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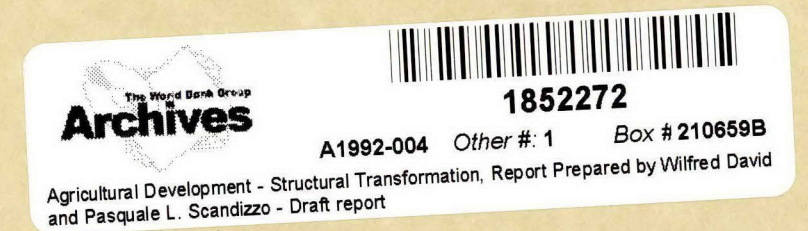
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AGRICULTURAL DEVELOPMENT AND
STRUCTURAL TRANSFORMATION

Prepared by

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January 19, 1979

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i. Middle income countries represent a diverse sample of economic conditions and development experience. They include both poor and relatively rich countries and a variety of success and failure stories in increasing food output, export crops, developing domestic industries and expanding trade. By and large, their patterns of growth differ from the experience of the developed countries during the early phase of their development in that agricultural production and trade is originally less diversified, self-reliance for food consumption lower and industrialization somewhat costlier and less dynamic.

ii. Despite these differences some universal patterns of change can be observed from the experience of all countries and include: a declining share of agriculture in total output with a concomitant increase in the share of manufactures; a shift in the labor force from agriculture and other primary industries where its productivity is low, to secondary and tertiary activities where it is higher, and changes in the patterns of external trade in agriculture with diversification in domestic production and a reduction in food imports.

iii. These differences, however, cannot be related to the prescription of a correct path of development and there is general agreement that development and industrialization and, indeed growth and development cannot be seen as synonymous. While it seems clear that agriculture's role in structural transformation is inherently connected to the sector's role in the overall development process, the traditional focus on growth and accumulation is not necessarily appropriate. At the minimum, development implies the attainment of a set of social goals such as (i) the provision of basic needs to everyone, (ii) an equitable income distribution, and (iii) a better quality of life. These objectives involve both growth-distribution and efficiency-equity considerations. In general,

they do not stand in contrast with the objective of increasing agricultural productivity, the point of convergence being the institutional structure of society which must be altered through the adoption of suitable policies and strategies (as discussed in Chapters 2, 3 and 5).

iv. The process of structural transformation can be studied at various levels of aggregation: (a) in terms of the inter-relationships between agriculture and the rest of the economy and (b) with respect to changes taking place within the agricultural sector itself. Both aspects are touched upon in this paper. An important point of emphasis is the inter-dependence between the agricultural and non-agricultural sectors. This complementary relationship between agriculture and non-agriculture is a multi-dimensional and complex one, involving exchange of products, flows of productive factors, diffusion of ideas, etc. It involves not only the backward and forward linkages of the agricultural sector to other sectors of the economy, but also the patterns of consumption and expenditures generated from incomes earned in agriculture. Since the agricultural sector still employs the largest proportion of the labor force in many middle income countries, what happens to incomes generated in that sector will largely determine the vicissitudes of other sources, e.g., capacity utilization and financial viability of domestic industry, by way of influence on the effective demand in the domestic market for their products. Thus the management of the rural sector during the process of industrialization is of importance for the economy as a whole.

v. The interpretation given to agriculture's role in the transformation process depends on one's perception of the sector's role in the overall development process. The conventional view of development focuses on the creation of conditions of self-sustained growth in per capita incomes and output as well as

X requisite changes in economic, social and political structures. However, the available evidence suggests that the historical growth process may be accompanied by increasing immiserization reflected by absolute impoverishment of lower income groups as well as increasing relative inequality. Such the absolute impoverishment, it is contended, may result from an erosion of traditional economic structures due to increasing competition from the modern industrial sector for markets and resources. Such a disruption of the traditional economic system could lead to the impoverishment of some groups. Supporters of the hypotheses based on increasing relative inequality argue that ^this occurs not because of declining absolute incomes for lower income groups but because rates of growth of income for upper income groups is higher than for their lower income counterparts. Therefore, to the extent that the growth process is not accompanied by significant income linkages between two groups, development may be accompanied by increasing relative inequality.

vi. While the relative merits of these two rival theses are not explored in depth here, the paper focuses on the related aspect of structural change which represents shifts in the relative shares in the economy of specific groups attached in particular production sectors. To the extent that economic growth is likely to bring about continuous disturbance in the pre-existing relative position of several economic groups, e.g., a decline in the relative position of farmers, small-scale producers, etc., the process of transformation is likely to be fraught with conflict. This is the case even where it leads to increased income or product for all groups in society. As Kuznets remarked in his 1973 Nobel Lecture: "In that modern economic growth has to contend with the resolution of incipient conflicts continuously generated by rapid changes in economic and social structure, it may be described as a process of controlled revolution." (Kuznets 1973, p. 253).

vii. Because of the inherently conflictual nature of the structural transformation process, the paper places particular emphasis on the welfare implications of the development process. It embraces a conception of development in which the attainment of a social optimum must be considered a fundamental objective of policy. Attainment of social optimality is synonymous with the movement of society - both nationally and at the level of individual sectors - from one state to a socially preferred state. As such, the attainment of social optimality becomes consonant with a long term objective of national development policy based on the successive relaxation of those systemic obstacles to the full realization of the human potential of all groups in society. Within this context, the desirability and outcome of the structure^{al} transformation process will ultimately depend on (i) the extent to which it provides the material basis for achieving the above objectives, and (ii) the extent to which it establishes the institutional conditions for removing the other barriers to self-realization.

viii. While a full treatment of the notion of social optimality cannot be presented in this paper, it is emphasized because it raises certain basic issues, relating to overall development policy in general, and the role of agriculture in particular. These issues relate to (i) the concrete benefits that are sought and the scale of priorities; (ii) the population groups that will pay the price and how and by whom the sacrifice will be arbitrated; (iii) the mechanism through which benefits will be achieved. This raises certain subsidiary questions relating to national self-reliance, material versus moral incentives, the role of popular participation, technological appropriateness, etc; and (iv) the time horizon deemed necessary before significant gains are achieved. While the paper does not pretend to address these issues in depth, they are raised because of ~~their implications for Bank poli~~

their implications for Bank policy as well as future directions for development thinking and research.

ix. In the majority of the middle income countries, agriculture merits attention in the study of the transformation process because of its large size. On average, for the middle income countries in Asia, Africa and Latin America, the sector still accounts for about 30% of total value-added, and employs more than 60% of the labor force. In all these countries it remains a basic sector because of the singular importance of food in human diet, with about 40% of consumption spending devoted to agricultural commodities. In addition, for many of these countries, agriculture still provides the major source of foreign exchange earnings and savings.

x. For these countries, this paper presents a preliminary look at some of the patterns and problems connected with the process of structural transformation. As such, it is exploratory in nature, and relies heavily on the published literature (see bibliography) as well as a large body of secondary data sources and Bank reports. Due to data constraints the presentation is very uneven in many places. However, despite these limitations we have tried to use as much empirical evidence as possible in arriving at relevant conclusions.

xi. Once the alternative hypotheses and the available evidence on structural transformation is examined, we ^{find} ~~found~~ that the following conclusions can be tentatively reached. First, countries whose industrial sector is not sufficiently developed to create a market for domestic food products, and countries whose comparative advantage in food production is low or negative, appear to face a choice between balanced but slower growth both between and within the sector and unbalanced but faster growth. This result comes from a comparison of the countries pattern of growth in the mid-1970's which, for predominantly agri-

cultural countries, display a negative correlation between (i) industrial and agricultural growth, (ii) food production and agricultural growth, and (iii) overall GDP growth and all indicators of relative size of the agricultural sector. This negative correlation is further reinforced by the fact that population growth tends to shift resources from the sectors where the country may have comparative advantage to food production.

xii. Second, for the most successful non-agricultural countries, the process of differentiation of the economy is sufficiently advanced to permit labor absorption from the agricultural into the industrial sector maintaining, at the same time, an adequate balance between agriculture and non-agriculture. In these countries, complementarity between the agricultural sector and the manufacturing industry may be high, inter alia, because of historical emphasis on agricultural growth since the earlier stages of development. As a consequence, development proceeds along a broad front, involving trade, food production, industrialization and population.

xiii. Third, for both predominantly agricultural and non-agricultural economies, the pursuit of balanced growth between agriculture and manufacturing and within agriculture between food and non-food is associated with the higher achievements in terms of ensuring the satisfaction of basic needs, improving the conditions of the poor and bettering the quality of life for all. Furthermore, the worst conditions of life are found in those countries where the push to industrialize at the expense of agricultural development and growth in food production is highest.

xiv. Fourth, the countries which have been most successful in raising agricultural output also achieved success in generating support and reforming production organizations. Success in land reforms and institutional reorganization is prompted by a mixture of (i) farmers support, (ii) a shift in the power relationship in

in the direction of the reformists, (iii) a centralized strong government authority and (iv) appropriate technical change.

xv. Fifth, while by and large the internal terms of trade evolved in favor of the agricultural sector in many middle income countries, the structure of agricultural prices is such that agricultural producers are still penalized to replenish government budgets, foster industrialization or permit lower urban wages. The urban bias of these agricultural policies has been compounded by other inequities and is often associated with a strong unbalanced pattern of growth for the entire economy.

xvi. Finally, in the area of planning and policy coordination, a conflict often exists between the need to monitor and promote development through a centralized body and the importance of farmers' participation. All strategies for agricultural development - especially those involving small farmers - critically depend on farmers' involvement in the decision-making process. While the experience of both bureaucratic and participatory approaches in the last decade or so has been mixed, greater thrust in the direction of participation is suggested by the success of the decentralized strategies (e.g., Korea and China) in mobilizing the total energies of the farming population.

Wilfred David

A. PRINCIPLES

AGRICULTURE AND STRUCTURAL TRANSFORMATION

1) Some Conceptual Issues

1.1 There are two broad strands running through the extensive theoretical and policy literature on the role of agriculture in structural transformation.

One provides a broad historical perspective of the role of agriculture in economic development. The other stresses agriculture's role in the secular or long-term pattern of structural changes accompanying development. In this latter case the most widespread approach encountered is the attempt to draw historical lessons from the experiences of the developed countries during the earlier stages of their development with the objective of applying these lessons to the contemporary developing countries. Those who focus on this latter strand usually move interchangeably between a description of the role agriculture has actually played in the history of developed countries to policy prescriptions about agriculture's potential role in the economic development of contemporary developing economies.

1.2 Besides blurring the distinction between description of and prescriptions for patterns of change, there is usually not a clear enough distinction between the implications for transformation of closed and open economy models. The former is concerned with the internal relationship between the agricultural and non-agricultural sectors within the domestic economy while the latter is concerned with the external relationship between the domestic economy and the rest of the world. The distinction between those two perspectives becomes important since they can have different and sometimes conflicting implications for the role of agriculture in the transformation process.

1.3 However, it may be useful at this point to clarify what is meant by "structural transformation". The view taken here is that structural transformation is a process through which an economy moves from one state to a socially preferred state. Such a process involves the attainment of some level of "social optimality" and therefore goes beyond the narrower principle of Pareto optimality and its related efficiency criteria. Differently expressed, the transformation process is inherently concerned with the attainment of self-sustained development. This is usually accompanied by two sets of processes -- growth and accumulation on the one hand and structural change on the other.

1.4 While there is general agreement that certain structural changes are needed to sustain the future growth in output and to provide a response to the changing needs of society, opinion is divided as to what the relevant parameters are. As previously mentioned, the conventional wisdom perceives it as a process which follows a pattern of change observed for the developed countries during the early phases of their development. However, since the prevailing set of rights, endowments, relative prices, etc. are important constraints to the Pareto-optimal configuration and therefore to the nature of the growth process, the optimal configuration changes as concomitant changes take place in rights, endowments, etc. This implies that there is no one efficient solution but an infinity of efficient solutions, depending on the structure of society.

1.5 The conventional view of the transformation process is a subset of a wider view of economic development which equates it with the attainment of certain patterns and levels of growth. Articulated by Sfeir-Younis and Bromley [1978], the process of development and, by implication, transformation involves five basic principles: (1) accumulation - the direct relationship between development and investment; (2) acceleration - a structure that allows for "rapid" development; (3) consistency - the structure for development should be such that society's objectives are easily identifiable; (4) sacrifice - the impossibility of simul-

taneously satisfying all of society's objectives. While the recognition of these principles is important in the consideration of the growth path, the analysis of development requires the addition of the institutional principle. This view recognizes the possibility of having development without increasing the set of investments and vice-versa. Development can then be associated with a process which identifies appropriate institutional changes and self-generating economic incentives within a given development environment.

1.6 While in the longer run growth and development go together, this need not be the case in the shorter run. Generally, an expansion of national or sectoral output without other changes in resource allocation constitutes growth with little development. On the contrary, large increases in social sector investments which are not accompanied by increased output in directly productive sectors such as agriculture represents development without much growth. Thus, in examining the success or failure of countries in achieving their long-term objectives, both the growth prospects as well as the structural changes which facilitate or impede development, need to be analyzed. The urgency of the structural change phenomenon is also highlighted by the experience of many developing countries which reveals that transformation is more difficult than accumulation and that the proper deployment of resources is more difficult than their allocation.

1.7 From the closed-economy perspective, the role of agriculture in structural transformation is posited in terms of certain interdependencies between the agricultural sector and the rest of the economy. The received tradition normally sees agriculture as making four standard contributions to the development process: (1) as a source of essential domestic food supplies and raw materials for maintaining a growing industrial population; (2) helping to increase the size of the domestic market; (3) as a source of domestic savings for industrial expansion; (4) as a source of labor and human capital for use in the faster growing sectors; and (5) as a source of foreign exchange through agricultural

exports. While there is general agreement about the complementarity between the agricultural and non-agricultural sector during the process of development, no clear indication is usually given as to whether the expected contributions of agriculture should be on a voluntary or a compulsory basis.

1.8 In terms of the five standard roles mentioned above, it should be emphasized that the first four -- increasing food supply, the savings and market contributions and human capital transfer -- basically describe internal relations between agriculture and non-agriculture from a closed economy, two-sector modelistic perspective. However, the fifth -- agriculture's contribution to augmenting foreign exchange receipts -- requires some conception of a semi-open economy, depending on agriculture's comparative advantage. The integrating of these two perspectives becomes necessary if agriculture's role in the process of structural transformation is to be properly understood and evaluated.

1.9 While there is general agreement that agriculture should perform the vital function of meeting domestic food requirements, the food self-sufficiency requirement is not so obvious in a situation where a country has a comparative advantage in non-food agricultural products. In this case, meeting both the food and foreign exchange requirements might be conflicting. Of course, where a country's comparative advantage lies in food production these two functions can easily be satisfied -- the case of the food exporting countries in Asia, e.g., Thailand. However, the emphasis in present writings seems to focus on those food-deficit countries which export non-food products on the basis of existing comparative advantage.

1.10 Agriculture's savings and market contribution are usually postulated in terms of increases in the incomes and spending power of farmers. The common argument is that rises in agricultural productivity would bring about increases in the domestic market for industrial goods because of increases in the income and spending power of farmers as well as a rise in domestic food production relative

to exports. Since it is further assumed that increased food production would primarily benefit poor farmers, this would lead to a more equal income distribution, and given the increase in total incomes, expenditures on industrial goods would increase. However, as the experience of many developing countries shows, there is no unambiguous relationship between increased farm incomes and spending on the one hand and the creation of a larger domestic market for industrial goods on the other. It depends on farmers' spending propensities for domestic goods relative to imports and the extent to which domestically produced goods are competitive with imports. Thus, when conditions governing the operation of the open economy are taken into consideration, it is not necessary for the agricultural and non-agricultural sectors to grow in a balanced fashion.

1.11 Furthermore, one implication which becomes important for the process of structural transformation is that agricultural productivity must increase. Depending on the circumstances, this can be achieved through the markets for increased agricultural output which the non-farm sector (domestic and/or foreign) can provide; also through the provision of a variety of inputs from the non-agricultural sector. It is in this sense that agriculture can become an important sector in sustaining the development process. While the strength of the complementarity between the agricultural and non-agricultural sectors can be expected to change as development progresses, a matter of some concern is that the process of transformation not be frustrated because agricultural productivity is not rising sufficiently or because non-farm income and employment opportunities are not expanding rapidly enough in relation to population and labor force growth.

ii) The Conventional Approach

1.12 Empirical analysis of the structural transformation phenomenon shows that there are certain patterns of change which countries experience with per capita income growth. While some of these patterns seem to be universal, others are more specific and depend on variables such as country size, economic structure, forces of history, as well as the political and social milieu which in turn shape the policies and strategies pursued.

1.13 The most general model of structural change usually posits a secular decline in agriculture vis-a-vis other sectors as per capita income increases. Several explanations of observed differences in sector growth rates are usually given. One such explanation is the change in the structure of domestic and foreign demand as per capita income rises and goods and services with a higher income elasticity of demand become more important in final consumption. Evidence to support the income elasticity explanation for changes in sector shares can be found in the declining proportion of food in total private consumption. On the supply side differences in sector growth rates arise from the uneven expansion of factor inputs among sectors as well as the uneven increase in productivity as new processes and techniques are adopted and at different rates. This aspect of structural change is usually evaluated by observing employment and investment patterns, i.e., agricultural vs. industrial employment and the relative share of investment allocated to the various sectors. Since new techniques are typically embodied in new capital, a combination of increases in factor inputs and new technology provide a mechanism for differential sectoral growth rates.

1.14 Based on this historical evidence, there has emerged a firmly established generalization that for every great region of the world living standards tend to be higher the smaller is the relative importance of agriculture in output and employment. From this has developed the popular prescription that development implies

a diversion of resources from agriculture to the industrial sector. The stimulation of industry therefore becomes a necessary condition for the improvement of agriculture because the income generated in the industrial sector is expected to stimulate the demand for agricultural sector products and, in turn, a part of industrial sector output may serve to reduce input constraints on agricultural sector expansion. One aspect of this view is that the stimulation of industry is a necessary condition for development because it draws surplus population from the land, and assuming a rate of increase of industrial growth in excess of population growth, a tendency for output per head in agriculture to increase even in the absence of changes in land tenure arrangements, in cropping patterns or production techniques.

1.15 Changes in sector shares are usually correlated with shifts in the labor force from agriculture and other primary activities to secondary and tertiary activities, or historically from those activities where output per worker is low to where it is high. Such growing differentials in output per worker may result from an unequal increase among sectors in inputs of capital and other factors, particularly since intersectoral productivity differentials reflect the contribution of all inputs, and not just labor. Further, sector differences in labor quality may widen with increased age-sex differentials or growing differences in education and training. Other possibilities are that specific product and factor markets are imperfect or that opportunities for factor substitution differ among sectors.

1.16 The studies of Colin Clark (1940), Kuznets (1971) and Chenery (1975) as well as many others, have identified and measured the long run relation between GNP per head and the share of the labor force in agriculture. In general, their work highlights the massive migration of workers which is part of the growth process. Explanation of the factors governing labor transfers can be found in

the assumptions made regarding the conditions of labor supply in the classical (Lewis 1954, Ranis and Fei 1961, 1964) and neo-classical (Jorgenson 1967) approaches to the transformation of the dual economy. The classical model assumes that the labor supply is infinitely elastic during the early phase of development, while the neo-classical model assumes that real wages may vary and that earnings in agriculture are proportional to those in industry. These assumptions about the conditions of labor supply carry important implications for the process of labor transfers, the movement of the terms of trade between agriculture and non-agriculture, as well as the economic feasibility of transformation from agriculture to industry.

1.17 The classical model is essentially concerned with industrial growth and therefore prescribes a balanced growth path of development. Industrial sector expansion requires concurrent development of agriculture at an appropriate rate, with a stable terms of trade between the two sectors. Such a balanced growth path is also necessary to keep real wages in terms of industrial products at a constant level. Therefore, too rapid an expansion in agricultural productivity may retard industrial growth. The central feature of economic transformation in this approach is the reallocation of surplus labor from agriculture to non-agriculture at a fixed real wage rate.

1.18 Once the growth process begins, and as intersectoral balance is maintained, the industrial sector is assumed to expand smoothly as labor moves out of agriculture on a continuous basis. When this phase of development is completed, surplus labor is no longer available to the industrial sector at a constant real wage rate. According to Fei and Ranis when this "turning point" between the classical and neo-classical phases is reached, real wages in the non-agricultural sector begin to rise and capital-deepening begins in the agricultural sector.

1.19 A pertinent question relating to the experience of middle income countries is whether their development profile confirms the labor transfer process or whether they have reached a "turning point" as postulated above. To the extent that these countries have experienced growth in the non-agricultural sectors, a question is whether employment opportunities have expanded sufficiently outside agriculture to facilitate the process of surplus labor transfer. Has the labor transfer process been an important dimension of the growth experience of these countries? This question is important since the experience of most countries has shown that labor transfers have been largely part of a process of relocating surplus labor from one sector to another. In attempting to answer this question, consideration should be given to Kuznets' hypothesis (1967) that increases in per capita income have been primarily due to rising productivity within sectors rather than to shifts in the relative shares of the labor force between sectors.

iii) Agriculture - Industry Balance

1.20 The approach which emphasizes transfers of surplus labor from agriculture as an indispensable dimension of economic transformation tends to equate development with urbanization and industrialization. This viewpoint tends to overestimate the potential of the non-agricultural or industrial sector to absorb surplus labor and to accommodate growth in the labor force. Further, it overlooks the potential of the agricultural sector in eliminating surplus labor through the adoption of labor-intensive innovations within the sector.

1.21 The argument for the industrialization alternative is that it raises incomes by providing higher productivity employment than the agricultural sector. Further, it is said to provide the potential for self-sustaining growth through the re-investment of profits and through linkages to other sectors which use industrial outputs as inputs. Some writers stress the difficulty of introducing modern agricultural technology in traditional agriculture and the price-

inelasticity of demand for agricultural products in both domestic and international markets which tend to frustrate the leadership potential of the agricultural sector. Others refer to the fact that the total capital cost (water, fertilizer, seed, pesticides) is generally higher in agriculture than in industry.

1.22 By contrast, the "pro-agricultural" school continuously question the efficacy of the industrial sector as a vehicle for creating income and employment. This is reflected in the inability of this sector to absorb surplus labor. From this perspective it is argued that the agricultural sector should receive primary attention based on the belief that the per unit cost of increasing output and employment is lower in agriculture than in industry. "Apart from the question whether a program that leaves the bulk of the nation's population out of account can properly be called national development, industrialization itself moves on its stomach; it must be supported by an adequate food supply". (Johnston and Southworth, p. 11).

1.23 The real issue, however, concerns the processes which will develop and maintain an appropriate "balance" between agriculture and non-agriculture. The concern is the extent to which agricultural growth and development is made commensurate with that of other sectors of the economy. Whether agriculture has the "ability to lead" or "needs to follow" other sectors during the process of transformation cannot be addressed on a priori grounds and must depend on individual country experiences. What is important is that some countries have made considerable progress in emphasizing agricultural development and can continue such policies even at more advanced stages of development. Once countries reach a stage in their development where output, employment and exports are expanding along broad fronts, agriculture may become less crucial in sustaining the development process. Nevertheless, for the majority of middle income countries, a substantial agricultural potential still exists. Others are hampered by inadequate agricultural growth. Some, especially those whose development has been based on mineral exports, have large and very rural areas whose problems are indistinguishable from their low income counterparts.

1.24 In the final analysis the problem may not be one of deciding on an "agricultural" versus an "industrial" strategy but rather to recognize that "the development of manufacturing industries does not preclude the development of agriculture." On the contrary, they are mutually dependent: the problem facing the less developed countries is not one of choosing between primary and secondary activities but rather one of ensuring the balanced expansion of all appropriate sectors of the economy..." (United Nations 1971).

1.25 Hirschman (1958) in his "linkage" concept provides a different rationale for emphasizing certain sectors in the process of development. In his view the best development path lies not in the promotion of balanced growth where every activity expands perfectly in step with each other but by selecting those activities where progress will induce further progress elsewhere. Contextually development and therefore the process of transformation should not be viewed as a series of alternatives, e.g., agriculture versus industry, but rather in terms of efficient sequences of public investments that tend to maximize "induced" investment decisions. An activity which shows a high degree of interdependence as measured by the proportion of output sold to other industries (forward linkage) and the proportion of output that represents purchases from other industries (backward linkage) should be established early in the development process because of the growth stimulus emanating from output using and input supplying industries.

1.26 Yotopolous and Nugent (1973) have attempted to measure the extent of forward and backward linkage using inter-industry tables for a number of developing countries. They also developed a total linkage index which considered the indirect effects that emanate from the direct linkage effects. They find that the industries exhibiting the highest total linkages are leather, basic metals, clothing and textiles, while the lowest linkages are found in agriculture, services, mining and utilities. On the basis of their indices of sectoral linkage effects

Yotopolous and Nugent conclude that there is a clear priority for secondary production, especially manufacturing over agriculture and services. A test to see whether countries that emphasized high linkage sectors were indeed able to achieve high rates of growth than did countries that emphasized low linkage sectors failed to establish any clear relationship between an emphasis on high linkage sectors and growth. On an a priori basis, however, the evidence suggests that the larger the linkage the greater the output and employment creation potential. The linkage issue therefore becomes crucial in the study of the process of structural transformation.

1.27 In summary, the following conclusions can be drawn from a review of the relevant theoretical and empirical literature dealing with general patterns of structural change:

(1) Changes in output structure can be linked to changes in per capita incomes. The general pattern is for countries with higher per capita incomes to have proportionately smaller agricultural sectors.

(2) The pattern of change relating to changing sector shares is likely to show considerable variations as per capita income increases because of differences in natural resource endowments, country size and economic policies.

(3) Changes in sector shares are usually accompanied by a proportionate reduction in the agricultural labor force via rural/urban migration. Countries with a smaller fraction of their labor force engaged in agriculture, despite the reduced manpower availability, generally have higher absolute levels of national per capita output.

(4) Questions of labor absorption and productivity are central to the considerations of structural transformation. This relates to the structural connections between a given sector's changing share in national output, the level of average labor productivity within the sector, and the amount of labor it

releases or absorbs. The labor absorbed in a particular sector follows directly from its productivity ratio, i.e., its average product per worker relative to the national product per worker. The observed pattern has been for intersectoral productivity differentials to be greater during the early phases of development and to narrow as per capita income rises. Average labor productivity is lower in agriculture and generally well below the national average over the entire range.

iv) The "Double Development Squeeze" on Agriculture

1.28 While the application of criteria drawn from the conventional approach to the study of the transformation process in developing countries can certainly provide useful insights, a certain skepticism could be raised about the unqualified application of the model. The guarded use of the model becomes important not only because of its inherent limitations but more importantly from the predilection of the policymakers to draw policy prescriptions from the description and analysis of the patterns of change. These limitations refer especially to the effects of the transformation process on the conditions of life (the "social effects" as well as their implications for the "double development squeeze" on agriculture).

