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Agriculture

Sector Working Paper

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FOREWORD

This is one of a series of World Bank pamphlets dealing with those sectors (e.g., education, agriculture, power, transportation, population, etc.) to which the Bank directs its development lending. Initially, these Sector Working Papers were not written with any thought of publication. They began as an internal exercise to gain better perspective on the characteristics of the fields of activity covered by the Bank's projects and to describe the size and philosophy of the Bank's lending program in each field.

The original instructions were to prepare papers that would describe the distinctive economic, financial, and institutional characteristics of each sector; outline the role played by each sector in the general process of economic development; review the scale and approach of World Bank operations in the sector; and summarize the Bank's philosophy about how its own operations, together with the activities of other aid donors, can contribute to building up each sector—physically, financially, and institutionally—in its member countries.

Although Bank loans are usually for specific projects (e.g., a dam, a group of schools, a power system) we are convinced that their merits can be judged only within a broad assessment of their relation to the development of the sector and of the whole economy. The fixing of priorities among individual projects, and the reform of policies and institutions to best serve a country's development needs, require that individual projects be considered in this wider context. Thus Bank projects are derived from an analysis of the larger economic systems into which they must fit. In conducting this "systems analysis" as a foundation for its project lending, the Bank places primary reliance on field-based country economic studies and sector surveys.

The Sector Working Papers have served a useful function at all levels within the Bank; we now feel they may be of similar interest to people beyond our own staff and management. They are therefore being published in a series of pamphlets that deal with the individual sectors in which the Bank is operating.

Robert S. McNamara
President, World Bank Group

June 1972

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AGRICULTURE
SECTOR WORKING PAPER

● This paper discusses the part that agriculture plays in achieving the key development goals of greater production and exports, more employment, and a better distribution of income. Some policy issues of wide relevance for less developed countries are singled out for attention. After a review of the Bank Group's past activities in agriculture, projections are made of its future work in the sector.

The paper is not intended to be comprehensive in its coverage. In order to be concise, it touches only briefly, and sometimes not at all, on several important aspects, such as agricultural credit, rural development, rural-urban migration, nutrition, international commodity stabilization schemes and ecological problems. Some topics that are of relevance to agriculture are discussed in companion working papers —particularly those dealing with population planning, transportation and water supply. The balance between rural and urban development is considered in the paper on urbanization.

The term World Bank Group as used in this paper refers to the International Bank for Reconstruction and Development (World Bank), the International Development Association (IDA) and the International Finance Corporation (IFC). References to the Bank include IDA, but not IFC. Money amounts are expressed in U.S. dollar equivalents. The Bank's fiscal year (FY) ends June 30.

CHALLENGES FACING AGRICULTURE

The importance of agriculture in the economic development of low-income countries has come to be recognized increasingly in recent years. A number of causes have contributed to this change. Rapid population growth has focused attention on the need to expand food production. At the same time, the success that has been achieved in obtaining dramatic increases in crop yields through the use of new agricultural technology has demonstrated that agriculture offers excellent investment opportunities. This combination of circumstances has meant that, for many countries, measures to raise agricultural production have become both more urgent and more feasible.

The renewed interest in agricultural development has been accentuated by a degree of disillusionment with the outcome of industrial growth. In particular, it is recognized that industrial growth has not succeeded in preventing rising unemployment and continuing poverty for the great mass of people. The creation of employment oppor-

tunities and the alleviation of poverty have thus tended to be raised to the status of important development goals in their own right. The challenge for agriculture is to combine an acceptable rate of growth of production with movement toward these goals.

In dealing with the related problems of poverty and unemployment, agriculture is of exceptional importance. It is the sector which provides employment for most—typically, 50% to 80%—of the work force, contains the majority of poor people, and is the birthplace of many of the urban poor. Food and fiber, the products of the agriculture sector, are prominent among the goods which poor people demand in greater quantities as their incomes rise. Furthermore, in countries not endowed with exploitable minerals, the foreign exchange earnings from agricultural exports are frequently of critical importance for development.

There is growing confidence that the development and application of new technology can solve many of the production problems in agriculture. But increasing concern is being expressed about the distribution of the benefits of economic growth. This reflects the fear that the technological revolution will itself have adverse distributional effects within the agriculture sector—in particular, that its benefits will be captured to a disproportionate extent by the landowners, and that labor will be "saved" to no purpose other than to swell the numbers of unemployed. If these consequences are to be avoided, much rethinking of the conventional wisdom is required.

Production

The performance of the agricultural sector is judged primarily by its ability to expand production of food and raw materials. Increased agricultural production is of critical importance when both population and income grow rapidly in low-income countries, particularly if the poorest segments of the population share in the income growth. For example, if the population grows by 3%, and per capita income also rises by 3%, the total demand for food could increase, typically, by about 5%. Rising incomes also generate a demand for a diet that is of higher quality and more varied, so that the pattern of agricultural production needs to be diversified.

During the 1960s, agricultural production in developing countries increased at an average rate of 2.6% per year, while food production alone grew by 2.8% per year (Annex 1). These rates were little more than sufficient to keep pace with population growth. As a result, per capita production increased at annual rates of 0.16% for all products and 0.20% for food alone. In Latin America and Africa, agricultural production per head actually declined. Although, if judged against the

forecasts of widespread famine which were common in the mid-1960s, this performance may seem reasonably creditable, it is clear that agricultural production must accelerate if future demands are to be met.

According to the projections underlying the Provisional Indicative World Plan for Agricultural Development (IWP) prepared by the U.N. Food and Agriculture Organization (FAO), the total population of developing countries will rise from 1,720 million in 1970 to 2,515 million by 1985[1]. To meet the increase in domestic demand for food as populations grow and incomes rise, the IWP estimates that food production will have to expand by 4.3% per year for the period 1967-1985. The marketable portion will have to grow even more rapidly—by 5% to 6% annually—because of increasing urbanization. Even if the rise in incomes is smaller, the demand for food will increase rapidly, since the greater part (about 70%) of the increase will stem from population growth.

The growth in agricultural production has come from three sources: expansion of acreage, increase in yields, and shifts to more valuable crops. Expansion of acreage has been more important in Latin America and Africa, while yield increases have been more important in Asia. Although there are considerable areas of unused cultivable land in Latin America and Africa, and some in Asia, the expansion of arable and harvested area in developing countries is unlikely to exceed 0.7% and 1.3% per annum, respectively, over the period 1962 to 1985[2]. Since these rates are less than the expected rate of population growth, an increasing proportion of future agricultural growth will have to come from increased yields. The shift to higher value crops involves a greater degree of farm and regional specialization in production; this calls for improved communication and marketing facilities within countries and for trade policies which allow international specialization to take place.

It is necessary not only to increase agricultural production, but also to improve the productivity of labor in agriculture. The improvement in productivity is required to raise the incomes of those engaged in agriculture, and to meet the demand for agricultural products coming from the increasing proportion of the population engaged in non-farm activities. As Annex 2 shows, economic growth ordinarily involves a decline in the relative importance of agricultural production and of the agricultural work force, since other sectors expand more rapidly than agriculture. This means that the proportion of

[1]More recent projections by the United Nations raise these figures to 1,765 million and 2,675 million, respectively.

[2]FAO, *Provisional Indicative World Plan for Agricultural Development* (Rome, 1970), Vol. I, p. 39.

agricultural output that is marketed, rather than consumed on the farm, must rise.

If the marketed portion does not increase commensurately with the increase in demand, food prices rise. Since food expenditures represent half or more of the total expenditures of low-income people, the effects can be very disruptive, both economically and politically. Some of the possible consequences are inflationary wage demands which slow down industrial growth, expenditure of scarce foreign exchange on food imports, or resort to draconian—but frequently ineffective—measures to commandeer or ration food supplies.

Agricultural production per man varies considerably among countries but is low in most of the developing world (see Annex 3). There is a general tendency for low labor productivity to be associated with a high man/arable land ratio. But the main point conveyed by Annex 3 is that there is no simple explanation of low productivity in agriculture; it results from a complex of factors, such as poor natural resources, lack of accumulated capital and current inputs, technological backwardness, poorly-developed human skills, and the social environment.

Undoubtedly, many opportunities exist for increasing agricultural output through technological innovation involving relatively small amounts of investment per man and per unit of land. But identifying and exploiting these opportunities is not always easy. Nevertheless, a recent study (the results of which are given in Annex 4) showed that agricultural output per farm person increased in all but one of a group of developing countries, even though in some the crop area per person declined. The gains in productivity reflect partly an increased use of purchased inputs—and, indeed, it is this source which must be increasingly relied on in the future.

If it is assumed that the use of fertilizers is a rough measure of the use of purchased inputs of all kinds, the table in Annex 5 gives some idea of the probable scope for increasing the use of these inputs. Although fertilizer consumption in developing countries is very low in comparison with developed countries, it is expected to double between 1967/68 and 1972. But even the doubling will mean that the application of fertilizer per unit of cultivated area will remain relatively low. The actual availability of modern inputs such as pesticides, fertilizer, engines and piping will, of course, be an important determinant of gains in productivity.

New Technological Advances

Considerable improvements in agricultural technology have been achieved in the developing countries over the past 20 to 30 years. Initially the emphasis was on cash crops, particularly export crops,

where some quite remarkable technological successes have been achieved. Of particular importance have been the breeding of high-yielding oil palm varieties; the use of vegetative propagation techniques in rubber and tea production to allow the properties of high-yielding clones to be adopted widely; and the development of cotton varieties and their adaptation to the requirements of industrial processes. Cultivation practices have been greatly improved and there has been wide acceptance of chemical fertilizers, pesticides and herbicides, often specifically developed for particular crops in particular environmental conditions. In livestock production, too, there have been notable technological advances, even under tropical and semi-tropical conditions: production has been increased by improving animal health control, using tropical legumes for pasture improvement, and upgrading local cattle with improved disease- and insect-tolerant breeds.

More recently, there have been similar technological advances in the production of food crops under the tropical and semi-tropical conditions typical of many developing countries. Such advances are still largely restricted to wheat, rice and coarse grains grown under irrigation. The wheat and rice varieties of the "green revolution" are capable of high yields with the aid of fertilizers, pesticides and adequately controlled water supplies. They were produced by means of genetic and agronomic "engineering" carried out in international and national research centers, and were developed specifically for regions with an adequate supply of rainfall or irrigation water. Their wider use will require an expansion of reliably irrigated areas in various parts of the developing world.

But more work needs to be done to produce still better and more widely adaptable varieties, particularly for dry-land farming. The "green revolution," impressive as it has been, has left many parts of the world and many millions of farmers unaffected. A much bigger research effort is needed for crops such as millets, legumes, oilseeds, vegetables, tubers and fodder, if the advances made with wheat, rice and maize are to be matched. Similarly, more research is needed on livestock production and disease control—especially in the humid tropics—and on water management in irrigation systems[1].

The use of new, high-yielding cereal varieties has spread with remarkable speed in Mexico and parts of south and south-east Asia—and, to a lesser extent, in the Middle East and North Africa. Their use in Asia, the Middle East and North Africa commenced as recently as 1965-66, yet, by 1970, they covered 10 million hectares, or 22% of the

[1]The Bank's role in supporting such research is discussed on page 48.

wheat area of 14 major wheat-producing countries. In the same year, another 10 million hectares, representing 13% of the total rice area in 12 countries, were planted with high-yielding rice varieties[1]. Annex 6 gives the data for individual countries. It shows that adoption of the new varieties of wheat has proceeded furthest in Pakistan (46% of the total wheat acreage in 1970-71) and India (33%). Partly because less irrigated land is available, only 6% of the Turkish and 3% of the Iranian wheat areas were planted with the new varieties. Corresponding rates of adoption of the new rice varieties were 50% in the Philippines, 42% in West Pakistan, 19% in South Vietnam, 15% in India, and 11% in Indonesia.

While the expansion in area of high-yielding varieties can be measured, their precise effect on yields and production is more difficult to determine. In 1970-71, in the less-developed countries of Asia and the Middle East (excluding Mainland China), the estimated production of wheat was 71 million tons and that of rice (paddy) 163 million tons. These represented increases of 30% and 19%, respectively, over the tonnages produced in 1965. Not all of these increases are attributable to the "green revolution," of course, even though 1965 may have been a somewhat better-than-average year.

If one takes the total area planted to new varieties in the countries listed in Annex 6[2] in 1970-71, and uses estimated yield multipliers for the new varieties, it is possible to calculate roughly how much they may have contributed to production. For example, if it is assumed that use of the new varieties (in combination with complementary inputs), instead of the old, increases yields by 100% in the case of wheat, and 25% in the case of rice[3], wheat output has increased by 8.3 million tons (or 22%), and rice output by 4.6 million tons (3.25%) in 1970-71[4].

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[1]There seem to be two main reasons why the new rice varieties have not been accepted as readily as the new wheat varieties. One is that they are less palatable than the old varieties of rice. The second is that they are less readily adaptable to a wide range of environments than the new wheat varieties.

[2]Note that not all countries where high-yielding varieties have had an impact are included in this list. Notable omissions are Mexico for wheat, and Taiwan for rice.

[3]These percentages do not imply that varietal improvement has been markedly greater in wheat than in rice. The difference in favor of wheat reflects the fact that the new wheat varieties are grown almost exclusively under irrigation; under these conditions, yields are well above average in any case since, unlike rice, a substantial part of wheat output is produced under dry-land conditions.

[4]Availability of the new varieties has led to an expansion of plantings, particularly in the case of wheat, as well as higher yields per unit area. The above calculations attempt to catch only the yield effect. However, they probably do not underestimate the net effect of the new varieties on agricultural output. Although they do not credit the new varieties with increased output resulting from expansion of areas sown to wheat and rice, neither do they debit them with the reduced production of crops—such as cotton and pulses—that were displaced by wheat and rice.

These estimates are very rough, because the yield multipliers used are of uncertain validity. Furthermore, they do not take into account the contribution of modern inputs used in conjunction with traditional crop varieties. Nevertheless it seems clear that the impact on total wheat production in these countries has been substantial, but that the effect on rice production has been relatively small in the aggregate, though quite significant in particular regions.

One result of the increased cereal production—as the FAO medium-term forecast on cereals (Annex 7) shows—is a trend toward greater self-sufficiency in countries which have traditionally relied on imports for part of their foodgrain requirements. However, there is reason to believe that grain production will not continue to increase as rapidly as hitherto unless stronger efforts are made to spread the use of improved technology, to intensify research, and to provide complementary inputs, particularly water. Not only will increased plantings of the new varieties be restricted by the lack of suitable environments; but the spread of disease and pests may become a problem too. For instance, in the Philippines both the traditional and the new varieties of rice were attacked by a serious virus disease in 1971, necessitating a resumption of rice imports. Even in wheat and rice, therefore, there is a need for continuous research to make the new varieties better able to resist disease and pests.

The availability of new technology was a necessary but not a sufficient condition for the "green revolution" to occur: changes in government policies and priorities were required to strengthen the incentive to modernize. In India, for example, the shock of two poor monsoons helped lift agriculture to the top of the government's development priorities; greatly increased amounts of foreign exchange were allocated for importing fertilizer, better price incentives were provided, and research, extension and input distribution facilities were expanded and made more efficient.

Agricultural production has been increased primarily by concentrating capital investments, purchased inputs and the new technology on a small segment of agriculture. While this is largely because land and water resources are better in some regions, it also reflects the uneven distribution of entrepreneurship, capital availability and public investment policies. Concentration of resources where output increases are most readily obtainable is a sound strategy if the aim is to increase marketed output as quickly as possible. But the less urgent this need becomes, the greater is the attraction of a policy whereby the limited supply of capital is combined with expanded use of labor and new technical knowledge over a much larger proportion of farms.

Such a strategy would help in a situation where production is con-

strained by lack of effective demand while a large proportion of the rural population continues to go hungry because it produces so little. Modernization on small farms will, however, require greater efforts to provide extension and credit services and possibly to develop techniques of production that are better adapted to the conditions prevailing in traditional agriculture.

The adoption of new techniques is likely to have significant effects on the geographical pattern of production, and also on the product composition. Developments to date have increased the comparative advantage of irrigated areas in the production of foodgrains. As production of these basic necessities increases and their prices fall, the real incomes of consumers will rise and they will increasingly demand other agricultural products—meat, milk, fibers, fruits and vegetables —and agricultural resources previously committed to foodgrain production will become available for meeting this demand. If economic growth is to be promoted through greater diversification of agricultural production, a good deal of investment in research, extension and the marketing infrastructure will be required.

Exports

Just as agriculture dominates the economies of most low-income countries, so also it provides the largest portion of the foreign exchange earnings that are so vital for their economic development. Although exports of minerals and manufactures have grown more rapidly over the last decade, agricultural primary products still account for over 80% of the export earnings of at least eight countries, 50-80% in the case of at least nine countries, and 30-50% in the case of another eight or more (Annex 8)[1]. The major customers for the developing countries' agricultural exports are the industrialized countries; consequently, agricultural production, income and employment for the majority of less developed countries are shaped in part by factors beyond their control. However, public policies in these countries sometimes discourage agricultural exports by reducing producer incentives and discouraging the reinvestment of earnings.

Despite some encouraging achievements, the record of less developed countries in expanding agricultural exports has been generally disappointing. The unit value of such exports from both developed and developing countries has more or less stagnated over the last ten years. But, in terms of volume, agricultural exports from developing countries have grown far more slowly than those from developed areas. As a result, the total value of developing countries' agricultural

[1]Based on a sample of 36 countries accounting for 65% of less developed countries' export earnings.

exports rose by only 30% between 1957-59 and 1970, compared to a growth three times as high in developed countries' exports (Annex 9). It is interesting to note that the more rapid growth in the latter case is accounted for in part by the lowering of trade barriers and expansion in trade among developed countries themselves.

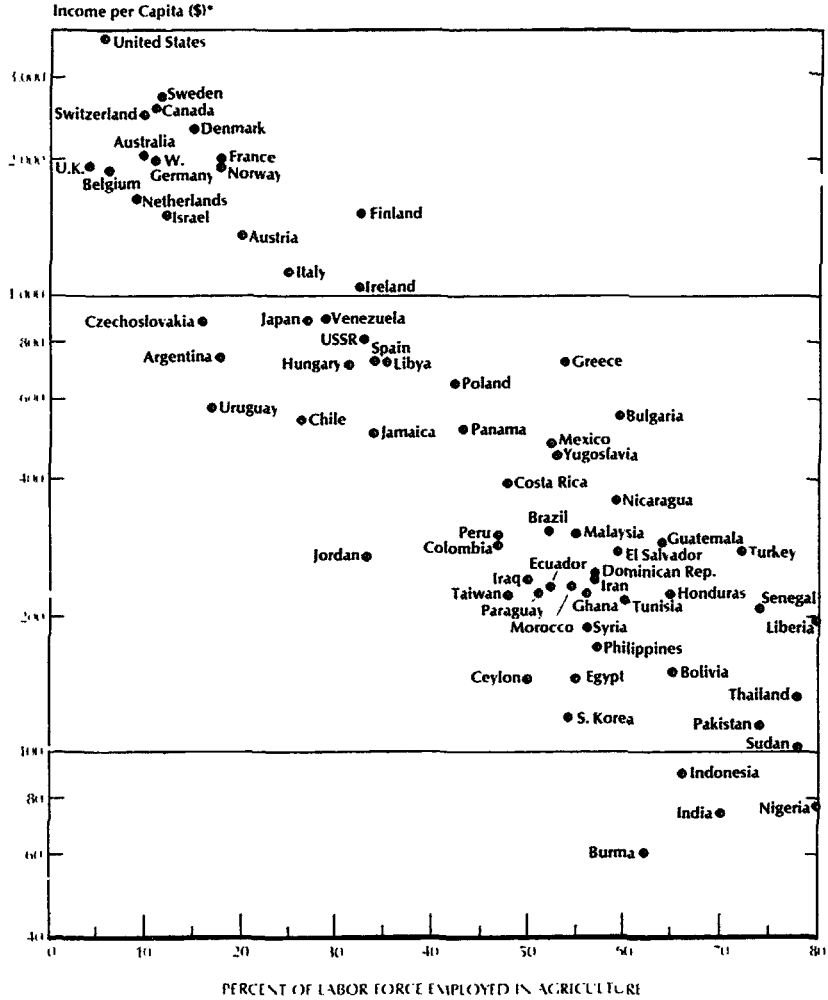
The FAO forecasts that the agricultural exports of developing countries (excluding forestry and fish) will grow by about 3% annually over the next eight to ten years. In that case, the growth rate will be a little better than it has been during the past decade. It will need to be higher in order to make a greater impact on the employment problem in developing countries. The differences in labor and capital intensity in production indicate that if some agricultural production is shifted from the developed to the developing world, far more jobs would be created in the latter than would be lost in the former.

