1,548	7	251	10	7,900	6
Total number of farms	12,956		50,959		48,811		22,426		2,633		137,824	

1/ Includes chemical and organic fertilizers.

2/ Reference Period: July 1, 1971 - June 30, 1972.

3/ Total number of farms include enumerated farm units of undeclared size.

Source: Second National Agricultural Census, September, 1972.

Table A4.11 Irrigation Utilization by Farm Size and Region, Peru, 1972
(Number of irrigated farms and percentage of farms with arable crop land which could be irrigated within farm size groups)1/

	Farm Size (hectares)											
	Less than 1		1 to 5		5 to 20		20 to 100		More than 100		All Sizes	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Country												
Irrigated farms	82,285	53	210,879	42	67,557	33	11,765	25	3,261	37	195,747	41
Total number of arable farms	155,656		549,515		205,928		46,966		8,844		966,909	
Costa												
Irrigated farms	14,489	97	51,181	93	21,249	91	3,756	93	1,279	98	91,956	93
Total number of arable farms	14,977		55,110		23,348		4,069		1,303		99,007	
Sierra												
Irrigated farms	67,613	49	176,718	39	42,703	30	6,875	27	1,872	25	295,801	39
Total number of arable farms	137,804		454,636		143,476		25,530		7,494		767,068	
Selva												
Irrigated farms	181	6	2,958	8	3,605	9	1,114	7	110	6	7,990	8
Total number of arable farms	2,875		39,569		39,104		17,367		1,919		100,834	

1/ Reference Period: July 1, 1971 - June 30, 1972.

Source: Second National Agricultural Census, September, 1972.

Table A4.14 Tractor Ownership by Farm Size and Region, Peru, 1972
(Number of tractors and percentage of the country total)[1/]

	Farm Size (hectares)											
	Less than 1		1 to 5		5 to 20		20 to 100		More than 100		All Sizes	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Country	131	2	822	10	1,791	21	2,150	26	3,458	41	8,352[2/]	100
Costa	75	1	483	6	1,283	15	1,636	20	2,855	34	6,332	76
Sierra	50	-	322	4	415	5	319	4	408	5	1,514	18
Selva	6	-	17	-	93	1	195	2	195	2	506	6

1/ Reference Period: July 1, 1971 - June 30, 1972.

2/ The total number that own tractors is 5,265.

Source: Second National Agricultural Census, September, 1972.

Table A4.15 Purchased Seed Utilization for Selected Crops by Farm Size in Peruvian Costa and Sierra Regions, 1972.
(Number of farms and percentage of farms growing the crop within the farm size group)[1/]

	Farm Size (hectares)											
	Less than 1		1 to 5		5 to 20		20 to 100		More than 100		All Sizes	
	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%
Rice purchased seeds												
Costa farms	843	72	4,772	75	2,288	82	527	82	221	83	8,651	78
Sierra farms	46	33	281	33	131	27	93	31	12	28	563	31
Corn purchased seeds												
Costa farms	5,352	85	17,765	65	8,948	69	1,718	83	643	100	34,427	69
Sierra farms	9,081	12	22,877	10	5,853	9	1,164	12	299	17	39,274	10
Wheat purchased seeds												
Costa farms	57	33	493	18	308	17	73	28	32	76	963	19
Sierra farms	2,875	9	10,995	7	3,533	8	774	13	205	21	18,382	8
Potato purchased seeds												
Costa farms	453	100	2,404	84	1,429	83	347	78	121	91	4,770	85
Sierra farms	17,820	22	63,540	23	21,826	25	4,457	27	1,210	29	108,853	23

1/ Reference Period: July 1, 1971 - June 30, 1972.

Source: Second National Agricultural Census, September, 1972.

Table A4.16 Total Value of Loans to the Agricultural Sector by Commercial Banks and the Agrarian Bank of Peru, 1970-1981

Year	Commercial and Savings Banks		Agrarian Bank of Peru 1/		Total
	Value (millions of soles)	Percentage	Value (millions of soles)	Percentage	Value (millions of soles)
1970	1,540	(18)	7,007	(82)	8,547
1971	1,581	(17)	7,586	(83)	9,167
1972	1,769	(17)	8,709	(83)	10,478
1973	1,861	(15)	10,432	(85)	12,293
1974	1,864	(12)	13,364	(88)	15,228
1975	1,950	(11)	16,238	(89)	18,188
1976	2,150	(10)	20,443	(90)	22,593
1977	2,377	(8)	26,189	(92)	28,566
1978	2,419	(6)	35,739	(94)	38,158
1979	3,541	(6)	58,481	(94)	62,022
1980	7,265	(6)	120,500*	(94)	127,765
1981	20,486*	(9)	211,900*	(91)	232,386

1/ Agricultural Development Bank until 1975.

*Estimated.

Source: Estudio Para el Establecimiento del Seguro Agrario en el Perú. Comisión Especial del Seguro Agrario, RSN 003-82-INIPA, January, 1982, p. 4.

Table A4.17 Value of Loans of the Agrarian Bank of Peru by Agricultural Activity, 1970-1981 1/

Year	Agriculture	Livestock	Machinery & Tools	Forestry	Marketing	Agro-Industry	Irrigation	Land Improvement	Total
	(Millions of Soles)								
1970	3,057	299	27	8	965	6	14	6	4,182
1971	1,976	411	32	11	840	9	18	4	5,125
1972	3,843	419	35	12	1,122	6	7	6	5,450
1973	5,178	513	80	7	1,021	1	151	23	6,976
1974	7,289	917	243	11	1,100	9	26	79	9,874
1975	11,180	1,115	360	47	1,567	21	53	147	14,690
1976	16,054	1,705	457	33	3,672	15	30	44	22,010
1977	21,599	2,491	512	52	6,136	12	23	87	30,912
1978	32,658	3,647	1,149	121	5,761	18	90	144	43,588
1979	65,689	7,204	3,071	191	14,170	240	269	643	91,827
1980	118,646	11,662	6,199	847	24,486	360	3,056	1,411	260,494
1981	213,410	26,464	5,940	1,634	20,214	479	1,746	1,512	271,419

1/ From 1970-1977 own resources and from 1978-81 own resources and exterior account.

Source: Agrarian Bank of Peru.

Table A4.18 Percentage Distribuzion of Loans of the Agrarian Bank of Peru by Primary Agricultural Crops, 1970-1982[1/]

Year	Cotton	Rice	Coffee	Sugar	Corn	Potatoes	Wheat	Fruits and Others	Total
1970	28.0	33.9	8.2	3.3	7.3	7.7	0.1	11.5	100.0
1971	31.5	31.3	6.2	8.1	8.4	4.1	0.4	10.0	100.0
1972	31.9	29.1	5.5	7.0	9.4	5.3	0.3	11.5	100.0
1973	34.3	30.3	3.2	7.0	8.3	5.6	0.3	11.0	100.0
1974	33.1	29.2	3.3	8.8	7.8	7.1	0.9	9.8	100.0
1975	22.4	24.8	3.1	4.9	12.2	9.3	0.7	12.6	100.0
1976	23.8	34.9	2.6	2.6	13.0	8.8	0.5	13.8	100.0
1977	23.0	33.3	3.4	3.3	11.6	10.7	0.5	14.2	100.0
1978	31.0	27.2	5.0	2.2	9.5	10.9	0.4	13.8	100.0
1979	33.6	28.5	4.6	4.1	8.0	8.0	0.4	12.8	100.0
1980	34.0	29.1	5.0	2.0	6.1	11.4	0.3	12.1	100.0
1981	23.8	36.0	2.2	5.9	6.6	14.0	0.2	11.3	100.0

1/ Corresponds to the loans for agricultural crop production.

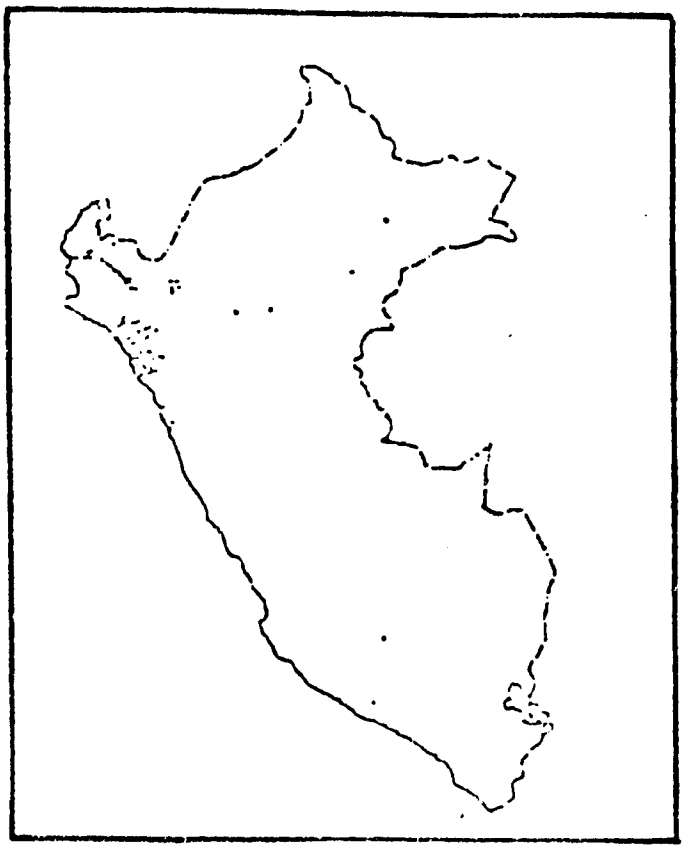
Source: Agrarian Bank of Peru.

Table A4.19 Regional Distribution of Agrarian Bank of Peru Loans, 1970-1981 1/

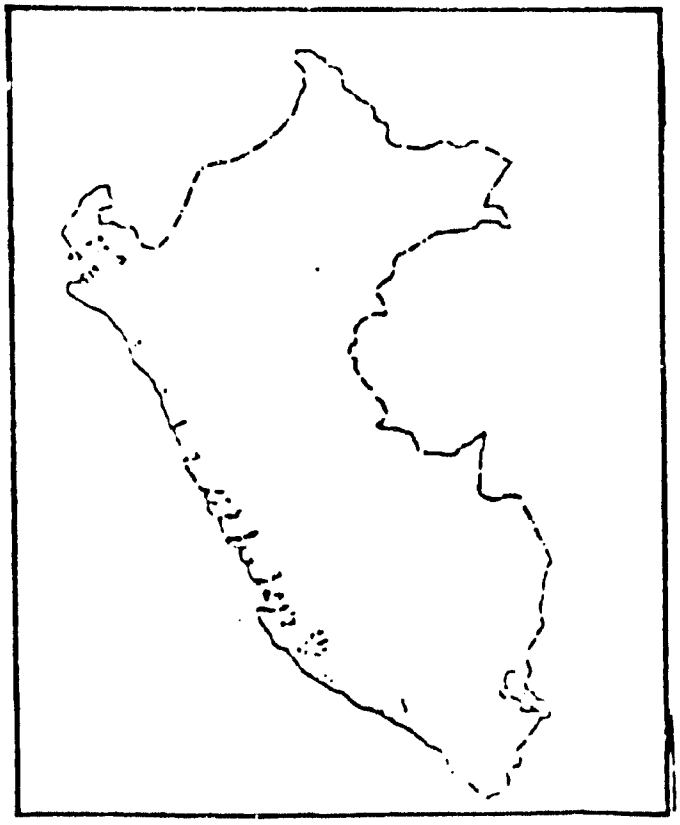
Year	Costa	Sierra	Selva	Total
1970	59	11	30	100
1971	65	8	27	100
1972	60	9	31	100
1973	69	8	23	100
1974	67	14	19	100
1975	68	13	19	100
1976	65	15	20	100
1977	60	14	26	100
1978	63	14	23	100
1979	64	12	24	100
1980	60	14	26	100
1981	64	16	20	100

1/ Corresponds to the loans for agricultural crop production.

