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Peru: agriculture, crisis and macroeconomic policy

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This article considers nine selected products which account for 50% of the gross value of output and also have a clear regional differentiation. The period analysed is from 1970 to 1985.

The results of the analysis show that developments in the farming sector depend to a large extent on international factors and on the policies introduced to adjust the country's external accounts. The situation of each product is different in the medium and short terms, depending on the effects of the general and specific policies. In a longer-term perspective, the visible trends in production are due to great strength in rice —the main product of Peru's agriculture which is cultivated mainly on the coast— and to a similar strength in the cultivation of hard yellow maize and the production of poultry meat and beef. The first three products show the influence of sustained policies for imports substitution and modification of consumption patterns. Cotton and coffee show an upward linear trend despite the exchange-rate slippage and the falls in their internal and external prices, while the decisive factor in sugar cane seems to be the availability of water for its cultivation. The situation of the traditional mountains crops is different; potatoes show a downward trend and starch maize follows a consistent linear trend independent of the adjustment policies introduced.

The impact of exchange rate, monetary and wages policies have different effects on agricultural output in different regions. On the coast, producers of poultry meat and some rice producers seem to have been hurt by the austerity policies, which at the same time seem to have benefitted producers of sugar cane, cotton and hard yellow maize, and some rice producers. Lastly, the situation is unclear in the forest regions. The cutback in lending has had adverse effects on production of rice and hard yellow maize, yet this last product has been benefitted by the real exchange rate.

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I

Background and aspects of overall development

The Peruvian economy is under the influence of a long-term crisis which has shown considerable fluctuation. There is a consensus to the effect that the economy was at its most dynamic in the mid-1960s. Since then it has experienced the 1967-1968 crisis, a period of stagnation up to 1972, a brief expansion in 1973-1975 based on foreign borrowing, and from 1975 to 1985 a series of serious crises interrupted by periods of stagnation.

In 1985 the per capita gross domestic product was much the same as in 1965. Average real wages in 1984 were 22% lower than in 1957 and salaries 47% lower. Wage incomes amounted to 38.7% of the national income in 1950 and 46.5% in 1976 before the present crisis began. The sacrifice during the expansion was made by independent workers, particularly farmers, who saw their share in the national income fall from 21.5 to 9.1% between those two years. In the 1980s, in contrast, the recession concentrated its greatest relative impact on urban wage-earners.

The pre-crisis period was characterized by a process of industrialization in a situation of abundant foreign exchange which facilitated the establishment of an assembly industry and an agroindustry based on the processing of imported foodstuffs. This caused considerable internal dislocation.

The stagnation of industrial productivity caused by the lack of technological innovation led to an increasing loss of relative competitiveness and an increasing trade deficit. The main features of Peruvian industry in this period were the lower level of internal integration and the low productivity.

The most important development in agriculture in the period leading up to the crisis was the agrarian reform, a process which since the mid-1950s had been a major political football, to the detriment of the sector's progress and investment in agriculture and livestock in particular.

Various reforms were introduced from the early 1960s, culminating in the 1969 reform, the

most radical and decisive of all. The crisis and the adjustment occurred when the structure of land ownership and tenancy had just undergone radical change.

Accordingly, the agricultural sector was in a very shaky technological and administrative condition owing to the withdrawal of some of its most experienced technicians and the establishment of the new institutions.

The change of government in 1976, which coincided with the onset of the crisis, reduced even further the political weight of farm producers in the modern sector co-operativized by the agrarian reform. The new official policy was more broadly favourable to privately and individually owned businesses. However, the fact that the reform was part of the justification of the military take-over, together with other factors, meant that the process of anti-associative institutional change was initially slow.

1. Regional features of agriculture

The land resource is scarce in Peru. Only 5.9% of the country's area is suitable for crops, i.e., roughly 7.6 million hectares, of which some 2.9 million are actually cultivated. Of this total, about 750 000 hectares are at the Coast, 1.7 million in the Sierra and 400 000 in the Selva (forest).

The Coast has 26% of the arable land and contributes about 50% of the sector's gross domestic product. It has irrigated land of very good quality. It has a great future potential for increased productivity and expansion of the irrigated area. The main crops are cotton, rice and sugar; poultry farming is also concentrated in this region.

The Sierra is the least productive region; it has half the cultivated land but contributes only 25% of the sectoral product. Its agriculture is

basically unirrigated and there is little possibility of extending the frontier. Its main crop is potatoes, but its beef is among the most important of the country's farm products.

The Selva, lastly, is the most extensive region but it is extremely fragile from the ecological standpoint. Nevertheless, it has the greatest potential for expansion of the cultivated area. Coffee, hard yellow maize and rice are the main crops.

2. Agricultural and overall production

Agriculture's contribution to the national economy has been steadily declining in recent decades. In 1970 the sector contributed 14.6% of the gross domestic product, a proportion which fell to 10.8% in 1980. In the period 1982-1984, which corresponds to the second recessionary adjustment, for the first time in a long time agriculture increased its contribution to the national total, delivering 13% of what was produced in the country.

