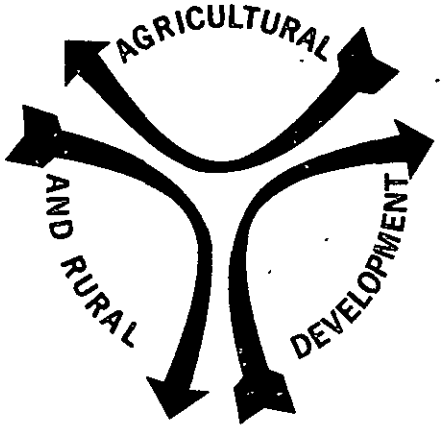
FACTORS AFFECTING THE ECONOMIC AND SOCIAL WELL-BEING OF AGRICULTURALISTS IN LESS-DEVELOPED COUNTRIES



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FACTORS AFFECTING THE ECONOMIC AND SOCIAL WELL-BEING OF AGRICULTURALISTS IN LESS-DEVELOPED COUNTRIES

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FOREWORD

For some years the United States has provided sizable amounts of food to countries with inadequate per capita supplies. The continuity of these flows has led to arguments in some circles that these shipments are ends in themselves. But the objectives underlying these shipments have been substantially broader and more obscure than simply expanding the exports of U.S. farm products. These products are expected to (a) reduce the immediate dangers of hunger in less developed countries when a natural disaster occurs, (b) provide food to groups of populations which are unable to protect themselves against the harsh allocation of a market economy, and (c) encourage the economic development of the recipient country so that ultimately it can become self-sufficient in food or have adequate resources to import food supplies from the world market. The implementation of effective programs with these complex and important multiple objectives requires considerable thought and evolution to guarantee that the benefits outweigh potential negative aspects.

The particular study reported in the following pages concentrates on the various economic, social and institutional interrelationships which facilitate or restrain developmental processes. An awareness and understanding of these interrelationships by national planners in recipient countries are prerequisites to devising and implementing plans which will maximize the contribution of food aid to expanding economic activity and to improving general welfare. Even though considerable heterogeneity exists among less-developed countries, similar potentials and(or) bottlenecks are found in countries of diverse geographical location and ethnic orientations. However, common problems often cannot be attacked with common solutions. Each development plan must present solutions which reflect the opportunities and constraints existent within individual countries.

The study focuses primarily on the production activities of the individual firm. However, since production, consumption and investment decisions are not independent, factors affecting the latter decisions are also examined. As national planners become increasingly aware of the matrix of factors affecting individual decisions, the feasibility of implementing public policies to facilitate realization of planning objectives is improved. The likelihood of using food aid effectively is also enhanced.

This study follows several other studies which have examined major aspects of international shipment of food commodities outside commercial markets. It represents a thorough analysis of yet another aspect of using P.L. 480 food shipments in underdeveloped economies. We are hopeful that it will be of value to policy makers, administrators and other researchers interested in maximizing the effectiveness of food as a tool in economic development.

Earl O. Heady
Executive Director

September 21, 1971
Ames, Iowa

Leo V. Mayer
Project Director

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CHAPTER I. FRICTION POINTS OF AGRICULTURAL DEVELOPMENT: SUMMARY

The "self-help" provisions of the Food for Peace Act of 1966 emphasized the complementary roles that recipient governments must play in stimulating domestic agricultural production. Under provisions of the Act, recipient governments were obligated to initiate institutional reforms, encourage development of agricultural input-supplying industries, and generally maintain a favorable economic climate. These self-help provisions were designed to encourage expansion of private investment and production activities in the agricultural sector. The self-help provisions generally required additional public measures, however, and these measures use financial and administrative inputs—inputs which have alternative uses throughout the economy. The purpose of national planning, of which the self-help provisions are a part, is to help ensure that these scarce inputs are utilized in their highest uses. This study analyses these various scarce inputs and the interrelationship between them. The ranking of uses, of course, is a function of the configuration of objectives pursued during the planning period for the country under consideration.

Planning Objectives for the Agricultural Sector

Planned targets or objectives are usually stated in terms of production levels or production growth rates to be realized during the planning period. While these are the principal objectives, secondary attention is given to seemingly auxiliary objectives such as: (1) Improving allocative efficiency of resource use; (2) Raising individual, real incomes; (3) Increasing quantities marketed so as to keep food and fiber costs relatively low; (4) Promoting capital accumulation and improving resource mobility throughout the economy; (5) Improving the country's foreign exchange position; (6) Furthering the quality of life through expanded

education and health systems; and (7) Ensuring social and political stability. Relatively little attention is given to the fact that some of these objectives may be conflicting, that trade-offs exist among stated objectives, and that each alternative course of action has an opportunity cost associated with it. Some objectives are also complementary.

Public investment in marketing and communications facilities, ceteris paribus, should have a favorable impact on resource mobility and efficiency of resource allocation throughout the economy. If labor and capital are transferred from the agricultural sector to other areas of the economy, the planned growth rates for the agricultural sector may not be realizable. Investment in marketing systems which reduces marketing margins and improves the efficacy of market prices as signals of consumers' and resource owners' preferences may have the complementary impact of improving net returns to producers and of keeping costs to consumers and manufacturers relatively low. The question arises as to whether this redistribution of income is more favorable to developmental processes than the existing pattern. Similarly, increased contact with markets often raises producer-consumers' aspirations and incentive for increasing levels of production and quantities marketed. However, increased awareness of alternative life styles and of relative economic and social well-being without the means to share in the benefits of economic growth tends to generate social and political instability. Neither is conducive to private investment and implementation of national plans for development.

The configuration of planning objectives is conditioned by time horizons, i.e., the planning period being considered, and by various economic, technical

and political constraints. For example, the goal of increasing supplies for domestic consumption and for exports within a relatively short period of time is best facilitated by policies geared toward market-oriented producers. That is, subsistence-oriented producers are, at least temporarily, directly left out of planned developmental processes. Similarly, land reform programs may provide additional employment opportunities as well as alter the distribution of wealth and income in favor of the relatively disadvantaged. However, if the objective is to effect short-term increases in production and quantities marketed, this objective may best be met by raising economic incentives within an essentially unchanged agrarian structure. The feasibility and rationality of "forgetting" these individuals are constrained by political considerations and by humanitarian concerns. The essentially-deferred economic and social costs associated with integrating these individuals more fully into the market economy at a later date must also be taken into account.

Circular Economic Activities

Developmental planning requires an understanding of the interrelationships among the various economic and social factors conditioning production, consumption, and investment activities. Not only must substitutions among the means and planning objectives be elucidated but those complementary relationships generating important externalities in developmental processes must also be identified. Nurkse and others have popularized the general nature of these interrelationships and have termed

them "vicious circles" of poverty.[1] However, this conceptual approach to developmental problems is misleading. The concept of a vicious circle implies the existence of "propitious" or "beneficent circles". That is, if the vicious circle can be turned around, the propitious circle should result. If, for example, the vicious circle is identified as one of low per capita real incomes → low per capita savings → low per capita private investment → low per capita real incomes, then a reduction in taxes with per capita real incomes invariant would be expected to generate a higher per capita level of savings, a portion of which can be invested so as to increase resource productivity and, subsequently, producers' incomes. A propitious circle which is cumulative upward should now be operative. Of course, this reasoning ignores several, potential obstacles to upward, cumulative growth. Beginning with higher per capita savings, private investment may not be undertaken because the potential investment has an unfavorable discounted net return. The assumption that private investment is also profitable investment cannot be made on an a priori basis. In addition, producers' objectives condition decisions to consume, hoard, expend socially, and invest in both productive or nonproductive ventures. For subsistence-oriented producers, the need and, in turn, the utility derived from increasing present consumption represent a strong first claim on any savings or "surpluses" that are generated.

One additional comment on the use of circles as a conceptual approach:

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[1] A number of formulations have been made. See, for example, H. W. Singer. Economic Progress in Underdeveloped Countries. Social Research 16: 1-11. 1949, and Benjamin Higgins. Economic Development. New York, N. Y., W. W. Norton Co. 1959. p. 271.

a circular and causatively-reinforcing interrelationship implies that the circle can be broken into at any point so as to make it cumulative upward. However, the various links or components of the circle are not of equal strength and importance. Higher savings whether through increased incomes, lower taxes, or public subsidization of certain private costs are not sufficient for expanding private, productive investment. Similarly, public investment and price policies which raise incomes or potential incomes need not generate additional savings. The increments of income may rather be spent on consumer goods and in bidding up the prices of these commodities. True, at least a partial transfer of income out of the agricultural sector for use elsewhere in the economy takes place. However, the subsequent capacity of the agricultural sector for increasing food and fiber supplies is not improved. In a "second round" of economic activities, the income transfers implicit in increased expenditures for consumer goods may stimulate production of these goods. In turn, the increased availability and variety of such goods may act as a positive incentive motivating producers to try to raise their incomes. Production and consumption decisions are not only interrelated for those goods which are produced and directly consumed; these decisions also affect producers' motivations for increasing production and income levels through private investment.

Importance of the Agricultural Sector

Im many less-developed countries, a majority of people derive, directly or indirectly, their incomes from the agricultural sector. For example, several African and Asian countries have 70 percent or more of

their total population in the agricultural sector.[1] This percent is considerably lower for most South American countries.

According to the 1968 United Nations Yearbook of National Accounts Statistics, only 10 of the 113 nations for which data were available for the mid-1960's reported having agricultural sectors contributing 50 percent or more to the respective country's gross domestic product computed at factor cost.[2] These percentages, however, underestimate the relative importance of the agricultural sector from other viewpoints. Food is the most fundamental commodity in the economy; its availability makes other economic activities possible. Also, the agricultural sector and related marketing activities have the capacity to absorb much of the population increase and additions to the labor force who cannot find alternative employment. To some extent, the agricultural sector is a "holding" point for individuals waiting for an expansion of external employment opportunities. Furthermore, agricultural commodities account for a major proportion of many countries' exports.[3]

In addition to considerations of personal economic and social well-being, per capita real income levels condition the flow of government tax

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[1] See Appendix Table 1.

[2] Of the 10, only India and Nepal with 52 and 66 percent, respectively, are nonAfrican countries. Excepting Lesotho, these countries showed a downward trend in this percent during the past five to ten years. In addition, substantial variation among countries exists. For example, the comparable 1967 figures for Morocco, Tunisia, and Zambia are 30, 16, and 9 percent, respectively. Similarly, the figures for Latin America range from 8 percent for Chile and Venezuela to 38 and 49 percent for Honduras and Haiti, respectively.

[3] See Appendix Table 2.

revenues and the market demand for producer and consumer goods produced elsewhere in the economy. Both are essential to the development process: government revenues are necessary for sustaining public functions, and a strong market demand in the agricultural sector is prerequisite to diversification and general expansion of the economy. All of these considerations interact to influence social and political stability which, in turn, conditions the economic climate for developmental processes.

Planning on national and regional scales represents one means for attempting to influence the direction and rate of economic activity. A number of "friction points" impede or facilitate developmental processes. Those that act as impediments are targets for public intervention so as to alleviate their impact. Those that facilitate are targets for exploitation so as to further their contribution to economic activity. For example, at relatively early stages of agricultural development, agriculturalists have limited aspirations relative to increasing the volume and variety of consumer goods consumed but not directly produced. In this context, limited aspirations dampen the incentive to increase quantities supplied to the market. At a later stage, however, this impediment is not operative in that market-oriented producers increase their demand for income as new producer and consumer goods become available.

