

ROUTLEDGE REVIVALS

The Primary Sector in Economic Development

Proceedings of the Seventh
Arne Ryde Symposium
Frostavallen,
August 29-30, 1983

Edited by

Mats Lundahl



The Primary Sector in Economic Development

It is a major problem for less developed countries to make their primary sectors sufficiently profitable in order to be able to build up their manufacturing and service sectors. This edited collection, first published in 1985, examines the nature of the primary sector and its role in economic development. Chapters consider problems of stagnation and income distribution in such countries as Chile and Brazil; trade in national primary products and exports in Africa and the Middle East; and reform and policies of development in countries such as Peru. An interesting volume with an international scope, this title will be of value to economics students with a particular interest in the role of the primary sector in developing economies.

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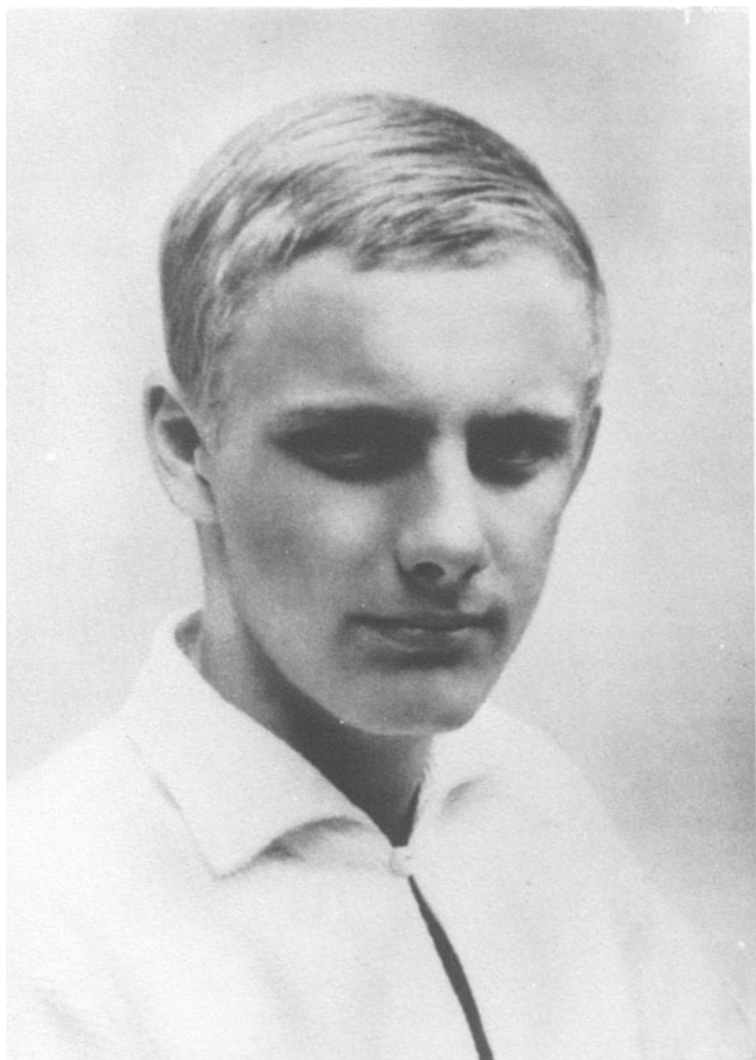
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THE PRIMARY SECTOR IN ECONOMIC DEVELOPMENT



ARNE RYDE
8 DECEMBER 1944 — 1 APRIL 1968

THE ARNE RYDE FOUNDATION

Arne Ryde was an exceptionally promising young student on the doctorate programme at the Department of Economics at the University of Lund. He died after an automobile accident in 1968 when only 23 years old. In his memory his parents Valborg Ryde and pharmacist Sven Ryde created the Arne Ryde Foundation for the advancement of research at our Department. We are most grateful to them. The Foundation has made possible important activities to which our ordinary resources are not applicable.

In agreement with Valborg and Sven Ryde we have decided to use the means of the Foundation mainly to arrange a series of symposia, as a rule one every second year. Our intention is to alternate between pure theory and applications. The themes of our previous Arne Ryde Symposia have been: Economics of Information (1973), Econometric Methods (1975), The Theoretical Contributions of Knut Wicksell (1977), The Economic Theory of Institutions (1979), Social Insurance (1981) and Pharmaceutical Economics (1982).

Björn Thalberg

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THE PRIMARY SECTOR IN ECONOMIC DEVELOPMENT

Proceedings of the Seventh Arne Ryde Symposium
Frostavallen, August 29–30, 1983

Edited by **MATS LUNDAHL**



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PREFACE

The present volume contains a selection of the papers presented at the Seventh Arne Ryde Symposium, on *The Primary Sector in Economic Development*, August 29–30, 1983, at Frostavallen, Sweden. The topic of the symposium was chosen against the background of the importance of agriculture and mineral resources in the development of the Third World. Among the fields of interest were the role played by the primary sector in the development process, the lagging primary sector as an obstacle to development and the generation of change and obstacles to change in the sector.

As head of the organising committee, my gratitude goes to all who made the present volume of proceedings possible. Above all, it goes to the Arne Ryde Foundation for the generous financial assistance both for the symposium and for the printing of the proceedings and to Åsa Weibull, who acted as administrative secretary and thus had to handle all the tedious and thankless work that the undersigned chose to ignore. Göte Hansson, Bo Södersten and Björn Thalberg supported me in the organising committee. Alan Harkess checked the English of various contributions. Agneta Kjellgren and Pia Åkerman typed a number of manuscripts and Agnetta Kretz drew the figures. Keith Persson photocopied all the papers for the symposium. Ronald Findlay provided generous assistance at various stages during the preparation of the proceedings and so did a number of referees who unfortunately will have to remain anonymous. Hopefully, the result, which is hereby communicated to the readers, stands in some reasonable proportion to all these efforts.

Mats Lundahl
Lund

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INTRODUCTION

Mats Lundahl

The term 'primary production' or 'primary sector' appears to be a New Zealand contribution to the economic science. Allan Fisher traces its use back to a New Zealand Census Report from 1891 where 'agricultural, pastoral, mineral and other primary producers' appear in the occupational classification.¹ Ten years later, the term had made it across to Australia where, in a census, primary producers were defined as 'embracing all persons mainly engaged in the cultivation or acquisition of food products, and in obtaining other raw materials from natural sources', i.e. those engaged in agriculture and pastoral activities and in 'capture, etc., of wild animals and their produce, fisheries, forestry, water conservation and supply, mining and quarrying'.² From then on, however, it spread relatively slowly. Writing in 1939, Fisher states that the words 'primary' and 'secondary' production 'did not appear until quite recently in the writings of English economists',³ while 'some American writers apparently still find them novel'.⁴

Today, the terms 'primary', 'secondary' and 'tertiary' are no longer novel to anybody working in the field of economics but constitute a universally accepted part of the profession's vocabulary, having gained acceptance not least through the writings of Allan Fisher⁵ and Colin Clark.⁶ Still, it must be admitted that the definition of 'primary' has not become fully standardised. The problem in this context is mining, which sometimes is included in the primary sector, sometimes not. Colin Clark, in his monumental work *The Conditions of Economic Progress*, offers the following discussion of what constitutes the primary sector:

The first division is agriculture. With this we include all forms of grazing, including nomadic grazing; the business of obtaining meat and skins by hunting and trapping, in most parts of the world now only carried on a very small scale indeed; and the much more substantial business of fishing. It is also convenient to include forestry at this stage. Mining is a border-line case, which is sometimes included here, sometimes with manufacture, and which perhaps deserves a class to itself.