In the 1970s the importance of agricultural production for the external market declined and, according to the available information, production was reoriented towards the domestic market.

In the midst of the crisis the shortage of foreign exchange and the devaluation of the currency invested the Sierra with increased importance, although it is the least productive zone. The transformation of Peru into a net importer of food since the end of the 1970s has placed the problem of the agricultural backwardness of the Andean region at the centre of the debate about development strategies. However, it is probable that cultural factors are more influential than the actual possibilities of making the Sierra the axis of the country's agriculture.

II

The adjustment policies

There have been two periods of stringent adjustment in the last 10 years: 1976-1978 and 1982-1983. The principal method was devaluation with inflation and a closed economy, which meant that the anti-inflation goals were secondary to those of external balance. In other words, the inflation policy was used to attain this balance at a lower level of domestic production activity.

The following were the main features of the adjustment policy:

1. *Exchange-rate policy*

A close relationship has been established between variations in the real exchange rate and the level of overall economic activity. The policy of raising the exchange rate was the commonest way of influencing the external imbalances and the level of domestic activity. This was the case in 1976-1978. The effectiveness of devaluation in raising the real exchange rate was relatively less in 1982-1983 because domestic prices increased independently of the devaluation owing to incidental factors such as the floods, droughts and avalanches.

At the end of the 1970s and in the early 1980s a ready supply of foreign exchange was provided by the increased exports and the unblocking of the World Bank loans. As a result the real exchange rate underwent a sizeable decline.

At the end of 1981 the devaluation speeded up under the impact of the worsening of the terms of trade, and inflation did likewise. This development continued until mid-1983, briefly interrupted for nine months but then moving ahead again until the change of government in 1985.

In brief, during the decade of crisis the basic exchange-rate policy had two periods of rising rates and an intermediate period in which the slippage was used as an anti-inflation tool.

The record of the impact of the variations in the exchange rate on inflation shows that the prices of the categories of product classified as

"tradeable" by the Central Reserve Bank (BCR) reacted with a lag of two quarters, while the prices of "non-tradeables" reacted immediately.

These results indicate that in Peru's institutional context, particularly in its labour market, exchange-rate policy was one of the fundamental means of causing domestic inflation to rise or fall, aggregate demand to decline or increase, and imports to contract or expand.

2. *Prices policy*

The increase in public tariffs and prices controlled by the State was also a decisive tool in reducing the fiscal deficit and aggregate demand, especially from 1981.

The ratio of the indices of controlled prices to the overall consumer index was 0.55 in 1981, but it rose to 1.37 in 1982 and then remained above unity until 1984. It was 1.06 in 1982, 1.28 in 1983 and 1.16 in 1984.

With respect to specific increases of controlled prices in this period, the price of gasoline always moved faster than inflation, while the relative prices of controlled foods rose in 1981 and 1983 and public tariffs in 1981, 1982 and 1984.

3. *Tariff policy and protection*

These policies were not so important in generating recessions. Three periods can be distinguished:

- The period 1976-1978: tariffs were not changed but domestic production was given greater protection by the rising exchange rate. The final net result was an increase of 70% in protection, in spite of which output fell as a result of the drop in incomes caused by the increased inflation.
- The period 1979-1981: the domestic market was opened up, tariffs were reduced, and the exchange-rate slippage resulting from the great expansion of exports increased the effectiveness of the liberalization measures.

These exports came from the investment projects started in the first half of the decade and they were also a response to higher international prices. The lowest average tariff level of 32% was achieved in 1981, with the maximum tariff, without surcharge, falling from 155 to 60%. The main tool of the liberation policy was the elimination of bans. Between the end of 1978 and the end of 1979 the number of prohibited import items fell from 1 852 to only nine and the number of free import items rose from 1 753 to 3 745. This process did not last long but long enough to renew and build up stocks of domestic consumer durables, imported automobiles, etc. The level of protection in 1981, including the effect of the exchange rate, was again similar to the pre-crisis level, i.e., between 40 and 50% of the maximum level of 1978.

- The period 1982-1983: tariffs were increased when the fall in international prices persisted and imports soared —US\$1 668 million in 1978 and US\$3 802 million in 1981. A surcharge of 15% *ad valorem* was established in 1982, a further surcharge of 10% on CIF value in 1983 and another of 17% in 1984, which considerably increased the level of protection. The renewed upward movement of the exchange rate at the same time increased the protection of domestic production.

The domestic market was thus closed and a return was made to the method of securing adjustment by reducing the general level of domestic activity by lowering the aggregate demand. This method is demonstrably effective in reducing imports and freeing foreign exchange for payment of creditors, or for retention in State hands, instead of providing it to importers.

4. Income and public spending policies

In 1978, the most critical year of the first adjustment, the income of the central government was 3% higher than in 1975. This came about owing to the increase of 372% in the fuel tax and the commencement of new mining exports subject to taxes and despite the drop of 38.8% in the income tax.