The summary discussions of some of these friction points follow. Although production, consumption, and private investment activities of agriculturalists are interrelated, they are partially segregated for individual examination.

Production

One of the general objectives of development plans is to increase production levels in the agricultural sector. Higher production levels should be associated with higher rural incomes and increased marketings. Consequently, the focal point of interest is higher marketings and not increased production, per se. Production increases are generally necessary but not sufficient for expanded marketings.[1] For subsistence-oriented producers, increased consumption represents a strong, first claim on any increases in production of edible commodities. But higher levels of living through higher consumption levels are also a national goal. In subsequent rounds of economic activity, improved physical well-being resulting from higher consumption levels should augment physical capacity for work and the efficiency with which labor is utilized in production processes. For nonedible, cash crops increased production is usually synonymous with increased marketings. Three points are clear: (1) Higher marketings are more important to general economic expansion than higher production levels alone; (2) The differential demand for various commodities indicates that selected marketing increases are preferable to expanding marketings of all commodities; and (3) Along the continuum of subsistence to market-oriented producers, individuals have differing capacities and motivations to exploit economic opportunities

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[1] Increased marketings may result from a higher demand for income as rents, tax assessments and demand for manufactured consumer goods increase. Unless production is increased, direct consumption must be reduced or external financing must be obtained to sustain existing consumption patterns.

as they arise. Some of the factors, i.e., friction points, affecting these three considerations are discussed below.

Land Tenure Systems

Land tenure systems appear to be the friction point with the strongest, most important secondary effects. Several reasons are applicable:

(1) As tenure arrangements vary among squatters, members of communal holdings, tenants and owner-operators, differential arrangements for sharing costs and returns result. The level of net returns affects the individual's economic well-being and his motivation and capacity for increasing future returns. Sharecroppers are often required to pay a substantial proportion of their output as rent. While this is instrumental in mobilizing marketings, it represents a significant income transfer to the landlord. The sharecropper, in turn, must often secure financing for meeting necessary consumption and production expenses. The security provided members of communal holdings is high but the products of individual initiative must often be shared with others. The alternative of leaving the communal structure involves both economic and social costs;

(2) The tenure situation affects access to alternative sources of external financing. Those public and cooperative agencies providing credit at relatively-low cost usually require collateral for securing loans. Land is the preferred form of collateral. Since squatters, tenant-operators, and those participating in communal organizations do not have title or an unambiguous title to land, they must secure credit from private sources charging high nominal interest rates. The real terms of such credit are even more onerous often with adverse consequences for

the debtor's future economic and social well-being;[1]

(3) The uncertainty associated with alternative tenure systems affects production practices, length of planning horizons, and incentives for private investment. Squatters and tenants having short-term, unwritten leases are rationally motivated to maximize present production without concern for longer-term resource productivity. Their planning horizons are often coterminous with the production period generating little incentive for private investment even if they have the capacity to invest. Small-scale owner-operators may have the incentive to invest but not the capacity. Tenants may be required to secure credit from and market their commodities with the landlord at prices largely determinable by the latter. Consequently, the landlord has a definite bargaining advantage. Even though several countries have legislation to provide security of tenure and an equitable sharing of costs and returns, such legislation is inadequate and(or) ineffectively implemented. Individuals who could seek redress through judicial proceedings are often neither aware of their rights nor have the financial means to initiate such proceedings. Furthermore, landlords can readily find means to circumvent most legislation. Finally, estate owners and absentee landlords are not motivated to undertake private investment in the firm when the likelihood of agrarian reform is high, particularly if compensation for expropriated land is unlikely or only at a low level;

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[1] For a summary discussion of the real terms of credit, see a later section of this chapter dealing with rural credit institutions.

(4) The prestige and security associated with ownership motivate individuals to invest in land, per se, with less emphasis given to investment in complementary inputs. At times, large, extensively-cultivated estates are maintained because owners are more interested in maintaining the economic and, in turn, the social and political status quo than in increasing agricultural productivity. This orientation coupled with the political power wielded by these individuals dampens any prospects for legislated agrarian reforms which if implemented and enforced would benefit the majority of agriculturalists; and

(5) Related to (4) above, more intensive cultivation of currently-populated land would not only provide additional employment opportunities for the rapidly growing, potential labor force in the agricultural sector but also production levels, particularly food grains, could be expanded if inputs complementary to land and family labor were made available to cultivators.[1] Similarly, several less-developed countries, especially in Africa and Latin America, have substantial areas of land which are potentially cultivable.[2] However, the costs of bringing this land under cultivation may be prohibitive in terms of the opportunity costs associated with necessary financial and administrative inputs having alternative uses in other parts of the economy. Land must be cleared; transportation,

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[1] See Table 3.7 for estimates of the productivity differences between the "minifundia" and the extensively-cultivated "latifundia" in some Latin American countries.

[2] Estimates of potential cropland expansion in several less-developed countries are given in Table 3.6.

marketing and educational facilities constructed; and people induced to resettle in these areas.

Efficiency of existing tenure systems

Criteria for efficiency can be stated only in terms of objectives. Tenants' objectives often differ from landlords'. Private objectives are often not consistent with public goals. Furthermore, technological change, population growth, and changing resource demands in other sectors of the economy emphasize the need for dynamic efficiency, i.e., efficiency which holds over time.

National planners attempting to guide production and marketing patterns may stress aggregation of the large number of small landholdings found in most less-developed countries into holdings where economies of scale can be realized and where economic activity can more easily be guided and monitored. Such aggregation or collectivization schemes, however, may not be consistent with other objectives such as producer freedom and security, efficiency of labor use, and political stability. If machines at least partially displace labor, the displaced labor becomes idle labor unless complementary firm enterprises are developed and(or) additional employment opportunities are generated in other areas of the economy. Small-scale producers would appear to be more interested in individual prerogative and security than in cooperating with some abstract governmental entity which has usually adversely affected them in the past.

Efficiency of tenure patterns is also a function of the availability and distribution of inputs complementary to land. That is, if the

distribution of rural labor is considered invariant, land currently idle or extensively cultivated should be redistributed to producing units where family labor is underemployed. In another context where employment opportunities are generated elsewhere in the economy and increased working capital is made available to small-scale producers, the previous tenure pattern would be inefficient. Changes in technology introduce another variable affecting efficiency of tenure systems.

Land distribution and land-use patterns in parts of Latin America suggest a considerable potential for increasing agricultural production through land redistribution programs, particularly if inputs complementary to land and family labor are more readily available. But, again, the objectives of "minifundia" operators are not consistent with those of "latifundia" owners while the objectives of neither group are likely similar to those of a national planning unit. Where tenancy insecurity is high, absentee landlordism is widespread, and landholdings badly fragmented, cultivation practices for maintaining or increasing land productivity are often neither encouraged nor economically attractive. Fragmentation is a lesser problem when family labor is the principal input in production activities and when such labor has a low opportunity cost.

Shifting cultivation has been an economic adaptation to existing production techniques and prevailing climatic conditions. Increased population pressure is accommodated by reducing the length of the cultivation cycle or by clearing new land. Reducing the cycle while using existing production techniques is not coterminous with maintaining soil productivity over time. New production practices must be devised

and implemented

Planning for tenure reform

Planned reforms are a function of the total content of planning objectives. For reforms to be realistic and effective, they must be coordinated with other programs and must be reflective of existing economic and political realities. Effective land redistribution programs require substantial inputs of time, money and administrative services, particularly if expropriation payments are made.[1] Political power is often a function of the distribution of wealth, including land. At the same time agriculturalists are conditioned to economic change, political forces may block and(or) water down needed tenure legislation. The likelihood of effective implementation must also be assessed. The government loses creditability and support when programs are publicized but not effectively implemented.

As noted earlier, an efficient tenure reform program is also a function of the distribution and availability of complementary inputs. Since resource markets are imperfect in the sense that resources do not move freely throughout the economy, tenurial efficiency is conditioned by reforms in marketing and transportation systems.

The important point to stress is that efficient tenure systems are a function of planning objectives pursued and of any complementary programs initiated. Land redistribution and legislation controlling rents and taxes effect a redistribution of income. Income distribution, in turn, has an impact on the strength of internal markets and on political

[1] Some writers assert that large-scale landowners have already realized sufficient gains because of their preferred position so that they are not entitled to any compensation. Long-term, low-interest bonds lessen immediate financial pressure if compensation is to be made.

stability in the country. In addition, while land redistribution programs increase employment opportunities and individual economic security, the immediate consequence may be a drop in production and(or) quantities marketed. Finally, efficiency over time implies redistributions of resources. However, the evolution of programs and necessary legislation is a time-consuming process.

Production Technique and Efficiency of Resource Use

The term production technique refers to the choice of inputs used and the manner in which they are combined and employed for productive purposes. Subsistence producers growing wheat on small plots of land, relying heavily on draft power and family labor, employ a production technique vastly different from that of highly-mechanized, extensive operations of Great Plains wheat producers in the United States. Several technical and economic factors interact to influence and determine the production technique employed.

Initially, producers' awareness of better techniques and of improved inputs is the primary factor constraining a shift to nontraditional techniques. With high rates of illiteracy, printed information is intelligible only to a small proportion of the rural population. Under these conditions, such information is communicated more effectively by the "demonstration" effects of some producers adopting new techniques and by government programs of demonstration farms. These phenomena are complemented when extension service personnel work with individual producers and farm organizations. Communications media, especially radio, have an increasing impact on in-

dividuals' awareness and expectations. Awareness and expectations not matched by achievement are conducive to unrest. Thus, producers must also have the capacity, i.e., the financial resources and managerial talents to procure and successfully adopt technological innovations suited to their farming operations. Subsistence-oriented producers have a strong predilection to continue traditional production practices. The costs associated with uncertainty of response with nontraditional production techniques are actually and(or) illusorily high.

Thus, awareness is only a necessary, not a sufficient condition for producers switching to a "better" technique. Considerations of availability, adoptability and profitability must be weighed. A seed variety highly successful in one region of the world is not expected to be equally productive in another area. Fertilizer mixtures must be geared to crops grown, soil characteristics, and climatic factors. Substituting machine inputs for labor is often not economically feasible when land units are small and fragmented and labor has a low opportunity cost. Finally, any considerations of social acceptability must be taken into account. Communal organizations and "closed" communities may resist changes in production techniques because of consequent changes in work patterns, distribution of economic gains, and existing social structures.

The relative importance of the above factors varies with stages of economic development and attendant features such as levels and distribution of agricultural incomes, literacy rates, and attitudes toward change. Rising literacy rates and a substitution of a more-scientific understanding of production processes for reliance on supernatural powers and(or)

fatalistic attitudes tend to make producers more receptive to technological change. An improvement in per capita incomes not only provides the means but also an income margin permitting producers to assume some of the uncertainties associated with adopting nontraditional inputs and practices.