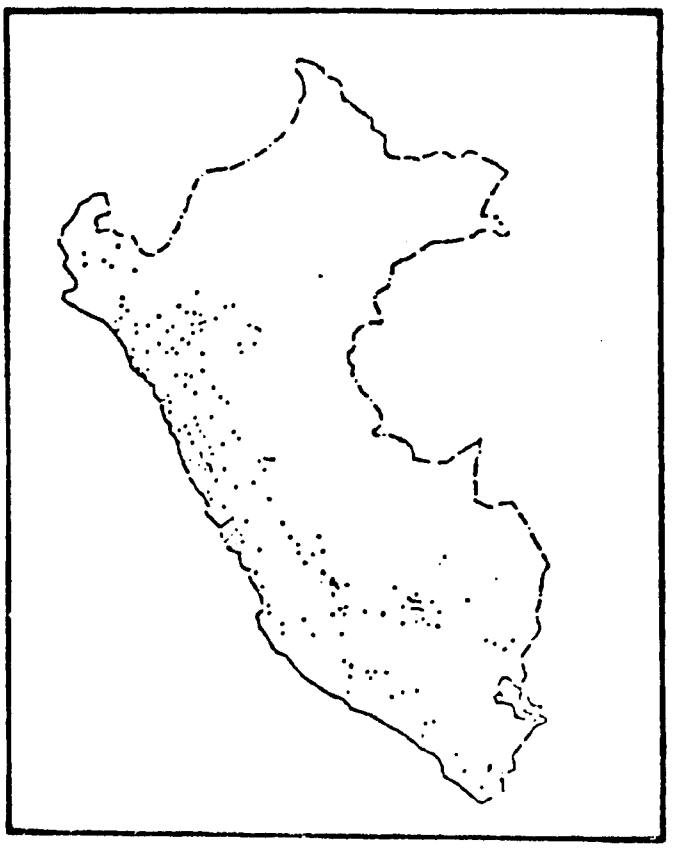
Source: Agrarian Bank of Peru.



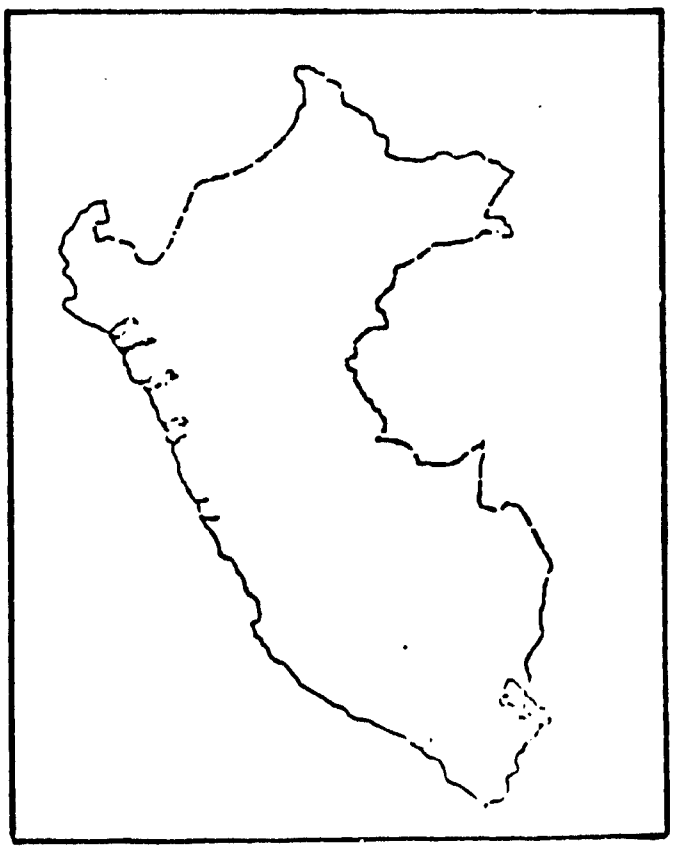
A4.1 Major Rice Producing Areas, Peru, 1977



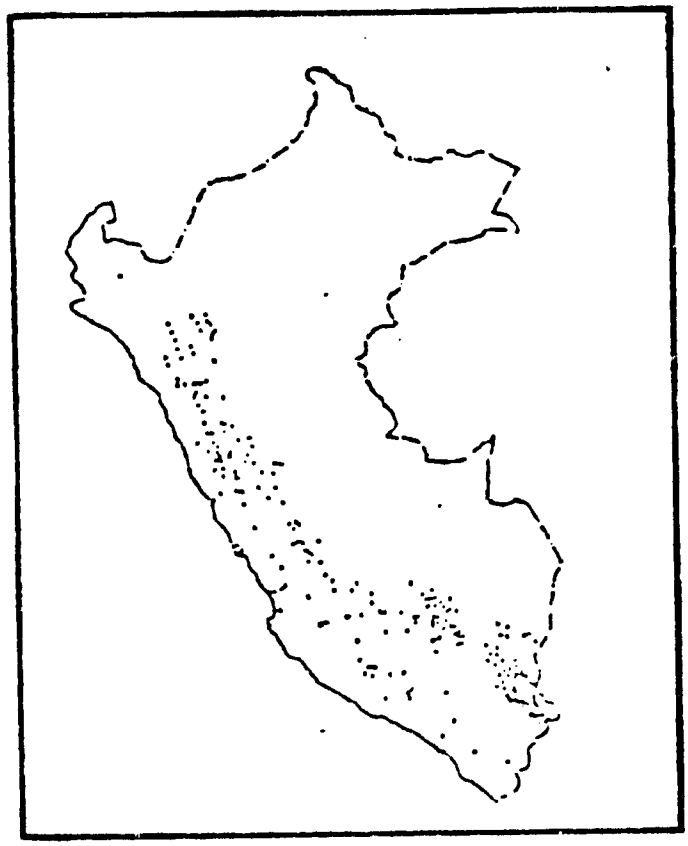
A4.2 Major Cotton Producing Areas, Peru, 1977



A4.3 Major Corn Producing Areas, Hard Yellow and Soft White Corn, Peru. 1977



A4.4 Major Sugarcane Producing Area Peru. 1977



A4.5 Major Potato Producing Area Peru, 1977

Figure A4.6 Network of Principal Roads, Peru, 1981

APPENDIX B

INTERNATIONAL AND DOMESTIC AGRICULTURAL PRICES

Table B6.1 Domestic Producer Prices Compared to Border Prices Based on Prevailing and Estimated Equilibrium Exchange Rates, Nominal Values and Constant 1975 Soles, Wheat, Peru, 1970-1982

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982[a]
INTERNATIONAL PRICES AND TRANSPORTATION (dollars per metric ton)													
World Price, FOB U.S. Gulf Ports[1/]	55	61	70	138	180	149	114	105	131	162	176	176	168
Transportation and Port Charges[2/]	9	4	4	16	19	17	18	19	20	20	26	22	19
Tariffs and Duties	--	--	--	--	--	--	--	--	--	--	--	--	--
Border Prices, C&F Callao, Peru	64	65	74	154	199	164	132	124	151	182	202	198	187
BORDER AND DOMESTIC PRICES (soles per metric ton)													
Border Price, C&F Callao	2,477	2,515	2,864	5,960	7,701	6,773	8,725	10,391	23,601	40,859	58,297	83,714	109,227
Domestic Soft Wheat Price[3/]	4,090	4,270	4,964	5,655	6,619	10,482	10,801	18,306	30,202	47,476	61,800	108,078	136,930
Domestic Hard Wheat Price[4/]	3,200	3,200	3,200	5,300	4,696	5,547	8,349	11,420	22,968	37,054	42,582	77,121	87,663
BORDER AND DOMESTIC PRICES (constant 1975 soles per metric ton)													
Border Price, C&F Callao, Prevailing real exchange rate[5/]	3,387	3,263	4,332	8,613	9,519	6,733	6,536	5,638	8,113[**]	8,526	7,551	6,183	5,668
Border Price, C&F Callao, 1978 real exchange rate[6/]	5,787	5,636	6,209	12,156	15,165	10,821	9,367	7,176	8,123[**]	8,796	8,602	7,619	6,892
Domestic Soft Wheat Price	7,409	7,287	7,823	8,172	8,182	10,482	9,092	9,933	10,382	9,791	8,005	7,982	7,106
Domestic Hard Wheat Price	5,797	5,426	5,061	7,659	5,740	5,547	6,256	6,196	7,895	7,661	5,516	5,695	4,279
RATIOS													
Domestic Soft Wheat Price/ Border Price, prevailing real exchange rate	1.65	1.70	1.71	.95	.96	1.55	1.24	1.76	1.28	1.16	106	1.29	1.28
Domestic Hard Wheat Price/ Border Price, prevailing real exchange rate	1.29	1.27	1.12	.89	.60	.82	.96	1.10	.97	.91	.73	.92	.75
Domestic Soft Wheat Price/ Border Price, 1978 real exchange rate	1.28	1.29	1.26	.67	.68	.97	.86	1.38	1.28	1.11	.91	1.04	1.01
Domestic Hard Wheat Price/ Border Price, 1978 real exchange rate	1.00	.96	.81	.61	.40	.51	.67	.88	.95	.87	.64	.74	.62

[a] Based on January-June

[**] Differs only due to rounding error.

1/ Number 2, Hard Winter, Ordinary Protein: "Selected Prices of International Significance," FATUS, U.S. Department of Agriculture, Washington, D. C.

2/ Vessels in Time Charter. Port charges do not include unloading. Provided by Naviera Humboldt, S.A., Lima, Peru.

3/ Uncontrolled market price of soft wheat. Provided by the Ministry of Agriculture, Lima, Peru.

4/ Controlled price set for payment upon delivery to commercial mills of domestic and imported wheat (see Section V). Provided by the Ministry of Agriculture, Lima, Peru.

5/ Nominal soles per metric ton/CPI-Peru, or equivalently (nominal dollars per metric ton/CPI-US)(Price level adjusted exchange rate).

6/ (Nominal dollars per metric ton/CPI-U.S.)(1978 Price level adjusted exchange rate).

Table B6.2 Domestic Producer Prices Compared to Border Prices Based on Prevailing and Estimated Equilibrium Exchange Rates, Nominal Values and Constant 1975 Soles, Hard Yellow Corn, Peru, 1970-1982

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
INTERNATIONAL PRICES AND TRANSPORTATION (dollars per metric ton)													
World Price, FOB U.S. Gulf Ports[1/]	57	58	56	97	132	122	115	98	105	118	129	135	115
Transportation and Port Charges	9	4	4	16	19	17	18	19	20	20	26	22	19
Tariffs and Duties	--	--	--	--	--	--	--	--	--	--	--	--	--
Border Price, C&F, Peru	66	62	60	113	153	139	133	117	125	138	155	157	134
BORDER AND DOMESTIC PRICES (soles per metric ton)													
Border Price, C&F Callao	2,554	2,399	2,322	4,373	5,921	5,671	7,614	9,804	19,537	10,981	44,733	66,379	78,289
Domestic Producer Price[2/]	3,550	3,600	3,600	4,200	5,360	8,200	10,000	13,010	20,750	13,250	61,670	80,500	128,500
BORDER AND DOMESTIC PRICES (constant 1975 soles per metric ton)													
Border Price, C&F Callao, prevailing real exchange rate[4/]	5,627	5,066	4,674	6,319	7,319	5,671	5,718	5,319	6,716**	6,389	5,796	4,902	4,061
Border Price, C&F Callao, 1978 real exchange rate[5/]	5,968	5,375	5,035	8,920	10,890	9,061	8,196	6,269	6,724**	6,669	6,601	6,057	4,939
Domestic Producer Price	6,331	6,068	5,696	6,069	6,625	8,200	7,565	7,070	7,133	6,858	7,988	6,635	6,668
RATIO													
Domestic Producer Price/ Border Price, prevailing exchange rate	1.19	1.39	1.55	.96	.90	1.44	1.32	1.33	1.06	1.07	1.18	1.21	1.64
Domestic Producer Price/ Border Price, 1978 real exchange rate	1.00	1.13	1.13	.68	.61	.90	.92	1.04	1.06	1.01	1.21	1.06	1.35

Based on Source Data.

Office of Interagency Studies

1/ Number 2, Yellow: "Selected Prices of International Significance", FATUS, U.S. Department of Agriculture, Washington, D.C.

2/ Vessels in flag charter. Port charges do not include unloading. Provided by Nestlera Humboldt S.A., Lima, Peru.

3/ Controlled price set for payment upon delivery to commercial mills (see Section V). Provided by the Ministry of Agriculture, Lima, Peru.

4/ Nominal soles per metric ton/CPI-Peru, or equivalently: nominal dollars per metric ton/CPI/U.S.)(Price level adjusted exchange rate).

5/ (Nominal dollars per metric ton/CPI-U.S.)(1978 Price level adjusted exchange rate).