Against the background of crisis, transfers of capital from the government to public enterprises were reduced, the gross formation of capital by the central government was maintained, pay fell, and there were increases in the payment of interest and principal on the foreign debt and to a lesser extent in defence spending. In these circumstances public enterprises made sizeable cutbacks in their investment expenditure by terminating the most expensive projects.

In the 1980s, during the second adjustment, the central government's real income fell sharply (29.3%) in 1981-1983. The income tax was cut (-38.3%), as were taxes on foreign trade (39.3%). The fuel tax was raised 32.4%, but this was not sufficient to offset the other declines.

Accordingly, all items of expenditure were cut in real terms in 1982, except for foreign debt and defence payments. Defence spending was also cut back in 1983, but the total amount of these two items was nevertheless maintained in global terms owing to the increased payments abroad.

5. Monetary and credit policies

Monetary policy contributed to the decline in nominal incomes and domestic demand and thus to the recessionary adjustment. In 1981-1983 it moved from a first stage (1981-1982), in which the goal was to support growth through credit and liquidity, to a second stage (1982-1983), in which the priority was protection of the level of reserves, with the level of domestic activity bearing the burden of the cost of the external obligations and the drop in international prices.

The goal of protecting the reserves was in fact re-established in September 1982. Lending to the public sector was cut and public enterprises were encouraged to borrow abroad in the short term, while domestic lending to the private sector was increased. Reserves increased as a result of the inflow of foreign loans due to the availability of World Bank loans after a decade of blockage.

The monetary restriction was intensified in the first half of 1983 but relaxed in the second, for the Central Bank had to help the central government with its serious arrears of payment. At this time it was still not possible to protect the level of reserves by recourse to short-term borrowing.

In these circumstances the effective average level of cash reserves did not decline despite the measures taken. Furthermore, interest rates proved to have very little impact in the adjustments. They were consistently negative in real terms. The most important feature of monetary policy was the intense dollarization resulting from the greater profitability of dollar deposits.

As to the institutional framework, with a view to promoting the development of the financial system a policy of institutional liberalization was introduced during the government which came to office in 1980; this policy envisaged:

- Unification of the ceiling of passive interest rates at 55%;
- Reduction to zero of the marginal reserve requirement on national currency deposits;
- De-restriction of the period of capitalization of interest;
- Authorization for financial bodies to carry out short-term operations and for the country's commercial and foreign banks to make loans of one to five years.

The results of this experiment were disappointing. Almost no progress was made in attracting deposits or in financial intermediation.

6. Results

From the simplified standpoint of the indicators which have the best systematic interrelationship, a systematic negative ratio is observed between the real exchange rate and the gross domestic product.

Reserves recovered rapidly after the first adjustment programme in 1978, but this was due not so much to the domestic contraction as to the completion of big mining and petroleum projects started in the first half of the decade. In 1983, in contrast, the level of reserves was maintained at the cost of a heavy cutback in productive economic activities.

The devaluations had an important impact on the reduction of imports but not on the increase of exports. This meant that the trade balance problems could not be resolved by this means. It has been established that exports were affected more by the big investment projects, as

happened in 1979 and to some extent in 1984. In fact, the investment in big projects coincided with times of expanding output and therefore with the disbursement of external financing unconnected with refinancing of the debt. However, it is not easy to relate the expansion of the domestic market to the inflow of this capital. The multiplier effect ought not to have had very much impact as most of the investment was imported.

This demonstrates that external financing had a considerable effect on imports. The income elasticity of imports is much less when imports financed by long-term loans are discounted. Accordingly, the increased imports which coincided with increases in the gross domestic product were not entirely attributable to industry, just as the cutbacks were not due entirely to the austerity policies.

There is no statistical association between the movement of the gross domestic product and the performance of the balance of payments, or between this balance and the debt service; the debt service remained stable regardless of what was happening in the country.

The drop in imports as a result of the devaluations was closely linked with the declines or slowdowns in the gross domestic product.

The policy of higher real exchange rates was clearly associated with the reduction of real wages and vice versa. In the long term, however, the ratio between these two variables was positive. Factors in this were the increased exports, the exchange-rate slippage in 1979-1980 to neutralize the corresponding monetary impact, and the renewed access to external loans in the first years of the last decade.

Nevertheless, the negative impact of the devaluations on wages was greater than the positive impact of the exchange-rate slippage. This was because the abundant foreign exchange was used only marginally to improve wages and domestic demand. It was actually used by preference to:

- Service the foreign debt, including advance payments;
- Increase imports of consumer and capital goods, many of which were consumer durables;
- Make good the international reserves deficits resulting from the continuation of economic expansion up to 1977.

In view of this policy, it is understandable that the country's output should have fallen so far during the last decade despite the fact that exports tripled in value in the middle of the period.

The cutback in liquidity was due to two factors: the monetary policy and the incentives for saving in foreign currency. Furthermore, the lag in nominal incomes caused by the devaluation and inflation meant that liquidity also declined, and in addition to this the monetary policy made the lag in wage rises more effective and lasting.