The choice of optimal production technique is conditioned by producers' objectives. Furthermore, national planners may have objectives different from individual producers. In addition, the optimal technique changes over time. The standard criterion for determining the static, optimal production technique is that technique which satisfies the marginal conditions for economic efficiency.[1] This, in turn, is the production technique which minimizes the cost of producing the planned output level. In this case, the producer's objective is profit maximization. Producers may also have other objectives: (1) Tenants and squatters having insecure tenancy arrangements are motivated to use production techniques which exploit soil productivity over time; (2) Absentee landlords often are satisfied with receiving usual rents with little concern for production practices; (3) "Latifundia" owners engaging in extensive-type cultivation have objectives other than profit maximization; and (4) Communal organizations and "closed" communities take social as well as economic conditions into account in making resource allocation decisions. In each of these selected cases, the optimal production technique differs; it also differs from the technique which would be associated with profit maximization. However, the objective can be restated in terms of constrained profit

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[1] These conditions are outlined in Appendix D.

maximization where the above objectives are treated as constraints. Finally, national planners are interested in maintaining resource productivity over time, expanding relative and absolute production levels of various commodities, and altering the distribution or imputation of income to resources employed. The production techniques necessary for realizing these societal-oriented objectives are often different from existing production practices. Realization of these objectives requires tenurial legislation and general agrarian reform.

Efficiency of resource allocation

The relatively few studies attempting to evaluate the economic efficiency of producers' resource allocation decisions in less-developed areas generate inconclusive results. Most of these studies relate to farm management practices in Indian villages. Considering those studies concluding that producers are economically efficient at the margin of production, three comments are relevant. First, the marginal conditions for economic efficiency can be satisfied even though producers use different production techniques. That is, a producer may be operating at a point interior to his production possibility frontier, i.e., at a point where the same resources could be combined in an alternative manner to generate a higher output level, and yet satisfy these marginal conditions. Second, data from individual farms are usually pooled for analysis, but an analysis based on averages is appropriate only to those farms characterized by phenomena that represent the average. Nonaverage farms will, perforce, be economically-inefficient farms. Third, data quality is suspect

as are certain concepts used in the analyses. Most producers keep only sketchy records, if any. Market prices whether prevailing or publicly-supported are not the appropriate prices for those having only limited contact with the market economy, for tenants required to market their produce with landlords, or for producer-debtors required to market through their creditors.

In any case, producers who appear to be economically efficient at the margin need not be equally efficient when nontraditional inputs are introduced. Furthermore, the firm-household context represents the larger entity for evaluating efficiency of resource allocation. Studies focusing on production efficiency only implicitly presume that this broader context of efficiency is already satisfied. For example, the maximizing decisions relative to labor allocation for work in the production unit, work as a hired laborer, and leisure have presumably been made. Similarly, capital funds have been allocated among employments such as working capital, saving, and private lending. Finally, the question of the generality of these individual studies to conditions prevailing in other less-developed areas remains unanswered.

To evaluate the efficiency of resource allocation, criteria for efficiency are necessary. As with land tenure systems, efficiency can be viewed from several viewpoints implying different criteria. Respective criteria must be related to objectives being pursued.

Planning for efficient production techniques

From the standpoint of economic efficiency, the optimal production

technique is a function of physical relationships and relative prices Technical efficiency, i.e., allocating resources for maximum output at each resource use-level, is furthered by increasing producers' scientific understanding of production processes. This also makes producers more receptive to adopting technologically-improved inputs. Qualified extension service personnel can assist in increasing this understanding. The international transfer of scientific techniques can be instrumental in developing and(or) adopting new seed varieties, cultivation practices, fertilizer mixtures, and livestock rations. Indigenous research can be oriented towards increasing production of those commodities, whether export crops or foodgrains for domestic consumption, most crucial to meeting planning objectives.

Public pricing policies affecting relative price relationships condition resource allocation and production patterns, but they have no direct influence on the efficiency with which production techniques are used. However, publicly-supported prices reducing price uncertainty to the producer facilitate determination of his "best" production plan and the corresponding optimal production techniques. In a similar vein, tenurial legislation providing security and lengthening producers' planning horizons encourage nonexploitative cultivation practices.

Rural Credit Institutions

Rural credit institutions are an additional important friction point. The seasonality of income and the relatively small income base of a large number of cultivators effectively force them to obtain external financing

to at least partially underwrite consumption and production expenses from one harvest period to the next. Furthermore, strong social pressure encourages individuals to observe family and religious events in a traditional manner. The costs are relatively burdensome and are usually financed by credit obtained from merchants and professional moneylenders. Such expenditures, however, do not improve the borrower's financial position and his capacity for repayment. Refinancing at high interest rates is costly.

The lack of collateral with a secure title and the relative lack of publicly-regulated institutions in rural areas force borrowers to obtain the majority of external financing from private sources. While the terms of credit may reflect the risks and costs of making a large number of small loans to individuals having tenuous financial positions, the high effective interest rates impede most producers from improving their economic position, especially through private investment. Unless improved inputs are available and(or) net economic returns to inputs augmented, credit costs subtracted from discounted net returns to traditional inputs may leave such a small residual that private investment is not a remunerative alternative.

The combination of providing credit quickly and without stipulations as to use make private lenders attractive sources of funds even though their interest charges are high. The nominal interest charges do not reflect a number of additional, hidden costs such as (1) Deducting interest charges at the time the loan is made; (2) Demanding repayment in kind and undervaluing the commodity used for repayment; (3) Overpricing commodities

when credit in kind is provided; and (4) Landlords' demanding labor services in addition to interest charges.

Low-cost credit through cooperatives and public agencies lessens producers' reliance on private sources of credit. Lower-cost credit and the absence of marketing ties detrimental to the debtor tend to effect a redistribution of income away from merchants, traders, and money-lenders toward producer-debtors. The effect of this redistribution on developmental processes depends on the relative uses made of this income. That is, the question is whether economic growth is promoted by income transfers from producers to creditors or by producers retaining a larger share of their revenues. Producer-debtors, however, are definitely in an improved economic position.

Credit offered through cooperatives and public agencies provides opportunities to supervise the use of credit. The highest use may be in production or consumption; the ranking of uses depends upon the objectives of the lending agency. Collateral with a secure title is usually necessary to obtain credit from cooperatives and public sources. Collateral is a scarce commodity for many small-scale producers, especially tenant-operators.

Regulating the terms of credit is difficult and has been largely unsuccessful. Records are often not kept; borrowers are not aware of the real rates of interest they pay. High rates of illiteracy and poor income positions discourage borrowers who have been exploited from initiating judicial proceedings to redress wrongs.

Planning for rural credit institutions

If private lenders are to be replaced, either by making their operations illegal or establishing public agencies to supplant them, the new sources of credit must be competitive with these private lenders. Lacking this, private lenders will still be patronized even though their operations are costly and(or) illegal. Creating agencies to supplement private sources reduces the quantity of financial and administrative inputs that the government must supply if rural credit institutions are to be reformed. Regulation of the activities of private lenders, however, is difficult.

Given the limited availability of credit for distribution, the question arises as to credit for whom and under what terms. Again, the answer depends upon the planning objectives being pursued. Among low-income families, credit for meeting consumption expenditures is an important component of credit demand. From a humanitarian standpoint and because of a low capacity for credit repayment, interest charges should be low for that portion used to purchase necessities and relatively high for any conspicuous consumption. The problem, of course, is to regulate and monitor credit use. High interest rates impede debtors' capacity to improve their economic well-being; they also represent significant transfers of income to lenders, a portion of which may be used to finance economic growth in other sectors of the economy. The opportunity cost of using credit to underwrite a portion of consumption expenditures is the rate of return foregone by not using such credit for production expenses and for private investment in the firm. The difficulties of placing appropriate weights on humanitarian and economic objectives so as to devise an appropriate credit policy are

apparent.

Since much credit is extended as credit in kind, use of a revolving stock of commodities may be instrumental in not only meeting some of the credit needs of small-scale producers but also of facilitating net transfers of commodities from the agricultural sector for use elsewhere in the economy. The net transfer occurs in the form of interest paid in kind. This advantage, however, must be juxtaposed with the costs of building and maintaining storage facilities, deterioration in quality of stocks, and administrative inputs. Such a program may be integrated with a buffer stock program to lessen variations in market prices. Finally, establishing and sustaining public credit agencies require financial and administrative inputs--inputs which have opportunity costs in terms of their alternative uses in developmental processes.

Market Systems as a Component of Social Overhead Capital Facilities

Social overhead capital facilities include the matrix of marketing, transportation, communication, education, and government facilities which provide the framework for economic activity and the foundation for economic growth. According to economic theory, the market mechanism performs an important role in guiding economic activity. In both product and factor markets, prices are the links between quantities supplied and demanded which cause markets to be cleared. Through the pricing system, consumers reflect their demand preferences for consumer goods and producers reflect their demand for factors of production, including intermediary goods. Also, producers and resource owners indicate the amounts

of goods and factor services, respectively, which they will offer at various prices. Acting in an environment of imperfect knowledge, individuals must estimate these prices or exchange ratios before making their respective consumption, resource allocation, and factor supply decisions so as to maximize their individual objectives. These are considerations primarily affecting the static efficiency of the market in allocating resources and distributing the final product. The market mechanism as an instrument variable serves to generate and sustain developmental processes which affect the motivations and objectives of economic agents and the integration of these individuals into a more-fully interdependent economic system. It is in this sense that the marketing sector may also be a leading sector in promoting economic development.

Consumers, resource owners, and national planners send a configuration of signals through this matrix of facilities. These signals may be responded to, discounted, or ignored. First, these signals must be transmitted through transportation and communication mechanisms. Where these mechanisms are rudimentary, the signals are transmitted by word-of-mouth which is neither reliable nor timely. Producer-consumers suspect and discount such information. The imperfections of these mechanisms distort the quality and effectiveness of market signals so that inefficient resource allocation and production patterns result. Markets tend to be localized with limited intermarket flows throughout the economy. Consequently, the impact of any pressures and incentives generated by developmental processes, such as government policies and changes in market demand, is dissipated with little, if any, effect on producers' activities and economic systems in remote areas.

In most less-developed areas, individual marketing middlemen are the most important links in the system that channels agricultural commodities from producers to domestic consumers and exporters. While marketing boards and marketing cooperatives are important outlets for certain crops in certain areas, the nature and scope of their operations differ from that of the large number of middlemen operating individually and on a small-scale basis. Despite a relatively high proportion of production consumed directly by small-scale producers, their aggregate marketings constitute a significant part of total marketings by all producers. In the case of noneddible cash crops, which are grown by producers having operations of diverse size, a very high percentage of production realized is marketed.

At low stages of economic development, the number of marketing middlemen is generally high. However, their distribution throughout the economy is strongly conditioned by population densities, transportation facilities and costs, and the effectiveness of communications systems in denoting areas of marketable supplies and excess consumer demand. Furthermore, a system of credit advances by wholesalers which filter down to various individuals in the marketing structure affects the location and size of operations of these various middlemen. As the distance from established market areas increases, the number of middlemen at each stage of the marketing process decreases. The producer has progressively fewer alternative marketing outlets.