2 Introduction

The common feature about all the above, of course, is that they all depend upon the direct and immediate utilisation of natural resources. By their nature, therefore, they can only be carried out at the point where the natural resources are — one of the most important considerations distinguishing them from manufacture.⁷

In the present volume we will not go into any terminological intricacies but simply include mining in the primary sector.

The Role of the Primary Sector

Several authors have observed that there is a tendency for the relative importance of the primary sector to fall as real income *per capita* rises, both in terms of output value and in terms of employment. This conjecture goes at least as far back as to William Petty who in 1691, wrote:

. . . there is much more to be gained by *Manufacture* than by *Husbandry*; and by *Merchandise* than by *Manufacture*. . . We may take notice that as Trade and Curious Arts increase; so the Trade of Husbandry will decrease, or else the wages of Husbandmen must rise and consequently the Rents of Lands must fall.⁸

The modern version of this statement is above all due to Colin Clark:

We may . . . observe that the data support the generalisation that a high proportion of the total labour force engaged in agriculture and associated forms of employment is only to be found in economically undeveloped communities, and that in an economically developed community there is almost invariably, through time, a tendency for this proportion to fall.⁹

In the growth process of advanced economies there has been a secular tendency for the share of the primary sector in total output to fall and for the share of the secondary sector to rise. However, the share of the tertiary sector does not display any systematic relationship with this process, with the exception of transport and communications whose shares have risen.¹⁰

Still it cannot be denied that during the past and (especially) present centuries, the role of services in the developed economies has been strongly enhanced and that the rising importance of services is intimately connected with the character of economic growth itself in these nations. According to R.M. Hartwell:

The result . . . of economic growth and industrialisation in the advanced economies was, ultimately, *the service revolution*: those economies with the highest *per capita* real incomes are today experiencing service revolutions comparable with the industrial revolutions of the eighteenth and nineteenth centuries. This new stage of development is the culmination of a long process of growth and structural change from which are emerging economies with fifty per cent or more of their employed population engaged in the production of non-tangible goods. . . The lesson of history is, undoubtedly, that what has already happened in the United States will happen elsewhere, and that the trend in employment towards the services in all developed and developing economies will finally result in a world-wide service revolution.¹¹

The first paper in the present volume presents an objection to the customary division of economic activities into 'primary', 'secondary' and 'tertiary' as well as to the 'evolutionary' sequence that has just been sketched. In his 'sermon' on economic development, *Markos Mamalakis* begins by noting that development economics is frequently cast in a dualistic framework which leaves no room at all for service activities. On the other hand, the traditional threefold division is not a meaningful one either but only serves to create analytical confusion. The process of economic development never was one from primary to secondary and tertiary activities, but one from *embryonic rural* activities of *all* three kinds to *modern rural and urban* ones with a higher productivity, *and* where industrial and service activities at the same time increase their importance in relation to agriculture.

Mamalakis examines four different concepts of 'primary' sector (excluding mining). The first one of these treats 'primary' as synonymous with agricultural. This definition corresponds to a certain notion of 'surplus' labour, i.e. labour that cannot be fully employed in the primary sector, whose magnitude Mamalakis places in the order of 80 per cent of the rural labour force. The second definition

is broader and includes all activities needed to produce and *deliver* agricultural goods to the final consumer. Thus, a number of service activities which traditionally are considered 'tertiary' enter the picture: storage, transport and trade. With this definition, the size of the labour surplus shrinks to something like 50 per cent. The third concept of the primary sector is even wider, since in addition to the foregoing it also includes the production of rural *industrial consumer goods*, i.e. industrial consumer goods produced in rural areas. The labour surplus in this case amounts to a mere 20 per cent. Finally, we have the most extensive of the four definitions, where not only rural industrial consumer goods' but also rural industrial *capital goods*' production are taken into account. 'Primary' corresponds to rural, and the labour surplus at most amounts to 10 per cent of the rural labour force.

These extended definitions of 'primary' sector have certain implications for the strategy of economic development. One of the most important goals of development must be to increase the productivity of all activities and among those of course also the rural ones. Much in the same way as Michael Lipton,¹² Mamalakis argues in favour of a correction of the bias against rural areas which permeates development planning in many countries and advocates the decentralisation of both political power and government services as necessary for transforming the countryside in the direction of higher productivity and a fuller, more multifaceted life.

Mamalakis also goes on to discuss income distribution problems and their relation to the problems of the primary sector and points to the failure of industrialisation to bring about a more egalitarian distribution. Here services also have a role to play, as one of the components in a package which also contains land reforms and higher relative prices of agricultural products. To reach the basic needs targets, an upgrading of services is needed, not only in urban areas but in rural districts as well. An end must be put to the various forms of discrimination of the countryside, and in this, according to Mamalakis, services have a catalytic role to play, since making services available to the rural population serves to break a number of urban monopolies, like education, as well as rural power concentrations, like the monopoly-monopsony nexus which characterises factor markets in many developing countries,¹³ while at the same time it contributes to capital accumulation in the widest sense of the word, i.e. including the human capital component as well.¹⁴

Agriculture constitutes the most important part of the primary sector. Traditionally, agriculture has been given a fivefold role in the process of economic development.¹⁵ Enough food has to be provided to meet the rise in demand as the population grows and real incomes increase when the non-agricultural sectors of the economy develop. Agriculture also has to provide the economy with foreign exchange, in particular at the early stages of development when the non-agrarian sectors are still relatively undeveloped. Thirdly, agriculture has to release labour to man the other sectors as these grow, and conversely, to provide work when other sectors cannot. The fourth role is that agriculture must contribute both to the formation of overhead capital in the economy and to investment in the other sectors of the economy if these are to be able to grow. Finally, it is the responsibility of agriculture to increase the cash incomes of the rural population, thereby stimulating the demand for non-agricultural goods and services.

Thus, the development of an economy calls not only for developing the non-agricultural sectors but for developing agriculture as well. Failing to pay attention to the latter sector may jeopardise the entire development process. There was a time in the history of development economics when the question was frequently posed whether industry or agriculture should be given priority.¹⁶ However, after the balanced-unbalanced growth debate in the late 1950s and early 1960s,¹⁷ a consensus gradually emerged that even though during shorter periods one sector could be allowed to leap ahead of the others, in the longer run some kind of overall balance would be needed in the economy if the speed of the development process was not to slow down.

In other words, agriculture should not be allowed to become a lagging sector, since this would also pose obstacles to the development of the rest of the economy. Should farmers, for example, prove unable to provide enough food, valuable foreign exchange which could have been used to increase the capital stock of the economy may have to be spent on food imports, or the price of food will rise. The latter will not only serve to feed inflation in countries where food occupies a large share of household budgets, but may also endanger the health and nutrition standard of the poorer segments of the population.