Demand prospects for many of the typical agricultural products of developing countries, such as rubber, palm oil, groundnuts, coffee, tea, cocoa, sugar, cotton and tobacco, often appear to be discouraging. If considered over the medium period of, say, ten years, the scope for increased exports is often limited by growing competition among developing countries, competition from synthetic substitutes, and sometimes competition from subsidized agricultural production in developed countries. Yet in the longer run the prospect of population increases and higher living standards must result in a growing demand for some of the commodities where surpluses now appear to threaten. Uncertainties inherent in making price projections for the longer term cause difficulties in making investment decisions, especially for tree crops with long economic lives.

While the export outlook for some agricultural products is not particularly encouraging, for others it is quite good. The latter category includes meat, feedgrains, certain types of fish, fruits and vegetables, timber and paper products. Some of these commodities might become scarce unless developing countries exploit their production potential effectively.

Another way in which developing countries could increase their export earnings is by doing more of the processing of raw materials themselves: meal and oil might be exported rather than oilseeds, cotton textiles rather than cotton lint, canned or frozen foods rather than fresh products. However, developments of this type require both better access to developed markets and increased investment in processing capacity. It would also be helpful if developed countries eliminated some of the existing structure of protection and subsidies, and thus encouraged their producers to shift away from products that can be imported more economically from developing countries. Finally,

Income per Capita, 1967, and Percent of Labor Force in Agriculture, 1965, Developed and Less Developed Countries



*Gross National Product per Capita 1966 Dollars

Source: *Economic Progress of Agriculture in Developing Nations, 1950-68*. Foreign Agricultural Economic Report No. 59. U.S. Department of Agriculture Washington, 1970

developing countries could stimulate trade among themselves by expanding their economies and adopting more liberal trade policies.

Although agricultural exports account for a substantial part of total exports of many developing countries, they often represent a much smaller percentage of total agricultural production. In India, for instance, agricultural exports are over 40% of total exports but less than 3% of total agricultural output. A similar situation prevails in Pakistan, where the respective figures are 50% and 5%; in Thailand (80% and 25%) and in Ethiopia (98% and 10%). On the other hand, these percentages are 90 and 50 for Argentina. A few countries may be able to sell a large part of the increase in their agricultural production in export markets. But most countries will have to rely mainly on the expansion of their domestic markets.

Employment

Developing countries face a pressing need to provide employment for a rapidly increasing population. In agriculture the problem is mainly one of underemployment, which is perhaps best defined as a condition in which irregular work of low productivity results in extremely low levels of earnings and consumption.

As mentioned earlier, and as indicated by the table in Annex 2, economic growth is ordinarily accompanied by a decline in the relative importance of the agricultural work-force. Further evidence of this tendency—but also of the existence of large departures in individual countries from the general relationship—is provided by the figure on the opposite page.

It would be unwarranted, however, to conclude that the task of employment creation must fall primarily to non-agricultural sectors of the economy. With rapid population growth, the absolute numbers of those available for employment in agriculture will increase, in many countries, for the foreseeable future. For example, as the table on the following page shows, the agricultural population of Asia will continue to increase until well into the twenty-first century, unless population growth is sharply reduced or the growth of urban employment is greatly accelerated.

Although the numbers employed in agriculture can be expected to increase in most developing countries, the rate of increase will differ among countries, depending mainly on the present size of their non-agricultural sectors. The latest FAO projections are that between 1970 and 1985 the agricultural population in East Africa will increase by 31% (from 80 million to 105 million); in South Asia by 24% (from 490 million to 606 million); and in Latin America by 14% (from 118 million to 135 million).

Agricultural Population Projections for Asia[1]

Assumed Rate of Growth of Population	Assumed Rate of Growth of Urbanization	Year in which Agricultural Population Reaches Peak	Size of Agricultural Population in Peak Year[2]
percent per annum			million
2.8[3]	3.8[6]	2052	2,790
2.5[4]	3.8	2025	1,310
2.3[5]	3.8	2011	950
2.8	5.0[7]	1993	820
2.5	5.0	1984	701
2.3	5.0	1979	640

[1]Excluding Communist countries and Japan.
[2]Agricultural population in 1962, the base period for these projections, was 583 million. By 1970 it had reached 701 million.
[3]U.N. high estimate.
[4]U.N. medium estimate.
[5]U.N. low estimate.
[6]IWP projected rate.
[7]"High" rate.
Source: FAO, *Provisional Indicative World Plan for Agricultural Development* (Rome, 1970) Vol. 1, pp. 32-33.

With few exceptions, agricultural production in developing countries is carried out by labor-intensive methods: traditional agriculture provides work for many hands, even if earnings are miserably low. The demographic prospect depicted in the table above implies that in many countries sustenance and work will have to be found for many more people in the coming decades. Fortunately, modern techniques that increase output can be introduced into traditional agriculture without changing its labor-intensive character. However, as is argued in detail later, if government policies and the structure of prices favor capital-intensive production techniques and if the small farm sector is neglected, agricultural growth will provide far fewer opportunities for productive employment than it could. Hence there is a need to re-examine existing policies and institutions to see whether they promote or discourage a pattern of development which utilizes labor resources.

A policy of creating employment in rural areas should reduce rural-urban migration and the social and private costs associated with it. Furthermore, it is very difficult to reduce urban unemployment by creating more jobs in urban areas if underemployment and low earnings remain characteristic of agriculture. For, as the urban unemployed are absorbed into the work-force, they will simply tend to be replaced by new migrants from the countryside, attracted by the chance of securing a high-paying urban job.

Effects of Technological Change on Employment

The introduction of modern agricultural technology has had mixed

effects on the demand for labor in Asia, and the net effect on employment in regions where their use is spreading is not always clear. The high-yielding varieties of wheat and rice call for more intensive cultivation. Moreover, the shorter growing season of the new varieties frequently permits double- or multiple-cropping, thus greatly increasing the number of cultural operations carried out in the course of the year. The use of improved seeds and fertilizers is therefore conducive to labor-intensive farming methods, and, of itself, tends to create more employment.

The use of the new varieties, however, has been accompanied, for various reasons, by an increasing degree of farm mechanization. Not all mechanization has an adverse effect on employment; the mechanization of operations that can be performed only slowly or inadequately using hand methods—or which take place at times of peak labor demand when labor is, in fact, a scarce resource—is often necessary in order to break the bottlenecks hampering production. Some examples are the use of tractors for rapid land preparation so as to permit increased double-cropping, of mechanical threshers to handle the greatly increased harvest, and of motor pumps to lift irrigation water. In these cases more intensive cultivation frequently raises the total requirement for on-farm labor.

However, once acquired for a particular purpose, some machines—and, in particular, tractors—can be used for other purposes as well, and it is usually economical so to use them. In addition, not all mechanization that has occurred is of the sort that increases output. Some has been labor-saving in intent or in practice. For these reasons, and also because government policies in many countries often wittingly or unwittingly encourage indiscriminate mechanization, growing concern is being expressed about the extent to which mechanization is proceeding[1].

There is also a danger that the direct employment benefits of the new technology will, to some extent, be offset by changes in the cropping pattern. Areas planted to crops favored by technological advances tend to expand at the expense of other crops. If the former are less labor-intensive than the latter, the net effect on employment will be smaller; and, if the shifts in crop composition are large enough, employment could even decline. In South Asia some labor

[1]In an attempt to improve its knowledge of this matter, the Bank has arranged with the FAO/IBRD Cooperative Program for a pilot study of the employment and income distribution effects of the Muda Irrigation Project in Malaysia (which involved substantial farm mechanization, including private machinery pools providing services to small farmers); and with some Indian research units for monitoring the employment, income distribution and productivity effects of farm mechanization under two Bank-financed credit projects in India.

displacement has occurred as wheat acreage has expanded at the expense of more labor-intensive crops such as cotton—a tendency that has been accentuated by price incentives working in the same direction.

Looking to the future, however, the high-yielding grain varieties could contribute to employment by releasing land and water resources for producing other foods, such as vegetables and milk, where much more labor is required. Shifting away from monoculture with its seasonally-peaked demand for labor may also be the most practical solution to the problem of seasonal underemployment.

The "green revolution" also generates off-farm employment, in activities connected with supplying farm inputs and consumption goods and services and marketing the larger harvests. In parts of India, for example, there has been a clear rise in the earnings of village craftsmen, such as blacksmiths and carpenters, and small workshop industries have come into being, producing such things as simple mechanical threshers. However, quantitative evidence regarding these secondary employment effects is not available. There is also considerable potential for creating employment by the construction and improvement of irrigation facilities, the productivity of which has been greatly enhanced as a result of the new agricultural techniques.

In sum, the widespread adoption of the new, output-increasing agricultural techniques can significantly reduce unemployment and underemployment. However, if their full potential in this regard is to be realized, policies which favor almost exclusively the growth of a small capital-intensive "modern" agriculture sector will have to be modified. In particular, farm mechanization will have to be selective, the emphasis being on the type that is essential for increasing output per hectare. Of course, further development of yield-increasing technologies for a wider range of crops and environments—rainfed as well as irrigated—is as essential for generating employment opportunities as it is to meet the demands of the market.

As things stand, the fact that the new techniques are mainly applicable to irrigated agriculture means that their impact on employment is limited and is concentrated in particular regions. Because of low labor mobility, the expansion of output and employment in favored areas may be slowed by labor shortages, while chronic unemployment exists in other parts of the same country. Nor do the new techniques necessarily lessen the seasonality of farm labor-requirements: in fact, they sometimes accentuate the seasonal peaks. Depending on the overall availability of labor, the solution may lie in selective mechanization, in conducting some post-harvest processing, storing or marketing activities locally, in greater crop diversification, or in the

careful timing of programs for off-farm employment, such as rural public works.

Income Distribution

The progress of the agriculture sector—as the provider of subsistence and cash income to those engaged in it, and as producer of marketed foodstuffs and fibers—has a very direct bearing on the welfare of poor people in developing countries.

The rural poor consist of many millions of subsistence farmers, small farmers, laborers and their families. Their poverty reflects the fact that their productivity is low and that they own few assets in the form of either land or capital equipment. Programs for raising agricultural production by using modern techniques benefit the urban poor, since they tend to hold down the prices of their basic necessities. But they do not necessarily help the rural poor.

The effects on rural poverty depend on many factors, and are likely to be mixed. Initially, the benefits tend to go principally to the larger, more commercially-oriented farmers, who are better able to make the financial outlays required to purchase modern inputs and to assume the risks associated with trying something new. To secure acceptance, the new techniques are often subsidized. As they are accepted more widely, the burden of the subsidy weighs heavily on the exchequer, and it is sometimes reduced or removed just at the time when the smaller producers decide to adopt the techniques[1]. In addition, if the resulting production increases are not matched by rising demand, the prices of agricultural products tend to fall, so that those who have not managed to increase their production are left worse off than before.

Similarly, if the new techniques are, on balance, labor-saving, the lot of landless laborers, tenant farmers and owner-operators who supplement their incomes with outside employment is likely to worsen. In general, the effect of the new technology on income distribution will depend upon the pattern of adoption, the pattern of resource ownership, and on the net effect on the demand for labor. It will also depend upon existing redistributory devices, such as taxation of income or land.

Since the mass of the poor have few assets other than their capacity to work, they will be benefited by policies which increase the demand for labor; in this respect, the problems of poverty and unemployment are closely related. A development strategy which stresses paid employment will benefit small farmers: more of them or members of

[1]In some cases, instead of removing the subsidy, governments have limited the supply of the input.

their families will secure paid employment and there will be less underemployment of those who remain on the farm. But, in addition, specific programs designed to raise the productivity and the incomes of farmers and farm workers are needed.

One way of doing this is by giving them knowledge of new production methods, together with the means of putting the new methods into practice—for example, better credit and marketing facilities. Another approach is to provide them with more land, through land settlement (if unused land is available) or, in areas where the pattern of land ownership is highly skewed, land redistribution programs. The additional land raises the farmer's labor productivity; moreover, since the land is usually sold on concessional terms, he also benefits in his role of landowner.

Experience in a number of countries has shown that the second approach is unlikely to be successful unless it is accompanied by the first; that is, it is not sufficient to break up, through land reform, what is often a semi-feudal social structure and not put anything in its place. Similarly, in some situations, the first approach may make little headway without an admixture of the second, since the size and fragmentation of land holdings and tenure arrangements may discourage the adoption of new production techniques.

SOME MAJOR POLICY ISSUES

It is proposed now to focus attention on some important policy issues which many developing countries must face as they strive to promote agricultural development. It is realized, of course, that because of differences among countries in the physical, economic and social environment, the tasks facing governments will vary from country to country, as will the policy instruments that are feasible. However, a few of the issues that are of particular concern in many countries are singled out for attention here.

Government activities in relation to the economy fall into three main categories: first, the creation and/or maintenance of an institutional framework that is conducive to social stability and economic progress; secondly, the general management of the economy; and thirdly, the provision of public services and investments, particularly for purposes unlikely to be performed by the private sector. In agriculture, these public services and investments typically include research, technical extension services, general supervision of the cooperative sector, and provision of major infrastructure such as surface irrigation systems, systematic groundwater development and rural roads.

Governmental "management" of agriculture in most developing countries is weak—weaker than that of most other sectors of the economy. This is partly a result of past attitudes which gave low priority to agriculture. Although attitudes have been changing, government activities affecting agriculture still suffer from insufficient funds and a lack of skilled manpower, and economic policies often militate against agricultural development.

The concept of investment projects for agricultural development is still a fairly new one to some governments, and few are well equipped to identify, prepare and implement such projects. There is a reluctance to recognize that highly technical and specialized skills are as necessary in agriculture as they are in other sectors. For example, the fact that project management requires professional skills that might have to be hired from abroad is less readily appreciated in the case of agricultural projects than it is in the case of power and transport projects[1].

Resolution of the issues discussed below is the responsibility of the developing countries themselves. The Bank Group and other development agencies can assist through advice and objective commentary on the effects of existing and proposed policy options—for example, through the Bank Group's sector survey missions and in the course of project work. But the solution to one important problem will depend very much on policies adopted in developed countries. Agricultural exports from developing countries cannot increase significantly unless developed countries grant wider market access and offer less encouragement to high-cost production by their own agriculture. This conclusion follows from the fact that roughly three-fourths of developing countries' agricultural exports consist of commodities which compete directly with the same products or synthetic substitutes produced in developed countries (see Annex 10).

It is disturbing that despite the crucial importance of agriculture in most low-income countries, agricultural commodities remain the category where the least progress has been made after almost a quarter century of effort to achieve a worldwide reduction in trade barriers. A disposition to view the problem of agricultural development

[1]It is important to note that in the agricultural field there has been a significant improvement during the 1960s in the services which consultants can supply. Many consulting firms whose competence was formerly restricted to engineering have acquired agricultural expertise and in several cases have set up their own agriculture departments. A considerable number of new consulting firms have come into existence and it is now possible to hire suitable consultants for most agricultural work which may need to be done. This gives governments and development agencies much more scope and choice when they wish to undertake studies or when they need help in the execution of projects.

in a broader perspective is necessary in the interests of both the developed and the developing countries.

Making Better Use of the Price System

A considerable body of evidence is now available to demonstrate that peasant farmers respond to economic incentives. For example, the supply of many peasant-produced crops has been shown to have responded to changes in their relative prices. Also, it has been observed that small farmers are not indifferent to the income-increasing opportunities afforded by the adoption of new technology with a high pay-off. Traditional agriculture is recognized as being a good deal more efficient than it was once thought to be.

It follows that the price system can play an important role in allocating resources and products in the agricultural sector, and between it and the rest of the economy. If price signals are distorted so that they fail to reflect relative scarcities, resources may be misallocated, to the detriment of production, growth and employment. This is not to say that all distortions are bad—some, for example, may be justified on the ground that they improve the distribution of income; nor is it to say that the resulting misallocations are necessarily serious. However, it does mean that the possibility should be borne in mind that substantial misallocations may be occurring; price, trade and fiscal policies should be examined in that light.

Agricultural prices are often the subject of a good deal of government intervention designed to serve a variety of political, social and economic ends, and the resulting structure of relative prices may not encourage the efficient use of resources. Adjusting prices to bring them into line with relative scarcities and trading opportunities is a difficult task which calls for considerable political courage. It also calls for perceptive and informed economic analysis: in a situation where there are many discrepancies between the actual and an ideal price structure, it is not always apparent whether a particular discrepancy is harmful or, by offsetting another distortion, is beneficial. The task is further complicated by the existence of dynamic factors which cause production and trading opportunities to change, and by uncertainty regarding future trends—for example, in the market prospects for export commodities.

A few years ago, there was a general tendency for the price systems of developing countries to discourage agricultural investment and production. However, in the meantime, a number of countries have substantially revised, or are in the process of revising, their policies affecting agriculture. As a result, the situation is now much more mixed, and agricultural production in several countries is being ac-

tively encouraged through price support programs, investment incentives and so on.

But while price systems that are systematically biased against agricultural production are now less common, the problem of price distortions within the agricultural sector remains. This problem may, indeed, be more serious than it was, owing to the tendency of government intervention to be directed at specific products, or specific inputs, and also to a failure to adjust prices in directions indicated by technical advances. For example, the policy pursued by many countries of supporting foodgrain prices at levels above world prices deserves reconsideration in view of the fact that, as a result of the new agricultural technology, unexpected marketable surpluses of grain have been generated.

These surpluses give rise to a host of problems, including the strain on government budgets when surpluses are acquired at high support prices; loss of production of other crops, including export crops, because of diversion of resources to grain production; problems of storing grain stocks which cannot be moved at the high prices; and eventually, depression of world grain prices as former importers attain self-sufficiency or become exporters. The problem basically is to establish within the overall structure of market prices a level of price support for grains which appropriately reflects the decline in costs of production. This is a difficult task technically, and even more so politically.

Retention of high support prices is sometimes urged as being necessary to provide incentives for small farmers, even though small farmers are least likely to have marketable surpluses, and therefore least likely to benefit from the price supports. Similar arguments are invoked to justify the granting or retention of input subsidies. Price supports and subsidies are generally an inefficient way of assisting small farmers since, if payments are proportional to the volume of production, the benefits go mainly to well-off farmers.

