AGRICULTURAL DEVELOPMENT AND EMPLOYMENT GENERATION

by

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SUBJECT: Transmittal of Concepts Paper on "Agricultural Development and the Demand for Food"

TO: John Eriksson
Associate Assistant Administrator
Bureau for Program and Policy Coordination

I am pleased to transmit to you the following report: "Agricultural Development and the Demand for Food". The report is the result of a project (Number 930-0091) undertaken under a participating agency service agreement between the U.S. Agency for International Development and the U.S. Department of Agriculture.

The approach used in the study is to assess the employment, output and effective demand effects of alternative development patterns. This approach makes it possible to account for the direct as well as the numerous indirect and interaction effects that characterize the development process. Also, it permits the definition of an "ideal model" of agricultural development that can be used to develop policy and program guidelines for AID as well as a basis for setting goals for U.S. development assistance. Conversely, it becomes the basis for avoiding inappropriate goals for U.S. development assistance and circumventing LDC policies that are likely to produce "undersirable models" of agricultural development.

The first three chapters of the report develop the framework for the analysis by examining recent development experience and defining development models. Chapter IV analyzes the "functional areas" used by AID in its programming process for their potential impact on employment generation and growth of effective demand. The interrelationships among the functional areas and the determination of priorities for development assistance activities are discussed in Chapter V. The last chapter presents a brief summary and the major conclusions of the study. An Executive Summary provides a concise statement of the recommendations and priorities for development assistance activities.

The objective of the study as set forth in the statement of work was to prepare a concepts paper that identified programs, policies, and projects that would be most likely to generate an increase in the rate of growth of effective demand of poor people in developing countries. The statement of work emphasized that the final report was to indicate the relative effectiveness of alternative instruments (policies and projects) in terms of their ability to augment the rate of growth of employment, output and effective demand of poor people. As the study evolved it became evident that an approach that attempted to analyze directly the relationship between alternative instruments (policies and projects)

and employment, output and effective demand was not feasible due to the lack of sufficient time to obtain and analyze information on the complex indirect and interaction effects underlying the relationship. The development process is characterized by indirect effects that are often greater than direct effects. Moreover, the magnitude of both effects depends on how an investment interacts with--reinforces or depreciates--the effects of other on-going economic activities. Another complicating factor is the large variability in the time lag between direct and indirect effects. Some of the most significant effects of an investment may not be realized for a decade or more. It was the lack of time and information on these indirect, interaction and time lagged effects that led to the use of an alternate approach to achieve the study's objectives.

Based on our experience with this study we recommend that AID consider two options for continuing its work on identifying programs, policies, and projects that would be most likely to generate an increase in the rate of growth of effective demand of poor people in developing countries. The first option would entail additional research on the relationship between alternative instruments and employment, output and effective demand. This will involve indepth research specifically designed to estimate the indirect, interaction, and delayed employment effects of alternative instruments. It will require a careful analysis of specific development instruments (policies and/or projects) in the LDC's, and to be useful to AID, it will have to devise a procedure to generalize the results beyond the immediate environment of the research project. That is, the unique conditions exogenous to the specific instruments analyzed would have to be accounted for and a procedure to generalize the employment effects of the instruments would have to be developed. A large number of instruments (policies and projects) would have to be analyzed before AID could use the information generated as a generalized program guidance tool. Under this option the employment effects of essentially all relevant instruments would have to be determined before AID could compare the relative merits of alternative instruments. While this research would generate additional useful information, it would require a large quantity of resources and an extended period of time to complete.

The second option would entail research on how to design and implement the dispersal strategies that are needed to bring about a USF pattern of development. That is, research to identify the constraints to and opportunities for pursuing dispersal strategies in the LDCs. In essence this research would focus on how to modify LDC policies. Its objective would be to design and develop a process and procedure for establishing a long-term strategic approach to setting priorities on US agricultural development assistance projects in individual countries in order to increase employment, output and effective demand of the poor. This would entail developing a procedure to (1) determine where a country is with respect to achieving a USF pattern of development and to assess what types of constraints may frustrate attempts to evolve a USF pattern of development, (2) assess the degree of opportunity to use alternative means (modification of macropolicies, land reform, distribution of nonland assest, etc.) to facilitate progress towards a USF pattern of development, (3) decide what <u>needs</u> to be done in the long term and what <u>can</u> be done in the short term, and (4) develop a tactical or contingency plan to take advantage of improved opportunities to accelerate progress towards the USF pattern of development as socioeconomic and political conditions change. This option in essence involves developing a procedure that

AID could use in any country to design, implement and update a long-term strategic approach for setting priorities on US agricultural development assistance. It will not require as many resources nor be as time consuming as option one and could be applied on a country by country basis to test its utility.

The two options outlined above entail very different types of research. Option one assumes that insufficient information exist to design long-term strategies for achieving a USF pattern of agricultural development and that additional research is needed before such strategies can be designed. Option two assumes that a USF pattern of development is desirable and that sufficient knowledge exist on the relationship between instruments and employment generation and effective demand and that this can be coupled to a careful analysis of the socioeconomic and political conditions in a country to determine an efficient long-term sequence of development assistance activities. Responsible professionals will recognize that there are good arguments to support both assumptions. AID may wish to pursue either option or a combination of the two depending on the quantity of resources it has available for this type of research.

On behalf of the members of our staff and Bruce Johnston at the Stanford Food Research Institute, I extend my appreciation to you for the opportunity to contribute to this important area of work and for the open and frank environment between AID and the USDA in which the work has been undertaken.

T. KELLEY WHITE
Director
International Economics Division

FOREWORD

This concepts paper addresses an important and timely issue--agricultural development and generating expanded employment opportunities and thereby increasing the effective demand for food and other essential commodities of the poor in less developed countries. It was prepared in response to a growing recognition that one of the main contributors to the seriousness and extent of rural poverty in the low income developing countries is the persistence of unemployment and underemployment. Some 60 to 80 percent of the population and labor force in these countries are still dependent on agriculture and governments face formidable problems in providing employment opportunities for this rapidly growing labor force. This analysis emphasizes the need for a long-term strategic approach to fostering a broadly based agricultural development based on labor-using, capital-saving technologies which facilitate rapid increases in opportunities for productive employment both within and outside the agricultural sector.

The report is the product of a project undertaken under an agreement with the United States Agency for International Development. Dr. Bela Mukhoti made significant contributions to all parts of the report and her extensive collaboration with AID professionals during the conceptualization and design phase of the study was critical to the initiation of the work. Many of the ideas in the report draw heavily on her previous work. Included in the previous works are Dr. Mukhoti's doctoral dissertation, journal articles published in the 1960's and 1970's dealing with agrarian structure and its relationship to agricultural development, and in particular an unpublished paper on "Patterns of Technological Transformation of Agriculture and Economic Development" prepared for presentation at the 1980 Allied Social Science Convention in Denver, Colorado. Dr.

Bruce Johnston has drawn heavily on his extensive knowledge of the development arena and made an invaluable contribution to writing all parts of the report. His contribution drew heavily on his joint book with Peter Kilby Agriculture and Structural Transformation and on his book Redesigning Rural Development: A Strategic Perspective that he wrote in collaboration with William C. Clark. Johnston has requested that particular acknowledgement be given to Clark's contribution to some of the ideas presented here. The policy analysis perspective of this paper and its treatment of issues of organization and management draw heavily on chapters in their joint book that were written mainly by Clark. Dr. Lon Cesal was involved in all phases of the study and made a major contribution to bringing the various facets of the study together into a final report. Also, he made a major contribution to writing some parts of Chapter V. Finally, the authors are indebted to Dr. I. J. Singh of the World Bank for making available draft chapters from his forthcoming monograph Small Farmers and the Landless in Asia. The ideas and information contained in those chapters have been of considerable value.

The recommendations presented in the paper add another important dimension to those given in the AID Agricultural Development Policy Paper issued in 1978. They have important implications for the design and implementation of U.S. develoment assistance policies and should be given careful consideration by AID as well as by professionals concerned with development in the late developing countries.

T. KELLEY WHITE
Director
International Economics Division

EXECUTIVE SUMMARY

1. The objective of this analysis is to suggest guidelines for identifying policies and programs to generate expanded employment opportunities and thereby increased effective demand of the poor for food and other essential commodities in less developed countries. The approach used is to assess the employment, output and effective demand effects of alternative development patterns.

2. Broadly based agricultural development that is based on uniformly small farms (USF)--that involves a large and growing percentage of a country's farm population in the process of technological change, is much more effective in expanding employment opportunities and generating increased income and growth of effective demand than a dualistic pattern of development that is based on a dual size structure of farms (DSS)--that confines increases in productivity and output to a subset of large-scale, "modern" farm enterprises. It is the increase in backward, forward, and final demand linkages under the USF pattern of development that tends to encourage the growth of ever more differentiated factor and product markets. The increasing differentiation in these markets in turn propels the development process and expands employment opportunities, output, and effective demand both within and outside the agricultural sector.