Numerous roles are actually and potentially performed by the middlemen. In such capacities, middlemen are in positions to both

stimulate and inhibit developmental processes. These roles include

(1) Want creation The introduction of new consumer goods, often imported goods, and the creation of new consumer wants favorably affect producers' behavior as evidenced by higher levels of production and quantities marketed. Since merchants and traders supply those goods consumed but not produced, they represent the vehicles for expanding the quantity and variety of consumer goods available to purchasers. But want creation may have adverse consequences too. New consumer goods may increase the importance of present consumption over future consumption with an adverse impact on saving and private investment in the firm. However, this phenomenon may only be temporary and primarily applicable to consumer goods that can be purchased in small quantities. As goods are introduced which require relatively substantial expenditures, the motivation for deferring present consumption may increase;

(2) Credit to producers Producers are often forced or inclined to make the bulk of intended marketings shortly after harvest. The absence of storage facilities and the demand for money to pay rent, taxes, debt obligations, and expenditures for post-harvest social events are the primary reasons for this seasonality of marketing. Producers often have to resort to credit for financing consumption and production expenses until the next harvest period arrives. Such credit is provided by marketing middlemen. By providing credit and perhaps price concessions to producers, the middleman becomes the marketing outlet for the indebted producer. At the same time, the middleman often obtains financing from a wholesaler or

the next individual in the marketing chain to whom marketing obligations now exist. That is, vertical trading relationships are established through the use of credit. Thus, credit advances by market intermediaries satisfy a mutual interdependence. Producers require financing for production and consumption expenditures while middlemen-lenders represent local sources of credit and marketing outlets. The latter individuals are also able to lessen the uncertainty surrounding continued sources of supply from which to procure commodities and sources of demand for those consumer goods retailed. In addition, producers may find the relationship somewhat advantageous in that the uncertainty relative to marketing and credit decisions is reduced. Price and interest cost concessions may be given to clients of long standing. Continued indebtedness, however, maintains or increases the superior bargaining position of the lender relative to the borrower;

(3) Collection, aggregation and distribution processes Producers located near marketing and consuming centers often engage in petty trading. They do not rely on the first middleman to start their goods through the marketing channels; they are that first middleman. Producers located at successively farther distances from these centers are confronted with increasing transportation, labor, and time costs and decreasing awareness of existing and anticipated market conditions if they are to market their goods themselves. Due to the state of transportation and communications facilities, wholesalers rely upon a hierarchy of middlemen to search out the relatively-small quantities sold by individual producers, grade and bulk these commodities of variable quality, and transport them to collection

points. These operations are costly, in terms of labor and time expended, relative to the value of the commodities involved. Wholesalers find it economically advantageous not to employ and supervise a staff of employees to complete these labor-intensive operations. The opportunity cost associated with the middlemen's time and labor inputs is often not high. Consequently, each is willing to work for a relatively small absolute return. Middlemen perform similar operations in the distribution of domestically-produced and imported consumer goods;

(4) Communication of information on supply-demand conditions With limited transportation and communications facilities and low literacy rates, exchange of information among middlemen at different stages is a principal means of identifying market conditions. Information is transmitted on the quantities and sources of supply and on demand for both agricultural commodities and consumer goods. These individuals are also in positions to introduce producer-consumers to new crops for which a market exists, to improved production inputs, and to new consumer goods. Conversely, the same middlemen transmit information to wholesalers relative to the adoption of new crops and changes in consumer demand; and

(5) Entrepreneurship and mobilization of resources Trading and performing other middlemen functions are important means for acquiring knowledge and experience of the workings of the market and of entrepreneurial activities. This is true for both small traders who aspire to expanding their scale of operations and for agricultural producers engaging in some trading activities. Since such trading often takes place in an environment of brisk competition, the economically and socially

sagacious trader is rewarded for his efforts. Thus, the acquisition and perfection of entrepreneurial skills are seen as the means to economic survival. Furthermore, middlemen's margins in both their marketing and retail distribution activities represent net transfers from the agricultural sector. Such capital accumulation can potentially be used for productive uses in other areas of the economy, including the marketing sector.

Market efficiency

Since the understanding of the operation of product and input markets in less-developed countries is limited, it is not surprising that relatively little is known about the efficiency with which markets operate. Too often, efficiency is imputed on the basis of estimated marketing margins and(or) the apparent degree of competitiveness in markets. Neither is sufficient for evaluating efficiency. What appear to be relatively-high marketing margins may be the consequence of high transportation costs and the amount of services applied to the good prior to retail to consumers. The difference between retail price and the price initially received by producers need not reflect exploitation of the latter. Similarly, a large number of middlemen at one stage in the marketing process may help to ensure that each earns only a minimum return. However, where credit advances by middlemen and merchant-traders are used to finance marketing and production activities, opportunities for price discrimination arise within the vertical structure of the marketing channels. Furthermore, the large number of middlemen is normally found only at first stages of marketing. At higher stages, relatively few participants are found. Finally, poor

transportation and communications facilities require that much of the market information be transmitted by word-of-mouth among middlemen. Regardless of the number of middlemen, such a communications system does not ensure that reliable market information is transmitted.

Need for an efficient marketing system

The importance of low-cost food and agricultural raw materials in sustaining general economic development, the potential market for consumer and producer goods among the masses of rural people if they are able to realize higher per capita real incomes, and the potential flow of resources from the agricultural sector to support other sectors of the economy all suggest the need for an efficient marketing system. Reductions in per unit transport costs and marketing margins, improved information on interregional supply-demand conditions, and the availability of improved production inputs at costs which make them accessible to large numbers of producers all tend to raise returns to producers and keep costs to consumers relatively low. Higher monetary returns to producers, ceteris paribus, increase their purchasing power for consumer and producer goods. Lower food costs tend to increase the real income of consumers. Given a relatively high income elasticity of demand for food in most less-developed areas, higher real incomes substantially increase the demand for agricultural commodities. Reductions in transport and marketing costs also improve the competitive position of agricultural commodities in the export market. Competiveness is extremely crucial here because of the importance of generating foreign exchange earnings for procuring capital and consumer

goods for domestic consumption.

To maximize individuals' objectives, the market mechanism must reliably transmit consumers' and resource owners' preferences and producers' demand for production resources. Inaccurate transmission of consumers' preferences distorts resource allocation decisions for both agricultural producers and manufacturers. The efficient operation of resource markets improves the possibility of resources moving to their best uses. This is essential for coordinating the growth of the economy. An efficient market system also facilitates longer-term planning on the part of all participants in the economy, including national planners.

Market reform alters the distribution of income in the economy. Since the marketing middlemen are often considered to be unproductive even though earning a return, their elimination is considered essential and desirable. Yet, their incomes represent forms of capital accumulation. From the standpoint of overall economic development, the question arises as to whether this capital, in the form of the middlemen margin, is used more effectively by marketing middlemen or by producers who realize higher incomes as marketing costs decline. The answer depends upon the effect on incentives and individuals' objectives. As has been noted, in many areas middlemen in the first stage of the marketing process are also agricultural producers realizing supplemental incomes. If marketing middlemen are to be reduced through reform measures, provision must be made for absorbing the services they provide. For example, relative to providing credit to producers, their elimination requires that producers be able to secure credit elsewhere. Their role of transmitting

market information must be assumed by government extension personnel and improved communications media. Their role of bulking, grading, and transporting the initially-small quantities marketed must be assumed by other personnel or machines. The absorption of services provided by the middlemen is not without economic and social cost to the society in question. The monetary costs of reform are evident. The displacement of a large number of middlemen who, at least initially, cannot secure alternative employment also involves social and perhaps political costs. These costs must be weighed against the potentially higher unit returns to producers and lower costs to consumers.

The Human Factor

Human values, attitudes and objectives have a strong conditioning influence on production, consumption and investment decisions. Where fatalistic attitudes rather than a scientific understanding of production processes are operative, producers envision few means for influencing production outcomes and the need for private investment. Improved inputs and assistance offered by agricultural extension agents are of little use to these individuals. Social pressures influence values attached to conspicuous consumption and wealth accumulation which translate into producer-consumers' objectives.

From the standpoint of economic development, religions, extended families, and communal organizations embody both positive and negative features. The relative emphasis of these features determines their impact on developmental processes. While religious support can be found for

de-emphasizing materialism and wealth accumulation, it may also encourage personal industry and thrift as well as personal advancement. Similarly, members of some extended families can lay claim to the produce and rewards of other family members thereby lessening the latters' motivation and capacity for improving their well-being. Conversely, members of extended families can provide assistance to more enterprising members of the system. The suppression of individual consideration for group welfare in communal organizations discourages individual initiative. In the same situation, however, communal organizations can provide a good deal of security to members as well as act as foundations for cooperative enterprises.

Where favorable economic opportunities exist and producers have the incentive and the means, both intellectual and financial, to exploit these opportunities, they appear to do so. The rapid adoption of cash crops grown in conjunction with traditional food crops in Africa; the willingness of rural people to seek temporary, nonfarm employment oftentimes at considerable distances from home; and the general price responsiveness of producers to changing price and, in turn, income relationships all indicate a generally strong potential, if not actual, demand for higher incomes. What may be viewed as low aspiration levels and values inimical to economic improvement may be manifestations of an infrastructure generating low monetary returns, weak incentives for raising demand for consumer goods, and a variety of uncertainties.

Government Programs and Policies

Government programs and policies are the instruments or means for facilitating realization of national planning objectives. They are the

instruments for conditioning the rate and direction of economic activity at "growth points" in the economy. The nature and scope of the instruments, however, are conditioned by a number of constraints. Effective reform programs are often not politically feasible. Financial and administrative inputs have opportunity costs in alternative employments. Lengths of planning horizons affect selection of a feasible configuration of objectives. Furthermore, various programs and policies must be integrated and coordinated for enhancing their individual effectiveness. Developmental programs for selected points without complementary programs to expand and strengthen linkages between these points dampen tendencies toward a more-fully integrated economy where resources are sufficiently mobile so as to move to their highest uses.

Public pricing policies

The studies to estimate producers' responsiveness to changing price relationships reveal a generally positive response in terms of production configurations. That is, as the price of crop A is increased relative to crop B, an acreage shift from the latter to the former usually takes place. Since this is the aggregate outcome, the results do not imply that each producer alters his production patterns.

For most food crops, the derived price response coefficients of acreage adjustment are low but usually positive. The coefficients are positive and substantially higher for nonedible, cash crops. This is a consequence of the importance of growing certain food crops for direct consumption where relative prices are less important than consumption

requirements. Furthermore, cash crops are often grown as supplemental enterprises permitting producers to readily shift into and out of these crops.

Relative acreage is used as a proxy for planned cropping patterns. This use of acreages to measure producer response abstracts from the direct influence of weather conditions on yields and the impact of prices on the intensity with which nonland inputs are applied to land, i.e., per acre yields when the influence of weather has been removed. The degree of responsiveness in altering cropping patterns is influenced by a number of additional factors including:

(1) The number of alternative crops which can be grown by the producer and the ease with which inputs can be shifted among crops is important. The length of time necessary for adjustment has a direct effect on the degree of short-run response versus response over a longer period of time. As the number of feasible crops increases, the cropping pattern is expected to be more responsive to changing price relationships;

(2) Even though alternative crops are feasible, many low-income, small-scale producers are inclined to gear production decisions to meet consumption requirements. For example, where an inedible, cash crop can profitably be grown, producers growing the crop and using the income to purchase necessary consumption goods in the market place confront price uncertainty from two sides. Uncertainty surrounding market conditions for the cash crop and, in turn, a major proportion of his monetary income exists. The cash crop is often an export crop subject to substantial price variations. In addition, the producer confronts

the uncertainty of prices he must pay for his food items and other consumer goods. Consequently, many producers do not gear cropping patterns to anticipated or existing market prices when production for direct consumption is their major objective.