Non-Price Rationing

In many cases, key resources necessary for agricultural development are allocated not so much by price, as by non-price rationing devices. Much of the credit available for agriculture goes to those who can provide acceptable collateral, i.e., to those with land or other forms of transferable wealth. Small farmers and landless laborers derive little or no benefit from low interest rates, low-cost inputs, cheap power rates, etc., when they cannot take advantage of them because they lack collateral or complementary resources. Ironically, such concessions are usually introduced supposedly to benefit these groups. The problem has been recognized, and the Bank is trying to

find ways of dealing with it. But continuing efforts are required to devise allocative mechanisms that avoid the inherent biases associated with the traditional forms of subsidy within prevailing institutional frameworks.

Irrigation water is almost universally underpriced and allocated by physical rationing. Rules and practices governing the use of water often serve neither efficiency nor equity very satisfactorily, and their inflexibility hinders adjustments to changing production techniques and cropping patterns. Raising water charges to reflect opportunity costs would promote the more effective use of water and at the same time generate additional public revenues which could be used for other development projects. It is possible to devise water pricing systems that promote both equity and efficiency—for example, through discriminatory pricing, and by making water rights transferable, so that an allocation of rights on grounds of equity need not prevent an efficient allocation of water.

Price Distortions and Unemployment

Several types of price distortions which are commonly present in developing countries encourage producers to substitute capital for labor to a greater extent than is warranted by their relative scarcities. The fixing of interest rates at artificially low levels, trade policies that underprice imported capital equipment, such as farm machinery, and minimum wage and other social welfare legislation that raises the price of labor above its supply price, are cases in point. These distortions—since they do nothing to increase the aggregate supply of capital relative to that of labor—introduce rationing problems such as those mentioned above.

Entrepreneurs who are lucky enough to have access to cheap sources of credit or foreign exchange, or who are subject to minimum wage legislation, have an incentive to organize their economic activities in a capital-intensive manner. The labor that may be displaced either becomes unemployed or finds employment in those sectors—which may be traditional agriculture—that are not favored by access to cheap capital and in which the relative prices of labor and capital thus tend to be distorted in the opposite direction[1]. The effect is

[1]High urban wage rates induce unemployment not only through the displacement of labor by machines, but in a more direct manner. A large discrepancy between urban wage rates and rural earnings—provided it is not explicable in terms of higher skill requirements, high living costs, or similar factors—attracts rural people to cities in search of high-paying jobs. The number of such job seekers depends upon the urban-rural wage differential and on how they perceive their chances of getting a job. Creating more urban jobs may do little to reduce the total of urban unemployment, since the pool of job seekers is likely to be replenished by more migrants from the countryside. It can be reduced only by narrowing the wage differential.

therefore to accentuate the dualistic nature of the economy, i.e., to heighten the contrast between a technologically modern sector, with high capital-output ratios and labor productivity, and a traditional sector using labor-intensive techniques and providing extremely low labor incomes. The misallocation of resources restrains both total output and the demand for labor.

The policies just described are economy-wide in their impact. Being the main traditional sector, agriculture is affected if industrial employment does not expand as fast as it could: more people remain in the traditional sectors, resulting in lower labor incomes, underemployment and unemployment. But such policies also foster the growth of dualism within agriculture. As was pointed out above, it is the large commercial farmers who have the easiest access to cheap credit and cheap inputs. They are also frequently subject to minimum wage legislation—whereas traditional farmers are not, or can evade its provisions—and this has a direct effect on such decisions as replacing labor by machinery or chemicals (e.g., weed killers) and cultivating labor-intensive crops.

The present state of knowledge permits only impressionistic judgments concerning the effect of price distortions on the choice of technology: quantitative estimates are lacking. Nevertheless, the circumstantial evidence is too significant to be ignored. Furthermore, the use of capital-intensive methods of production is fostered by the ability of developing countries to borrow capital-intensive technology from developed countries. Often the developing country's needs would be better served by some intermediate type of technology, but the incentives to develop it are generally lacking[1].

Policy Implications

The best way of avoiding the resource misallocations associated with price distortions is to remove the distortions. This may involve the removal of taxes, subsidies, etc., or, in some cases, the imposition of "corrective" taxes, subsidies, etc. Thus countries should be encouraged to adopt realistic foreign exchange rates or, where appropriate, offset overvaluation with appropriate rates of import duties or special taxes; to adopt interest rates that adequately reflect the cost of capital; and, whenever they consider it essential to grant subsidies to agricultural production, to do it in such a way as to direct these to specific

[1]It is necessary to encourage research into labor-intensive agricultural production methods, as part of the increasing interest in agricultural research generally. When suitable opportunities arise, it should be possible to support applied research in this field. In the transportation sector, the Bank has recently begun a study of the substitution of labor for equipment in road construction. The results may have considerable significance for agriculture in terms of labor-intensive construction of minor agricultural roads and irrigation infrastructure.

high priority programs or enterprises in line with the optimal use of resources. Measures such as these could lead to political difficulties. This is, if anything, more true of correcting distortions in the price of labor, since it is not politically realistic to revoke existing minimum wage laws or to subsidize labor use directly, except perhaps to a limited extent—for example, by subsidizing the labor cost of local public works.

The best that can be done, perhaps, is to make the maximum practical use of the small farmer as a production unit. The small farmer (defined here as one who uses principally family labor) will tend to displace labor by other factors of production later than would other agricultural producers, since the price he places on his own and his family's labor will represent its opportunity cost, as he sees it. Unfortunately, there are practical limitations to expansion of small-farm production (see "Small Farm Sector" below). It is also theoretically possible to offset price distortions in the labor field by deliberately raising the price of labor-substituting inputs; but such action, unless generally applied to all sectors, would tend to discourage agricultural production.

The use of additional taxes or subsidies to correct price distortions is limited by the political difficulties which governments face in raising levels of taxation or public spending. Hence, close attention should be given to existing fiscal arrangements, to see if corrective taxes or subsidies can be substituted for distorting ones, within the given limits of governmental budgets.

Price Distortions and Public Investment

Price distortions particularly affect private investment decisions. They are, therefore, important in agriculture, where there are a large number of private producers. In the public sector, investment decisions need be less influenced by prices, since the desire to maximize profits or minimize costs is moderated by social considerations. Indeed, the influence of price distortions on public investment planning can be removed by the use of techniques such as shadow pricing, whereby prices intended to reflect the true relative scarcities of products and resources are used to assess the costs and benefits of investments.

There are some practical difficulties with this approach, however. A basic difficulty is that since many price distortions are the result of government policies, a high degree of sophistication is required of governments if they are to negate these policies in their public investment activities. Another difficulty is that while selecting and executing investment projects on the basis of shadow prices reduces the social

costs or increases the social benefits, it has the opposite effect on money costs and benefits, which depend on the prevailing market prices.

Governments facing severe budgetary constraints may, therefore, prefer to select projects and construction methods which are cheap in terms of ruling prices. They may be reluctant to launch, say, labor-intensive public works programs the opportunity cost of which might be low because of unemployment in the economy, but which might be quite costly on a cash basis[1]. Project selection on the basis of shadow prices is likely—given a fixed budgetary constraint—to result in a smaller works program, but production elsewhere in the economy will suffer less since the program will tend to use resources, such as labor, that are underutilized in the private sector. Total output is thus likely to be greater than if the larger works program were implemented; furthermore, the use of labor-intensive works will improve the distribution of income.

In some cases the price distortions in the public sector may be more severe than in the private sector, since many public-sector agencies enjoy special concessions, such as duty-free imports, favorable exchange rates, and interest-free capital.

The price distortions are sometimes so great that although particular agricultural projects are financially attractive, they are nevertheless unsound for the economy as a whole. The Bank, therefore, requires that the projects it finances should provide a satisfactory rate of return to the economy, taking shadow prices into account. While this procedure can weed out some clearly undesirable projects, it does not assure the selection of the projects with the highest priority. This is particularly the case when labor resources are abundant.

The Bank is, therefore, increasing its sector work in order to help borrowers identify priority investments. It is playing a more active role in the identification and preparation of projects, so that relative resource endowments are considered at an early stage. The Bank's early involvement in project identification also presents the opportunity for introducing income distribution and employment as important criteria in the project selection process.

Small Farm Sector

A major policy issue in almost every developing country is how to raise the incomes of the rural poor—small farmers, landless laborers,

[1]In some instances, the budgetary cost of labor-intensive public works projects has been reduced by persuading local people to donate their labor services, or work for small rewards; and by drafting people, e.g., members of the armed forces, to work on them.

the unemployed, and their families. These groups represent a large proportion of both the total and the rural population; they constitute the poorest segment of society, and they have been largely bypassed by the progress of the past decade. Policies and techniques for raising their incomes and productivity have not yet been devised for application on a massive scale. Yet development cannot have much meaning if it does not include the alleviation of rural poverty.

The size of the problem is immense. About 700-800 million—about one-third of the total population of the developing world[1]—are economically deprived rural people. The gap between them and the rest of the population will continue to grow unless determined efforts are made to better their lot.

There is considerable potential in the small farm sector for reducing underemployment, alleviating poverty and increasing agricultural production. The marketable production of individual units is small, since most small farmers live at or near the subsistence level, but their combined output constitutes an important, and sometimes dominant, share of total agricultural production. Because productivity is low, incomes are low even though they may be supplemented by small farmers and their families undertaking off-farm work. Changes in technology and access to services would boost productivity and incomes, and serve to reduce underemployment. Even marginal increases in productivity in the small farm sector would make a substantial contribution to total output, though the total growth in output is constrained by the growth of effective demand.

There has been limited success in bringing the benefits of development to this economically-disadvantaged group. Several governments have initiated programs to combat poverty in rural areas; some examples of projects designed to help the small farm sector in which the Bank has participated are described later in this paper.

The scope of the problem is enormous in terms of the number of families involved and the capital and institutional services required. Moreover, the rural poor have the highest illiteracy rate, the worst health conditions and the poorest access to markets, all of which make innovation and investment more difficult. The average investment per farm family in a selected group of recent Bank-financed projects was $1,100. This investment level cannot be sustained in a world where there are more than 100 million small farm families. The total investment in agriculture in developing countries is estimated at $7,000-10,000 million per year, which would be equivalent to less than $100 per small farm family if all the investment was for them.

The analogy of the housing problem in developing countries may

[1]Excluding Mainland China.

be instructive. In that area, too, the capital cost of even minimum housing units far exceeds the available resources. The emerging solution is a "sites and services" approach, whereby governments provide the infrastructure but the urban poor have to construct their own dwellings. A comparable approach—substituting idle labor for capital—is indicated for the rural poor.

However, even the provision of extension, credit and other services to enable small farmers to increase their productivity requires massive resources. The total supply of trained personnel is grossly inadequate; moreover, only a small proportion of the staff available at present provides services for the rural poor. In addition, the rural poor are less well supplied with other public services, such as education, health, electricity and water.

Since growth in agricultural production is unlikely to exceed 4-5% per annum, and the rural population is expected to increase at about 1½% per annum for some decades, production per head in agriculture cannot be expected to increase by more than about 3-3½% per year. The increases in net income will be less since more purchased inputs will be required to boost production. But these are average figures. Unless new measures are devised, the increases will be concentrated among the larger farm units and the real incomes of the rural poor will change very little.

There are no ready-made, generally-applicable solutions to the problem. If maximum impact is to be achieved, programs will have to be devised which encourage initiative and self-help among small farmers and increase their productivity. However, increases in primary production alone cannot provide sufficient opportunities for increasing the incomes of small farmers and others among the rural poor.

It is proposed to outline here some of the difficulties and opportunities in the development of the small farm sector. While the problem is clear, the framing and implementation of programs to assist small farmers remain a major challenge to the ingenuity of those engaged in agricultural development.

Economies and Diseconomies of Scale

Many agricultural operations can be performed quite efficiently on a very small scale. For example, from the standpoint of crop biology there is no reason for yields to change according to size of field or of farm. However, some inputs require a certain minimum scale of operations if they are to be used efficiently. This is true of machinery of various types and of certain fixed investments, such as tubewells. Similarly, a certain minimum size of herd or flock is needed for efficient livestock breeding.

It is often possible for small farmers to share the services of these inputs by the creation of machinery pools, by contract hire, by setting up public or cooperative tubewell systems serving several farms, and by group ranching. However, such arrangements create organizational and managerial problems, and there have been many failures. Miniaturization of machinery is also possible, but usually at the cost of some loss of efficiency. In general, then, small farmers are at some disadvantage because of technological economies of scale, but usually the disadvantage is slight.

On the other hand, financial economies of scale in agriculture are often quite significant. For example, the small farmer suffers, sometimes considerably, from being able to purchase only small quantities of inputs, and to sell only small quantities of produce at a time. He also finds it hard to obtain credit on reasonable terms: he usually has little security to offer against loans and finds it difficult to make an initial down payment in cash. Banking institutions tend to find it too expensive to administer loans to small farmers because the amount of each loan is small. Since it is difficult to get credit on reasonable terms for storing their output, small farmers usually are forced to sell their produce at harvest time when prices are normally low.

The ratio of labor to land and capital on small farms tends to be high. Off-farm employment opportunities are often lacking, limited or inconvenient to exploit, so that family labor tends to be used on the farm, even if its marginal productivity is low. This tendency is reinforced by the willingness of small farmers to work hard, under the spur of poverty. The result is that labor-intensive production techniques tend to be used, and labor productivity is low. However, the productivity of land in small farms is frequently as high as, or even higher than, in large farms[1]. Provided that he is not too handicapped

[1]A number of studies have shown that the value of output per hectare, on average, is higher on small farms than on large farms. If this is because large farms tend to occupy the poorer land, or because small farms concentrate on labor-intensive high-value crops, the finding would be of little significance for agricultural policy: after all, subdividing large farms would not raise their natural fertility, nor could all land be devoted to intensive horticulture. However, when careful investigations have been made in which land quality and product-mix have been held constant, some difference in favor of small farms often remains, though in some cases it disappears. There is thus some evidence that small farmers use land more efficiently. However, the relevance of this evidence may be questionable since most such studies refer to earlier periods when the application of modern technology was not common practice.

A priori reasoning suggests—and experience tends to confirm—that yields per hectare may be greater on small farms for some particularly labor-intensive crops (such as fruits and vegetables and tobacco), but higher on large farms for crops (such as sugar, rubber and oil palms) where sophisticated technical management is required. Yields per unit area can be an ambiguous guide to intensity of land use, however, since as commonly quoted they do not take account of double-cropping or land left fallow.

by other disadvantages—in particular, as discussed below, by restricted access to modern technology—the small farmer can, through hard work and careful management, use land efficiently.

Adoption of Innovations

Small farmers tend to be slower to adopt innovations than large farmers. Such behavior does not imply that the profit motive is lacking; rather, it arises from the objective circumstances of the situation. Most innovations involve risks and a small farmer can ill-afford to take additional risks when the annual crop is all that stands between his family and starvation. The tactic of adopting the innovation on a small experimental scale, to see if it works, is hardly available to him when the scale of his whole operation is so small: it is far more rational for him to wait and see how others fare. New technologies also usually require increased expenditure on cash inputs, such as improved seeds, fertilizers and weedicides. The small farmer cannot always afford such expenditures, and his access to credit is limited. If he does secure credit it is likely to be from a moneylender and to carry a high interest charge, so that he will want to be reasonably sure of a high pay-off before he borrows.

For these reasons, large and medium-sized farmers are at an advantage in a period of rapid technological change. Some evidence from India illustrates the point. Before the "green revolution," small farms commonly showed higher yields per hectare, but subsequently the reverse relationship has been observed, owing to the larger farmer's greater propensity to adopt the new yield-increasing methods. The large farmer will have a permanent advantage if there is a continuing flow of potential innovations from research and development activity—even though the new technology itself is neutral to scale.

Extension services, credit agencies and similar institutions find it easier to deal with a few large farms than with many small ones. Apart from the fact that administrative costs are lower, large farmers tend to be more receptive to advice and more creditworthy; they are also less likely to be isolated by social barriers or by illiteracy. While large farmers can play an important role in demonstrating the effectiveness of new techniques, deliberate efforts are required if governments are to reach small farmers through extension services and credit agencies.

Policies which neglect the small-farm sector tend to widen income disparities, sharpen social tensions in rural areas, and do little to assist the bulk of the rural population. In a situation of population pressure and widespread unemployment, small farms have the not

inconsiderable social virtue of providing more employment per unit area than large farms. They are also capable of farming their land intensively. If they are offered the knowledge and the means to use new techniques, the social advantages of small-scale farming can be gained without harming production.

However, a substantial effort is required to plan and implement schemes for developing the small farm sector. It is seldom useful to offer only credit without also providing complementary facilities such as extension services and marketing infrastructure (including roads and physical facilities as well as marketing institutions). Such integrated schemes are thus apt to draw heavily on the financial and manpower resources of governments; and it is easy to succumb to the temptation to provide less than the minimum necessary for success (sometimes, on the other hand, such schemes are provided with an excessive share of scarce resources in order to push them through).

Land Policy

The pattern of land ownership and the contractual and customary relationships between landlords and tenants can have a considerable influence on production, employment and income distribution in agriculture. In developing countries, land represents a much higher proportion of total wealth than in developed countries, and inegalitarian patterns of land ownership are a major source of income inequality. Furthermore, the owners of land usually possess political and economic power which can be exercised in ways that harm the interests of the bulk of the rural people. Land reforms aimed at securing a more equal distribution of land have been prosecuted successfully in a number of countries, though in some cases at the cost of an initial drop in agricultural production. Some land reform measures have been little more than political gestures and have been ineffective, or even counterproductive.

Whether measures designed to break up large holdings—such as land distribution, progressive land taxes, or the imposition of ceilings on the size of individual holdings—will be undertaken depends on what society considers equitable, and on the balance of political forces. However, the need for productive efficiency and employment creation also has to be considered. Although a landholding is not necessarily the same thing as a farm operating unit, the pattern of land ownership does affect the way in which land is used, and does so in two main ways.

First, because the amalgamation or sub-division of owned parcels of land to form operating units involves transaction and coordination

costs[1], there is a tendency for landholdings and farm operating units to coincide. If the economies or diseconomies of scale are strong, operating units will tend to become of optimum size, despite the transaction and coordination costs. But the economies of scale generally are not very strong. It is the pattern of land ownership, therefore, that largely determines the size of operating units. Size, in turn, influences the character of farm operations. With small holdings, the agriculture is likely to be more labor-intensive, with lower output per man but probably no less output per acre. It will also require more publicly-provided credit and extension services but probably use less purchased inputs.

Second, the incentive to improve the land and use it efficiently depends in part on whether the person who cultivates the land also owns it; and, if not, on the contractual arrangements between the owner and the operator.[2] Ownership and operation will tend to be divorced if the size of the owned parcel of land is very different from the optimum-sized operating unit. (Absentee ownership also implies the separation of operation from ownership.) Under tenancy arrangements there is frequently little security of tenure, nor are there guarantees that the tenant will be compensated for the improvements he may make on the farm. His incentive to invest in farm improvements is thus blunted. Similarly, the tenant's or manager's incentive to farm efficiently is reduced if he does not share fully in the rewards of efficient operation.

These deficiencies in contractual relationships are usually not simply the result of landlords and tenants being thoughtless, but reflect the fact that there are difficulties and costs involved in devising tenancy contracts that preserve all the incentives. Tenancy reforms which give the tenant greater scope for exercising entrepreneurship usually reduce the landlord's entrepreneurial role correspondingly, so that the gain in efficiency is not clear-cut; there may, in fact, be a loss. Tenancy is a device whereby landlord and tenant combine their resources in a common enterprise: there are bound to be conflicts of interest and some blunting of incentives.

Owner-operated farming is often favored because it avoids the need to reconcile the interests of owners and operators through

[1]These include the cost of negotiating contractual arrangements, each party's uncertainty regarding the competence and good faith of the other, and, in general, all the monetary, psychic and time costs involved in the association of two or more persons in a single enterprise. These costs are the basic source of the disincentives to efficiency which inhere in many rental arrangements and which are discussed in the next paragraph.