3. Unless there are very special circumstances, the USF and DSS patterns of agricultural development tend to a considerable extent to be mutually exclusive. A development policy which focuses on promoting rapid growth of output within large-scale farm enterprises results in resources of

capital and management being concentrated within that subsector. This in turn reduces opportunities for small farmers to participate in the technological transformation and commercialization process of the agricultural sector.

4. A successful USF pattern of agricultural development depends on designing and implementing "dispersal strategies" that disperse government efforts and resources of capital and management over essentially the entire agricultural sector. A key characteristic of these dispersal strategies is that increases in productivity and output are based on labor-using, capital-saving technologies which expand employment and income opportunities for family labor, and many instances hired labor as well, among a large and growing number of small-scale farm unit.

5. Development assistance agencies should give special attention to planning and policy analysis in order to identify opportunities to modify macroeconomic policies so that instead of accentuating a USS pattern of development they are supportive of small farm development. Trade, foreign exchange, tax and credit policies often militate against small farmers and in favor of large farmers and much the same applies to manufacturing firms outside the privileged enclave of "modern sector" firms. Normally it will not be possible to influence these policies directly. However, strengthening the capability of countries to conduct professional, unbiased policy analyses would provide professional and political leaders with a stronger rationale to change policies that militate against small farmers and small firms in the nonfarm sector.

6. A redistributive land reform is an especially desirable measure for promoting a USF pattern of agricultural development. While there are normally

very limited opportunities to directly support a major land reform program in most countries, it may be possible for AID, preferably in a concerted effort with other donors, to strengthen a support coalition that is genuinely committed to land reform. There may also be opportunities to help in laying the basis for a successful land reform when and if there is a change in the political climate.

7. Agricultural research and extension programs are of fundamental importance to locally adapted "dispersal strategies" that must be available to small farmers in order to realize a USF pattern of development. Four major problem areas are limiting the positive impact of the development and diffusion of new technology in promoting the expansion of employment opportunities and increasing effective demand among the rural poor: (1) the "yield gap" problem related to the large difference in yields obtained by the great majority of farmers and the yields obtained on agricultural experiment stations; (2) under investment in national agricultural research programs, especially in the countries of tropical Africa; (3) inadequate attention to the special problems of increasing productivity of small farmers under rainfed conditions; and (4) policies that have tended to negate the positive effects of technological progress on the expansion of employment opportunities and increase of effective demand. All of these need increased emphasis by development assistance agencies.

8. Development assistance agencies should encourage and support the use of labor intensive methods to construct and maintain rural infrastructures. Also, they should support efforts to strengthen the organizational and management techniques that are needed in the LDCs to design and imple-

ment infrastructure projects that use labor intensive techniques.

9. Development assistance support for marketing, storage, inputs supply, and credit should concentrate on assistance for strengthening facilitative and regulatory actions; improving facilities for public markets and storage, introducing standard weights and measures, and the disseminations of reliable price information are representative examples. The essential commercial functions of marketing farm products and distributing inputs do not merit priority in the allocation of government resources and should be left to the private sector.

10. While the most important requirement for stimulating the growth of rural based industries is generating widespread increases in income and effective demand of the farm population, development assistance agencies can contribute to fostering rural industrialization and thus rural employment through support for training and extension programs to upgrade the technical skills of small- and medium-scale workshops and through support for developing and defusing simple items of farm equipment. Also, development assistance agencies can encourage and support reforms in a country's macroeconomic policies which will have the effect of lessening obstructions to the creation and growth of small, labor-intensive firms and lessening directly or indirectly subsidization of large-scale, capital-intensive firms in a privileged modern sector.

11. Ancillary activities offer an opportunity to rather quickly increase employment, income, and effective demand among small farmers and even landless families if they have access to small houseplots. Activities that merit attention include dairy, poultry, pigs, fish ponds, woodlots and charcoal, and handicrafts. The principal role for development assistance

agencies in supporting these types of activities is likely to be in assisting in the subsidized distribution of nonland assets such as a cow, baby chicks or pigs.

12. Strengthening local participation and the performance of various "facilitator organizations" is critical to providing the "public goods" such as research, extension, and irrigation systems that make possible a USF pattern of agricultural development. While improving administrative capabilities in a developing country is inevitably difficult and a time-consuming process, there is still an urgent need for development assistance agencies to support efforts to advance the "state of the art" as it relates to methods of increasing the competence of research, extension, health, and other facilitator organizations as well as evolving more effective methods of fostering local organizations.

13. While food aid is controversial, its political popularity assures that it will continue to play an important role in U.S. development assistance policy. There is a large unrealized potential to use Title III of P.L. 480 to support the dispersal strategies that are needed to achieve a USF pattern of agricultural development. A number of recommendations on improving the operation of P.L. 480 in general, and Title III in particular, are contained in a task force report to the Secretary of Agriculture; AID should carefully considered these and invest more of its management resources in making Title III more effective as a development assistance tool.

14. For most production processes and for commercial functions such as marketing agricultural products and distributing farm inputs, price and market mechanisms have a significant advantage in transmitting

information and in harmonizing the decisions of million of small farmers and producers of other goods and services. The importance of a major and dynamic role of the private sector is further reinforced by the high opportunity cost of overburdening government administrative capabilities. There are many essential functions which will not be performed adequately if at all by private firms, and if LDC governments are to be most effective, they should focus their limited resources on ensuring a high standard of performance by government organizations in accomplishing the enormously important tasks where governmental decisionmaking and action are indispensable.

15. Achieving a USF pattern of agricultural development will take decades in most LDCs. Thus, there is a need for AID to adopt a long-term strategic approach to setting priorities for U.S. agricultural develoment assistance if the objectives of increasing employment, output and effective demand of the poor are to be achieved. Each country is different, and while no general blueprint can be prepared in advance, an important part of deciding what to do in a specific country is to identify efficient sequences of actions. This involves first assessing constraints and identifying opportunities in order to decide what needs to be done in the long term and what can be done in the short term. AID should invest more of its management resources in making these assessments and identifying the efficient sequences of actions that are needed to achieve a USF pattern of development in the LDCs.

16. It is recommended that AID undertake additional research on how to design and implement agricultural development strategies that will accelerate the rate of growth of effective demand of the poor in the late

developing countries. Very little is known about what constitutes an effective long-term (10-30 year) strategy--what are its principal and minor components? How do these interact? How do they change both in terms of size and substance over the long-term? What is the appropriate sequence of emphases on different components over time? While some work has been done on identifying and testing the effectiveness of individual components of agricultural development strategies, no attempt has been made to identify the general principles underlying the design and implementation of the complete complement of components that make up a long-term strategy. Research is needed not only to assist the LDCs to design their development strategies, but to assist development assistance agencies to design and manage their programs in these countries.

Chapter I

INTRODUCTION

The purpose of this paper is to suggest guidelines for identifying policies and programs that are likely to be effective in generating expanded employment opportunities and increasing the effective demand of the poor for food and other essential commodities in less developed countries. The basic premise of the paper is that an appropriate pattern of agricultural development can play a crucial role in attaining the multiple objectives of development. It is in that sense a sequel to AID's Agricultural Development Policy Paper (June 1978) which emphasized "a broadly participatory, employment-oriented agricultural production strategy for developing countries." The existing policy paper, while it recognizes the need for a simultaneous emphasis on increased supply of agricultural output and expanded employment and income opportunities for low income families (thereby increasing the effective demand for agricultural output), tends to focus more on the supply than on the demand side of the equation. The analysis presented in this report focuses on both supply and demand, but tends to emphasize the importance of accelerating the rate of growth in effective demand of the poor in the LDC's via employment generation.

The approach used in the study is to assess the employment, output and effective demand effects of alternative development patterns. This makes it possible to define an "ideal model" of agricultural development that takes into account the numerous direct, indirect, and interaction effects associated with alternative patterns of development. This "ideal model" then becomes the basis for setting goals and developing guidelines for AID policies and programs that are founded on actual development experience. Conversely, it becomes the basis for avoiding development assistance policies that lead to "undesirable

models" of agricultural development.

During the past decade there has been a lively and inconclusive debate about the objectives and content of development strategies. In the 1950s and 1960s, development strategies focused primarily on increasing the growth of GNP by rapid industrialization and the transfer of "surplus" population from the traditional rural sector to the industrial and tertiary sectors. This included an emphasis on the process of capital accumulation and the need to raise the level of savings and to supplement domestic resources with an inflow of external capital. For agriculture, however, there was also an emphasis, particularly in AID programs, on building national institutions, especially in agricultural research, education, and extension. Support for India's agricultural universities was a notable example.