(3) Acreage response is further affected by access to markets, transportation costs, and by tenurial arrangements. In addition, basing producer response on relative market prices only does not take into account variations in input prices and any technological change which affect production decisions. Finally, indices of wholesale prices or prices received by producers do not give any indication of public price policies reducing price uncertainty where such uncertainty affects production decisions nor of other public policies subsidizing or taxing the costs of production inputs. Variations in wholesale prices may not be accompanied by similar changes in prices received by producers; the latter are the important prices for production decisions. For example, where debtors are required to market outputs to creditors and tenants to landlords and when creditors and(or) landlords are able to set prices independently of existing market prices and any government price-support policies, public pricing policies are of little consequence to these debtors and tenants. Complementary programs of rural credit reform and tenancy regulation are prerequisite to these debtors and tenants being able to realize the benefits of improved prices whether these prices result from market conditions or specific public price policies.

Relatively less is known about the price elasticity of quantities

marketed, i.e., the combined effect of market prices on production and direct consumption decisions with the residual being marketed. The limited investigation of this phenomenon, both on a theoretical and econometric basis, suggests the existence of a perverse market supply function for some individuals. Quantities marketed and market prices are expected to move in opposite directions when the proportion of production marketed is small (related to [2] above), the elasticity of production is low, the price elasticity of demand is low, and the income elasticity of demand is high.[1] Technological advance and access to improved inputs raise the elasticity of production. Increased consumption and higher income levels raise the price elasticity and lower the income elasticity of demand. When these phenomena occur, the price elasticity of quantity marketed increases, and the normal, price-quantity marketed relationship results.

A possible conflict exists between raising economic incentives to producers while keeping food and raw material costs relatively low so as to expand domestic consumption and exports. Of importance to producers is the margin between costs and returns and not the absolute level of each. Consequently, programs to increase producers' margins by reducing production costs rather than raising market prices are preferable. Public subsidization of production costs need not take place. Improved inputs raising production levels can bring about lower per unit

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[1] Factors affecting the elasticity of production were discussed earlier. The price and income elasticities of demand are discussed in the subsequent "Consumption" section.

production costs. Extension agents may be able to recommend more efficient production techniques thereby lowering per unit output costs. Similarly, improvements in transportation and marketing facilities open new markets and may reduce marketing costs so that inputs costs are lower and(or) net revenues to producers higher. Each of these possible programs has its own costs.

Fiscal policies

For a period of time, infusion of capital into less-developed areas was viewed as the primum mobile to economic development. This impetus to economic growth would be via the "multiplier" concept. That is, additional capital would initiate successive, reinforcing rounds of economic activity. However, fiscal policies in conjunction with the multiplier do not usually initiate these rounds of economic activity in less-developed areas. The reason is that use of the multiplier concept presumes the absence of structural bottlenecks in the economy so that inputs and commodities flow freely within and among sectors. Where transportation, marketing, and communications facilities seriously retard this flow, use of the multiplier is inappropriate. Such is the case for most, if not all, less-developed countries. Investment in the economy's infrastructure is necessary to alleviate these obstacles.

Most less-developed countries obtain the major proportion of their government revenues through "indirect taxes" such as turnover taxes and import-export taxes. Turnover taxes are a tax on commodities entering the marketing channels. "Direct taxes" such as property and personal

income taxes are less important.

From the government's standpoint, indirect taxes appear to have several advantages: (1) The difficulties and costs associated with cadastral surveys for use in assessing land taxes are avoided; (2) The taxes are assessed and collected with relative ease;[1] (3) The tax structure can be readily altered as production and incomes vary from year to year; and (4) The producers who are primarily subsistence-oriented are in effect given a tax exemption since they have only limited participation in the market.

Turnover taxes are easily passed on to the producer in the form of a lower price for the commodities he markets and(or) a higher price charged the final consumer. If the tax is selective in that differential rates are applied to commodities, the relative profitability of production and the relative costs in consumption are modified so that supply and demand conditions are altered. But this may be consistent with public policy to encourage the production of some goods relative to others. If the turnover tax is borne by the consumer rather than the producer, the increased cost to the consumer reduces his real income and, ceteris paribus, a smaller quantity is bought at the higher price.

The impact of export taxes depends on the direction in which they are shifted. If the producer bears the tax with the export offer price

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[1] Where producers sell or barter goods on a personal basis outside of the regular marketing system, turnover taxes are easily avoided. Collection is facilitated where the major portion of the crop is sold to a few large wholesalers and processors or through marketing cooperatives.

unchanged, the lower returns on the export crop relative to competing crops motivates producers to alter cropping patterns in favor of the latter. Consequently, the quantity offered for export is expected to fall. If the tax is shifted forward to the international consumer, the rise in the export offer price tends to place the exporter at a competitive disadvantage.

Both turnover and export taxes tend to be regressive. These taxes, whether levied on a specific or ad valorem basis, do not reflect production costs and differential net returns to producers. Similarly, such taxes do not reflect the producer's ability to pay. Since export taxes are usually specific in nature and borne by the producer, they are regressive. The per unit tax is the same for all producers, regardless of scale of operations. Conversely, since the small-scale producer directly consumes a major portion of his output, no tax is levied on these goods. The market-oriented producer who purchases a relatively-large proportion of his consumer goods in the market is subject to taxation on these transactions.

In the case of taxes on imported goods, consumers pay the tax in the form of higher prices. The real incomes of consumers are lowered. In the case of producer goods, total production costs are forced upward. Consequently, the terms of trade are turned against producers. Manipulating the terms of trade as a means of transferring income or capital from the agricultural sector to the government or other sectors of the economy is conditioned by two important factors: (1) The degree of participation in the market or monetized economy; and (2) The strength of market participation as reflected by the rate at which individuals enter and

withdraw from the market economy.

Higher prices for imported goods may provide temporary protection for import-substitution industries which are attempting to grow and survive. The imposition of taxes, however, invites the danger of retaliation on the part of other countries participating in international trade. Taxes on foreign trade can be varied as economic conditions in world markets change. In the case of ad valorem taxes, when export prices fall, government revenues can be maintained only if export taxes and(or) exports are increased. When prices fall and tax levels are increased, the producer is penalized twice. When the price of export crops has fallen relative to nonexport crops, producers are motivated to shift resources to the latter. Consequently, considerable reliance on import and export taxes as a major source of government revenues makes the government's revenue position vulnerable to fluctuations in world trade. Countries exporting a small number of commodities are in an especially precarious position. Diversification of exports would tend to stabilize export earnings and public tax revenues. Since exports and imports are channeled through relatively-few ports, these taxes are often the easiest to collect.

When the tax is placed on improved inputs, a lesser quantity of inputs can be obtained with a fixed working capital constraint. However, the higher productivity of these inputs may reduce per unit production costs to the cultivator and the quantities offered for marketing may be maintained or increased. In either case, imposing a tax on production inputs discourages use of such inputs. Furthermore, differential tax rates affect the relative costs of using inputs and, in turn, patterns

of input allocation. That is, this form of tax can be used not only for generating public revenue but for directing input use and production configurations.

Turnover and import-export taxes represent income transfers through turning the terms of trade against producer-consumers. In addition, the relative incidence of taxes affects the relative profitability of producing various commodities and the relative costs of consumer goods. Consequently, resource allocation, production, and consumption patterns are altered for many individuals.

Agricultural extension services

Extension personnel are generally viewed as the transmitters of information relative to costs and returns of improved inputs, alternative production techniques, and economic outlook data for use by producers. More generally, they have three broad functions: (1) To perceive and diagnose problems confronting the producer whether such problems deal with technical aspects of production, securing credit, or gaining access to remunerative outlets; (2) To devise means for alleviating or solving these problems; and (3) To communicate and to persuade producers to adopt these recommended means. They essentially act as consultants to producers or producer organizations so that the latter can more rationally accommodate their decision-making processes to a changing environment. The general responsiveness of producers to changing price and profit situations was borne out in the previous section on public pricing policies. This responsiveness, however, does not imply that producers, especially subsistence-oriented producers, have the capability to acquire or digest technical

information on improved inputs and cultivation practices. Competent extension agents can fill that need. But the flow of information need not be unidirectional. Extension workers are, theoretically, in the best position to communicate the needs and potentials of producers to regional and national planning groups. However, the effectiveness of extension personnel is contingent upon a number of factors, some of which are listed below:

(1) As representatives of the government, their credibility and motives are regarded with various degrees of suspicion, especially in relatively-remote villages. If extension services are provided through a local cooperative or through cooperation of a village leader, individuals contacted are likely more receptive;

(2) Extension personnel need to have a working knowledge of agricultural operations and of existing patterns of economic and social relationships. They also need information to extend. A considerable potential exists for increasing productivity through communicating information on existing production techniques. Certainly, the discovery of higher-yielding inputs and superior production practices would complement this expansion. Where demonstration is possible, the effectiveness of transmitting such information is improved. Even where improved inputs and information are forthcoming from indigenous research institutions, their applicability is limited by differing soil and climatic conditions and by variation in social systems. Even though the proposed change is technically feasible, extension agents do not always give sufficient consideration to economic feasibility;

(3) The number of producers in the area serviced by the extension representative must be manageable. Otherwise, the agent must spread his expertise and time too thinly and lose some of his effectiveness. Local participation in initial discussions and planning of extension projects helps to ensure acceptance and rapid adoption. At the same time, extension representatives are perhaps encouraged to rethink the economic and social feasibility of their programs as applied to specific localities and cultures. Repeated visits to the same villages and same producers not only convey an appearance of genuine interest but provide the representative with an opportunity to monitor producer operations. Where producers are collectively bound by a cooperative, communal organization, or confidence in a village leader, the extension agent may spend the major portion of his time with these organizational or social leaders, in effect, employing them as his assistants, thereby permitting the agent to indirectly contact a larger number of producers. Of course, the effectiveness of such an arrangement would depend upon the competence and willingness of these leaders to absorb and transmit the information provided by the extension agent; and

(4) While the work of extension personnel may be a necessary ingredient to stimulating agricultural productivity, it definitely is not sufficient. That is, competent extension agents may effectively explain the merits of a nontraditional input or a new cash crop. If, however, the producer has a high-risk aversion, does not have access to necessary financing, does not have the managerial capability, or does not have a

strong ego-focused image of change, the recommendations offered will not be implemented; and the cultivator will continue traditional production practices. Furthermore, where tenurial insecurity encourages exploitative cultivation practices and discourages private investment, few producers are interested in soil conservation and investment in productivity-increasing inputs whose benefits are realized over a period of time. These individuals have a strong time preference for current income. Inadequate transportation and marketing facilities reduce net returns to increments of labor and capital and dampen the producer's economic incentive to change. Finally, where belief in magic and reliance on patron saints for promoting economic well-being is strong, recommendations by extension agents carry little weight.

Implicit in (4) above is the fact that the benefits of extension programs primarily accrue to landowners and particularly those having sizeable landholdings. These are the individuals who are more literate and more market-oriented, and who have a greater capacity, both in terms of financing and in adjusting activities within the firm, for introducing change. Few benefits are realized by sharecroppers and landless laborers. While certain changes may be associated with positive-sum outcomes, the costs and benefits are not equally shared by all participants. Consequently, the differential net returns affect relative economic positions and, in turn, relative social and local political positions. Recognizing these eventualities, extension agents should anticipate the longer-term consequences of change.

For most less-developed countries, high population growth rates

complicate achievement of increasing per capita incomes, raising literacy rates, improving health conditions, and creating additional employment for the expanding labor force. While expanding populations provide the potential for a larger, internal market, per capita incomes must be maintained or increased if a strong effective demand in the domestic market is to persist.