1.29 The economic and technical changes accompanying the transformation process may fit easily into the economist's criterion of efficiency, but their desirability should ultimately depend on a proper assessment of hidden costs and benefits as well as on the willingness of the population to accept

them. As pointed out in the previous section a major effect of the transformation process lies in increasing urbanization and a concomitant decline in the relative importance of the agricultural sector. However, such a process involves a variety of costs and returns which are not normally reflected in the conventional measures of economic change. While urban life certainly provides amenities and opportunities not readily available in rural areas, the necessity to move from rural to urban areas implicit in the conventional model of development fails to take into account the substantial social costs involved in pulling up roots and adjustment to the relative anonymity and higher costs of urban living.

1.30 Further, the evidence suggests that for many societies people show a great reluctance to leave the land unless forced by land shortage or economic necessity to do so. The unwillingness to become members of the industrial (urban) labor force and to commit themselves to work in factories even though this may offer better prospects for earning higher incomes can be attributed to a dislike for wage labor and a desire to preserve one's freedom and independence. The implication is that in the attempt to draw policy prescriptions based on the nature of the transformation process taking place in middle income countries, account should be taken of the kinds of sacrifice people may be willing to make to development and transformation, at least as these terms are conventionally interpreted.

1.31 Since the levels of specialization and division of labor reached in industrialized countries is used as a yardstick for judging the nature of the transformation process in the developing countries, account should be taken of the negative effects on the quality of life that such a process tends to produce.

1.32 The costs and sacrifices associated with the transformation process are evidenced by the fact that it has historically been accompanied by growth-induced conflicts. Such conflicts are likely to arise from shifts in the relative importance of production sectors, and therefore in the relative distribution of benefits to various population groups. This implies that if structural transformation is to lead to self-sustained development, it must be accompanied by the requisite institutional and related changes designed to spread the benefits to all groups in society, and especially to lower income groups. The issue concerning the increasing relative inequality that may accompany the transformation process are taken up again in Part B of this paper. Here, however we consider its relations to the fundamental issue of the "double development squeeze".

1.33 The possibility of a double development squeeze raises questions about the relative inequalities that may develop both within agriculture and between agriculture and other sectors during the process of transformation. To the extent that the conventional approach to transformation is adopted, the sector may be really squeezed in three ways, (i) by means of the direct outflow of capital, represented by the net balance of purchases and sales of the agricultural sector; (ii) by the deteriorating terms of trade between agriculture and non-agriculture; and (iii) by the transfer of human capital through migration.

1.34 These problems can be highlighted in terms of two aspects of the squeeze discussed in detail by Wyn Owen over a decade ago - the production squeeze and the expenditure squeeze. The production squeeze can assume various direct or indirect forms. In a command-type economy, output can be extracted directly through compulsory deliveries at low prices to the non-agricultural

sector; or alternatively through a combination of high farm prices and high farm taxes as happened historically in Japan. It can also assume an indirect form, operating through the market mechanism, as exemplified the U.S. development experience. Under such a system the farm sector, through an intersectoral profit transfer brought about by technological progress, is made to deliver to the non-farm sector increasing supplies of food and other agricultural commodities at progressively lower prices.

1.35 This deterioration in the agricultural terms of trade, combined with competitive pressures, and advancing technology provide the main reasons for the relative decline of the agricultural sector. This constitutes the basis for the expenditure squeeze since those farmers who do not adopt new methods become faced with two equally unpalatable choices: either to "be left behind" in the unprofitable world of subsistence farming or to drift to cities and join in the ranks of the urban unemployed and slum dwellers.

1.36 In addition to those previously mentioned, there are other costs to the agricultural sector associated with rural/urban demographic movements. First, there is the substantial capital transfer from agriculture to non-agriculture connected with the costs of rearing and educating that part of the non-agricultural labor force that originates in the agricultural sector. Second, in serving as a residual employer, the agricultural sector maintains at its own expense redundant quantities of labor until alternative employment opportunities are provided by the non-agricultural sector - with the agricultural sector becoming an informal unemployment insurance and social welfare system.

1.37 In view of the above considerations, extreme caution should be exercised in the attempt to draw policy prescriptions for middle income and other developing countries based on models of structural transformation drawn

from the experience of the developed countries during their modern growth. To the extent that certain features of the model are adopted, the various costs and diseconomies attendant upon the transformation should be borne in mind, and attempts made to minimize them. The clear conclusion which emerges from these perspectives is that a model of structural transformation suited to the needs of the developing countries must be based on the necessity to progressively build up the rural sector rather than its demise. As the experience of the developed countries shows, the possibilities for an industrial revolution depend on a prior or simultaneous agricultural revolution.

1.38 The above point has been most forcefully articulated by Sir Arthur Lewis, and we quote from him at length:

"The size of the industrial sector is a function of agricultural productivity. Agriculture has to be capable of producing the surplus food and raw materials consumed in the industrial sector and it is the affluent state of the farmers that enables them to be a market for industrial products. If the domestic market is too small, it is still possible to support an industrial sector by exporting manufactures and importing food and raw materials. But it is hard to begin industrialization by exporting manufactures. Usually one begins by selling in a familiar and protected home market and moves on to exporting only after one has learnt to make one's costs competitive.

The distinguishing feature of the industrial revolution at the end of the eighteenth century is that it began in a country with the highest agricultural productivity - Great Britain - which therefore already had a large industrial sector. The industrial revolution did not create an industrial sector where none had been before. It transformed an industrial sector that already existed by introducing new ways of making the same old things. The revolution spread rapidly to other countries that were also revolutionizing their agriculture, especially in Western Europe and North America. But countries of low agricultural productivity, such as Central and Southern Europe, or Latin America or China had rather small industrial sectors, and there it made rather slow progress." W. Arthur Lewis, The Evolution of the International Economic Order, p.10.

v) Openness, Resource Endowment and Size

1.39 The relative degree of openness or closedness, size and resource endowments are important influences determining agriculture's potential role in the transformation process. These characteristics define a country's economic structure, i.e., the initial set of rights, relative prices, and generally institutional conditions which must be altered during the process of development. When such criteria are used, countries can be subdivided into at least three categories.

1.40 First, there are those small, labor abundant, natural-resource-poor economies in Asia, e.g., Korea, Taiwan and historically Japan. By necessity such countries are forced to rely heavily on foreign trade as the major engine of growth. Second, there are the natural-resource-rich open economies of Asia (Philippines, Thailand) and in Latin America (Brazil, Venezuela) where again foreign trade is important, and there the import substitution strategy, especially in the case of the Latin American countries, has had a prolonged history. Third, there is the case of the natural-resource-rich open economies mainly in Sub-Saharan Africa, e.g., Nigeria, Ghana, Ivory Coast, in which external trade has also been an important vehicle of growth but which show substantial variations in development patterns. The feature which primarily differentiates these countries from the two typologies mentioned above is that they, more than others, seem to be struggling with the human and physical infrastructure prerequisites necessary for the transition to modern development. Another category of countries are the large, labor surplus, natural-resource-rich countries such as China which are relatively closed economies and where the process of development is by necessity domestically oriented based on a balanced growth process between the industrial and agricultural sectors.

1.41 The majority of these countries, however, share some common structural characteristics which are important in considering the actual and potential patterns of structural change. These include (1) open dualism with two agricultural subsectors existing side by side and in many cases with a substantial non-agricultural sector. The typical pattern is for a food producing, domestically oriented, agricultural hinterland to co-exist with a cash crop producing, export-oriented, commercialized agricultural "enclave" exhibiting production relations similar to those observed for a commercialized "modern" industrial sector; (2) "labor surplus", especially in the traditional or subsistence subsector with an "excess supply of labor" employed at given institutionally determined wages.

1.42 Issues relating to size, resource endowment and openness highlight the fact that there are two interdependent types of constraints to development - those that can be attributed to internal factors and others which might be traced to the external environment. The interaction between the internal and external factors can have a profound effect on the transformation process as well as on its outcome. From the perspective of agricultural development, an important internal factor lies in the domestic economic structure. In general, this can be delineated by distinguishing land-surplus from labor-surplus economies. As demonstrated in Part B of this paper, these two types of economies require, and usually follow, different paths of technological adoption. In general, one would expect that land-surplus economies would emphasize labor-saving technologies in order to increase agricultural productivity, while labor-surplus economies would focus on land-saving or yield-increasing technologies. This dichotomy carries different implications for the nature and form of capital and other investments necessary to augment agricultural productivity.

1.43 In terms of the external environment, the degree of openness has implications for the extent to which the countries concerned can combine "outward-looking" and "inward-looking" strategies optimally. While a discussion of these issues would take too far afield, it is particularly important at this juncture. In particular, the role of agriculture in the transformation process should be considered within the context of a call for a New International Economic Order which requires a close look at existing international economic relationships [David,1977].

2. AGRICULTURAL STRATEGIES AND POLICIES

i) The Role of Agriculture in Development

2.1 The nature of the transformation process within agriculture as well as the sector's role in the overall transformation process can be influenced to a large extent by the broad spectrum of policies and strategies which a particular country pursues. Analytically, a distinction should be drawn between those policies and strategies which are directly addressed to the agricultural sector as distinct from those, especially macroeconomic policies, whose influence is more indirect, but nevertheless significant. The nature of the linkages between policies and the nature and extent of structural transformation has not been sufficiently examined in the development literature. However, some generalizations can be drawn from the experience of developing countries.

2.2 The types of macro-economic and sector policies pursued influence the speed of movement towards social optimality, alluded to in the previous section; that is, the success or failure in achieving the multiple objectives of agricultural development -- growth in agricultural output, incomes, employment and in general, improving the overall standards of well-being of the rural masses. In a similar vein, the policy framework reflects whether in the process of transformation agriculture's contributions are voluntary or whether through deliberate governmental acts a compulsory contribution is exacted; and therefore on whether the double development squeeze is encouraged.

2.3 For example, the agricultural sector can make a voluntary contribution to domestic food self-sufficiency if a rise in agricultural productivity leads to an automatic reduction in food prices. On the other hand, the imposition of food price controls may be an indirect method of forcing agriculture to provide cheap domestic food. Savings may be squeezed out of agriculture by taxation or other policies which deliberately turn the terms of trade against the sector. Per contra, the sector's contribution to savings can be voluntarily induced by higher returns to investments in the industrial sector.

2.4 Many middle income countries now strive to achieve some measure of social optimality. In particular, the question of a more equitable distribution of income has not only humanitarian and political significance but cannot be divorced from the question of the optimum economic organization of society. The need to restructure development priorities became particularly evident during the 1960s when it became clear that the normal process of development was accompanied by the relative increase in impoverishment of a number of groups, and especially rural residents. Further, the results of empirical investigations show that the traditional policy instruments have a weak or unsystematic effect on the relative share of income going to the poor, especially in agricultural and rural areas.

2.5 Some economists contend that the fundamental question here is whether the general possibility for income redistribution is so embedded in the structure of so many economies that it can only be transformed by major changes in the existing social, political and economic framework. Indeed studies have shown that those countries which have achieved some measure of success in attaining the social optimum, e.g. South Korea, Taiwan and the Peoples' Republic of China have followed a similar set of strategies designed to alter the structure of society. All these countries emphasized during the earlier stages of their development dynamic asset redistribution focusing primarily on land. Such a step may involve low or negative output growth rates but it sets the political, social and institutional prerequisites for subsequent growth. This first stage in the transformation process of these countries was later followed by massive accumulation of human capital as well as rapid human resource-intensive growth strategies.

2.6 Based on the experience of these countries the basic question of social optimality then revolves around three alternative policy choices: (1) whether, following the historical experience of the U.S.A. and Japan emphasis should be placed on growth during the early phases and redistribution and human capital formation later; (ii) whether the emphasis should be reversed - with redistribution and human capital formation stressed during the early phases and growth later; or (iii) whether to emphasize a strategy of 'equitable' growth with some minimal emphasis given to all these objectives. Of course, there are some middle-range development theorists who feel that the last mentioned alternative can be attained if policy emphasis is shifted towards more labor intensive technologies, broad-based skill-intensive growth strategies, export promotion in trade policy, etc.

2.7 While the relative merits of these alternative claims cannot be evaluated in this paper, they raise important implications for the transformation, and in particular its relationship to the attainment of fundamental development objectives. The choice of strategy, like the choice of development objectives involves critical decisions about which groups in society are to benefit. While in theory a strategy may be "neutral" with respect to the scale of farming or its location, in the sense that even small holders located anywhere may benefit, in practice such neutrality breaks down, especially in agriculture where larger and wealthier farmers tend to have better access to credit, inputs and services. Therefore, the selection of policy objectives and strategies become more than a technical matter.

ii) Bimodal and Unimodal Strategies

2.8 According to Johnston (1972) and Johnston and Kilby (1975) the most fundamental issue of agricultural strategy facing developing countries is the choice between a bimodal and a unimodal strategy. In the bimodal strategy, resources are concentrated within a subsector of large capital-intensive units whereas the unimodal strategy seeks to encourage a more progressive and wider diffusion of technical innovations adapted to the factor proportions of the sector as a whole. The essential difference between these two approaches is that the unimodal strategy emphasizes sequences of innovations that are highly divisible and scale neutral. Such innovations can be used efficiently by small-scale farmers and adopted progressively. Although the bimodal strategy usually entails a much more rapid adoption of a wide range of modern technologies, this is usually confined to a small fraction of the farming population.

2.9 The success of strategies based on resource concentration (bimodal) or resource dispersion (unimodal) depends on the policy objectives being pursued. The available evidence suggests that where the objective is greater equity a strategy of agrarian reform is usually more successful than one based on resource contribution. Section 5 of this paper discusses the progress of Agrarian reform in select middle income countries. The underlying assumption is that farmers respond better to attempts to increase agricultural productivity when they have an adequate stake in the land they work. By contrast, where the objective is a rapid increase in agricultural production and productivity with only secondary concern for improving income distribution and employment, a strategy of resource concentration is likely to be more effective than a gradualist unimodal strategy.

2.10 The experience of countries like Mexico and India show that the concentration of resources is acceptable if increased agricultural output is the objective, but the social and political costs may be high. For example, in Mexico, concentration of resources on larger commercial farmers included substantial economic incentives for increasing production, but at greatly increased public costs. Studies of the unimodal approaches in Israel, Japan, South Korea, Singapore and Taiwan found that agricultural growth rose rapidly after an initial period of slow motion. In the case of Taiwan the scale of agriculture was stabilized and yields were increased though more slowly than the bi-modal strategy in India. However, the benefits of increased output were more widely distributed among farmers. The strategy not only increased agricultural output but also provided more jobs and led to a better income distribution.

2.11 While the unimodal strategy seems to offer the best prospects for the attainment of social optimality, its success depends on the policy instruments which are used. While there can be no unique correspondence between the instruments and goal attainment, the experience suggests their impact on the transformation process depends ultimately on their characteristics as well as on the vigor and honesty with which they are applied. While the unimodal strategy can involve a broad mix of policy instruments - conventional, as well as non-conventional, - the country experiences suggest that in those countries where the strategy was successful, primary emphasis was given to asset redistribution, especially land reform, as well as human capital formation and accumulation.

2.12 For analytical purposes, three types of policy instruments can be distinguished. First, there are the conventional instruments of prices, subsidies, trade, monetary and investment policy which are used to effect changes in relative factor proportions, employment and incomes and therefore on the structure of demand and production. Some of these instruments through their

influence on relative product prices determine the nature and direction of shifts in the sectoral terms of trade and therefore the relative gains of farmers. Further, since the use of appropriate technology has become an important sub-objective in the development process, some measure of importance must be given to those measures which influence the degree of substitution among factors of production and therefore the labor or capital intensity of the production process. These, in turn, influence employment and relative factor incomes.

2.13 The above measures are usually combined with marginalist anti-poverty instruments, e.g., public investment in infrastructure, credit rationing at subsidized rates, etc. These measures do offer some hope for betterment in agriculture, but invariably they are not designed to effect major changes in the structure of the economy. An important example of instruments designed to achieve the objective by altering the pattern of wealth distribution is agrarian reform. This paper focuses attention on three types of measures whose influence is considered most pervasive -- prices and subsidies, technological change and agrarian reform.

2.14 Both the historical trends in the agricultural terms of trade as well as policies influencing it are of critical importance in the study of the transformation process. At the aggregate level, the effects of relative prices on sectoral resource allocation play a crucial role in determining the characteristics of the overall process of structural transformation. At the micro level, the relationship between specific prices received and prices paid by farmers are important in determining the types of technology that are adopted and the rapidity with which they are diffused. In general, movements in the agricultural terms of trade signal relative parities between urban and rural groups and therefore tend to determine the extent to which the agricultural sector benefits.

2.15 Policies designed to increase agricultural production which do not pay sufficient attention to maintaining the agricultural terms of trade tend to lower the absolute income of farmers and benefit urban groups in the main. On the other hand, when the terms of trade are maintained policies to improve output can prove beneficial on a broad front, especially in terms of providing increased incomes for small farmers and to some extent landless laborers.

2.16 However, increases in the agricultural terms of trade can have detrimental effects on economic development. First, since agricultural incomes are relatively low, a redistribution of income towards this sector might have a negative effect on savings. Second, a relative rise in domestic agricultural prices can lessen a country's ability to export agricultural commodities and can therefore restrict agriculture's potential contribution to earning foreign exchange with imports increasing as a consequence. Further, higher food prices can create added burdens for the urban poor and may discourage the flow of rural labor to urban jobs in so far as the latter is considered a necessary condition for economic transformation. The reduction of these negative effects will depend on the extent to which policies for the agricultural sector are co-ordinated with those for industrialization and trade.

2.17 In countries with a high degree of homogeneity in urban and rural areas, the terms of trade can be shifted in favor of rural areas without any deep concern for the differential impact of such shifts on different social groups. However, the terms of trade effect as in the case of prices and taxation becomes a much more complex phenomenon in those economies with high degrees of income inequality and growing marginalization. In such economies both rural and urban groups may be existing at bare subsistence levels and need to be protected. Furthermore, public policies with respect to the terms of trade, pricing and taxation between agriculture

and non-agriculture can undercut the effectiveness of programs for rural poverty and prevent the poor from reaping the expected benefits if such policies are not effectively geared to the social optimality objective.

2.18 It should also be emphasized that the agricultural terms of trade constitute only one factor determining agriculture and rural transformation. If a rise in the domestic terms of trade is due to reduced supply caused by natural factors, the reduction in the volume of non-agricultural goods commanded by farmers may offset the favorable shift in the terms of trade. As mentioned above, it is only when the terms of trade improve simultaneously with increases in agricultural production, or declines because of an increase in productivity, that the results become favorable to the process of overall development and transformation. In very many cases public investments for raising agricultural productivity levels may turn out to be more crucial to the process of transformation than movements in the domestic terms of trade itself.

iii) Technology Change and Institutions

2.19 Clearly another important factor in the process of transformation is the rate and kind of technological change and the associated institutional changes, that occur in the agricultural sector. Technology change is an essential concomitant of structural change in situations where it is necessary to maintain the output of food and other crops to meet a growing demand - as incomes and populations rise - and with a reduced labor force - as rural-to-urban migration proceeds. It may also be important if the industrial growth is dependent on the processing of agricultural products as a major activity.

2.20 Because of the difficulties encountered on the consumer side in adjusting agricultural prices upward, and in view of the desirability of maintained cheap food as part of the conventional growth strategy, a frequently preferred means

of maintaining farm incomes and providing incentives is through promoting output via increasing technology change. Investment in agricultural research and extension services, and subsidies on the critical inputs associated with labor augmenting technology are an expected counterpart of this strategy. But there are other essential concomitants. The need to get inputs in to farms, and farm produce to markets, necessitates improved communications infrastructure, especially roads. The increased commercialization of farming can be expected to stimulate the growth of rural financial systems and other services associated with transportation, storage, processing and marketing. In addition, the changing technology will cause other changes - partly as a consequence of technology and partly to facilitate its adoption - including farm size growth and land consolidation.

2.21 Thus a characteristic feature associated with agriculture playing a full role in economic growth and structural transformation - in terms of the five factors cited above - will be a significant structural change within agriculture itself. Such changes are observable and their observation provides another indication of the changes that will occur. More important, however, is the fact that these changes to a substantial degree can be controlled or managed. Unless they are closely managed, there is the possibility that economic opportunities for more rapid development will be lost, that food shortages may occur, and that rural poverty may be increased. The extent of all these effects is of course proportional to the size and importance of the agricultural sector, but their existence is an essential component of structural change, and concerning which there are clearly elements that can be judged in terms of social optima.

Pasquale L. Scandizzo

&

Wilfred David

B. EMPIRICAL EVIDENCE^o

3. Patterns of Growth and Structural Change

i) Introduction

3.1 With a minimum per capita GNP of US\$260, the middle income countries are a somewhat more affluent area of the developing world. The arbitrary cutoff lines separating them from poorer countries imply, however, that even such a summary judgment has to be qualified to be in any way meaningful. First, we are not interested in a single indicator of affluency and economic progress but rather in a composite one, capable of capturing some of the key elements of the economic structure of the countries in question. Second, if these countries are indeed better off than poorer countries and if some of them are better off than others, in terms of incomes, growth rates and alike, question arises on whether these different scores are related to one-another and whether, indeed, reasons can be discovered for the different performances of similar countries. Third, we are interested in the possible trade-offs between fast growth in agriculture and in manufacturing at various stages of development and between growth and agricultural exports, food imports, and food production.

3.2 Within the broad framework of these three sets of qualifications, this section addresses some of the basic issues concerning the development profile of the middle income countries and the role of agriculture in the process of structural transformation. This is done by investigating alternative typologies of development on the basis of the available evidence on aggregated growth and structural change and by directly analyzing the same evidence to test hypotheses on the main components of the countries pattern of growth. Throughout the section, emphasis is put on highlighting issues related to broad statistical patterns of readily available and recent data.

3.3 Because of data availability and the different emphasis of various sections of this report, the sample of middle income countries considered is a varying one. For a basic core group, we considered eleven sufficiently diverse country cases to provide a representative spectrum of countries experiences. Of the group, five are basic middle income countries with per capita incomes in between \$266 - \$520 range,^{1/} five upper middle income ones in the \$521 - \$1075 range,^{2/} and one (Venezuela) a higher income country. (Table 1.1). There is no correlation between per capita income attainment and the development patterns observed. Four are semi-industrialized, four mineral exporters, and the remainder rely on agricultural exports as the primary engine of growth.^{3/} These patterns are reflected in the policies and strategies they have followed, either because of historical circumstances or by deliberate policy choice. The process of development in five is based on primary specialization; another four practice balanced growth strategies; import substitution has been a major strategy in two, while industrial specialization provides the major thrust in yet another.^{4/} (See Table 1.2).

1/ Nigeria, Sudan, Morocco, Philippines, Thailand.

2/ Ivory Coast, Ghana, Algeria, Brazil, Republic of Korea.

3/ Semi-industrialized - Brazil, Turkey, Republic of Korea, Philippines;
Mineral producers - Venezuela, Algeria, Morocco, Nigeria;

Agricultural exporters - Ivory Coast, Thailand, Ghana, Sudan.

4/ Primary specialization - Algeria, Ivory Coast, Nigeria, Sudan, Venezuela;

Balanced - Thailand, Philippines, Morocco, Ghana;

Import substitution - Brazil, Turkey;

Industry specialization - Republic of Korea.

ii) Alternative Country Typologies

3.4 For a more systematic statistical analysis, on the other hand, all the countries classified as middle-income by the World Development Report I were considered candidates for the sample. Data limitations, however, forced us to use different subsamples depending on the indicators selected and the phenomena analyzed. As an expansion of the core group and in order to test the basic classification of agricultural exporters, mineral exporters and semi-industrialized, a sample of 29 countries was used. Of these, the agricultural exporters group comprises Ghana, Ivory Coast, Malaysia, Thailand, Paraguay, most Central America and Egypt. The mineral exporters group is formed by only seven countries: Zambia, Morocco, Algeria, Venezuela, Nigeria, Iran and Iraq. The semi-industrialized group includes Brazil, Mexico, Argentina, Colombia, Chile, Turkey, Tunisia, Korea, Taiwan and the Philippines.^{1/}

3.5 Using discriminant analysis as a systematic way to compare group means, predict group membership and generally test the significance of the classifications, we considered 10 socio-economic variables as potential indicators of each country group development pattern. The means and standard deviations for these variables, each of the country groups and the total are presented in Table 1.

3.6 As the table shows, the country averages appear to depart from each other and from the total by appreciable amounts for almost all variables. Whether these differences are statistically significant, however, particularly where they are considered simultaneously is not a priori clear, due to the large variations of

^{1/} This grouping excludes countries such as Portugal, Romania and Yugoslavia, whose development is already such that they can be put in a higher category of industrialization.

Table 3.1

SOCIO-ECONOMIC INDICATORS BY COUNTRY GROUPS (29 COUNTRY SAMPLE)

Variable	Semi-industrial Countries	Agric. Exporters	Mineral Exporters	Total
-----MEANS-----				
GRAGR	3.8400	3.4833	0.2571	2.8276
AGREXP	79.6000	85.7500	96.5714	86.2414
AGRLAB	43.9000	57.2500	53.1429	51.6552
PCFOOD	107.3000	109.1667	101.0000	106.5517
LITER	75.8000	59.5833	42.4286	61.0345
LND	0.1606	0.1737	0.1163	0.1554
GRIND	7.7700	6.8167	8.3143	7.5069
GRPOP	2.4700	2.8167	2.9286	2.7241
POP	37.4400	10.9833	24.8286	23.4483
GRGDP	6.3500	5.5333	6.4571	6.0379
-----STANDARD DEVIATIONS-----				
GRAGR	2.6713	2.0718	4.7102	3.3070
AGREXP	23.1804	10.1006	4.8255	16.1348
AGRLAB	15.3511	15.0582	15.1375	15.7917
PCFOOD	11.6242	16.6233	9.2195	13.4552
LITER	14.5587	22.8929	19.4667	22.8152
LND	0.1169	0.1110	0.0796	0.1055
GRIND	5.1043	4.0029	5.0555	4.5319
GRPOP	0.6075	0.4877	0.3729	0.5282
POP	30.6110	14.2530	24.7521	25.4807
GRGDP	3.5243	2.5144	2.2926	2.7911

GRGDP = rate of growth of GDP (1970-76)
 GRAGR = rate of growth of agricultural GDP (1970-76)
 GRIND = rate of growth of manufacturing GDP (1970-76)
 GRPOP = rate of growth of population (1970-76)
 PCFOOD = index of per capita food production (1976)
 AGRLAB = percentage of labor force in the agricultural sector (1976)
 AGRGDP = percentage of agricultural GDP over total GDP (1976)
 AGREXP = percentage share of merchandise exports in primary commodities
 LITER = adult literacy rate (1976)
 LND = agricultural land as percentage of total land (1976)

virtually all indicators within each country group. Our next step is then to ask whether there is a minimum subset of variables containing enough information to predict group membership for the countries examined: indirectly this question also seeks to identify (i) the variables for which group mean differences are statistically significant at some reasonable confidence level and, (ii) the best discriminators, i.e., those variables whose use in classifying the observations in one or the other category would minimize the risk of misclassification.^{1/}

3.7 On the basis of linear discriminant functions,^{2/} four variables appear to summarize most of the information contained in the classification proposed. Two of these variables, the agricultural growth rate and the percentage of the agricultural labor in the total labor force, are directly related to the performance of the agricultural sector and the agriculture-industry balance. The other two, the population size and the literacy rate, relate to more general characteristics of the countries. For these four variables the hypothesis of equality among the group means is rejected at any reasonable level of confidence. The coefficients of the classification function (reported in Table 3.2) tend to reflect the fact that (i) on average the semi-industrial and agriculture exporting countries show much higher growth rates in agriculture than the mineral exporters, (ii) their literacy rates are also comparatively higher, (iii) population is mostly concentrated in the semi-industrial and mineral exporting countries and, (iv) the agricultural exporters have systematically larger shares of their labor force employed in agriculture.