In terms of the growth of total GNP, the decades of the 1950s, 1960s and 1970s could be judged to have been rather successful for most of the developing countries. The growth of per capita GNP, however, was much less satisfactory because of the persistence of rapid rates of population growth in most of the lower income developing countries. Moreover, there was an accumulation of evidence indicating that a large fraction of the population --especially in rural areas--was benefiting very little from the overall economic growth. As a result, a large and growing number of families remained in a condition of absolute poverty associated with unemployment and underemployment, widespread malnutrition, and high rates of mortality and morbidity, particularly among infants and small children.

One response to that concern with the shortcomings of previous development efforts was to stress the importance of expanding employment opportunities. Emphasis soon shifted, however, to an emphasis on the reduction of

poverty by meeting "basic human needs." In the United States, amendments to the Foreign Assistance Act directed that an increasing amount of aid should be directed toward improving the well-being of the poor majority. This focus on "basic human needs has served a useful purpose in emphasizing that cerain needs related to food, nutrition, and health are indeed more "basic" than others. It also underscored the importance of being concerned not only with the growth of average GNP but also with the distribution of income gains among different segments of the population and with the composition of the goods and services produced and consumed.

There is no agreement, however, concerning the type of development strategies that would be effective in implementing a "basic human needs" approach. A major thesis of this paper is that emphasis on a dichotomy between the goals of growth and of equitably satisfying basic needs is unnecessary and unproductive. We argue instead that development strategies must be concerned with both the rate and the pattern of growth. In particular, we emphasize the advantages of an agricultural development strategy that is capable of simultaneously achieving high rates of growth of agricultural output and widespread increases in income and in effective demand by promoting the progressive modernization of the small-scale family farms that predominate in a developing country (Mukhoti, 1966, 68, 78, 80).

Such a strategy has significant economic advantages in achieving sector-wide increases in agricultural output at low cost. Being based on labor-using, capital-saving technologies appropriate to the factor endowment of developing countries, it leads to fuller and more efficient utilization of the rural work force. In contrast, capital-intensive technologies lead to the displacement of labor from agriculture in a situation in which there

are few opportunities for alternative employment because of the very limited development of manufacturing and other nonfarm sectors. Moreover, emphasis on gradual but widespread increases in the use of divisible, yield-increasing inputs permits sizable increases in "total factor productivity"--i.e., output per unit of all inputs--because technological innovations such as high-yield, fertilizer-responsive varieties enhance the productivity of the land and labor resources already committed to the agricultural sector. At the same time this type of agricultural strategy has significant social advantages. Expanding the opportunities for productive employment at a rate which exceeds the growth of the labor force seeking employment leads to a tightening of the labor supply/demand situation and a steady and widespread increase in returns to labor. The resulting increases in incomes and in effective demand make possible the higher levels of food consumption needed to eliminate malnutrition and other serious manifestations of poverty.

Our emphasis in this paper is on the effects of alternative development strategies on the rate and pattern of growth of agricultural output, but we recognize that those production-oriented policies and programs need to be supplemented by a selective strengthening of social service programs related to education, health, and family planning. This is particularly true for infants and small children because the high mortality and morbidity rates of that vulnerable group are a consequence of the two-way interactions between malnutrition and frequent bouts of diarrhea and other infectious diseases. In addition, efforts to slow the rapid growth of population that accentuates the difficulty of achieving full employment and reducing poverty can be facilitated by linking efforts to promote family planning with low-cost health programs which achieve broad coverage of a country's rural as well as

urban population. Experience demonstrates that such programs can simultaneously improve the prospects for child survival and the awareness on the part of parents of those improved prospects.

To simply assert the advantages of a broadly based, employment-oriented agricultural strategy is only a first step. An initial obstacle is that many development specialists and policymakers are skeptical of an agricultural strategy aimed at increasing the productivity of a country's small farmers. An exceptionally able Asian economist and former member of India's Planning Commission has called attention to this problem when he emphasizes "that policymakers harbour serious doubts about a small-farm structure" and "regard it at best as an inefficient and transitional mode of production" (Krishna, 1979, p. 1). It is indeed "transitional." But because of the structural and demographic characteristics of the lower income developing countries, it will be several decades at least before economic growth and the process of transforming the structure of the predominantly agrarian economies in the lower income developing countries will make it possible to reduce their farm population and labor force and reverse the present trend toward an increasingly small average size of farm units.

A priori reasoning is incapable of resolving the debate about the choice of strategy for agricultural development. The issues are so complex and the number of interacting variables so great that "intellectual cogitation" alone is not equal to the task of providing reliable guidance for the design and redesign of strategies for agricultural development. We have therefore supplemented a "thinking through" approach with an analysis and interpretation of past experience in Chapters II and III. This led to the identification of three alternative models of agricultural development:

(1) The Dual-Size Structure Model (DSS model)

(2) The Uniformly Small Farm Model (USF model)

(3) The Mixed Characteristics Model

The three models differ in terms of (a) equality or inequality in the ownership and access to land and other assets; (b) macroeconomic policies affecting relative prices and access to resources; and (c) sectoral policies determining the type of technologies available to and adopted by farmers.

The historical experience of Japan and Taiwan is of special interest in demonstrating the feasibility and the desirability of pursuing a USF pattern of agricultural development. This pattern made it possible to achieve a rapid expansion of opportunities for productive employment and widespread increases in income and in effective demand. The development and diffusion of new technologies, investments in rural infrastructure, and actions related to other functional areas provided a basis for disperal strategies that enabled a large and increasing percentage of farm households to participate in the process of technological change and in increases in income.

The lessons to be derived from the historical experience of Japan and Taiwan take on added significance because of a theme that has dominated much of the development literature. Preoccupation with dualistic development models that have emphasized the existence of "surplus labor" in agriculture has often been linked to theories about the determination of agricultural wages and the incomes of farm households which have assumed or asserted that farm wages and earnings tend to be rigid. Much of this literature has emphasized an "institutional wage", a "subsistence wage", or even a "nutrition-based efficiency theory of wage", and as a consequence there has been a tendency to neglect the fundamental importance of factors influencing the supply of labor and the demand

for labor. A recent critical review by Binswanger and Rosenzweig (1981) of employment, wages, and tenure and other contractual arrangements in rural labor markets has provided a comprehensive theoretical and empirical review of these issues. A major conclusion of their important monograph is to reaffirm the importance and considerable validity of "the principles of the supply-demand, competitive model" in spite of the institutional features that characterize rural labor markets in developing countries. They also stress that better understanding of the long-term changes in returns to labor calls for explicit study and analysis of "the reproductive and technological behavior that leads to the long-term evolution of supply and demand" (Binswaanger and Rosenzweig, 1981, pp. 2, 55). We argue here that the relatively rapid growth in the demand for labor, the long-term increases in returns to labor, and the reductions in fertility that have been associated with agricultural development in Japan and Taiwan also tend to confirm the importance of a demand-supply framework. 1/

The development of high-yield, fertilizer-responsive varieties of rice and other major crops, combined with the expansion and improvement of irrigagation and drainage, constituted the overwhelmingly important dispersal strategy in both Japan and Taiwan. Adoption of a gradually widening range

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1/ In addition to the general development literature, Binswanger and Rosenzweig give considerable attention to papers presented at a 1979 conference held in Hyderabad, India on "Adjustment Mechanisms in Rural Labor Markets in Developing Areas" sponsored by the Agricultural Development Council, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), and the Ford Foundation. Chapters by Umemura, Tussing, Masui, Misawa, and Minami included in Agriculture and Economic Growth: Japan's Experience (Ohkawa, Johnston, and Kaneda, eds., 1969) are especially valuable as empirical and theoretical treatments of the evolution of the rural labor supply-demand situation in Japan.

of improved items of farm equipment also contributed to the growth of output. The farm equipment was simple and inexpensive and enhanced the productivity of labor rather than displacing it. Furthermore, the demand for farm inputs, together with increased demand for consumer goods, provided an important stimulus to the decentralized growth of small- and medium-scale manufacturing units that employed relatively labor-intensive technologies.