Consumption

The importance of consumption patterns on quantities marketed varies with the stage of economic development and with the type of commodity being considered. At low stages of economic development, characterized by a large number of subsistence-oriented producers, a substantial proportion of annual output is consumed directly. As development proceeds with producers participating more fully in the market economy, specialization of production and changes in consumption preferences interact to depress direct consumption in favor of processed foods and increased emphasis on consumer goods not directly produced. Increased participation in the market economy provides more opportunities for affecting the terms of trade to producer-consumers. In turn, the corresponding variations in income distribution in conjunction with the marginal propensities to consume, invest, and save directly affect the strength of internal market for producer and consumer goods.

The three important factors affecting consumption decisions are the relative prices of goods, consumers' disposable incomes, and consumption preferences or tastes. Consumption decisions, however, are not independent of production and investment decisions. As noted earlier when the

producer specializes in nonedible, cash crops, he faces two types of price uncertainty: uncertainty of price received for the commodity he markets and uncertainty surrounding retail prices he must pay for his consumption goods. He reduces this uncertainty by diversifying production so as to produce some commodities for direct consumption. Investment decisions are a function of investment profitability, length of planning horizons, and investment costs. Consequently, when investment profitability is low, planning horizons constricted, and "surpluses" or profits relatively small, increased present consumption is an attractive alternative. As the opportunity costs of higher present consumption increase, consumption-investment decisions become more interrelated and more complex.

Price elasticity of demand

The strong firm-household interrelationships in most less-developed countries invalidate the separation of consumption from production decisions. A relative increase in the price of a particular food grain, for example, not only increases the profitability of increasing relative production of that crop but also increases the cost of direct consumption of that commodity. Consequently, while the monetary income of the producer-consumer is expected to increase, so is the relative cost of consuming that particular commodity. The price elasticity of demand is a coefficient denoting the responsiveness of changes in the consumption demand pattern as, ceteris paribus, relative prices of consumption goods vary.[1]

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[1]For example, the price elasticities of demand for wheat in India used by Krishna range from -0.2 to -0.4.

The sign of the price elasticity of demand is usually negative since, for example, an increase in price of commodity A relative to B makes A relatively more expensive in consumption and commodity B is substituted for A. The absolute value of the price elasticity of demand varies with commodities and with consumption patterns. For subsistence-oriented producers whose principal food item is rice, for example, this absolute value is expected to be very low. That is, the generally low level of consumption and the importance of rice in the total consumption pattern interact so that changes in the relative price ratio have little effect on consumption decisions. Consumption patterns are geared more to physical requirements than to the relative costs of goods consumed.

As real, disposable incomes of producer-consumers increase and as a larger variety of consumer goods becomes available, individuals have both the means and incentive to alter consumption patterns; and the relative quantities of consumer goods demanded become more responsive to changes in relative prices of these goods. In this situation, consumer goods act as "incentive goods". In turn, the producer's demand for income increases. If prices received and paid are invariant, larger quantities of goods must be marketed. Alternatively, external financing can be used to finance the newly-demanded consumer goods. Use of credit in this manner does not improve the debtor's capacity to repay. In the absence of higher real, disposable incomes, debt must be refinanced, assets sold, or conspicuous consumption reduced. Refinancing and selling assets cause the debtor's economic position to deteriorate. Reducing conspicuous consumption is likely to have adverse social rather than economic repercussions. In

all of these situations, a net transfer of income from the producer-consumer takes place.

Income elasticity of demand

The income elasticity of demand for a specified good is a coefficient of responsiveness in demand for this good as disposable income of the producer-consumer varies.[1] As relative prices of commodities produced vary, ceteris paribus, the producer's monetary income and disposable income also vary. The important income level is the level of real, disposable income where disposable income is a function of gross returns, production costs, rents, debt repayment, and taxes. The effects of various terms of credit were discussed previously as was the general ineffectiveness of tenure legislation in regulating rents. Imposing new taxes and(or) raising levels of existing taxes, ceteris paribus, reduces disposable incomes. However, a portion of taxes may be subsequently returned in the form of public investment in the economy's infrastructure and underwriting costs of positive pricing policies.

As real, disposable incomes vary, corresponding changes occur in the relative demand for those commodities produced and consumed directly and for those consumer goods purchased in the market. Because of physical requirements and consumption tastes and preferences, the income elasticity of demand varies for individual commodities. For example, at low levels of living, certain cereals representing the major component of consumption

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[1] The income elasticities of demand for wheat in India used by Krishna range from 0.5 to 0.8. See Appendix C.

patterns have a high income elasticity of demand. That is, even as incomes rise, a major proportion of income increments is spent on consuming additional food grains.

Rising per capita, real incomes and an increased variety of consumer goods motivate individuals to restructure their consumption preferences and, in turn, the value of the income elasticity of demand attached to respective consumer goods. But this substitution among goods occurs largely after levels of living have risen above some minimum, physical level. Previously, consumption patterns were traditional and essentially fixed. Consequently, processed foods, clothing, improved housing, and education increase in relative importance. The income elasticity of demand for cereals declines, relatively and absolutely.

Tastes and preferences

This friction point conditioning producer-consumers' decisions has already been partially discussed. To summarize, consumer goods act as incentive goods in that increased availability and variety of these goods alter consumption preferences and individuals' demand for income. Recognizing that observances of social and religious events are also consumer goods, the opportunity costs of these expenditures increase as the availability and variety of consumer goods expand. The rapidity with which newly-introduced consumer goods have been adopted in several less-developed countries, particularly in Africa, indicates a willingness and desire to alter traditional consumption patterns.

Private Investment

Investment in outlets other than working capital imply a lengthening of the planning period beyond the production cycle. That is, whether funds are invested in an irrigation pump, improved housing, savings account, or an item of jewelry, investors usually realize a flow of returns extending beyond the next production period. This, of course, does not preclude liquidating the investment at any time. Lengthening the planning horizon is prerequisite to sustained economic development. This attitudinal change, however, also introduces new uncertainties not encountered when traditional production and consumption patterns are maintained. When investment in nontraditional inputs is contemplated, additional managerial inputs may be necessary. This should be reflected in estimates of the physical productivity of various inputs, estimates which usually are not synonymous with results achieved on experimental plots and demonstration farms. Additional price uncertainty is involved when new outputs are added to the firm. Several friction points appear in the investment decision function.[1]

Initial investment cost

The initial cost varies with type of investment. The construction of an irrigation system is more costly than purchasing a new plow. Consequently, the potential investor's financial position which includes both accumulated reserves and access to external financing affects the

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[1] Private investment is discussed in Chapter VII. The investment decision function is given in Equation 7.1.

number of feasible investment opportunities. Most small-scale producers, whether tenants or owner-operators, simply do not have the financial capacity to invest in an irrigation system. When external financing is used for part of the investment cost, credit costs also affect investment decisions. Thus, the incentive and capacity for private investment are conditioned by the availability of credit and its cost.

Estimated net returns

Not only are the estimated net returns important but also the distribution of these returns over the investment planning period. If net returns are negative during an early part of the period, producers having limited financial resources may not be able to undertake the investment. This is particularly true when external financing is used for part of the initial investment. Interest payments may have to be made before the investment becomes profitable. Similarly, those potential investors experiencing low levels of living may not be motivated to assume the uncertainty of an unsure distribution of net returns through time.

Discount factor

As the discount factor applied to estimated net returns is increased, ceteris paribus, the profitability of the investment under consideration decreases. Several factors are or can be implicit in the discount factor. The opportunity cost associated with investment funds is included. As economic expansion provides alternative uses of investment funds outside the firm, as savings institutions become more widely dispersed, and as government bonds and corporation stocks assume greater familiarity and

reliability; the opportunity cost associated with funds privately invested in the firm changes. Each of these alternative, competing investments has its own uncertainty which should be reflected in the opportunity cost.

Price and technical uncertainties associated with the potential investment are also important. As these uncertainties increase, so does the value of the discount factor. Public pricing policies through, for example, marketing boards can reduce near-term price uncertainty. Technical uncertainty is associated with investment in nontraditional inputs. This uncertainty is particularly crucial for producers who are "survival-oriented" and for those embodying fatalistic attitudes and reliance on supernatural phenomena for ensuring their well-being. Improved education and communications systems together with the work of extension personnel should partially alleviate this technical uncertainty.

Length of planning horizon

The length of the planning horizon is the period over which the investment provides a flow of returns or a more constricted period over which the investment must show a favorable discounted net return. Tenurial insecurity, the need for net positive returns within a short time period, and the uncertainty of agrarian reform and land redistribution may be reflected in either or both the length of planning horizon and the discount factor. Effective legislation guaranteeing tenants' rights and providing owners with secure titles to land reduces one element of uncertainty. Access to low cost, long-term financing lessens the need for net positive returns soon after the investment is made. Relatively

low cost credit for essential consumption purposes would complement the above.

The length of planning horizon is conditioned by the individual's economic position. In addition, his attitude toward planning to influence his economic well-being and his orientation toward increasing income demand are important. As already noted in the preceding discussion on consumption, income demand is a function of the availability of consumer goods and individuals' aspirations and expectations for raising their levels of living. Without an increased demand for income and(or) wealth, there is little motivation for private investment.

Summary

The inappropriateness of manipulating or concentrating on one factor or friction point in developmental processes has been stressed at several points. The interrelationships among factors emphasize the importance of simultaneous action at several points. Relaxing one obstacle is not sufficient for mitigating or removing other impediments to agricultural and general economic expansion. Yet, the call for a simultaneous attack on developmental problems is incompatible with many of the realities which confront national planners in less-developed areas. Resources are scarce everywhere but capital and administrative inputs are particularly scarce in these areas. Thus, resources which may be committed to building roads, radio stations and monuments have alternative uses in education facilities, health systems, and irrigation networks.

The best use of these resources is conditioned by planning objectives

and the length of the planning horizon. That is, a time-distribution of developmental priorities implicitly exists for any developmental plan. Such priorities are peculiar to the objectives pursued, various economic and political constraints, and length of plan during which objectives must be realized. Plans for the agricultural sector must be integrated and coordinated with plans for other sectors of the economy. Rural areas include a number of occupational groups in addition to agricultural producers. Landless laborers, rural artisans, marketing middlemen, and local merchants are all part of economic activity in rural areas. Most countries have evolved to their present state over a period of several centuries. Those individuals currently vested with economic and political power are often reluctant to admit change. Finally, planning requires facts and planning principles.

To some degree, change has its own built-in momentum. Improvements in communications, transportation, and educational facilities not only increase individuals' aspirations but awareness of their relative economic well-being. Inequitable distributions of wealth and income which condition all aspects of life coupled with few, effective means for reducing these inequalities generate frustration and tendencies for social and political uncertainty; neither is conducive to private investment and to longer-term planning.

Ideally, the need is for general structural reform, i.e., a coordinated program of alleviating obstacles simultaneously. However, few countries have the financial and administrative resources even if they have the will. They face the ubiquitous economic problem: allocating

scarce resources among competing, though often mutually supporting, means so as to maximize objectives being pursued. Investment in roads, extension service systems, or rural credit institutions cannot be based on a priori reasoning only. Each potential allocation of financial and administrative resources must be subjected to at least an economic test of its merits relative to alternative uses. With all of these factors in mind, planners should try to develop those programs consistent with existing realities. General prescriptions and borrowing developmental plans from other areas are of little use. Such an approach is misleading, if not detrimental, to promoting developmental processes.