In the same way, if agricultural exports are insufficient to make for a steady inflow of foreign exchange, and no other export revenues are available, capital formation is likely to suffer, since most

underdeveloped economies are too small from the domestic market point of view to allow for profitable production of investment goods. Agriculture has to serve as a 'quasi capital goods sector'.¹⁸

The third role of agriculture, as a provider of labour to the remainder of the economy, has been the one which has proved easiest to fulfil, given the relatively high rate of population growth in most underdeveloped countries. The problem has instead been that when the non-agricultural sectors have not grown fast enough agriculture has had to step in and act as a 'sink' from the employment point of view. An inadequately developed agricultural sector faces great difficulties in doing this without depressing *per capita* incomes excessively.

Nor is an inefficient agricultural sector where productivity is low likely to be able to save very much, and this in turn poses another problem for capital formation, unless recourse is made to forced savings via taxation of the sector or via turning the domestic terms of trade against agriculture. Both of these measures have been frequently practised. Coercion is, however, not a good way of mobilising savings if, in addition, the fifth and final role of agriculture is taken into account. If a domestic market for the products of, for example, manufacturing industry, is to be created, purchasing power from large population segments is needed. If the other sectors of the economy are not particularly well developed, the only group that can possibly provide this purchasing power is the agricultural population, assuming however, that this power is not taxed away.

Ester Boserup discusses some of the factors that have precluded African agriculture from successfully playing the five development roles which we have sketched above. She begins by offering yet another definition of the 'primary' sector. According to Boserup, a primary sector does not emerge until the economy has left the pure subsistence stage and begins to sell food or other goods. The notion of 'primary' is hence connected with the notion of 'surplus', above what is consumed by the producer families themselves.

In Africa, the primary sector often exports more or less its entire surplus while the secondary sector remains relatively undeveloped. The problem facing the African nations is that there are strong factors which tend to hamper the development of both primary and secondary production.

In a historical perspective, Africa is not unique in exporting most of what the primary sector produces without having developed any secondary sector. The same was true, for example, of the European

countries a couple of centuries ago and of other non-European economies when they came into contact with Europe. The difference between Europe and the rest of the world lay rather in the fact that the European primary sectors were domestically owned whereas, elsewhere, foreign ownership played a very important role. These foreign interests repatriated large parts of their earnings instead of reinvesting and developing the secondary and tertiary sectors of the host countries, as they had done in Europe itself.

Africa stands out in one respect, as far as the relationship between the primary sector and the rest of the economy is concerned. The development of the secondary sector has often proceeded at a much slower pace than elsewhere, including Asia and Latin America. The density of the African population has been low, people are scattered over large areas, and infrastructural facilities are as a rule lacking. Railroads and roads have not been adequately developed and this in turn makes transport and exchange of all sorts of goods difficult. Thus, it has proved difficult to develop commercial food production, with the result that Africa has to import large amounts of food. Transport is expensive, unless the crop in question is one of high value in relation to its weight.

Other obstacles have militated against the development of the primary sector. The sex division of labour turns out to be a big problem. In Africa, the women cultivate the fields but at the same time they are responsible for a host of household duties. According to Boserup, as the population grows, the demand on their time increases. Faced with diminishing returns to labour, they have to devote an increasing amount of time to cultivation in order to feed their families. Consequently, they find it more difficult to produce a surplus which can be sold outside the household.

The development of commercially based food production is also hampered by the fact that modernisation efforts have by and large centred on non-food export crops. African food producers have also had to compete with low-priced food imports, which are frequently the result of subsidies to food producers in developed countries. Moreover these imports often enter Africa at overvalued exchange rates.

Boserup ends her paper by discussing the possibilities for developing the African primary sectors. In the long run, the African nations will want to industrialise, but this is hardly feasible unless the primary sector can produce enough to finance industrialisation. In order for this to be possible, food imports which eat into the

scarce reserves of foreign exchange must be avoided. Cultivation practices can be intensified in regions where the population density is already high, and more lands can be brought into cultivation provided only that they can be reached. Infrastructural investments, not least in transport and communication facilities, are essential in order to open up peripheral areas. If this does not take place, rural people will continue to migrate to mining centres, plantations and other areas, which provide employment, and also give rise to food imports.

Arne Bigsten picks up one of Mamalakis' threads, namely that analysis conducted in the dual economy framework may be completely misleading. In the rural context, for example, this means that a smallholder family has many sources of income besides agriculture proper.

Bigsten analyses the composition and change of incomes of Kenyan smallholder families from the mid-1960s to the mid-1970s, which is a period when the Kenyan rural economy became increasingly monetised and diversified. He then finds that smallholder incomes may be divided into four different categories: farm income, wage income, transfers and non-agricultural operating surpluses. During the period under study, the smallholders of central Kenya saw their farm incomes increase, both absolutely and as a share of their total incomes. Wage incomes as well rose considerably in real terms although their share of the total fell. Transfers (from relatives outside the rural area) increased sufficiently fast to make for an increased share as well. The final category, surpluses from such activities as manufacturing and businesses of various kinds, suffered a declining share. However, this income category appears far too difficult to measure and far too heterogeneous to permit any meaningful conclusions to be drawn.

The diversification of incomes was present both in the mid-1960s and ten years later. According to Bigsten, this is to a large extent the result of the inherent risks of farming. Nevertheless, the farming component increased its relative importance over the decade, probably because it became progressively easier for the smallholders to go into lucrative cash crop production. As a result, the subsistence component of farm income fell. Presumably, smallholders first meet the subsistence needs of the family and thereafter expand in the direction of more cash crops.

Bigsten also carries out a disaggregation of his data, according to income classes. This disaggregation reveals that the share of farm

incomes in the total increases with the size of incomes, i.e. it is the poorer families who most often have to rely on non-farm incomes. On the other hand, families with a large wage income component are as a rule found in the upper income brackets. This seems to be due to a tendency to move out of *agricultural* wage employment to take better-paid jobs outside whenever this possibility arises. The share of transfer incomes decreases with income size, which may indicate that rural-urban migration is concentrated in the poorer families.

Kenya's economic structure is in a process of change. This is also reflected in what takes place in rural areas. The farm household does not derive its income solely from agriculture but has also other important sources of income. Bigsten concludes that this has implications for development strategy. It is probably not by accident that the households that have good contacts with urban areas and labour markets are also those that do best in agriculture. Improvement of communications between country and town has an important role to play when it comes to speeding up the development process.

Problems of Stagnation and Income Distribution

As is well known, agricultural production easily stagnates in less developed economies. Agricultural stagnation may be due to several reasons. The reason which certainly most easily springs to mind is that of excessive population growth in relation to the growth of agricultural output. The Malthusian spectre is a more or less permanent guest in many areas of the Third World.¹⁹

However, population growth is not an unconditional evil.²⁰ It not only makes for more people to be fed but these same conditions also tend to lead to positive changes on the output side. More land is brought into cultivation, the length of the fallow period is shortened, more labour is used, capital equipment and crop mixes change and new, more efficient, technologies are introduced.²¹ The net outcome of these two mutually counteracting forces is not given. Some countries have managed to increase agricultural output *per capita* in the face of heavy population growth. Others have failed to do so.