The money supply thus helped to ensure that the reduced demand for liquidity was balanced at a lower level or that the increase in nominal incomes took longer, thus maintaining the higher exchange rate which had been achieved.

The available information indicates that the movement of liquidity in relation to the gross domestic product was very similar to that of wages, but there was a much weaker relationship between these income and production variables and the total liquidity; this would indicate that the dollarization policy converged with the austerity programme.

Public expenditure has been held responsible for generating excess demand and therefore inflation. However, if only domestic income and expenditure is considered, there is a surplus; and if interest payments on the debt but not the government's imports are eliminated from the

calculation, the resulting deficit is much smaller than the official estimates. Accordingly, the demand-generating and in the long term inflationary impact of public spending, even in the worst of cases, was smaller than asserted. This shows that the aim of fiscal policy was to increase the domestic surplus and use it to finance the servicing of the foreign debt.

Lastly, in order to fill out very briefly the economic policy developments described in earlier paragraphs, we must record some of the many indicators of the people's living standards. The per capita gross domestic product fell sharply but wages fell even further. According to certain health indicators, poverty increased dramatically and was reflected in the incidence of transmissible and respiratory diseases and poliomyelitis and in the percentage of undernourished children. Morbidity increased enormously during the crisis (between 1974 and 1983). The incidence of transmissible diseases notified in 1983 was 431.3% higher than the incidence notified in the national health system during 1974. The increase was 1 184% for acute respiratory diseases.

As for income distribution, wages amounted to 46.9% of the national income in 1974, 40.1% in 1980 and only 33.9% in 1984. In real terms, wages were 27.4% lower in 1984 than in 1974, while business profits were 51.9% higher and the urban per capita gross domestic product 19.7% lower than in 1961 despite the drop in the migration rate.

III

Agriculture and the adjustment policies

The approach taken in this article to evaluate the impact of economic policy on agricultural development is to make an analysis by products, for in Peru they have a clearly regional association. The nine main products are considered for this purpose, representing about 50% of the gross value of agricultural output. This method is based on the assumption of great heterogeneity in Peruvian agriculture.

The analysis which follows is based on individual study of the trends throughout the period 1970-1985 and fluctuations around these trends. The main justification for this method lies in the existence of distinct factors of economic policy and temporary or cyclical movements in the economy as a whole in the long term, which in this case is taken to be 15 years. In this study a statistical relationship is considered to be posi-

rive and strong when the long-term trends follow a similar curve and there is a strong statistical relationship between the fluctuations around these trends. In this case we consider that the impact of one variable on another is "structural", i.e., it affects both the immediate and the long-term curve of the trend. When this is the case the impact of the policy is very great, for it continues over a long period and affects, throughout the 15 years, the long-term trajectory prior to the crisis and accordingly the middle levels around which future fluctuations will occur. This power has precisely the effect of causing very rapid changes in the long-term path of the variables. The study does not take into account the long-term effects which will be visible only in that long term and which will probably be of great importance in some respects, such as technology. The relationships between variables are not so strong when, for example, the trends are similar but the fluctuations are not related; we then conclude that the similarity is due to factors beyond the scope of the study. On the other hand, if the trends are not similar but the fluctuations in the variables have a statistically significant relationship, we conclude that the influence of one variable on another is very short term and does not have a "structural" impact on it. In this summary we present only some of the graphic or statistical evidence, so that it should indeed be a summary. We have preferred to establish very simple equations in the regressions even though their explanatory level is low.

1. Potatoes

Potatoes are the main product of the Sierra and in the long term their output shows a downward trend, the linear path of which is not affected by the long-term variations in the country's total output and in wages or in its own price relative to the general consumer price index. The short-term variations fluctuated around this linear path. Nor did the weather or credit affect the long-term production levels. In fact, during the 15 years of the period under study the long-term trend of credit was linear and upward while, as pointed out, the output trend was linear and downward. The credit curve indicates that the macroeconomic adjustment policy did not affect

the trend before the crisis. Potato production thus seems to have been unaffected by the national economic crisis; it proceeds with its own crisis.

The picture was different in the short term since, to begin with, a clear inverse ratio was established between prices and quantities, and the weather clearly had an impact on the movement of these two variables. It appears that variations in the amount of rainfall determined variations in the areas sown and harvested and the harvest determined the market price. This is because we are dealing here with unirrigated agriculture.

It has been established that another short-term factor was the amount of credit granted by the Agrarian Bank in the sowing season, which is in the calendar year preceding the harvest year. It must be stressed that in view of the restriction of lending, the loans were concentrated on the most efficient production units. However, the inverse ratio between the trend paths of the two variables raises questions about the impact of lending on output. It is clear that, although the credit obtained each year generally varied in the same direction as output, as the years passed an increasing volume of credit was obtained per ton produced and that the loans grew steadily less effective.