^{1/} For the technical details and definitions on discriminant analysis see R.A. Eisenbies and R.B. Avery, Discriminant Analysis and Classification Procedures, Lexington Books, Toronto and London, 1972.

^{2/} The technique used was minimization of Wilk's lambda with equal probabilities. See R.A. Eisenbies and R.B. Avery, op. cit., pp. 10, 31, 70-71.

Table 3.2

CLASSIFICATION FUNCTION COEFFICIENTS

Variable	Semi-Industrial	Agric. Exporters	Mineral Exporters
GRAGR	0.029	0.029	-0.271
AGRLAB	0.465	0.529	0.452
LITER	0.402	0.379	0.311
POP	0.033	-0.028	0.006
Constant	-26.124	-26.350	-18.655

3.8 Table 3 presents the results obtained by using the discriminant functions based on the above four variables to predict group membership. Altogether, it is clear that while the overlapping between group 1 and 2 (semi-industrialized and agricultural exporters) is not high, the group of mineral exporters presents characters and/or includes countries which might be classified in one of the other two groups. The classification is thus only moderately successful as fully 41% of all cases are misclassified.

Table 3.3

29 COUNTRY TYPOLOGY - PREDICTION RESULTS

<u>Actual Group</u>		<u>No. of Cases</u>	<u>Predicted Group Membership</u>		
			<u>GP. 1</u>	<u>GP. 2</u>	<u>GP. 3</u>
Group 1	Semi-industrial Countries	10.	7. 70.0%	3. 30.0%	0. 0.0%
Group 2	Agricultural Exporters	12.	1. 8.3%	9. 75.0%	2. 16.7%
Group 3	Mineral Exporters	7.	2. 28.6%	1. 14.3%	4. 57.1%

Percent of "Grouped" cases correctly classified: 68.97%

3.9 As a second attempt to test the country typology proposed, we reduced our subsample to 22 countries with more homogeneous group characteristics.^{1/} An additional variable, AGRIMP representing the percentage of the import bill accounted for by food is also introduced as a potentially explanatory variable. Given this new configuration, and using the methods described above, five variables appear to constitute the best linear combination to discriminate among the groups and predict group membership for unclassified observations. Of these variables, GRAGR and AGREXP directly relate to the performance of the agricultural sector while the remaining three: AGRIMP, GRPOP and GRGDP are related to the performance of the economy at large.

3.10 Table 3.4 showing the classification function coefficients for the three groups again mainly reflects differences among the means. Aside from the already noted difference among agricultural growth rates, the semi-industrial and agricultural exporting countries are closer in terms of export shares while agricultural and mineral exporters are closer in terms of import shares and population growth rates. Overall growth performance is highest for semi-industrial countries and lowest for agricultural exporters.

Table 3.4

CLASSIFICATION FUNCTION COEFFICIENTS

	<u>Group 1</u>	<u>Group 2</u>	<u>Group 3</u>
GRAGR	-0.02869	-0.37678	-0.87712
AGREXP	0.28469	0.28751	0.35733
AGRIMP	0.51468	0.81939	0.80168
GRPOP	7.36647	12.97958	12.08767
GRGDP	0.67356	-0.15192	0.40858
Constant	-24.20054	-35.97636	-41.62683

^{1/} The countries are the same as before minus Paraguay, El Salvador, Guatemala, the Dominican Republic, Mexico, Peru, Chile, Taiwan and Algeria.

3.11 Where prediction results are checked (Table 5), the subsample classification appears to be more successful than the previous one. Overall, about 82% of all cases are correctly classified and no significant overlap between groups appears to exist except for the case of two observations in the last group. However, the number of mineral exporters is too small to provide a sufficiently robust test of the classification.

Table 3.5

22 COUNTRY TYPOLOGY - PREDICTION RESULTS

<u>Actual Group</u>	<u>No. of Cases</u>	<u>Predicted Group Membership</u>		
		<u>GP. 1</u>	<u>GP. 2</u>	<u>GP. 3</u>
Group 1	7.	6. 85.7%	1. 14.3%	0. 0.0%
Group 2	9.	1. 11.1%	8. 88.9%	0. 0.0%
Group 3	6.	0. 0.0%	2. 33.3%	4. 66.7%

Percent of "Grouped" cases correctly classified: 81.82%

3.12 Given that this classification appears an acceptable one, is the analysis revealing any pattern beyond what has already been observed on mean and classification function differences? The coefficients of the standardized discriminant functions, reported in Table 6, can be used to help answer this question. These coefficients can be interpreted as the weights of an index of the five variables selected. For the case on hand, two of such indexes are provided, the first explaining more than 65% of the intergroup variance and the second about 25%. In the first index (Func. 1) both agricultural and overall growth rate receive positive weights while population growth rates, agricultural export and food import shares receive the highest average score (this is called the "centroid"

of the group), and the agricultural and the mineral exporters receive progressively lower ones. Therefore, we can tentatively interpret this index as one of overall economic performance and industrialization and conclude that the higher the joint growth of agriculture and the rest of the economy, and the lower the growth in population, the agricultural export share and the food import share, the highest is the probability that a country can be classified as a semi-industrial one.

Table 3.6

STANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1	FUNC 2
GRAGR	0.35445	0.69364
AGREXP	-0.15574	-0.74338
AGRIMP	-0.51979	0.29214
GRPOP	-0.64910	0.57188
GRGDP	0.33276	-1.10352

Centroids of Groups in Reduced Space

	FUNC 1	FUNC 2
Group 1	1.14495	-0.09105
Group 2	-0.43949	0.54412
Group 3	-0.67655	-0.70996

3.13 The second index (Func. 2) is somewhat harder to interpret. It seems to partly reflect a trade-off between agricultural and overall economy performance, since it shows a high positive sign for agricultural growth and an even higher negative one for GDP growth. Food import dependence and population growth are also positively weighted, while agricultural export shares receive a negative weight. Since this index has the highest average score the agricultural exporters and because it conforms to further evidence from cross-country regression analysis

(to be presented later in the course of this section), it can be interpreted as an index of performance at an earlier stage of economic progress. As we will show, the evidence suggests that this stage is characterized by a trade-off between agricultural and industrial growth.

iii) The Structure of Growth Performance

3.14 The analysis of inter-group differences suggests that the macroscopic differences in the economic base of the country (i.e., mineral, industrial or agricultural) are reflected in differences in performance of the agricultural sector and of the whole economy. Apparently, there is no simple correlation between the growth rates attained and the development patterns observed, but the discriminant analysis results do suggest significant multiple correlations. For all indicators considered in the analysis of country classification, furthermore, both inter-group and intra-group variances are high. In other words, although we can expect more similar performance levels from countries where balance between agriculture and manufacturing and the base for economic growth is similar, the differences in other structural variables maintains a high level of diversity in the sample. While the heterogeneity of the groups does not permit drawing conclusions on the reasons behind the between groups differences in growth and production in agriculture, the same variability is an important asset to test the hypothesis that the success and the failure stories within each group are caused by differences in the pattern of development embraced by choice or by necessity by each country.

3.15 More specifically, we want to explore the following general questions concerning economic development and structural change. First, is it possible to find a significant statistical association between agricultural performance indices and structural indices? Second, are these associations, if any,

consistent with the ones predicted by common sense, other empirical studies and any of the reviewed hypothesis on economic development? Third, can we draw historical lessons and broad policy conclusions from these statistical results? The answers to these questions depend on the interpretation given to the various patterns of transformation outlined in Part A of this paper and how these are applied to the experiences of the semi-industrialized, mineral exporting and agricultural exporting countries. In general, one would expect that the movement from the pre-industrial to the industrial stage should be accompanied by increasing sectoral interaction with development of the agricultural sector being a precondition for industrial development as agricultural productivity rises; or with the development of the industrial sector contributing significantly to agricultural development - in other words that the "industrial revolution" should be accompanied at some stage by the "agricultural revolution". Attempts at answering such questions cannot be made with any degree of confidence until an analysis is made of the statistical patterns given below.

3.16 Before we proceed to this analysis, however, some issues related to the classification have to be settled. Clearly, the three-fold classification tested before is not a very convenient one to investigate the reasons for differential performance across countries. On the one hand the group of mineral exporters is too small to be used as a subsample for hypothesis testing. On the other hand the results of the discriminate analysis themselves indicate that a two-fold classification would capture most of the information contained in the three mean group differences for the selected variables. Furthermore, the increase in intra-group variability that would follow a reduction to two of the country groups could substantially increase the power of the structural indicators to explain the variation in performance.

3.17 In order to go from three-fold to a two-fold classification, it is first interesting to notice that the balance between agriculture and the rest of the economy more than any other variable seems to be a key element of distinction and heterogeneity of the middle income countries. With the exception of three countries: Mauritania, Ghana and Sudan, where agricultural GDP accounts for 35% or more than GDP, all middle income countries have an agricultural sector contributing both a small and a decreasing proportion of domestic national product. In comparison to "poor" countries (less than US\$260 of per capita GNP), where agricultural GDP is rarely below 40% of total GDP, with a median of 45%, middle income countries show also a concentrated distribution and do not cluster either from above or below around the medium value of 21%.

Table 3.7: SELECTED INDICATORS OF GROWTH AND ECONOMIC STRUCTURE

		Agricultural Countries		Non-Agricultural Countries		All Countries in the Sample	
		Means	Standard Deviations	Means	Standard Deviations	Means	Standard Deviations
GRAGR	%	4.18	(2.40)	1.45	(4.10)	3.07	(3.43)
AGREXP	%	83.16	(18.12)	74.23	(33.56)	79.53	(25.42)
AGRIMP	%	15.00	(7.59)	15.69	(6.36)	15.28	(7.02)
AGRLAB	%	63.32	(15.25)	37.31	(19.12)	52.75	(21.10)
PCFOOD	%	108.68	(18.05)	106.62	(35.93)	107.84	(26.27)
LITER	%	46.68	(29.35)	64.31	(19.33)	53.84	(26.87)
LND	%	17.93	(12.07)	15.84	(11.80)	17.08	(11.81)
GRIND	%	7.05	(3.59)	8.40	(6.37)	7.60	(4.86)
GRPOP	%	2.65	(0.48)	2.43	(0.98)	2.56	(0.72)
POP	%	16.75	(15.68)	17.33	(29.35)	16.99	(21.83)
GRGDP	%	5.66	(2.42)	6.63	(2.80)	6.06	(2.58)
Observations		19		13		32	

GRGDP = rate of growth of GDP (1970-76)
 GRAGR = rate of growth of agricultural GDP (1970-76)
 GRIND = rate of growth of manufacturing GDP (1970-76)
 GRPOP = rate of growth of population
 PCFOOD = index of per capita food production (1976)
 AGRLAB = percentage of labor force in the agricultural sector
 AGRGDP = percentage of agricultural GDP over total GDP
 AGREXP = percentage share of merchandise exports in primary commodities
 AGRIMP = percentage share of merchandise imports in food
 LITER = adult literacy rate
 LND = agricultural land as percentage of total land

3.18 Table 3.7 contains some statistical indicators of economic progress and structure of middle income countries for an overall sample of 32 countries and two subsamples separated on the basis of the percentage of GDP accounted for by the agricultural sector. With respect to the former classification and with some exceptions, the subsample of the "non-agricultural" countries now contains those countries where the percentage of GDP claimed by agriculture is less than or equal to the median value. The "agricultural" countries are the remaining ones and they are prevailing agricultural exporters.^{1/}

3.19 As Table 3.7 shows, the effect of the reclassification on the group means of the non-agricultural versus agricultural countries is not major, as compared to the original three-fold classification, except for the agricultural growth rate. Furthermore, with few exceptions, the two-fold classification adopted is consistent with the one tested with the discriminant analysis in the sense that (i) the non-agricultural sample includes most of the same countries for the two classifications and (ii) except for GRAGR the means of the non-agricultural and agricultural sample are not significantly different from the means of the semi-industrial and agricultural exporters sample in the 29 country three-fold classification.

3.20 Let's now consider the association between agricultural growth rates and the structural indices reported in Table 3.7. Using a quadratic equation to account for nonlinearities, the regression models reported in Table 3.8 were estimated. While the robustness of the results was checked on several alternative

^{1/} The non-agricultural group includes Jordan, Syria, Korea, Jamaica, Brazil, Iraq, Yugoslavia, Portugal, Iran, Hong Kong, Venezuela, Singapore and Congo. The agricultural group comprises Togo, Egypt, Cameroon, Sudan, Thailand, Honduras, Senegal, Philippines, Liberia, Morocco, Ghana, Ivory Coast, Colombia, Zambia, Nicaragua, Tunisia, Malaysia, Turkey and Costa Rica. See the Appendix to this Chapter for more details on procedure adopted to identify the classification.

models, the three equations in the table can be used to dispel some popular notions on the variables associated to higher agricultural growth and to indulge in some interesting speculations. First, the degree of export orientation of the agricultural sector appears to significantly contribute to explaining the variance of agricultural growth in the sample considered. Its effect, however, on the same rate of growth is only substantial for the "agricultural" countries, where an increase of one percentage point in the share of exports claimed by the agricultural sector is associated, on average, with an increase of about 1.2% in the agricultural growth rate. Some of the countries in this subsample, of course, have clearly chosen a pattern of development emphasizing growth in agricultural exports. This is the case, for example, of Malaysia and Thailand and to a lesser extent also of Togo and the Philippines.

3.21 Second, among the non-agricultural countries, the ones with higher literacy rates fare consistently better in agricultural growth than the others. This effect is remarkable both because of its magnitude and consistency of sign (always positive in the range of countries considered) and because of the low and insignificant simple correlation among agricultural growth and literacy rate (the linear correlation coefficient between the two variables is - 0.01). Third, while industrial growth seems on average to have a positive effect when the pooled data are considered, the separate subsample estimates show a significant positive effect for the non-agricultural countries and a much larger, significant negative effect for the agricultural ones. It thus seems that the countries of the agricultural group face a trade-off between agricultural and industrial growth and that, once the effects of other variables is taken into account, countries with more successful industrialization programs will also have to accept a lower rate of success in agricultural growth. For the semi-industrial and

Table 3.8

Agricultural Growth Rate as a Function of Other Socio-economic Variables
Regression Coefficients

	<u>Constant</u>	<u>AGREXP</u>	<u>(AGREXP)²</u>	<u>LITER</u>	<u>(LITER)²</u>	<u>LND</u>	<u>GRIND</u>	<u>(GRIND)²</u>	<u>GRPOP</u>	<u>(GRPOP)²</u>	<u>DUMMY^{1/}</u>	<u>R²</u>	<u>OBSERV.</u>
Overall sample	-2.282	0.065	--	0.080	--	--	0.395	-0.026	-0.798	--	-2.097	0.394	32
		(1.97)		(3.20)			(1.20)	(1.73)	(0.71)		(1.732)		
Non-agricultural Countries	-29.375	0.034	0.0006	0.656	-0.0048	0.14	0.722	-0.045	--	--	--	0.915	13
		(0.298)	(0.600)	(2.982)	(2.526)	(2.084)	(2.431)	(0.409)					
Agric. Countries	-8.594	1.256	--	--	--		-1.999	0.195	-24.370	4.481		0.538	19
		(2.785)					(2.261)	(2.566)	(2.382)	(1.421)			

- The numbers in parenthesis are "t" ratios.

1/ This variable is equal to one if then GDP agricultural share is less than 0.2 and 0 otherwise.

mineral exporting countries, on the other hand, the situation is reversed, perhaps because of the unbalanced growth pattern characteristic of most of these countries or, we may speculate, because the trade-off between agriculture and industry is only a property of an earlier stage of development (mostly represented by the countries of the agricultural group). This latter speculation is also confirmed by the fact that population growth rate has a large, significant and negative impact only on the sector growth of the agricultural countries.

3.22 Table 9 extends the above analysis to two additional performance variables, the index of per capita food production and the rate of growth of gross domestic product. In both cases, the equations estimated on the selected subsamples are significantly different of each other and of the ones estimated on the pooled data - Also a much larger proportion of the variance of the performance variable (ranging from 75% to 97%) appears to be explained by the selected regressors.

3.23 In the case of food production, the rate of growth of the agricultural sector has one major positive effect for the non-agricultural group, while the same variable has a negative effect for the agricultural countries. In part, this result is related to the strong positive correlation found for the agricultural countries between agricultural growth rates and primary export share and can be explained by the higher export orientation of agricultural production in the agricultural group. In terms of a mere comparison of performance, it is also important to note that not unlike industrial and agricultural growth, food production and expansion of the agricultural sector shows a negative trade-off only for the middle income countries representing the earlier stage of economic development.

3.24 Within the non-agricultural group, however, important assets to increase per capita food production are both trade-orientation (as measured by the percentage of exports accounted for by primary commodities and by the percentage of

Table 3.8 : AVAILABLE PER CAPITA FOOD AND GDP GROWTH RATE AS A FUNCTION OF OTHER SOCIO-ECONOMIC VARIABLES

- Regression Coefficients -

Variable	PCFOOD		Agricultural		GRGDP		Agricultural Countries			
	Non-agricultural		Countries		Non-agricultural		A		B	
	Countries		Countries		Countries					
GRAGR	2.680	(3.07)	-9.246	(1.87)						
SGRAGR			1.643	(2.93)						
AGREXP	2.541	(5.16)					-0.056	(0.49)	0.0048	(1.60)
(AGREXP) ²	-0.022	(5.50)					-0.003	(3.00)		
AGRIMP	10.771	(2.93)	4.114	(1.44)	0.811	(1.01)	-0.391	(1.71)		
(AGRIMP) ²	-0.457	(3.81)	-0.083	(1.28)	-0.044	(1.41)	0.0092	(1.61)	-0.002	(1.25)
AGRLAB					1.463	(3.56)	-0.0017	(0.06)		
(AGRLAB) ²					-0.013	(3.51)				
PCFOOD					-0.490	(2.59)	-0.297	(2.28)		
(PCFOOD) ²					0.0016	(2.68)	0.002	(3.33)		
AGR GDP	-18.777	(4.64)			-8.936	(3.44)	-0.158	(1.31)		
(AGR GDP) ²	0.827	(4.11)			0.370	(3.36)				
LITER									0.119	(1.89)
(LITER) ²									-0.001	(1.43)
GRPOP									-41.21	(3.25)
(GRPOP) ²			8.796	(3.56)					7.29	(3.17)
POP			3.050	(2.42)					0.31	(2.07)
(POP) ²			-0.044	(1.57)					-0.005	(1.67)
Constant	101.943		-21.897		49.825		32.083		55.024	
R ²	0.969		0.746		0.793		0.857		0.823	
Observations	13		19		13		19		19	

Note: The numbers in parenthesis are "t" ratios.

imports accounted for by food) of the agricultural sector, and the relative size of the non-agricultural part of the economy. Thus higher rates of food production are associated with both higher (relative) exports and higher (relative) food imports.

3.25 As for the agricultural countries, a higher degree of food production is associated with a lower overall performance of the agricultural sector and with higher food imports. In part these correlations reflect the fact that the countries where food production has to be stressed are also the ones that may profit less from specialization and/or that may find themselves in the double bind of having both to produce and import more food because of a large and growing population. These interpretations are confirmed by the significance and the size of the positive effect of the population growth and the population size variables and by the equations estimated for total GDP (right hand panel of Table 8).

3.26 For the GDP growth variables, two sets of multiple correlations were considered. In the first set, the differences in performance of the countries were compared with the share variables (composition of trade, labor force and total GDP), while in the second set the same differences were related to literacy rates and demographic variables. As for all the results presented, the parameters estimated are affected by simultaneous equation bias and should be interpreted only as broad indicators of statistical association.

3.27 For the non-agricultural countries, only the first set of regressions gave statistically significant results. For these countries a higher level of per capita food production and a higher share of agricultural GDP are associated, as expected, to lower overall performance. Once these effects are taken into account, however, countries with a larger fraction of their labor force in agriculture show higher growth rates than other countries with comparable characteristics.

For the same type of regression, the results for agricultural countries conform to the general pattern of structural change discussed in most of the empirical literature. In particular, countries with higher agricultural sector shares and a higher proportion of the labor force in agriculture do appear to have lower growth rates than comparable countries. Furthermore, countries whose agricultural sector is relatively less important in terms of trade shares (of exports and imports) and per capita food production fare also better in terms of overall growth rates.

3.28 While the second type of multiple correlation tests (column B of Table 8) did not show a significant association between growth performance and semi-industrial countries, population growth rate, population size and literacy rates display significant and, in the case of population growth, large correlations with GDP growth. The negative correlation of population growth is particularly impressive and suggests that countries of comparable education and labor force may be distinctly handicapped by lack of family planning, and/or by policies encouraging unchecked population growth.

3.29 If we again interpret the grouping of the countries considered as representing two consecutive stages of economic development, the above findings can be summarized as follows. On a first development stage, countries whose industrial sector is not sufficiently developed to create a market for domestic food products and countries whose comparative advantage in food production is particularly low, display a negative correlation between (i) industrial and agricultural growth, (ii) food production and agricultural growth, and (iii) overall GDP growth and all indicators of relative size of the agricultural sector. This negative correlation is further reinforced by the fact that population growth tends to shift resources from the sectors where the country may have comparative advantage to food production. Finally, agricultural and

overall GDP growth are strongly affected by the degree of literacy of the population: a clear indication of the importance of human capital investment in the initial stages of development.

3.30 For the most developed non-agricultural countries, on the other hand, the process of differentiation of the economy is sufficiently advanced to permit labor absorption from the agricultural into the industrial sector maintaining, at the same time, an appropriate balance between agriculture and non-agriculture. In these countries, complementarity between the agricultural sector and the manufacturing industry may be high, inter alia, because of historical emphasis on agricultural growth even when the economy was at the earlier stages of development. As a consequence, equilibrium between agriculture and non-agriculture is easier to maintain and development proceeds along a broad front involving trade, food production, industrialization and population.

3.31 In conclusion, while the evidence examined so far is of entirely cross-section nature and is limited to a few data points, the quantitative results presented (and many more based on alternative models) are not inconsistent with the hypothesis that a model of balanced growth may be the key to a successful performance of both the agricultural and non-agricultural sectors and to high development achievements. It is also important to stress that the same cross section data can be used to formally reject the opposite hypothesis; and particularly any postulated negative trade-off between agricultural and industrial growth for predominantly non-agricultural countries.

iv) Accelerated Growth and the Social Optimum

3.32 During the period 1960-1975 the middle income countries, as a group, experienced significant macro-economic growth rates. While the per capita income figures given below show represent the combined influence of both population and output growth, the growth achievements are still relatively spectacular. For example, the performance of the middle income countries was much better than that for the developed countries when the latter

Table 3.9: COUNTRIES RANKED ACCORDING TO PER CAPITA GROWTH PERFORMANCE

	Average		
	960-75	1960-70	1970-75
Republic of Korea	7.1	6.4	8.2
Thailand	4.6	5.0	3.6
Brazil	4.3	2.3	6.2
Turkey	4.0	3.5	4.9
China, Peoples Republic of	3.7 ^{1/}	n.a.	n.a.
Ivory Coast	3.5	4.3	1.9
Nigeria	3.4	0.4	5.3
Philippines	2.5	2.1	3.7
Venezuala	2.2	3.5	2.5
Morocco	1.9	1.3	3.0
Algeria	1.8	-0.7	4.3
Sudan	0.1	-0.7	3.8
Ghana	-0.2	-0.7	-0.3

^{1/} 1952-1974 Period.
n.a. = not available

entered the modern growth epoch, even allowing for the comparatively higher rates at which the population of the middle income countries have been growing. A case in point is Great Britain, where the evidence suggests that the per capita output growth for this country was less than 1.5% per annum between 1801 and 1871 and did not exceed 1.75% per annum even during the following three decades.

3.33 However, macro-economic growth was not always accompanied by comparable changes in structural and institutional characteristics, for example, income redistribution and poverty. Some major features of the problem of impoverishment, based on the recent work of Chenery and Ahluwalia (1978) are presented below. If absolute poverty is defined in

Table 3.10: INDICES OF GROWTH AND DISTRIBUTION 1975

Country	GNP per Capita \$US 1970 prices	% of Population in Absolute Poverty 1975		Share of Lowest 40% 1975 esti- mate
		GNP Figures HP Official Exchange Rates	Using Adjust- ment	
Korea	197	0	3	16.9
Thailand	200	47	38	11.5
Brazil	372	13	21	9.1
Turkey	295	19	31	9.1
China, People's Republic	-	-	-	-
Ivory Coast	290	18	31	10.4
Nigeria	113	43	41	13.0
Philippines	184	14	32	11.6
Venezuala	1180	10	18	8.5
Morocco	235	28	34	11.3
Algeria	-	-	-	-
Sudan	114	40	56	14.5
Ghana	255	22	32	11.2

Source: Ahluwalia, Carter and Chenery (see Annex Table 1.3)

terms of income levels which are insufficient to provide adequate nutrition, the figures show that the bulk of the poor in the country sample in this sample are concentrated in sub-Saharan middle income countries, Thailand and the Philippines. Inequality, defined in terms of the share of income going to the lowest 40% of the population is also high for all countries, but it seems to be mostly concentrated in the semi-industrial countries in Latin America (Brazil, Venezuela) as well as Turkey.