[2]Communal ownership of land is not discussed in this paragraph. However, it should be noted that in some cases it provides sufficient incentives to cultivators.

rental and other contractual arrangements. It is also favored because, with the rent component of farm income accruing to the operator, a more egalitarian pattern of income distribution is generally promoted. The inclination to provide land to the largest possible number of small farmers means that the size of the operating unit tends to become as small as is compatible with reasonably efficient operation and the provision of a socially-acceptable minimum standard of living for the operators.

More recently, as the implications of demographic changes have become clearer, the principal virtue seen in small-scale family farming is that it can provide employment and, to a lesser extent, can economize on purchased inputs. If small holdings tend to be more socially-productive than large holdings—in that they produce as great an output per unit area using more of the abundant and less of the scarce resources—the conflict which many have perceived between an equitable distribution of land and efficiency in farming may be largely illusory.

Belief in the existence of this supposed conflict was often bolstered by an exaggerated idea of the economies of scale that could be realized in agriculture. Some governments therefore favored the establishment of large-scale cooperative or collectively-owned farm enterprises. However, the management of such enterprises has often been weak. Current approaches favor retaining owner-operated production units but assisting them through cooperative, collective or state-owned organizations that can realize economies of scale and exercise bargaining advantages in the provision of off-farm and some specialized on-farm services.

Whatever size of farm it is desired to promote, it is not merely a matter of breaking up large holdings; some farms are so small that they could never support a family, even if modern techniques are used to increase production. Such units can be viable if suitable opportunities exist for off-farm employment but, where they do not, land reform measures are required to bring farm sizes up to some minimum level.

This can sometimes be accomplished by combining small farms with land that is being redistributed: in Tunisia, for example, land taken over from *colons* was available for redistribution. But since it is politically difficult to enlarge holdings by dispossessing some smallholders (unless they can be induced to leave to take up other jobs), often the best that governments can do is to try to prevent the situation from getting worse. Inheritance laws which prohibit the subdivision of land below a certain size of holding can help in this respect.

Small farmers suffer from a number of disadvantages, of which perhaps the most serious are meager financial resources, restricted access to credit, and the consequent reluctance to adopt new techniques. Land redistribution therefore needs to be accompanied by the extension of credit, marketing and technical advisory services to small farmers. Often these services or functions were previously performed by landlords. If they are not provided, the impact of land reform on production, and possibly also on the welfare of the new smallholders, is likely to be adverse.

The Impact of New Technology

New agricultural technology which increases output per unit area is essentially land-substituting in character, since it enables a given output to be produced from fewer hectares of land. Its widespread adoption will tend ultimately to diminish the relative importance of agricultural land and the share of agricultural revenue attributable to land. On a global basis this tendency does exist. But in regions that have been favored by the new technology, land values have risen. For example, the introduction of the new high-yielding varieties has increased the value of wheat land in many parts of Asia.

However, in areas where the new technology has not been applied, the value of wheat land will tend to fall—since the overall increase in wheat production will tend to depress wheat prices. The danger therefore is that in regions where the new technology is being adopted, income inequalities may worsen—the tendency being reinforced by the fact that the larger farmers are usually the first to adopt the new techniques. Far from reducing social tensions in rural areas, the spread of the new technology is likely to sharpen them, and lead to greater demand for the implementation of measures, such as land reform, for the redistribution of income and wealth.

Use of the new technology may often be accommodated only with difficulty by existing tenancy arrangements. Although the latter are not without their deficiencies, they are often reasonably well adapted to the conditions of traditional agriculture. But they may need extensive revision if the new technology is to be adopted and its benefits equitably shared. For example, under crop-share tenancy —which, as compared with cash tenancy, or the use of hired labor, serves the purpose of dividing risks between the landlord and the tenant—each party has an incentive to supply too little of the inputs for which he is responsible. In practice, it appears that this tendency is often held in check so that each tends to adhere to customary norms of performance: at any rate, there is little evidence that share-rented farms are operated much less efficiently.

However, new technology, particularly since it involves increased

use of purchased inputs, will require a new set of commitments from landlord and tenant, and perhaps also changes in the customary shares into which produce is divided. Until the revisions are made, the incentives to adopt new techniques that depend on the use of purchased inputs may be seriously impaired.

Furthermore, it appears that rather than entering into revised tenancy agreements, landlords in areas favored by the new technology have been tempted to let their tenancy agreements lapse and to farm the land themselves, using hired labor and machinery. Several considerations probably explain this behavior: it may be easier for landowners to introduce new techniques by directly supervising hired workers; being uncertain about the yield increases that can be attained, they may have found it difficult to negotiate revised tenancy agreements; and legal protection of tenants—or the threat of it—may have prevented the negotiation of contracts acceptable to the landlord. Another possible explanation is simply that modern agriculture is intellectually more engaging and financially more rewarding than traditional farming.

There is a good deal of fragmentation of landholdings in some countries, especially in South Asia. Under traditional agriculture and with underemployment of labor, fragmentation probably does little to constrain production, and reduces risks to some extent. The effects of fragmentation are more serious under modern agricultural conditions since it increases the costs of distributing inputs, of appraising credit requests, and of arranging for custom services. It becomes highly inconvenient when labor is in short supply, as now happens in some areas at harvest time.

The inconvenience of fragmentation is greatest in irrigated areas, since it raises the costs of distributing water (both directly and through the loss of cultivable land to additional canals). Also, labor shortages at harvest time are more likely to occur in areas served by irrigation. Consolidation of land is difficult to arrange in practice; farmers are usually reluctant to participate voluntarily because they fear that the land they receive may be less valuable than the land they give up[1].

Implementation of Land Reforms

The historical record shows a tendency for land reforms to be enacted in law but not successfully—or only partially or slowly—

[1]Voluntary participation may be more readily encouraged if consolidation is accompanied by land improvement works, such as irrigation or land levelling within existing irrigation schemes. Since all participants are likely to benefit, each may be less concerned—so the argument runs—as to whether he receives precisely the same share of improved land as he had of the original unimproved land.

implemented in practice. Where the program has been vigorously prosecuted, the results have sometimes been adverse, in that agricultural output has fallen and the condition of those whom it was intended to benefit has not been improved, or has even deteriorated. The record is, in a sense, unfair to land reform in that it has often been implemented in times of great social tension, and against strong opposition, by radical governments. But even in a favorable environment, successful implementation requires a good deal of political courage and administrative finesse.

Land reform is expensive, both in terms of the fiscal cost of compensating the former owners, and of the human and material resources required to administer it properly and to provide services to the newly-created small holders or cooperative enterprises. It also suffers from perverse announcement effects: owners faced with the threat of losing their land—usually compensation is incomplete, so that a degree of expropriation is involved—cease to improve it and allow existing facilities to deteriorate; and laws which promise tenants security of tenure lead landlords to dismiss their tenants and replace them by hired laborers and/or machinery. Thus a difficult dilemma arises if the adverse announcement effects are to be minimized: the redistribution of land should be done rapidly, but a piecemeal approach is more in keeping with the limited fiscal and administrative resources of governments.

Attempts to bring about land reforms have sometimes been frustrated by vested interests, and governments may feel they have to proceed cautiously because production might be disrupted in the initial stages. In some cases governments, bowing to the pressure for land reform, but lacking the will to take effective action, have enacted token legislation. However, such political expediency usually worsens the existing situation, as landlords take evasive or defensive actions to the detriment of both production and the employment opportunities of tenants and rural workers.[1]

It is clear that agricultural development cannot do all it might to improve rural life if the distribution of land ownership is highly skewed. Despite the political and administrative difficulties involved, governments should pursue land policies which help disperse the benefits of agricultural progress widely rather than allowing them to

[1]A study of the impact of land reform legislation on two Indian villages showed that although laws were framed to improve the position of tenants (by limiting the amount of rent payable, and by giving them greater security of tenure and the right to purchase land) the results left them worse off. Owners were able to evade the legislation by various means, including the replacement of tenants by hired laborers. It is interesting to note that a new tenurial relationship—a form of quasi-tenancy (but not legally classifiable as tenancy)—was devised to meet the situation.

go to only a small segment of the population. Steps should at least be taken to tax the higher rental incomes arising from public investments, and to reinvest the proceeds in infrastructure so as to increase the income-earning opportunities of wider strata of the population. If this is not done, rising land values will make it increasingly difficult to redistribute the land later.

Although the Bank's overall influence on these matters is bound to be slight, it can take explicit account, in its appraisal work, of whether the benefits of a project are likely to be widely dispersed or captured by only a few individuals. The burden of financing the compensation paid to owners under land redistribution programs is the responsibility of the governments concerned, but the Bank can assist in financing other programs designed to raise the productivity of those to whom the land is distributed.

PAST BANK GROUP ACTIVITIES IN AGRICULTURE

The Bank Group's activities in the agricultural sector take various forms. The most obvious and easily measured is direct lending for agricultural projects. But a substantial proportion of the lending in other sectors—such as transportation, electric power, education and industry—also benefits agriculture indirectly. Analyses are made of the agricultural sectors of the economies of borrowing countries. Technical assistance is provided mainly, but not exclusively, through the preparation, appraisal, supervision and post-evaluation of projects. Finally, support is given for economic and agricultural research.

The agricultural sector is among the most difficult of any to "manage." It is thus a sector in which aid donors, including the Bank, have particular difficulty in agreeing with governments on satisfactory project lending programs. Decision-making at the farm level is in the hands of a very large number of small operators. The political repercussions of agricultural policies are usually wide, particularly in the case of food prices.

The Bank does not claim to have answers to the multifarious problems posed by agricultural development. The patterns of past agricultural lending described here are not a precise guide to the future. A great deal of innovation will be required, which may in time lead to considerable deviations from present patterns, and from the projections about future lending in the section entitled "The Bank Group's Future Role."

Capital Transfer

Direct Lending for Agriculture

The Bank's direct lending for agriculture has accelerated rapidly in recent years. By June 30, 1971, it had reached a cumulative total of about $2,500 million. A breakdown by subsector, area and period is given in Annex 11.

Until the early 1960's the importance of agriculture in overall economic development was not fully recognized. This tended to limit the scope for Bank operations in the sector. Thus, over the period FY1948-63, the Bank's lending for agriculture amounted to only $628 million for 71 projects; that sum represented 8.5% of its total lending. In 1963, the Bank decided to increase its support for agricultural development. The increase was facilitated by the fact that the International Development Association (IDA) had been established in 1960; with IDA, it became possible to expand activities in countries which were particularly poor and in which agricultural development was frequently of the highest priority.

The effort to increase support for agriculture was initially hampered by a shortage of well-prepared projects. The Bank began increasingly to provide assistance for the identification and preparation of projects. As a result, its direct lending for agricultural development over the five years, FY1964-68, amounted to almost as much as during the previous 16 years: about $600 million for 46 projects. The proportion of agriculture in the Bank's total lending rose to 12%.

In 1968, the Bank decided to accelerate its agricultural lending further. The target adopted was that over the five years, FY1969-73, it should total about $2,400 million, or four times as much as in the previous five years, FY1964-68. By the end of FY1971, 60% (or three years) of the time had elapsed, and around 50% of the target had been reached. About $1,200 million had been committed for 96 projects, which was almost equal to the total agricultural lending during the previous 21 years. In the period FY1969-71, the share of agriculture in total lending rose to almost 19%. Enough projects are now being processed to enable the FY1969-73 target to be met.

Lending in Indirect Support of Agriculture

A considerable amount of Bank Group lending in other sectors supports agriculture indirectly. While there are a number of conceptual difficulties in preparing precise data, some orders of magnitude can be given.

Of particular importance in this context are the investments in *road transportation,* especially in countries that are predominantly agricultural and where much of the traffic is therefore related to agriculture.

Over the past five years, the Bank has invested about $1,350 million in the highway sector. A large part of this investment is helping to finance the construction and improvement of some 30,000 km of roads. Over two-thirds of these roads, in terms both of length and of cost, are directly benefiting the agricultural sector. Thus,

- about 2,000 km are low-cost roads which are virtually part of agricultural development schemes;
- about 5,400 km are rural roads where the benefits to agriculture represent an important part of their economic justification; and
- about 14,400 km are roads where the benefits to agriculture have been identified although not separately estimated.

Investments in other modes of transport, such as railways, have also helped agriculture considerably. But in their case the benefits cannot be so readily assessed in sectoral terms.

The Bank Group has invested significant amounts in *agriculture-related industries*. Such industries include those that use locally-produced raw materials like cotton or forest products, as well as those that produce agricultural inputs like fertilizer for local use. By the end of FY1971, the Bank and IDA had lent about $340 million directly for such industries. The International Finance Corporation (IFC) had invested another $157 million. Over the period FY1968-71, the Bank Group as a whole channeled a further $213 million into agriculture-related industries through local development finance companies. A sub-sectoral breakdown of these investments is given in Annex 12.

Many of the *educational facilities* supported by Bank lending are in rural areas. In addition, since 1968 about $40 million has been specifically lent to support agricultural education, training and research.

Trends in Bank Lending for Agriculture

Diversification of Lending

The most notable trend in the Bank's lending for agriculture, particularly since the early 1960's, has been the diversification beyond basic irrigation infrastructure into on-farm activities, technical services and related rural development (such as rural road construction, processing industries and, so far to a minor extent, education and health services). Increasing emphasis is being given to rain-fed, rather than irrigated, agriculture. The Bank is becoming more heavily involved in storage, marketing, seed multiplication, forestry and fisheries projects. Individual projects of all types are becoming more comprehensive in nature, the stress being on general rural development.

The volume of lending for irrigation projects continues to grow. The annual average has risen from $23 million during FY1948-63, to $53 million in FY1964-68 and $140 million in FY1969-71 (Annex 11). These figures reflect the priority that continues to be given to irrigation projects in those parts of the world (such as East and South Asia, the Middle East and North Africa) where resource conditions require it. On the other hand, the share of the Bank's agricultural lending devoted to irrigation projects has declined steadily. It has fallen from nearly 60% in FY1948-63, to 44% in FY1964-68 and 34% in FY1969-71. The decline is even more marked when it is considered that recent irrigation projects have increasingly involved items other than irrigation infrastructure.

The diversification beyond basic irrigation infrastructure results from:

(a) the need to follow-up investments in irrigation infrastructure with credit for on-farm development, so that farmers can take fuller advantage of the water made available to them;

(b) the greater need for the multiplication of improved seeds, and for increasing storage and processing capacity, particularly in Asia, as a result of the "green revolution";

(c) the good export prospects for beef and fresh fruit and vegetables;

(d) the availability since 1960 of IDA funds, allowing investments in many of the poorer countries which typically depend heavily on agriculture. In many of them, particularly in Africa, irrigation has so far had a relatively low priority. Investment in African agriculture has involved mostly small farmers requiring projects specifically designed to overcome the constraints on small farm development[1]; and

(e) population growth has encouraged settlement of new lands, which has often become possible as a result of other developments, such as disease control.

Irrigation Development

Through the 1950's the Bank's lending for irrigation was primarily for the construction of dams and main distributary canals. Governments, farmers and local entrepreneurs were responsible for financing, without further Bank assistance, the complementary investments required to take advantage of the improved water supply[2]. However, it was found that, in many cases, although progress on the major

[1]For example, all nine agricultural projects in Africa financed by the Bank in FY1971 involved the small farm sector.

[2]For example, field ditches and drains; land levelling; input supplies; extension services; and additional processing and marketing facilities (including roads and farm tracks).

construction works was generally satisfactory, the complementary developments were delayed. The economic benefits of the capital-intensive works, therefore, were either not fully realized or were realized rather late. This was often attributable to a lack of coordination between various agencies involved in the development of irrigated agriculture and to a lack of appropriate financing.

In recent years, therefore, the Bank has given particular attention to these complementary developments during project preparation and appraisal. It has sought to ensure that the planning of agricultural and ancillary developments has been carried out, and that suitable arrangements have been made for implementation, including those required for proper coordination. In some cases, especially those where the construction and consequently the disbursement periods are long, the Bank has financed irrigation development in phases or, where appropriate, has financed only the major civil works.

But the trend is towards paying equal attention to all aspects of the development and use of water resources, and financing the agricultural and ancillary developments as well as the basic irrigation infrastructure. Some recent irrigation projects have thus provided for the construction of the complete distribution system down to the field level; the construction of roads and tracks; the strengthening of applied research, demonstration facilities and agricultural extension services; the provision of credit to entrepreneurs, cooperatives and farmers for input supply, on-farm investments and storage and processing facilities; and training of farmers as well as of operations personnel.

The broader approach has helped to make it possible to realize more quickly the full economic benefits of the capital works. But often, many other problems have remained, the resolution of which has called for changes in government policies. It is still frequently the case that the organization of government services within irrigation projects is not suitably coordinated. This is particularly true of coordination between the entities directly responsible for infrastructure construction and those responsible for agricultural extension services and applied research; and between the latter and agricultural development banks.

Similarly, governments need to attach much more importance to the efficient control of scarce water. The introduction of double-cropping—which often forms one of the principal economic justifications for the irrigation infrastructure—generally continues to be disappointingly slow, especially where large numbers of small farmers are involved. Some governments still insist on making the water available over as large an area as possible, in order to reach the maxi-

mum number of farmers. As a result, individual farmers may be left with too little water for intensive cultivation, and there is the danger that the soil may deteriorate. If cropping intensities remain relatively low, the opportunities for fuller, round-the-year employment also suffer. The scope for increasing cropping intensities by systematic and fully integrated development of surface and groundwater resources deserves greater attention.

The Bank frequently has encountered situations where dams have been constructed, but developments "below the dam" have still to come, leading to a growing number of projects for the improvement and completion of existing systems. In some cases, the projects are for the rehabilitation and redesigning of very old systems; in these, modern methods of water control and drainage are introduced to increase efficiency and thus increase cropping intensity. In other cases, the projects are for completing distribution and drainage systems which have not been developed to their full potential. In yet other cases, the principal objective is to increase the supply of water through an existing distribution system, converting what might have been designed originally as a drought-protection system into one allowing intensive irrigation and double-cropping. Here, systematic and integrated ground water development has an especially important role to play.

The types of projects described in the preceding paragraph generally involve relatively little capital investment, but bring high returns, and are thus of high priority. One reason why governments do not give them priority more frequently is that they involve farmers who have already received some benefits from public investments (e.g., in the original system), whereas governments often prefer to give priority to new schemes which generally are more prestigious, even though such schemes are likely to be more capital-intensive, yield benefits only in the more distant future and bring lower economic returns.

Agricultural Credit

Reference has already been made to the diversification of the Bank's agricultural financing into support for on-farm investments and storage, marketing and processing, usually provided in terms of agricultural credit facilities. Ultimate borrowers have included individual farmers, groups of farmers, cooperatives and public-sector entities. It is not feasible for the Bank itself to invest directly in a large number of small enterprises. So Bank funds provided in support of credit facilities are usually channeled through intermediary institutions within the borrowing countries.

These institutions range from agricultural development banks to those parts of the commercial banking system involved in extending medium and long-term credit facilities. Sometimes, especially if there are no suitable intermediaries, it is necessary to establish channels of credit for on-farm development within project authorities, often newly created; the latter may be involved simultaneously in giving technical assistance to participating farmers and in constructing infrastructure.

The share of Bank funds lent in support of agricultural credit has grown very rapidly. It has risen from an annual average of $2 million (5% of Bank lending for agriculture) over the period FY1948-63 to about $56 million (47%) in FY1964-68 and about $258 million (63%) in FY1969-71.