The short-term variation in real producer incomes, measured by the gross real value of potato production, depended on the variation in relative prices. As these were affected by the variation in the quantities produced, it might be expected that the main determinant of the incomes of peasant potato farmers was the amount produced. However, setting this factor against the impact of the real exchange rate of the previous year, we find that the latter dominated the former and that this typical adjustment factor in Peru is the most probable explanation for the variation in peasant incomes. Apparently the close relationship between the real exchange rate of the previous year and the gross real value of potato production was due to a very powerful substitution effect between potatoes and wheat. Potatoes thus behaved as a kind of tradeable good. The influence of demand fell to the point at which there was no significant relationship between the variation in relative prices and the variation in real wages.

2. Rice

Rice is the main product of Peruvian agriculture; it is based on the Coast and is increasing most strongly in the Selva. In the case of this product there was a weak relationship between the long-term paths of its output and its relative price and the path of the macroeconomic variables. One important reason for this was the permanent priority assigned to this crop and the support policies which were maintained in the midst of the crisis. The trend of credit for this activity rose in the 1980s when the economy was undergoing its main crisis.

The variations in the gross real value of output were due more to variation in the quantity than in the price. The fluctuations of credit followed output fluctuations very closely, with a year's lag. Therefore, the adjustment policies which temporarily restricted the growth of credit affected the incomes of rice producers, but the decline was offset to some extent by selected subsidies.

Since the domestic price of rice in the husk was influenced primarily by movements in the international prices of husked rice and secondly by movements in the real interest rate, we consider this product to be a tradeable good although it is intended for the domestic market.

3. Sugar cane

Long-term *sugar cane* output depended to a large extent on the flow of the Coast rivers in the previous year. Prices followed a similar path to real wages and international sugar prices.

The gross real value of output depended in both long and short terms on the variation of prices rather than on the amounts produced. The variation of the real exchange rate and real wages in the previous year together explain the fluctuation in the value produced. This is one of the few examples of a farm product in which the demand seems to play a powerful role in determining the value through its impact on the quantity produced. However, it is difficult to understand why in each year means of production should adapt to the demand of the previous year even though the sugar actually came almost entirely onto the domestic market.

Since prices and quantities are determined independently, the adjustment policy, with

higher real exchange rates and lower real earnings, will have had a double effect on the real incomes of cane producers. On the one hand, a positive effect via higher product prices; on the other hand, a negative effect via reduction of quantities owing to lower demand. The information obtained seems to indicate that the positive effects were more important.

4. Cotton

Despite the downward trend of domestic prices as a result of the behaviour of the international price and the long-term exchange rate slippage, *cotton* output maintained a linear and upward trend during the 15 years in question. Variations in the national economy do not seem to have affected this path.

The fluctuations in the relative price show a close connection with international prices in harvest periods and also with the real exchange rate of the previous year. This is apparently due to the forms of payment to the producers, which take into account the international price at the moment of delivery of the product.

The short-term variation in the quantity produced depended primarily on the variation of profits in the previous year. Furthermore, since prices depended on the real exchange rate and international prices, the gross real value of output ought to have risen in both price and quantity with the implementation of the adjustment policies. The most powerful determinant variable was therefore the real exchange rate of the previous period.

5. Coffee

Coffee output and its gross value showed an upward linear trend despite the downward movement of prices from 1979.

In the short term the gross value of output was associated with variations in the domestic price, which was based on the international price, and in the exchange rate in the previous period. This product is intended primarily for the external market and its supply depends basically on its profitability.

Accordingly, coffee producers were benefited in the long and short terms both by higher international prices and by the adjustment policies which raised the real exchange rate.

6. *Hard yellow maize*

The price trend of *hard yellow maize* moved roughly in step with the international price up to the middle of the period under analysis. The paths then diverged: the domestic price fell while the international price rose. The production trend turned downward at the beginning of the crisis but it has risen considerably in the 1980s. As in the case of rice, movements in maize output reflected a specific incentives policy. The aim was imports substitution. The specific policy offset any long-term effects of the crisis and the adjustment policy.

Fluctuations in the short-term price of maize depended on variations in the international price and the real exchange rate. This is the product which was subject to greatest competition from imports. Variations in the quantities produced had the greatest effect on the gross value of output and they apparently depended heavily on the availability of credit in the same year. This being the case, the stabilization policies will have affected maize production. Nevertheless, real incomes do not seem to have been affected.

On the other hand, demand had a clear impact on imports. Variations in real wages also affected the supply and therefore the amount to be imported, but not the price or the output in the following year.

7. *Starch maize*

Starch maize, a mountain product and therefore of peasant origin, showed a constant linear production trend unconnected with the adjustment policies. This is a similar case to potatoes, another mountain product. The long-term trajectory of the relative price was also similar to that of potatoes, i.e., ascending quadratic before the crisis and descending throughout the crisis.

The short-term price was also inversely related to the quantity produced. Wages in the previous year, unlike the case of potatoes, seem to have influenced output; this would indicate that output increased in expectation of increased demand. However, a more formal analysis is needed to evaluate the actual likelihood of such planning in peasant production.