Table B6.3 Domestic Producer and Retail Prices Compared to Border Prices Based on Prevailing and Estimated Equilibrium Exchange Rates, Nominal Values and Constant 1975 Soles, Rice, Peru, 1970-1982

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
INTERNATIONAL PRICES AND TRANSPORTATION (dollars per metric ton)													
World Price, FOB Bangkok, Thailand 1/	143	129	116	114	561	161	254	271	369	314	434	483	316
Transportation and Port Charges 2/	27	12	12	68	57	51	54	57	60	60	78	66	57
Tariffs and Duties	--	--	--	--	--	--	--	--	--	--	--	--	--
Border Price, C&F Callao, Peru	170	141	160	182	598	412	308	328	429	394	512	549	373
BORDER AND DOMESTIC PRICES (soles per metric ton)													
Border Price, C&F Callao	6,579	5,457	6,192	14,009	23,143	16,809	12,679	27,486	67,053	88,453	157,763	232,117	217,869
Domestic Producer Price 3/	7,500	7,500	7,500	7,500	9,000	11,500	16,275	20,670	32,175	67,935	117,000	182,505	264,250
Domestic Consumer Price 4/	8,800	8,800	8,800	8,800	10,600	13,000	18,120	25,350	36,520	67,670	94,180	143,330	200,000
BORDER AND DOMESTIC PRICES (constant 1975 soles per metric ton)													
Border Price, C&F Callao, prevailing real exchange rate 5/	11,918	9,269	9,797	20,256	28,607	16,809	13,261	14,914	23,050**	18,243	19,140	37,143	11,306
Border Price, C&F Callao, 1978 real exchange rate 6/	15,373	12,225	13,426	28,579	42,565	26,862	18,981	18,976	23,078**	19,043	21,804	21,180	13,748
Domestic Producer Price	13,587	12,712	11,866	10,838	11,125	13,500	12,190	11,215	11,061	14,010	15,156	13,479	13,713
Domestic Consumer Price	15,962	14,915	13,974	12,717	13,103	13,300	13,573	13,755	12,554	13,955	12,225	10,586	10,379
RATIOS													
Domestic Producer Price/Border Price, prevailing real exchange rate	1.14	1.37	1.21	.53	.39	.80	.92	.75	.48	.77	.79	.79	1.21
Domestic Consumer Price/Border Price, prevailing real exchange rate	1.34	1.61	1.42	.63	.46	.79	1.02	.92	.54	.76	.64	.62	.92
Domestic Producer Price/Border Price, 1978 real exchange rate	.88	1.04	.88	.39	.26	.50	.64	.59	.48	.73	.69	.63	1.00
Domestic Consumer Price Border Price, 1978 real exchange rate	1.04	1.22	1.04	.44	.31	.49	.71	.72	.54	.73	.58	.50	.75

*Based on January-June.

**Differ only due to rounding error.

1/ Thailand Rice, White, 5-percent Broken (1970-1980): "Selected Prices of International Significance," FATUS, U.S. Department of Agriculture, Washington, D. C. Thailand Rice (1981-82) "International Commodity Price Bulletin," Organization of American States, Washington, D.C.

2/ Estimated from related shipping rates. Port charges do not include unloading.

3/ Polished rice equivalent (1.5 times official controlled price set for payment upon delivery to commercial mills, see Section V). Provided by the Ministry of Agriculture, Lima, Peru.

4/ Controlled retail price set for ordinary grade polished rice (see Section V). Provided by Ministry of Agriculture, Lima, Peru.

5/ Nominal soles per metric ton/CPI-Peru, or equivalently (nominal dollars per metric ton/CPI-U.S.)(Price level adjusted exchange rate).

6/ (Nominal dollars per metric ton/CPI-U.S.)(1978 Price level adjusted exchange rate).

Table 86.4 Domestic Producer and Mill Prices Compared to Border Prices Based on Prevailing and Estimated Equilibrium Exchange Rates, Nominal Values and Constant 1975 Soles, Tanguis Cotton, Peru, 1972-1981

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
BORDER PRICE (dollars per metric ton)												
Border Price, FOB Callao, Peru[1/]	765	880	940	1,351	2,021	1,259	1,712	1,913	1,737	1,946	1,877	1,813
BORDER AND DOMESTIC PRICES (soles per metric ton)												
Border Price, FOB Callao	29,605	34,056	36,378	52,284	78,273	51,367	98,320	160,328	271,493	436,877	541,702	776,536
Domestic Producer Price[2/]	9,706	11,595	29,262	17,922	38,000	19,744	22,215	32,648	51,757	93,342		
Domestic Wholesale Price[3/]	23,001	27,001	30,001	42,002	52,002	54,719	67,003	91,830	157,571	329,187	518,934	679,549
BORDER AND DOMESTIC PRICES (constant 1975 soles per metric ton)												
Border Price, FOB Callao Prevailing real exchange rate[4/]	53,632	57,722	57,560	75,555	96,753	51,367	73,648	86,993	93,329*	90,095	90,169	57,351
Border Price, FOB Callao 1978 real exchange rate[5/]	69,179	76,298	78,878	105,541	143,853	82,087	105,503	110,672	93,442*	94,054	79,935	69,945
Domestic Producer Price	17,581	19,652	38,389	25,899	46,971	19,774	16,540	17,715	17,795	19,250		
Domestic Mill Price	43,480	45,766	47,470	60,696	64,279	54,719	50,189	49,825	54,167	77,888	67,219	50,188
RATIOS												
Domestic Mill Price/Border Price, prevailing real exchange rate	.81	.79	.82	.80	.66	1.06	.69	.57	.58	.75	.96	.89
Domestic Mill Price/Border Price, 1978 real exchange rate	.63	.60	.60	.57	.45	.67	.47	.45	.58	.72	.83	.72

*Differs only due to rounding error.

1/ Average FOB price received by ENCI for export sales of Tanguis cotton fiber. Provided by the Ministry of Agriculture, Lima, Peru.

2/ Base price for Tanguis seed and fiber set for payment upon delivery to commercial ginning mills. Does not include final payment based on net earnings from all sales (see Section 3). Provided by the Ministry of Agriculture, Lima, Peru.

3/ Price of Tanguis cotton fiber set for sales to domestic textile mills. Provided by the Ministry of Agriculture, Lima, Peru.

4/ Nominal soles per metric ton/(PI-Peru, or equivalent (nominal dollars per metric ton/(PI-US)(Price level adjusted exchange rate).

5/ (Nominal dollars per metric ton/(PI-U.S.)(1978 Price level adjusted exchange rate).

Table B6.5 Domestic Industrial Raw Sugar Prices Compared to Border Prices Based on Prevailing and Estimated Equilibrium Exchange Rates, Nominal Values and Constant 1975 Soles, Peru, 1972-1981

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
INTERNATIONAL PRICES AND TRANSPORTATION (dollars per metric ton)										
U.S. Market Support Price[1/]	200	226	649	494	290	246	275	364	662	447
Transportation and Port Charges[2/]	8	32	38	34	36	38	40	40	52	44
Tariff and Duties	--	--	--	--	--	--	--	--	--	--
Border Price, Callao, Peru	192	194	611	460	254	208	235	324	610	401
BORDER AND DOMESTIC PRICES (soles per metric ton)										
Border Price, Callao	7,430	7,508	21,646	18,768	14,579	17,430	35,630	72,730	176,046	170,388
Domestic Industrial Price[3/]	5,000	5,000	5,000	5,000	15,150	18,280	33,270	57,560	150,000	320,000
BORDER AND DOMESTIC PRICES (constant 1975 soles per metric ton)										
Border Price, Callao, prevailing real exchange rate[4/]	11,755	10,843	29,229	18,768	10,920	9,457	12,626*	15,000	22,804	12,584
Border Price, Callao, 1978 real exchange rate[5/]	16,111	15,311	43,490	29,992	15,653	12,033	12,641*	15,660	25,978	15,547
RATIO										
Domestic Industrial Price/Border Price, prevailing real exchange rate	.67	.66	.21	.27	1.04	1.05	.90	.79	.85	1.88
Domestic Industrial Price/Border Price, 1978 real exchange rate	.49	.47	.14	.17	.72	.85	.90	.77	.75	1.52

*Differ only due to rounding error.

1/ Sugar, U.S. Market: "International Commodity Price Bulletin," Organization of American States, Washington, D. C.

2/ Estimated from related shipping rates. Port charges do not include unloading.

3/ Controlled price set for raw sugar for domestic industrial use (see Section V). Provided by the Ministry of Agriculture, Lima, Peru.

4/ Nominal soles per metric ton/CPI-Peru, or equivalently (Nominal dollars per metric ton/CPI-U.S.)(Price level adjusted exchange rate).

5/ Nominal dollars per metric ton/CPI-U.S.)(1978 Price level adjusted exchange rate).

Table B6.6 Domestic Producer and Retail Prices, Nominal Values and Constant 1975 Soles, Potatoes, Peru, 1970-1982

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
						NOMINAL PRICES (soles per metric ton)							
Domestic Producer Price[1/]	2,254	2,160	2,815	3,422	4,546	5,899	6,411	10,774	16,751	33,850	62,030	66,690	64,628
Domestic Consumer Price[2/]	4,060	3,959	5,110	6,150	5,470	9,710	9,390	18,580	18,610	39,880	89,200	110,410	116,553
						DEFLATED PRICES (constant 1976 soles per metric ton)							
Domestic Producer Price	4,083	3,661	4,450	4,940	5,620	5,899	4,800	5,850	5,760	6,980	8,030	4,930	3,354
Domestic Consumer Price	7,355	6,712	8,080	8,890	6,760	9,710	7,033	10,080	6,400	8,200	11,550	8,150	6,048
						RATIO							
Domestic Producer Price/ Domestic Consumer Price	.56	.54	.55	.56	.83	.61	.68	.58	.90	.85	.56	.55	

*Based on January-June.

1/ Average farm price provided by Oficina Sectorial de Estadistica (OSE), Ministry of Agriculture, Lima, Peru.
2/ Average retail price in Lima metropolitan area. Provided by the Ministry of Agriculture, Lima, Peru.

Table B6.7 Nominal Exchange Rate, Consumer Price Indices for the United States and Peru, and the Price Level Adjusted Exchange Rate (Soles/Dollars), 1970-1982

Year	Nominal Exchange Rate (Soles/$)	CPI Peru	CPI United States	Price Level Adjusted Exchange Rate (Soles/$)
	period average			
1970	38.7	55.2	72.1	50.5
1971	38.7	59.0	75.2	49.3
1972	38.7	63.2	77.7	47.6
1973	38.7	69.2	82.6	46.2
1974	38.7	80.9	91.6	43.8
1975	40.8	100.0	100.0	40.8
1976	57.4	133.5	105.8	45.5
1977	83.8	184.3	112.7	51.2
1978	156.3	290.9	121.2	65.2
1979	224.5	484.9	134.9	62.4
1980	288.6	772.0	153.1	57.1
1981	422.8	1,354.0	169.0	52.8
1982 1/	584.1	1,927.0	176.9	53.4
January	518.6	1,718.0	175.2	52.9
February	539.5	1,784.0	175.8	52.9
March	562.7	1,898.9	175.6	51.8
April	595.4	1,981.4	176.4	53.0
May	628.0	2,043.4	178.1	54.6
June	660.1	2,136.0	180.3	55.4

1/ Based on January-June.

Source: International Financial Statistics, International Monetary Fund.

APPENDIX C

THE MACROECONOMIC SETTING

This appendix is divided into two parts. The first part reviews some basic economic indicators and the macroeconomic performance of the last decade. The second part is a discussion of sectoral growth and trade.

Basic Indicators and Macroeconomic Performance

The basic economic indicators reported in Table C3.1 show that growth in real GDP fell from 7.1 percent in 1970 to 3.1 percent in 1976. For the two years 1977 and 1978, real growth in GDP was negative, declining by -1.2 and -1.8 percent, respectively. Associated with the decline in GDP were high levels of deficit financing in the domestic economy. The deficit, as a percent of GDP, increased from 1.4 percent of GDP in 1970 to 7.5 percent in 1977.[1] Increases in the rate of inflation accompanied growth in the deficit. Inflation increased from 4.2 percent in 1972 to 73.7 percent in 1978. Meanwhile, the nominal value of the sol relative to the U.S. dollar remained essentially unchanged from 1970 to 1975 and, in real terms,[2] became increasingly overvalued relative to the U.S. dollar.

During the early and mid-1970's the increase in the real value of the sol and expansionary fiscal policies contributed to an increasing deficit

---

[1] The data on government finance in the table refer only to that for the Central Government. They exclude public enterprises. The significance of this can be seen by noting that if the losses of the public enterprises are included, the total deficit as a share of GDP is estimated to be approximately 8 percent in 1981, whereas consideration of the deficit for the Central Government alone reduces it to 4.9 percent of GDP.

[2] The real value of the sol in terms of the U.S. dollar is obtained by adjusting both the sol and the dollar for the respective rates of inflation in the two countries.