The range of investments financed by the Bank through credit institutions covers practically all aspects other than the transfer of existing resources such as land. The principal items include: on-farm land development (groundwater development, land levelling, field ditches and drains, land clearing); other on-farm investments (tree crop planting, pasture improvement, livestock purchase, farm machinery purchase, building construction, fencing, on-farm processing and storage facilities); incremental working capital needs for initial purchases of additional inputs (such as fertilizers, pesticides and fungicides); and off-farm developments (processing and storage enterprises, fishing vessels and gear).

About half of the Bank's financing of private-sector agricultural investments has been for projects where the provision of medium or long-term credit facilities is the sole or principal element[1]. Of course, this is only possible where the other ingredients essential for agricultural development are already available or are to be provided from other sources. To be successful, such projects depend on active demand for the credit facilities being extended, which means that the policy climate has to be conducive to private-sector agricultural investment.

Other essential prerequisites for effective credit programs are technical advisory services backed up by applied research and demonstration, a well functioning transportation infrastructure, the availability of inputs and a dealer network, including service facilities. On-farm development needs to be backed up by suitable storage, processing and marketing facilities, the establishment of which depends on the scope for increasing marketable surpluses.

Where any of these essential prerequisites for effective credit pro-

[1]These are the so-called "credit projects" of Annexes 11 and 13.

grams are missing or under-developed, the Bank only finances "credit" within the context of a comprehensive integrated project. For example, "credit" forms a part, sometimes a major part, of practically all lending for integrated rural development and settlement projects.

"Institution building" has been an integral and extremely important aspect of most lending in support of agricultural credit programs. The Bank has actively participated in the creation of new credit institutions, and in the improvement and rehabilitation of many already in existence. Of particular importance has been the adoption of development-oriented lending policies. Existing institutions frequently stress lending against adequate collateral, thus favoring those in possession of assets while not providing facilities to those who offer promising opportunities but inadequate security.

In such circumstances, the Bank has stressed the need for the institutions to rely more on an expert technical appraisal and financial assessment of the incremental earning capacity of a proposed private-sector investment, rather than on the ability of the sub-borrower to provide mortgages and other security. This is particularly important in lending to small farmers, especially tenant farmers and others who have no land to mortgage. The reluctance of many credit institutions to move far enough in this direction is still a major constraint in channeling Bank financing to small farmers, although there is no evidence that the average repayment record of small farmers is any worse than that of larger farmers.

Similarly, the Bank has stressed the need for credit institutions to adopt terms of lending (down payments, grace periods and repayment periods) appropriate to the investments being financed and the financial condition of the potential sub-borrower. Interest rates are frequently subsidized by governments in order to reduce the debt-servicing burdens of the poor farmer. However, because access to institutional credit facilities is frequently limited by collateral requirements as well as by local vested interests, it is usually the wealthier farmers who benefit from such subsidies. The poor farmer is left to the mercy of the moneylender and the exorbitant terms he imposes. For these reasons, the Bank has paid increasing attention to the adoption of realistic interest rate structures and other terms of lending.

Livestock

For the most part, Bank lending in support of livestock development has taken the form of specialized credit programs, although other forms have also been used. Such lending has risen from an annual average of $500,000 (1% of Bank Group lending for agricul-

ture) in the period FY1948-63 to $91 million (22%) in FY1969-71[1]. The rise principally reflects the good export prospects for beef.

Within the overall trend, certain other trends are discernible. Although meat export remains a major objective, a growing number of projects are designed principally to meet local demand.

The scope of livestock projects is being steadily widened. Most of the early projects involved existing private ranch operations in the temperate zones, almost exclusively for beef cattle and sheep. But more recent projects have moved increasingly into: tropical and semi-tropical zones[2]; pigs and poultry for local consumption (often to replace beef, as the price of the latter has risen with the increase in export demand); livestock operations as part of mixed farming operations, including smallholder participation[3]; dairy operations producing for local consumption, usually also involving dairy-beef; secondary industries such as slaughter-houses and meat-packing plants[4]; and state-owned ranching operations in some African countries where this form of organization is preferred by governments and where privately owned ranching has not been established.

Various institutional forms have been tried to bring these developments to the smaller producer. The institutional forms include the establishment of group ranching based on an existing tribal structure, cooperative ranching and ranch corporations owned by smallholders.

In all livestock operations financed by the Bank, the essential elements have been improved management, the transfer of appropriate technology (particularly grassland improvement), training of local technical service cadres, the strengthening of local administering organizations and the application of sound economic and financial lending policies by credit institutions.

Integrated Smallholder Development

Smallholder development frequently takes place within projects for regional rural development, irrigation and settlement. Sometimes

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[1]These figures, for the most part, are included in the global figures for the credit component of Bank lending mentioned in the sub-section on "Agricultural Credit" above.

[2]This move into tropical and semi-tropical zones has been made practical by the development of new techniques, particularly improved animal health control, use of tropical legumes for pasture improvement and upbreeding of local cattle with improved cattle which are less susceptible to disease and insects.

[3]Beef-fattening and milk production have been found to be practical for smallholder operation (as opposed to breeding, which usually demands larger herds, especially under marginal range land conditions), although milk production by smallholders demands an effective extension service and marketing infrastructure.

[4]In view of stiffer sanitary regulations in the main importing countries, increasing amounts of beef exports are in the form of precooked meats and almost all beef exports now have to be bone-out.

it is possible to assist smallholders through the provision of credit alone. But in most cases—especially in Africa—smallholder development has to be of an integrated nature. In other words, it has to provide for such items as technical advice and marketing facilities (including roads), as well as credit for on-farm development and input purchase. Such integrated smallholder development programs are relatively recent (dating mainly from the early 1960's); and patterns of organization and management are not well established in many countries.

The Bank's lending has, therefore, involved a large degree of innovation. While some trends are beginning to emerge, not enough is known yet about smallholder motivation in different environments to make any firm judgments. It is likely that the period of innovation will continue for some time, and will be increasingly based on the applied economic research sponsored by the Bank and the work of the proposed Rural Development Unit[1]. Existing tenurial arrangements may create substantial difficulties in smallholder development. The Bank has, therefore, found it necessary at times to insist on cadastral surveys, and increased permanency in usufruct and/or tenure rights, before financial support is provided.

Two principal strategies of integrated smallholder development have emerged. The first concentrates attention on a specific cash crop of high potential as a focal point for rural development. An example is the Kenya smallholder tea project which provided credit and extension services for smallholders scattered throughout the tea-growing zones, together with complementary tea-processing factories and access roads. For many cash crops, however, the application of this strategy is limited by market prospects, even if particular projects are successful and the climate and soils are suitable over wide areas.

The second strategy is to concentrate attention on the overall development of a specific geographical area which has a high potential and is of manageable size. The activities supported include production both for subsistence and for a marketable surplus, and such aspects as soil conservation, local marketing facilities for food surpluses, input supplies, roads and social services. Recent examples of such a strategy are the Lilongwe and Karonga projects in Malawi, the Wolamo project in Ethiopia and the Casamance project in Senegal.

The principal danger in this strategy is that too many scarce resources, particularly of trained manpower, may be concentrated on a small area. It may become difficult to apply the strategy on a large scale later because of budgetary and manpower constraints. Thus there is a continuing attempt to determine the minimum package of inputs and services which can make a substantial impact on a

[1]See pages 60-61.

large number of widely distributed smallholders farming under varying conditions.

Within both strategies, it is advantageous for small farmers to group together in some way to obtain economies of scale in procuring inputs and marketing their produce. This end has been achieved in a variety of ways in accordance with local traditions and outlook, but no definitive trend has been established. In certain cases, commercial or state-owned estates have formed nuclei for smallholder development, providing smallholders with essential services. In other cases, the service cooperative has been the favored solution. Where cooperatives are unpopular, possibly because of earlier failures, or where they are still in their infancy, semi-autonomous state agencies have sometimes been found to work well. One of the keys to success in all these organizational forms is the quality of the management.

Land Settlement

The settlement of new lands has been supported by the Bank whenever appropriate opportunities have arisen. However, there are not many parts of the world with large areas of suitable and unexploited land. The settlement of new lands has high priority, therefore, only in some countries.

The trend within settlement projects financed by the Bank has been towards reducing the "public" input and relying more on the settlers' own efforts. Otherwise, in countries where the principal initial purpose of settlement is to provide large numbers of families with at least a subsistence income, public budgetary constraints would severely restrict the number of settlers that could be accommodated. Recent settlement projects (e.g., in Colombia, Papua/New Guinea, and Tanzania) thus concentrate on the provision of low-cost access roads, technical advisory services and credit for on-farm development, and construction of drinking water sources.

Estates, Seed Production and Forestry

Some countries continue to seek Bank finance for private and public sector tree crop estates. A start has been made in a small way with the financing of integrated projects covering seed multiplication, processing and marketing. This field of activity should become important as the benefits of modern agriculture are spread more widely.

Another sub-sector which has so far received little Bank lending, but which is expected to grow in importance, is forestry (though forest industries have been extensively helped within the industrial context)[1]. The demand prospects for forest products are favorable.

[1]See Annex 12.

Bank involvement, however, is being restricted at present by inappropriate forest development policies in many countries where viable forest projects have been identified. For example, the need to conserve forest resources may be interpreted as a need to restrict exploitation absolutely, rather than as a need for rational exploitation and resource management through selective cutting and replanting.

A further constraint is that the development periods for forest projects are usually very long. However, new varieties of fast-growing species of tropical woods, particularly pines and eucalypts, are suitable for pulp, paper and chipboard industries and provide a promising base for future projects.

Agricultural Industries

The demand for agriculture-related industries, such as food processing and fertilizer production, is growing. In the case of smaller projects, the most appropriate way of channeling Bank Group funds to such industries is usually through intermediate industrial financing institutions in the borrowers' countries. In the case of the larger projects, such as fertilizer plants, the most appropriate way may be to make industrial, rather than agricultural, loans. Recent Bank Group industrial investments of this type are summarized in Annex 12.

Lending for certain other types of agriculture-related industries is more appropriately handled within the context of general agricultural lending. Projects of this type include private and public-sector grain storage operations, the provision of public wholesale grain markets and the expansion and improvement of grain and feed milling facilities, and crop processing, especially as part of integrated schemes for production, processing and marketing.

Other projects for agricultural industries which have recently been financed—and which possibly point to future trends—involve fresh fruits and vegetables. In such projects it is necessary to integrate investments in on-farm production, sorting and packing facilities and transportation (particularly refrigerated trucks and ships). The amount of such lending has so far been very small; it has averaged about $18 million per annum over the three years FY1969-71, and represents about 4% of total agricultural lending during this period. But it is tending to rise, particularly since marketable surpluses of grains in Asia and elsewhere are increasing.

Fisheries

Although fisheries projects so far account for a very small part of the Bank's agricultural lending—about $24 million since FY1964,

representing about 1% of total agricultural lending—support for the development of fisheries is growing and some trends are discernible. The earliest projects involved relatively large and sophisticated operations based on tuna fish for export. But the scope for further lending of this type is limited by the very competitive nature of the industry.

More recent projects have concentrated on smaller-sized operations, based principally on shrimp (mainly for export) and food fish (mainly for local consumption). Expansion of Bank lending for the latter is hampered, however, by difficulties in ensuring the repayment of credits granted to small fishermen in this high-risk industry. Another trend is towards making projects more comprehensive by including shore facilities (wharves, boat repair, ice-making and processing facilities) and technical assistance, as well as the supply of boats and fishing gear. The Bank is currently working on its first project involving fresh-water fish farming, a sub-sector which may be expected to grow in importance.

Training and Research

The widening scope of projects is evident in the tendency to include elements of training and applied research whenever necessary. Moreover, as the importance of these elements has been increasingly recognized, agricultural education, training and research have featured more prominently in the Bank's education lending[1]. The Bank has recently made its first loan exclusively for agricultural research activities (to Spain, at the end of FY1971). Several other countries have meanwhile approached the Bank for technical advice on the formulation of national agricultural research projects.

The need to strengthen the international agricultural research program has been discussed in the earlier section entitled "Challenges Facing Agriculture." To assist in meeting this need, the Bank has taken the lead in co-sponsoring, along with FAO and UNDP, the Consultative Group on International Agricultural Research in order to mobilize finance to continue and expand the work of existing international research centers and to establish new ones. The Bank provides the Secretariat of the Consultative Group. For technical advice, the Consultative Group has established a Technical Advisory Committee (TAC) consisting of 12 distinguished scientists; the Secretariat of the Committee is located in FAO.

Within this context, the Bank is contributing to the financial requirements in 1972 of three centers. The first two are the already existing Centro Internacional de Mejoramiento de Maiz y Trigo

[1]See page 38.

(CIMMYT)[1], located in Mexico, and the Centro Internacional de Papas (CIP)[2], located in Peru. The third center—the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT)—is currently being established; it will be located in India.

Geographical Distribution of Lending

There have been some trends in the geographical distribution of agricultural lending. These are indicated in detail in Annex 11 and are summarized below:

Area	FY1948-63				FY1964-68				FY1969-71			
	Operations		Amount		Operations		Amount		Operations		Amount	
	No.	%	$ million	%	No.	%	$ million	%	No.	%	$ million	%
Sub-Sahara Africa	7	10	60	9	8	17	44	7	32	33	153	12
Asia and Pacific	21	30	255	41	16	35	295	49	35	37	588	48
Europe and Australia	15	21	176	29	—	—	—	—	6	6	119	10
Middle East and North Africa	4	5	42	6	5	11	52	9	4	4	116	10
Central and South America	24	34	95	15	17	37	209	35	19	20	250	20
Totals	71	100	628	100	46	100	600	100	96	100	1,226	100
Average Amount per Operation ($ million)			8.8				13.1				12.8	

Comparisons between FY1948-63 and later periods are distorted by lending in the former period to countries which no longer receive Bank financing. But comparing FY1964-68 with FY1969-71, the share of agricultural lending to Sub-Sahara Africa increased from about 7% to about 12%. Agricultural lending to Southern Europe was resumed in the latter period after a total absence in the former. The share of agricultural lending to Asia, the Middle East and North Africa remained about the same in the two periods, although all these regions showed increases in absolute amounts. On the other hand, the share of lending to Central and South America declined from about 35% to about 20%. This decline is wholly attributable to the South America region, which alone shows a fall in absolute lending for agriculture between FY1964-68 and FY1969-71. The fall partly

[1]International Center for Maize and Wheat Improvement.

[2]International Potato Center.

reflects expanded agricultural lending by the Inter-American Development Bank.

The average size of agricultural loans increased substantially from $8.8 million in FY1948-63 to $13.1 million in FY1964-68, but fell marginally to about $12.8 million in FY1969-71. There are substantial variations by region and sub-sector (see Annex 13). Thus, lending to Sub-Sahara Africa has averaged only $5 million per operation, while most other regions average $10-20 million. The low average for Sub-Sahara Africa reflects the small size of individual countries, the relatively recent introduction of the concept of agricultural investment projects and the relatively small capital investments required for the technologies being introduced. Thus the region's share (33%) of the total number of agricultural projects processed by the Bank is almost three times as high as its share of amounts committed (12%).

Since Bank staff time absorbed by an agricultural lending operation is largely independent of the amount lent, Sub-Sahara Africa's large share of the number of agricultural projects reflects a similar large share of Bank staff time which, in recent years, has about equalled that devoted to Asia. This fact contrasts sharply with the relative population of the two areas (240 million and 980 million, respectively, the latter excluding Japan, Mainland China and Oceania). As another indication of contrast, each man-year of Bank staff time devoted to agricultural project appraisal in FY1969-71 led, on average, to $3.4 million of lending and to assisting some 10,000 farmers in Sub-Sahara Africa; whereas for Asia the figures were $12 million and 40,000 farmers, respectively. This reflects the effort the Bank is making to serve the smaller and poorer countries among its membership.

Technical Assistance and Project Preparation

The technical assistance provided by the Bank for agriculture has increased with the volume of lending, although there has been a conscious attempt to avoid competition with other sources of such assistance. Previously, technical assistance for agriculture was confined largely to broad advice on planning and organization, as part either of general survey missions or of special agricultural missions sent in response to specific requests from borrowers. As the emphasis on agriculture increased, the need to assist developing countries in the identification, preparation and implementation of projects became more apparent.

The establishment of the FAO/IBRD Cooperative Program in 1964 and the posting of permanent missions in Eastern and Western Africa were specific responses to the need for assistance in project identification and preparation. Resident missions in India, Pakistan and

Colombia were also, at least in part, engaged in similar activities, and the resident mission in Indonesia has given particular emphasis to project identification and preparation work. A further trend has been to support project-connected technical assistance—project management, applied research and further project preparation—under loans or credits, in cases where UNDP has been unable to finance it.

In addition, in the course of loan supervision, the Bank has offered advice not only on implementing the project in question, but also on developing new projects. In relatively few cases is the Bank the executing agency for UNDP agricultural projects (e.g., the Yaque del Norte irrigation project in the Dominican Republic, the Khanabad irrigation project and the agricultural credit project in Afghanistan, and the Indonesian Sugar Survey). Nearly always, UNDP looks to FAO as the executing agency for its agricultural projects. In some cases, the Bank has made technical assistance grants for feasibility studies (e.g., for the Jengka Triangle project development in Malaysia).

On UNDP pre-investment projects which are likely to be of interest to the Bank, and for which FAO is the executing agency, there is close collaboration between the three agencies. The Bank comments on the terms of reference and plans of operations for UNDP projects, and makes its views known to FAO during the course of project execution. The proposals emerging from these pre-investment projects thus tend to have a better focus on investment content and implementation plans when they become ready for appraisal.

Activities such as these have made it possible to assist in identifying and preparing promising investment opportunities in sufficient numbers to meet the needs of the Bank's projected agricultural lending program. But "numbers" alone are not enough; there is also the need for improvement in "quality." This is particularly so if projects are to be selected not only because they increase production, but also because they help broader development objectives such as employment creation and income distribution.

One difficulty is that many developing countries do not have a clear and specific set of development objectives against which a potential project's impact can be measured. The inadequacies of their planning organizations also sometimes mean that too many policy matters are left to the agencies providing the project preparation assistance. Within the Bank, a principal handicap is that it needs greater in-depth knowledge of the agricultural sectors of its borrowers, and of the development policies affecting them, than it presently has. Partly for this reason, the Bank has recently instituted a series of in-depth agricultural sector survey missions[1].

[1]See "Agricultural Sector Analysis," page 63.

The Bank has undertaken several major studies in the agricultural field. These include the Special Study of the Water and Power Resources of West Pakistan, the East Pakistan Agriculture and Water Development Program, a Study of African Agriculture, the Gezira Study in the Sudan, an agriculture and irrigation related manpower survey in Morocco, an agricultural credit study in Malaysia, a review of the Master Plan for Medjerda Basin Development in Tunisia and a review of the programs of Colombia's agrarian reform agency, INCORA. The Bank participated in the study of Nigerian Agriculture sponsored by the U.S. Agency for International Development (USAID), and later developed the blueprint for a federal agricultural credit system.

The Bank has also become involved in direct assistance to its borrowers for project management. In lending for agriculture, the weakness of project management often requires the establishment of new public project authorities supported by foreign expertise to manage the project until such time as local staff can be trained to take over. In providing this assistance, great care has to be exercised so as not to stifle local initiative and to ensure that the management training is carried out effectively.

To assist in meeting this problem, the Bank established the Agricultural Development Service (ADS) in East Africa in 1965 to provide a corps of project managers to help governments in the execution of projects. In addition, a number of project managers have been recruited, especially for livestock projects in Latin America, Africa and Europe—through direct hire by the borrowers, through arrangements with UNDP or the Organization of American States (in the Western Hemisphere), under bilateral aid or, as a last resort, as seconded personnel from the Bank.