The adjustment policies which reduced real wages and therefore the production of this type

of maize do not necessarily seem to have impaired the gross value of output, for prices offset this effect. The higher real exchange rate, on the other hand, caused a production cutback but also a price increase. The final outcome seems to have been favourable to this product. The corresponding regression with the real exchange rate was positive but not significant.

8. *Poultry meat*

In the long term, output of *poultry meat*, the main livestock product, showed a linear and upward trend, which was due to the heavy substitution of consumption in favour of this item. There was also a parallel downward trend in prices. The crises and the adjustments had no effect on these long-term trends. Recently, as in the case of rice and hard maize, the specific policies have offset the usual effects of the recession.

In the short term, fluctuations in quantities had a greater effect than other variables on prices, with an inverse ratio. A direct association can also be seen between real wages and output, and so demand factors seem to have dominated in the short term. This is the statistically most reliable and officially clearest case of the impact of restrictive demand policies. The odd thing is that the main impact was on the quantity produced and not on prices. This is in fact consistent with the earlier account which established a direct connection between variations in the real exchange rate and variations in poultry meat prices, but this effect acted through a recessive impact on demand and the impact of demand on the quantities produced, which in turn influenced the prices. The improvement of prices in a recession was not offset by the negative effect of the variations in quantities. Apparently, in the definition of the short term used in this study, which corresponds for poultry meat to the short cycle of the economy's dynamics, the criteria of the theory which assumes supply inelasticity do not apply, even if they appear to do so.

9. *Beef*

The long-term output trends and the gross value of the output of *beef* showed an upward curve. Prices, however, followed a typical quadratic path, first rising and then falling. In the short term, output was associated positively with real

wages in the previous year and negatively with rainfall in Puno, the main livestock area. Prices were inversely related to the quantities produced.

The gross value of output in the short term also depended more on prices than on quantities. The negative impact of the crisis through lower demand was therefore not clear, since the effects of price and quantity on the gross value of output cancelled each other out. Accordingly, the adjustment policies did not affect the real incomes of livestock farmers. Once again, as in the case of hard maize, wages affected the volumes imported and not the prices.

10. *An attempt at aggregation and synthesis*

From the standpoint of the long-term trends, i.e., the trends during the period 1970-1985, it can be asserted that the adjustment policies had a less immediate impact on the quantity produced. In the case of the "traditional" products such as potatoes, starch maize and beef, output followed paths which were not altered by the crisis. The reasons for the trends seem to have little to do with the main national production cycle created by the crisis or with the adjustment policies. Nor was the production trend affected by the crisis in the case of the most vigorous products, such as rice and poultry meat. The cause lay in the power of the specific policies on imports substitution or consumption patterns. In third place were the products for which the prices and quantities produced were directly affected by relative prices, which also depended directly on international prices. This was true of cotton and coffee. The production trend of both these crops was also independent of the domestic cycle. Lastly, sugar cane and hard maize followed cubic long-term paths and not quadratic ones like national output and demand as a whole. Sugar production was affected mainly by the availability of water and hard maize by the vigour of the substitution policy.

The long-term trend of relative agricultural prices was universal. All the prices followed a quadratic curve first rising and then falling during the crisis. This movement was consistent with that of relative international prices and, apparently, with the traditional deterioration of the terms of trade of commodities in recessions.

Only poultry meat and its input, maize, were exceptions to this trend. In the long term, the path followed by relative prices did not coincide with that of the real exchange rate even in the case of the products whose price fluctuations were closely linked to the exchange rate in the short term.

An analysis now follows of the short-term performance; the products will first be classified into tradeable and non-tradeable in the light of the formation of their prices. They will then be grouped in terms of the impact of real wages, credit or international prices and real exchange rates on the quantities produced.

First we have those products for which international prices and the real exchange rate were decisive in the formation of their prices. These products are coffee, cotton, sugar cane, rice and hard yellow maize. The effect of the real exchange rate was dominant in the short term, for its variation accounted for 67% of the weighted index of relative prices of these products. In the long-term, as already pointed out, their movement suggests that international prices were the most important factor. It might also be argued that the transnational pattern was repeated within each country, thus internalizing the explanation.

Coffee and cotton can be considered the most typical tradeable products, for their prices were determined almost exclusively by the two variables mentioned above. The quantities produced also depended on relative prices and on the real exchange rate of an earlier period. The other products must have been affected by other less important factors which offer a better explanation of the determination of short-term fluctuations. Several of them, such as rice, hard maize and sugar cane, were affected by factors which offset the benefit obtained on the price side. The statistical relationship found with wages or with credit, depending on the case, suggests a negative impact.

In another group of products the variations in the quantities produced were the main reason for the variations in prices, with an inverse ratio. Furthermore, the output was intended exclusively for the domestic market. The products in this group are potatoes, starch maize and the two livestock products, poultry meat and beef. The quantities produced seem to have fluctuated in

all cases, except for potatoes, in a similar way to wages in the earlier period. Wages were responsible for 36% of the short-term variations in the quantities produced.