Alia Ahmad's contribution deals with the tension between the negative and positive effects of population growth. In this, she takes Ester Boserup's theory of population growth and agricultural change as her point of departure. Thomas Malthus, in his *Essay on the Principles of Population*, postulated that the cause-effect relationship

between agricultural output and population growth went from the former to the latter. Boserup, in her widely read book, *The Conditions of Agricultural Growth*,²² challenged the Malthusian view and instead advanced the idea that population growth should be considered as the exogenous variable which determines output.

Ahmad analyses how in the case of Bangladesh a high population growth has led to the stagnation of agricultural output *per capita*. Bangladesh has an agricultural economy which is highly labour-intensive. The typical farm is devoted to wet-rice production. Population growth rates have been high throughout the present century. As a result, more and more land has been put into cultivation and the agricultural practices have changed. With time, however, these efforts have proved insufficient to prevent the stagnation of agricultural production *per capita*.

One of the main reasons for this stagnation is that population growth has not only acted as a stimulus to increased output but it has simultaneously created *obstacles* to growth, since the growth of the population has taken place within a setting characterised by highly imperfect factor markets. In the land market, large landowners dominate the smaller ones who encounter difficulties in obtaining access to land. The labour market also operates in a dualistic fashion. According to Ahmad, the small farmers are not guided by opportunity cost principles in their allocation of labour time to farming while large scale farmers who use outside labour are motivated by these considerations. The latter find it difficult to obtain workers during the peak season, since the workers as a rule at that same time are farming their own plots and give priority to these, increasing the labour input as long as this adds to output while large farmers equalise wages and marginal value products of labour. As the population grows, the discrepancies in labour/land ratios that arise as a result of the difference in the modes of operation of large and small farmers are accentuated. By the same token, the inefficiency of Bangladesh agriculture tends to increase over time.

In addition, the rural credit market is segmented. Only large farmers have access to the former part of the market, while smallholders have to make do with informal credit at high effective interest rates.

Since the scope for substitution of capital for labour is limited in Bangladesh agriculture, the relative cheapness of capital has not resulted in investment in the large farm sector. Instead, cheap credit has been used to acquire more land, which in turn has enhanced the

discrepancy between the land/labour ratios in large and small agriculture. This, in turn has stimulated the employment of share contracts. The landowners thereby obtain labour whereas the workers/sharecroppers make the landlords bear some of the risks inherent in agriculture and at the same time find a safe outlet for their family labour. However, sharecropping as such, in the case of Bangladesh, tends to be less efficient from the production point of view, than owner-cultivated areas.

In this way, population growth tends to exacerbate inefficiencies. This, in turn, has not been adequately offset by outside forces. The government has largely ignored the welfare of the rural population and private incentives have been stifled by the tax, subsidy, foreign exchange and credit policies pursued. An urban bias has been operating, with resources flowing from agriculture to urban occupations rather than vice versa. In those instances where the government has tried to stimulate agriculture, resources have been channelled towards the large-scale end of the sector rather than towards the small farmers.

It is not only in Bangladesh that rural factor markets are imperfect. This feature is notorious in many developing economies, not least in Latin America, where the heavy concentration of land in the hands of a tiny minority has led to imperfections in the other factor markets as well.²³ From economic theory we know that an economic system where perfect competition prevails in all product and factor markets will display efficiency in production and not lead to any waste in the allocation of production factors, whereas economies characterised by monopolies or monopsonies will not. In this way, production will be constrained when factor markets are imperfect.

The paper by *Mats Lundahl* deals with imperfections in factor markets as a possible cause of agricultural stagnation. Between 1930 and 1955 agricultural output *per capita* stagnated in Chile. Two different explanations have been advanced. The first one contends that agricultural stagnation was due to the change in economic policy which took place at the onset of the Depression, when, after several decades of an outward-oriented trade policy, Chile turned inwards and began a process of promoting industrialisation by means of import substitution. By favouring manufacturing at the expense of agriculture and by simultaneously importing food at subsidised prices, agriculture was squeezed into stagnation.

The second explanation is the one taken up by Lundahl. Rural factor markets in Chile during the period under consideration were

highly imperfect. The land was concentrated in the hands of a minority of monopolistic landowners who by virtue of their control of the land also exercised monopsonistic control over the local labour markets. Their landed property and consequent political influence allowed them to obtain credit at low effective rates of interest. At the other end of the scale we find on the one hand, landless labourers and on the other small farmers, *minifundistas*, who have problems in obtaining access to land. Moreover they have to work for the monopsonistic landowners and are forced to obtain credit from the informal credit markets where loans can be obtained only at high effective interest. Such a system is inefficient in the sense that when different producers face different relative factor prices, less is produced than would otherwise have been possible given the technology and the factor endowments of the sector.

Lundahl traces developments in the land, labour and credit markets of rural Chile between 1930 and 1955 to find out whether the degree of monopolistic or monopsonistic control and other imperfections increased or decreased. He finds that the distribution of agricultural land was very uneven both at the beginning and at the end of the period. However, a slight decrease in inequality seems to have taken place. In the labour market there were very few changes. The budding labour movement had considerable problems in organising the rural workers, but at least it cannot be contended that the labour market was *more* imperfect in 1955 than in 1930. Finally the situation in the credit market is harder to examine, since data for informal credit are lacking, but the evidence concerning formal credit indicates that the market inequalities at the beginning of the period of investigation in the factor markets of rural Chile either remained largely unchanged or decreased slightly. Hence the explanation of agricultural stagnation which runs in terms of factor market imperfections does not seem correct. Lundahl concludes that the economic policies pursued by the Chilean governments probably go much further towards offering a satisfactory explanation of what took place.

Faulty economic policies often go a long way towards explaining agricultural stagnation in many developing countries. Even though the rate of population growth is not exceedingly high and the distribution of assets not excessively lopsided in agrarian districts, government economic policies frequently create negative incentives for agriculture with the result that this sector lags behind and is consequently unable to fulfil satisfactorily the five roles in the

development process that were discussed earlier. Agriculture is over-taxed, both directly and via manipulation of the relative prices of food and industrial goods in favour of the urban population, to the detriment of the farmers. Overvalued exchange rates make exports of agricultural products less profitable. Credits are channelled to industry while agriculture suffers. Public investments, e.g. in infrastructure are concentrated in urban areas with the consequent neglect of the countryside. Rural areas are starved of education with the result that the most gifted among the rural youths leave for the cities.²⁴

Third World agriculture does not suffer only from the effects of domestic policies, however. What happens in the industrialised nations affects them as well. 'Export pessimism' is no novelty in the discussion of the future of the Third World, but has for several decades constituted one of the fundamental arguments in favour of accelerated industrialisation of less developed countries.²⁵ The markets for agricultural products in the nations of North America and Western Europe have in the main been characterised by a high degree of protectionism which in turn has also had repercussions in those development countries whose exports would otherwise have competed favourably with domestic agricultural producers.²⁶

Per Lundborg takes up a particular aspect of this problem, namely the extent to which in the case of Brazil the unequal distribution of incomes is a result of protectionistic measures in the United States and Western Europe.