Table C3.1. Basic Economic Indicators, Peru, 1970-1982

Indicator	Year												
	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982*
Rate of:													
Growth in Real GDP (%)	7.31	5.12	5.85	6.18	6.86	3.33	3.06	-1.20	-1.78	3.76	3.00	3.87	2.0
Increase in Consumer Prices**			4.2	13.8	19.1	24.0	44.7	32.4	73.7	66.7	60.8	72.7	70.0
Unemployment (%)***	4.7	4.4	4.2	4.2	4.0	4.9	5.2	5.8	6.5	7.1	7.0	6.8	6.8
Underemployment (%)***	45.9	44.4	44.2	41.3	41.8	42.4	44.3	48.2	52.0	51.4	51.2	47.9	46.0
Ratio of:													
Government Finance													
(at this sales, - = deficit)	-3.3	-8.1	-10.8	-14.1	-14.1	-30.6	-48.4	-79.1	-85.0	-18.4	-140.9	-416.1	
As a percent of GDP	1.4	3.1	3.7	3.9	3.1	5.5	6.3	7.5	5.1	0.6	2.8	4.9	6.0
Balance of Payments													
(billion U.S. dollars)													
Trade and Service Account													
(- = deficit)	202	-35	-31	-267	-725	-1541	-1194	-922	-192	785	63	-1619	-1771
Net Reserve Capital													
(- = outflow)	-15	124	61	357	1139	1042	882	982	195	281	545	985	1321
Total Change in Reserves													
(- = increase)	-187	-89	-30	-95	-413	499	312	-60	-4	-1066	-608	634	448
Exchange Rate, Period Average													
(nominal soles/US$)	38.7	38.7	38.7	38.7	38.7	40.8	57.4	83.8	156.3	224.5	288.6	422.8	660.1
Price Level Adjusted Exchange Rate (nominal soles/US $ x USCPI/PCPI), Base 1975 = 100	50.54	49.30	47.56	46.21	43.81	40.30	43.50	51.20	65.18	62.41	57.14	52.85	55.4

* Estimated.

** Memoria, 1981, Central Reserve Bank of Peru, Lima, Peru.

*** Ministry of Labor, Lima, Peru.

Source: International Financial Statistics, International Monetary Fund, and calculation of the authors (last row of table).

on the country's trade and service account. Deficits on current account increased from 35 million dollars in 1971 to 1,541 million dollars in 1975. The current account deficit was financed to a large extent by compensating nonreserve capital inflows. In 1975 these nonreserve capital inflows were 1,042 million dollars and government reserves holdings of foreign currencies fell by 499 million dollars.

Deterioration in the country's financial accounts induced the government to embark on a stabilization-cum-economic-recovery program with the support of the IMF and the World Bank. The recovery program aimed at strengthening finances, stimulating exports, stemming the loss of currency reserves, and promoting a more efficient use of private and public resources. A major component of the program was the devaluation of the sol in 1976, followed by successive devaluations through 1978 in real terms. While deficits on current account persisted between 1976 and 1978, they declined from a deficit of 1,194 million dollars to a deficit of only 192 million dollars. The current account showed a positive balance in 1979 and 1980. Total reserve holdings also increased for the years 1977 to 1980. However, the austerity measures forced the country into recession in 1977 and 1978. The rate of inflation also remained high, ranging from 73.7 percent in 1978 to 60.8 percent in 1980.

The change in government in 1980 led to policy changes to decrease the level of public intervention and to increase the role of the private sector in economic activity. These changes have come at a time of worldwide recession and shrinking markets for Peru's major exports. The resurgence of large government financial deficits of 4.9 percent of GDP in 1981 and a projected

6 percent in 1982 reflects revenues foregone from declining export earnings. The decline in export earnings from agriculture averaged about 28 percent in 1981 and 1982 compared to 1980, while the decline in export earnings from minerals averaged about 15 percent during the same period. The increase in the financial deficit since 1980 also reflects the postponement of upward adjustment in consumer prices for major foodstuffs and the persistence of other government subsidies which have required foreign borrowing, and aggressive borrowing for capital investment.

Excess demand has also resulted in trade deficits on current account of magnitudes exceeding the deficits of 1975. Again, despite heavy borrowing this has resulted in record declines in official reserves of 634 million dollars in 1981 and an estimated 448 million dollars in 1982. The real value of the currency increased from 1978 through 1981 relative to the U.S. dollar. Since February 1982, however, the Central Bank has pursued a policy of depreciating the sole at a faster rate than the inflation differential between Peru and the United States. Consequently, the sol has depreciated in real terms since February despite very high levels of inflation.

Sectoral Growth and Trade

Sectoral growth of the economy is reported in Table C3.2 for the years 1972-81. Agriculture has declined as a portion of Peru's GDP from about 14 percent in 1972 to about 12.6 percent in 1981. These estimates are probably biased downwards because, as is noted elsewhere in this report, Peru's price policies appear to discriminate against the agricultural sector, lowering the price of agricultural products relative to prices in other sectors of the economy. The growth in the agricultural sector has averaged less than 2

Table C3.2. Gross Domestic Product by Sectors, Constant 1970 Soles, Peru, 1972-1981

	1972	1973	1974	1975	1976*	1977*	1978*	1979*	1980*	1981*
	millions of 1979 soles									
Agriculture	37,633	38,536	39,422	39,816	41,130	41,130	39,896	41,125	38,918	43,900
Percent Change		2.4	2.3	1.0	3.0	0	-3.0	3.1	-5.4	12.1
Fishing	2,960	2,276	3,093	2,621	3,145	2,972	3,867	4,231	4,017	3,613
Percent Change		-23.0	35.9	-15.2	20.0	-5.6	30.1	9.6	-5.1	-10.0
Mining	20,398	20,276	21,026	18,734	20,401	25,952	29,071	32,948	32,025	30,616
Percent Change		-.6	3.7	-11.0	15.0	27.2	15.1	10.3	-2.1	-4.3
Manufacturing	66,662	71,595	76,905	80,582	83,966	78,508	75,682	78,636	82,802	84,326
Percent Change		7.4	7.5	4.7	4.1	-6.5	-3.6	3.4	5.3	1.9
Construction	12,413	13,055	15,927	18,603	18,082	16,690	14,001	14,521	17,257	18,886
Percent Change		5.0	22.0	16.9	-2.9	-7.7	-16.0	3.7	18.9	9.4
Government	22,071	22,557	23,076	24,114	24,596	25,285	25,159	25,033	25,420	26,015
Percent Change		2.2	2.3	4.4	2.0	2.8	-.5	-.1	1.6	2.3
Other	105,625	116,089	124,370	129,557	132,219	129,192	125,505	129,142	135,174	141,294
Percent Change		10.0	7.1	4.1	2.0	-2.3	-2.9	1.0	4.5	4.6
Total	267,782	284,384	303,879	314,029	323,559	319,729	313,983	325,838	335,613	348,650
Percent Change		6.1	6.9	3.3	3.0	-1.1	-.08	3.8	3.0	3.9

*Preliminary.

Source: Memoria, 1981, Central Reserve Bank of Peru, Lima, Peru.

percent per year since 1972, far below the estimated population growth rate of 2.7 percent. The drought in the late 1970's and in 1980 contributed to years of zero and negative rates of growth. If the preliminary estimates reported for 1981 are correct, however, the agricultural sector would appear to have recovered from the drought, with output increasing by 12.1 percent.

The mineral sector has ranged from about 6 percent to 10 percent of GDP since 1972. The mineral sector has experienced the highest rate of growth relative to other sectors. The major contributors to growth in this sector were copper and petroleum, both of which increased in volume and prices during 1976-79. Growing world demand for these products eased the impact of the austerity measures imposed during this period. However, the value of exports from this sector has declined during 1980-81 along with declining world demand for mineral and petroleum products.

The manufacturing sector accounts for the largest single component of GDP, averaging about 25 percent of GDP since 1972.[1] This sector expanded at an annual rate greater than 7 percent in the early part of the 1970's, but except for 1980, growth was significantly lower in the latter part of the 1970's and into the beginning of the 1980's.

The growth of the government sector has exceeded 2 percent per year with the exception of the three year period 1978-80. The share this sector makes up of total GDP declined slightly from around 8 percent in 1972-73 to approximately 7.5 percent in 1980-81.

---

[1] This estimate is biased upward for the same reason that the share accounted for by agriculture is biased downward. The protection of the manufacturing sector causes the price of output to be higher than it otherwise would be.

Data on the value and volume of mineral exports are reported in Tables C3.3 and C3.4 for the years 1972-82. Copper exports comprised the major component of mineral exports through 1978. From 1978 to 1981, the value of copper exports increased by about 29 percent while the value of petroleum exports increased by about 284 percent. From 1972-80, the growth in mineral exports averaged about 20 percent per year. However, in 1981-82 the volume of exports generally increased while the value of these exports actually declined. Hence, the decline in the value of mineral exports in 1981-82, and corresponding loss in foreign exchange earnings, refects declining world prices.

The value of agricultural exports accounted for roughly 20 percent of total export value from 1972 to 1977, but has since fallen to 5.3 percent in 1981, as shown in Table C3.3. The major agricultural exports during the last decade, in order of importance, are coffee, sugar, cotton, and wool.

Historical trends in exports of these commodities are presented in Table C3.5. The value of agricultural exports for the most part increased from 1970 through 1976. This corresponds to the period when the country was experiencing increasing rates of inflation, and an increase in the real value of the sol offset by expanding world markets. Accompanying the devaluation of the sol in 1976, the value of total agricultural exports increased by over 20 percent in 1977. Since 1977, however, the total value of agricultural exports has fluctuated from a high of 361.6 million dollars in 1979 to a low of 170 million dollars in 1981. These more recent fluctuations reflect the effects of drought and declining world market prices for coffee and sugar.

Table C3.3. Distribution of Export Value by Sectors, Peru, 1972-81

	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981
	percent									
Mining	44.5	55.4	48.2	42.4	50.8	52.2	47.0	41.8	45.0	43.4
Petroleum and Petroleum Products	0.7	1.4	1.9	3.4	3.9	3.0	9.2	18.5	20.3	21.5
Agriculture	19.3	18.4	21.6	29.1	19.4	18.5	13.3	9.4	5.8	5.3
Fishing	27.3	12.4	16.1	15.0	13.1	10.4	10.0	8.0	4.9	4.4
Other Traditional Products	2.3	1.8	1.7	2.3	2.4	1.6	2.8	3.0	2.7	3.9
Non-Traditional Products 1/	5.9	10.6	10.5	7.8	10.4	14.3	17.7	19.3	21.3	21.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Including textiles, frozen and canned fish, fishing vessels and other non-traditional exports.

Source: Memoria, 1981, Central Reserve Bank of Peru, Lima, Peru.

Table C3.4. Principal Exports of Minerals and Petroleum, Peru, 1970-1982

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982[a]
	Value: Millions of Nominal U.S. Dollars Volume: As Indicated												
Copper:													
Value:	246.7	175.2	188.1	325	301.1	155.7	227.0	392.4	408.6	667.5	712.6	529	467
Volume: (000's tons)	111.1	195.1	208.7	194	183.6	151.9	181.9	331.3	343.9	337.1	350.5	325	331.6
Iron													
Value:	77.1	60.6	67.5	66.1	75	51.9	63.5	90.5	73.8	84.9	94.8	91	119
Volume: (000's tons)	9,891	8,868	8,789	8,908	9,731	4,975	4,470	6,122	4,778	5,749	5,730	5,269	6,198
Silver, Refined													
Value:			11	38	60	82	90	116	118	234	312	312	191
Volume: (000's troy ounces)			20,030	15,223	13,641	18,192	20,818	25,110	22,534	24,807	15,905	28,075	27,141
Lead													
Value:			58	80	121	94	112	132	175	294	383	192	168
Volume: (000's tons)			168	179	149	128	180	172	177	164	154	139	152
Zinc													
Value:	48.7	48.0	70	98	150	151	192	164	133	171	210	272	265
Volume: (000's tons)	314	344	402	407	422	406	412	434	437	418	438	499	484
Petroleum													
Value:	6.8	5.6	7	15	28	44	53	52	180	646	792	692	888
Volume: (million bbs.)	2,417	1,432	1,816	2,609	2,198	4,067	4,742	4,104	13,775	23,570	22,427	19,915	25,517
Other:	65	25	65	25	72	68	34	28	55	129	105	124	130
Total			486.6	647.1	809.1	646.6	771.5	974.5	1,141.4	2,226.4	2,609.4	2,214	2,230
Percent Change				33.0	25.0	-20.1	19.1	26.1	17.1	94.7	17.2	-15.2	0.7

[a] Estimated by Central Reserve Bank of Peru.

Source: Memoria, 1981, Central Reserve Bank of Peru, Lima, Peru.

Data on the volume and nominal value of Peru's imports of grains, livestock products, and agricultural inputs appear in Table C3.6 and Table C3.7. For years 1970-80, the imports of grains ranged from 52 percent of the total value of agricultural imports in 1970 to a high of 87 percent in 1980. Within the grains category, wheat accounts for the largest component of the total value of agricultural imports. Wheat imports ranged from 41 percent of the total value of agricultural imports in 1970 to over 52 percent in 1979.

The rate of increase in wheat imports also exceeded the increase of other major commodities imported. The growth in the value of wheat imports averaged over 35 percent per year from 1970-1975 followed by three years of decline. The decline in wheat imports corresponded to the period 1977-79, when austerity measures were undertaken and when the sol was devalued. Since 1978 wheat imports have risen at a rate of 8.5 percent per year.