Through its Economic Development Institute (EDI), the Bank has been helping governments to improve the capacity of their staff to undertake project analyses in the agricultural and other sectors. The EDI offers courses for qualified officials in developing countries, both in Washington and overseas. The number of courses offered each year is increasing, with a higher proportion conducted overseas and/or in languages other than English.

Thus, the EDI has scheduled seven Agricultural Project Courses in FY1973, more than in any previous year. They will be conducted in English, French and Spanish, and four of them will be overseas. Increasingly, the EDI expects to focus its efforts on helping member-countries to develop their own capacity to teach project analysis. For this purpose, it expects more of its efforts to be directed towards cooperation with local and regional institutions. The preparation of

teaching materials based on Bank experience for circulation outside the EDI will also assume greater importance.

Since 1964, the contribution made by FAO to the Bank's activities has expanded considerably, particularly in relation to technical assistance. The FAO/IBRD Cooperative Program came into being in mid-1964 with a team of 12 men in Rome. By December 1971, the number had grown to 52. The team is multi-disciplinary, consisting of agriculturalists, irrigation specialists, economists and others working together on project problems.

Most of the work under the Cooperative Program has been concerned with the identification and preparation of projects to be financed by the Bank. At present, FAO staff are participating in some phase of project preparation in the case of about 40% of the projects in the Bank's agricultural pipeline; they are also providing assistance in the preparation of agricultural education projects. The Bank has also called on FAO increasingly to participate in country economic missions and in the appraisal and supervision of projects.

Economic Research Activities

The Bank's economic research activities have two principal aims: to establish a factual or conceptual basis for policy, and to provide general support to operations in the sector. A brief account of the economic research relating to agriculture which is in progress illustrates the current focus. A study is being made of the effects on employment and productivity of the use of tractors in India; this results from the Bank's initial projects to finance mechanization there. Irrigation rehabilitation projects in Mexico have been re-appraised. Similar re-evaluations of two irrigation projects in India and a credit project in West Pakistan are in progress. The farmers' response to new varieties of rice is being investigated in Bangladesh.

A study of rural development in East Africa is being prepared. It will be closely linked with the in-depth agricultural sector surveys that are being carried out in a number of countries and with reviews of a number of ongoing projects. The aim is to improve understanding of smallholder motivation and rural development generally, and to assist in determining the minimum package which may be needed in the future for smallholder development projects covering a wider area.

Other studies which are being conducted or prepared and which are closely related to the Bank's role in rural development include: a study in India of substitution between labor and capital in road-building; a likely extension of this study to the construction of irriga-

tion works; studies of village electrification and water supply; an evaluation of existing experience in non-formal education for rural development; and the construction of programming models of the agricultural sectors of Mexico, Brazil and Portugal.

Some of these studies simply explore the opportunities for raising the productivity of familiar types of agricultural projects—by learning from the experience of past investments and by seeking to improve the theory and practice of measuring project costs and benefits. There is also an "entrepreneurial" aspect—in exploring opportunities for the Bank to support new types of projects. Outside of this formal part of its economic research program, the Bank is endeavoring to expand its research-oriented program of monitoring project performance. So far, a systematic data-gathering and evaluation procedure has been built into only a few projects, such as the livestock projects in Mexico, Uganda and Uruguay and the Kadana irrigation scheme in India.

So much agricultural economic research of relevance to developing countries is undertaken throughout the world that a good deal of attention is devoted within the Bank to reviewing and interpreting studies conducted elsewhere. This is an increasingly important source of new ideas for development policy.

The content of the Bank's own research program is determined by very specific policy needs or by the advantages of working with its own data. Nevertheless, much of it is conducted outside. For example, the Indian mechanization study referred to above is being carried out by two local universities, and many of the other studies are conducted with the help of consultants or cooperating agencies in the developing countries. The Bank has arranged with the FAO/IBRD Cooperative Program for a pilot study of the employment and income distribution effects of the Muda irrigation project in Malaysia, which includes substantial farm mechanization (including private farm machinery pools providing services to small farmers).

Impact of the Bank's Activities

Although Bank lending has been increasing rapidly, it still represents only about 1-2% of the total investment (domestic and foreign) in agriculture in developing countries[1]. The impact of the lending is, however, greater than might be implied by such figures. This is because the capital transfer is in the form of foreign exchange provided on relatively favorable terms (particularly in the case of IDA credits).

[1]The basis for this estimate is given at the beginning of the next section entitled "The Bank Group's Future Role."

Furthermore, the Bank carefully considers the development value and appropriate design of the projects it finances.

The overall impact thus extends beyond the capital transfer. For example, the Bank has helped in the introduction or extension of better technologies and in the improvement and strengthening of institutions. Projects have led to improvements not only in farming practices, but frequently also in government policies.

Some ways in which the Bank's agricultural project work has had an impact far beyond the project being financed are indicated below:

(a) introduction or expansion of new techniques such as in the livestock industry[1], bulk handling of grains, improved water control in irrigation schemes, land levelling, low cost settlement methods; and detailed consideration of the appropriate technology (hand versus mechanical methods of forest clearing; pros and cons of on-farm mechanization);

(b) institution building (particularly agricultural credit institutions, agencies handling smallholder development projects, cooperatives and marketing boards); the strengthening of management; and improved coordination between the various entities involved in agricultural development (particularly those responsible for construction and agricultural development in irrigation projects);

(c) improvements in credit policies[2], and the adjustment of interest rates to reflect the scarcity of capital, thereby encouraging labor-intensive rather than capital-intensive methods of production, and promoting resource mobilization through increased savings;

(d) greater attention to particular aspects of project preparation which are frequently neglected (the effects of irrigation on various types of soils, land classification and drainage; fisheries resource estimation; marketing infrastructure and institutions; crop quality control standards);

(e) changes in taxation and other fiscal measures such as water charges (price distortions in the economy may be preventing the development of a particular activity which would be economically advantageous or may be encouraging an activity which is not, as discussed in the earlier section on "Some Major Policy Issues"); and

(f) introduction of project monitoring systems, so that both borrowers and the Bank can learn more from their experience.

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[1]See pages 43-44.

[2]See page 43.

To a considerable degree, the Bank's influence for change depends on the extent to which it is supported by the sort of detailed knowledge that comes from sector surveys and project activities. Such sector surveys are a fairly recent development, but are scheduled to be expanded greatly in the coming years[1].

Because the data are lacking, it is difficult to estimate the likely impact on employment and income distribution of any but the most recent Bank investments in agriculture. But these aspects are now being regularly investigated during the identification, preparation and appraisal of projects. An analysis can, however, be made of the numbers of farm families directly benefited by Bank agricultural investments over the past three years (FY1969-71) and the average investment per farm. A list of the projects involved, with the pertinent data, is presented in Annex 14.

In approximately 73 of these projects, it was possible to estimate the numbers of farms that could be expected to benefit—about 2 million farms in all, involving a population of about 10 million. The average investment per farm was about $1,100, of which the Bank financed about half. However, the average investment per farm varied widely from one project to another. It ranged from a low of $24 in Niger and $50 in Burundi, to a high of about $120,000 in one case in Iran. A more detailed breakdown is given in Annex 15.

Roughly 80% of all the farms involved were assisted by projects where the average investment per farm was less than the overall average of $1,100. This indicates that a large number of "small" farms benefited from such projects. On the other hand, over 80% of the total investment and over 70% of the operations involved projects in which the average investment per farm was above the overall average of $1,100. Less than 1% of the participating farms benefited from projects where the average investment per farm exceeded $21,000. This category accounted for about 20% of Bank support (in terms of both total project costs and the number of operations). The remaining 80% went to projects in which the average investment per farm was in the range of $20 to $21,000.

The skewed nature of the distribution of the investments implied by these figures reflects the generally skewed distribution of farm sizes referred to in the earlier section entitled "Some Major Policy Issues." It also reflects the ability of the operators of larger farms to undertake investments efficiently, whereas the operators of small farms are usually in greater need of short-term input financing and technical assistance which is being provided under a number of bilateral programs.

[1]See sub-section on "Agricultural Sector Analysis" below.

THE BANK GROUP'S FUTURE ROLE

Agricultural investment in most developing countries will continue to receive high priority. The financing of agricultural projects can thus be a useful way of increasing transfers of capital. However, bilateral lending for agricultural projects is comparatively small. There is thus a substantial role to be played by the multilateral aid agencies such as the Bank.

Over the period FY1974-78, the Bank's agricultural lending program is projected at about $4,400 million (compared with $2,400 million in FY1969-73 and $600 million in FY1964-68). This section considers the lending program in the perspective of the total investment in agriculture in the developing countries and of the other agricultural project aid (bilateral and multilateral) likely to be available. It also discusses what the future trends in the content of the Bank's agricultural lending program are likely to be, in the light of the discussions in the preceding sections, and the need for the Bank to improve its agricultural sector analyses.

Overall Agricultural Investment and Capital Transfers

No systematic attempt has been made to estimate the financial resources needed to maintain the momentum gained as a result of the "green revolution." However, some orders of magnitude can be derived on the assumption that present ratios between agricultural investment and agricultural GNP will continue to hold true.

In the 30 developing countries for which the Bank has relevant data, it appears that this ratio averages about 9%[1]. The figure compares with the 7% contained in FAO's Indicative World Plan, which FAO suggests should be a sufficient ratio to sustain a growth in agricultural output of 4% per annum. Agricultural GNP is projected to grow at about 5% per annum in current prices, or from about $100,000-110,000 million in 1969 to about $140,000-155,000 million in 1976. This implies that overall investment in agriculture in developing countries, which may have been of the order of $7,000-10,000 million in 1969, should increase to about $10,000-14,000 million by the mid-1970's.

[1]The figure of 9% is used in this paper for want of a better one. The results derived from it (i.e., the estimates of agricultural investment in the developing countries) should be treated with caution. Firstly, the data on investments in the 30 countries are often probably unreliable and, in any case, refer only to a single year. Secondly, the ratio for individual countries varies widely around the average 9% figure, from less than 1% to almost 50%; and only 12 of these individual country ratios lie within the range 6-12%. Thus, it is possible that widening the statistical base to more countries would substantially alter the result.

In comparison with the total agricultural investment in developing countries, the external assistance provided by developed countries and multilateral institutions such as the Bank Group for agricultural projects has been small. Commitments of such assistance for the period 1966 through 1970 appear to have averaged about $630 million annually. Of these, about $220 million have been in the form of bilateral assistance from DAC member countries[1], $170 million from the regional development banks—the Inter-American Development Bank (IADB) and the Asian Development Bank (AsDB)—and $240 million from the World Bank[2].

The trend in bilateral capital assistance for agriculture has recently been downward (it has fallen from $245 million in 1966 to $160 million in 1969); but there was a considerable rise in 1970 to some $300 million. The regional development banks are generally increasing their commitments to agriculture. IADB's commitments reached $236 million in 1970, although they fell sharply to $93 million in 1971. AsDB's commitments started at $24 million in 1969, rose to $31 million in 1970 and then declined to $28 million in 1971.

The rapid increase in the World Bank's commitments has already been noted[3]. In FY1971 they were about $420 million, representing about 40% of the current annual level of such commitments of about $1,000 million from all sources. Considering that, with a rapidly increasing rate of commitments, disbursements lag considerably behind commitments, the World Bank's contribution to overall agricultural investment in the developing countries at present is probably of the order of 1-2%.

Future trends in bilateral capital assistance for agricultural projects are difficult to foresee. Although recently such assistance has been declining, there are indications that some DAC member countries intend to reverse the trend in the future, as evidenced by the recovery in 1970. If the need for food aid decreases as the "green revolution" spreads, donor countries may have to consider increasing their direct project assistance for agriculture.

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[1]In addition, bilateral food aid is currently running at about $1,500 million per annum; a substantial proportion of the technical assistance (also running at about $1,500 million per annum) is directed to the agricultural sector; some project aid which was for unspecified purposes at the time of commitment ($235 million in 1969) undoubtedly went to agricultural projects in practice; and aid to finance current imports ($884 million in 1969), general purpose loans ($164 million in 1969) and budget support ($260 million in 1969) can generally be expected to involve the agricultural sector to some extent.

[2]Agricultural investments by the European Development Fund (FED) are not included in these computations.

[3]In the section on "Past Bank Group Activities in Agriculture."

However, one constraint may be that the foreign exchange component of agricultural projects is generally low. Another may be that it will take time for the donor countries to build the staff required to appraise agricultural projects. The future trend in agricultural lending by the regional development banks is also difficult to determine, although it seems likely to be upward, perhaps reaching a level of about $350-450 million by the mid-1970's.

Thus the scope for expanding the World Bank's lending in the 1970's is clear. It is proposed to raise the annual rate of such lending from the target of around $500 million for about 40 projects in FY1972 to about $750-850 million for about 60 projects by the mid-1970's and to about $1,000 million for about 70 projects by 1978. This means that the Bank Group's share of external assistance for agricultural projects would probably rise to around 50% by the mid-1970's, assuming that bilateral aid can be raised to about $350-450 million per annum[1].

The World Bank is thus expected to remain the main external source of agricultural project financing. Its contribution to the overall investment in agriculture in developing countries would still be relatively small, but would rise from the present 1-2% to about 4-5%. Part of the increase would result from the fact that the lag in disbursements is expected to be less as the rate of growth of new commitments slows down.

Recent experience indicates that sufficient promising agricultural projects will be identified and prepared as a basis for the Bank's projected agricultural lending program. The various sources of project preparation assistance are now well geared up to this task although more manpower will be needed to achieve the targets, to improve the quality of preparation and to equip the sources of preparation to handle increasingly complex and comprehensive projects, including non-agricultural rural development components.

This situation, which is an improvement over the position in the early 1960's when the lack of prepared projects constrained very much the expansion of agricultural lending, has been brought about in large measure by the establishment of the FAO/IBRD Cooperative Program, the work of the Bank's overseas missions and the provisions for preparation of follow-up projects in loans and credits, which have been described earlier. Other factors contributing to this improvement have been the closer collaboration between the Bank and FAO on UNDP pre-investment studies in the field of agriculture, the in-

[1]Even if bilateral capital project assistance remains at the pre-1970 level of about $150-250 million, the Bank Group's share would remain below 60% of total official capital project assistance to agriculture.

creasing capabilities of local institutions and consulting firms to carry out project preparation and continuous bilateral technical assistance for project investigation.

The Direction of Future Lending

The direction of the Bank's future lending for agriculture will reflect the progress made in resolving many of the fundamental questions raised earlier in this paper about agriculture's role in the overall development process.

For example, will the agricultural products of the developing countries be given better access to markets in the developed countries? How might protein deficiencies in many traditional and low-income diets be avoided? What constitutes the essential minimum of factors necessary to stimulate broad-based rural development, taking into account the widely varying stages of development reached by different developing countries? Can appropriate intermediate technologies be devised which will make use of abundant supplies of unskilled labor without sacrificing the overall rates of growth which are fundamental to development? What are the trade-offs, if any, between economic growth and more equal distribution of incomes?

In the developing countries, changes in government policies will affect agricultural investment plans, and the direction of Bank support for such plans. Removal or reduction of price distortions could stimulate agricultural development and affect the form it takes. Of fundamental importance will be the attitudes of governments on agrarian reforms generally and on the priority to be given to programs to assist small farmers in particular. The Bank will continue to invest in projects supporting economically sound agrarian reform programs (including land reform, where appropriate), although it does not participate in the financing of land transfers.

At a time when ideas, technologies and socio-economic priorities are changing rapidly, it is essential that the Bank maintain a flexible attitude in its agricultural lending policies and keep abreast of changes. This paper has already referred to the Bank's support for research in agricultural technologies and agricultural economics. The need for improved knowledge of the agricultural policies of borrowers is discussed below[1].

The Bank has recently established contacts with, and provided budgetary support for, the UN Protein Advisory Group. Within the

[1]See "Agricultural Sector Analysis."

Bank, a Rural Development Unit is being set up; it will concern itself with all aspects of rural development with a view to identifying agriculture's changing role in the urban-rural polarization as it occurs at different stages of development. The work of this group will have a strong operational bias, and should assist the Bank in giving greater emphasis to the small farm sector.

Project Content

In view of all these factors, it is difficult to predict the longer-term trends in the project content of the Bank's agricultural lending program. But in the shorter term, many of the trends that have become apparent in recent lending may be expected to continue. These include:

(a) a continuing expansion in the scope of projects to cover all investments required to achieve general development objectives in the rural areas concerned;

(b) consistent with governments' ability to provide adequate resources (particularly of qualified manpower), and building on the substantial experience of recent years, an extension of smallholder development schemes (including settlement of landless people) to support larger numbers of small farmers, providing them with a meaningful incremental income at the lowest possibie cost per farm;

(c) an increase in the number of projects aimed at producing food crops, livestock and fish for local consumption;

(d) an increase in the number of projects to handle the expected increases in marketable surpluses of food products (e.g., marketing, processing, storage and transportation projects) as well as the provision of facilities for input distribution and related service industries;

(e) basic irrigation infrastructure lending, potentially supporting productive rural works programs, will probably continue to expand in absolute terms although its share of Bank agricultural lending is likely to decline further as increasing emphasis is placed on on-farm investments and agricultural industries; and

(f) as individual developing countries become increasingly conscious of the need to provide employment opportunities and to distribute incomes more equitably, an increasing emphasis on small farmers and projects designed to be labor-intensive.

Geographical Distribution

The aggregate of the agricultural components of the Bank's current country-by-country operations programs for the period FY1972-76 exceeds by far its capacity to appraise projects over that period. However, no other basis exists at present for analyzing the geographi-

cal distribution pattern of future agricultural lending. The data are summarized below in relative terms, compared with two preceding periods:

	FY1964-68		FY1969-71		Projected FY1972-76	
	No. of Projects	Amount	No. of Projects	Amount	No. of Projects	Amount
	(percentage of total)					
Sub-Sahara Africa	17	7	33	12	35	17
Asia and the Pacific*	35	49	37	48	29	39
Europe, Middle East and North Africa	11	9	10	20	15	19
Central and South America	37	35	20	20	21	25
	100	100	100	100	100	100

*The FY1972-76 figures for Asia and the Pacific understate the probable position since they do not include lending to Bangladesh or Pakistan, for which projections are not presently available.

The increased rate of lending is also matched by an increase in the number of countries in which the Bank has made, and is expected to make, agricultural investments:

	Number of Countries		
	FY1964-68	FY1969-71	FY1972-76 (Projected)
Sub-Sahara Africa	5	18	33
Asia and the Pacific	7	9	13
Europe, Middle East and North Africa	3	6	16
Central and South America	12	10	21
	27	43	83

The rapid expansion of agricultural lending in the recent past and that projected for the five years FY1974-78 will further tax the capacity of receiving countries successfully to implement agricultural development projects supported by the Bank. Reference has already been made to the need for the Bank and others to provide assistance for agricultural project management. The Bank's project supervision responsibilities will increase even more rapidly and become more complex as the agricultural portfolio is further diversified both in types of projects and geographical distribution; as larger amounts are committed for projects with significant policy reform, rural development and institution building components; and as training programs associated with agricultural project lending receive increased emphasis and in turn require more attention during their implementation. The

effectiveness with which projects are implemented not only determines in large measure the benefits the receiving country will attain, but also the rate at which funds committed will be used. Continued expansion of the Bank's lending for agriculture will thus require greatly increased efforts to meet these responsibilities.