Many researchers have dealt with income distribution in Brazil and its tendency to become more unequal during the 1960s and 1970s. However, the majority of these studies do not centre on the agricultural sector which, as Lundborg points out, is slightly surprising, since in countries like Brazil the poorer segments of the population include large rural groups. Thus, if we are to explain the development of the distribution of incomes in Brazil, an examination of agriculture is called for.

Lundborg simulates the impact on the Brazilian income distribution of different international and domestic policy changes for the 1960-68 period with the aid of a global, dynamic computable general equilibrium model. A basic run is carried out to account for the actual development, and the results of this basic run are in turn compared to what would have happened if either of the following four changes had taken place:

1. The EEC increased its wheat imports by 10 per cent in each period.

2. The EEC pursued the same policy as under (1) and in addition doubled imports of other cereals and rice in each period, while the United States simultaneously doubled taxes or cut subsidies to domestic grain producers by 50 per cent per time period.
3. The government support to Brazilian wheat producers (tariffs and subsidies) was doubled.
4. Government subsidies to Brazilian coffee producers were doubled.

What Lundborg finds is that changes in international policies would not have had much of an impact on income distribution in Brazil. The coordination of policies in the EEC and the United States, for example, leads to improved relative prices for agriculture, but the main beneficiaries are the richer rather than the poorer groups within the rural sector.

When it comes to domestic policies, the picture that emerges is somewhat divided. Increasing support to wheat producers has a different impact on the distribution of incomes depending on the criterion that is employed to measure this distribution, whereas increased support to coffee yields a more equal distribution of incomes.

Income distribution problems and government policies also constitute one of the themes in *Christer Gunnarsson's* contribution. Gunnarsson analyses the factors behind growth and stagnation in the Malaysian rubber smallholder sector. Since the late 1950s, the previously unknown tendency for growth in smallholder rubber production to generate inequalities in the distribution of incomes within the smallholder sector has begun to emerge.

Malaysian rubber production takes place in two different kinds of settings: large estates and peasant smallholdings. Production among smallholders began around the turn of the century. The 1910s and 1920s were decades of rapid growth whereas during the 1930s the colonial government restricted smallholder expansion. At the outbreak of World War II, some 40 per cent of the rubber acreage in Malaya consisted of smallholdings. The post-1957 period, in turn, has seen new growth in the sector.

Gunnarsson focuses on these two growth periods: the early one and its connection with the opening of trade, and the post-1957 period and the relationship of this period with government policies.

For the early period, three different theories of international

trade are tested. The first is dependency theory,²⁷ according to which the expansion of the capitalist system created underdevelopment in the colonies. The introduction of rubber was, according to this theory, forced upon the smallholders, who had few incentives to take up cash production voluntarily. Gunnarsson does not accept this view but instead argues that smallholder rubber production in Malaysia has been a result of voluntary decisions on the part of the peasants, while the colonial power, contrary to what the theory predicts, tried to limit rubber production to European-owned large estates. Besides, dependency theory fails to specify the mechanisms that made the Malayan peasants respond to incentives that were actually created by the market mechanism.

The second theory discussed by Gunnarsson is the neoclassical comparative cost doctrine. As it seems, the introduction of rubber was *not* a neoclassical process of reallocation of production along the production possibility frontier. Food production did not decline even though rubber production increased.

Instead Gunnarsson turns to the 'vent for surplus' theory.²⁸ This theory assumes that both land and labour are idle before trade is opened, due to the limitations of the domestic market. This, according to Gunnarsson, fits the Malaysian economy well. By sacrificing leisure, the peasants could use hitherto idle land to develop rubber production. The triggering event here was the establishment of British rule which ensured a demand for the export product and simultaneously provided the economy with import goods which gave an incentive to the peasants to begin cash crop production.

The second phase of expansion, after 1957, was due to completely different reasons. During the introductory phase, the complementarity of rubber with existing peasant crops had played a decisive role for growth. The second expansion, on the other hand, was largely a result of government policy, in particular when it came to introducing high-yielding varieties. This policy has affected the smallholder group unevenly. The group is not a homogeneous entity and the assistance given by the government in the substitution of high-yielding varieties for the traditional ones has favoured the larger and medium-sized among the smallholders, while the smallest units have not benefited to the same extent. In this way income equalities appear to have been created within the sector. This has particularly given rise to increasing poverty for the smallest producers.

Trade in Primary Products

The vast majority of developing countries are basically primary producers in the sense that the primary sector accounts for the largest share of both GDP and employment. A majority are also primary *exporters*.²⁹ This fact has frequently been a cause for worry. Thus, in his celebrated Wicksell lectures, Ragnar Nurkse observed that while international trade had been an 'engine for growth' for the primary producing countries during the nineteenth century, due to the expanding markets in the countries that were industrialising at the time, the twentieth century presented a much gloomier picture.³⁰ Shifts in the composition of manufacturing industry in the developed countries in the direction of a lower raw material content and increased use of synthetics, low income elasticities of demand for agricultural goods in combination with agricultural protectionism, for example, made it difficult for growth impulses in developed countries to be transmitted via trade. Gone were the days when the markets of the industrialised nations could lead to growth via staple product trade.³¹ Instead, arguments were presented to show that the less developed countries could easily export away domestically generated growth impulses via secularly falling terms-of-trade³² or that export incomes of primary producers would fluctuate heavily and thereby have a negative impact on the rate of economic growth.³³

Some of the problems facing primary exporting countries are dealt with in the article by *Edward Horesh* and *Susan Joeques*. Horesh and Joeques examine the 'linkage' and 'leakage' effects of primary exports on a developing economy: the case of mining and cocoa in Ghana 1956–69. Neither of these two concepts is a clearcut operational one. The linkage approach was developed by Albert Hirschman in *The Strategy of Economic Development* where 'forward' and 'backward' linkages were defined in terms of the relation of a particular industry with other industries using this industry's outputs as inputs or delivering inputs to it.³⁴ Hirschman has subsequently attempted to generalise the linkage concept³⁵ and Horesh and Joeques use his notions of 'consumption' linkages — the spending of export revenues on consumer goods — and 'fiscal' linkages — taxation of exports where the proceeds are used for productive investment.

The idea of 'leakages' departs from the opposite idea, i.e. leakages prevent linkages from coming into play, e.g. when part of the export proceeds are repatriated abroad instead of being reinvested

in the exporting country. To quantify potential linkages and leakages Horesh and Joeques derive functional distributions of incomes by making a distinction between incomes that are repatriated (out of profits and salaries of foreign employees), domestic profits and labour income and government income. While data problems make it difficult to establish any clear trends as far as leakages are concerned, it is shown that between 1956 and 1969, domestic wage incomes and profits fell in mining while the government's share rose steadily. By and large, the same trend could be established in cocoa production, with the tax share accruing to the government rising dramatically.

Thus, in the Ghanaian case there appears to have been a trade-off between potential fiscal and consumption linkages. The potential for the former rose, while that of the latter fell. With respect to fiscal linkages the mining and cocoa sectors proved to be of more or less equal magnitude, whereas the amount of leakages differed significantly between the two: 23 per cent against 3 per cent of net export proceeds. It would seem that there were few direct production linkages in any of the two sectors. Cocoa and mining products were both exported in an unrefined state and all the capital equipment needed in the mining sector was imported. Only in relation to cocoa farming did some minor backward linkages develop.