Peru has for the most part been self-sufficient in rice. Modest imports of rice occurred in 1975 and 1976. However, in 1979 and 1980 rice imports accounted for 18.4 and 20.3 percent of the value of total agricultural imports, respectively. Hence, rice and wheat together accounted for 70 and 56 percent of the total value of agricultural imports for the years 1979 and 1980. In other parts of this paper, it is pointed out that consumer prices for these major food grains have declined in real terms. The increased imports of these grains therefore reflect in part the demand creation caused by Peru's consumer price policies.

Imports of livestock products, with the exception of milk, have tended to decline during the last decade. The most notable decline has come in the importation of beef. Conversely, growth in domestic beef and poultry produc-

Table C3.6. Volume of Principal Imports of Agricultural Commodities and Inputs, Peru 1970-1980

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
						metric tons					
Crops											
Rice	15,410	--	--	--	--	78,178	70,622	--	--	150,423	227,701
Wheat	521,759	695,758	853,300	763,400	711,342	820,267	743,735	766,800	720,416	898,665	821,747
Corn	1,717	425	104,059	231,190	238,210	321,935	278,281	171,097	149,556	127,511	485,194
Sorghum	--	--	40,416	26,250	22,987	42,681	--	51,858	--	26,242	--
Soybeans	5,550	5,110	42,445	19,286	16,000	34,407	34,302	26,156	15,000	22,575	--
Barley	14,124	11,880	26,106	19,031	19,391	33,085	31,676	17,435	22,186	33,918	15,951
Oats	--	--	225	1,858	10,521	5,099	2,555	14,147	--	3,802	11,710
Soybean Oil	21,275	6,044	28,439	56,361	65,144	57,263	74,692	60,301	81,985	20,707	39,711
Malt	1,191	11,661	20,401	20,080	20,241	40,310	33,852	21,839	11,357	74	21,917
Livestock											
Sheep meat	7,766	8,805	5,430	1,584	7,184	1,974	1,470	2,004	214	--	1,666
Beef	18,299	22,898	17,992	11,910	5,661	4,781	3,344	4,678	1,126	--	1,615
Powdered skim milk	14,900	21,176	25,644	28,082	23,166	29,677	25,135	24,141	15,902	16,427	25,840
Dried milk fats	5,130	2,149	921	8,459	11,541	11,600	11,812	11,627	7,751	4,258	9,255
Infant formula	791	651	1,416	--	--	--	--	--	--	--	--
Inputs											
Urea	81,784	105,792	92,455	90,104	111,118	20,806	20,956	50,020	34,630	7,500	441
Ammonia Nitrate	1,079	11,954	14,126	18,133	30,197	22,000	11,854	24,660	21,764	34,668	21,885
Ammonium Sulfate	27,771	40,496	19,365	65,440	79,750	8,000	30,250	34,087	29,637	30,653	26,460
Herbicides	277	211	391	919	886	1,988	620	999	598	717	860
Natural Rubber	3,991	4,511	4,827	4,462	4,682	7,265	5,147	7,407	6,971	6,841	7,000

1/ Includes regrigerated and frozen meat and fresh meat for consumption.

Source: Statistical Bulletin of the Agricultural Sector, Oficina de Estadistica Agropecuaria (OSE), December 1981.

Table C3.7. Value of Principal Imports of Agricultural Commodities and Inputs, Nominal U.S. Dollars, Peru, 1970-1980

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
	million U.S. dollars, FOB										
TOTAL	77,982	81,756	141,412	179,170	284,860	361,377	250,138	217,113	192,190	263,210	404,658
Crops	40,668	48,796	102,351	131,763	214,615	293,711	209,142	161,636	156,805	230,557	333,033
Rice	1,802	--	--	--	--	31,358	13,768	--	--	48,432	82,177
Wheat	31,981	43,568	53,075	55,500	89,125	137,222	104,673	86,961	82,149	137,208	147,970
Corn	243	86	20,643	49,066	62,216	52,184	14,245	19,748	14,313	14,961	59,291
Sorghum	--	--	8,018	5,771	19,063	4,773	--	5,261	--	1,272	--
Soybeans	556	560	4,675	2,221	3,833	7,351	7,011	6,220	7,619	6,624	-
Barley	782	1,019	2,305	2,129	3,261	5,952	5,458	1,224	3,144	5,191	6,612
Oats	--	--	15	216	1,655	857	429	2,160	--	721	1,608
Soybean Oil	4,892	1,908	10,601	11,659	31,305	39,141	35,124	34,016	45,717	14,078	25,710
Malt	194	1,655	1,021	1,201	4,157	12,281	8,432	6,044	3,861	70	8,645
Livestock	30,381	26,656	31,524	34,709	42,367	46,474	29,920	34,197	17,397	13,649	48,248
Sheep meat	2,720	2,931	1,951	1,175	6,549	1,209	1,627	1,583	185	--	5,701
Beef	22,043	16,062	13,858	11,406	7,563	5,868	2,287	4,072	1,081	--	5,572
Powdered skim milk	2,947	5,931	13,286	14,443	16,552	24,988	12,591	14,452	7,451	8,588	23,812
Dried milk fats	1,711	919	841	7,685	11,703	14,409	13,415	14,090	8,678	5,061	13,163
Infant formula	960	811	1,586	--	--	--	--	--	--	--	--
Inputs	6,933	8,304	7,535	12,698	27,878	21,192	11,076	19,280	17,998	19,004	23,377
Urea	4,070	5,081	4,441	5,317	14,984	5,868	2,150	5,405	4,397	942	77
Ammonia Nitrate	55	644	746	1,335	3,754	4,922	2,155	2,792	1,177	4,774	4,188
Ammonium Sulfate	718	819	523	2,344	3,594	2,191	1,096	1,580	2,011	1,740	2,644
Herbicides	422	224	348	1,606	1,921	6,266	2,240	3,855	2,113	3,412	5,460*
Natural Rubber	1,668	1,536	1,475	2,076	3,625	1,945	3,435	5,648	6,270	8,136	11,008*

*Estimated.

Source: Statistical Bulletin of the Agricultural Sector, Oficina de Estadistica Agropecuaria (OSE), December, 1981.

tion has given rise to large increases in corn and soybean imports. For example, average corn imports in 1980-81 were 224 percent above 1978-79.

Fertilizers imports have tended to remain fairly constant since 1974, with the exception of urea, which has declined significantly. The level of fertilizer imports in the immediate future will depend on whether Peru decides to use national gas by-products from its petroleum operations to manufacture ammonium nitrate fertilizers, and the corresponding trade and pricing policies.

APPENDIX D

THE AGRICULTURAL SECTOR

This appendix is divided into three parts. The first part provides data on the population and land resources of Peru. The second provides data on agricultural production and the third on agricultural inputs.

Population and Land Resources

Peru has a land area of 128.5 million hectares and an estimated population in 1982 of 18.3 million people. Approximately 33 percent of this population is considered rural. According to the last National Agriculture Census (1972) 23.5 million hectares (18 percent of land area) were classified as farmland, as shown in Table D4.1. Farmland includes cropland, natural grassland, forest and woodland. Three percent of the land area (3.7 million hectares) was classified as cropland. Approximately one million hectares were under irrigation.

The country is made up of three distinct physiographic zones. These zones are delineated in Figure D4.1. The Coast (Costa) is the narrow strip of desert along the 2,300 kilometer Pacific coastline. This area of 13 million hectares comprises approximately 10 percent of the total land area. In 1982, 8.2 million people (45 percent of the population) lived in the Costa. According to the 1972 Agricultural Census, 14 percent of the Costa was classified as farmland, and 800,000 hectares (6 percent of the zone) were cropland, of which 600,000 hectares were under irrigation. The Costa accounted for approximately 43 percent of the gross value of national agricultural production in 1981.

The second geographic area is the Andean mountain range or Sierra. This region covers approximately 28 percent of the total land area and is where 45 percent of the population lives. Of the land area in the Sierra, 19.4 million hectares (54 percent) are considered farmland, of which 2.3 million hectares are cropland. Of the cropland only 400,000 hectares were irrigated in 1972. Production from the region accounted for approximately 42 percent of the gross value of national agricultural production in 1981.

The third region is the jungle or Selva. This area is subtropical to tropical and comprises approximately 62 percent (79.7 million hectares) of the total land area, with a population of 1.9 million people in 1982. The 1972 Agricultural Census reported that only 3 percent of the Selva was classified as farmland, and only 0.8 percent as cropland, of which only 5 percent was irrigated. The Selva accounted for approximately 15 percent of the gross value of agricultural production in 1981.

Agricultural Production

The crops of primary value produced in Peru from 1970-79 are shown in Table D4.2. In terms of total sales value in 1979, the crops would be ranked as follows: potatoes, cotton, rice, sugar, hard yellow corn, coffee, soft yellow corn, wheat, beans, sorghum, and soybeans. Overall, the value of crop production decreased slightly in real terms (-0.6 percent average annual growth rate) over this ten year period. The greatest declining trends appear in cotton (-2.3 percent/year), beans (-2.0 percent/year), and potatoes (-1.6 percent/year), while soybeans (+31.8 percent/year), sorghum (+18.3 percent/year) and coffee (+3.3 percent/year) show the largest average increases in value.

Table D4.1. Land Area and Population by Region, Peru, 1972

	Total	Costa	Sierra	Selva
Land area (million has.)	128.5	13.0	35.8	79.7
Percent of land area	(100)	(10.0)	(28.0)	(62.0)
Population (millions)*	18.3	8.2	8.2	1.9
Percent of population	(100)	(44.8)	(44.8)	(10.4)
Farmland (million has.)1/	23.5	1.8	19.4	2.3
Percent of land area	(18.0)	(13.8)	(54.2)	(2.9)
Cropland (million has.)2/	3.7	0.8	2.3	0.6
Percent of land area	(2.9)	(6.2)	(6.4)	(0.8)
Irrigated land (million has.)3/	1.0	0.6	0.4	0.03
Percent of land area	(0.8)	(4.6)	(1.1)	(0.04)

*1982, U.S. Agency for International Development.

1/ Includes cropland, natural grassland, forest and woodland.

2/ Includes land under short and long-term fallow and perennial crops.

3/ Total irrigated cropland not including the land area occupied by perennial crops, cultivated perennial pasture and forest plantation.

Source: Second National Agricultural Census, September, 1972.

Figure D4.1. Geographic Regions of Peru

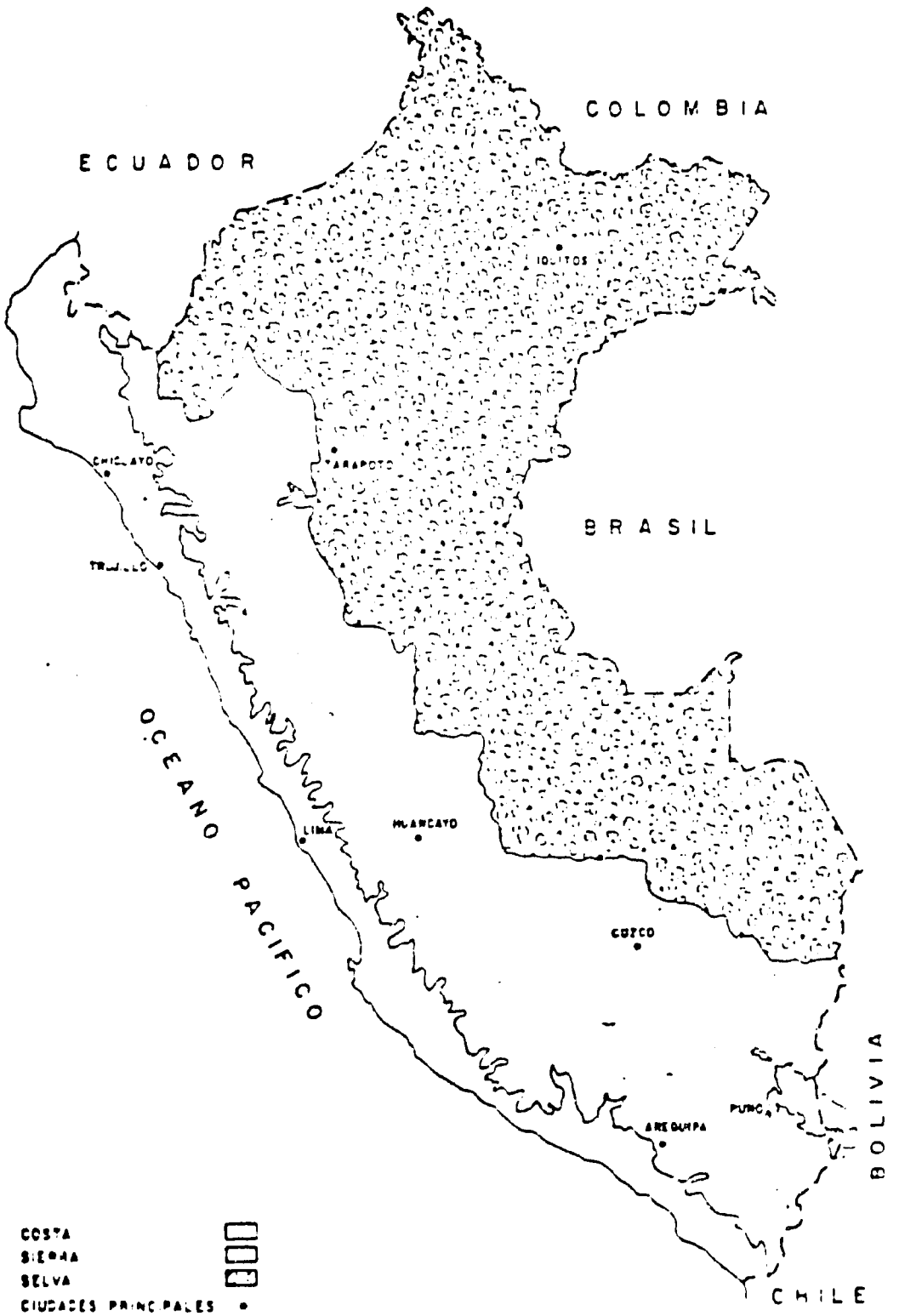


Table D4.2. Value of Production of Principal Agricultural Commodities, Constant 1973 Soles, Peru, 1970-1979