Agricultural Sector Analysis

Although most of the agricultural projects at present in the pipeline have been selected without a systematic analysis of the entire agricultural sector, the judgments of the past have probably not been far wrong. This is partly because the choices were rather obvious and were limited by the lack of well-prepared projects. But while the Bank's appraisal procedures ruled out the financing of projects with low economic returns, the projects selected may not always have ranked highest in terms of sector priorities or development goals such as employment creation. With the projected expansion of lending, it is essential that the Bank should improve its knowledge of the agricultural sector in the countries in which it operates. Greater understanding of the policy framework within which a project would have to be carried out should help also to improve its design and execution.

Until quite recently, the Bank's knowledge of the agricultural sector in a particular country was derived largely from two sources. The first was represented by the contacts established in the process of preparing, appraising and supervising projects (sometimes expanded to include subsector reviews, such as the Uruguayan livestock survey). The second source was the agricultural sector work done in the course of economic missions.

But experience has shown that although project-related sector knowledge can be valuable, its focus seldom extends beyond the subsector in which the project is located. Economic mission work, on the other hand, emphasizes the macro-economic aspects; while it is important in providing guidance on intersectoral priorities, it usually cannot provide the depth of sector analysis that is now required to support agricultural lending on the projected scale.

To improve its sector knowledge, the Bank has to depend increasingly on in-depth sector surveys, conducted by expert staff to cover all major aspects of so diverse a sector as agriculture. Such sector surveys can produce guidelines for future lending, particularly in relation to government policies which affect agriculture. They are expected to have a major impact on the selection of investment priorities (and thus also on the selection of projects for Bank financ-

ing). They should also facilitate appraisal work and the preinvestment work done by others.

Ten such sector surveys (covering a variety of countries in Eastern and Western Africa, South Asia, East Asia, Europe and South America) have been carried out. One more is scheduled for FY1972 (making five in all for that year). The first five surveys have recently been completed through the stage where the findings have been discussed with governments. Another two reports have been prepared and are scheduled for discussion in FY1972. The remaining three reports are under preparation. The completed sector surveys have clearly helped to identify priorities and further steps in project preparation, and have been well received by governments.

In one case, the survey report has led to a reorientation of the government's irrigation and rural development strategy for an important but depressed region, and to a higher priority for storage and transportation. In another case, the survey has resulted in an extensive revision of irrigation policies and a renewed interest in reorganization of government services to agriculture. A third country has begun serious attempts to reorganize its agriculture along lines recommended in the sector survey report, and to take steps toward land tax reform and more economical use of available lands.

In the other two cases where the results of the survey have been discussed with governments, a positive contribution has been made to the countries' preparations for forthcoming development plans. In all these cases, there have been continuing discussions between the governments and the Bank on major issues, as well as further project preparation activities, based on the results of the sector surveys. Of course, not all recommendations made by sector survey missions are accepted by governments.

The results of sector survey missions have so far been encouraging. It is proposed to expand coverage to other developing countries as rapidly as possible, taking into account the competing demands on the Bank's staff resources. It is planned that, by FY1975, sector survey missions will be mounted at the rate of ten per annum. At that rate, sector surveys would be completed for the prospective 25 largest agricultural borrowers by FY1975, and for the prospective 35 next largest by FY1980.

ANNEXES

	1948-52 Average	1953-57 Average	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970[1]	Annual Growth Rate 1958-60-1968-70
	(1952-56 average = 100)																(Percent)
TOTAL PRODUCTION ALL AGRICULTURAL PRODUCTS																	
Developed Countries[2]	89	101	106	114	116	114	114	119	124	124	125	128	133	137	136	136	1.75
Developing Countries	86	103	109	114	118	121	125	129	132	135	138	138	144	148	154	158	2.60
Latin America	87	103	111	117	118	120	128	128	132	134	143	140	148	147	153	158	2.58
Far East[3]	87	103	107	111	117	121	127	128	132	136	134	135	141	148	155	160	2.86
Near East[4]	82	104	115	118	122	124	123	135	137	141	145	148	153	159	163	163	2.91
Africa[5]	85	102	107	110	113	121	116	124	128	132	134	134	138	142	147	148	2.42
FOOD PRODUCTS ONLY																	
Developed Countries[2]	89	101	108	115	117	115	115	120	125	125	127	132	138	142	141	141	2.02
Developing Countries	86	103	109	113	116	120	124	127	131	135	136	137	143	149	154	159	2.84
Latin America	87	103	111	116	114	117	124	126	131	137	141	142	151	152	157	166	3.20
Far East[3]	87	103	107	112	118	123	127	129	132	137	134	135	141	149	156	162	2.84
Near East[4]	82	104	115	118	121	122	123	133	135	137	141	145	150	155	159	159	2.73
Africa[5]	86	102	106	108	111	117	113	121	125	127	128	128	132	137	140	141	2.20
PER CAPITA PRODUCTION ALL AGRICULTURAL PRODUCTS																	
Developed Countries[2]	93	100	102	108	108	106	105	108	111	110	109	111	114	117	115	113	0.69
Developing Countries	94	101	102	103	104	105	106	106	106	106	105	103	104	105	106	106	0.16
Latin America	97	100	103	105	102	102	105	103	103	101	105	100	103	99	100	101	−0.30
Far East[3]	95	101	101	102	104	106	108	107	107	107	103	102	103	106	108	109	0.35
Near East[4]	91	102	107	106	107	106	103	110	109	109	109	108	109	110	110	107	0.16
Africa[5]	94	100	100	100	101	105	98	103	104	104	103	100	101	101	102	100	−0.09
FOOD PRODUCTS ONLY																	
Developed Countries[2]	93	100	103	109	109	107	105	109	112	111	111	114	119	121	118	117	0.92
Developing Countries	94	101	102	103	103	104	105	105	105	106	104	102	104	105	105	106	0.20
Latin America	97	101	103	104	100	99	102	101	102	103	104	102	105	102	103	105	0.23
Far East[3]	94	101	101	103	106	107	109	107	107	108	104	102	103	107	108	110	0.28
Near East[4]	90	102	107	107	106	105	103	108	107	106	106	106	107	108	107	104	0.03
Africa[5]	94	100	99	98	99	102	96	100	101	100	99	96	97	97	97	95	−0.35

(1) Preliminary estimates (2) Includes Japan, S. Africa and Israel and excludes U.S.S.R. and Eastern Europe (3) Excludes Japan (4) Excludes Israel (5) Excludes S. Africa

Source: *The State of Food and Agriculture, 1971*, (FAO, Rome: 1971)

Annex 2

Normal Variations in Economic Structure with Level of Development

Structural Characteristic	Level of GNP per capita (in 1964 US$)				
	$50	$100	$200	$300	$400
	Percent				
Share of GDP of					
Primary production	58	46	36	30	27
Industry	7	13	19	23	25
Services	30	35	38	39	40
Jtilities	5	6	7	8	8
Percentage of labor force in					
Primary production	75	68	58	50	44
Industry	4	10	16	21	24
Services and utilities	21	22	26	29	32
Urban population, as % of total population	7	20	34	41	46
Exports of primary products, as % of total exports	89	78	68	61	56

Source: Hollis B. Chenery, "Growth and Structural Change", *Finance and Development*, September 1971.

Agricultural Output per Agricultural Worker and Factors Associated with Differences in Output, 19 Countries, 1960

Country	Agricultural Output per Farm Worker	Total Land per Capita of Total Population	Arable Land per Agricultural Worker	Literacy Rate	Infant Mortality Rate per 1,000	Agricultural Workers per Hectare of Arable Land	Fertilizer Used per Hectare of Arable Land	Urban Population as a Percentage of Total Population	Rank of Country in Miles of Road per 1,000 Sq. Miles of Land Area	Agricultural Output per Hectare of Arable Land	Gross Domestic Product per Capita
Group I	Dollars	Hectares	Hectares	Percent	Number	Number	Kilograms	Percent	Rank	Dollars	Dollars
Israel	1,825	0.9	3.3	96	32.0	0.31	80.5	77.3	3	557	905
Argentina	1,080	12.5	13.1	86	59.6	.07	n.a.	67.0	16	78	465
Spain	656	1.6	4.4	87	51.6	.23	31.6	n.a.	7	150	372
Poland	616	1.0	2.4	95	74.7	.41	49.0	48.1	2	252	538
Chile	547	9.1	9.3	80	118.0	.11	17.0	67.2	12	59	405
Colombia	531	7.7	1.9	62	100.0	.51	n.a.	n.a.	18	270	248
Venezuela	500	12.5	3.2	52	64.1	.30	3.8	66.1	17	150	650
Japan	402	0.4	0.4	98	37.7	2.39	303.7	63.5	1	961	337
Greece	391	1.6	1.9	80	41.4	.52	38.0	42.5	5	205	297
Mexico	369	5.6	4.1	65	77.7	.30	9.4	50.7	11	110	321
Average	692	5.3	4.5	79	65.7	0.52	66.6	60.3	9	279	454
Group II											
Egypt	365	3.7	0.6	20	130.1	1.76	87.0	37.7	15	643	155
Turkey	326	2.7	2.6	39	n.a.	.39	1.5	37.8	13	127	254
Yugoslavia	250	1.4	1.8	77	98.5	.57	28.0	n.a.	4	141	179
Brazil	229	11.1	1.4	49	n.a.	.45	13.0	45.1	14	104	145
Taiwan	228	0.3	0.6	54	34.2	2.10	203.8	59.5	6	477	97
Pakistan	182	1.0	1.5	19	n.a.	.73	3.2	n.a.	10	133	64
Philippines	181	1.0	1.2	75	82.6	.77	12.5	42.7	9	139	113
India	114	0.7	1.2	24	145.9	.80	2.3	17.9	8	91	70
Thailand	94	1.9	0.9	68	54.8	1.13	2.3	11.8	19	106	84
Average	222	2.6	1.3	47	91.0	0.97	39.3	36.1	11	218	129

Source: *Changes in Agriculture in 26 Developing Nations, 1948-1963* (U.S. Department of Agriculture, Foreign Agricultural Economic Report No. 27, 1965).

Annex 4

Compound Annual Rates of Growth in Total Agricultural Production, Total Agricultural Population, Agricultural Production per Farm Person, and Crop Area per Farm Person, 25 Countries, Selected Periods, 1950-68

Country and Region	Total Agricultural Production 1950-68[1]	Total Agricultural Population 1950-65[2]	Agricultural Production per Farm Person	Crop Area per Farm Person
		Percent		
Latin America				
Costa Rica	4.2	2.3	1.9	2.1
Guatemala	5.0	3.4	1.6	— .2
Jamaica	2.7	1.3	1.4	1.6
Mexico	5.1	1.7	3.4	1.4
Panama	3.6	2.1	1.5	.4
Argentina	2.0	1.9	.1	— .8
Brazil	3.8	1.3	2.5	3.1
Colombia	3.3	1.3	2.0	.5
Paraguay	2.4	1.8	.6	n.a.
Uruguay	— .1	.8	— .9	—2.8
Venezuela	5.1	2.1	3.0	1.8
Asia and Africa				
Cyprus	4.9	— .8	5.7	n.a.
Iran	2.7	1.2	1.5	n.a.
Israel	9.3	2.2	7.1	n.a.
Turkey	3.4	2.8	.6	— .6
Ceylon	2.9	1.2	1.7	.3
Indonesia	2.3	1.5	.8	.8
Malaysia	4.1	3.1	1.0	—1.5
Thailand	4.5	2.9	1.6	.6
Egypt	2.4	2.2	.2	—1.2
India	2.6	2.1	.5	— .8
Japan	3.3	—4.5	7.8	3.7
South Korea	3.7	.3	3.4	1.2
Philippines	3.7	2.0	1.7	.7
Taiwan	4.5	2.4	2.1	—1.7

[1] Data cover a shorter period than 1950-68 in some instances.

[2] Estimates based on data from several sources. Data on economically active population in agriculture were used for Ceylon, Costa Rica, Egypt, Indonesia, Malaysia and Thailand.

Source: *Economic Progress of Agriculture in Developing Nations, 1950-1968* (U.S. Department of Agriculture, Economic Research Review, 1970).

Actual and Projected Capacity, Production and Consumption of Fertilizers[1] in Developed and Developing Countries

	1967/68			1972		
	Capacity (1)	Production (2)	Consumption (3)	Gross Capacity[2] (4)	Potential Production[3] (5)	Projected Consumption (6)
	Million metric tons					
Latin America	1.6	0.8	2.1	4.0	2.5	3.5-4.0
West, Central and East Africa	...	—	0.3	0.7	0.6	0.5-0.6
Near East and North Africa	1.7	0.6	1.0	3.5	2.4	1.8-2.0
Far East (excluding Japan)	1 9	1.2	3.5	5.3	3.3	7.0-8.0
of which:						
India	(1.1)	(0.6)	(1.8)	(3.3)	(2.0)	(4.0-4.5)
Pakistan	(0.2)	(0.1)	(0.3)	(0.7)	(0.5)	(0.6-0.8)
Total developing countries	5.2	2.6	6.9	13.5	8.8	13-15
Total developed countries[4]	63.0	53.8	46.1	108.4	78.6	65
World Total	68.2	56.4	53.0	121.9	87.4	78-80

(1) In terms of nutrient content (N, P_2O_5 and K_2O).

(2) Gross capacity includes plants in operation and plants and factories under construction, contracted, or in an advanced stage of planning in 1967/68; for the U.S.S.R., production goals have been used.

(3) Potential production has been derived from gross capacity by taking into account closure of old plants, reduced capacity utilization during the first year of operation of new plants, losses in manufacturing and non-agricultural use of primary plant nutrients.

(4) Including Eastern Europe and the U.S.S.R.

Source: *The State of Food and Agriculture, 1970,* (FAO, Rome: 1970).

Area Devoted to High-Yielding Varieties (HYV) in Relation to Area of All Varieties, 1970/71

(Preliminary; subject to revision)

	Area[1]		Proportion
	HYV	All Varieties	HYV
	—acres—		—percent—
WHEAT			
Afghanistan	574,300	(7,329,500)[3]	(7.8)
Algeria	346,300	7,400,000[2]	4.7
India	14,559,000	44,211,100	32.9
Iran	321,200	10,378,000	3.1
Iraq	309,000	5,023,500	6.2
Jordan	300	543,600	0.1
Lebanon	8,600	150,700	5.7
Morocco	49,400	1,230,600	4.0
Nepal	242,700	(959,000)[3]	(25.3)
Pakistan (E)	24,000	311,000	7.7
Pakistan (W)	7,288,000	14,976,000	48.7
Syria	94,000	930,000	10.1
Tunisia	255,000	1,816,200	14.0
Turkey	1,184,000	20,262,200	5.8
RICE			
Burma	496,300	12,295,000	4.0
Ceylon	73,000	(1,609,000)[3]	(4.5)
India	13,593,000	92,494,500	14.7
Indonesia	2,303,400	20,353,600	11.3
Laos	132,500	(1,900,000)[3]	(7.0)
Malaysia (W)	327,100	1,336,000	24.5
Nepal	167,600	(2,900,000)[3]	(5.8)
Pakistan (E)	1,137,000	24,494,000	3.3
Pakistan (W)	1,548,000	3,715,000	41.7
Philippines	3,868,100	7,691,300	50.3
Thailand	(400,000)[2]	18,779,600	(2.1)
Vietnam (S)	1,240,300	6,423,000	19.3

[1] Excluding Communist Asia.
[2] Particularly rough estimate.
[3] 1969 70 area.

Source: *Imports and Plantings of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations.* By Dana Dalrymple. (Foreign Economic Development Service, U.S. Department of Agriculture in Cooperation with U.S. Agency for International Development, Washington, D.C.)

Medium-Term (1974) Forecast for Cereal Production, Utilization and Net Trade in Selected Developing Countries

Annex 7

	Production			Apparent Domestic Utilization			Net Trade		
	Actual		Forecast	Actual		Forecast	Actual		Forecast
	1965-67 Average	1970[1]	1974	1965-67 Average	1970[1]	1974	1965-67 Average	1970[1]	1974
	Thousand metric tons								
NET IMPORTERS									
Far East									
Ceylon	680	1,064	1,364	1,634	2,054	2,034	+ 954	+ 990	+ 670
China (Taiwan)	2,244	2,295	2,410	2,456	3,529	3,696	+ 212	+ 1,234	+ 1,286
India	68,627	91,309	109,400	77,582	94,454	110,000	+ 8,955	+ 3,145	+ 600
Korea, Republic of	5,937	6,788	7,624	6,598	8,764	9,964	+ 661	+ 1,976	+ 2,340
Malaysia (West)	881	933	1,320	1,532	1,655	1,684	+ 651	+ 722	+ 364
Pakistan	17,557	22,814	26,072	19,025	24,500	26,530	+ 1,468	+ 1,686	+ 458
Total Countries Listed	95,926	125,203	148,190	108,827	134,956	153,908	+12,901	+ 9,753	+ 5,718
Near East									
Iran	5,168	6,358	7,245	5,426	6,707	7,385	+ 258	+ 349	+ 140
Iraq	1,892	2,152	2,940	1,926	2,265	3,190	+ 34	+ 113	+ 250
Egypt	5,782	6,642	8,210	7,908	7,293	9,610	+ 2,126	+ 651	+ 1,400
Total Countries Listed	12,842	15,152	18,395	15,260	16,265	20,185	+ 2,418	+ 1,113	+ 1,790
Latin America									
Brazil	17,355	21,993	23,855	18,958	22,307	23,250	+ 1,603	+ 314	- 605
Chile	1,789	1,771	2,357	2,195	2,251	2,750	+ 406	+ 480	+ 393
Total Countries Listed	19,144	23,764	26,212	21,153	24,558	26,000	+ 2,009	+ 794	- 212
Africa									
Algeria	1,383	1,598	2,172	1,920	2,057	2,735	+ 537	+ 459	+ 563
Ghana	527	487	573	638	624	689	+ 111	+ 137	+ 116
Morocco	2,779	4,301	4,519	3,354	4,287	4,902	+ 575	- 14	+ 383
Senegal	663	672	952	898	951	1,342	+ 235	+ 279	+ 390
Tunisia	524	655	515	786	1,228	1,202	+ 262	+ 573	+ 687
Total Countries Listed	5,876	7,713	8,731	7,596	9,147	10,870	+ 1,720	+ 1,434	+ 2,139
Grand Total	133,788	171,832	201,528	152,836	184,926	210,963	+19,048	+13,094	+ 9,435
NET EXPORTERS									
Argentina	16,781	19,166	25,750	7,407	9,287	13,285	- 9,374	- 9,879	-12,465
Mexico	12,276	14,150	17,780	10,727	13,366	16,480	- 1,549	- 784	- 1,300
Thailand	8,713	10,368	12,215	6,020	7,828	8,605	- 2,693	- 2,540	- 3,610
Total Countries Listed	37,770	43,684	55,745	24,154	30,481	38,370	13,616	13,203	17,375

NOTE: Net imports are indicated by a (+) sign; net exports by a (-) sign.

Share of Agricultural Primary Products in Export Earnings of Selected Developing Countries, Average 1967-69

Country	Total Export Earnings	Share of Agricultural Products [1]
	US$ million	percent
I. Over 80%		
Ethiopia	106.7	99.1
Ceylon	327.6	98.8
Turkey	518.0	90.7
Uganda	186.7	90.4
Argentina	1,481.5	87.6
Ghana	295.4	83.9
Brazil	1,948.8	82.4
Morocco	453.1	81.7
II. 50-80%		
Thailand	680.7	78.3
Colombia	525.3	77.8
Tanzania	223.6	76.6
Kenya	162.2	75.3
Philippines	890.7	73.3
Mexico	1,277.6	66.0
Malaysia	1,111.9	60.0
Nigeria	713.4	58.8
Tunisia	157.6	53.4
III. 30-50%		
Pakistan	682.2	47.8
Singapore	1,320.1	45.6
Peru	833.8	45.0
Spain	1,621.8	41.7
India	1,758.0	38.0
China (Taiwan)	826.8	33.8
Indonesia	717.9	31.2
Yugoslavia	1,330.1	30.1

[1] SITC 0. 1. 2 - 28 . 4.