Altogether, Horesh and Joeques conclude that linkages from export-related activities were weak in Ghana during the period under consideration while the leakages from mining were quite substantial. The only potential linkages to develop were the fiscal ones, but unfortunately, the government did a poor job when it came to investing the tax proceeds productively.

Bo Södersten also deals with the theme of mineral exports, but from a different angle. He addresses himself to the question of what a newly independent mineral-rich economy may make of its minerals in its development effort. Basing himself on Mamalakis' ideas of 'mineral-led' development,³⁶ Södersten examines two concepts of rents which may accrue to mineral producers. The first is the traditional Ricardian rent which arises due to the existence of deposits of different qualities and which accrues to the owners of the mines where superior ores are exploited. The second is a short-period rent which is due to the fluctuations of the price around a 'normal' or trend value typical for minerals which may be captured by selling when the price is above the trend.

Södersten poses the question of how rents should be divided

between the state and the capital and labour employed in mining. His suggestion is that the mines should be run with a minimum of capital so that the total share going to this factor is also minimised. The share of labour is somewhat more difficult, since when Namibia gains independence from South Africa, there will most probably be a tendency among mine workers to press for high wages, because this group may easily come to constitute an elite within the labour force. Therefore Södersten underlines the importance of restraint on the part of the Namibian government when setting levels of wages in the mines.

The government must then deal with the question of how rents accruing to the state should be spent. Södersten recommends the creation of a specific development budget with earmarking of funds for industrial development and the institution of a norm for the division of government spending between current expenditure and development expenditure.

The subject of trade policy is also brought up. From the market point of view Namibia is far too small for any import substitution policy to work. An export push, based on minerals, is needed. The country's strong comparative advantage in mineral production should also allow Namibia to leave the customs union with South Africa, which has apparently not been particularly beneficial. Finally, Södersten makes some specific recommendations regarding industrial promotion, identifying suitable industries and pointing to fishing and agriculture as suitable bases for industrial expansion.

The perceived lack of dynamic elements in primary exports, based to a large extent on the negative experiences of primary exporting countries during the Depression of the 1930s and on the shortage of industrial imports during World War II, made many developing countries launch import-substituting strategies for industrialisation. By the 1960s, these policies which had tended to dominate the picture, had not, as is well known, yielded particularly successful results.³⁷

Ronald Findlay takes a different attitude. His paper shows that primary exports may be quite compatible with industrialisation without import substitution and that in the long run primary exporting countries may well become industrial exporters instead.

Findlay deals with three inter-related issues. The first part of his essay is dedicated to the Ricardo-inspired model constructed by Bent Hansen of economic development with unlimited supplies of land.³⁸ In the second section, this model is turned into a Ricardian

model of primary exports and manufacturing. The last section analyses resource-based industrialisation in an open economy.

The Hansen model depicts a colonial economy where plantations monopolise high-quality land and where peasants have a choice between working on these plantations and settling on 'unlimited' land of marginal quality. Findlay examines the results of population growth, increases in the supply of superior land and technological progress in the plantation sector as well as the impacts of price changes and points out that plantation agriculture in this setting is an 'enclave' in the economy in the sense that a rise in the price of plantation crops does not change the real incomes of the native population. Moreover, the interests of planters and natives are opposed to each other. Thereafter, manufacturing is introduced and Findlay demonstrates that if both the return to capital and product prices are given, the real wage that manufacturing can afford to pay is also given. If this wage is above what the peasants can earn on marginal lands, peasant agriculture will be wiped out, and plantation wages will rise.

With given real wages in the plantation sector, the phenomenon known as 'Dutch disease' can be introduced. When the peasant sector has been wiped out and plantations and manufacturing compete for labour, an expansion of the latter sector, will drive up the wage rate and force capital to leave the country and thus lead to deindustrialisation.

In the second section of this paper, Findlay uses the Hansen model as a point of departure and shows how an economy which starts as an exporter of primary products becomes a producer of manufactures which it may eventually even export. In the Hansen model production was instantaneous. Findlay now assumes that it takes time. In this way capital enters the model. Agricultural workers receive their wages (food = circulating capital) at the beginning of the period and the output appears at the end. Since the workers in the plantation and manufacturing sectors earn less than their marginal product, due to the existence of an unlimited supply of marginal lands profits arise in these two sectors. Findlay demonstrates that if capital is competitively allocated, the size of the plantation sector becomes determined.

Going one step further, allowing for savings and capital accumulation out of profits, Findlay subsequently shows that, after the initial expansion of the plantation sector, when the rate of profit has been driven down in this sector as a result of diminishing returns to

land, all further expansion will take place in the manufacturing sector at a constant profit rate (due to a given price of manufactures in combination with a given wage rate and constant returns to scale). This expansion may even result in the export of manufactures, provided that capital accumulation is sufficiently rapid in relation to population growth, while food production on marginal lands will shrink.

The final section points specifically to the role of raw materials in international trade in a model with one raw material, requiring 'land' and labour for its production and one final good using the raw material and labour. Here, Findlay first determines the optimum allocation of resources in the closed economy and the properties of this optimum before he goes on to demonstrate what the country's equilibrium will look like if the two goods can be traded for each other internationally at given prices and the country exports its raw materials.

Michael Roemer deals with the opposite side of the primary exports problem. A boom in primary exports may be a 'curse in disguise'. During the 1970s a number of developing countries had such booms. However, far from all of these countries saw any overall growth in the economy. One reason for this was the 'Dutch disease', experienced where a boom in primary exports may have negative repercussions on the rest of the economy that stifle growth.

The impact of Dutch disease has been analysed in a three-sector model by Max Corden and Peter Neary,³⁹ and Roemer also makes use of this model. In addition to the expanding sector, there is a 'lagging' sector of other traded goods as well as a non-tradeables sector (services, transports etc.). In the short run, only labour is mobile between these sectors. First, there is the spending effect: the price of non-tradeables increases and this in turn leads to an appreciation of the domestic currency in real terms. At the same time, labour moves from the lagging to the non-tradeables sector. There is, however, also a 'resource movement' effect. The export boom pulls labour away from both the lagging and the non-tradeables sector into the expanding one. Thus, the net effect is that the output of the lagging sector will fall, whereas, as far as non-tradeables are concerned, the two effects counteract each other.

In the long run, all factors are mobile, and then the results are no longer as clearcut. It is uncertain which of the sectors will suffer contraction. Roemer stresses this point, since most analyses have

concentrated on the short run. Economic development, however, is by definition a *long-run* phenomenon and this must be kept in mind when the effects of a primary export boom are analysed. However, it cannot be denied that a number of less developed countries have suffered from Dutch disease. Roemer examines the validity of Dutch disease models for that type of economy, as well as some alternatives to the Corden-Neary model and some empirical data on Dutch disease in developing countries.