3.34 These recent estimates by Ahluwalia, Carter and Chenery confirm the earlier estimates made by Chenery and associated in 1974. They are also confirmed by other studies of the problem. For example, studies of the Latin American middle income countries show that the wealthiest 5% consume over 30% of national income, while the poorest 20% receive only 4%. For the middle income countries in Africa the top 20% receive about over 50% of national income while the lowest 40% receive 10-20% (see Table 1.3a). A case study of cocoa produced in Ghana showed that their real income declined 25% between 1960 and 1970. In Morocco, the poorest 40% of rural households experienced a drop in real consumption between 1960 and 1971. Turkey has one of the most skewed income distributions in the world, along with Mexico, Brazil, and Venezuela.^{1/}

3.35 The above trends are similar to those observed for Asian middle and low income countries (Tables 1.3b and 1.3c). In an ILO commissioned study, Griffin and Khan^{2/} examined the experiences of Pakistan, India, Bangladesh, Malaysia, Sri Lanka, Indonesia and the Philippines. A household was considered below the poverty line if it did not have

^{1/} Shail Jain, Size Distribution of Income, (World Bank 1975).

^{2/} Poverty and Landlessness in Rural Asia (Geneva: ILO 1977).

sufficient income to satisfy minimum consumption needs in terms of caloric requirements. The results of this study show a clear trend toward a greater incidence of poverty, and that there was no positive correlation between the rate of economic growth and poverty alleviation. Poverty and inequality increased as rapidly in countries with high growth rates as in those where natural output grew more slowly. There was also no clear relationship between poverty and land-man ratios. Poverty worsened as rapidly in countries with relatively abundant land as in those with relatively less land per capita. The majority of middle income countries are characterized by highly unequal distribution of land ownership, with Gini concentrated ratios of the distribution of land holding of over 0.5^{1/}. (See Section 5). Even for those countries which instituted land reforms, the evidence suggests that the redistribution resulting from these reforms have not been sufficient to bring about significant changes in the inequality of land ownership.

3.36 While there seems to be general agreement that the rapid macro-economic growth performance of middle income as well as other developing countries has not been accompanied by significant redistributive effects, opinion is divided on the question whether the growth process led to absolute impoverishment or an increase in relative inequality. We offer a few brief comments on this debate since it has implications for the interpretation of agriculture's role in the development process. In this connection, three types of evidence have been marshalled about the relationship between economic growth and inequality: long-run evidence based on the historical experience of the contemporary developed world; cross-sectional evidence comparing countries at different stages in

^{1/} Griffin and Khan, *ibid*; Z.M. Ahmad (ed) *Land Reform in Asia, with particular reference to Pakistan, the Philippines and Thailand* (Geneva: ILO 1976).

development at a particular point in time; and time-series evidence from the recent history of particular developing countries.

3.37 Kuznets in his studies of the long term patterns of change in the developed countries hypothesized that these countries passed through three stages - a pre-industrial stage of relative equality, an industrialization phase of relative inequality and modern phase of reduced inequality (the inverted S-Curve). When applied to the developing countries such a pattern is expected to emerge because of several factors: inequalities in the initial distribution of productive assets, especially land; population shifts from the agricultural to the capital-intensive and higher-productivity industrial sector; the increasing demand for skilled labor in the latter sector leading to increasing inequality since the supply of skilled labor expands relatively slowly. If one assumes that the middle income countries are, by and large, at the second stage, then one would expect that they would have a more unequal distribution than their poorer counterparts.

3.38 However, as recently suggested by Frances Steward (1978), there are possibly two reasons why one should not expect the patterns of change in middle income countries to fit the historical profile suggested by the experience of the developed countries. First, account has to be taken of changes in technology and population and second, of changes in social structure including social institutions, property and payment systems, government policies, etc.

3.39 While recent cross-sectional studies lend general support to the Kuznet's hypothesis, opinions differ on the extent of increases in inequality. The studies of Adelman and Morris (1973) show that there has been an increase in absolute inequality, whereas the studies of Ahluwalia

(1976) conclude that while relative inequality might have increased, this was not necessarily the case for absolute inequality since the absolute income levels of poorer groups tended to rise more slowly than the average. For example, some middle income countries (Brazil, Mexico, Turkey, the Philippines) which have experienced moderate to fast rates of GNP growth as well as sharp increases in relative inequality tended to show some improvement in the absolute income levels of the poor.

3.40 However, as pointed out in para. 3.5, the studies of Griffin and Khan for South-East Asian countries, reach more drastic conclusions. They find that both absolute and relative impoverishment worsened for all countries studied irrespective of their growth performance, with the People's Republic of China a notable exception. While coverage of the studies by Griffin and Khan and those of Ahluwalia, Chenery and others differ, it seems that the findings of Griffin and Khan do not conflict with the cross-sectional or time-series data in that all the countries they studied are moving from the pre-industrial to the industrial stage, in which case one would expect inequality to increase. However, there are no observed uniformities in magnitude of changes among the different country typologies - semi-industrialized, mineral exporters or agricultural exporters.

3.41 A general comment which can be made about the co-existence of rapid growth and increasing relative inequality in middle income countries is that this phenomenon probably reflects certain structural characteristics of their economies. The success in maintaining fairly impressive rates

of long-term growth, and in over-coming the destabilizing effects of short-term disturbances, have tended to obscure several deep-seated structural problems that appear to have become intractable in recent times. Such problems cast doubt on the appropriateness of past development strategies, and suggest the need for a redirection of emphasis. This has become particularly urgent since the benefits of national and sectoral growth do not seem to have permeated the various strata of society. As a result, there does not seem to be any sizeable reductions in the already large income and other disparities between regions and occupations as well as between rural and urban areas.

3.42 It should also be emphasized that in many middle income countries planning and administrative structures are being strengthened, new institutions to integrate their economies have been established and public investments in irrigation and other support services have increased. these developments did not benefit all groups in society, and did not produce expected results in terms of social optima because of structural and policy constraints. In many cases, the political, social and economic structures continue to favor privileged groups; investments allocations to areas of concentrated poverty remain low; in addition national policies with respect to prices; the agricultural terms of trade, taxation and employment were not always consistent with the fundamental objective of equitable growth.

v) Growth and Basic Needs

3.43 By dramatizing the possible divergence between the attainment of social goals and fast economic growth, the discussion of the previous section suggests that performance comparisons and structural indicators should consider not only sector growth rates, production and trade, but also less conventional measures of development. These measures have partly been considered by the studies cited and here we wish to concentrate on indicators of the provision of basic needs.

3.44 While the statistical evidence of performance and country differences on basic needs is scant, middle income countries data and historical evidence is sufficient in most cases to compute three basic indicators of well being: life expectancy, infant mortality and literacy rates. These indicators are indirectly related to income distribution and cover only a limited part of basic needs, but they nevertheless appear to be significant indices of country performances in achieving some basic characteristics of social well being.^{1/}

3.45 Table 3.11 presents data for a subsample of 21 middle income countries for which life expectancy, infant mortality and literacy rates are available. In addition to the individual values of the indicators, two combined indices are reported. The first one, named Physical Quality of Life Index (PQLI) is derived by indexing the three indicators on a scale of 0 (the most unfavorable performance in 1950) to 100 (the best performance expected by the end of the century) and taking an arithmetic average. The second one, named Disparity Reduction Rate (DDR) is defined as the rate of which a country's disparity

^{1/} See M. McLaughlin and the Staff of the Overseas Development Council, The United States and World Development, Agenda 1979, Praeger Publishers, 1979, pp. 132-133 for a summary of the main reasons why these three variables can be considered good indicators of important aspects of social progress.

between performance in PQLI in anyone time and the best expected performance in the year 2000 is being reduced.

3.46 Before systematically relating the information presented in this table with the indicators of economic performance and structural changes, several observations are in order. First, in a significant number of cases a good standing in either of the indices (or their combination) is related to the past performance of the country in reducing the gap between present conditions and social standards. Second, with few exceptions a good performance in improving the combined social indicators is associated with relatively smaller agricultural sector. Conversely, poor base year conditions and poor social performances are typically associated with a relatively more export dependent agricultural sectors.

3.47 If the countries with highest achievements in the quality of life index are grouped by continent, the PQLI seems largely to reflect the balance between the agricultural and the non-agricultural sector. For Asia, for example, the two countries with a more balanced, centrally guided growth: Taiwan and Korea, show also the highest level of the combined quality of life index. The Philippines and Thailand, where balanced growth has received some attention but much less close and centralized monitoring, have the lowest performance and Malaysia, for many aspects an intermediate case in growth policies, has also an intermediate performance. Both Africa, Europe and the Middle East on one hand and Latin America on the other show similar patterns, in the first region the prototype of unbalanced growth and poor basic need performance being Algeria, while in the second region a similar position is taken by Brazil.

Table 3.11 : INDICATORS OF SOCIAL PROGRESS IN MIDDLE INCOME COUNTRIES

	Life Expentancy at Birth <u>1/</u>	Infant Mortality ^{2/}	Literacy %	PQLI	DDR %
Colombia	61	90	81	72	9.7
Korea	61	70	85	82	5.0
Mauritania	39	187	11	18	0.4
Morocco	53	133	21	40	1.5
Philippines	65	47	88	71	3.3
Thailand	61	89	79	71	0.6
Algeria	53	145	26	41	1.4
Brazil	61	109	66	66	0.8
Chile	63	56	88	79	4.1
Costa Rica	68	38	89	85	4.4
Dom. Republic	70	27	78	64	0.2
Iran	66	47	78	52	2.3
Jamaica	65	35	83	85	3.1
Malaysia	68	41	53	73	4.6
Mexico	68	20	82	75	1.8
Peru	56	80	72	65	2.1
Romania	70	31	38	91	4.8
Taiwan	70	25	85	87	5.2
Tunisia	55	135	32	46	1.6
Turkey	57	119	51	56	2.1
Yugoslavia	68	36	84	84	4.6

1/ Years

2/ Thousand of live births - Figures are Population Reference Bureau Estimates for 1976 based on U.N. data.

3/ Literacy data are the latest estimates available and generally represent the proportion of the adult population (15 years and older) able to read and write.

Source: McLaughlin, M.M. and assoc., op. cit.

3.48 A multivariate analysis of the differences in the quality of life indices shows that these indicators display significant statistical association with selected economic and demographic structural indices. Table 3.12 and 3.313 reports a first set of simple and multiple correlation reports for a sample of 29 middle income countries for which the basic QLI indices are available.

3.49 Aside from the literacy rate variable, which shows itself as a good proxy for the other QLI variables being highly correlated with all, the highest simple and partial correlations occurs between the social indicators and the percentage of labor force in agriculture. However, while this statistical association is strong, the effect of the decrease of relative size of the agricultural sector on the level of the social variables appears to be small. Thus, for example, from the regression results in Table 3.13 we can conclude that a coeteris paribus decrease of one percent of the proportion of the labor force in agriculture is associated, on average, with an increase of only 0.12 years in life expectancy, and a decrease of 0.8 deaths per thousand in the infant mortality rate.

Table 3.12: SIMPLE CORRELATIONS BETWEEN SELECTED INDICATORS OF SOCIAL PROGRESS AND ECONOMIC AND DEMOGRAPHIC VARIABLES

Linear Correlation Coefficients					
	LFEXP ^{1/}	DEATHRT ^{2/}	INFMORT ^{1/}	LITER	PQLI
LITER	0.897	-0.913	-0.858	1.00	0.951
GRPOP	-0.260	0.131	0.301	-0.119	-0.234
POP	0.146	-0.254	0.025	0.204	0.173
PCFOOD	0.367	-0.367	-0.301	0.172	0.313
AGRLAB	-0.783	0.737	0.794	-0.687	-0.744
GRGDP	0.43?	-0.524	-0.238	0.397	0.380
GRAGR	-0.251	0.170	0.402	-0.199	-0.255

1/ Variable LFEXP and INFMORT denote respectively life expectancy at birth and infant mortality as described in Table 3.11. All other variables except DEATHRT are defined as in Table 3.7.

2/ DEATHRT is the death rate in per thousand.

Table 3.18: MULTIPLE CORRELATION BETWEEN SELECTED INDICATORS OF SOCIAL PROGRESS, AND ECONOMIC AND DEMOGRAPHIC VARIABLES

Dependent Variable	Linear Regression Coefficients ^{1/}		
	LFEXP	DEATHRT	INFMORT
Coefficients at Indep. Variables			
Constant	48.303	23.329	72.142
LITER	8.226 (7.79)	-0.139 (7.32)	-
(LITER) ^{2/}		-	-0.0104 (7.32)
GRPOP	-1.837 (2.37)	-	10,430 (2.56)
POP		-0.024 (1.50)	
PCFOOD	0.067 (3.05)	-0.043 (3.31)	-
(PCFOOD) ^{2/}	-	-	0.0013 (2.79)
AGRLAB	-0.1205 (3.26)	-	0.779 (4.14)
(AGRLAB) ^{2/}	-	0.00054 (2.35)	-
GRGDP	-	-	-
(GRGDP) ^{2/}	-	-	0.244 (2.10)
R ²	0.913	0.905	0.906
Observations	29	29	29

^{1/} The numbers in parenthesis are "t" ratios.

3.50 In comparison, the population growth variable appears to make much more difference to account for the base year differences in social performance, even if account is taken of the fact that the range of variation of this variable is very small. Among the agricultural variables, in addition to the relative size of the agricultural sector, the index of per capita food production is also positively correlated with all the quality of life indices. In practice, this variable tends to counteract the effect of the proportion of the labor force variable for those countries where a still relatively large agricultural sector is justified by food provision to a growing economy. Finally, it is interesting to notice that while the GDP growth rate appears to have a relatively large and significant effect on the differences in infant mortality rates, its correlation with the other variables is small and insignificant.^{1/}

3.51 As we turn to the consideration of the performance in achieving social targets, the data show correlations only partly similar to the ones relating the base year indicators. First, for most variables, "quality of life" achievements are positively correlated with growth achievements in agriculture. Second, population growth appears to have strong negative effect on the performance in increasing life expectancy. Third, the relative size of the agricultural sector and the amount of per capita food production are both positively related with higher social achievements while the share of primary exports displays a negative relationship.

^{1/} The PQLI, however, is significantly related to the rate of growth of agricultural production as the following estimated equation shows:

$$\begin{aligned}
 \text{PQLI} = & 70.432 - 0.816 \text{ AGRLAR} + 0.424 \text{ PCFOOD} - 0.0020(\text{AGREXP})^2 + 1.601 \text{ GRAGR} - \\
 & \quad (5.00) \quad (3.03) \quad (2.22) \quad (2.18) \\
 & \quad 0.314(\text{GRAGR})^2 \\
 & \quad (1.98) \\
 R^2 = & 0.733
 \end{aligned}$$

Table 3.14: MULTIPLE CORRELATION BETWEEN DRRs AND
SELECTED ECONOMIC AND DEMOGRAPHIC
VARIABLES

	<u>PQLI</u>	<u>LITER</u>	<u>LEXP</u>	<u>INFMORT</u>
Constant	7.957	7.130	4.091	-
AGRLAB	-0.207	-0.361	-0.017	-
	(2.09)	(2.17)	(1.44)	
(AGRLAB) ²	0.0015	0.0026	-	-
	(1.72)	(2.00)		
AGRDP	0.229	0.218	-	-
	(1.67)	(1.08)		
(AGRDP) ²	-0.0039	-0.0033	-	-
	(1.78)	(0.69)		
PCFOOD	-	-	-	0.062
				(2.30)
(PCFOOD) ²	0.00021	0.00025	-	-
	(3.00)	(2.08)		
AGREXP	-0.197	-	-0.00018	-0.144
	(3.28)		(2.25)	(2.06)
(AGREXP) ²	0.0148	-	-	0.00094
	(2.90)			(1.49)
GRAGR	0.480	0.730	0.438	0.334
	(2.18)	(2.14)	(3.56)	(1.66)
(GRAGR) ²	-0.072	-0.089	0.042	-
	(3.60)	(2.87)	(4.30)	
GRIND	-	-	0.022	-
			(6.67)	
(GRIND) ²	-	-	-	-
POP	-	-	-	-0.056
				(3.29)
(POP) ²	-	-	-	-
GRPOP	-	-	-4.190	-
			(2.12)	
(GRPOP) ²	-	-	(.842)	-
			(2.27)	
LITER	-	-	-0.079	-
			(23.94)	
(LITER) ²	-	-	0.00103	-
			(3.32)	
R ²	0.853	0.667	0.954	0.741
Observations	19	19	19	19

3.52 As for all the correlations estimated, these results are only suggestive of possible cause-effect patterns and do not constitute a formal test of any specific theory. The strong statistical patterns displayed by the data considered is, however, remarkable, we think, in that it decisively shows (i) that large trade-offs between development and growth may exist, and that (ii) while the initial conditions may tend to favor the countries which are less dependent on the agricultural sector, success in pursuing social goals may favor those countries pursuing a path of more balanced, if slower, growth.

vi) Sector Disequilibria, Labor Transfers and Productivity Differentials

3.53 The first part of this section underlines the importance of the relative decline in agricultural output share vis a vis the industrial sector and the correspondent shifts of the population from the rural sector (see Annex Table 3.4, 3.5, 3.6). These measurements, however, are not necessarily accompanied by the same set of transformation in other economic and social variables. Therefore, question arises as to whether these statistical trends correspond to the process of transformation as suggested by conventional models or are the product of a different set of forces. Before attempting to analyze the relevant country experiences, we should remind ourselves of certain implications of the conventional model as outlined in Part A of this paper. There are two elements of that model which have significant for the present discussion: (1) movements of the labor force out of agriculture to the urban industrial sector, and (2) the relationship of such demographic shifts to output and productivity disparities.

3.54 As outlined in Part A of this paper, an explanation of the manner in which outmigration provides a point of linkage between the agricultural and non-agricultural sector is provided by a large number of dual economy models. According to most of these models, the agricultural sector is assumed to employ large numbers of low wage workers and the non-agricultural (industrial) sector a small number of higher-wage workers. The marginal workers transfer out of agriculture, thereby increasing wages and per capita incomes in the low-wage agricultural sector. This simultaneous increase in the supply of labor in the high-wage industrial sector tends to decrease wages and per capita incomes in that sector. In this process agricultural outmigration acts as a levelling force as the agricultural sector becomes structurally linked to the non-agricultural sector in terms of growth rates and development potential. It is in this manner that balanced development takes place between agriculture and non-agriculture and dualism comes to an end.

3.55 According to this view of the transformation process, therefore, the process of labor transfer is the major equilibrating force in correcting the disequilibrium that exists between the agricultural and non-agricultural sector during the pre-industrial phase of development. This intersectoral reallocation is supposed to reflect shifts in the labor force from activities where output per worker is lower to where it is higher, as well as intersectoral patterns due to changes in output per worker in a given sector. In the attempt to apply the above view of the equilibrating role of the labor transfer process to analyzing patterns of change taking place in the middle income countries, cognisance has to be taken of at least three elements of

the recent development experience which do not seem to confirm the dualist hypothesis: (i) the high rates of migration from the agricultural to the urban industrial sector, (ii) the unabated persistence of such migration flows despite the tendency for urban unemployment to increase, and (iii) the sectoral accentuation of dualism accompanied by increasing wage differentials between the agricultural and non-agricultural sectors, even in the face of high unemployment rates.

3.56 Against the above background, we now examine some broad patterns of change in three semi-industrialized countries - Korea, Turkey and Brazil; the mineral-exporting countries - Venezuela; one primary exporter - Thailand; and one balanced growth country - the Peoples' Republic of China. Attention is paid to two sets of factors previously mentioned: labor transfers and intersectoral productivity differentials.

A. Semi-industrialized countries - Korea, Brazil, Turkey

3.57 For Korea it has been estimated^{1/} that approximately 400,000 rural people have moved to urban areas every year, or about 10 million during the 1955-77 period. During the earlier periods the country experienced a growing labor surplus relative to land availability, so that migration out of rural areas provided a source of cheap labor for the growing industrial and urban sectors without reducing aggregate farm output. It can be argued that if the population that shifted into the non-agricultural sectors had remained on the farms, rural areas in Korea would have been more crowded and average farm size reduced to about 0.6 hectares by the mid-1970s. This would have aggravated the problems faced by the marginality of Korean

^{1/} P.Y. Moon, "Korea's Agricultural Policies in Historical Perspective", Korea Development Institute Working Paper No. 7704, April 1977.

agriculture. Thus it can be concluded in the case of Korea that the shift of population out of rural areas proved economically beneficial to both agricultural and industrial development.

3.60 A study on Brazil by Constantino Lluch (1978) shows the gap in output per worker in agriculture and non-agriculture for the 1959-70 period.

The results show that the value of output per worker in non-agriculture was 4.6 times that for agriculture in 1949, five times in 1959 and seven times in 1970. Further, when nominal income growth is decomposed into inflation and output components by utilizing sector growth rates (table 3.9), the results show that for the 1949-70 period, the ratio of average labor productivity between agriculture and non-agriculture increased by about 2% per annum. During the 1949-59 period there was a slow widening of labor productivity differentials. But the 1960s witnessed an accelerated pace of inflation and increased urbanization which reduced the rate of growth of the agricultural labor force by almost one-half. As a result, labor productivity differentials widened at four times the previous rate (3.1% compared to 0.8%). It appears, therefore, that the Brazilian economy has achieved a high rate of growth of agricultural output, with differentials in output per worker increasing between agriculture and the rest of the economy.

3.61 The developments mentioned above have helped quicken the pace of emigration from rural areas. The move out of agriculture was particularly noticeable for North East Brazil where the net rural-urban migration between 1960 and 1970 amounted to about 10 million persons, or one of every four persons living in rural areas in 1960. The high rural/urban migration took place not only across regions, but across locations as well. The proportion of rural households decreased from 68 to 48% and the share of the rural population fell from 55% in 1960 to 40% in 1975.

3.62 In Turkey, a strategy of industrial growth has been relied upon to provide employment opportunities for the growing labor force in a situation where agriculture still provides the main source of income for about 63% of the population. Between 1963 and 1965 the proportion of the population employed in agriculture declined by 21% while the proportion of the population living in rural areas declined by only 13%. In this case labor transfers out of agriculture was supposed to play the classical role of relieving pressure on the rural economy. Thus three kinds of migration have been taking place, (i) to the cities in search of temporary or permanent jobs outside agriculture; (ii) seasonal migration to exploit agricultural labor shortages in other regions during peak seasons, and (iii) migration to foreign jobs. While the latter two types of migration can be considered economically desirable, rural-urban migration as in the Brazilian case has caused serious problems in urban areas due to the limited growth in industrial employment opportunities and lack of adequate urban services.

3.63 When attempts are made to link the labor transfer process to sectoral productivity differentials the following patterns emerge. For Turkey, the growth of labor productivity as measured by output per worker was actually higher in agriculture than in non-agricultural sectors - 3.1% compared to 2.0% per annum in real terms for the 1963/65-1973/75 periods. The difference is in part due to declining agricultural employment. However, similar to patterns observed for other countries, labor shifted from lower productivity agricultural sector to the higher productivity industrial sector. On average, labor productivity in the non-agricultural sector is still about five times higher than that in the agricultural sector. (See

Annex tables 3.10 and 3.11). Similar patterns are noticeable for income disparities which are about five times as high.

B. Mineral Exporting Countries - Venezuela, Nigeria

3.64 Because of the impact of oil and the traditionally low contribution of agriculture to total output, the case of Venezuela is not typical of that observed for other middle income countries. The process of labor transfers out of agriculture has therefore taken on different dimensions. Outmigration from the agricultural sector has been large, but the evidence suggests that most migrants can find jobs in the urban industrial sector at relatively high wages. The prices paid for both skilled and unskilled labor are much higher in Venezuela than in most other middle income countries, as the modern and more technologically advanced industrial subsector provides higher incomes and expands in importance. Some other factors which single out Venezuela as a special case are mentioned below. For example, take the case of the traditional subsector which has been an important producer of subsistence food crops, coffee, cocoa, fruits and vegetables. Here, rising labor costs and an exchange rate based on petroleum has made competition in world markets difficult. As a result, outmigration of labor has taken place coupled with a shift from crop to animal production and a substitution of capital for a portion of the outmigrating labor resources. This trend has been stimulated by the high factor prices in urban areas and more developed agricultural areas.

3.65 The decline in agricultural employment was further accelerated as a result of mechanization and improved cultivation techniques. These factors contributed to a rapid increase in agricultural output - 5.1% per annum between 1961 and 1975 - and as a result output per worker in agriculture

grew by about 5.3% per annum. Over the same period, the rising productivity per worker in agriculture can be associated not only with the decline in the proportion of the agricultural labor force but also with an increase in the number of days worked. During the 1961-75 period labor utilization increased from 170 to 275 working days as a result of an expansion of land under cultivation. Further new forms of agricultural employment and productivity have been favorably stimulated by the diversification of production due to changes in urban consumption patterns. The steady trends in the production of livestock, poultry, oilseeds, fruits and vegetables - aided by government price support policy - has increased labor utilization and reduced under-employment significantly. The shift towards these newer forms of agricultural activity, especially modern ranching and poultry farming, has not only contributed to the decline in subsistence employment but has also created new forms of demand for agricultural labor.

3.66 The new forms of labor demand created in the "modernizing" agriculture were accompanied by increasing urban employment (-6.2% between 1961 and 1975) which was able to keep pace with the rapid growth in the urban labor force. As a result, since the early 1960s total employment has been growing at about 3.7% per annum which is estimated to be higher than the rate of growth of the total labor force. With real GDP growing by about 5.8% over the same period, total productivity per worker increased by nearly 2.0% per annum. However, with a decline in the rate of increase of petroleum extraction between 1961 and 1975 average productivity per worker increased by less in the overall economy than in the non-petroleum sector. GDP without petroleum showed a 7.2% annual increase resulting in a 3.3% increase in output per worker. (see Annex table 3.12).

3.67 Thus, Venezuela represents a case, similar to the situation observed for Turkey, in which output per worker in agriculture has been growing faster than that in the non-agricultural sector, but for different reasons. In the Venezuelan case it depicted diversification of the agricultural production structure with a concomitant shift from traditional subsistence crops to modern forms of agricultural activity. The resulting loss of employment opportunities in traditional subsistence agriculture led to labor transfers to both the modern urban industrial sector and to the modern agricultural sectors. In these two sectors both incomes and labor productivity levels were higher than in traditional subsistence agriculture.

3.68 Venezuela presents a vivid contrast to the case of the other mineral exporting middle income country being illustrated in this section - Nigeria, where unlike Venezuela, primary agricultural production of the subsistence type has traditionally provided the main source of growth. The oil sector has only recently begun to dominate the economy now accounting for an estimated 30% of GDP, 93% of export earnings and 80% of government revenues. Nevertheless, Nigeria's agricultural sector still provides the major means of support for approximately 77% of the country's total population of 77 million, contributes 25% of GDP and 60% of all non-oil exports.

3.69 While the Nigerian data base is very scanty, it is still possible to comment on dimensions of the labor transfer process based on field observations and a large number of micro-studies. According to current estimates population has been growing at an annual rate of 2.5%. The rate of urban population growth of over 6% a year (over 10% in capital cities), indicating considerable rural/urban migration. In spite of this, the rural areas are themselves growing very fast, recording an average annual increase

of nearly 2.0%. Thus, while over 23% of the population lived in the urban areas in 1970, and about one-third of the working population were engaged in non-agricultural, mainly urban-based, activities, the rural areas continue to play the dual role of contributing the bulk of the increase in population as well as employment in a situation where land-man ratios appear to be favorable.