	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	Average annual growth (%) 1/
Total	55,065.5	n.a.	56,411.1	57,154.3	59,169.8	59,048.8	n.a.	n.a.	57,720.3	59,428.5	0.7
Crops	41,067.2	42,190.8	40,255.8	40,583.6	41,641.9	40,169.8	38,593.8	n.a.	38,811.8	40,704.7	-0.6
Programmed	22,910.6	21,060.0	21,648.7	21,822.6	22,499.5	21,814.6	21,179.8	n.a.	20,663.0	22,444.5	-0.7
Cotton	4,806.1	4,511.1	4,154.2	4,567.6	4,972.9	4,191.1	3,190.5	3,411.5	3,610.8	4,716.9	-2.1
Rice	3,071.4	1,096.4	2,526.5	2,512.1	2,588.8	2,812.0	2,988.0	3,075.0	2,450.6	2,929.5	-0.1
Coffee	1,317.1	1,421.8	1,411.7	1,417.8	1,405.7	1,317.1	1,319.1	1,309.0	1,669.5	2,090.4	3.1
Sugarcane	2,460.3	2,691.0	2,791.0	2,843.1	2,976.4	2,903.3	2,849.3	2,857.1	2,583.1	2,279.7	-0.6
Beans	587.9	510.8	551.2	571.8	586.2	541.0	551.1	518.9	465.9	467.0	-2.0
Maize (soft white)	1,105.0	1,111.6	1,174.6	1,028.8	1,059.6	1,206.6	1,665.8	1,261.1	1,291.9	1,092.8	1.1
Maize (hard)								2,521.2	1,856.8	2,172.5	
Potatoes	6,602.8	6,734.2	5,863.6	5,862.6	5,894.0	5,610.7	5,704.8	5,407.8	5,862.2	5,871.1	-1.6
Sorghum	42.2	61.0	95.1	97.4	75.2	101.9	159.4	178.2	180.2	186.8	18.0
Soya	1.4	6.8	5.1	7.7	14.5	11.9	23.9	n.a.	38.5	60.7	11.8
Wheat	912.4	889.1	871.8	891.5	926.2	919.0	927.7	871.1	818.5	759.6	-1.2
Other	18,156.6	19,130.8	18,607.1	18,761.0	19,142.4	18,355.3	17,214.0	n.a.	18,150.8	18,259.7	-0.5
Livestock	11,998.1	n.a.	16,155.1	16,570.7	17,727.9	18,878.9	n.a.	n.a.	18,906.5	18,724.1	1.4
Programmed	11,960.5	n.a.	11,429.1	11,782.4	14,803.4	15,857.9	16,444.0	16,590.0	15,821.4	15,614.6	1.4
Poultry	1,726.4	1,901.7	2,769.8	3,067.0	3,817.0	4,697.7	5,062.5	5,170.9	4,288.6	4,281.1	10.9
Sheep	519.2	654.9	582.4	586.7	595.2	590.5	590.9	621.2	621.2	628.8	0.8
Pork	1,401.1	n.a.	1,618.0	1,606.1	1,647.4	1,649.8	1,657.4	1,630.1	1,600.1	1,585.0	1.0
Beef	2,898.0	n.a.	2,912.1	2,884.6	2,911.8	2,919.9	2,958.7	2,969.1	3,017.6	2,955.6	0.4
Eggs	815.1	882.0	1,018.7	1,172.1	1,319.5	1,469.2	1,616.1	1,645.3	1,705.0	1,624.7	8.8
Fresh milk	4,578.5	n.a.	4,528.1	4,567.7	4,512.5	4,510.8	4,558.2	4,551.0	4,502.1	4,571.2	0.1
Other	2,037.8	n.a.	2,726.0	2,788.1	2,924.5	1,021.0	n.a.	n.a.	1,085.1	1,069.7	n.a.

1/ Least squares estimates of growth trends.

Source: Ministry of Agriculture, Lima, Peru.

By examining the principal crops in more detail a better understanding of the production trends through 1982 can be developed. Production tables are included in Appendix A. Starting with rice, Table A4.1 shows that the area planted in rice in 1981 (149,700 has.) and the estimated area for 1982 (143,400 has.) are slightly greater than the area planted in 1971 (140,000 has.). Likewise, the total annual production for 1981 (712,000 MT) and forecast for 1982 (681,100 MT) are greater than production in 1971 (591,000 MT). The yields for the latter two years were also higher, averaging 4.75 MT/ha. in 1981 and 1982, compared to 4.01 MT/ha. in 1971. The decreases in area planted and production in 1978-80 relative to 1977 can be partially explained by the drought which restricted water use in the Costa during this period.

The northern coastal area is the major rice production region in Peru, as shown in Figure A4.1. The irrigated rice production area of the Costa represented approximately 63 percent of the Peruvian rice land during 1970-77, while falling to approximately 53 percent in 1978-79. In 1979 almost all of the remaining 47 percent of the rice land was in the Selva, with 35 percent of this Selva land under irrigation. Because of the difference in yields between the two regions, the Costa accounted for 69 percent of rice production in 1979, with an average yield of 5.5 MT/ha.

The second major coastal crop is cotton, which is primarily produced south of Lima, as shown in Figure A4.2. In 1981, 157,300 hectares of cotton were planted in Peru and 285,800 metric tons were produced, as shown in Table A4.2, giving an average annual yield of 1.82 MT/ha. This represented a 9 percent increase in area planted and a 15 percent increase in production, compared to 1970 when the yield was 1.72 MT/ha. However, both area and

production are expected to decrease in 1982 due to prices that are expected to be lower. Over 97 percent of the total land area planted in cotton in 1979 was in the Costa under irrigation. The remaining proportion was pro-

The third major crop of the Costa in terms of land area is hard yellow corn (Table A4.3). Since the production statistics for hard yellow corn were combined with those for soft corn until 1976, overall production trends for hard yellow corn are difficult to discern. However, comparing land area and production from 1977 to 1981 suggests there have been decreases of 15 percent and 23 percent, respectively. In 1970, essentially all of the hard yellow corn was produced in the Costa under irrigation. In 1979, only 50 percent of the land planted in corn and 67 percent of the corn produced in Peru was attributed to the Costa under irrigation as the area in this crop decreased by 26 percent from 1970 to 1979. The area of increasing importance for production of hard yellow corn has been the Selva under rainfed conditions. This area accounted for 47 percent of the land planted in hard corn and 31 percent of the total production in 1979.

The fourth major crop of the Costa is sugarcane, which is cultivated under irrigation and is primarily concentrated in the area north of Lima, as shown in Figure A4.4. The total area devoted to production of sugarcane has varied from 55,600 hectares in 1977 to 41,600 hectares in 1981. Production reached a high of 9.1 million metric tons in 1974, and was at a low of 5.3 million metric tons in 1981. In 1981, as shown in Table A4.4, approximately 219,000 metric tons of raw sugar were imported to fill domestic needs. Production in 1982 is estimated to have recovered sufficiently to provide estimated net exports of 92,000 metric tons.

The primary crop in the Sierra in terms of land area has been potatoes. Total national hectarage planted in potatoes has been trending downward from the high of 315,200 hectares in 1970 to 194,100 hectares in 1980, which represents a 38 percent decline. Total production decreased 28 percent from 1970 through 1977 and has been fairly stable at 1.7 million metric tons since 1978, with the exception of the drought year of 1980, when production fell to 1.4 million metrict tons. In 1979, approximately 90 percent of the potatoes were produced in the Sierra, of which 82 percent were produced under rainfed conditions. The area of irrigated potatoes produced in the Sierra has stayed around 35,000 hectares since 1970, while that under rainfed conditions has reflected the overall downward trend. In 1979, approximately 9,400 hectares (4 percent of the total land planted in potatoes) were planted in the Costa of the total land planted in potatoes) were planted in the Costa with irrigation, producing 10 percent of the 1979 output.

The second main crop of the Sierra in terms of land area is soft white wheat. The total land area planted in wheat has generally declined, as shown in Table A4.6. The greatest number of hectares (138,500) were planted in 1971, while in 1980 area planted fell to 68,600 hectares. Essentially all of the domestic wheat is grown in the Sierra. In 1979, 86 percent of the total wheat area and 82 percent of production were in the Sierra without irrigation, while an additional 12 percent of the area and 15 percent of the production were in the Sierra under irrigation. The small amount of wheat grown in the Costa was probably red hard wheat, grown primarily as a rotation crop under irrigation.

In the Selva the primary crop in terms of land area and value is coffee. The trend in coffee hectarage and production have been upward, peaking in 1979

with 154,700 hectares and production of 105,500 metric tons. Over 95 percent of area and production in 1979 was in the rainfed Selva, as shown in Table A4.7.

National production of beans in terms of hectares planted and annual output has shown a slight decrease since 1970. In 1970, the total area planted was 65,800 hectares and total output was 53,300 metric tons, giving an annual yield of .81 MT/ha. By 1981 the total area planted had fallen to 49,900 hectares, and output had fallen to 43,600 metric tons. Yields had risen slightly to .87 MT/ha. Approximately 49 percent of the land planted in beans is located in the Sierra of which 85 percent is planted without irrigation. The Costa contains 33 percent of the land planted in beans, all under irrigation. The remaining 18 percent of bean hectarage is in the Selva under rainfed conditions. The annual average yield in 1979 for beans in the Sierra was approximately .63 MT/ha., compared to 1.1 MT/ha. in the Costa and approximately .93 MT/ha. in the Selva. The area planted in the Sierra under rainfed conditions shows the greatest decline since 1970.

Time series information on the production of soybeans and sorghum on a regional basis is limited. On a country-wide basis, the number of hectares planted to soybeans has increased from 400 in 1970 to 7,600 in 1981. During this period production has increased from 400 metric tons to 14,000, as indicated in Table A4.9. The production of sorghum has shown a similar overall trend. In 1970, only 3,600 hectares were planted, with an output of 12,200 metric tons. In 1981, planting was reported at 13,700 hectares, with total production at 44,300 metric tons.

Agricultural Inputs

As shown in Table A4.11, the sale of fertilizer in Peru increased from 233,863 metric tons in 1970 to 370,875 metric tons in 1977, and then decreased in the following years, falling to 314,486 metric tons in 1980. This overall trend is reflected in the apparent utilization of nitrogen, also shown in Table A4.11. The amount of nitrogen used was 109,359 metric tons in 1977. Since that time, nitrogen utilization has decreased steadily to 87,121 metric tons in 1980.

Data on fertilizer use by regions is presented in Table A4.12, which is based on the 1972 Agricultural Census. In 1972 only 15 percent of all farms in Peru used fertilizer. There is large variation by region and farm size. Of all farms in the Costa, 38 percent used fertilizer, compared to 13 percent in the Sierra and 6 percent in the Selva. In the Costa only 15 percent of farms less than one hectare used fertilizer, as opposed to 85 percent of farms of 100 hectares or more. Fertilizer use tends to increase with farm size in the Sierra and Selva as well, but differences are not nearly as large.

The importance of irrigation and water use in the agricultural sector in Peru is reflected in the previous discussion of regional crop production. Agricultural production in the Costa is especially dependent on irrigation. According to the 1972 Agricultural Census, approximately 95 percent of the total arable cropland (producing annual crops) and 93 percent of the farms in the Costa are irrigated, as shown in Table A4.13. In the Sierra, 39 percent of the farms have irrigated land, and such land accounts for 24 percent of arable cropland, while in the Selva only 8 percent have some irrigation. In

terms of hectares of irrigated land, rice was the major user of irrigation in 1979.