In the case of potatoes, rice and hard maize the short-term variation in the quantity produced was more closely connected with the credit received than with other policy variables. The problem, especially in the case of potatoes, is that it is difficult to view credit as an independent variable when there was also a close relationship between it and the amount of rainfall. Nevertheless it must be remembered that the trend of real lending to agriculture indicates a credit restriction. As this restriction was not observed in most of the chosen products, its impact must have been on others. To sum up, the impact of exchange-rate, monetary and wages policies on agricultural production differed according to the type of product. From the regional standpoint, it is hard to establish from the available information that there were different impact. On the Coast, producers of poultry meat and some rice producers were hurt by the austerity policies, but these policies seem to have worked to the benefit of producers of sugar cane, cotton and hard yellow maize, and of some rice producers as well. In the Sierra, in contrast, potato producers benefitted, but producers of beef and starch maize suffered. Lastly, the situation was unclear in the Selva; the credit restriction had negative effects on production of rice and hard yellow maize, and the real exchange rate had positive effects on production of hard maize.

As to the type of producer, sugar co-operatives and more so cotton co-operatives benefitted from the adjustment policies. Medium-sized producers of rice were probably slightly hurt, and producers of hard maize benefitted. On the other hand, small and medium-sized producers of potatoes were favoured by the adjustment, but the opposite was true of beef producers. Lastly, and still in the short term, large and medium-sized producers of poultry meat suffered.

The main conclusion is that a suitable framework for agricultural development requires both a high real exchange rate and increased credit and wages. It is also necessary to establish a floor for producers of goods whose prices are very

sensitive to output variations. This implies real heterodoxy in economic management and would entail drastic redistribution of capital to waged labour.

The formal equation which comes closest to the empirical findings is:

$$\hat{p} = \hat{P}_a^* + E/\hat{P}_i$$

where \hat{p} is the relative price of the tradeable products, \hat{P}_a^* is the dollar price of their counterparts in the international market, E is the nominal exchange rate, and P_i the index of non-farm prices (in our case these prices are assumed to vary in step with the consumer price index). A simpler formula is sufficient for the other type of goods:

$$\hat{p} = \hat{X}_a$$

where \hat{X}_a is the variation in the production of the same product.

In turn, the variation in the quantity produced is connected, in the case of several products, with the variation in demand in a previous period, so that we can express it as follows:

$$\hat{X}_a = (WLi/\hat{P}_i) - 1$$

where WLi is the nominal level of earnings.

Lastly, in the case of export products, the quantity produced is related to the profits in the previous period which, in turn, are determined by the relative prices. It can be expressed as:

$$\hat{X}_a = (\hat{p}) - 1$$

The formula for those products whose fluctuation is connected with access to credit is:

$$\hat{X}_a = (\hat{C}) - 1$$

The validity of this equation cannot be questioned empirically for both in the long term and in its fluctuations the aggregate agricultural output follows a curve very close to that of aggregate credit. Our reluctance to give it greater weight in the product studies is because the results are not as conclusive as in the aggregate analysis.

However, many of the earlier conclusions refer to the effect of only a few variables on the short-term variations in agricultural output and prices. It may have happened that the beneficial effects revealed did not offset the long-term damage caused by the deterioration in interna-

tional prices. This can be seen in the contrast between the downward trends of the real exchange rate and relative international prices. On the other hand, the specific policies may have altered the effect of the general policies. Lastly, it must be remembered that the variable chosen to

represent real peasant incomes does not take into account changes in production costs. The uncertainty about the value of the respective figures directed us towards the gross real value of output used in this study. We will end this summary with a brief review of the specific policies.

IV

The specific policies

A new interest has been taken in agriculture but it has not led to specific and coherent measures for capitalization of farming. The minimum institutional bases do not exist for the stable implementation of specific policies on landholding, regional priorities and institutional frameworks, and the role assigned to the State has undergone major changes. Accordingly, the specific policies have not had a widespread impact on agriculture.

The exceptions in terms of continuity are the policies on incentives for rice and poultry meat, on production in the Selva, on subsidies for imported foods and fertilizers, and on the priority to be given to agriculture in development lending.

1. *The institutional aspects*

The economic crisis occurred at the end of the process of agrarian reform which had altered the system of ownership of the large production units, both modern and traditional. The main concern during the reform was with institutions and not directly with development. The crisis period was marked by the reversal of this new institutional framework. The adjustment policy was introduced, obviously, in circumstances of acute institutional instability which did not encourage long-term investment. The economic crisis affected the reformed structure of collective ownership by destroying a large part of the co-operative system which had been created and replacing it with individual smallholdings. Out of 618 co-operatives in existence in 1985, 108 had received approval for this change in mode of operation, 69 were in the process of making the

change, and 101 had actually parcelled out the land. Various factors contributed to this development, including: the difficult weather conditions in the last decade, when there were serious droughts and floods; the lack of clarity in the operational structure of the co-operatives, which had no goals of accumulation and rationalization of production; management difficulties and corruption, which undermined the confidence of the members in the reformed enterprises; the lack of proper retirement arrangements, which reduced the incentive to retire from individual ownership; and the hostility of the last two governments to the co-operative model.