3.70 Most of the analysis of labor transfer process in developing countries is confined to rural-urban migration. However, in Nigeria, as elsewhere in Africa, there is also extensive rural-rural as well as urban-rural (mainly) return migration. Rural-rural migration partly reflects the wide range of ecological situation, population-resource relationships and the availability of local resources and opportunities. Rural-rural migration tends to redistribute the population spatially in line with the inter-rural pattern of resource distribution as well as opportunities available in the rural sector. The return of urban to rural migrants are those persons who had previously migrated from their home villages and districts into other urban or rural areas but who have now resettled. The evidence suggests that such return migrants are usually highly motivated persons who, on account of their high economic expectations, usually stimulate change in their home environments. Such influences could take various forms, e.g., the initiation of economic development projects or the introduction of new farming techniques or crops into rural areas. On the other hand they can also stimulate further outmigration, especially if they were economically successful. It has been shown that on an overall basis the return of migrants has been a major contributory factor to the socio-economic development of a large number of rural communities.

3.71 While no firm data exist on the exact nature of these human resource transfers, the evidence indicates that both return migration and rural-to-rural migration are economically beneficial to the agricultural development. The participants in the rural to rural migration process differ from their rural-urban counterparts in the sense that they do not require specific skills to function effectively as farmers or farm laborers. Unlike young school leavers who predominate in the rural-urban migration stream, tenant migrant farmers in the rural areas are usually adults between ages 20 to 50, with a high concentration in the 20-40 age group. The increase in youth migration for wage employment in the cities has created a labor shortage particularly in cocoa producing areas. However, migrants from land deficit areas of the East, Kwara and Sokoto states have moved to these areas, thereby relieving both source and destination regions of their peculiar problems. At the destination they live as laborers further graduating as sharecroppers and self-employed farmers. While seasonal labor migrants (mainly from Northern Nigeria) move to the cocoa zone during the slack farming period (October-February), more permanent migrants are mainly those pushed for shortage of land; hence they work initially as laborers and later become self-employed tenant farmers paying rent on land leased to them by their landlords. These migrants cultivate food crops, and harvest and process palm fruits. Since labor is a critical factor in farming, especially cash cropping, the migrant labor system has ensured the steady growth of the rural sector, due to the production of food, timber and palm product extraction, and rubber production. In addition, landlords are able to earn extra income through the rent paid on palm trees which were hitherto unexploited.

3.72 Studies have shown that the impact of the influx of migrants from cocoa growing areas to the cities has been adversely affected by "fill in" migration of laborers from infertile agricultural areas. Such migration is usually prompted by the desire to plant tree crops at destination areas. This has led over the years to a system of absentee landlordism and a series of tenancy agreements. While landlords are paid fees on their farm, they live and work in the informal sector to towns and employ hired labor on their farms, thereby realizing substantial income in origin areas. Tenant farmers also tend to consolidate their farm plots and this had led to considerable improvements in agricultural productivity.

3.73 Thus the rural-to-rural labor transfer process in countries like Nigeria constitutes a phenomenon different from the process observed in other middle income countries outside Africa. It is important to the study of the transformation process because of its potential use as a means of alleviating labor shortages and generally enhancing agricultural development.

3.74 However, while rural-to-rural migration can be used as a vehicle in transforming Nigeria's agriculture, it has increasingly faced the problem of intersectoral disarticulation associated with urban-rural human resource transfers. The loss of employment in agriculture has not been sufficiently compensated for by the limited number of new jobs created in the industrial sector. The industrialization drive has shown some success. Between 1963 and 1974 value added in manufacturing grew at an annual compound rate of over 12% while the sector's share in GDP rose from around 5 to 7% over the same period. Despite this good performance labor absorption was insignificant with total employment in manufacturing estimated at only 324,000 in 1975. With increasing capital deepening promoted by the various

forms of industrial protection, local producers have been able to maintain high prices for industrial goods as well as high profits and wages. The resulting bias against agriculture is reflected in the worsening terms of trade against agriculture and a growing income gap between agriculture and other sectors. The generally high import content of the industrial sector, coupled with the low backward and forward linkages between agriculture and other sectors have militated against the development of a diversified economy.

3.75 As noticed in the Korean case, rural outmigration has led to an increase in the mean age of the typical rural household, resulting in an older agricultural population unable to cope with arduous farming tasks. As a result many parts of rural Nigeria are experiencing declining agricultural output and higher production costs. The increasing expenditure on hired labor by rural households results from the decline in the size of the rural family labor force as well as changes in the rural family composition brought about by the high rate of out-migration. Urban-rural migration is sometimes accompanied by increasing farm size and therefore higher average rural household earnings. However, cases where such high earnings occur are accompanied by increased costs for hired labor as well as net monetary transfers to urban areas. The result, therefore, is a net physical and financial loss to rural areas.

3.76 In conclusion, Nigeria represents the now common case observed in many middle income countries in which urban industrial growth was not accompanied by decisive changes in the structure of the agricultural sector, productivity and food production thereby creating the surpluses necessary for urban growth. The rural-urban labor transfer process tended to outrun the pace of industrial

development, outpacing the vital development of agriculture which is necessary for genuine structure transformation. The essential "agricultural revolution" has therefore been frustrated by the pace and volume of urban growth. Rural-urban migration, rather than playing an equilibrating role in linking the agricultural and non-agricultural sector, tends to exceed the capacity of the urban industrial sector to provide productive employment.

C. The People's Republic of China

3.77 The study of the transformation process in China must be based on the relative emphasis given to agricultural, rural industry and the urban industrial sectors in the nation's economic policy. Since the late 1960s the Chinese authorities have recognized that only agriculture and rural industry could provide adequate employment for increasing labor force. This was based on a recognition that even if the urban industrial sector expanded as rapidly as possible, it could not absorb the annual increase in the labor force. The development of agriculture and light industry was therefore seen as meeting the basic demands of the burgeoning population for food and shelter as well as generating much of the funds necessary for future growth.

3.78 As is well-known, the political and economic program for pursuing these goals was based on the Maoist principles of "walking on two legs". There are five such principles: (i) agriculture and industry should be developed simultaneously, (ii) both light and heavy industry should be developed, but with priority given to heavy industry; (iii) both national and local enterprises should be developed; (v) the use of modern and indigenous methods of production should be promoted. It was further recognized that successful implementation of these policies requires considerable planning, decentralization and policy co-ordination as well as optimal division of labor.

3.79 Because of these factors the entire development pattern and therefore the marked structural changes which have taken place in the Chinese economy were different from those observable for other middle and low income countries. In the typical developing country the agricultural sector contributes between 40 and 60% of national product and the preponderant share of the labor force is also in this sector. However, the process of development and transformation is accompanied by significant shifts in these ratios leading to a gradual decline in agriculture's share in national output and the proportion of the labor force engaged in that sector. This has been the case where countries at different stages of development are compared using cross-sectional and long-run time series evidence.

3.80 The available evidence suggests that China followed the typical path of development up to the early 1950s. However, by the 1970s only about 25% of the country's national product was derived from agriculture, with more than 50% derived from industry (see Annex table 3.3). While under normal circumstances one would expect such marked changes in sectoral product structure to be parallel to similar movements in labor force structure, this was not the case in China. According to Alexander Eckstein (1977) there is no indication that the agricultural labor force has diminished. This is borne out by other calculations which show that between 1957 and 1975 the labor force increased by between 38% and 50% and that 70% and 77% of the increment occurred in rural areas. Given the absence of large-scale unemployment in either rural or urban areas this suggests that there has been a tremendous increase in employment since 1957 and that this included a large rural component. It seems, therefore, that China's agricultural sector has been able to absorb a very large number of new entrants into the labor force during the past two decades.

3.81 The above situation should be contrasted with that existing in the pre-1957 period which paralleled the experience of most middle and low income countries. During this earlier period an industrialization policy which concentrated resources on a small number of capital-intensive projects (the Soviet-type model) produced the classic pattern of rapid output growth combined with massive open unemployment and seasonal unemployment in rural areas. The Chinese situation of the 1950s parallels that of many middle incomes today in which the growth of labor requirements was outmatched by a swollen labor force consisting of masses of peasants who flocked to urban areas in response to bad harvests or the possibility of jobs on new construction projects. Thus, during the earlier period both "push" and "pull" factors were in operation. People were "pushed" from the agricultural sector because of disruptions caused by massive collectivization and "pulled" to urban areas because of their attractiveness, the prospects for better working conditions, higher wages, etc.

3.82 However, in contrast to other middle income countries, China introduced a rigid labor allocation process after the Cultural Revolution, in part designed to stem the flow of people from the countryside to urban areas. Persons desiring to leave rural areas had to obtain permits from local authorities and at the other end permits to stay in the city. Without such a permit a ration card could not be obtained. Further serious housing shortages in urban areas as well as tight policing of movements served as a serious deterrent to rural-urban migration. Besides policies designed to prevent rural-urban migration, return-migration from urban to rural areas was also encouraged from time to time.

3.83 These unconventional approaches aside, mention must be made of government policy which took account of China's factor endowments. In a

situation of land scarcity Chinese authorities recognized that sustained increases in agricultural output could be achieved only by increasing yields per acre by means of intensive land use without a decreasing use of labor and other inputs. Such strategies resulted in genuine increases in rural employment and labor productivity (See Annex Table 3.14). However, to the extent that agricultural labor shares did not change significantly between 1957 and 1975, labor productivity differentials between the agricultural and non-agricultural sectors have probably increased rather than decreased. (Annex table 3.15). To the extent that intersectoral productivity differentials are widening, it may prove difficult in the future to reduce income gaps between the agricultural and non-agricultural sector.

4. PATTERNS OF AGRICULTURAL GROWTH

1) Growth Trends

4.1 During the 1961-76 period the growth of agricultural production made a substantial contribution to the increase in the GNP of middle income countries. The magnitude of this contribution, however, varied widely across countries according to each country's structural characteristics. Table 4.1 reports the results of a multiple regression analysis that attempts to estimate the average contribution of agricultural GDP growth to total GDP, controlling for other socio-economic variables related to the economic structure of each country and to its position on the development path.

Table 4.1

GDP GROWTH AS A FUNCTION OF AGRICULTURAL GDP
AND SOCIO-ECONOMIC VARIABLES

<u>Variables</u>	<u>Regression Coefficients</u>	<u>"t" Statistics</u>
GRAGR	-	-
(GRAGR) ²	0.0636	4.01
AGREXP		
(AGREXP) ²	-0.0005	3.20
POP	0.0600	3.69
(POP) ²	-	-
GRPOP	1.211	2.23
(GRPOP) ²		
LITER	0.083	1.51
(SLITER) ²		
CONSTANT	2.231	
DUMMY/ ¹	1.827	2.20
R ²	0.663	
Observations		32

¹ Equal to one for "non agricultural" countries and zero "agricultural" ones. (See Section 1 for the definition of these two groups and of the variables.)

4.2 Tables 4.2 and 4.3 present in turn estimates of average growth rates in agriculture (from trend equations) and relate them to the more recent agriculture GDP growth.

Table 4.2

AVERAGE GROWTH RATES IN AGRICULTURAL OUTPUT
(COMPUTED FROM TREND EQUATIONS)

-Constant 1961/65 prices-

<u>Country</u>	<u>Total Agricultural Output</u>	<u>Crop Output</u>	<u>Food Output</u>
Algeria	1.6	1.7	1.6
Ghana	0.5	0.5	0.5
Ivory Coast	6.4	6.4	7.1
Nigeria	1.6	1.5	1.6
Sudan	3.0	2.5	3.7
Morocco	4.0	4.2	4.0
Korea	5.0	4.7	4.8
Philippines	4.7	5.0	4.9
Thailand	4.4	4.4	4.8
Turkey	4.3	4.7	4.1
Brazil	3.9	3.5	5.7
Venezuela	4.0	2.4	4.3

Source: Table 4.1 of the Appendix.

Table 4.3

ESTIMATES OF AGRICULTURE CONTRIBUTIONS TO GDP GROWTH

	<u>Historical (1970-76) GDP Growth Rates</u> %	<u>Average Growth Rates for Agriculture Output (1961-65)/1</u> %	<u>Trend Contributions of Agriculture to GDP Growth</u> %
Algeria	6.2	1.6	2.63
Ghana	2.0	0.5	0.80
Ivory Coast	6.5	6.4	40.08
Nigeria	7.4	1.6	2.20
Sudan	6.1	3.0	9.38
Morocco	4.8	4.0	21.20
Korea	10.3	5.0	15.44
Philippines	6.3	4.7	22.30
Thailand	6.5	4.4	18.94
Turkey	7.2	4.3	16.33
Brazil	10.6	3.9	9.13
Venezuela	5.3	4.0	19.20

/1 Constant 1961/65 prices.

4.3 Based on the regression in Table 4.2 and 4.3, Table 4.4 contains also estimates of agriculture's contribution to GDP growth. These estimates show that the share of overall growth that can be attributed to agriculture has been considerable for all countries except Algeria, Ghana and Nigeria. The growth in food and grain output showed trends similar to those exhibited for agriculture as a whole. As a result, for many middle income countries the trend in per capita production was higher than the average of 1.2% per annum achieved by the developed countries. Again, the notable exceptions can be found on the African continent - Algeria, Ghana and Nigeria. The trend rates in food production are closely correlated with trends in food imports previously discussed.

Table 4.4

AVERAGE GROWTH RATES IN PER CAPITA PRODUCTION
(FROM TREND EQUATIONS)

	<u>Agriculture</u>	<u>Food</u>
Algeria	-0.9	-1.0
Ghana	-1.5	-1.6
Ivory Coast	1.7	2.1
Nigeria	-0.7	-0.7
Sudan	0.7	1.2
Morocco	0.7	0.7
Korea	1.9	1.7
Philippines	1.1	1.2
Thailand	0.9	1.2
Turkey	1.1	1.0
Brazil	0.9	1.9
Venezuela	0.4	0.5

4.4 The trend growth rate figures hide the perturbing influences of bad harvests, civil wars, and other factors on agricultural production. Using the standard error of the de-trended agricultural growth rates (percentages) as an indicator of the variability of output, the regressions show extremely high variability for Nigeria, Morocco, Turkey and Brazil. These fluctuations, however, are not only due to random factors, but also to variations in agricultural policy,

investments and other changes in the economic environment not captured by a simple trend variable. A study of their consequences shows that the impact of production short-falls was most severe in Sub-Saharan African countries where agriculture still accounts for a significant share of total output.

Table 4.5

VARIABILITY IN AGRICULTURAL PRODUCTION

Standard Errors of Agricultural Production
(from detrended figures)

	<u>1961-76</u>	<u>1961-70</u>	<u>1970-76</u>
Algeria	4.35	10.54	8.20
Ghana	2.74	6.18	4.88
Ivory Coast	2.90	7.21	6.23
Morocco	9.60	58.30	13.65
Nigeria	15.13	94.91	12.23
Sudan	3.55	0.96	4.88
Korea	6.70	17.38	13.27
Philippines	4.54	10.62	10.11
Thailand	4.25	5.49	10.24
Turkey	22.07	66.37	49.71
Brazil	12.54	41.50	24.41
Venezuela	3.20	9.83	5.52

ii) Sources of Agricultural Growth

4.5 Agricultural growth stems from a variety of sources and is accompanied by diversification, changes in the composition of output and changes in the technology and in the relative importance of the inputs. A basic analysis of sources of growth relates to the extent to which increases in agricultural production have originated from the expansion of cultivated area rather than increases in yields. This is clearly only a preliminary issue, since increases in yields are caused by many factors and area increases may be themselves caused by yield increases. To the extent that a simple decomposition of agricultural growth can be attempted, however, area and yield contributions varied widely across regions. Yield increases were small in countries in Sub-Saharan Africa

and Latin American countries, where new land was relatively abundant and agriculture tended to expand through extensive techniques and less fertile land rather than land already under cultivation. In Asian, Middle Eastern and North African countries where the cultivated areas rose rather slowly, substantial increases in yields were achieved.

4.6 Table 4.6 shows a summary decomposition of the output increase into an area effect and a yield effect. Statistical analysis (not reported here) clearly shows that area expansion is the predominant source of output growth in all countries with untapped land potential, low population densities and using land intensive technologies. Also, despite the consistency of the aggregate results, crop by crop analysis shows (Table 4.4 in the Appendix) large variations. For example, during the years 1961-76 the growth rate in area harvested under staple food crops^{1/} was highest for the Sudan (5%) followed by Brazil and Ghana (3%), and the Ivory Coast, Thailand and Philippines (2%). Similar trends were noticeable for the area under temporary crops. However in this case, Ghana showed the highest rate increase (8%), followed by Morocco and Sudan (6% and 5% respectively) and Brazil (4%). For Thailand, the Philippines and the Ivory Coast the average rate of increase of area under temporary crops was the same (2%) as that under staple food crops. The area under major permanent crops showed the greatest increases for Sudan and the Ivory Coast (both 8%) followed by Thailand (4%). Area under permanent crops showed the largest declines in Brazil (4%) followed by Ghana and Morocco. When the average growth rates for all crops are taken into

1/ Staple Food Crops - refers to all cereals, root crops, pulses, groundnuts and plantains. Temporary Crops - refers to all staple food crops and all other annually planted crops excluding minor crops, i.e., crops area of which is less than 100,000 ha. Permanent Crops - refers to all tree crops and cash crops, which grow for long periods and need not be replanted after each harvest, such as cocoa, coffee and rubber, it includes land under shrubs, fruit trees, nut trees and vines, but excludes land under trees grown for wood or timber.

Table 4.6

CHANGES IN ACREAGE AND YIELDS
1961/65-76

			<u>Output Increase</u>	<u>Acreage Increase</u>	<u>Yield Increase</u>
<u>Average</u>					
Nigeria	)	% per annum	2.1	1.7	0.4
Algeria	)	% contribution	100.0	80.95	19.05
Venezuela)				
<u>Average</u>					
Ghana	)	% per annum	3.5	2.8	0.7
Ivory Coast	)	% contribution	100.0	80.0	20.0
Sudan)				
<u>Average</u>					
Morocco	)	% per annum	2.0	1.0	1.0
Turkey	)	% contribution	100.0	50.0	50.0
<u>Average</u>					
Korea	)	% per annum	3.2	1.4	1.8
Thailand	)	% contribution	100.0	43.75	56.25
Philippines)				
<u>Average</u>					
Brazil	)	% per annum	2.8	2.2	0.6
Venezuela	)	% contribution	100.0	78.57	21.43

consideration, the figures show that Sudan experienced the largest increase (5%) in harvested area, followed by Brazil (3%), with the Ivory Coast, Philippines and Thailand experiencing growth rates of 2% each. Ghana, Morocco and Nigeria achieved growth rates in total cropped area of 1% each.

4.7 The above trends point to some important changes in the structure of crop production. For three countries there were steady increases in the cropped area - Ivory Coast, Sudan and Thailand, but with substitutions among the different types of crops. In the case of Sudan, the area under major permanent crops increased faster than that under temporary and staple food crops, even though

there were substantial increases in the latter two categories. The shift towards major permanent crops was highest for the Ivory Coast, followed by Thailand. The countries which show some clear trends in land substitution over the 1961-76 period are Brazil, Ghana and Morocco. In Brazil, area under major permanent crops decreased by 4% while that under temporary crops increased by the same percentage points. This to some extent reflects changing patterns of crop diversification in the country, with a shift from crops such as coffee to others such as wheat and soybeans. The increasing emphasis placed on these two have been mainly responsible for the rapid expansion in agricultural output. The cases of Ghana and Morocco are less spectacular. In the former case the permanent cropped area declined slightly with major increases in the area under other crops. In the Moroccan case, the 1% increase in the area devoted to staple food crops was paralleled by a similar decline in area under permanent crops.

4.8 Growth in agricultural production can also be analyzed from the point of view of the variance of the growth rates. Table 4.7 presents an analysis of variance of agricultural growth in the form of percentages for the most important foodcrops. For wheat and maize the contribution of yield tends to exceed the contribution of area both for the overall sample and the subsample of predominantly non agricultural countries. Conversely in agricultural countries area increases account for most of the growth variability of food crops, and particularly so for such crops as maize and potatoes whose ultimate destination may be poor people. For rice, a strong correlation exists between growth rates of area and yield and this common variation explains most of the growth in production for non-agricultural countries.

4.9 Changes in area harvested for specific crops have been decomposed into two sub-periods - 1961/68 and 1968/76. During the first 1961/68 sub-period Brazil, Venezuela, Sudan and Thailand showed steady increases in areas harvested for cereals, roots and pulses, with substantial inter-country variations. For Brazil there was a steady expansion of about 4% per year in area under rice, wheat, other cereals, nuts and pulses. In Venezuela, the largest increases were recorded for rice (10%), wheat (4%) and other grains (6%). The land extensive nature of cultivation patterns in these two countries is clearly brought out by these developments. In the case of Venezuela the shifting pattern of under-crop acreage is also related to developments in livestock production. The Sudan recorded particularly large increases in the area devoted to wheat (17%) while there were important gains in area harvested of pulses in Thailand (17%), Nigeria (14%) and Ghana (6%). In the case of Thailand,

Table 4.7

% of Growth Variation in Production explained by
Growth Variation in

Crop Countries		Yield	Area	Joint Area and Yield
<u>Wheat</u>	Non-Agric.	48.27	40.73	11.00
	Agric.	39.43	74.46	-13.89
	All	48.26	52.81	- 1.07
<u>Rice</u>	Non Agric.	5.54	8.63	85.83
	Agric.	52.97	62.00	-14.97
	All	7.16	16.58	76.26
<u>Maize</u>	Non Agric.	61.35	13.41	25.24
	Agric.	20.68	78.43	0.89
	All	66.24	36.96	- 3.20
<u>Potatoes</u>	Non Agric.	14.27	94.92	- 9.19
	Agric.	40.11	57.20	2.69
	All	20.29	93.37	-13.66
<u>Sorghum</u>	Non Agric.	20.24	99.13	0.63
	Agric.	8.05	99.81	- 7.86
	All	0.30	99.98	0.02

Source: FAO data files. The number of observations is 101 for the agricultural countries, 119 for the agricultural ones and 220 for the whole sample.

these developments are closely correlated with the crop diversification patterns previously mentioned. It should also be noticed that during the 1961-68 sub-period, the Republic of Korea showed substantial increases in the area harvested of roots, pulses and wheat. However, in contrast to the other cases mentioned, these developments are more reflective of land intensity than land extensive cultivation patterns.

4.10 During the 1968/76 subperiod, tremendous increases in area harvested were once again recorded for Brazil, Ghana, Sudan and Thailand, with decreases for Morocco (except for pulses, the Republic of Korea and Venezuela. In terms of inter-crop differentials, the area harvested for wheat increased substantially for all crop categories in Ghana, Sudan and Thailand. In the Thai case, the substantial increase in the harvested area of root crops is significant. In general, the changes in area harvested reflect the fact that for most countries less fertile land was being brought under cultivation, and available land being used more intensively.

4.11 The full potential of agricultural transformation for accelerating agricultural growth and improving equity can only be realized with substantial increases in the use of agricultural inputs which economize on scarce factors and raise labor productivity. Traditional production practices are becoming increasingly inadequate in the face of growing population, increasing food needs and reduced arable land-man ratios in some countries. Not only has the dependence on new inputs such as fertilizers, pesticides and farm machinery increased, but the available data suggests that fertilizers now account for nearly two-thirds of the commercial energy used in developing countries (table 4.7 in annex). In this section a few comments are addressed to the relationship between the growth of agricultural output in middle income countries, and certain types of input uses, i.e., irrigated land, fertilizers and farm machinery.

4.12 Aggregate data on irrigated land (Table 4.5 in Annex) seem to indicate that the countries with the highest percentages of irrigated land to arable land area were some of the ones to achieve the highest rates of growth in agricultural production. This is particularly noticeable for land-scarce countries in Asia, and a clear distinction has to be drawn between these countries and those, e.g., Venezuela which practice a land-extensive agriculture.

4.13 The data on fertilizer consumption (Table 4.6 in Annex) show perceptible rates of growth for all middle income countries, except for the Sub-Saharan African countries - Ghana, Ivory Coast, Nigeria, where consumption per ha of arable land was about 6 kg. As a group consumption per ha in the middle income countries was higher than the 20 kg per ha achieved for developing countries as a whole. However, the 1976 consumption levels (except for Korea) was considerably less than the 100 kg per ha achieved for developed countries.

4.14 The importance of fertilizer and mechanization is confirmed by the cross-country comparison of production results and pattern of input use for 49 of the 54 middle income countries. The regression estimates, reported in Table 4.7 relate 1974 gross values of crop output per ha to per ha fertilizer, tractor power and planted area in selected important crops. The crops considered are rice, wheat, maize, sorghum and potatoes and comprise 90% of the basic food crops consumed in the developing countries.

4.15 Despite the apparent association between the highest percentage of irrigated land and the highest rates of growth in agriculture, the multivariate analysis failed to reveal any significant correlation across the whole sample between yields and irrigation, once the effect of fertilization, tractor power and area in specific crops was accounted for. Simple correlations between yields and other inputs however, is relatively high, as Table 4.8 shows, and suggests

Table 4.8

CROSS-COUNTRY COMPARISON OF PRODUCTION PERFORMANCE: DOUBLE
LOG REGRESSION OF GROSS VALUE OF CROP OUTPUT PER HA VERSUS:

- Regression Coefficients -

<u>Variables</u>	<u>All Middle Income Countries</u>	<u>"Non Agricultural" Countries</u>		<u>"Agricultural" Countries</u>
Nitrogen Fertilizer/ ton of cropland	0.329 (5.30)	0.408 (4.206)	0.395 (3.87)	- -
Irrigated Area/ ha of cropland				0.120 (2.00)
Tractor Power/ ha of cropland		0.208 (1.33)	0.336 (2.30)	
Planted Area in Rice/ ha of cropland	0.288 (5.760)	0.078 (1.62)		0.596 (9.93)
Planted Area in Wheat/ ha of cropland	0.191 (4.24)	0.066 (1.53)		0.313 (5.05)
Planted Area in Sorghum/ ha of cropland	0.079 (1.580)			0.174 (3.63)
Constant	13.577	13.989	14.087	
R ²	0.74	0.81	0.75	0.89
Observations	49	19	19	30

Note: The numbers in parenthesis are "t" ratios. Data are from FAO files (1974).

that multiple correlation may be difficult to estimate due to the concomitant variation of irrigation with both fertilizer and tractor use.