During the post-World War II period redistributive land reform programs in Japan and Taiwan reinforced the USF pattern of agricultural development and reduced the inequality in income distribution. It is important to recognize, however, that these countries were pursuing a USF pattern of agricultural development long before the redistribution of land ownership under the postwar land reforms. The considerable concentration of land in large ownership units, however, was not reflected in the size distribution of operational or management units. Large landowners invariably rented out their land to tenants so that agricultural production was carried out by uniformly small units, although many of them were tenants or part-tenants rather than owner-cultivators. Because of the scarcity of land relative to the large number of farm households, the large landlords were able to demand rental payments equal to some 50 percent of the output produced by tenant cultivators. This resulted in a highly skewed pattern of income distribution. Nevertheless, tenants and landlords had a common interest in increasing productivity and output by adopting divisible, yield-increasing innovations appropriate to the labor-using, capital-saving technologies employed by the uniformly small farm units.

In contrast, the DSS pattern of agricultural development that prevails in many of the contemporary developing countries is characterized by a concentration of agricultural land in a subsector of large and relatively

capital-intensive farm enterprises. These large farms employ technologies which differ drastically from those employed by the great majority of farm units. Because of price distortions--underpricing of capital and foreign exchange--and other effects of macroeconomic and trade policies, the large-scale subsector has preferential access to resources. Moreover, since that subsector accounts for the bulk of commercialized production, the large firms are not subject to the severe cash income and purchasing power constraints that characterize the agricultural sector in countries where the number of farm households is very large relative to the nonfarm population dependent on purchased food. Hence, the large farm units are able to invest in labor-displacing mechanical equipment as well as in fertilizers and other yield-increasing inputs. This concentration of cash income in the large-scale subsector, however, intensifies the purchasing power constraint for the great majority of small farm units. And in countries where land is scarce, the concentration of land in the large-scale subsector means that the size of the farm units in the small-scale subsector is even smaller than the small average size because the number of farm units in the small-scale subsector is so large relative to the total area of farm land. (We note, for example, that in India the average farm size declined from 5.0 to 3.8 acres between 1961-62 and 1971-72).

Most of today's lower income developing countries confront a choice between the USF and DSS models because to a considerable extent these alternative patterns of agricultural development tend to be mutually exclusive. The intensified purchasing power constraint that small farms face within a DSS pattern makes it exceedingly difficult to implement dispersal strategies. In addition, the scarce resources of capital, foreign exchange, and

trained manpower tend to be concentrated on focus strategies which benefit the large-scale subsector. Focus strategies may also benefit a very limited number of small farms, but they are so resource-intensive that they cannot be widely dispersed among the great majority of the farm population.

Many of the contemporary developing countries represent what we have referred to as a "mixed characteristics" model. This pattern of agricultural development involves a mixture of large and relatively capital-intensive farm enterprises coexisting with a much larger number of small-scale farms; but the large-scale subsector is not as dominant as in the DSS model.

We review the development experience of four countries--Kenya, Tanzania, Costa Rica, and Malaysia--which represent diverse conditions and illustrate very different examples of a mixed characteristics model. The experience of Malaysia is of particular interest. Owing to a virtually unique combination of factors, Malaysia is an exception to our generalization that a strong emphasis on focus strategies precludes the possibility of successfully implementing dispersal strategies. Our analysis of the special circumstances that enabled Malaysia to emphasize focus strategies in the development of a plantation sector and at the same time to implement dispersal strategies that led to widespread increases in smallholder productivity and income highlights the importance of certain characteristics of a developing country that are particularly relevant to the choice of an agricultural strategy.

Three factors--per capita income, the share of agriculture in the country's total labor force, and the nature of a country's resource endowment--stand out as being particularly important in determining the nature of its development problems and the strategic options that are feasible. The first two factors are particularly useful in defining a typology of developing

countries because they are so highly correlated. A brief examination of data for 38 low-income, 52 middle-income, and 18 industrialized countries emphasizes that with few exceptions the low-income developing countries are also characterized by having a large share of their labor force in agriculture--77 percent in 1960 and still 72 percent in 1978. On average the share is much lower in the middle-income developing countries; and the decline in agriculture's share from 58 percent in 1960 to 45 percent in 1978 was considerably greater than the decline registered in the low-income countries. In the industrialized countries, the average share of agriculture in the labor force was only 17 percent in 1960, and by 1978 a mere 6 percent of the labor force was in agriculture. A brief review of trends in fertility, mortality, and in rates of natural increase lends support to the earlier statement that this structural characteristic of the low-income developing countries will continue to be a fundmentally important characteristic for many years. It is this characteristic, of course, which underscores the crucial importance of a pattern of agricultural development that fosters increases in farm productivity among the great majority of farm units so as to generate expanded opportunities for productive employment in agriculture and widespread increases in income and in effective demand.

Even though a majority of developing countries may continue to correspond to our mixed characteristics model, we believe that the empirical evidence and theoretical analysis both emphasize the importance of their approximating a USF pattern of development as closely as political and other constaints permit. Although we recognize the importance of political factors in shaping development strategies, we emphasize that they exert their influence in specific functional areas. We conclude that policies and investment pro-

grams in seven functional areas will largely determine the success of efforts to influence the rate and pattern of agricultural development.2/

(1) asset distribution and access,

(2) planning and policy analysis,

(3) development and diffusion of new technology,

(4) investments in rural infrastructure,

(5) policies and programs related to marketing and storage, input supply, and credit,

(6) rural industry and ancillary activities,

(7) institutional development: improving organizational structures and managerial procedures.

In Chapter IV we analyze each of the functional areas in order to assess the potential impact of policies and programs on employment generation and the increase of effective demand. The effects will, of course, be quite different in countries characterized by a USF pattern of agricultural development as compared to a DSS pattern. The adverse effects of a DSS pattern on employment expansion and on the growth of effective demand will be especially serious in the low-income, late-developing countries where the bulk of the population is still dependent on agriculture for employment and income. Differences in the availability of agricultural land and other features of a country's resource endowment also emphasize the location-specific nature of the problem of designing and implementing agricultural strategies.

In our discussion of the development and diffusion of new technologies,

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2/ The differences between this set of functional areas and the five functional areas singled out for attention in AID's 1978 Agricultural Development Policy Paper are explained in section D of Chapter III.

we emphasize that many of today's developing countries confront a more difficult task than Japan or Taiwan in evolving dispersal strategies. This is a consequence of their dependence on farming carried out under rainfed conditions rather than the relatively homogeneous and controlled conditions in Japan and Taiwan where irrigated agriculture predominates. Moreover, in many of the contemporary developing countries, especially in tropical Africa, the scope for expanding irrigation is limited which means that agricultural research and extension programs must confront the special problems of increasing productivity and output among small farmers operating under rainfed conditions.

In Chapter V we address the problem of setting priorities for U.S. development assistance. Priorities are identified in relation to the requirements for progress toward a USF pattern of development. This is justified because the USF model is so much more effective than the DSS model in providing employment for a rapdily expanding rural labor force, increasing agricultural output, and accelerating the growth in effective demand of the rural poor. The need to develop a long-term strategic plan to guide establishing priorities for U.S. development assistance activities in individual countries is discussed. It is argued that such a strategic approach is needed to reinforce movement towards the employment-generating USF pattern of development and to offset the "natural" tendencies in many of the LDCs that encourage a DSS pattern of development which tends to retard growth in employment opportunities. Also, it is argued that the development of a long-term strategic plan requires a careful and realistic assessment of the socioeconomic and political circumstances that dominate the country's policymaking process in order to determine, within the context of what needs to be done in the long term, what types of opportunities

exist in the short term for development assistance agencies to further progress towards a USF pattern of development. The long term strategic "plan", with its assessment of constraints and opportunities, is then used to guide decisions on what can be done in the short run while at the same time contributing to what needs to be done in the long term.

Priorities for U.S. development assistance activities are considered both within the context of selectively choosing activities within individual functional areas and highlighting the most appropriate combinations of functional areas for "typical types" of opportunities that may be encountered in individual countries. The "typical types" of opportunities are considered to be variable in the sense that over time a country may move from one "typical" opportunity to another. Within the context of a long-term strategic country plan, a change in the "typical" circumstances that characterize a country sets the stage for changing the combination of development assistance activities that might be supported by AID. To cite the most important example, if the political environment in a country changes from one of active opposition to active support for a USF-type reform, then the portfolio of projects to be supported by AID should change. The long-term strategic "plan" should include a tactical or contingency plan to take advantage of improved opportunities to accelerate progress towards a USF pattern of development. Socioeconomic and political conditions change, some times gradually, but especially in the LDCs, some times very abruptly, and the long-term strategic plan must be designed to quickly take advantage of such change.

Major policy recommendations designed to assist in initiating a U.S. development assistance program that would encourage USF patterns of development in the LDC are summarized in Chapter VI. The thesis underlying these

recommendations is that the focus of some of the programming procedures in AID needs to be altered to facilitate long-term AID support for USF-type development patterns.