Marketing was the other area in which an important reversal of the institutional framework took place. For example, a food marketing network had been established during the agrarian reform which delivered food to the consumer through a chain of supermarkets. The deregulation, intensified by the government of President Belaunde, destroyed this system and with it the possibility of price regulation.

2. *The policy of imports subsidies*

The main foreign trade policy was to subsidize imported foodstuffs to satisfy the massive urban consumption. In the long term, imports of wheat and maize-sorghum tended to increase, and there was a general rise in the imported component in the basket of consumer goods. The long-term trend was not altered by the economic crisis, but natural disasters did have a visible impact. Imports rose on these occasions and subsequently maintained their higher level. The establishment of new patterns was encouraged

by the policy of subsidies for already subsidized imports.

In 1977 the annual subsidies for these items amounted to 96.6% of the imported value. In 1978, under the austerity policy, they were reduced to 15.7% but then climbed back to 62.3% in 1979. The most obvious example was that of inputs for production of poultry meat, which became cheaper in comparison with beef, pork and lamb.

In short, and in accordance with the available information, the prices of food products with a high imported component were adversely affected by the adjustment policies. This was due to the overall policy of devaluation and the specific policy of reducing imports subsidies. In the long term, however, the imports subsidies were a factor in the systematic fall in the prices of imported products in relation to those of domestic products and an incentive for their increased consumption.

3. Prices policy and the agricultural crisis

Producers' profits fell. During the 1970s, in particular in the second half of the decade, the input-product terms of trade were clearly negative for cotton, sugar cane, yellow maize and potatoes. The increases in the cost of inputs, labour and machine hours were larger than the price increases. During the period of macroeconomic adjustment the machine-hours cost increased the most, followed by day wages. The fertilizer subsidy was a compensatory factor in the case of inputs. These results are important because they illustrate the progress made in the basic labour force. However, it is difficult to obtain reliable figures on the movement of costs during the past 15 years.

The end result of this deterioration in the terms of trade was decapitalization of modern agriculture in favour of industry. Rice was the product which best resisted the crisis as its prices rose faster than its costs between 1975 and 1978, which was not the case for the other crops.

In the 1980s the priority products were the only ones whose costs rose less than their prices: in rice owing to the movement of controlled prices; and in yellow maize owing to higher productivity and prices. In the case of potatoes, the production increases resulting from better

weather conditions were reflected in an enormous drop in prices. In cotton and sugar cane, products not covered by a specific policy, costs rose more than prices.

4. Financial policy

In 1975 agriculture received barely 3% of the total allocation of credit in the country, industry 38%, trade 26%, and construction 12%. Of this small amount, private banks lent only 5%, and the Agrarian Bank was the institution which supported the sector.

Loans were received by barely 7% of the production units, representing 19% of the cultivated area. Rice, cotton, potatoes and maize received 78% of the loans in 1975. The main beneficiaries of the lending were the large collective enterprises, and those who received least were the Andean peasants.

The following changes have taken place in recent years: rice has made a major advance; cotton has declined; preference has been given to lending to individual producers; and the amount of credit has fallen as a result of the recession.

Analysis of the impact of credit on output shows that there was a real increase in the credit/product and credit/hectare ratios in the long term; however, aggregate output fell. As pointed out earlier with respect to certain products, it would seem that credit had no positive influence on output in the long term.

Another very important point is that, despite the negative real interest rates, the financial costs of the farms rose enormously. The decapitalization of agriculture is clearly reflected in the financial situation of the modern farms. The proportion of financial costs in total costs rose from 8.3% in 1978 to 30.2% in 1983 for potatoes, from 13.1 to 48.6% for cotton, from 7.3 to 30.2% for yellow maize, and from 6.9 to 30.2% for rice. In these products, as may be imagined, bad debts increased owing to the fall in profits caused by the deterioration in relative prices.

5. Summary

To sum up, the specific policies are of great importance in the determination of the final results of the crisis in Peru's agriculture. A more detailed study than the present one is therefore needed. It can be said that in general terms the

macroeconomic policy was not backed up by a coherent set of specific policies. Prices policy served to protect agriculture from external competition but it also increased costs. The supply of the massive urban market required a degree of continuity in the production incentives for poultry meat and rice. In institutional terms, the main goal was to reverse the agrarian reform and the State marketing system. With respect to the regionalization of agriculture, the regional emphasis varied with the successive govern-

ments. Production in the Selva has been given a particular boost in recent years. Lastly, the crisis seems to have affected the already fragile process of capitalization. The financial problems, the cutback in the research work financed by the public sector, the institutional instability and the growing shortage of experienced agricultural professionals, in addition to the recurrence of very destructive weather conditions, have all contributed to this outcome which will have its greatest effects in the years to come.