CHAPTER II. INTRODUCTION

As economic development proceeds, the agricultural sector typically declines in relative economic importance. But this does not imply that the agricultural sector is relatively unimportant in developmental processes. To the contrary: the starting point for economic development is man's use of land and its inherent resources. The application of labor and man's ingenuity to using these resources largely determines the product forthcoming and, in turn, the physical level of living. In the Malthusian state, this level of living is low and essentially constant. However, the Malthusian doctrine minimizes the importance of man's capacity for altering his environment. Man has not always made good use of his physical and human resources. Societies have advanced, economically and culturally, only later to decline and even disappear.

At the earliest stages of economic development[1], the agricultural sector is the only sector in the "economy". Only after individuals have produced enough to exceed their own consumption requirements do exchange and trade become feasible. As exchange is accelerated, new wants and new trading opportunities are generated. In turn, production and consumption patterns are altered by varying degrees through points in time.

Change has not been uniform. Those countries rather arbitrarily classified as "developing" are characterized by considerable heterogeneity in economic and social achievements, both within and among countries,

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[1]Economic development is generally viewed as changes in the structure of the economy which lead to sustained increases in per capita real incomes. Of course, per capita incomes are only averages and give no indication as to the distribution of income or to the adequacy of such incomes for realizing necessary or desired levels of living.

as well as in potentials for future advance. Differing resource endowments, climatic factors, and external contacts, whether the latter were through colonial conquest or trade, have constrained and facilitated developmental processes. When such processes must be integrated with or superimposed on existing cultural patterns, another dimension to the complexity of explaining or predicting economic change is introduced.

The focal point of interest is those countries which are termed "less-developed" on the basis of per capita incomes which are low relative to those in other countries. None is at the earliest stage of development in that the agricultural sector is the only sector. Rather, countries have varying levels of living and economies of varying diversity.

The desire to raise levels of living and the recognition that the various sectors of the economy are interrelated have increased the emphasis given to formulating national plans to stimulate and guide economic activity. The orientation toward identifying and supplying the missing, causative input which would accelerate and sustain developmental processes has largely been unsuccessful. For example, infusing capital or developing entrepreneurial skills has not been sufficient. Rather, this orientation has shifted toward the need for simultaneous action at several, interrelated "friction points"; hence, the need for coordinated planning, both within and among sectors of the economy. This orientation need not imply a "balanced growth" approach to development, however.

National planning is fashionable in many less-developed countries and is necessary for most. The impetus for planning largely arose after

World War II when economic disparities among nations were publicized, and social and physical scientists were engaged to determine the causes of these phenomena and to construct programs for moving the less-developed areas toward the relatively more affluent developed countries.

Planning is fashionable because it manifests a trend toward modernization, especially among those countries with a Socialistic bent. At times, national plans are a precondition to attracting external assistance. In addition, the developing and publicizing of national plans have connotations for political and social stability. But this also indicates a necessity for planning since such stability is desirable, if not necessary, for attaining developmental goals.. Conversely, invariant social relationships may discourage private initiative and inhibit implementation of public policies which nearly always result in a differential distribution of costs and benefits among those affected. Neither is complete political stability conducive to developmental processes if corruption among public officials is widespread, if public policies are geared toward maintaining the economic and social status quo, and if the public does not have confidence in the prevailing political structure. Thus, too much stability or too much instability is inimical to economic and social change. The optimum balance is not only an elusive but tenuous phenomenon.

Increasingly, the desire for change has its own built-in momentum. Such a desire is one of degree and varies with regions within countries and among countries. The desire is stimulated and sustained through increased contact between rural and relatively urban areas resulting in

more participation in the market economy and through increased communication via radios, movies, and word-of-mouth. Furthermore, the growth of labor unions and other economic groups which generate or mobilize individuals' goals and, in turn, publicly articulate these ends are another actual and potential force for change. Also, public exhortations accompanying the implementation of developmental plans condition people to the desirability and necessity for change. But change is not unidirectional. Adverse experiences, whether actually or illusorily perceived, affect individuals' receptiveness to future change. The inability to achieve individual and collective goals likely affects the levels at which future goals are set. This need to attain stated public goals also usually generates the need for a coordinated, economic plan. Concomitantly, planning should facilitate the establishment of a configuration of goals which is economically, socially, and politically feasible.

As noted previously, at relatively early stages of economic development the agricultural sector is the predominant sector in the economy, both in terms of its contribution to national income and the proportion of the population living and working in this sector. Even in countries where the agricultural sector is not the principal sector, the expansion of agricultural production is often viewed as being the mainspring or precondition to sustained, general economic growth in the economy.[1]

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[1] Kuznets states, "...an agricultural revolution--a marked rise in productivity per worker in agriculture--is a precondition of the industrial revolution for any sizeable region in the world" (1.8, pp. 59-60). Similarly, Nicholls writes, "...until underdeveloped countries succeed in achieving and sustaining (either through domestic production or imports) a reliable food surplus, they have not fulfilled the fundamental precondition for economic development." (1.14, pp. 366-367).

A number of phenomena lend support to this proposition. Included would be the following:

(1) The high proportion of the population and the active labor force residing in the agricultural sector.[1] The economic considerations are quite apparent. This population represents a potentially expanding market for producer and consumer goods produced outside of the agricultural sector, both domestically and internationally. At the same time, these individuals represent an existing and potential demand for employment opportunities throughout the economy. Obversely, they represent a potential labor supply for economic expansion and diversification;

(2) The desirability of dampening current or potential inflationary tendencies so that consumers and users of agricultural raw materials have access to these commodities at relatively low prices. These low prices help keep the cost of living and unit production costs relatively low.[2] Ceteris paribus, opportunities for expanding agricultural exports are also improved;

(3) The need to increase the mobility of capital and labor to the nonagricultural sectors of the economy through the generating agricult-

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[1]See Appendix Table 1. This proportion is particularly high for the African countries where several have 70 percent or more in the agricultural sector. For Asia, the most populous countries of India, Pakistan and Indonesia also have about 70 percent of the population in agriculture. The figures are considerably lower for most South American countries.

[2]Low market prices for agricultural commodities need not be associated with low profits or a low motivation for private investment if production costs are also low.

ural "surpluses" to sustain workers and capital investment in other sectors of the economy;[1]

(4) To expand foreign exchange earnings through exports of agricultural products and a reduction of agricultural imports. The generation of foreign exchange represents the means for importing capital and consumer goods, both of which have a direct impact on developmental processes;[2]

(5) To promote political stability which is influenced by economic conditions in the agricultural sector. The benefits of increased output and (or) agricultural income as a component of GNP are never equally distributed among agriculturalists. However, increased output and income represent a potential means whereby a system of taxation and transfer payments may be used to effect some considerations of economic equity; and

(6) To pursue nationalistic objectives of being self-sufficient in food production thereby lessening the need to import foodstuffs as production levels vary with environmental conditions.

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[1] The term "surpluses" has an ambiguous connotation. In the context in which it is used here, "surpluses" represent the differences between production and direct consumption of the respective commodities.

[2] Appendix Table 2 provides data on average imports and exports for selected countries for the 1964-67 period. The contribution of agricultural exports to total exports exceeds 50 percent for all countries except India. In turn, the percent of all imports designated as manufactured goods and machinery ranges from around 40 percent to 65 percent. Thus, agricultural production and subsequent exports are major contributors to the country's capacity to import.

Population growth rates are high for most less-developed countries.[1] Annual, average growth rates for population generally range from 2.0 to 3.5 percent. For several countries, the growth rate of agricultural output does not even keep pace with that of population.[2] For some Latin American countries, in particular, the population growth rates appear to be increasing. Given the high income elasticity of demand for agricultural goods in these areas, any increases in per capita real income accentuate the race between growth in demand relative to supply. The disparity between these growth rates is exacerbated during periods of adverse production conditions. The upward pressure on prices does not benefit the majority of individuals in less-developed countries. Subsistence-oriented producers who account for a significant proportion of the rural populations sell relatively little in the monetized market. All consumers see their cost of living rising. Wage earners, including agricultural workers, experience a reduction in their real incomes unless their monetary incomes are raised accordingly. Increases in the cost of agricultural raw materials and in labor wages tend to reduce the profit margins of

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[1] See Appendix Table 3 for annual, average growth rates for population, per capita real gross domestic product, and agricultural output for selected less-developed countries.

[2] The relationship is more involved. Agricultural output includes nonedible commodities. Several countries export a substantial portion of their agricultural output. Conversely, a part of export earnings is used to import food commodities. Furthermore, even if the growth rate of food production is equal to or exceeds the population growth rate, distribution patterns determine the impact on individual welfare.

manufacturers. If private investment is dampened, growth in consumer and producer goods industries is also retarded.

The development and gradual distribution of the improved wheat, rice, and corn varieties have been a bright light on the horizon. The successes of the new wheat varieties, for example, in Mexico and India, have been rather phenomenal. Since wheat and rice are the two most important food grains in most less-developed areas, it is important to note that this technological advance is limited to only two or three crops but also the most important ones. The initial success of and the publicity given to the "Green Revolution" or the "Green Evolution" certainly have raised expectations of many--national planners all the way down to the peasants. A substantially-improved means for increasing agricultural productivity has been generated. However, several qualifications must be made. The improved seeds are primarily adaptable to irrigated land which, of course, limits the extensiveness of their adoption. Complementary inputs, in the form of fertilizers and irrigation water are necessary (1.11, 1.22). The rate of adoption is retarded by insufficient financial means to obtain these inputs, including the seeds, and by the need for some additional management inputs for determining the optimum mix of inputs.[1] Because of

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[1] Even if cultivators are relatively efficient in allocating the traditional production inputs, they are not likely equally adept in the use of nontraditional inputs such as the improved seed varieties and new fertilizer mixtures. Furthermore, a lag in adoption on the part of subsistence-oriented producers would be expected as a consequence of the uncertainty of response with an alternative production technique.

the differential rate of adoption, the initial gains from the "Green Revolution" go to the early adopters of the improved inputs. A proportion of cultivators who have raised their expectations find them unfulfilled. While it is tempting to view this as the "social consequences" of economic change, such an interpretation appears to be misleading. The economic and, in turn, social consequences of an expanding population and increasing demand for agricultural commodities, whether demand is effective or not, against a relatively inelastic supply were the important factors which stimulated both the need for and interest in developing improved agricultural inputs. Thus, social instability appears to have been both the cause and consequence of the "Green Revolution". More correctly, the process of change involves nearly simultaneous change in social and economic relationships obscuring any specific cause and effect association.[1]

Planning focuses on sectoral growth and the consequences for intersectoral relationships. The economy's infrastructure, physical and human resources, and individual attitudes and motivations form an integrative system of economic and essentially noneconomic factors which mutually constrain and sustain developmental processes. The early work of Rosenstein-Rodan (1.17) stressed the need for an integrative approach to development in the sense that "balanced growth" among the various

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[1] See Frankel (1.4) for an excellent discussion of technical change in association with social change.

sectors of the economy is necessary for reducing the possibility of shortages and surpluses among sectors. Nurkse (1.15) popularized the interrelationships among factors through the concept of the "vicious circles of poverty." Lewis (1.9) and Ranis and Fei (1.16) were primarily interested in agriculture's contribution to industrialization through labor transfers, and the capital embodied in labor, out of the agricultural sector.[1] Little attention was given to increasing agricultural productivity. By implication, the industrial sector would be the leading sector and the necessary adjustments in the agricultural sector would follow.[2]

The Harrod-Domar models (1.1, 1.5) stress the role of capital investment in the economy. This is implicit in their emphasis on the use of capital/output ratios and levels of investment in largely determining the level of economic activity. By further implication, behavior patterns are assumed unchanged and no structural bottlenecks occur in the economy as the levels of investment are varied. The successes of capital transfers under the Marshall Plan to Western Europe after World War II and the remarkable growth of Israel, partly through capital inflows, have perhaps overemphasized the importance of capital, per se. In both of these situations, experienced, competent individuals were available for distributing and

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[1] A later version by Fei and Ranis (1.3) acknowledged that investment in the agricultural sector may be necessary.