He subsequently poses the question of whether Dutch disease is really a disease at all, i.e. whether it needs to be 'treated'. After all, the core of the disease lies in the shift of relative commodity prices in favour of the booming sector, and shifts in relative commodity prices by their very nature must favour certain sectors over others. Hence they could be regarded as a recurrent feature of economic life. Nevertheless, Roemer argues that we *are* dealing with a disease. If a boom is expected to be short-lived, there is a need to protect the rest of the economy from the price signals emanating from it and even in the case of more long-run trends, the government does not necessarily want the economy to progress along the path which results from primary export-led growth, especially not if the boom is based on an exhaustible resource like petroleum. A more diversified development pattern may be desirable.

The most obvious treatment of Dutch disease is sterilisation of the revenues of the expanding sector by the government, by accumulation of foreign reserves and by limits on expenditure. Such a policy may, however, be politically difficult to carry out, since in less developed economies there is always, for various reasons, heavy pressure on the government to spend and it is unlikely that governments are able to resist such pressure. There are, however, other remedies. A dual exchange rate which pays an appreciated rate to the booming sector and a devalued one to all other tradeables could be used, but this would presumably only create incentives to circumvent the dual system in various ways. Taxing the expanding sector and subsidising all other tradeables would have the same effects, but in the typical political environment in less developed countries, the result could easily be that sectors dominated by political favourites would end up with the fatter share of the subsidies. Finally, there is tariff protection, where especially in the case of a lagging manufacturing sector, the primary export boom leads to deindustrialisation. However, as is well documented in the development literature, this has a number of drawbacks. Thus Roemer concludes that there are

well-known remedies for Dutch disease, but that from the political point of view those that are economically to be preferred have a bitter taste. Hence the persistence of Dutch disease in many developing economies.

Frank Kirwan's paper points to some second- and third-round consequences of a boom in primary products: migration from non-expanding less developed economies into expanding ones and the effects that this migration has had for the economy from whence the migrants come. The case dealt with is the OPEC-triggered rise in oil prices in the 1970s and its impact on labour-exporting states in the Middle East, particularly Jordan.

When the price of oil rose in the 1970s, the demand for labour grew in the oil-exporting Arab states. Much of this demand was met by migration from such non-oil-exporting countries as Egypt, Jordan and the two Yemens. These migration waves reached such proportions as to create a labour scarcity in some of the source countries, which in turn led to a replacement wave from such countries as Bangladesh, Korea, Pakistan and China. Since most of this migration within the Arab world is not of a permanent character, it has given rise to a flow of remittances back to the source countries where, due to lack of supply elasticity, balance of payments problems and an upward pressure on the price level have arisen. Furthermore, given the relatively undeveloped state of the capital markets, many of these funds has been channelled into land acquisition and residential construction instead of into productive capital formation.

Kirwan chooses the case of Jordan to illustrate how these mechanisms work. Perhaps as much as one-third of the Jordanian labour force is employed in the neighbouring oil-producing states while Jordan itself imports Egyptian and other labour to fill the gap created by these departures. These migrants remit part of their earnings back to Jordan to the effect that substantial sums are entering the country each year.

Kirwan employs a two-by-two model with one non-traded good to analyse the possible impact of remittances on the source country. If no remittances at all take place, and everybody in the source country, including the emigrants, has the same homothetic tastes, the welfare of those remaining behind falls.⁴⁰ As Kirwan shows, if remittances are introduced that are sufficiently large to maintain the nominal income of the source country at its pre-migration level, the welfare of the source country will still be lower than if no migration

had taken place, assuming that the emigrants consume in their home country. On the other hand, should remittances be even larger, the impact on welfare may be either positive or negative.

In the concrete case of Jordan, the combined effect of emigration and remittances was probably positive, since during the first part of the seventies there was unemployment and hence very little output ought to have been lost when migration began, while the gap left by the migrants was filled by foreign workers. Thus, according to Kirwan, the effect of remittances alone ought to have been by far the most important one.

Finally, Kirwan examines several macroeconomic consequences of emigration from Jordan. Due to emigration, unemployment fell drastically from 1970 to 1975 — from 14 per cent to 2 per cent — at the same time as GDP rose. A large part of the remittances from the emigrants ended up being invested in real estate which created a boom in the construction sector. Over the same period, agriculture contracted, but Kirwan does not find any evidence which indicates that this fact was a consequence of emigration.

Generating Change

Many of the articles in the first three sections of the present volume demonstrate different ways in which the development of the primary sector in Third World economies is blocked, and how a lagging primary sector may constitute a brake on the overall dynamism of these economies. The last two sections, in turn, deal with the generation of change in the primary sector to break this impasse.

It is not difficult to point to areas where change is needed, particularly in agriculture. As we have seen in the foregoing, the land ownership and land tenure systems in many countries tend to foster inefficiency, underemployment and skewed distributions of income. Land reforms are needed to correct this, but also to ensure a redistribution of political power away from the feudal or semi-feudal hierarchies that still characterise many rural areas, in favour of more broadly defined, economically less powerful, groups.⁴¹ Land reforms cannot, however, do the trick alone, but must be complemented by other reform measures as well. Without provision of such services as credits, irrigation, seeds, fertiliser, marketing, education etc., the probability that land reforms will become 'negative' events is high as the historical experience eloquently demonstrates.⁴²

Rural credit markets are often hopelessly imperfect. This is not necessarily the result of monopolistic power, as described above, but frequently information problems fragment these markets in such a manner as to make for a systematic misallocation of funds, away from high-yielding investments towards unproductive ones instead.⁴³ In both these instances, credit reforms are needed to make investment in agriculture possible. The lack of credit also bears directly on the lack of modern inputs in agriculture. Such innovations as the Green Revolution have a bias towards increased use of material inputs like fertiliser, irrigation and sometimes also towards mechanisation. If such needs cannot be met, the innovations may turn out to be inferior from the point of view of the individual farmer, who consequently will not adopt them but continue with a technology that is low-yielding.⁴⁴

It is, however, not only direct provision of inputs that is needed. For agriculture to become dynamic, a number of overhead facilities are also needed. When landless workers take over the land, following a reform, they will be facing a number of problems that are new to them. They need education and extension services which enable them, for example, to understand technological change and to make economic calculations. Even though sometimes the argument is heard that farmers in developing countries do not need any formal education to become efficient producers, as Theodore Schultz has pointed out, it is virtually impossible to find any instances where educated farmers who continue to farm are coupled with a stagnant agricultural sector.⁴⁵

Similarly, farmers need marketing outlets. Land reforms often face problems during the first years after the reforms have been undertaken in that the institutional structures that existed before the reform, for example with respect to collection and transport of agricultural produce, break down or go out of existence when the reforms are undertaken. New systems will then have to be devised rapidly, if the marketed surplus which the non-agricultural sectors of the economy need is not to fall drastically.

Technological change represents another big headache for the individual farmer. Naturally, such change can be introduced spontaneously, but often it tends to be very uneconomical for the individual to search for suitable new techniques without assistance. Since agricultural technology to a large extent has the character of a public good whose returns cannot so easily be appropriated by the innovating individual, research will have to be undertaken by other entities

and extension services have to be organised to ensure the spread of technological change.