Data on other major inputs used in crop production (e.g., machinery, seeds, non-fertilizer chemicals, and labor) disaggregated by region and crop were not available in any consistent time series format. Consequently, the trends in the use of these inputs cannot be analyzed at this time. The data taken from the 1972 Agricultural Census on ownership of tractors by size of farm and region is given in Table A4.14. Similarly, the number of farms using purchased seed for selected crops is shown by farm size for the Costa and Sierra regions in Table A4.15. Use of tractors and purchased seeds were concentrated on large farms in the Costa.

Annual data is available regarding credit going to the agricultural sector. Credit has increased significantly in nominal terms since 1970; however, prior to 1979, it was decreasing in real terms. As shown in Table A4.16, the total value of loans going to the agricultural sector in 1970 was 8,547 soles, with 82 percent of that total originating in the Agrarian Bank of Peru (Banco Agrario de Peru, BAP). In 1981, the total volume of loans had increased to 232,386 soles, with 91 percent coming from the BAP. Of this amount, approximately 90 percent went for short term loans directly to crop production activities, as shown in Table A4.17.

The distribution of short term loans by crop enterprise price is given in Table A4.18. In 1981, rice production enterprises received the highest proportion of short-term loans (36%), followed by cotton (24%), potatoes (14%), corn (7%), and sugarcane (6%). Coffee has shown a significant decrease in BAP loans since 1970. On a regional basis the majority of BAP

credit has gone to the Costa since 1979, averaging over 60 percent each year. In 1981, 64 percent of the BAP credit went to the Costa, 20 percent to the Selva, and 16 percent to the Sierra, as shown in Table A4.19.

Transportation also plays a crucial role in the agricultural sector. The principal network of roads in Peru is illustrated in Figure 4A.6. High quality roads are concentrated in the Costa and there is negligible road construction in the Sierra and Selva. Consequently, transportation of agricultural products in the Costa occurs throughout the year at relatively low cost, while the cost of transporting agricultural products in the Sierra and Selva is quite high.*

---

*See Richard King. "A Study of the Production and Marketing of Corn and Sorghum in Peru," 1982.

APPENDIX E

PRICING POLICIES FOR SIX PRINCIPAL AGRICULTURAL COMMODITIES

This Appendix provides detail on the pricing practices and marketing systems for six principal agricultural commodities. These include rice, wheat, corn, cotton, sugar and potatoes.

Rice

Rice is one of the basic foods of consumption and production in Peru. Continuing monopoloy rights to market both domestic and imported rice was granted to the Rice Marketing Enterprise, Inc., (Empresa Comercializadora de Arroz, S.A., ECASA) by legal decree 22056 of March 26, 1980. As recently stipulated, the price of unpolished rice is fixed by the General Direction of Agroindustry and Marketing (Direccion General de Agroindustria y Comercializacion, DGAIC) of the MAGR, in coordination with the MEFC. The milling of rice is performed by private firms under contract to ECASA. Before domestic rice producers can sell their rice to a local rice mill they must receive an income order from their respective regional ECASA office. After receiving this income order, producers can then deliver their output to the mill where it is graded according to the degree of humidity and impurities.

After the rice is polished at the mill, ECASA controls the distribution to different regional warehouses based on quotas established by the MAGR. In Metropolitan Lima, processed rice is distributed by ECASA directly to the retailer, with a charge for an average transportation cost

included. In other parts of the country, retailers must pick up their rice from the appropriate regional ECASA warehouse or designated rice mill.

As of September, 1982, the price that ECASA had been decreed to pay producers for unpolished rice was 200 soles per kilogram in the Costa region and 220 soles in the Selva, as shown in Table E5.1. Processed rice is marketed in a three-grade system. The best rice (extra) has no consumer subsidy and costs nearly two and a half times as much as the subsidized ordinary rice, which retailed for 270 soles per kilogram in September, 1982. The conversion rate for producing ordinary rice from unpolished rice is 69 percent in the Costa and 67 percent in the Selva, while the conversion rate for superior rice is 65 percent, and for extra rice 58 percent. The percentages of rice designated as ordinary, superior, and extra in 1982 were approximately 75, 23, and 2, respectively.

In addition to handling all domestic production, ECASA is the only importer of rice. The DGAIC has been given the responsibility to determine the annual volume of rice imports. From the DGAIC, ECASA solicits a sanitation request which describes the characteristics and conditions of the grain to be imported. It also solicits a license to import from MEFC. The importation of rice has been exonerated from all types of tariffs and duties.

The rice storage reserve policy of the DGAIC has been to maintain an average stock volume of 100,000 metric tons. This volume corresponds to approximately two months of storage. In December, three months supply is held in storage since domestic harvests are at a minimum during the months of January through March. The PL-480 rice imports for 1982 will provide 55,000 metric tons of rice. Since domestic production has tended to be equivalent

Table E5.1. Distribution of Costs in the Production, Processing, and Marketing of Rice, and Official Prices, Peru, September, 1982

Distribution of Costs

		Percent of Final Value
Farm Price (polished rice equivalent)		74.2
Processing		20.1
Hulling	7.4	
National Weighted Transportation	9.3	
Spoilage	0.6	
Other	2.8	
Wholesale profit	0.0	
Retail Distribution		5.7
Local Transportation	1.8	
Spoilage	0.0	
Other	1.0	
Retailer Profit[1/]	2.9	
		100.0

Official Prices

Farm Price	Unpolished Rice	Polished Rice Equivalent[2/]
Costa	200	300
Selva	220	330
Processed Prices	**Wholesale[3/]**	**Retail[4/]**
Grade of Rice		
Ordinary (corriente)	252	270
Superior	436	480
Extra	591	650
Imported	350	385

1/ Includes returns to labor.
2/ Based on a conversion facts for producing corriente rice from unpolished rice of 67.
3/ Paid to ENCASA by private retail outlets.
4/ Paid by consumers.

Source: "Programas de Abasto Interno 1981: Arroz," Ministry of Agriculture (DGAIC), Lima, Peru.

to consumption at the prevailing price, PL-480 imports tend to enhance current government stocks. In the years 1979-81, however, there was no equivalence between production and consumption.

Wheat

Wheat used in the manufacture of flour for bread and noodles is included in the list of agricultural products controlled by the government. The price of both domestically produced and imported wheat is controlled at below world levels on entering flour mills. The price of domestic wheat for uses other than flour milling (trigo mote, whole grain, etc.) is not controlled. The majority of the wheat produced domestically is soft white grain and used primarily for local consumption in the Sierra. Small quantities of red hard wheat are grown on the coast as a rotation crop. In 1981, of the 118,551 metric tons of domestic wheat produced, only 67 metric tons went into the flour milling industry.

Given that such a small percentage of domestic wheat enters commercial flour milling channels, the manufacture of bread and noodles as well as other wheat products is totally dependent on imports. The importation of wheat is subject to quota rules set by the MAGR in conjunction with ENCI and the MEFC at the beginning of each year. The DGAIC determines the annual needs of the industrial mills and assigns monthly quotas. These quotas are subject to change during the year. In September, 1981, four mills received maximum quotas of over 100,000 metric tons, five mills had quotas of 20,000 to 99,999, and three received quotas of under 20,000 for the year 1982.

Since 1977 the assignment of quotas has been based on an arithmetic average of actual milling volume in the previous two years weighted by capacity of each company. The milling capacity in the 12 plants presently operating is substantially underutilized.

In April 1980 the government instituted a consumer wheat flour price subsidy for certain bread and noodles to reduce the cost increases of these basic foods. Mills pay as much as 50 percent less for flour going to bread and noodles manufacture, as illustrated in Table E5.2. With this pricing structure there has been a growing demand for basic wheat products. Recently a system of selling the popular bread only in lower income neighborhoods and only during certain hours of the day has been instituted in order to reduce demand. The extent of success in targeting subsidized products to specific income groups in this manner has not been thoroughly investigated, although the Central Bank has made estimates.

Corn

Two types of corn--hard yellow and soft white--are produced in substantial quantities in Peru. The soft white corn is primarily utilized for local human consumption and does not enter commercial marketing channels. The hard yellow corn is utilized primarily as a livestock feed. The price analysis of this study focuses on the hard yellow corn variety. Imports have contributed a substantial proportion of the total supply of hard yellow corn. Imports ranged from under 30 percent in four of the past ten years to over 60 percent in 1980.

Table E5.2. Official Prices of Wheat Flour by Final Use Classifications, Peru, 1980

Location	Final Product	Official Price April 1980	Official Price August 1980
Lima	Bread popular	S/.25,500 TM	S/.43,220 TM
	Noodles popular	32,991	43,220
	Other uses (cookies, etc.)	69,225	69,225
Iquitos	Bread popular	29,551	50,086
	Noodles popular	37,010	50,086
	Other uses	74,225	74,600
Lima (retail)	Bread popular	49.16/kg.	73.06/kg.
	Noodles	58.98/kg.	73.06/kg.
	Other uses	106.50/kg.	107.17/kg.

Source: "Programa de Abastecimiento 1981: Trigo", Ministry of Agriculture (DGAIC), Lima, Peru.

Corn imports are controlled by quotas assigned to private feed mixing mills by the MAGR in coordination with ENCI. Of the 24 commercial mills operating during 1980, two received quotas of over 50,000 metric tons per year, five had quotas for 10,000 to 49,999, 14 received quotas of 1,000 to 9,999, and 3 had quotas of under 1,000. Prices paid by commercial mills for domestically produced corn are subject to control. Seventy-five percent of domestic hard yellow corn is marketed through the commercial mills. The remaining 25 percent is marketed through less formal channels which are not controlled.

Corn import quotas are highly valued for two reasons. First, the consistency of the quality of imported corn is generally considered to surpass that of domestic corn. Second the price of imported corn has generally been below the price set for domestic corn. These reasons have motivated commercial millers to continually press for increases in quota levels.

A final important aspect of corn pricing policies concerns the acquisition of corn from the Selva. ENCI is responsible for buying this corn and is mandated to pay essentially the same price as is set for delivery to mills in other regions of the country. Transportation from the Selva to corn deficit areas can cost as much as a third or more of product value. Thus, a substantial subsidy is being utilized to encourage corn production in that region. A recent attempt to eliminate this transportation subsidy was rescinded, after protests among corn producers in the affected areas.

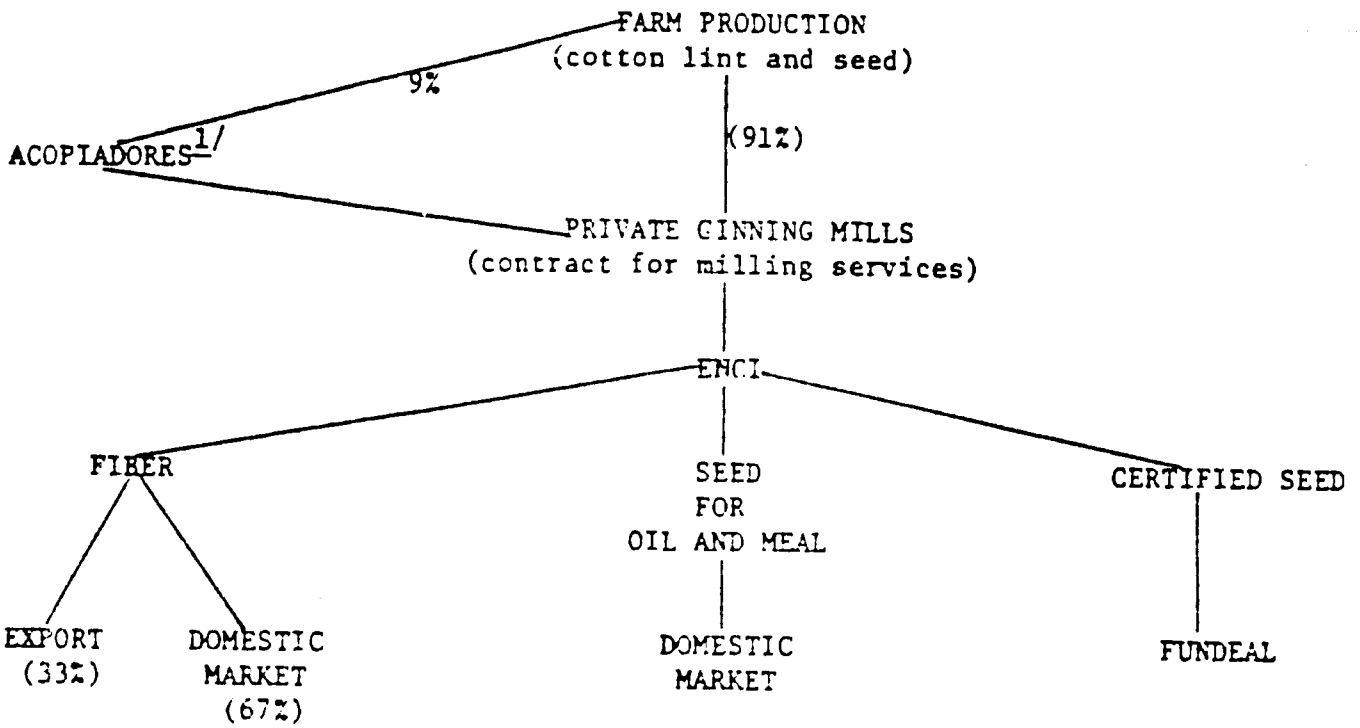
Cotton

Through 1982, ENCI has maintained exclusive control of the purchase of all cotton from farmers. ENCI also controls the distribution of fiber and seed to domestic and foreign markets. Cotton ginning has been performed by private firms which contract to provide this service on the basis of a quota system. A second parastatal firm, FUNDEAL, is responsible for the distribution of certified seed at prices set by the MAGR.