4.16 For the countries in the "agricultural" subsample, on the other hand, irrigation, rather than mechanization and fertilizer use seems to be the index of technological level associated with higher yields. While for all middle income countries a full 40% of the variance of output per ha can be explained by variations in nitrogen fertilizer use, for the non agricultural group about

Table 4.9

LINEAR CORRELATION COEFFICIENTS BETWEEN INPUT
LEVELS (LOGARITHMS) IN THE CROSS-COUNTRY SAMPLE

	<u>Nitrogen Fertilizer per ha</u>	<u>% Irrigated Land</u>	<u>Tractor Power per ha</u>
Nitrogen Fertilizer per ha	1	0.506	0.625
% Irrigated Land		1	0.548
Tractor Power per ha			1

Note: Number of observations :49. All coefficients are
significant at 5% confidence level.

50% of the same variance is explained by fertilizer and slightly less than 20% by the degree of mechanization.

4.17 The effect of the percentages of cropland planted into rice, wheat and sorghum may be interpreted, to some extent, as dependent on the diffusion of high yield varieties for these three crops. According to USDA estimates (Table 4.8 in the Appendix), for South and East Asia, over 60% of the wheat area and 26% of the rice area was under HYVs in 1974-75. For the middle income countries, the Philippines had the highest percentage (64%) of their total rice area under HYVs. The corresponding proportions for African countries in the case of wheat was: Sudan 50%, Algeria 27.9%, and Morocco 16.7%.

4.18 In addition to cross-country evidence, these speculations are also supported by the evolution of yields and input use over time. Table 4.10 summarizes the results of a cross-country time series analysis conducted, for the same sample of countries, for the period 1964-1974.

4.19 While the equations in Table 4.9 broadly conform with the static cross-country evidence presented above, two considerations are in order.

Table 4.10

CROSS-COUNTRY TIME SERIES COMPARISON OF PRODUCTION PERFORMANCE
DOUBLE LOG REGRESSION OF GROSS VALUE OF CROP OUTPUT PER HA VERSUS:

- Regression Coefficients -

<u>Variables</u>	<u>All Middle Income Countries</u>	<u>"Non Agricultural" Countries</u>	<u>"Agricultural" Countries</u>
Nitrogen Fertilizer/ ha of cropland	0.241 (12.05)	0.215 (4.89)	0.039 (1.95)
Irrigated Area/ ha of cropland	-	-	0.125 (5.95)
Tractor Power/ ha of cropland	-	-	-
Planted Area in Rice/ ha of cropland	0.328 (20.50)	-	0.550 (29.00)
Planted Area in Wheat ha of cropland	0.225 (15.00)	0.215 (4.32)	0.296 (20.03)
Planted Area in Sorghum/ ha of cropland	0.131 (7.71)	-	0.223 (13.94)
Planted Area in Maize/ ha of cropland	0.064 (3.02)	0.241 (3.05)	-
Constant	13.275	13.399	13.180
R ²	0.693	0.664	0.828
Observations	490	190	300

Note: The numbers in parenthesis are "t" ratios. Data are from FAO files (1964-74).

First, nitrogen fertilizer appears to be the input explaining the bulk of variation and, in light of its increasing trend, of the growth of yields per acre over the entire sample. When the sample is sub-divided into the two groups of semi-industrial and agricultural countries, however, irrigation appears to be the input associated with higher yields. The mechanization variable, on

the other hand, fails to show any statistically significant explanatory power when the time series evidence is brought into the picture.

4.20 As for the case of the static cross-country evidence, the time series sample shows a fair amount of simple correlation between levels of input use (Table 4.11) and values not significantly different from the ones correlated for a single year (Table 4.9).

Table 4.10

LINEAR CORRELATION COEFFICIENTS BETWEEN INPUT LEVELS
(LOGARITHMS) IN THE CROSS-COUNTRY OVER TIME SAMPLE

	<u>Nitrogen Fertilizer per ha</u>	<u>% Irrigated Land</u>	<u>Tractor Power per ha</u>
Nitrogen Fertilizer per ha	1	0.528	0.605
% Irrigated Land		1	0.530
Tractor Power per ha			1

Note: Number of observations :490. All coefficients are significant at .01% confidence level.

4.21 Overall, despite the nuances in the statistical correlations, the bulk of the evidence tends to support the hypothesis that fertilizer, irrigation and machinery are all associated with agricultural development. Trends in farm machinery use (Table 4.7 in Appendix), for example, are similar to those noticeable for fertilizers and are reflected in the pattern of farm machinery imports (Table 4.14 in Appendix). Therefore, while yield differences appear to be more correlated with differences in fertilizer and tractor use among non agricultural countries and with fertilizer and irrigation among agricultural countries, the process of diffusion of modern technology in all countries appears to be promoting a "package" of these three inputs.

iii) Technological Change and Transformation

4.22 The increasing use of modern technology in all developing countries raises questions about the impact of technological change on social optimality. The argument that technological change may contribute to the deterioration of income distribution has been addressed by many commentators.^{1/} The claims usually include the faster rates of adoption by higher income farmers or by owners compared to tenant-farmers, a tendency towards a labor-saving bias in technology that reduces labor's share, non-adaptability of technological innovations to all geographical areas and incentives for landlords or wealthy farmers to consolidate small holdings into large units thereby promoting a proletarianization of the rural population,

4.23 The evidence suggests that for the Republic of Korea a first phase of land saving innovations has been succeeded by a recent trend toward a less intensive use of labor. Until the early 1970's chemical technology was the main force in raising agricultural productivity. This was later combined with the development and dissemination of high yield varieties of rice and as a result both acreages and yields have shown tremendous increases since 1972. Since 1967, however, a concomitant phenomenon of gradual substitution of mechanical equipment and herbicides has taken place, and the available data indicate that the trend has been accelerating in recent years. For example, between 1965 and 1976, labor input per ha of rice production decreased from 1400 hours

^{1/} For example, Walter FALCON, "The Green Revolution: Generations of Problems", American Journal of Agricultural Economics (December 1970); B. F. JOHNSTON and J. COWNIE, "The Seed-Fertilizer Revolution and Labor Force Absorption", American Economic Review, September 1969; W. J. STAUB and M. G. BLASE, "Induced Technological Change in Developing Agricultures: Implications for Income Distribution and Agricultural Development", Journal of Developing Areas (July 1974); and Clifton WHARTON, Jr. "The Green Revolution: Cornucopia or Pandora's Box", Foreign Affairs (April 1961).

to 1,040, and that of barley from 980 to 710 hours while the holding of farm machinery increased from 0.17 HP to 0.88 HP per ha of cultivated land.

4.24 The evidence for other Asian countries also points to similar if not more dramatic effects. For example William Bartech (1977), who used several micro-studies to evaluate the impact of biological-chemical and mechanical innovations on employment in six Asian countries - India, Pakistan, the Philippines, Sri Lanka, and Thailand - reached the following conclusions: (i) in the absence of mechanization, a shift towards HYV technology (biological-chemical) unequivocally raises the demand for labor per unit of cropped area. More labor is required to prepare seed beds, apply cultural treatments and harvest. Thus the land-augmenting nature of the technology leads to more intensive cropping patterns, resulting in a less drastic reduction in labor demand during slack seasons and therefore a reduction in seasonal underemployment and poverty of the landless and land-poor. (ii) A shift towards mechanization (tractorization) unequivocally increases unemployment. This has been confirmed by a large number of other studies, and further comments are made on the subject below. (iii) In the majority of cases, however, the adoption of modern technology has involved a combination of innovations, with the labor-augmenting effects of biological-chemical innovations interacting with the labor-saving effects of mechanical innovation. The results of the study show that the net effect of such shift has reduced labor demand.

4.25 The majority of studies of the impact of mechanical innovation (tractorization) on employment and output in developing countries have shown that it drastically reduces worker-hour and labor input per unit of output (See for example Donaldson and McInerney 1975, Yudelman et. al. 1971, and Duff 1978). In general, the evidence strongly indicates that where mechanical innovation takes the form of increased tractor use it does not lead to increased

output through changes in yield per hectare or through changes in cropping intensity. Benefits appear to be associated largely with reduced cost of animals and associated human labor. Increased investment in tractors does aim to provide some social benefits - increasing consumption, leisure, and reducing strenuous work. However, the relevant question is whether greater social benefit can be achieved by investing capital in other forms of economic activity. This is likely to be the case in those situations where there are no gains in output and where the investment simply leads to labor displacement.

iv) Conclusions

4.26 The analysis developed in this section has touched issues concerning both the apparent trends in agricultural production and some problems associated with agricultural growth, the increasing use of modern inputs and the distributional consequences of agricultural transformation. While the nature of this study is too exploratory to warrant firm conclusions, the body of evidence reviewed suggests nevertheless four main generalizations.

4.27 First, for nearly all middle income countries agricultural growth provides a substantial contribution to GDP growth, despite a falling sector share and large random variations in production outcome. Within agriculture, growth during the past 15 years, was also substantially due to the growth rate in food and grain output, and was sufficient to assure an average per capita increase in food production in excess of the average 1.2% per annum achieved by developed countries.

4.28 Second, all countries with untapped land potential and primitive technology expanded agricultural production by relying mainly on area rather than on yield increases. More intense cultivation of land into food grains and higher use of modern inputs such as fertilizer, irrigation and machinery was also one

major source of growth and the main source for the land scarce Asian countries.

4.29 Third, among modern inputs, nitrogen fertilizer appears to be unequivocally associated both with higher yields across countries and with growth in land productivity. Both mechanization and irrigation, however are significantly correlated with fertilizer use and this makes it difficult to control for each other's influence. Overall, the process of diffusion of modern technology in all countries appears to be promoting a "package" of modern inputs, which is not necessarily the optimum one on either efficiency or income distribution grounds .

4.30 Fourth, evidence from Korea and other Asian countries suggests that the process of agricultural modernization may be of the labor saving type even for land scarce countries and workers may not be sufficiently compensated by the increase in wages for the loss in employment following the adoption of more capital and land intensive techniques. However, in many countries agriculture may have reached the economic limits for increasing labor productivity with the present wage rate structure and either shifts in the crop mix or land saving techniques will have to be adopted to promote any further increase in production. This conjecture is supported by the ubiquitous and increasing importance of the most land saving input - nitrogen fertilizer.

Wilfred David

C. POLICY

5. MANAGEMENT OF RURAL STRUCTURAL CHANGES

Introduction

5.1 The policy implications of the cost studies presented are, by necessity ambiguous. This is true both because of the exploratory nature of our search for basic patterns of growth and because of the inherent fact that similar policies may be unequally successful in different countries even though similar conditions may appear to prevail. For few major policy options, however, we feel that the evidence considered is suggestive of some generalizations and that a further consideration of the historical experience of the middle income countries may be useful to indicate the broad directions of a development strategy.

5.2 The next two sections examines the experience of the middle income countries in managing the process of structural transformation in the rural sector through four major policy instruments: (i) Agrarian Reform, (ii) Changes in the Internal Terms of Trade, (iii) Agricultural Price and Subsidies and (iv) Central Planning. These instruments by no means exhaust the set of important policies and one of them, land reform, is more often the product of a sudden institutional transformation rather than the cause of a gradual one. However, to various extent, their judicious use appears to be associated to all cases where the process of growth and structural transformation may be labelled a success from the point of view of a broad set of social goals.

1) Essentials of Agrarian Reform

5.3 Agrarian reform, broadly interpreted, involves the modification of a wide range of conditions that affect the agricultural sector. These include; price policies which shift the terms of trade in favor of agriculture, agricultural research and extension to foster technological change, increasing public resource allocations to agriculture, expanding supplies of strategic physical inputs, and providing infrastructure to facilitate agricultural production. While the modifications in the above conditions may prove important in bringing about structural

change in agriculture, there is general agreement that land reform is, in most circumstances, a central and critical part of agrarian reform. However, it is by no means a sufficient condition since it is only one instrument in the process of change.

5.4 The importance of land reform stems from its potential for bringing about structural changes in the agricultural sector. On both theoretical and practical grounds it holds the promise of being one of the most powerful policy instruments for achieving the combined objectives of increasing agricultural production and employment as well as promoting rural equity. However, a pertinent question is: how can these potential gains be achieved under different country situations. At the theoretical level the answer to this question depends on four factors: (i) a country's state of development, (ii) its development priorities, (iii) the degree of concentration in land ownership; and (iv) the relative abundance of agricultural land.

5.5 In terms of a country's level of development, it can be hypothesized that the more developed a country, more opportunities for wage labor are likely to exist and therefore the extent of labor market dualism is likely to be less pronounced. On an a priori basis, one would expect a decline in the influence of labor market dualism to bring about a narrowing of the divergence in intensity of land utilization across farm sizes. On a similar basis, it is reasonable to suppose that the markets for credit, capital and land become more perfect as a country develops so that more viable alternatives to land as an asset holding instrument exist. This implies that land use distortions associated with the above factors should diminish as per capita income rises.

5.6 However, the validity of the above presuppositions also depends on a country's development philosophy, i.e. the extent to which it is willing to establish the conditions necessary for more equitable growth. Using examples of countries at different extreme of the political spectrum, Korea is a country where a thorough-going land reform established favorable initial conditions in which policies to promote growth led to a broad-based sharing in the growth

process. On the other hand, in countries such as Yugoslavia and China the creation of initial conditions which socialized the ownership of assets was crucial in establishing and maintaining conditions of equitable growth. In the final analysis the feasibility of land reform depends on a country's political, social and economic objectives and the attempts it is willing to make in combining growth with equity.

5.7 The third factor - the concentration of land ownership - determines the share of total land held by the minority of small farms. The higher this share, the more severe will be the overall productive impact of the farm size productivity differentials. The fourth factor - the relative abundance or scarcity of land has implications for land utilization patterns. Using Latin America as an example, the available evidence suggests that large estates underutilize their available land resources while the existing landholding structure compresses labor into small properties and into an underemployed landless labor on force. Poor land utilization on large farms stems from factors such as: (a) labor market dualism in which the effective price is higher for hired labor on large farms than for family labor on small farms; (b) land monopoly and monopsony over labor on larger estates; (c) the holding of land as a portfolio asset rather than for productive purposes; (d) production partly for home consumption provides smaller farmers with greater market certainty than their larger counterparts. This implies that land reform can bring about a better allocation of resources within agriculture with increased output resulting from a combination of underutilized labor on small farms and the landless labor force with underutilized land on large farms.

5.8 There is no invariable or automatic relationship between agrarian reform and agricultural productivity. On the one hand, the demand that large

landholdings be broken up to allow for the widest possible diffusion of land-ownership can be defended on equity grounds. The moral basis of this claim is supported by the record of low productivity, inefficient utilization of factors of production, and monopolistic power which traditionally distinguishes the latifundista - type system. On the other hand, land redistribution does not guarantee a solution, much less an immediate one, to the problem of economic backwardness in agriculture.

5.9 While there is unquestionably a moral basis for land reform, redistribution of land, with every man getting an equal share, even assuming that sufficient land is available for all, could cut across certain basic requirements for economic performance. For instance, certain agricultural exercises can only be profitably pursued under large scale economic operations. In this case, equity would immediately conflict with the requirements for efficiency. In other cases, operating on a large scale may be necessary for profit maximization depending on the requirements of the particular activity. For example, cereal, livestock and sugar production normally requires large areas of land if the operation is to be efficient. Simple blanket reform, i.e. a sudden breakup of large estates has to take into account a large number of considerations in the interest of maintaining and improving economic performance in agriculture.

5.10 In some situations, variations in the character of land are such that it does not lend itself to fragmentation into relatively small holdings. In such cases, protection of the land from overcropping may become an overriding requirement so that simply breaking up large landholdings could run counter to efficiency in land use and conservation practices. In other cases, large areas of land have to be kept idle or maintained as pasture or forest.

5.11 While equity may require that land be redistributed, increasing unit yields in agriculture may call for the expansion of mechanization. In such cases a strategic choice becomes that between an agricultural strategy which

stresses capital intensive methods and large farming, (whatever the ownership pattern), against a more labor intensive technology on small farms. The latter requires fewer manufactured inputs, generates more employment, spreads income more widely, and is compatible with efficient production of some products.

5.12 Cross-country data on the land utilization of large farms relative to that of small farms are presented in Annex Table 5.1. The evidence clearly suggests a decline in relative farm land utilization as land endowment increase the cross-sectional evidence of the relatively higher output per hectare on small farms (Table 5.2) in a select group of countries demonstrates their longer-run equilibrium potential. Several comparative multicountry analyses have been made of the effect of differences in distribution of size of holdings on yields. Both the FAO 13-country study and the World Bank's Study of 40 countries indicate that a smaller average size of holdings and a low concentration of ownership were associated with increases in output per hectare.

Cross-section studies of central Thailand show that yields decline from 306 kilograms per rai (1 rai = 0.4 acre) on holdings of two to ten acres to 194 kilograms per rai on holdings of 140 acres or more. In the Philippines, small farms (less than 2 hectares) produced 2.9 tons of paddy per hectare, while farms of more than 4 hectares produced 2.2 tons per hectare. Systematic analyses of the differences between large and small farms in several Latin American countries indicate that output per hectare was 4 to 14 times higher, on average, on small farms than on large ones. Some of the most up-to-date and reliable data showing the relationship between land productivity and farm size are based on the Bank's Survey results for North East Brazil in 1973. (Annex table 5.3). For each of the seven physiographic zones, except for zone F - the rich cocoa planting area, output per land area systematically declines as farm size rises.

ii) Change in Agrarian Structure

5.13 In the analysis of agrarian structure attention is usually focused on land distribution ownership patterns as indicated by factors such as country's arable land relative to population as well as its allocation among farms. Annex table 5.4 presents data for a large number of developing countries for the 1960-70 period on the following indicators of agrarian structure: average farm size; population growth rate; land endowment (- total land per head of agricultural population) and land distribution (the GINI coefficient.^{1/} Statistical

^{1/} The Gini index of land concentration relates percentages of unit land area owned to percentages of the numbers of owners. Higher values imply greater concentration of land in fewer hands relative to the total number of owners. Land quality is not taken into account in this measure and in Latin America crop lands tend to be less concentrated than pastures or marginal lands. Since crop lands are more valuable the Gini index tends to overstate the concentration levels of landed wealth.

indicators of land ownership and distribution are more difficult to obtain, and while the data show trend for the 1960s informed opinion is that they more or less represent trends for the post-1970 period. There is also evidence that in some cases the patterns of ownership and distribution might have worsened.

5.14 It should be noted that agrarian structure is determined more by the interplay of historical factors and geographical location rather by middle income status. The three-part middle income country typology being used in this study therefore bears only a tangential relationship to the fundamentals of agrarian structure. These caveats aside, it is generally known that the relationship between agricultural land per capita and average size of holdings varies between countries because of differences in the ratio of the agricultural labor force to the total labor force. In general, the more developed a country the larger is the non-agricultural labor force relative to the total labor force and therefore the larger is the average farm size relative to agricultural land scarcity. As expected, average farm size and land per capita are much smaller, for the land-scarce countries in Asia compared to their more land abundant counterparts in Latin America and Africa.

5.15 The values of the Gini index for distribution of land ownership in most middle income Latin American countries are over .80, with a median range of nearly .90. By contrast, the countries from other regions, especially those in Asia show median index values in the .20 to .40 range. In the case of sub-Saharan African countries concentration of land in large individual holdings is very limited. However, traditional patterns of communal ownership are slowly being replaced by individual proprietorships. The high concentration ratios for Latin American countries is corroborated by other evidence.

The FAO committee on Agriculture reported in 1977 that around 1973 in Latin

American countries,

the big landowners - constituting about 2% of the farming population - earned an average per capita income of about U.S.\$2,560. In 1973 this group controlled a total of 7% of the agricultural land while the poor masses held only 2.5%.

5.16 The highly unequal distribution of access to land is also evidenced by the fact that a significantly large proportion of the labor force in some middle income countries remain landless. In some middle income countries in Latin America - e.g. Argentina, Colombia, Jamaica - it exceeded 40%. In most of the others it exceed 20%. For the Middle East and North Africa, Algeria recorded 60% before its agrarian reform; in Morocco and Tunisia 20% of the workers were landless, and in Egypt around 40%. For Asian countries, a third or more of the farmers in the Philippines were tenants in the early 1970's, while in Indonesia the figure was around 20%. The increase in the number of landless was also accompanied by an increase in the number of small or marginal farmers. In Latin American countries, the growth in the numbers under Minifundia between 1960 and 1970 and the consequential poverty are reflected in the rapid rates of rural/urban migration. In countries such as Turkey, Morocco and the Sudan farmers with less than 5 hectares formed around 50%. For three middle income countries in sub-Saharan Africa - Ghana, Liberia and Nigeria, farmers below one hectare account for 38%, 52% and 41 % respectively.

iii) Experience with Agrarian Reform

Venezuela and Other Latin America

5.17 The major instrument for reform in Venezuela was the 1960 Agrarian Reform Law which recognized and protected the right of private property in land, provided that this right fulfilled a social function. Under this law, unproductive lands, tenant farms, sharecroppers and other non-owners, as well as lands used for large-scale cattle rousing could be expropriated - but only where there were no uncultivated lands or other properties belonging to

the state which could be used for resettlement. The law carefully classified land in terms of distance from markets, water supply availability, and soil conditions, based on the lessons learned from the earlier agrarian revolution in Mexico. The law protected profit making enterprise by providing generous maximum limits on farm size. Farms in this category included those with less than 450 hectares which could be worked profitably; farms of less than 300 hectares; and grazing land of less than 2,000 hectares in one category and less than 3,000 hectares in a second category. Large landholders were given the right to receive an area not subject to expropriation. As in Mexico, the government did not take the initiative in expropriating land; petitions for land redistribution had to be presented by peasant groups.

5.18 It should be emphasized that the Venezuelan reform took place at a time when the country had reached a much higher state of development than its Latin American counterparts, with less than 30% of the labor force in agriculture compared to 75% for, say, Mexico and Bolivia. In contrast to other Latin American countries, Venezuela was able to pay handsome compensation to landowners whose estates were expropriated. Further, unlike other Latin American countries, the reform evolved from an initial period of private land redistribution into what essentially became a colonization program. In this process, more public lands have been affected than private, and the large estate system was never seriously threatened. The key to this result was the existence of large areas of unsettled public lands suitable for crop cultivation, and with a low overall population density. Historically, the country's population was concentrated along the northern sea coast, where most of its economic activity including market oriented agriculture was located. However, since World War II there has been an expansion of the agricultural frontier inward from the coast and this has been one of the most important

factors in the country's agricultural growth.

5.19 A lesson which was learned from Mexico's mistakes at agrarian reform was that institutionalization must be rapidly built up in order to insure effectiveness and order in executing agrarian reform. The principal institution set up for this purpose was the National Agrarian Institute (IAN) which was able to meet peasant demands for land redistribution without seriously threatening the large estate sector. During the earlier years land invasions by sindicatos in politically organized areas motivated the government to purchase or expropriate estates in commercial farming area. However by 1963 the sindicatos movement was largely co-opted by the national government and the emphasis shifted from estate redistribution to colonization, consolidation of reform settlements already started as well as to rural development programs in the fields of education, housing, credit and technical assistance. These were financed from government oil revenues.

5.20 The basic aim of the 1960 Agrarian Law was to transform the agrarian structure of Venezuela and incorporate the rural population into the development process through substitution of what was considered a 'just' system of property, tenancy, and exploitation of land for the latifundist system and to support any such reorganization by an adequate credit system and technical assistance for rural agricultural producers. While the pace of redistribution fluctuated sharply in response to major political events, between 1958 and mid-1962, 1.5 million hectares of land were immediately redistributed, over 500,000 campesino families resettled, 140 technical assistance centers established, and 21,600 hectares of land irrigated. However, over the entire 1959-1973 period 75% of all land taken for redistribution came from the public domain.

5.21 By 1973, approximately 9 million hectares of land were taken over by the National Agrarian Institute, but only 1.6 million hectares of this had been redistributed to 128,000 beneficiaries. Also by 1973 approximately 35%

of all rural families had received land under the reform program, while only 12% of the country's private estate land had been affected. Land titling has also lagged behind the redistribution process. By 1973, roughly 40% of all beneficiaries had clear titles, 30% had provisional titles, and 27% were squatters on land controlled by the National Agrarian Institute.

5.22 Data on the average size of holdings as well as reform beneficiaries are given in Tables 5.5 and 5.6. While the country's total agricultural production has been increasing at a rapid rate, the composition of national farm production shows the major sources of growth originating on larger estates, with sharp increases in the share of livestock and non-traditional crops in total output. The large estate sector was hardly disturbed by the reform, and continues to be better served than small farmers with credit, extension and other services. By contrast, productivity among small farmers remains low, and in most settlements farmers plant a few subsistence crops with little effective input from the extension service.

5.23 Even with land reform, the extent of dualism in Venezuelan agriculture seems to be increasing. While the large estate sector is expanding its resources and increasing its share of national agricultural production, the number of small farmers operating at low productivity levels has been growing. Since the larger farmers generally emphasize livestock and land-extensive crops, while small farmers are relatively inefficient, it appears that the nation is not developing in either sector the kinds of farms that would use either labor or land with great intensity. However, as shown in chapter 3 of this paper the agricultural sector now contributes only about 7% of GDP, so that the country's priorities might very well lie in other sectors. In conclusion, what land reform seems to have accomplished in Venezuela is to provide a means of taking care of its still numerous small farm operators and relatively backward rural poor, giving them some measure of security and an opportunity to produce for the market.

5.24 Land reform programs have also been carried out in Mexico, Chile, Peru, Colombia, Brazil, Bolivia - to mention a few. Data on the area of land redistributed, the number of beneficiaries, and the percentages of national agricultural land and farm families affected, are given in tables 5.8 and 5.9. The following conclusions emerge from the study of land reform in these countries. The large estates in Mexico and Bolivia have been extensively subdivided into small farms, with about half of the rural population in both countries becoming land reform beneficiaries. The major land redistributions occurred in Mexico in 1940 and Bolivia in 1955, so there has been ample time for the economic affects of land reform to become noticeable. The general evidence is that, following a period of readjustment, small farmers have increased their incomes and in comparision to precious owners, have raised their output. In Mexico, after an initial wave of increase in subsistence food crops, there was relatively slow progress among most reform beneficiaries, with a significant minority showing strong productivity gains. Those ex-owners of haciendas who retained substantial portions of their land appear to have improved their techniques and productivity in the post reform period. Both Mexico and Boliva have witnessed substantial increase in total agricultural output in the post-reform period, with rates of growth faster than the average growth rates for Latin America.

5.25 However, the history of agricultural growth in Mexico during a period of substantial technological changes in agriculture (1950 to 1968) illustrates how a lack of clear direction in public policy towards the poorest peasants resulted in the accentuation of dualism with its neglect of the traditional sectors of theeconomy; the adoption of innovations was limited to a relatively small and concentrated group of larger commercial farms, and most of the non-commercial and peasant farms were left out of the mainstream of development

5.26 Where large estates are highly mechanized and use costly chemical

inputs, or where sophisticated livestock operations are successfully performed, the economic consequences of land reform are more uncertain than with the less efficient traditional haciendas. It was mentioned before that to the extent that productivity in such operations stem from economies of scale, and where fixed and working capital requirements are large, their subdivision into small holdings may have a negative impact on productivity. Such scale economies can continue through use of a collective organization of production in producer co-operatives in conjunction with communal ownership by beneficiaries who work for wages plus a share of profits. However, the experience of collective arrangements has been mixed, and in some cases enough time has not elapsed to make a proper assessment.