Source: *Yearbook of International Trade Statistics, 1969* : United Nations .

Indices of Value of Agricultural Exports and Imports, by Level of Development

	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970[1]
	(1957-59 Average = 100)															
Exports																
Developed countries[2]	84	95	106	94	100	110	118	119	136	153	151	159	158	156	164	191
Developing countries	102	102	102	98	100	102	101	102	111	117	118	116	111	114	119	130
Latin America	104	106	105	99	96	99	100	103	112	121	125	123	117	127	128	143
Far East[3]	108	101	101	93	106	109	103	102	112	111	109	106	101	100	103	108
Near East[4]	95	101	110	91	99	102	96	101	113	114	123	127	123	129	135	138
Africa[5]	94	95	96	104	100	100	100	99	107	119	113	113	108	116	117	136
Imports																
Developed countries[2]	95	100	99	97	104	107	110	116	118	119	124	130	129	134	137	142
Developing countries	83	91	100	98	102	116	120	122	129	138	144	154	162	163	154	--
Latin America	101	91	99	102	99	103	108	115	125	140	136	147	144	153	145	...
Far East[3]	74	90	103	98	98	121	117	117	133	143	145	158	173	169	165	185
Near East[4]	77	87	95	94	111	124	137	138	141	149	169	171	174	173	155	...
Africa[5]	87	97	100	95	105	119	131	128	112	116	131	136	151	151	140	.

(1) Preliminary estimates
(2) Includes Japan, Israel and South Africa and excludes U.S.S.R. and Eastern Europe
(3) Excludes Japan and Mainland China
(4) Excludes Israel
(5) Excludes South Africa
Source: *The State of Food and Agriculture, 1971*, (FAO, Rome· 1971)

Annex 10

Composition of Agricultural Export Earnings of Developing Countries, 1955-70

	Competing Products [1]			Non-Competing Products [2]	Total
	Basic Foods	Raw Materials	Sub-Total		
			percent		
1955	36.5	31.2	67.7	32.3	100.0
1960-62 (average)	43.0	29.5	72.5	27.5	100.0
1965-67 (average)	47.1	26.2	73.3	26.7	100.0
1970 [3]	50.5	23.5	74.0	26.0	100.0

[1] Agricultural commodities produced in direct competition by both developed and developing countries. In the case of agricultural raw materials (e.g. cotton, rubber, hides and skins), the competition taken into account includes that between natural products and synthetic substitutes also.

[2] Coffee, cocoa, tea, bananas, spices, etc.

[3] Estimates.

Source *The State of Food and Agriculture, 1970*, p. 178. FAO, Rome: 1970

Bank and IDA Lending for Agriculture by Area and Subsector for Various Periods
(Amounts in US$ million)

	Irrigation, Drainage, Flood Control		Livestock		Credit		Storage, Processing, Marketing	
	Number	Amount	Number	Amount	Number	Amount	Number	Amo
FY1948-63								
Eastern Africa	3	48.0	—	—	—	—	—	-
Western Africa	—	—	—	—	—	—	—	-
East Asia & Pacific	7	55.4	—	—	—	—	—	-
South Asia	11	182.5	—	—	—	—	—	-
Europe & Australia	—	—	—	—	—	—	—	-
Middle East & North Africa	3	38.0	—	—	—	—	1	3.
Central America & Caribbean	3	27.5	—	—	—	—	2	.
South America	1	18.0	1	7.0	3	15.0	—	-
Totals	28	369.4	1	7.0	3	15.0	3	4.
% of totals	39.4	58.8	1.4	1.1	4.2	2.4	4.2	0.
FY1964-68								
Eastern Africa	—	—	—	—	2	8.6	—	-
Western Africa	—	—	—	—	—	—	—	-
East Asia & Pacific	4	103.0	—	—	1	5.0	—	-
South Asia	5	103.0	—	—	2	37.0	1	19.
Europe & Australia	—	—	—	—	—	—	—	-
Middle East & North Africa	—	—	—	—	5	51.5	—	-
Central America & Caribbean	2	44.0	—	—	2	28.0	—	-
South America	2	15.5	9	101.8	1	15.0	—	-
Totals	13	265.5	9	101.8	13	145.1	1	19.
% of totals	28.3	44.2	19.6	16.9	28.3	24.1	2.1	3.
FY1969-71								
Eastern Africa	1	5.0	5	13.2	—	—	—	-
Western Africa	—	—	—	—	2	10.1	—	-
East Asia & Pacific	5	117.0	1	7.0	1	12.5	2	21.
South Asia	8	143.2	—	—	8	188.4	1	6.
Europe & Australia	2	52.0	3	42.2	—	—	1	25.
Middle East & North Africa	3	96.0	—	—	1	20.0	—	-
Central America & Caribbean	1	5.0	6	153.8	1	3.7	—	-
South America	—	—	8	56.9	1	17.0	—	-
Totals	20	418.2	23	273.1	14	251.7	4	52.
% of totals	20.8	34.1	24.0	22.3	14.6	20.5	4.2	4.
FY1948-71								
Eastern Africa	4	53.0	5	13.2	2	8.6	—	-
Western Africa	—	—	—	—	2	10.1	—	-
East Asia & Pacific	16	275.4	1	7.0	2	17.5	2	21.
South Asia	24	428.7	—	—	10	225.4	2	25.
Europe & Australia	2	52.0	3	42.2	—	—	1	25.
Middle East & North Africa	6	134.0	—	—	6	71.5	1	3.
Central America & Caribbean	6	76.5	6	153.8	3	31.7	2	.
South America	3	33.5	18	165.7	5	47.0	—	-
Totals	61	1,053.1	33	381.9	30	411.8	8	76.
% of totals	28.6	42.9	15.5	15.6	14.1	16.8	3.8	3.

General Agriculture		Forestry		Fishery		Total		
Number	Amount	Number	Amount	Number	Amount	Number	Amount	% of total
4	12.2	—	—	—	—	7	60.2	9.4
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	7	55.4	8.7
3	17.1	—	—	—	—	14	199.6	32.2
12	170.2	3	5.8	—	—	15	176.0	28.6
—	—	—	—	—	—	4	41.9	6.5
6	9.0	—	—	—	—	11	37.3	5.8
8	17.8	—	—	—	—	13	57.8	8.9
33	226.3	3	5.8	—	—	71	628.2	100
46.5	36.0	4.2	0.9	—	—	100	100	
5	18.0	—	—	—	—	7	26.6	4.4
1	18.0	—	—	—	—	1	18.0	3.0
1	14.0	—	—	2	13.7	8	135.7	22.6
—	—	—	—	—	—	8	159.2	26.5
—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	5	51.5	8.6
1	5.0	—	—	—	—	5	77.0	12.8
—	—	—	—	—	—	12	132.3	22.0
8	55.0	—	—	2	13.7	46	600.3	100
17.4	9.2	—	—	9.2	2.3	100	100	
9	44.4	2	7.9	—	—	17	70.5	5.7
12	71.1	—	—	1	1.3	15	82.5	6.7
6	67.5	1	8.5	1	3.5	17	237.8	19.5
1	13.0	—	—	—	—	18	350.6	28.6
—	—	—	—	—	—	6	119.2	9.7
—	—	—	—	—	—	4	116.0	9.5
—	—	—	—	—	—	8	162.5	13.3
1	8.1	—	—	1	5.3	11	87.3	7.1
29	204.1	3	16.4	3	10.1	96	1,226.4	100
30.2	16.6	3.1	1.3	3.1	0.8	100	100	
18	74.6	2	7.9	—	—	31	157.3	6.4
13	89.1	—	—	1	1.3	16	100.5	4.1
7	81.5	1	8.5	3	17.2	32	428.9	17.5
4	30.1	—	—	—	—	40	709.4	28.9
12	170.2	3	5.8	—	—	21	295.2	12.0
—	—	—	—	—	—	13	209.4	8.5
7	14.0	—	—	—	—	24	276.8	11.3
9	25.9	—	—	1	5.3	36	277.4	11.3
70	485.4	6	22.2	5	23.8	213	2,454.9	100
32.9	19.8	2.8	0.9	2.3	1.0	100	100	

Bank Group Investments in Agriculture-Related Industries[1]

	Direct Investments By		Investments Channelled Through Local Industrial Development Banks[2]
	Bank-IDA	IFC	
	(US$ million)		
Subsector			
Agricultural Production	—	—	5
Food Processing and Beverages	34	25	34
Textile Manufacturing	13	19	113
Tobacco Processing	—	—	7
Leather and Leather Goods	—	—	2
Wood-based Industries	173	60	32
Rubber Products	—	—	11
Sub-total	220	104	204
Fertilizer, Pesticides and other Chemicals	117	53	6
Farm Machinery	2	--	2
Miscellaneous Products for Agricultural Use	—	—	1
Sub-total	119	53	9
Grand Total	339	157	213

[1] Those industries based on locally-produced agricultural raw materials or supplying local agriculture: through FY1971.

[2] FY1968-71 only.

Average Size of Agricultural Project by Area and Subsector over Various Periods

(US$ million)

	FY1948-63	FY1964-68	FY1969-71	FY1948-71
A. By Subsector				
Irrigation, Drainage and Flood Control	13.2	20.4	20.9	17.3
Livestock	7.0	11.0	11.9	11.6
Credit	5.0	11.2	18.0	13.7
Storage, Processing and Marketing	1.5	19.0	13.2	9.6
General Agriculture	6.8	7.0	7.0	6.9
Forestry	2.0	—	5.5	3.7
Fisheries	—	6.8	3.4	4.8
B. By Area				
Eastern Africa	8.6	3.8	4.1	5.1
Western Africa	—	18.0[1]	5.5	6.3
East Asia and Pacific	7.9	17.0	14.0	13.4
South Asia	14.3	19.9	19.5	17.7
Europe and Australia	11.7	—	19.9	14.1
Middle East and North Africa	10.5	10.3	29.0	16.1
Central America and Caribbean	3.4	15.4	20.3	11.5
South America	4.4	11.0	7.9	7.7
C. Overall Average	8.8	13.1	12.8	11.5

[1] A single project.

Loans and Credits for Agriculture, FY1969-71[1]
Total Cost and Number of Participating Farms

		Loan or Credit		Total Project Cost	Number of Participating Farms[3]
		Number	Amount[2]		
			($ million)	($ million)	
FY1969					
Ecuador	Fisheries	555	5.3	6.6	—
Sudan	Mechanized Farming	556	5.0	8.0	140
Guyana	Sea Walls	559	5.0	7.5	—
Zambia	Forestry	562	5.3	11.1	—
Senegal	Agriculture Credit	584/140	6.0	24.1	90,000
Malagasy	Livestock	585	2.8	4.2	—
Turkey	Seyhan Irrigation	587/143	24.0	63.0	4,800
Cameroon	Oil Palm	593	7.9	14.1	900
Iran	Dez Irrigation	594	30.0	74.3	3,700
Korea	Irrigation	600	45.0	89.9	50,000
Philippines	Agriculture Credit	607	12.5	25.0	6,500
Mexico	Livestock and Credit	610	65.0	200.0	4,600
Ivory Coast	Oil Palm	611/12/13	17.1	29.1	5,500
India	Seeds	614	13.0	22.4	400
Paraguay	Livestock	620/156	8.6	15.5	450
Colombia	Agriculture Credit	624	17.0	42.5	2,500
Zambia	Livestock	627	2.5	5.8	—
Indonesia	Irrigation Rehabilitation	127	5.0	8.8	110,000
Kenya	Livestock	129	3.6	11.4	—
Uganda	Livestock	130	3.0	5.1	56
Tanzania	Livestock	132	1.3	2.0	—
Pakistan	Consultants	136	2.0	6.6	—
Papua New Guinea	Agriculture Development	137	1.5	3.3	580
Dahomey	Oil Palm	144	4.6	9.6	4,000
Burundi	Coffee Smallholders	147	1.8	2.1	44,000
Indonesia	Estates I	155	16.0	32.0	—
Pakistan	ADB III	157	30.0	47.7	18,000
FY1970					
Spain	Livestock	633	25.0	52.0	1,050
Philippines	Irrigation	637	34.0	67.5	17,000
Kenya	Forestry	641	2.6	4.0	—
Morocco	Sebou Irrigation	643	46.0	109.5	15,000
Colombia	Livestock	651	18.3	44.1	970
Ceylon	Mahaweli Irrigation	653/174	18.7	50.0	40,000
Iran	ADFI Credit	662	6.5	16.0	131
Malaysia	Jengka II	672	13.0	28.6	3,000
Malaysia	Forestry	673	8.5	12.4	1,200
Zambia	Commercial Farming	685	5.5	11.1	300
Ivory Coast	Cocoa	686	7.5	13.6	22,400
Uruguay	Livestock	698	6.3	13.1	1,000
Ghana	Fisheries	163	1.3	2.3	—
Ceylon	Drainage	168	2.5	4.1	10,000
Ethiopia	Wolamo Agriculture Dev.	169	3.5	5.1	7,050
Bolivia	Livestock	171	1.4	2.3	110
Ecuador	Livestock	173	1.5	2.5	60
Papua New Guinea	Agriculture Development	175	5.0	8.8	1,020
India	Irrigation	176	35.0	66.7	176,000
Honduras	Livestock	179	2.6	5.2	135
Egypt	Drainage	181	26.0	147.0	250,000
Pakistan	Irrigation	184	13.0	22.7	60,000
Ethiopia	Agriculture Development	188	3.1	4.4	—
India	Gujarat Credit	191	35.0	67.0	26,840

Loans and Credits for Agriculture, FY1969-71[1]
Total Cost and Number of Participating Farms

		Loan or Credit		Total Project Cost	Number of Participating Farms[3]
		Number	Amount[2]		
			($ million)	($ million)	
Indonesia	Estates II	194	17.0	31.7	—
Indonesia	Irrigation Rehab. II	195	18.5	37.0	372,000
Afghanistan	Agriculture Credit	202	5.0	7.2	7,000
India	Punjab Credit	203	27.5	40.0	8,000
Ghana	Cocoa	205	8.5	15.6	5,000
Niger	Agriculture Credit	207	0.6	0.9	25,000
Pakistan	Tubewells	208	14.0	45.0	45,000
Pakistan	Irrig. Engineering	S-8	0.8	1.4	—
FY1971					
Israel	Agriculture Credit	709	20.0	49.0	7,000
Jamaica	Agriculture Credit	719	3.7	8.0	140
Philippines	Rice Processing	720	14.3	21.0	—
Guatemala	Livestock	722	4.0	7.8	300
Colombia	Caqueta Land Settlement	739	8.1	21.6	6,300
Mexico	Livestock III	747	75.0	192.5	10,900
Greece	Groundwater Development	754	25.0	50.0	6,000
Ivory Coast	Palm Oil and Coconuts	759/760	7.0	17.6	2,300
Turkey	Fruit and Vegetables	762/257	25.0	44.0	4,500
Nigeria	Western State Cocoa	764	7.2	11.6	8,000
Spain	Personnel and Training	768	12.7	28.2	—
Uruguay	Livestock III Supplement	773	4.0	21.4	3,000
Indonesia	Fisheries	211	3.5	4.3	—
Uganda	Tobacco	212	4.0	7.3	6,000
Malagasy	Alaotra Irrigation	214	5.0	8.2	2,900
Tanzania	Tobacco	217	9.0	14.7	15,000
Indonesia	Irrigation Rehab. III	220	14.5	29.1	260,000
Guyana	Livestock	221	2.2	4.4	—
Ecuador	Livestock III	222	10.0	19.7	575
Upper Volta	Cotton	225	6.2	9.4	46,000
India	Andhra Pradesh Credit	226	24.4	45.0	40,000
India	Agro-aviation	230	6.0	8.8	—
Korea	Livestock	234	7.0	12.6	700
Turkey	Livestock	236	4.5	7.5	300
Mauritius	Tea Development	239	5.2	7.0	3,730
Malawi	Lilongwe II	244	7.3	8.6	52,000
Dominican Republic	Livestock	245	5.0	9.0	260
Afghanistan	Khanabad Irrigation	248	5.0	6.0	6,000
India	Haryana Credit	249	25.0	44.5	20,000
India	Tamil Nadu Credit	250	35.0	62.3	50,000
Senegal	Casamance Rice	252	3.7	4.8	5,000
Senegal	Terres Neuves	254	1.4	1.6	550
Indonesia	Tea	259	15.0	24.9	—
Bolivia	Livestock	261	6.8	11.0	3,000
Indonesia	Seeds	246	7.5	12.0	—

[1] Excludes a multipurpose project in Yugoslavia and a supplemental loan for the Tarbela Dam, Pakistan.

[2] Net of cancellations.

[3] Where no number is given, the concept of "participating farms" is not applicable to the project.

Number of projects: 94
Total cost: $2,500 million
Bank and IDA financing: $1,200 million
Number of participating farmers: 2 million (in 73 projects costing $2,300 million, involving $1,100 million of Bank and IDA financing).

Distribution of Project Investment and Numbers of Participating Farms by Size of Project Investment per Farm[1]

(For those 73 projects listed in Annex 14 for which the concept of "participating farms" is applicable.

A. Distribution of Project Investment

Amount of project investment in approximate 20% groupings, ranked by project investment per farm. ($ million)	PROJECT INVESTMENTS PER FARM AVERAGE $	PROJECT INVESTMENTS PER FARM RANGE $	NUMBER OF PARTICIPATING FARMS	NUMBER OF PROJECTS
436.2	43,721	20,910-122,140	9,977	17
468.5	15,513	9,780- 20,080	30,200	9
482.4	5,729	3,430- 9,530	84,200	14
467.3	1,699	1,120- 3,120	275,020	14
456.6	285	20- 1,030	1,602,450	19
(All projects) 2,311.0	1,154	20-122,140	2,001,847	73

B. Distribution of Numbers of Participating Farms

Numbers of participating farms in approximate 20% groupings, ranked by project investment per farm.	PROJECT INVESTMENTS PER FARM AVERAGE $	PROJECT INVESTMENTS PER FARM RANGE $	AMOUNT OF PROJECT INVESTMENT ($ million)	NUMBER OF PROJECTS
399,397	4,643	1,120-122,140	1,854.4	54
367,450	674	410- 1,030	247.5	9
372,000	330	200- 380	122.9	4
312,000	121	110- 160	37.7	2
551,000	88	20- 100	48.5	4
(All projects) 2,001,847	1,154	20-122,140	2,311.0	73

[1] Project investment per farm is defined as the total investment in a project, divided by the number of farms participating in it. The data thus ignore the distributional pattern of investment per farm within individual projects.

Annex 16

Summary of World Bank's Activities in Agriculture, with Projections through FY1976

	Actual			Program		Actual [1]		Program
	1969	1970	1971	1972	1973	1964-68	1969-73	1972-76
Sector Surveys	–	3	3	5	7		18	41[2]
Commitments (US$ million)	366	414	446	510	690	600	2,400	3,630
% of Total Bank and IDA	21	19	18	18	24	12	20	22
Number of Countries	24	23	27	35	40	28	74	83
Lending Operations (No.)	28	32	36	42	53	46	190	273
% of Total Bank and IDA	25	27	28	29	32	17	28	32
Projects under Supervision at End of Fiscal Year	87	103	120	141	170	40[3]	124[3]	189[3]

[1] Including scheduled for FY1972-73.
[2] Includes 5 repeat missions
[3] Annual average over period.

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