As shown in Figure E5.1, the two principal types of cotton produced are Pima, which is primarily exported, and Tanguis which is used primarily by domestic textile mills. Since March 1978, prices charged to domestic textile mills have been based on world prices (as reflected in "Index A" published in the Cotton Outlook, Liverpool, England) multiplied by the official nominal exchange rate and adjusted by a coefficient determined by ENCI specifically for each type of domestic cotton. From 1978 through July 1979, the specific coefficients were 0.9 for Tanguis and 1.2 for Pima. In August 1979, these coefficients were increased to 1.1 and 1.5. By way of contrast, during 1977-79 the export price of Peruvian Tanguis reported in the Cotton Outlook averaged 31 percent above Index A. Cotton exports are subject to a tax of 25 percent of FOB value.

Prior to each production season ENCI announces base prices which will be paid to farmers upon delivery of raw cotton containing fiber and seed to the ginning mills. This initial payment is based on a weighted average of the expected unit value of domestic and foreign sales of fiber (less processing and marketing costs, and export taxes), and on the expected sales values of

Figure E5.1. Processing and Marketing of Cotton, Peru, 1980



PRODUCTION AND SALE OF COTTON FIBER

Variety	Production	Exports
	----- metric tons ------	
Tanguis	70,879	14,280
Pima	19,066	12,911
Supima	3,234	3,257
Del Cerro	2,723	2,489
Aspero/Semi Aspero	1,790	635
TOTAL	97,692	32,230

1/ These agents pool cotton from small farms to be able to deliver the minimum quantity accepted by the mills.

SOURCE: "Programa de Abastecimiento 1981: Algodón" Ministry of Agriculture (DGAIC), Lima, Peru.
Memoria, 1980, ENCI, Lima, Peru.

cotton seed. Upon delivery the raw cotton is weighed and graded. ENCI then sells the entire season's production, calculates its profit on total sales, and issues a second payment to farmers based on total net earnings and the quality and quantity of each producer's share of output. Thus, the final price received by a farmer depends on the quality of his cotton, the pricing decisions of the MAGR regarding sales of cotton seed and fiber to domestic mills, the level of world prices, and ENCI's success as an international marketing agent.

Sugar

During the seventies, the marketing and processing of sugarcane was handled primarily by twelve producer-managed sugar cooperatives. These vertically integrated agro-industrial sugar processing plants were formerly privately owned mills which were expropriated by the state during the Velasco Administration. Prior to January 1982 these cooperative plants were joined in a coordinating association of sugar production cooperatives, CECOAAP (Central de Coopertivas Azucareras del Peru), which handled both the internal and external marketing of processed sugar and by-products. However, the drought of 1979-80, which caused declines in domestic sugar production and the importation of sugar in 1981, led to the breakdown of the CECOAAP marketing arrangement.

Since the technical coefficients of processing sugar cane into its multiple products, including bagasse for paper products, were not available, the details and the pricing policy for paying sugarcane produ-

cers for the three different varieties grown in Peru are beyond the scope of this report. The DGAIC sets the prices of processed raw and refined sugar for consumer and industrial use. As shown in Table E5.3, the official prices of raw and refined sugar for domestic consumer uses are set at subsidized levels well below industrial use prices. The DGAIC also programs the quotas for each sugar processing plant and the respective quantities of raw and refined sugar to be proportioned for consumer and industrial use. Since control over the compliance with these quotas is difficult to regulate, leakages of subsidized sugar into industrial manufacturing and shortages of consumer refined sugar at the official price would be expected to occur.

Potatoes

During the 1970's, marketing of potatoes has been handled almost exclusively by the private sector, with limited intervention by EPSA and ENCI. For example, in 1980, ENCI sold approximately 4.7 thousand metric tons of potatoes (less than one percent of the total Peruvian potato production). The majority of the potatoes, which are grown primarily in the Sierra, are consumed on the farm or sold locally through regional markets. The potatoes that are sold in the cities move through the traditional marketing channels of individual truckers, wholesalers, and retailers. The DGAIC estimated that in 1981 the potato producer received approximately 65 percent of the urban retail price.

Table E5.3. Official Prices of Sugar by Final Use Classification, Peru, February 1982

Retail Distribution	Price per MT
Raw sugar	S/. 146,014
Refined sugar	S/. 183,864
Industrial Use	
Raw sugar	S/. 270,000
Refined sugar	S/. 300,000

Source: Ministry of Agriculture (DGAIC), Lima, Peru.

Prior to September 1978, the prices of the three basic types of potatoes (white, yellow, and colored) were set nationally and locally at the wholesale and retail level by the Departmental Price Regulating Groups for Food Products (Juntas Reguladores de Precios de Productos Alimenticios Departmentales, JURPAL). However, JURPAL was unable to rigorously enforce the official prices during these years. Since then potato prices have been allowed to move freely, although in January 1982 there was an official public price (DS.003-82-EFC) of 82 soles per kilogram and a retailer margin of 30 percent (DS010-82-EFC) set on white potatoes sold in Lima.

Since 1978 potato prices have shown a marked seasonal variation within the year. The lowest prices occur in April through June when potatoes are harvested in the Sierra. Because of an antispeculation law, which imposed severe fines on persons found hoarding produce for the purpose of selling later at a higher price, large supplies of potatoes were dumped on the central markets immediately after harvest. This law was the primary cause of seasonally low producer prices and high potato spoilage rates, and created a strong disincentive to invest in storage facilities.

Recently, the MAGR has proposed further state intervention in the marketing system for potatoes (and other perishable crops), which would provide competition for the traditional market intermediaries. This plan, PROCOMPRA, would develop twenty to twenty-four regional producer organizations (Rural Market Centers) and seven urban retail outlets in Lima (Urban Distribution Centers). The longer run plan includes the creation of approximately eighty "Peoples Markets" where producers would sell directly to consumers, particularly in low income areas. Also, and perhaps most

importantly, the plan provides production and marketing credit assistance, market price information services, technical training on packaging, shipping, weights and measurement market standards, and support for export promotion activities when domestic supplies are large.

REFERENCES

REFERENCES

Alberts, Tom. "The Underdevelopment of Agriculture in Peru 1950-1975. Some Factors Underlying the Secular Stagnation in Peruvian Agriculture." Research Policy Studies, Discussion Paper Number 121, Lund University, Sweden, April, 1978.

Alvarez, Elena. Politica Agraria y Estancamiento de la Agricultura, 1969-1977. Lima: Instituto de Estudios Peruanos, 1980.

Amat y Leon, Carlos and Dante Curonisy. La Alimentacion en el Peru. Lima: Centro de Investigacion de la Universidad del Pacifico, 1981.

Banco Agrario del Peru. Memoria. Lima, various issues.

Billone, Jorge, Daniel Carbonetto, and Daniel Martinez. Terminos de Intercambio Ciudad-Campo 1970-1980: Precios y Excedente Agrario. Lima: Centro de Estudios para el Desarrollo y la Participacion (CEDEP), 1982.

Caves, R. and Jones, R. World Trade and Payments. New York: Little, Brown, 1973.

Central Reserve Bank of Peru. Memoria, 1981. Lima: 1981.

Cleaves, P. S. and M. J. Scurrah. Agriculture, Bureaucracy and Military Government in Peru. Ithaca, N.Y.: Cornell University Press, 1980.

Comision Especial del Seguro Agrario. Estudio Para el Establecimiento del Seguro Agrario en el Peru. RSN 003-82-INIPA: Lima, January, 1982.

Coutu, A. J. and R. A. King. The Agricultural Development of Peru. Praeger Special Studies in International Economics and Development, New York: 1969.

Empresa Nacional de Comercializacion de Insumos. Memoria, ENCI. Lima, various issues.

Figueroa, Adolfo. "Effects of Changes in Consumption and Trade Patterns in Latin America." Quarterly Review of Economics and Business 21(Summer, 1981): 83-97.

Figueroa, Adolfo. "Agricultural Price Policy and Rural Income in Peru." Quarterly Review of Economics and Business 21 (Autumn, 1981): 49-64.

Fitzgerald, E. V. K. The Political Economy of Peru 1956-78: Economic Development and Restructuring of Capital. Cambridge, England: Cambridge University Press, 1979.

International Monetary Fund. International Financial Statistics. Washington, D.C., various issues.

International Monetary Fund. International Financial Statistics. Washington, D.C., various issues.

King, R. A. "A Study of the Production and Marketing of Corn and Sorghum in Peru." Department of Agricultural Economics, North Carolina State University. June, 1982. Mimeo.

Krueger, A.O. "The Role of Home Goods and Money in Exchange Rate Adjustment" in W. Sellekaerts, International Trade and Finance, New York: Macmillan, 1973.

Martinez, Daniel and Armando Tealdo. El Agro Peruano 1970-1980: Analisis y Perspectivas. Lima: Centro de Estudios para el Desarrollo y la Participacion (CEDEP), 1982.

McClintock, Cynthia. Peasant Cooperatives and Political Change in Peru. Princeton, N.J.: Princeton University Press, 1981.

Ministerio de Agricultura. "Programa de Abastecimiento 1981: Arroz." Direccion General de Agroindustria y Comercializacion. Lima: 1981.

Ministerio de Agricultura. "Programa de Abastecimiento 1981: Maiz-Sorgo." Direccion General de Agroindustria y Comercializacion. Lima: 1981.

Ministerio de Agricultura. "Programa de Abastecimiento 1981: Trigo." Direccion General de Agroindustria y Comercializacion. Lima: 1981.

Ministerio de Agricultura. "Programa de Abastecimiento 1981: Papa." Direccion General de Agroindustria y Comercializacion. Lima: 1981.

Oficina Nacional de Estadistica y Censos, Segundo Censo Nacional Agropecuario. Lima: 1972.

Oficina Sectorial de Estadistica, "Boletin Estadistica del Sector Agrario." Lima: Oficina de Estadistica Agropecuaria, December, 1981.

Schuh, G. E. "Food Aid as a Component of General Economic and Development Policy." Paper presented at Agricultural Development Council, Inc. Conference on Improving the Developmental Effectiveness of Food Aid in Africa, Abidjan, Ivory Coast, 24-26 August, 1981.

Schydlowsky, D. M. and J. J. Wicht. "The Anatomy of An Economic Failure: Peru 1968-78." Center for Latin American Development Studies, Discussion Paper No. 32, Boston University, February, 1979.

Thorp, Rosemary and Geoffrey Bertam. Peru 1890-1977: Growth and Policy in An Open Economy. New York: Columbia University Press, 1978.

Torres Z., Jorge. "Protecciones Effectivas y Sustitucion de Importaciones en Peru". Lima: Publicaciones CISEPA, Documentos de Trabajo No. 33, Departmento de Economia, Pontificia Universidad Catolica del Peru, December 1976.

Torres Z., Jorge. "Protecciones Effectivas y Sustitucion de Importaciones en Peru, 1981". Publicacaciones CISEPA, Departmento de Economia, Pontificia Universidad Catolica del Peru, forthcoming.

USAID Mission/Lima, Peru. "Briefing Book for the Presidential Agricultural Mission to Peru." Lima: USAID Mission, March, 1982.

U.S. Presidential Agricultural Task Force to Peru. "Report of the U.S. Presidential Task Force to Peru." Washington, D.C.: June 1982.

Van de Wetering, Hylke, Carlos Amat y Leon, Jose Salaverry, Rafael Otero, and Walter Petrovich. "Peru, Long Term Projections of Demand and Supply of Agricultural Commodities Through 1980." Programa de Investigaciones para el Desarrollo, Universidad Agraria, La Molina, Lima: Peru, June 1969.

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

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

World Bank. The Current Economic Position and Prospects of Peru. Washington, D.C.: Country Reports, January, 1973.

World Bank. Peru, Agricultural Sector Survey Updating Report. Volumes I & II. Washington, D.C.: September, 1977.

World Bank. Peru, Major Development Policy Issues and Recommendations. Washington, D.C.: A World Bank Country Study, 1981.