CHAPTER II

ALTERNATIVE PATTERNS OF AGRICULTURAL DEVELOPMENT: "DSS" AND "USF" DEVELOPMENT "MODELS"

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ALTERNATIVE PATTERNS OF AGRICULTURE DEVELOPMENT: "DSS" AND "USF" DEVELOPMENT "MODELS"

A. Policy Analysis and the Importance of Learning from Experience

Agricultural and rural development are extraordinarily complex processes because both the rate and pattern of change depend on a great many interacting variables--physical, economic, technological, demographic, institutional, and human. Concern with the rate of growth of agricultural output is obviously critical; most developing countries must expand production by 2 to 3.5 percent merely to prevent deterioration in the per capita availability of food supplies. Improvements in food consumption and nutrition also depend, however, on increases in the effective demand for food. This includes the "reservation demand" of farm households for subsistence consumption of their own production as well as the effective demand for purchased food by farm and, especially, nonfarm families. The pattern of agricultural development, i.e., the extent to which the entire farm population participates in increases in productivity and in agricultural income, have many other significant effects on rural well-being. It also has highly significant effects on overall economic growth and on structural transformation--the process whereby overwhelmingly agrarian economies are transformed into diversified and productive modern economies.

A fundamental proposition of this paper concerns the economic and social advantages of broadly based, employment-oriented agricultural development. This proposition is much more persuasive as an empirical generalization supported by the analysis of historical experience than as a logical deduction. A policy analysis perspective emphasizes the limits of "intellectual cogitation" in thinking through solutions to problems of agricultural development and pre-

dicting their outcomes. Those limitations are especially severe because agricultural development is such a complex, ill-structured problem and the effects of government policies and programs on the rate and pattern of development depend on so many interacting variables. 1/ Thus the outcomes associated with development efforts depend upon complex interactions which cannot be controlled or predicted with much precision. These include technical and economic conditions, policies, institutions, and the responses and performance of farmers, agricultural scientists, administrators and field staff, private firms, and other participants in the development process. Because the essence of the challenge of agricultural development is to promote efficient, evolutionary change of a complex, dynamic system, attempts to formulate agricultural plans on the basis of a subset of variables that can be quantified satisfactorily will inevitably be unsatisfactory because of the problems of "suboptimization." The need in a developing country is to design (and redesign) an agricultural strategy--a mix of policies and programs--which takes account of all of the significant variables, including a number of factors that are exceedingly difficult to quantify but which are too important to ignore. It is also important to emphasize that this should be a continuing, adaptive process which is guided by feedback derived from the experience obtained in implementing programs and learning from both successes and failures.

The 1950s and 1960s were characterized by exaggerated expectations concerning the role of economic planning based on an optimistic faith in man's

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1/ For a more complete presentation of a policy analysis approach to problems of agricultural and rural development, see Johnston and Clark, 1982, especially Clark's Chapter 1 on "Policy Analysis and the Development Process".

abilities to think through solutions to development problems by intellectual cogitation. A statement by India's Prime Minister Nehru epitomizes this optimistic view of intellectual cogitation in its assertion that planning and development "have become a sort of mathematical problem which may be worked out scientifically" (as quoted in Karanjia, 1960, p. 49). At the opposite extreme is the approach to social problem solving which Wildavsky (1979) refers to as "social interaction," an approach which relies not on "thinking through" but rather "acting out" solutions through social processes--market-determined prices, bargaining, voting, and other negotiated or trial-and-error learning processes. In fact, intellectual cogitation and social interaction each have important strengths and weaknesses. Good policy analysis should emphasize the complementary potential of the two approaches and seek means of integrating them (Johnston and Clark, 1982, pages 23-35).

The persistence of widespread and increasing rural poverty in so many developing countries further underscores the fact that promoting agricultural development is complex as well as intractable. The sobering experience of the past 25 years also points to another common pitfall in development planning: the tendency to equate the feasible with the desirable. One version of that pitfall is to assume that because a certain goal is so desirable, it must be feasible as well. Especially in less developed countries, however, resources are scarce, needs are enormous, and there is never enough money, time, or trained manpower for all the important tasks that demand attention. Moreover, the ubiquitous fact that resources have a high opportunity cost means that the feasibility/desirability equation cuts both ways. That is, an apparently realistic penchant for sticking with those things that are demonstrably feasible may also be a pitfall because doing one thing almost

always means not doing something else. All too often, opting for programs simply because they appear to be feasible is likely to preclude the search for other options which could have a much greater impact in reducing rural poverty and in furthering other development objectives.

A central thesis of this paper is that historical experience, especially as illustrated by the patterns of agricultural development in Japan and Taiwan, provides a "model" of a strategy for agricultural development that is both feasible and desirable in simultaneously achieving high rates of growth of agricultural output and generating widespread increases in employment, income, and in effective demand. The experience of Japan and Taiwan is especially significant in demonstrating that it is feasible to design and implement agricultural strategies that are effective in fostering rapid and widespread increases in productivity and output among small-scale farm units employing labor-using, capital-saving technologies. Their experience further demonstrates that such strategies have important economic advantages as a low-cost approach to expanding agricultural output while at the same time having significant social advantages in generating rapid expansion of opportunities for productive employment and widespread increases in effective demand for food and other essential goods and services. On the other hand, experience in many of today's developing countries demonstrates that if a country's agricultural strategy encourages a dualistic pattern of agricultural development in which large farm units have preferential access to land and other resources, this will to a large extent preclude the possibility of achieving a broad-based, employment-oriented pattern of agricultural development.

B. Alternative Patterns of Agricultural Development

1. The Dual-Size Structure (DSS) Model

In a great many of the contemporary developing countries the pattern of agricultural development is characterized by a dual-size structure (DSS). A relatively small number of atypically large and capital-intensive farm enterprises occupy a disproportionate share of the agricultural land. To cite one of the extreme examples, it is estimated that in Colombia the top 1 percentile of farmers account for 46 percent of the total area of farm land and their holdings average over 1,000 hectares. Much of the land in these large farms is devoted to livestock rather than field crops; but nonetheless these large farmers account for a very large percentage of crop production as well as total agricultural output. Their share in the commercialized production of farm products is especially large. In contrast, the great majority of farm units are less than 10 hectares and account for a disproportionately small share of agricultural production. Since a large fraction of the production of the small farm sector is for subsistence consumption by family members, their share in commercial production is considerably smaller than their share in total output. In fact, production of coffee for export is the only significant source of cash income for Colombia's smallholders. Over half of the country's coffee farms are less than 5 acres. Even though the small-scale farms account for much less than half of total coffee production, coffee farmers are in a privileged position among smallholders in Colombia and have considerably higher cash receipts than the typical small-scale farm unit (Johnston and Kilby, 1975, pp. 14-18).

The Gini coefficient, which varies from zero for a perfectly equal distribution to 1 for a completely uneven distribution (e.g., a situation where

the top 10 percent of farm households accounts for all the farm land), is a convenient summary measure of the concentration of land ownership. Not surprisingly, the Gini coefficient for Colombia is very high, although its coefficient of .87 is exceeded by the estimated Gini coefficients for Paraguay (.94), Peru (.94), Venezuela (.93), and Chile (.93). 2/ A number of other Latin American countries have similarly high Gini coefficients: .83 for Brazil and Guatemala, .80 for Nicaragua and the Dominican Republic, and at least .75 for Mexico. 3/ The estimated Gini coefficients for Pakistan and India are .63 and .58, respectively, based on FAO's Report on the 1960 Census of Agriculture. The concentration of land in those countries may have increased since that time. An analysis by Vyas based on National Sample Survey (NSS) data for 1961-62 and 1971-72 indicates that the share of land in "big" farms (15-49.99 acres) declined from 34 percent to 31 percent of the total area while the number of farm households in that category declined from 7 to 5 percent. Similarly, the share of land in "large" farms (50 acres and above) declined from 11 to 8 percent of the total while the percentage of farm households in that category declined from 0.7 to 0.4 percent of the total. The average size of "big" farms declined slightly while the average size of "large" farms declined appreciably from 81 to 74 acres. Over that decade the total number of farm households in India increased by 27 percent and their

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2/ These and the other estimated Gini coefficients are from Berry and Cline (1979, pp. 38-39) and are based on FAO, Report on the 1960 Census of Agriculture. Vol. 5 (Rome, 1971).