5.27 Such collective arrangements were implemented in a few countries, e.g. Mexico, Chile and Peru where land reform beneficiaries were organized into co-operative production units. In all cases, the continuing co-existence of the private farm sector and the ambivalence of government policy created management difficulties. Problems of incorporating landless workers or holders of very small plots into the production co-operatives also had to be faced because of the resistance of resident peasants to the incorporation of outsiders. The Mexican experience indicates that superior performance was attained in only a small number of co-operative enterprises. The experience of pre-Allende Chile shows that there were output gains on reformed estates, but that these resulted more from local farmer initiative. In general, the transition to co-operative management was easier and more successful in those cases where pre-reform operations utilized wage labor in standardized estate-wide activities, as on plantations.

5.28 In most Latin American countries, where the bulk of land is operated by large estates, attempts to help the rural poor through tenancy legislation had little impact. Imposing size limits on large estates proved to be more

effective and several countries attempted to do so and with considerable direct participation by peasant organizations. The results of these attempts offer many lessons. In several countries (e.g. Columbia, Venezuela, Chile) ceilings were initially applied only to "unused" or "inadequately farmed" lands and there was endless legal debate on the meaning of these concepts, and consequent delay in implementing the reforms. Later efforts to apply the ceiling concept to absentee owners of large estates and to redistribute land which was not operated by the owners, also led to evasions through delays in procedure. The underlying biases of such ceiling legislation are obvious: they were toward "farm efficiency" and less to equitable access of land. Ceiling programs had far better success in countries in which the objective was equitable access and the expropriation of lands above a particular level of large estates, generally without reference to entrepreneurship, residence or productivity standards (e.g. Peru after 1969 and Chile in the early 1970s). In these cases significant areas of land were expropriated and there was progress toward the objective of equitable access. In some countries (e.g. El Salvador) lack of speed in implementation led to sales by large estates of marginally ill-suited land in small plots at high prices. In other countries until 1965 the main aim of the laws was to abolish precarious tenancy arrangements but these programs had very little merit as land reform.

5.29 Settlement programs carried out on public land (e.g. Brazil, Mexico) as distinct from ceiling programs affecting large estates, were politically more acceptable and had wide appeal in countries with a large land reserve. When well organized, they provide partial relief to the peasants on crowded minifundia. Some "agrarian reform colonies" were established in almost every country, but studies record that few, if any, of the poorer landless laborers or smallholders benefited. Considerable investments in infrastructure and credit were concentrated on a small population who were already relatively well-off.

5.30 A study of the Chilean and Peruvian land reforms raises the following interesting policy issues. Where difficulties were encountered in raising agricultural output these did not arise from production declines attending land reform but from price controls on food in the face of rapid expansion of money incomes of the urban poor; actual quantities supplied rose but inconsistent policies led to apparent shortages. Second, despite substantial territorial penetration, the land reform reached only a minority of the poor. This pattern appears to have resulted from the turning over of land to pre-existing workers on large estates. Although a partial increase in labor use was ensured, it was inadequate to compensate for the extreme underutilization of labor on this land which previously characterized the private estates. As a result the former workers received a windfall gain and became an elite rural class.

5.31 The failure to subdivide reform units into individual family parcels brought about a clash between idealism and reality. The ideal of collective production clashed with the reality of past tradition of access to individual plots. Further, the reality of a much more direct reward to the worker for the effort expended on his individual plot conflicted with appropriate allocation of resources within the reformed sector. The lessons to be learned here are (i) expropriate land should not be considered the preserve of its former workers alone but should incorporate an appropriate additional portion of the landless labor force, (ii) the ideological pursuit of large collective farms may lead to an inefficient reform unit (Cline 1977).

5.32 Finally, the cross-country comparison of the impact of land reform in Latin American middle income countries indicates that the small farmers, e.g. in Venezuela, Mexico and Chile tend to use more labor on their land than large owners, to put more of the land to use, and often to shift toward labor-intensive crops or animals when the market is favorable. While the value of output per hectare may be lower on small farms than on large ones e.g. in Mexico, the evidence suggests that total factor productivity on small farms may be higher. Small

farmers are often inhibited by inferior access to credit and other supporting services and are less likely than large farmers to buy costly inputs in support of a high-value product mix. The production cooperatives fall somewhere in the spectrum of large and small farms in this respect. However, their total factor productivity is probably low, except for a minority of efficient enterprises.

5.33 Algeria and Sub-Saharan Africa. The programs and problems which effect the equitable access to land and water in Africa are not the same in all parts of Africa, and are markedly different from other regions. In Northern Africa the main problems in the early 1960s concerned the relationship between the modern sector consisting mainly of foreign owned estates and the traditional sector composed of the majority of the people living in the rural areas. The re-structuring of the agricultural sector was important as these countries gained independence.

5.34 The Algerian case merits special attention. During the initial phase of agrarian reform foreign owned estates (the modern sector) were consolidated and handed over to workers grouped into large self-managed farms of which there were about 2,000 occupying about 2.1 million hectares of cultivable land. About 180,000 permanent workers are currently employed on those farms which use modern farming techniques and continue to be partly autonomous. This initial program involved basic changes in the cropping pattern with the objective of cushioning the effects of foreign markets, (especially that of wine), on the production potential of these enterprises. There are conflicting opinions about the success of these earlier initiatives. However, the evidence suggests that while production declined initially, this was accompanied by an increase in income and consumption levels of estate workers who are involved in the self-management of these units. During the early years the program of agricultural self-management seemed a tremendous task, but in later years it proved a relatively easy program to implement compared to the problems faced in traditional agriculture in terms of access to supporting services as well as wide inequalities of access to land and water.

5.35 The Agrarian Revolution of the early 1970s aimed at solving such problems. Under the Agrarian Revolution absentee ownership was virtually abolished, ceilings were placed on landholdings, surplus land distributed in leaseholds, and beneficiaries required to become members of multi-purpose cooperatives. Landless peasants became organized into about 7,000 cooperatives occupying about one million hectares including 120,000 hectares of pasture land. These Agrarian Revolution farms together with the self-managed farms form the socialist sector holding a total of 3 million hectares of cultivable land. The impact of the Algerian Agrarian reform on distribution has been beneficial, but evidence on production is mixed and scanty. A crucial element in the improvement of traditional agriculture has been that the reform of modern enclave agriculture generated adequate resources for diversion to the traditional sector.

5.36 In Sub-Saharan middle income countries, e.g. Ghana, Liberia and Nigeria, tenure vested in tribal chiefs have for generations provided a safeguard against extreme inequality. However, these arrangements are beginning to disintegrate under commercial pressures, arbitrary misuse of powers and the gradual emergence of exploitative tenancies. As a result, inequalities in access to land have become evident. The major challenge for these countries is to adapt customary tenures to development needs, without sacrificing their traditional in-built equity. Some countries have attempted to meet this challenge by separating the areas subject to customary tenures from others, by creating statutory land boards limiting the powers of tribal chiefs or by granting individual titles on public lands, e.g. Liberia. Such measures have helped to demonstrate the negative effects arising from the erosion of traditional tenures. However, with growing population and commercialization pressures, conflicts between the two systems of tenure can be expected to emerge and become more serious.

Korea, Philippines, People's Republic of China

5.37 During the early 1960s most countries in this region were characterized by complex hierarchical agrarian structures except for the centrally planned economies e.g. the People's Republic of China where land reforms had created small peasant ownership and communes as well as Korea where the land reforms took place much earlier. The situation was also characterized by high population pressures, low land-man ratios, widespread poverty and very limited opportunities in the non-agricultural sector. After independence from colonial rule many countries introduced tenancy reform legislation as a means of removing obstacles to increase production on large areas of tenanted farms, especially in densely populated paddy growing areas, where insecurity of tenure and high rents prevailed. However, land scarcity in some countries made it impossible to implement legislation to provide security of tenure and control rents. The focus of tenancy legislation therefore shifted from rent regulation to protection of tenancy, or the declaration of tenants as owners. Also, in some countries e.g., Philippines legislation passed in the early 1970s eliminated share tenancy, converting sharecroppers into leaseholders, and subsequently declaring all leaseholders to be outright owners.

5.38 Subsequent to the success of tenancy reforms, appropriate production structures, supporting services, and measures to guard against disequilibrating tendencies are called for. In this context the Philippines carried out some noteworthy experiments with new production structures designed to bring beneficiaries of agrarian reform gradually together in cooperative ventures. Under the scheme the neighboring farms were merged into production units and provided with planning and financial assistance from state agencies.

5.39 The experience of the Republic of Korea can be considered useful to countries in the region because it has one of the world's highest man/land ratios

with the average size of holdings after land reform of only 0.9 hectares.

Before reform land ownership was highly concentrated and mostly rented out in small units. The land reform of 1953 put a ceiling of three hectares on ownership and converted tenants to owners. Today the agricultural community comprises only small peasant owners. The growth rate of agricultural output has been respectable by international standards. For example, in the post-reform period between 1952-56 to 1970 rice yields per hectare increased from 3.3 tons to 4.6 tons per hectare.

5.40 An ILO evaluation of the country's agricultural performance between 1963 and 1973 concluded that it was satisfactory in terms of production, distribution, savings and accumulation as well as poverty alleviation. Success in the Korean case was attributed to the following factors, (i) land reform was radical and covered a large proportion of areas and of the peasant population; (ii) it gave ownership to former tenants and was implemented without disturbing operational units; (iii) it resulted in a substantial redistribution of income and assets in the rural areas; (iv) the continual enforcement of the 3 hectares ceiling and the prohibition of the re-emergence of tenancy prevented the growth of inequalities. Such conditions do not exist in many other Asian countries. However, what the Korean experience shows is that if agricultural production is to be organized on the basis of private ownership of land, a relatively egalitarian system of peasant farming can prove superior to one with a high degree of concentration of land-ownership. It also indicates that land reform can be successful even under conditions of extreme land scarcity.

5.41 The Philippines offers an illustrative example of the obstacles to comprehensive agrarian reform when there is a high degree of tenancy. Prior to 1972 efforts were focused primarily on rent reductions and the conversion

of sharecroppers to leaseholders. Little progress was made in the implementation of reforms primarily because of landlord opposition, insufficient financing and poor administration. In 1972 when the entire country was declared a land reform area the country was still characterized by concentration of land ownership and an extensive system of sharecrop tenancy.

5.42 The country has one of the highest farm tenancy rates in Asia, with tenants cultivating 40% of all farms in the Philippines compared to about 15% for Thailand and 16% for Taiwan. The evidence also indicates that as many as two-thirds of those peasant families earned incomes that fell in the bottom 40% of the national income distribution. In the Philippines as in other parts of Asia sharecropping usually burdens the tenant with high rents, generally amounting to 50% of the harvest; unlawful ejections, and excessive interest rates ranging anywhere from 50 to 400% per year.

5.43 The 1970s therefore marked the beginning of an institutionalized and comprehensive agrarian reform and rural development program containing as its central elements land tenure improvements, institutional, infrastructural and general agricultural development as well as training. The new reform program is an ambitious one and it is expected to cover 955,000 tenants, 431,000 landlords and 1.5 million hectares.

5.44 The transfer of land titles to tenants in paddy and corn areas proved to be a complex undertaking involving identification and mapping of plots and recording ownership and tenancy. Land values had to be determined, land certificates issued and several compensation procedures initiated to effect the actual transfer of ownership. By the end of 1977, land certificates had been issued covering about 65% of eligible tenants. The amount of land actually transferred is much less. While progress has been made in facilitating land title transfers, the agrarian reform effort still falls far short of its goal of effecting a thorough modification of the land tenure system.

5.45 One aspect of the program is the transfer from sharecropping to leasehold of tenanted properties of less than 7 ha. However, to-date, only about one-half of these properties have been affected. One of the major reasons for the limited results in land tenure improvement has been the lack of cooperation between the many institutions responsible for various aspects of the reform program. The Department of Agrarian Reform depends on cooperation from agencies such as the Land Bank, the Public Highways Department (farm to market road construction), the Department of Public Works, Transportation and Communication (public utility construction) and the National Irrigation Administration and Farm System Development (irrigation and drainage). Arrangements for coordination between these departments has evolved rather slowly. The major step toward institutional development was taken in the establishment of a wide network of Samahang Nayan (Government-sponsored village associations) with compulsory membership for agrarian reform beneficiaries.

5.46 The rationale for land reform is that it would help raise productivity by providing the incentive of ownership to farmer tenants as well as a beneficial impact on the distribution of income in rural areas. As in other cases mentioned in this paper the relationship between tenure conditions and productivity increases may not be an unambiguous one. This is not to deny the importance of tenancy reform as perhaps a necessary condition for increasing agricultural productivity. What is probably more true of the Philippines is that the real constraint to productivity lies in the inadequacy of supporting services and access to irrigation. The newly organized cooperative movement is making a vigorous effort to provide inputs and necessary supporting services.

5.47 A World Bank study of the problem indicates that even if changes in tenure do not affect farm productivity, they could have a significant impact on individual incomes. If there is no difference in productivity and if incomes are affected only by changes in annual payments for the land, it is estimated

that the income of a sharecropper who had become an amortizing owner could increase by as much as 80% (in terms of the present value) over a 30-year period.

5.48 The land agrarian reform experience of the People's Republic of China has been well documented. Both its successes and failures provide useful lessons of how a country can experiment widely with policies that can reduce poverty and inequality without harming productivity. In order to understand the need for, and consequences of the land reform which took place in China, one must first of all look at the inequities in asset distribution which existed in pre-revolutionary China. The statistics on landownership distribution in China^{1/} show that during the 1930s the average amount of land owned by roughly 22% of rural families in the three top brackets was 10.8 acres or over 10 times the average amount of land owned by the 23% of small farmers. The average farm size operated by these three top groups was 7.9 acres while for small farmers the average farm size was 1.4 acres, giving a ratio of operational holdings of about 5:1. Further, if value of output in grain equivalent is taken as a proxy for average family income, the top groups had an average income approximately 6 times that of the bottom group. The system of property relations and distributional interest in these relationships were radically changed by the land reforms. The role of private ownership of land and other means of production as a source of inequality in income and power was severely reduced.

5.49 The process of land redistribution took many forms. For example, where tenancy was most prevalent ownership titles were transferred from landlords to tenant cultivators. In owner-operated areas land reform consisted of redistribution taking away some land from those peasants who had relatively large

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I.J.W. Buck, Land Utilization in China (New York, 1968)

holdings and giving it to those with very small plots and the landless laborers. Between 1949 and 1952 about 45% of the agricultural land was redistributed to over 60% of peasant households. As a result of the reforms the average size of ownership unit declined from the 1930s-level of 4 acres to around 2.4 acres in the 1950s partly because of the distribution of land to those who were previously landless and partly due to the increase in the size of the agricultural population.

5.50 There is no doubt that the land reform in China brought about a massive redistribution of income and wealth in favor of the poor. The weighted average of ownership of small and medium-aged farms during the 1930s was about 1.6 acres, or 40% of the average of all ownership units. After the land reform, the average area owned by poor peasants went up to 2 acres, or over 80% of the size of the average of all ownership units. During the 1930s the average size of landlords' holdings was nearly 19 times that of the average small or medium farmer, but after the reforms it was slightly less than the size of the average holding owned by a poor peasant. Richer peasants were subjected to less drastic measures. Their average holding was reduced to about 1.8 times the overall average, compared to 2.3 times the overall average during the 1930s.

5.51 There are two features of the reform which deserve mention. First, it was "class-based" in the sense that the objective of policy was not one of setting overall ceilings on ownership and enforcing it uniformly. Wealthier peasants, for example, were subjected to less stringent treatment than landlords who were considered members of an exploiting class. Second, the promotion of income equality was not the only achievement of land reform. Studies show that a substantial proportion of the profits, rent and other payments which formerly

accrued to landlords and wealthier peasants was not only channelled to the poorer classes but was also redirected by way of savings to self-financed investment projects and increased government revenues.

5.52 This brief commentary does not address later developments in the land reform process. However, a few brief comments are in order on the emergence of communes since they represent an important form of social, economic and political organization. The area of the commune typically covers between 3,000 to 12,000 hectares and 4,000 to 16,000 families. The commune combines within itself several functions which are not performed by the typical village or local government unit in developing countries. Of some significance in this regard is the fact that all the available land is collectively owned, and rent has disappeared as a source of income, power or participation. The communal structure has also been able to minimize the complex problem of landless labor and uneconomic holdings faced by other countries after land rights have been redistributed. It should be mentioned, however, that although land is collectively owned, the basic unit of cultivation is the work or production team of 25 to 30 families. While their area of operation varies from one commune to another, in most cases it does not exceed 25 to 30 hectares, a size of operations small enough to promote full participation and large enough to generate scale effects in the Chinese context.

5.53 The commune obtains 14 to 24 percent of the gross revenue of its agricultural production for capital investments within agriculture, forestry, fisheries and agro-processing, and a Social Fund supports welfare and cultural activities. The fact that every member of a commune has a stake in returns from on-farm and off-farm is an incentive for construction works for such purposes as irrigation and land improvement. Farm land improvement construction projects completed by the communes and brigades over the years greatly facilitated the struggle against drought, waterlogging and other natural disasters and rural

people's communes played a great role in combating the natural disasters of 1977. Commune organization facilitated establishment of effective channels of two-way communication between peasant groups and technical personnel. Moreover, they avoided the complex problems of credit management for promotion of agricultural development, with all the attendant problems of high rates of default and diversion of credit. The integration of health, nutrition and education programs with family welfare has also helped to reduce fertility rates and improve the overall effectiveness of rural social programs.

5.54 GENERAL CONCLUSIONS. There exists an abundant literature on the land reform experience of those countries which have adopted it and the foregoing brief review of selected countries does not pretend to be complete or comprehensive. The various experiences have been mixed and the success in each case often depended on the manner in which the reform was implemented. Speed and certainty in the revision of ownership rights in the main produced better results; stagnation and disruption followed when the process was accompanied by lengthy delays and uncertainty. In general, the potential economic effects of land reform can be ascertained only through careful empirical analysis of the existing structure conditions facing the agricultural sector in a given country context. Attempts to extrapolate from historical experiences can only prove hazardous. However, some broad generalizations can be made from the experiences of several countries which have used land reform as a major instrument of structural transformation.

(a) The countries which have been most successful in raising output also achieved success in generating support and reforming production organizations. Those governments that developed the most popular support were also the ones that were able to achieve the greatest increases in output. Conversely, where farmers were dissatisfied, output suffered and farmers were usually successful in resisting changes in production organization. The reforms that have separated changes in land ownership patterns from organizational changes also generated

the greatest political support. For example, in Japan, the Republic of Korea, Taiwan, Mexico, and Bolivia, the post-reform period was characterized by peasant support for relatively conservative governments. By contrast, in the Peoples' Republic of China agrarian reform generated support for a radically different thrust.

(b) Second, the most successful reforms are those which have been preceded or followed technical and organizational changes. If the initial impetus to output gains are to persist, the gains resulting from an increased labor intensity applied to land on small farms need to be supplemented by technological improvements. This normally requires more intensive deployment of infrastructure, credit and extension services, adapted to the needs of small farmers.

(c) Since there is usually a shortage of trained manpower necessary for successfully implementing land reform, the more complex the reform, the poorer is its administration, the slower its implementation, the greater are the exclusions and therefore resistance. As the Latin American experience shows, slowness and poor administration usually mean poor enforcement of the law. This is also borne out by the experience in India and the Philippines. In the latter case the reform got bogged down in legal arguments over yields and other issues because of the complex formulas built into the law. The most speedy reforms, e.g., those carried out in Japan Taiwan, Korea, and the Peoples' Republic of China were the simplest, the most complete and the most successful.

(d) Agrarian reform means not only changes in land ownership patterns but also shifts in power relations. Further, power is required to change existing power relations. The experience shows that the most extensive and successful reforms to have occurred where power was concentrated on the side of reform. For example, this was done by the occupation forces in Japan and by the armies of China in Taiwan. In the case of the Republic of Korea, the American

military government redistributed Japanese-owned land and the Korean Government did the same for Korean land. The land reforms of China, North Vietnam and Cuba followed successful revolutions. In the rest of Latin America, the most successfully reforms, e.g., in Mexico and Bolivia have combined peasant revolts from below and government pressure from above.

(e) This underscores the point that, in general, land reform decisions represent highly political choices in which the calculation of net economic benefits is only one element in the policy consideration. To the extent that the probable impact on national agricultural production is a factor in such decisions, the various country experiences examined suggest a positive prospect. The experiences of Venezuela, Mexico, Chile and Bolivia indicate that agricultural output rose at a faster rate during the post-reform compared to the pre-reform period, though an invariable causal relationship to land reform cannot be unambiguously established.

(f) The country experiences indicate that the simplest and most successful reform involves the transfer of ownership from absentee owners to tenants or other collectivities. For example, Algeria, Iran, Japan, the Republic of Korea relied on this type of reform. Unfortunately, there are few countries remaining where land reform can be this simple. In much of Latin America and Asia, a direct transfer of land from owners to tenants would primarily benefit better off tenants or wage laborers on hacienda-type structures, with minimal benefits, if any, to day laborers and marginal farmers. For example, in Ecuador, a partial land reform deprived the smallest landlords of communal grazing rights and the emergency help previously supplied by the hacienda. In the case of Venezuela, as many people benefited as became worse off and the problems of marginal farmers and the landless seem to be escalating.

(g) An issue which is frequently raised concerns the relative importance that should be given to the size of farms. Both the conventional wisdom and the experience of some countries (e.g. the Philippines) show a bias against small peasant holdings in terms of the skills, technological adaptation, and other change factors necessary for agricultural modernization and successful farm management. In this context, it has been argued that land reform can result in making the peasantry more dependent on subsidies and other forms of government support. However, the experience suggests that the most extensive reforms have produced the most modern and productive agriculture and that smallholders quickly learn skills they need. In Mexico, Bolivia, Chile, Japan, Taiwan and Egypt, the average productivity of land rose after land reform reduced average farm size. The Latin American experience further indicates that there has been no significant reform where parcelization has decreased output. For example, agricultural output has grown substantially faster in Bolivia, Mexico and Venezuela than the average for Latin America. In many cases, in order to avoid the proliferation of smallholdings, some governments have created large state-run farms. But the evidence suggests that these are frequently the most severely mismanaged and in some cases may even lead to decreases in agricultural output, e.g., as in Algeria, Cuba and Tunisia. Whether or not post-reform farms should be small or large in size depends on the specific country circumstances. In the majority of instances, however, the problem revolves not around the relative size of farms but on whether, even with small holdings, farmers are better off with some land than with no land at all.

(h) Production function analysis using Brazilian farm survey data indicates that the creation of family farms would incur no less in potential efficiency since returns to scale are constant. Simulations of the production

impact on redistribution of land into family farms of equal size suggests overall gains for Brazil of over 25%. Numerous studies, particularly those for Latin America reach similar conclusions. Even in the Asian context of a modest spectrum of farm sizes the pattern of an inverse relationship between output per farm area and total farm size has been well documented (e.g., Bardhan for India, and Domer and Kanel for data demonstrating the relationship for India, Taiwan, and the Philippines as well as Brazil, Colombia, Mexico and Guatemala).

6. POLICY - TRANSFORMATION LINKAGES

6.1 While it is difficult to measure the intended and unintended effects of alternative policies and strategies on the nature and directions of change in the process of transformation, a few concluding remarks are addressed to the question of potential linkages between these two variables, drawing on the experience of the middle income countries. As mentioned in Chapter 2 of this paper one important indicator of the links between policy and the transformation process is the internal terms of trade. While the terms of trade themselves are not an unambiguous measure, they do not provide useful insights into possible directions of change.

6.2 However, at least two caveats are necessary. A fuller understanding of the implications of the observable trends would depend on the extent to which movements in the above variable are correlated with other indicators, e.g., national and sectoral growth, changes in relative labor productivity, agricultural/non-agricultural income disparities, etc. Such an analysis could not be attempted at this stage. An attempt was made, however, to observe how some of these variables relate to each other for a sample of countries for which data exists. This reflects the necessity for countries to coordinate prices, fiscal and other policies with those affecting the internal terms of trade.

1) Changes in Internal Terms of Trade

6.3 A common welfare measure though not an efficiency measure of changing relationships between the agricultural and non-agricultural sectors is the agricultural or internal terms of trade. Since rural families include large segments of the population, the relationship between prices received by farmers for their products and the prices they pay for purchases of

goods should have some implications for income distribution and therefore the speed and direction of movement toward social optimality. In order to obtain some general trends for middle income countries, attempts were made to relate changes over time in the growth of wholesale prices to those of agricultural products and those of domestic goods as defined by the United Nations.

Table 6.1: Annual Percentage Rate of Growth in Wholesale Prices
1965-76

	<u>Agricultural Products</u>		<u>Domestic Goods</u>	
	<u>Linear</u>	<u>Log. Linear</u>	<u>Linear</u>	<u>Log. Linear</u>
Korea	20.3	18.8	16.1	13.4
Thailand	11.8	10.5	11.3	10.4
Philippines	19.7	15.8	20.3	15.4
Indonesia	31.2	27.8	26.4	24.9
Brazil	-	27.0	31.2	25.0
Venezuela	6.5	5.8	5.9	5.4
Mexico	10.7	9.3	10.3	8.9
Argentina	-	52.1	-	53.4

Source: U.N. Monthly Bulletin of Statistics: Sundry Issues

6.4 Trends are now considered in some more detail for a sample of countries. The internal terms of trade for Korea -- measured in terms of the ratio of prices paid and prices received by farmers (Table 6.1) shows that from a peak of 1963 the farmers' terms of trade deteriorated rapidly up to 1966 and reached an all time low in 1968. Between 1968 and 1971 prices paid by farmers for their purchases increased by nearly 9% but the prices they received increased much faster mainly because of the rate of increase in grain prices. Since then there has been a small decline in the terms of trade because of a sharp increase in farmers' cost of living. However, since 1968 the internal terms of trade have improved by nearly 20%.

6.5 A variety of instruments have been used to bolster the relative incomes, but the most important has been the government's support of higher grain prices to raise rural incomes, and increase food self-sufficiency. Data on the ratio between government selling prices and domestic purchasing prices show that since the early 1960s the release price of barley has been consistently below its purchased price with the difference expanding significantly. In the case of rice, purchase prices were below release prices until 1971 when a considerable difference emerged. The improvement in farmers' terms of trade can also be traced to input subsidization.