Other reform and support problems are common to agriculture and mining. These include, for example, income stabilisation schemes when supply or demand fluctuates in such a fashion as to make producer incomes fluctuate as well. Some type of stabilisation scheme may therefore be called for to smooth out these fluctuations over time in order to ensure, for example, that output of export produce does not fall drastically, giving rise to a reduction in the foreign exchange revenues needed to import investment goods.⁴⁶

Related to this is the problem of creating adequate incentives to producers. In the foregoing, we have seen examples of how government pricing and other incentive policies have militated against the primary sector. There is frequently a strong need to correct different types of biases that have been introduced without due reflection on the possible effects on primary production.⁴⁷

Finally, the integration of the primary sector with the rest of the economy must not be forgotten. It is a commonplace in much of the development literature that enclave mining and plantation sectors do not have any *patent* effects on the rest of the economy or that subsistence agriculture shows up in input-output tables with coefficients that are either zero or very close to zero. Thus, the linkage problem looms large. How can backward and forward linkages, as well as consumption and fiscal ones, to use the more ambitious approach, be created in order to involve the primary sector in a central role?

Ian Simpson examines the record of government intervention in agricultural development, in particular with respect to farm income stability and flexibility in the economic organisation of production.

The scope of government intervention has widened considerably after World War II. Prices are set by political decisions. Research programs are sponsored. Farmers receive subsidised credits and farm inputs. Institutions to control production have sprung up. Land reforms have been carried out in a number of countries. The results of these interventions, argues Simpson, have been generally unsatisfactory. The goals of income stability and flexibility in organisation have not been reached. Frequently, the necessary knowledge has been lacking. Intervention has not been based on facts. Inordinate delays in government decision-making has increased rather than reduced the uncertainty with which farmers have had to cope while institutions have been set up which, when no

longer needed, have not been scrapped but turned into counter-productive, bureaucratic organisations instead.

Simpson stresses that specific forms of intervention have their limitations. If governments are to manipulate prices, reliable estimates, e.g. of supply elasticities, are needed, but in spite of a prolific use of regression analysis and programming models, much remains to be achieved. Nor does price intervention as a rule take into account the effects that such intervention has on land values.

Agricultural research programmes often build on estimates of rates of return which Simpson feels are biased upwards, due, for example, to comparative inefficiencies in research establishments. There is also the question of public versus private involvement. Agrobureaucracies often have a tendency to take over tasks which would have been more efficiently performed if left to private initiative. Governments also undertake to invest directly in agricultural infrastructure, such as in irrigation and transport facilities, but often both the identification and timing of such projects are faulty. Land reforms as well suffer from bad preparation and lack of information or failure to use the available information correctly.

Simpson compares the interventionist role of government with the regulatory role. The latter policy is more modest in its scope and interferes less with the way the agricultural economy works. This policy aims instead at providing positive incentives which make stability and flexibility possible. Simpson identifies three important areas for regulation. Firstly, agricultural land markets have to be controlled to prevent land concentration and subsequent social unrest, while at the same time ensuring that land resources match capital and labour. The second area is stabilisation of agricultural prices which is felt to be necessary when farmers are averse to risk. Finally, the government should step in and ensure that the agricultural resource base is conserved. As is well known, erosion is severely threatening the ecosystems in many developing countries.

Tom Alberts provides a concrete illustration of the problems connected with ill-conceived land reforms. He analyses the effects of the 1969 Peruvian redistribution of land, undertaken by the military government.

The background to the Peruvian land reform is found in the tendency for agricultural production to stagnate. While in the 1950s agricultural output *per capita* grew by almost 2 per cent per annum, in the following decade, the growth rate fell to a mere 0.4 per cent. This stagnation had several causes. In the first place, arable land had

become increasingly scarce. Secondly, during the period under consideration, the Peruvian government resorted to a policy of import substitution in the manufacturing sector behind tariff walls which penalised agricultural production via an overvalued exchange rate. In addition, food prices were deliberately kept low. The overall result was that the internal terms-of-trade turned against agriculture.

The change in relative prices in combination with mounting expectations of a land reform during the era of the Alliance for Progress in the 1960s apparently led to a fall in private investments in agriculture to a very low level during the decade preceding the 1969 reform. The latter, in turn, had two objectives. One was to increase the rate of growth in agriculture while the other was to create a more egalitarian distribution of incomes.

The land reform was comprehensive. Over a period of ten years, some 10 million hectares were expropriated and redistributed to some 400,000 rural families. Unfortunately, however, this redistribution was not followed up with a complementary input package. It would appear that the rate of investment was low and the volume of credits furnished by the Agricultural Development Bank was cut in half. Besides, the policy of favouring the urban food consumers at the expense of the rural producers continued until the late 1970s. The land reform affected almost 50 per cent of the agricultural population. These people received land against a quite modest payment to the former landowners, based on the declarations of asset values that the latter had made during the years preceding the reform. Furthermore, payment took place in bonds not adjusted for inflation.

When the land reform began, the Peruvian distribution of income was very skewed. Rural incomes were low on average with the result that a steady stream of people left the countryside to go to towns. However, the reform mainly involved the permanent workers on the large estates and benefited the upper 20 per cent of the rural population, whereas the poorest, i.e. mainly the landless, were left outside. Thus, it is highly uncertain whether the distribution target of the reform was ever reached. Nor does the reform seem to have been very successful in terms of the growth objective. During the 1970s, agricultural production *per capita* became negative. Peruvian agriculture today appears to be as stagnant as it was twenty years ago.

Steven Englander's paper goes into the details of another of Simpson's themes: the importance of agricultural research and

training in connection with the transfer of agricultural technology. The bulk of the evidence available on research and transfer of technology in agriculture seems to indicate that these two activities are complementary in relation to each other and not substitutes.⁴⁸ Using this finding as a background, Englander sets out to examine how domestic agricultural research capacity is acquired in developing countries.

He begins by constructing a model of agricultural research and technology transfer, to answer the question of whether a research system in a particular developing country should adapt a foreign technology to suit its needs or develop a purely local one. The analysis is conducted with the aid of expected research possibility frontiers: tradeoff curves between two desired characteristics of the cereal (wheat) which describe the combinations of expected best improvements of these two characteristics from a given research programme.

Englander introduces two regions in his analysis, containing different relative valuations for the two characteristics. It is assumed that neither of the two regions prefers the variety which is the goal of the other. Furthermore, it is postulated that neither region can produce a variety which from the standpoint of the other region is better than what that region can itself accomplish. However, research is not a deterministic process but a highly probabilistic one. Consequently the result may be a product which has markedly different characteristics from those desired by the researchers. Hence the possibility remains that a region involuntarily ends up with a product that corresponds well with the requirements of the other region.

If this is the case, how does the other region respond? Will it or will it not attempt to exploit the research results? Obviously, this will depend to a large extent on *how close* the characteristics of the new variety are to those preferred by the region. If the new variety is superior to the existing ones in terms of both demand characteristics, the choice is easy. The product will be adopted. On the other hand, a product that is a great deal better in terms of one of the characteristics but below the standards set in terms of the second, will present problems.

One possibility is that, via domestic research, the new variety may be adapted to the requirements of the second region. However, it has often been the case in practice that complementary changes occur in factor endowments that enable new varieties that were