3/ For Mexico, Berry and Cline report a Gini coefficient of .75 based on estimates which treat ejido land as equally distributed among all ejitatarios (which it is not) and a coefficient of .95 as an unadjusted figure based on the FAO report on the 1960 census.

average size declined from 5.0 to 3.8 acres; the estimated total agricultural area declined from 318 million to 311 million acres. The effects of the subdivision of holdings associated with this substantial increase in the number of farm households was especially marked in the marginal farm households (below 1 acre). The number of households in the marginal category increased by just over 50 percent between 1961-62 and 1971-72 and the average size of their holdings declined from .21 to .14 acre (Vyas, 1979, p. 4). These NSS estimates related to land ownership. According to an analysis of the size distribution of ownership and operational units based on an earlier NSS survey, it was found that, unlike Japan and Taiwan, the concentration of land in large operational units was almost as pronounced as the concentration of land ownership (Mukhoti, 1978, p. 150). Moreover, in the case of Pakistan especially there appears to have been an increase in the concentration of land in large operational units since 1960 because of large farmers acquiring tractors and evicting their tenants in order to farm their land as a large operational unit rather than renting it out to many tenants cultivating small units.

The dual-size structure of the DSS model is also characterized by the use of drastically different technologies in the large-scale subsector as compared to those employed by the great majority of small farmers. Because the large farms tend to account for the lion's share of commercial sales, their cash receipts are sufficient for the purchase of lumpy and expensive inputs such as tractors in addition to using relatively large quantities of fertilizers and other current inputs. The opposite side of the coin, however, is that the great majority of small farmers are subject to an exceptionally severe purchasing-power constraint because the limited commercial market is largely preempted by the subsector of large farms. Consequently, they en-

counter great difficulty even in gradually expanding their use of divisible purchased inputs such as fertilizers needed to realize the high-yield potential of improved crop varieties. This cash income or purchasing power constraint is especially serious in "late-developing countries" where agriculture still accounts for a large percentage of the total population and labor force for reasons which we examine in Chapter III.

The foregoing difficulties of small farmers within a DSS pattern of agricultural development are an inevitable consequence of the concentration of land and of commercial sales, and therefore cash income, within the favored subsector of large-scale enterprises. Those disabilities are, however, usually intensified by the prevailing social environment and the concentration of political as well as economic power in the hands of the large farmers and their political allies and clients. The prevalence of economic policies which lead to the underpricing of tractors and other capital inputs and low-interest-rate policies exacerbate the consequences of the political power and influence of the large farmers.

A low-interest-rate policy for loans obtained from cooperatives and other institutional sources represents an implicit subsidy for those who are fortunate enough to receive credit from those sources. Low interest rates also have the effect of simultaneously discouraging saving and the supply of loanable funds and of increasing the demand for credit. Indeed, in inflationary situations, the official interest rates often represent a <u>negative</u> rate of interest in real terms and therefore an income transfer for those able to obtain loans. This combination of circumstances obviously gives rise to excess demand for the available supply of credit from institutional sources so that cooperatives and other institutional lenders must resort to adminis-

trative rationing of credit. Given the local power structure, it is hardly surprising that once again it is the large farmers who obtain the lion's share of the institutional credit available; small farmers generally must obtain credit from money lenders and other informal sources or do without credit all together. Essentially the same circumstances frequently apply to the availability of fertilizers and other inputs. That is, government subsidies on those inputs, often adopted for the ostensible purpose of enabling low-income farmers to purchase fertilizers, give rise to an excess demand for the quantities available, again necessitating some form of administrative rationing. And the power and status of the large farmers, often including a situation in which they manage to "capture" control of the local cooperative, means that they receive the bulk of the fertilizer and other subsidized inputs. Moreover, the fact that large subsidies on major farm inputs impose a substantial burden on the government budget often reinforces the effect of a general shortage of capital and of foreign exchange in limiting the total supply of those inputs.

The underpricing of tractors is often accentuated by trade policies. The combination of an overvalued exchange rate together with the granting of licenses for importing tractors and tractor-drawn equipment at zero or very low tariff rates has the effect of enabling large farmers to purchase labor-displacing equipment at artifically low prices.

Certain other consequences of the skewed distribution of political power associated with the DSS model should also be noted. Frequently, agricultural research and extension and training programs are biased toward the needs of large farmers. Examples of that bias are discussed later. It is sufficient to note at this point that many developing countries have allocated consider-

able resources of money and manpower to training programs for tractor drivers and mechanics while R&D activity directed at identifying or developing well-designed animal-drawn implements has either been sporadic and very limited or nonexistent. There is also a wealth of evidence indicating that extension field staff tend to devote most of their time and attention to meeting the needs of the large farmers; most small farmers rarely see an extension agent unless an extension program is structured to curb that tendency (Lowdermilk, 1972; Leonard, 1977). A final and important example concerns support for rural schooling. When large farmers dominate the local political process, the allocation of funds for public education generally receives a low priority. It is in the interest of large farmers to have a large supply of mainly unskilled labor available at low wage rates, and they are therefore often indifferent or hostile to using government resources to expand and strengthen education. This factor is presumably one of the principal reasons that the extent of education and literacy in some Latin American countries is below the level found in a number of Asian and African countries with much lower levels of average per capita income. 4/

2. The Uniformly Small Farm (USF) Model

The alternative pattern of agricultural development, best illustrated by the experience of Japan and Taiwan, is characterized by the progressive

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4/ Guatemala is a prime example. Although its average per capita GNP in 1978 was some three to four times as high as in the low-income developing countries of Sub-Saharan Africa, the percentage of its population of primary school age enrolled in school was only 45 percent in 1960 and still a modest 65 percent in 1977. In Kenya the comparable figures were 47 percent in 1960 and 104 percent in 1977, and in Tanzania the increase was from only 25 percent in 1960 to 70 percent in 1977. In Colombia, with average per capita GNP comparable to Guatemala, 90 percent of the urban children aged six to eleven were enrolled in school in 1974 but only 60 percent of rural children in that age group (World Bank, 1980, pp. 47, 154).

modernization of essentially all of a country's farm households. Because the number of farm households in most developing countries is large relative to the total cultivated area, these farm units are inevitably small. This pattern is thus characterized by uniformly small farms, and we will refer to it as the USF model of agricultural development.

The term "uniformly small" is not to be construed narrowly as meaning equally small. Even though agricultural policies are designed to foster reasonably equal access to land, knowledge, credit and other resources, individual farmers will vary in the skill, intelligence, and energy that they apply in managing those resources. Access to land may be a result of land ownership. In some situations, however, access is obtained by renting. Furthermore, we find that access to employment--farm or nonfarm--may provide satisfactory income-earning opportunities. In many developing countries, however, the job opportunities available to landless agricultural laborers are exceedingly precarious. Much of the most acute poverty is therefore found in the households of landless laborers.

The view that an effective and thoroughgoing land reform is a necessary precondition for a USF pattern of agricultural development is, superficially, reinforced by the fact that both Japan and Taiwan carried out remarkably successful land reform programs in the post-World War II period. It is clear, however, that the two countries were following a USF strategy long before the redistribution of land ownership under the postwar land reforms. 5/

5/ Under the postwar land reform programs carried out in Japan, Taiwan, and also in South Korea resident landlords were permitted to retain personally cultivated lands up to ceiling acreage, usually about 8 acres in all three countries. Land held in excess of that ceiling for personally cultivated land, and all tenant-held land (except in Japan, resident landlords were permitted to retain 2.5 acres of tenant-held land), was taken over by the government with compensation. The land was then sold to former tenants, part-tenants, and the landless in small units to be cultivated by family labor.

The considerable concentration of agricultural land in large ownership units was not reflected in the size distribution of operational or management units because the large landowners invariably rented out their land to tenants. Agricultural production was therefore based on uniformly small farms, although the farm units were comprised of roughly equal numbers of tenant, part-tenant, and owner-cultivator households. Sugarcane in Taiwan represented the principal exception, although even for sugarcane much of the production was carried out on small farms which delivered their cane to a nearby sugar mill operated by a large plantation. The principal effect of the postwar land reforms was to give tenants and part tenants title to the land that they cultivated and thereby to substantially reduce the inequality in rural income distribution. The economic rent associated with land ownership now accrued to the individual cultivator rather than to the large landlords collecting rent from tenants equal to some 50 percent of the output of the land they cultivated.

The most important consequence of this USF pattern of development was that the expansion of agricultural production was based on labor-using, capital-saving technologies that permitted widespread increases in farm productivity and employment. In both Japan and Taiwan the development and diffusion of high-yield, fertilizer-responsive varieties of rice was of central importance. The large returns realized from those divisible, yield-increasing innovations were also associated with controlled irrigation. The development and improvement of water control in Japan was a long, evolutionary process. Taiwan's agriculture was relatively undeveloped at the beginning of Japanese rule in 1895. The expansion and improvement of irrigation facilities was a major objective of the Japanese colonial administration; during the 1920s investment by the central government and the matching outlays by local irrigation

districts accounted for nearly 15 percent of total capital investment in Taiwan during the decade. Substantial investments were also made in extending road and rail networks so that farmers throughout the two countries had reasonably satisfactory transportation links with urban and industrial centers which facilitated the marketing of their products and the distribution of inputs.