6.6 However, such favorable shifts in the agricultural terms of trade can be contrasted with the rate of increase in output per worker which slowed by more than 50% from 4.2% per annum between 1963-68 to around 2.0% per annum for the 1968-75 period. This suggests that strong economic forces are likely to impede the further simultaneous growth in employment and productivity in Korean agriculture. A conclusion which might be drawn is that if the sector has to continue to absorb labor in the future, it is likely that agricultural productivity will stagnate.

6.7 As in other cases observed in this paper, shifts in the terms of trade in favor of agriculture have been accompanied by income disparities between rural and urban areas — the agricultural and non-agricultural sectors. Korea still faces this problem and labor productivity in agriculture is still low compared to other sectors. The government has used several policy instruments to offset the difference in productivity and income gains, e.g, by increased investment in agriculture, price support for grains, subsidies for agricultural inputs and the New Community Movement to improve rural living standards directly through a program of self-help. While such policies have resulted in significant improvements in rural living standards, average rural incomes remain considerably below average urban incomes. (Table 6.2). Added to this

is the disappointing growth in non-agricultural sources of rural incomes which remain around 20% of farm household incomes.

6.8 In the Philippines the government has pursued specific policies with respect to individual agricultural commodities but no overall policy for agricultural prices and the terms of trade. Relevant data are given in Annex Table 6.3. Prior to 1960 there was a tendency to improvements in the terms of trade for the non-agricultural sector; however, around 1960 this trend was reversed in favor of the food producing sector in agriculture. This resulted from food shortages due to stagnation in agriculture, and rapid urbanization. Between 1960 and 1974 the food producing sector of agriculture experienced a 3.7% rate of growth. Although favourable for agriculture this means a worsening in the situation of the urban poor who spend a high percentage of income on food. The average income of the lower income households in the urban areas is roughly that of many farm families, therefore redistribution has tended to be from one low income group to another. Currently, about 0.5% of GNP is being transferred to the food producing sector as a result of this improvement in the terms of trade.

6.9 The Government has tried to control increases in the prices of basic foods in order to stabilize the cost of living in urban areas, but this is becoming an increasing problem since producer prices must be attractive in order to provide the production incentive to farmers and to adjust to world market prices. The recent short supply of food has made it even more difficult for Government to control food price increases, and it also has very limited resources to provide subsidies for food production on a long term basis. Expansion of food production through the adoption of improved technologies, changes in input prices and commodity taxation are suggested as possible measures which may achieve a better terms of trade position.

6.10 During the 1970s the trends in the internal terms for Thailand were similar to those noticeable for other middle income countries in Asia, e.g., Korea and the Philippines. Between 1970 and 1976 the internal terms of trade moved substantially in favor of agriculture, rising to 143.3 in 1973 (1970 = 100) and subsequently falling to 130.7 in 1976 (Table 6.4). Price increases were registered for all agricultural subsectors and major crops, but were most marked in the case of paddy (rice) and to a lesser extent sugar cane, maize, cassava and fisheries. The farm gate prices for paddy trebled between 1970 and 1976. Within agriculture the relative price movements varied considerably, showing a general improvement for crops but worsening for livestock, fisheries and forestry. To the extent that relative price movements within the agricultural sector can be used as a proxy for relative income movements among farmers, the trends suggest that the income of those rice farmers with a marketable surplus increased appreciably faster than incomes of others. However, the evidence suggests that subsistence farmers tended to gain relatively less from successive increases in paddy prices. Despite the favourable movements in the terms of trade in favor of paddy returns to paddy production are generally lower than for other crops. Further, as in other Asian middle income countries, the shift in the internal terms of trade has not been accompanied by similar increases in output per worker. For example, between 1960 and 1970 the annual average growth rate in GDP per worker rose by about one half of that in the non-agricultural sector, indicating that the gap between output per worker in agricultural and non-agricultural sectors have become wider. Similar trends have been noticed for the post 1976 period. The process has also been accompanied by widening income disparities.

6.11 The terms of trade for various agricultural commodities in Thailand are a reflection of the fact that a large part of the growth of value added in agriculture was due to agricultural diversification. Due to new export possibilities, farmers changed cropping patterns and introduced new crops in response to price incentives. Although the area under paddy increased by $1\frac{1}{2}\%$ per year, planting and production of crops such as maize, cassava and sugar cane grew more rapidly. During 1967-70 when export earnings from rice showed a considerable decline, the loss was offset by increased earnings from maize, cassava and rubber. Since 1968 sugar exports have increased rapidly to between 250,000 to 400,000 tons and shows promise of becoming an even larger export earner in the future if the growth of production can be maintained.

6.12 Table A- 6.5 presents three alternative measures of the internal terms of trade for Brazil between 1960 and 1977: (1) the ratio of wholesale prices for agricultural products excluding export crops and wholesale prices for industrial goods; (2) the ratio of wholesale prices for agricultural products excluding export crops and wholesale prices of shoes, clothing and textiles. These three items are of particular importance in the budget of subsistence farmers; (3) a third index shows the ratio between wholesale prices for all agricultural products (domestic and export crops) and the wholesale prices of shoes, clothing and textiles. The results of all three computations show that during the 1970s there was a movement of the terms of trade in favor of the agricultural sector--both producers of food for the domestic market and export producers. During the 1960s it took at least one unit of agricultural production to purchase one unit of clothing or footwear; during the 1970s it only takes 50 to 60% as much agricultural output to purchase these commodities. These trends suggest that farmers have improved their purchasing power per unit produced during the 1970s. This includes a large proportion of small and poor farmers. These trends are corroborated by

other evidence which shows the relationship between farm gate prices for crops during the 1970s (Table 6.6). Between 1970 and 1977 these increased much faster than either the Rio de Janeiro cost of living index or its clothing and apparel component. Further, the favorable movement in the terms of trade for agriculture spans a wide range of agricultural and livestock products and not just export crops. However, while these trends show a clear movement of the internal terms of trade in favor of the agricultural sector, they do not necessarily imply similar movements in agricultural and rural incomes, and especially the incomes of the poor.

6.13 Further, a factor which probably affects the Brazilian case is that trends in prices received by farmers are for all agricultural products, and these trends are affected by the composition of the product mix. In Brazil where the major products are coffee, cocoa, cotton and sugar cane, the farm price index stood at 1,003 in 1975 compared to a 1966 base of 100. Since in Brazil increasing agricultural output can be attributed to acreage increases rather than yield increases, it is likely that improvements in the terms of trade were not much influenced by high farm productivity. Since clothing and footwear (used in the terms of trade measures) are near the bottom of the Engel curve, it can be legitimately inferred that the poor did gain somewhat though some of these gains in relative prices were offset by poor harvests during 1975 and 1976.

6.14 In Ghana consumer prices have been rising much faster than most other countries in West Africa. This tended to affect urban groups more than their rural counterparts, because a relatively large proportion of the former live on fixed incomes or no incomes at all while in the rural areas rising prices of agricultural produce tended to raise both farmers' imputed incomes as well as their income from sales. In this case we have calculated the terms of trade based on the ratio of the prices of local foodstuffs to prices of all other categories of commodities in the consumer price index (Annex Table 6.8). The index reveals a shift in favor of food crop farmers and a deterioration for cocoa farmers.

6.15 While no explicit measures of the internal terms of trade for Nigeria are presented, the available evidence suggests that this country exhibited trends similar to those observed for Ghana. This is borne out by the sharp movements in the consumer price index in recent times Table A6.9. Between 1970 and 1977 the overall index rose by about 400%, with the increase due almost entirely to increases in food prices. The relative importance of the food component in the aggregate consumer price index is borne out by the fact that, with 1960 as a base, food prices rose by over 500% while that for other commodities rose by less than a half--200%. Although a large proportion of food demand was met from imports, in Nigeria the expenditure elasticity on locally produced food is about 0.7, which implies that in times of rising food demand local food producers become relatively better off.

6.16 A general conclusion is that most middle income countries experienced favorable shifts in the terms of trade toward agriculture. In some cases it was due to deliberate policies designed to support grain prices together with input subsidization, e.g., Korea, Thailand, Philippines. (In Thailand it was accompanied by substantial diversification in the agricultural production process.) In others, especially in Africa, it signalled a shortage of food production relative to the growth in urban incomes and demand. In general, however, favorable movements in the terms of trade were not accompanied by concomitant changes in output per worker between sectors or with any significant change in rural/urban income disparities.

ii) Agricultural Prices and Subsidies

6.17 This section of the paper presents a brief review of some of the conventional policies, strategies and instruments used in middle income countries to effect desirable changes in the agricultural sector. The most pervasive of these measures is government control or support of agricultural product prices and those of purchased inputs.^{1/} The use of price policy as a means of achieving agricultural sector goals can be evaluated by examining the effects that policies have on various measures of productivity, efficiency and equity, i.e., the social optimum. Of some importance as well is the assessment of the public and private costs incurred in the implementation of such policy. Comparisons are needed between support prices and market prices to determine whether support prices affect realized prices.

6.18 One of the most important reasons behind price support policies lies in the desire to maintain and/or improve farmers' incomes. In this context an important question is whether price supports provide an efficient or effective mechanism for improving general levels of agricultural incomes and in particular, the incomes of farmers at the lower end of the income and wealth distribution. Where agricultural exports are important the impact of such policies on foreign exchange earnings and export competitiveness must be taken into account. The effect of price policy on foreign exchange earnings by agriculture can be evaluated (a) in terms of its effect on production of export or import substitution crops and (b) its effects on production costs and thereby the world market competitiveness of these crops.

^{1/} These issues have been extensively discussed in the recent background papers on Prices and Subsidy Policies prepared in the Economics and Policy Division, Agriculture and Rural Development Department.

6.19 A multiplicity of price management systems are utilized in middle income countries. Most African countries utilize a fixed price system under which marketing boards set producer prices and monopolize trade in almost all export crops and some food crops. In the case of export crops fixed prices are normally kept low to maximize revenue while in the case of food crops they are sometimes kept low to subsidize consumption or high to encourage production. In some cases the system is used as a price stabilization mechanism. Countries such as Turkey as well as middle income countries in Latin America use price support systems to cover a variety of crops while for Asian countries, e.g., Korea, this system is used for major food crops. Under this system agricultural produce is purchased at a guaranteed minimum price and then released at or below market prices. Sometimes this measure is used in combination with import restrictions on the commodities concerned. Minimum guaranteed price support systems are normally used to encourage domestic production, maintain farmers' incomes or provide measure of price stability. They have proved successful in some cases but the experience of many countries indicates that the system drains the government budget if purchasing and administrative costs exceed prices at which the commodities are finally sold. It should also be mentioned that sometimes no price intervention mechanisms are used and agricultural prices are left to be determined by the free interplay of national and international market forces. Nigeria, in the case of food crops, and Thailand are representative examples.

6.20 As in the case of output pricing many kinds of input pricing measures are used by middle income countries. The most frequently encountered scheme is that of incentive pricing which is used to encourage the use and guarantee the continued use of specific types of modern inputs. This is usually combined with subsidized credit. Some countries, e.g., Korea, Thailand, and the Philippines, use a form of consistency pricing whereby the government maintains prices at a reasonable consistent level over time. The general experience of those countries has demonstrated that where input prices increase substantially, the burden of the subsidy can prove catastrophic.

Besides the case of consistent pricing mentioned above some governments, e.g., Turkey, attempt to maintain a relatively constant ratio between input and output prices. Such inputs are subsidized in order to encourage production of specific agricultural crops.

6.21 The Philippines experience demonstrates some of the hazards that spring from exogenous fertilizer price increases. During the 1974-75 period the price of fertilizers increased by 400%, and since food production had to be subsidized, a dual pricing system was introduced for fertilizers. A subsidized price was established for food crops and a higher price set for export crops like sugar. Difficulties arose as fertilizer sold for food crops was diverted to sugar cane. This combined with high budgetary costs forced the government to raise the price of fertilizers. This led to an immediate decline in fertilizer use and consequently yields. It also caused dislocations in the agricultural credit machinery since many farmers could not repay their loans. The government devised a short-term solution by temporarily lowering fertilizer prices and increasing subsidies until world fertilizer prices declined. Two immediate lessons can be drawn from the Philippines experience. The process of agricultural transformation can be stymied by heavy dependence on unstable world markets for inputs. Second, it raises the issue relating to choice between crop and input price support or irrigation. Studies in the Philippines show that investment in irrigation is preferable to price support for rice in terms of social costs and benefits. However, such a policy is inferior to fertilizer subsidy if a high discount rate is applied to large scale, high cost, irrigation projects. This is the case when there are shortages of food-grains pending the completion of such irrigation works, causing hardships for consumers or involving high foreign exchange outlays on imports.

6.22 A good illustration of the price support mechanism under the marketing board system is provided by cocoa in Ghana. Successive governments in Ghana have set produce and retail prices for a wide range of commodities including those for which the government is sole buyer -- cocoa, cotton and kenaf. The developments in cocoa since the beginning of the century have been well documented. The last period in which there was active large scale planting of cocoa in Ghana was in 1945-59, with the early 1950s being the most intensive planting. Since that time cocoa producer prices in current prices have risen by 250% while that for other competitive crops -- maize, cassava and plantains -- have skyrocketed Annex Table 6.10. The data indicate that the competitiveness of cocoa relative to these other crops has declined by a factor of 3 to 9 since the last period of extensive cocoa planting. Many farmers, especially in the Ashanti region now insist on intercropping young cocoa seedlings with cassava, a practice extremely detrimental to the growth of the young seedlings.

6.23 There has also been a dramatic decline in the real value of cocoa producer prices. Current estimates show that the real price of cocoa to the farmer during the early 1970s was, on average, 75% of the level attained in the 1960s and about one-third of the 1950s level. At the same time the rural consumer price index increased by 623% between 1963 and 1976. To compensate for this inflation the producer price of cocoa would have had to increase sixfold in 1976 compared to the 1963 level. In fact, the producer price was on average 54% of what it should have been to maintain its real value. When comparisons are made with other West African nations the Nigerian price is about 550% and that for the Ivory Coast about 400% higher than the Ghanaian price, even at the official rate of exchange. Thus, the Ghanaian experience for cocoa producer pricing shows a relatively poor performance compared to the rural cost of living, support prices for competitive crops and those paid in other West African countries. While the influence of world market prices should be taken into account in evaluating this case, cocoa production has shown a consistently declining trend due to its relative unattractiveness to farmers.

6.24 In the case of imports, fertilizer price subsidies are the most important. Since 1970 the subsidy element has varied from around 50% to 86% of delivered farm gate costs with government outlays on fertilizer subsidies increasing from about 0.4 million cedis in 1970 to a budgeted outlay of 14.5 million cedis in 1977. Imports have been increasing rapidly in line with sales with a large unsatisfied demand left unmet. The Ghanaian experience of input subsidization raises two important issues. First, government outlays on fertilizer subsidies has become a significant budgetary burden in a period when the government continually runs a budget deficit. In 1976/77 the subsidy represented 25% of the current budget for all agricultural development, excluding cocoa. Further, the high subsidies have led to a misallocation of resources, with evidence of smuggling across national boundaries. This traffic results in Ghana allocating its scarce foreign exchange (the foreign exchange element of fertilizer delivered farm gate is about 65%) to stimulate agricultural production in neighboring countries competing for the same commodity market. It has also led to a healthy internal blackmarket. Input subsidization has taken place in the absence of an efficient distribution and therefore tended to benefit larger and wealthier farmers with greater access to public and commercial institutions. As a corollary, since this group comprises mostly larger mechanized farmers, fertilizer is being used to support increasing mechanization which, in the case of rice and maize, has been shown to be uneconomic at both official and international exchange rates.

6.25 Producer price supports have worked well in Nigeria for many years. However, in recent times, the combination of rapid growth of domestic demand and restrictions on imports has raised the rate of domestic inflation in Nigeria well above the increase in import prices. Production costs, particularly of farm labor, have soared and consequently the competitive position of local producers on the world market and vis-a-vis imports has deteriorated rapidly, as the exchange rate of the Naira has not been adjusted to offset this relative price movement. Producers

of commodities that are locally consumed have been protected by import controls (though there are notable exceptions, e.g., rice and red meat), but in the absence of favorable world price developments producers of export crops require compensation through a government supported rise in the producer price (or measures with similar effect), which many have not received. As a result, producers have switched from the export to domestic market (palm oil, groundnuts), whereas production of crops for which there is limited domestic demand has stagnated or declined (palm kernels, rubber and cocoa), even though producer prices for these crops have been increased.

6.26 The case of the Ivory Coast presents a clear contrast to that of Ghana. A Bank study of incentive systems and comparative advantage shows that the Ivory Coast has a clear advantage in the production of coffee, cocoa, oil palm products, copra, pineapple, bananas, etc. The domestic resource cost of cocoa and coffee range between 0.60 to 0.70, that for cotton 0.70 to 0.80 and rice grown in rotation with cotton 0.80. The Ivorian government has been able to promote these advantages by offering various price and other incentives to agriculture (Table 6.11). The general impression is that Ivorian farmers have been very responsive to producer prices. For example, a recent increase in the producer price for rice not only led farmers to step up production considerably but also to abandon crops for which the new system of prices became less profitable. Producer price policy seems to have had some beneficial impact on farmers' income levels as well as its distribution. Apart from banana and pineapple plantations, virtually all agricultural interests are Ivorian, with a relatively large number of families involved in coffee and cocoa production. According to official estimates, over the last ten years producers have been paid on average about 50% of the f.o.b. price for cocoa and coffee. Farmers received about \$200 million after taxes for these two crops in 1975.

6.27 As a result, there have been substantial increases in acreage. Earlier estimates of the area under cocoa and coffee cultivation show 600,000 and 700,000 hectares respectively, but by 1974 the agricultural census registered 920,000 hectares of cocoa and 1,235,000 hectares of coffee. Price incentives also seem to have worked in the case of other food crops, especially rice. Thus, despite considerable increases in the urban population and per capita incomes, the Ivory Coast, contrasted to say, Nigeria and Ghana (see para. 3.39), has become less rather than more dependent on food imports. Since the increase in food production was largely a spontaneous response of farmers and traders to market forces, it can be concluded that a reasonably efficient private marketing network exists and that farmers respond readily to price signals and incentives transmitted by this network.

6.28 Further contrasts can be drawn between the Ivorian free market framework and the socialist framework of Algeria where official producer prices are established for nearly all agricultural commodities, with fixed margins for wholesalers and retailers. Retail prices of cereals, flour, sugar, edible oils and coffee are maintained at levels lower than producer prices, which means subsidies to intermediary enterprises. The prices of inputs are fixed and have been kept stable by government policy over the last 5 years. In spite of government intervention, inputs and outputs can be obtained on farmers markets outside the official marketing system and this tends to reduce the effectiveness of government policy. During the period 1973 to 1976 agricultural incomes increased tremendously as a result of increases in agricultural prices relative to input prices. As a result socialist sector farms were able to improve their financial viability, but only after a long period of losses. Despite the favourable change in commodity prices some crops still remain non-profitable on socialist sector farms, except in climatically good years. Unprofitable crops are mainly grown in the socialist sector because salary advances are obtainable regardless of farm profitability and because of the absence of viable alternative co-ops. In this context, Agrarian Revolution Cooperatives have performed better than the socialist sector farms.

6.29 Finally, a few words about developments in Turkey. The experience in that country indicates that price policy, especially that for inputs has been effective from the production standpoint. The data indicates that attractive price support levels have encourage mechanization which has led to the expansion of tree plantations and irrigation investments, with a relative shift of resources and production from animal products to crops. A large part of Turkish agriculture is now mechanized and fertilizers and other inputs are widely used. The combined effect of price supports and subsidy prices for fertilizers has steadily reduced the real cost of fertilizers and steadily increased farmers' returns per unit of fertilizer applied. The impact of input use is somewhat reflected in the steady improvement in the ratio of input prices to out/prices (Annex Table 6.13).

Allocation of credit for planting soybeans in 1973-75 was conditioned on farmers increasing plantings of corn and beans. This was backed up with the imposition of mild export quotas on corn and soybeans.

6.30 Soybean production rose from 750,000 tons in 1967-68 to an estimated 5 million tons by 1972-73, replacing the production of coffee and wheat. In the latter case the governemnt realized that crop substitution was taking place because of inadequate support prices for wheat and so it chose to support domestic self-sufficiency in this product by raising domestic price supports above world market levels.

6.31 The experience of those countries which have used market intervention to stabilize the prices of food and agricultural products shows that in many instances such policies have been self-defeating and have deprived farmers, especially small holders, of the resources needed to raise the overall level of investment. Some middle income countries do have the resources to keep producer prices high and consumer prices low, meeting the resulting deficits from budgetary surpluses. However, the evidence suggests that in such cases governments are left with fewer financial resources for directing investments to most needy groups and areas.

6.32 A common experience of middle income countries and generally, for the developing world has been that shifts in the terms of trade in favor of agriculture through price incentives and high subsidies have produced some undesirable effects. In the majority of cases subsidized credit and low import prices for machinery have encouraged capital-intensive production methods by larger farmers and reduced farm employment. The impact of such policies on technological change and appropriateness cannot be considered in this paper. Further, it has not been possible to examine the country experiences in the external trade field, e.g., the impact of import substitution, export promotion, overvalued exchange rates, etc. on agricultural output. The effects of such policies are well known.

iii) Planning Transformation

6.33 The majority of middle income countries, whether statist or market oriented, practice some form of planning as a means of promoting agricultural development. While many plans and programs for the agricultural sector can and have been prepared outside of the context of national development plans, ideally the possibilities for enhancement of structural change to a large extent depend on the degree to which plans for agricultural development are undertaken within the framework of national planning. It should be mentioned that where national plans exist in the middle income countries they invariably includes plans and program for the agricultural sector.

6.34 The argument for integrating plans for the agricultural sector into the broader framework of national development is based on the perspectives of structural transformation addressed in this paper. The general thrust of the argument is that the nature and direction of the transformation process depend on the interdependent and mutually supporting interactions between agriculture and the rest of the economy, the efficiency and consistency of resource allocation among sectors, and the conformity of agricultural goals to national development objectives. These conditions can be optimally satisfied only within a framework of national planning.

6.35 Contextually, while there is no widely accepted set of principles for agricultural sector planning, and varying differences exist among countries, there is general agreement among planners that the typical sector plan should contain the following elements, as a minimum: (i) statements of the sets of objectives or targets to be achieved and their relationship to national and/or regional goals; (ii) the available resources and their development among projects; and (iii) the policies, strategies and institutional arrangements through which the resources can be used to attain the set of objectives. The examination of the

experience of middle income countries indicates that few, if any, have satisfied these conditions. In the majority of cases stated objectives are either conflicting and/or the means for attaining them not clearly articulated. In similar vein, plans for agricultural development merely recount government intentions without stating the policies or strategies to be adopted or resources to be allocated. The most pervasive gap lies in the failure of sector plans to give sufficient attention to regional development. The usefulness and effectiveness of such plans depends on the extent to which they take into account the varying ecological requirements of countries.

6.36 Turning to some organizational and administrative considerations, middle income countries display a multiplicity of organizations responsible for various aspects of agricultural development. This proliferation has sometimes resulted in agencies pursuing not only different but conflicting objectives, sometimes resulting in confused and incoherent signals being transmitted to the agricultural community. A common experience is that government planning agencies having overall responsibility for the preparation of national and sector plans as well as annual budgets usually do not have the managerial and technical capabilities to make the necessary detailed assessments of sector programs and policies. The diffused organizational structure is reflected in the high degree of administrative and financial autonomy of the major ministries and agencies having responsibility for some aspect of agricultural development.

6.37 The widespread diffusion of responsibility in many cases prevents the design of a coherent agricultural policy with well-defined objectives. Also, it has proved particularly detrimental to the effective implementation of policies and programs. The adverse effects on program and policy implementation of the

weak coordination between agencies and the excessive overlapping and duplication of their functions is compounded by the high level of centralization of decision-making. This point is further addressed below.

6.38 An interesting fact is that the plethora of organizations is not matched by a capability for sector analysis. The general experience is that the capability for sector analysis is inadequate because of an absence of well-developed staff units. As a result, few government agencies with a responsibility for agriculture are in a position to supply statistical and other information required to monitor the progress towards achievement of objectives or plan targets. This is an area to which increased lending efforts should be devoted.

6.39 There is an organizational dilemma that continues to militate against effective agricultural planning in developing countries. On the one hand, the various elements which combine to promote development are frequently so inter-related that a single coordinating body is sometimes needed. On the other hand, the scope of the agricultural sector in terms of its structure and functioning makes it impossible for one organization to deal effectively with all the multifarious aspects of agricultural development.

6.40 While no attempt is made to resolve the dilemma in this paper, it has been proved that strategies for agricultural development - especially those for small farmer development - to a large extent depends on farmer involvement in the decision-making process. This seems to call for less bureaucratic and more participative types of organizations. The experience of the last decade or so has shown that it is futile to attempt to implement schemes for agrarian reform and other types of agricultural development without the participation of the intended beneficiaries - the farming community. While the experience of both bureaucratic and participatory approaches has been mixed, greater thrust in the direction of participation is suggested by the unsatisfactory nature of most

non-participatory, top-down approaches that rely almost entirely on centralized agencies rather than on the total energies of the farming population.

6.41 A major means of encouraging people's participation in agriculture and rural development planning has been decentralization of government decision-making and implementation. It has been widely observed that in most middle income countries the governmental system is sometimes overcentralized to the point of diminishing effective policymaking and programming. However, several countries have taken steps to remedy this situation. A notable case is Nigeria which has embarked on one of the most ambitious decentralization efforts with the establishment of several state governments and a reconstituted local government system. While such an experiment might prove expensive in terms of resources committed to staffing and other operations in each state at the local level, many would consider this an appropriate investment to achieve the benefits of popular participation.

6.42 For the Asian countries, it is usually observed that the success of agricultural development has been accompanied by schemes to promote people involvement e.g. the New Community Movement in Korea. An organizational structure which seems to be appearing in these countries is the "spontaneous organization" of peasants, usually near the urban centers. Such organizations have the potential of encouraging innovation and new aspirations among the agricultural and rural population. The proximity to urban center facilities outside assistance - especially financial assistance and the training of personnel.

6.43 Probably the most successful demonstration of the benefits that can derive from decentralization and participation is the case of the People's Republic of China. In this case there was a devolution of many planning and implementation decisions to the province, county, commune, brigade and even to production teams. While the central government still reserves the key decisions

for itself, it delegates other kinds of specific decisions to different sub-national levels. The principle of self-reliance is more easily pursued when these lower levels have authority to act within specific areas. The Chinese experience reveals that the benefits of participation are much more widely diffused when a comprehensive approach to decentralization is pursued, with defined and shared areas of authority for peoples' participation at different levels.

6.44 By contrast, the Algerian example is one in which the central government plans and manages the majority of functions relating to agricultural development. In recent years there has been a movement to decentralize development decisions from the central administration to the provincial and communal levels. However, the central government continues to allocate nearly all investment, distributes all modern inputs used in agriculture, participates in planning cropping patterns, sets most producer prices and monopolizes nearly all credit.

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