There was naturally considerable individual variation in the speed, skill and energy with which different farmers increased their productivity and output. Such inter-farm differentials tend to be narrowed rapidly, however. For example, yield differentials opened up by uneven adoption of a new variety persist for only a few years. An extension agent interviewed in Taiwan in the early 1970s spoke of the "large" inter-farm variation in rice yields amounting to "as much as 10%," thus offering unintended but eloquent testimony to the uniformly high standards of cultivation.

The fact that the purchased inputs required for the modernization process were divisible and highly complementary to the on-farm resources of labor and land meant that they could be adopted universally in spite of the small size and limited cash income of the uniformly small farm units. In Taiwan, for example, close to 80 percent of all farms were within 1 acre of the average size of about 2.5 acres. Being highly divisible, the technologies were neutral to scale. Indeed, in both Japan and Taiwan there was an inverse correlation between farm size and crop yields because the application of labor and fertilizer on the small farm units was more intensive than on the large farms. Moreover, because of the rate of technical change and its labor-using bias, increases in total factor productivity (that is, output per unit of total inputs) made a substantial contribution to the impressive growth of agricultural production.

The fact that the USF patterns of agricultural development in Japan and Taiwan depended so much on the fuller as well as more efficient use of labor had very favorable effects on the expansion of employment and the increase in effective demand. An especially signficant feature of Taiwan's experience is that underemployment in agriculture was reduced in spite of a substantial increase in the size of the farm work force in a situation where there was only limited scope for enlarging the cultivated area. Following the introduction of public health measures by the Japanese colonial administration in Taiwan, mortality rates fell rapidly in rural as well as urban areas. Consequently, the rate of natural increase in Taiwan reached an annual rate of 2.2 percent as early as 1925-30; and after a time lag of some 15 years this acceleration in population growth was followed by an increase in the rate of growth of both the total and farm labor force. From the turn of the century until about 1925, the cultivated area expanded more rapidly than the farm labor force so that there was some improvement in the land/man ratio. But over the extended period from 1911-15 to 1956-60, the cultivated land area in Taiwan increased by just over 25 percent, barely half the increase in the farm labor force. Between 1930 and 1960 the number of farm households increased much more rapidly than the cultivated area resulting in a decline in the average farm size from 5.0 to 2.5 acres. Nevertheless, there is clear evidence of reduction in underemployment in agriculture.

It is estimated that the "flow" of labor inputs into agricultural production doubled between 1911-15 and 1956-60. This was twice the increase in the "stock" of farm labor because the average number of working days a year per worker increased by a third. This was facilitated greatly by a large increase in multiple cropping with the result that the crop area nearly dou-

bled even though the total area under cultivation increased by only 27 percent. The previously mentioned expansion of irrigation was obviously the critical factor in permitting the large increase in multiple cropping. The intensification of crop production between 1911-15 and 1956-60 was also associated with a thirteenfold increase in fertilizer consumption and a fivefold increase in all current inputs (Johnston and Kilby, 1975, p. 253). It is especially noteworthy that the technical innovations were land saving and that farm outlays for labor-saving equipment were negligible until the 1960s when labor shortages finally began to emerge. Throughout this 50-year period farm outlays for purchased inputs were concentrated overwhelmingly on divisible inputs of working capital that were complementary to the relatively abundant resource of farm labor. There was gradual improvement in the range and design of simple, inexpensive implements such as improved plows and harrows, row markers, and rotary weeders. But these items, which were important in easing seasonal bottlenecks and improving the timeliness and precision with which farming operations were carried out, did not displace labor. Investments in labor-saving equipment, notably power tillers, did not begin to become important until the process of structural transformation in Taiwan reached a turning point in the 1960s and the absolute as well as the relative size of the labor force began to decline. In the first half of the 1960s farm purchases of capital equipment represented about 25 percent of total outlays for farm inputs, but prior to that purchases of current inputs were nearly ten times as large as capital outlays (Johnston and Kilby, 1975, p. 318).

The USF pattern of agricultural development in Taiwan was associated with an increase in agricultural output at an average annual rate of 3.5 percent in both the prewar (1911-15 to 1936-40) and postwar periods (1951-55

to 1961-64). Moreover, a rapid increase in total factor productivity was the source of well over half of the increase in output. The fact that Taiwan's agricultural strategy was so efficient in its use of capital and other scarce resources also had important implications with respect to the net flow of resources to industry and other nonfarm sectors.

A distinctive feature of the USF strategies in Japan and Taiwan is that the positive interactions between agricultural and industrial development facilitated the concurrent growth of output and employment in agriculture and in manufacturing and other nonfarm sectors. In Japan the growth of nonfarm employment between the 1880s and the 1920s was sufficiently rapid to permit a slight reduction in the absolute size of the agricultural labor force (from 15.5 to 14.3 million) and a substantial reduction in agriculture's share in the total labor force (from 76 to 52 percent). This was facilitated, however, by the fact that the demographic transition in Japan, as in Western Europe, was associated with a relatively moderate rate of population growth. The rate of increase in the total labor force in Japan was a little less than 1 percent. In fact, it seems clear the Japan would have reached a structural transformation turning point characterized by a substantial reduction in the size of its farm labor force during the 1920s if it had not been for the pursuit of economic policies during the interwar period which had the effect of slowing the rate of increase in nonfarm employment. The deflationary policies necessitated by an unfortunate decision to maintain the yen at a level that was consistently overvalued between 1920 and 1932 were motivated by a desire to return to the Gold Standard at the prewar parity with the dollar and the pound sterling. Those deflationary policies had especially adverse effects on the growth of output and employment in the country's small- and medium-

scale manufacturing firms which meant a marked slowing of the expansion of nonfarm employment opportunities. In the decades prior to the First World War and again during the period of rapid economic growth following World War II, expansion of output and employment in the relatively labor-intensive small- and medium-scale firms of Japan's "semi-modern" industrial sector played a major role in facilitating increases in the per capita income of the farm population by providing alternative employment opportunities, thereby permitting a reduction in the size of the population and labor force dependent on agriculture for income and employment.

The concurrent growth of output and employment in agriculture and industry in Japan and Taiwan was facilitated by a net flow of resources from agriculture to the more rapidly growing manufacturing and service sectors. This net outflow was exceptionally large in Taiwan--and also exceptionally well documented (Lee, 1971; Johnston and Kilby, 1975, Chapter 8). From the point of view of the Taiwanese population, the net outflow of capital from agriculture was undoubtedly exessive since to a considerable extent the transfer of resources accrued to Japan. Consequently, the effects of the outflow of resources in accelerating the development of Taiwan's own nonfarm sector was not as great as implied by the size of the resource tansfer which ranged between 20 and 30 percent of the value of agricultural output.

The rapid modernization and commercialization of Taiwan's agriculture which made possible the large net outflow of resources had positive as well as negative effects on Taiwan's farm population. As early as 1921-25 approximately 65 percent of total agricultural output in Taiwan was marketed in spite of the fact that nearly 70 percent of the country's labor force was still dependent on agriculture so that the domestic commercial market was very limited.

The explanation for the high rate of commercialization of farm output is that well over half of the agricultural products that entered commercial channels were sold abroad--mainly rice and sugar exported to Japan. The substantial and effective investments made by the Japanese colonial administration in strengthening the physical and institutional infrastructure for agriculture were motivated by Japan's interest in fostering increased farm productivity and output in Taiwan in order to develop the colony as a supplier of imported sugar and rice for the Japanese home market. However, the establishment of agricultural experiment stations and research progams and the expansion of irrigation, transportation, and other infrastructure have been of immense and continuing value to the Taiwanese economy. More generally, the fact that the agricultural strategy pursued was based on the USF model which had already been so effective in Japan created conditions favorable for the very rapid and broadly based agricultural and industrial development achieved in Taiwan during the decades following World War II.

It would be absurd to suggest that Japan's colonial policies in Taiwan were intended to be more benign than the colonial policies pursued by European powers in their Asian and African colonies. There is certainly no indication that equity and social justice were high on the agenda on the Japanese rulers of Taiwan. Nevertheless, it seems clear that Taiwan's success in the postwar period in implementing a broad-based, employment-oriented agricultural strategy was to a considerable extent made possible by the progress made prior to the Second World War in implementing a USF model of agricultural development. Moreover, the gradual but widespread increases in farm incomes in Taiwan during that period generated a widespread growth of the effective demand of farm households for a widening range of simple and inexpensive items of farm

equipment that stimulated the establishment and growth of rural-based, small-scale machine shops and other firms that fostered the growth and diffusion of technical and entrepreneurial skills. The growth of rural demand for relatively simple consumer goods was quantitatively more important, although the qualitative importance of the skills in metalworking acquired in producing all-metal plows, harrows, foot-pedal threshers, sweet potato slicers, and a host of other items of farm equipment may have been greater. However, no sharp distinction should be made between the two types of products because the same rural workshops often produced both consumer goods and farm implements, e.g., electric fans and knapsack sprayers or bicycles and foot-pedel threshers. For both farmers and the entrepreneurs and skilled workers in rural-based manufacturing firms, this was a widespread, evolutionary process of upgrading skills and products based on learning-by-doing as well as a steady increase in cash incomes and capital formation. Especially in the earlier period of Japanese rule, many of the manufacturing firms were Japanese. Both the learning and diffusion processes, however, benefited from the fact that the social and technological "distance" between the Japanese and Taiwanese was not nearly as great as between the "traditional sector" and the enclaves of "modern" manufacturing firms that have been characteristic of the former European colonies even after independence.

In summary, the USF model of agricultural development epitomized by Japan and Taiwan was characterized by rapid growth of employment opportunities within and outside the agricultural sector. Inasmuch as agriculture was essentially a "self-employment" sector dominated by small-scale farm units, most of the increase in on-farm employment reflected the increase in the "reservation demand" for family labor resulting from increases in productivity and output based on

labor-using and land- and capital-saving technologies. In addition to the intensification of agricultural production with the adoption of divisible, yield-increasing innovations for rice and other crops, the income-earning opportunities of farm households were also augmented by the spread of ancillary activities.

A seventeenfold increase in the output of raw silk between the 1880s and the 1930s also made a notable contribution to the growth of farm cash incomes as well as to the expansion of foreign exchange earnings. This expansion continued through the 1930s in spite of a sharp decline in silk prices which began in 1925. Presumably this reflected the lack of alternative outlets for the labor committed to sericulture. In addition, technical innovations, generated by research, led to remarkable increases in productivity and mitigated the adverse effects of the decline in silk prices. The production of mulberry leaves expanded much more rapidly than the increase in the area planted to mulberry trees. An enormous increase in cocoon production was facilitated by innovations which made it possible to raise an autumn as well as a spring crop, and the yield of raw silk per kilogram of cocoons nearly doubled (Johnston, 1962, pp. 229-30). In Taiwan during the post-World War II period, rapid expansion of the production of mushrooms and asparagus for export played an analogous role in expanding opportunities for productive employment of the agricultural labor force and in augmenting farm incomes. Finally, with the rapid and decentralized growth of manufacturing, members of farm families have been able to augment household income greatly by wages from nonfarm employment.

Until the absolute size of the farm labor force began to decline significantly during the 1950s in Japan and during the 1960s in Taiwan, the increases

in per capita farm incomes were fairly modest; but being widespread they benefited virtually the entire farm propulation. With the tightening of the labor supply/demand situation as the demand for labor increased more rapidly than the growth of the farm labor force seeking employment opportunities, wage rates and returns to labor increased more rapidly. The growth of farm cash incomes led to especially rapid increases in outlays for farm inputs and purchases of manufactured consumer goods because of the high income elasticity of demand for those products. However, there was also a substantial increase in food consumption which, in the case of farm households, continued to be based on substistence consumption as well as purchased food. For Taiwan, it is estimated that between 1953 and 1970, the per capita availability of calories increased by 15 percent--from 2300 to 2700 calories per day--and the increases in protein and other nutrients were somewhat larger than the increase in energy intake. Inasmuch as the improvements in food consumption have been so widespread, problems of malnutrition seem to have been virtually eliminated (Galenson, 1979, pp. 436-37; Chiu, 1976).

The agricultural development experience of South Korea has not been as well documented as the experience of Japan and Taiwan. It is well documented, however, that Japan also fostered a USF pattern of agricultural development in Korea during the period of colonial rule which began in 1910. Substantial investments in institutional and physical infrastructure contributed to a broadly based, employment-oriented pattern of agricultural development, and increases in farm productivity and output were encouraged in part in order to expand rice exports to Japan. During the colonial period much of the farm land in Korea was owned by Japanese landlords, but a land reform program in the postwar period created an exceptionally uniform distribution of land ownership. The

estimated Gini coefficient of .20 for the distribution of farm land in Korea is remarkably low, appreicably lower than the estimated coefficients of .41 and .40 for Japan and Taiwan respectively (Berry and Cline, 1979, p. 38).

Japan, Taiwan, and Korea are clearly the outstanding examples of a USF model of agricultural development. In fact, it is difficult to find other clear-cut examples of agricultural development that fit the USF model. It can be argued, however, that the People's Republic of China (PRC) has relied essentially on a similar USF pattern of agricultural development in spite of the drastic differences between China's Communist regime and the mixed economies of Japan, Taiwan, and Korea which have relied primarily on market mechanisms to guide the allocation of resources and to determine the distribution of income. Since the severe setbacks experienced in China in the late 1950s and early 1960s, the fundamental unit of agricultural production has been the production team made up of some 30 to 40 households. Agricultural decision-making has for the most part been decentralized to this lowest level of the commune structure, and the units have apparently been small enough to maintain individual incentives and to minimize problems of shirking and poor performance. Thus reasonably satisfactory results have been obtained with production technologies which have been labor-using and capital-saving. Likewise, the increases in agricultural productivity and output have been based to a large extent on improved varieties, fertilizer, and other divisible, yield-increasing innovations together with very significant improvements in irrigation and drainage. This is, of course, in sharp contrast with the Soviet Union where collectivized agriculture has been characterized by a dual-size structure. Production in collective enterprises in the Soviet Union has been carried out in large-scale farm units employing large tractors and tractor-drawn implements while at the

same time a substantial part of the country's agricultural output has been produced on very small plots cultivated by the family labor of kolkhoz (collective) households using extremely labor-intensive methods.

The overwhelming emphasis in the Soviet Union on large-scale manufacturing firms is another significant contrast with the PRC. A high priority has been given in China to the development of heavy industries based on large-scale, capital-intensive technologies. But as in the case of Japan and Taiwan, this has been paralleled by the decentralized growth of a "semi-modern" manufacturing sector producing relatively simple farm implements and consumer goods based on labor-intensive technologies. A number of mistakes were made in the earlier efforts to promote this rural-based industrialization, but on balance it has made a notable contribution to expanding the output of industrial and agricultural production and to providing additional opportunities for productive employment in rural areas (Perkins, 1977; Rawski, 1979).

Among the countries of Latin America, Costa Rica stands out as the one country with a number of the features of the USF model. It is more appropriate, however, to consider the experience of Costa Rica as an example of a country falling in a residual category. In the next chapter we present short case studies that review the agricultural development experience of Costa Rica, Malaysia, Kenya, and Tanzania as diverse examples of what we refer to rather loosely as a "mixed characteristics model". Malaysia's experience is of special interest because it appears to be unusual in the degree of success that has been achieved in simultaneously promoting the development of a large-scale plantation subsector and a smallholder sector.

In the countries of sub-Saharan Africa the expansion of agricultural production has taken place predominantly on small-scale holdings. This has,

however, been essentially an "horizontal" expansion of production based on bringing additional land into cultivation. The technologies used have been very labor-intensive, relying mainly on human labor and the hoe and machete. Population growth has accounted for much of the increase in the supply of farm labor, but there has also been a significant increase in the rate of utilization of the "stock" of male labor as a result of a reduction in the time devoted to traditional activities such as hunting and fishing. The increase in male labor inputs in agriculture has been especially evident in the cultivation of new export crops such as cocoa, coffee, and cotton. To a large extent production of these new cash crops has been superimposed on the traditional systems of producing food crops, drawing upon the available "slack" represented by the underutilized resources of labor and land. The really important innovations were the economic innovations represented by the introduction of the new high-value crops. The expansion of cocoa in Ghana and of Robusta coffee in Uganda and of food crops throughout tropical Africa are good examples of this largely spontaneous process of horizontal expansion of production. Cotton on the other hand, has relied considerably more on agricultural research which promoted the introduction of exotic varieties and later achieved fairly significant yield increases, especially by breeding for disease resistance (Anthony et al., 1979).

Although agricultural production in much of sub-Saharan Africa has been based mainly on uniformly small units, it has for the most part continued to be a "resource-based" rather than a "science-based" agriculture. There have, of course, been many variations in this general pattern. In a number of countries plantation production of palm oil and other export crops has been of considerable importance, and in a smaller number of countries large farms

established by European settlers have been important in producing commercial crops. Some of the recent changes and future problems and prospects are illustrated in Chapter III by examining the experience of Kenya and Tanzania.