[2] Some similarities exist between this proposition and Hirschman's (1.6) discussion of sectoral linkages in an "unbalanced" approach to economic growth.

using the external assistance. In addition, the problem was to a large extent that of rebuilding or, in the case of Israel, building an infrastructure for the economy. This lessened some of the problems confronting countries currently attempting reform and transformation of existing structures, some of which have been institutionalized over time.

The inordinate emphasis on investment, per se, in constructing national developmental plans is criticized by Myrdal who stresses the complementary need for changes in attitudes and institutions. Myrdal writes:

> "This narrow approach to planning in the underdeveloped countries of South Asia implies one or both of two assumptions:
> (1) that development efforts directed at raising output by investment will induce changes favorable to development in all other conditions;
>
> (2) that efforts to change the non-economic conditions directly are difficult, impossible, or ruled out". (1.12, p. 1905)[1]

Such an approach minimizes the need for coordinated national planning and bypasses all of the ensuing problems. Reliance can be placed on traditional private enterprise with an occasional infusion of public funds where bottlenecks occur, externalities are widespread, and capacity for private investment is limited.

The models which have been noted are macro-economic in nature. The

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[1] Myrdal adds, "The majority of contemporary Western economists, with a few notable exceptions, are planners, at least with regard to the underdeveloped countries. But influenced by Marx to a degree they are rarely aware of, they usually make the first assumption [(1) above] that economic advance will have strong and rapid repercussions on attitudes and institutions, especially on those important for development". (1.12, p. 1905).

need for sectoral models giving more attention to individual producer and consumer behavior and the subsequent integration of these models for planning purposes is apparent. For example, the agricultural sector in less-developed countries embodies a continuum of landless laborers to subsistence-oriented producers to fully market-oriented, commercial producers. Such individuals, however, have different motivations and opportunities which affect individual economic activities and, in turn, aggregate outcomes.

PL 480 and Agricultural Development in Recipient Countries

In several countries, notably India, Pakistan, and Israel, food imports from the United States under Public Law 480 were instrumental in increasing domestic quantities of available food and, in turn, reducing the upward trend on prices. Although this program has been operative for several years, it can usually only be a short-run alleviation of any food problem for recipient countries. The uncertainty of program continuation would be a sufficient reason for reducing or phasing out reliance on PL 480 shipments. More importantly, if a country is to be self-sufficient in any commodity, food would be the first choice. The large proportion of consumers' budgets expended on foods and the growth in food demand through population and per capita income increases emphasize the importance of increasing agricultural productivity.

The "self-help" provisions of the Food for Peace Act of 1966 stipulate some of the complementary roles that recipient governments must play in stimulating domestic agricultural production. These provisions are

excerpted below:[1]

" ' Sec. 109. (a) Before entering into agreements with developing countries for the sale of United States agricultural commodities on whatever terms, the President shall consider the extent to which the recipient country is undertaking wherever practicable self-help measures to increase per capita production and improve the means for storage and distribution of agricultural commodities, including:

'(1) devoting land resources to the production of needed food rather than to the production of nonfood crops--especially nonfood crops in world surplus;

'(2) development of the agricultural chemical, farm machinery and equipment, transportation and other necessary industries through private enterprise;

'(3) training and instructing farmers in agricultural methods and techniques;

'(4) constructing adequate storage facilities;

'(5) improving marketing and distribution systems;

'(6) creating a favorable environment for private enterprise and investment, both domestic and foreign, and utilizing available technical know-how;

'(7) establishing and maintaining Government policies to insure adequate incentives to producers; and

'(8) establishing and expanding institutions for adaptive agricultural research; and

'(9) allocating for these purposes sufficient national budgetary and foreign exchange resources (including those supplied by bilateral, multilateral and consortium aid programs) and local currency resources (resulting from loans or grants to recipient governments of the proceeds of local currency sales).

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[1]United States Statutes at Large 80, P. L. 808, 1966, pp. 8-9.

'(b) Notwithstanding any other provisions of this Act, in agreements with nations not engaged in armed conflict against Communist forces or against nations with which the United States has no diplomatic relations, not less than 20 per centum of the foreign currencies set aside for purposes other than those in sections 104(a), (b), (e), and (j) shall be allocated for the self-help measures set forth in this section.

'(c) Each agreement entered into under this title shall describe the program which the recipient country is undertaking to improve its production, storage, and distribution of agricultural commodities; and shall provide for termination of such agreement whenever the President finds that such program is not being adequately developed."

Objective, Methods of Procedure, and Organization of the Study

Less-developed areas are characterized by their heterogeneity--variations in per capita resource endowments, in institutional structures conditioning economic activity, and in attitudes and motivations of individuals participating in the economy. In terms of land availability and employment opportunities, some countries are essentially overpopulated while others tend toward underpopulation. Yet, for all this heterogeneity, a number of factors commonly operative in each less-developed area can be abstracted for examination. The weights or importance attached to individual factors varies for particular countries and for stages of economic development. However, all factors are operative to some degree in all countries. Developmental plans must be tailored to specific problem areas and to the opportunities for achieving planned goals. For example, including provisions for reform of land tenure systems when such reform is not politically feasible or has little likelihood of being effectively implemented obfuscates the role and importance

of planning. In this environment land tenure systems represent a parameter in developmental processes.

Several attempts have been made to describe the process of agricultural growth and development. Johnston and Mellor's paper (1.7) was an early contribution to discussing some of the interrelationships affecting agricultural growth. Mellor (1.10) and Schickele (1.18) have made rather extensive discussions. Schultz's Transforming Traditional Agriculture (1.19) is important for his attempt to quantitatively test some of the hypotheses rather casually used by others. Several books have been edited which include papers often focusing on rather specific components of the agricultural sector. These would include Eicher and Witt (1.2), Southworth and Johnston (1.20), and Thorbecke (1.21). A number of the papers edited by Wharton (1.23), primarily dealing with subsistence agriculture, are based on a more integrative approach to understanding the interaction among economic and social factors. The paper by Nakajima (1.13) is particularly noteworthy.

The focal point of this study is the individual producer and the factors which influence his decision-making processes relative to resource allocation, private investment, and, to a lesser extent, consumption patterns. A laissez faire policy toward the agricultural sector is ruled out because of (1) The crucial need for increasing agricultural production quickly, (2) The desirability of involving the majority of cultivators in developmental processes rather than having any gains accrue to a relatively small proportion of highly commercialized producers, and

(3) The need for structural adjustment in the agricultural sector rather than assuming that the institutional structure changes in the right direction and correct proportion so as to be always favorable to developmental processes, both exogenous and endogenous. Such is the basis for public intervention in the form of national planning whereby sectoral programs and policies are coordinated and reinforced so as to improve realization of developmental goals.

Following the Summary and Introduction chapters, subsequent chapters deal with the principal factors affecting agricultural growth and development: (III) Land Tenure Systems and Firm Size; (IV) Production Technique; (V) Rural Credit Institutions; (VI) Market Systems as a Component of Social Overhead Capital Facilities; (VII) Values, Attitudes and Objectives of Agriculturalists as Producers and Consumers; and (VIII) Government Programs and Policies. Integrated with the discussion are references to the literature. The implication that these are the modal or most prevalent types does not necessarily hold; the literature only provides a repository of information relative to those factors and situations actually studied. Difficulties arise in segregating the discussion by chapters. For example, production techniques are not independent of land tenure systems and credit availability. The distribution of credit is conditioned by land tenure systems, government programs, and producers' objectives. Some of the "friction points" of agricultural development were identified and discussed in Chapter I. These "friction points" represent the instrument variables and(or) parameters of such development.

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CHAPTER III. LAND TENURE SYSTEMS AND FIRM SIZE

Land-tenure patterns are a part of the total agrarian structure. Agricultural growth and development are conditioned by the interaction of all components of this structure. For this study, land tenure is defined as the pattern of land distribution and of the rights and obligations of occupancy, ownership, and land use. Subsequent chapters focus on rural credit institutions, social overhead capital facilities, and government policies, some of the other components of the agrarian structure.

The evolution of the tenure structure results from social and economic power, custom, and legislation, all tending to become institutionalized over time. In addition, ecological factors affect land-use opportunities and production techniques. For example, shifting cultivation is not only an accommodation to or an outgrowth of climatic conditions and existing production techniques but also consistent with traditional social and economic relationships. In another vein, the tendency for the population to concentrate in areas of highest land productivity and near growth centers of the economy affects the demand for land and, in turn, the landowners' degrees of freedom in formulating tenurial arrangements.

A variety of tenure arrangements exists within and among less-developed countries. The continuum extends from landless laborers and squatters who possess no legal rights to land to extensive plantations and state-owned and operated farm systems. Owner-operators, producers operating under tenancy arrangements of varying terms, tribal or communal holding and operation of land, and combinations of these types of tenure are typically

found in differing geographical areas and in varying economic and social systems.

At low stages of economic development, the distribution of income is highly influenced by the pattern of land distribution. This concentration of wealth and income has important implications for the strength of internal markets for all goods and, in turn, economic incentives for diversifying the economy. In addition, the high man/land ratios in some areas, for example, South Asia, combined with high growth rate of the agricultural populations have reduced the size of individual land holdings, furthered fragmentation of holdings, and enabled landlords to exact tenancy arrangements largely on their own terms. With nonfarm employment opportunities limited, the relatively more-disadvantaged are willing to work under traditional tenancy arrangements or even more inequitable ones.

Reforms have been legislated. Too often, however, such reforms have been oriented more toward placation of agriculturalists rather than toward coordinated, structural readjustment. In addition, they often have not been effectively and vigorously implemented.[1] At times social gains have been at the expense of economic gains, especially from a longer-term viewpoint.[2] The vested interests of the politically articulate and powerful — landlords,

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[1] For example, see Flores (3.8, p. 5), Madiman (3.18, p. 292), Dutta (3.7, pp. 80-85), Jacoby (3.11, p. 70), Myrdal (3.19, pp. 1303-4, 1324, 1330-34), and Kermani (3.13, p. 67).

[2] From the individual standpoint, redistribution of land to former tenants and landless laborers in the form of essentially unviable economic units generates both social and economic gains, at least initially. At the macro-economic level, such land reform may be associated with decreases in production and (or) quantity marketed and adverse prospects for improving future agricultural productivity.

large estate owners, and moneylenders -- have motivated these individuals to champion for the status quo or for changes which primarily benefit them.[1] A disproportionate amount of influence in the hands of large landowners coupled with a lack of organized political and economic power on the part of small-scale cultivators has tended to sustain traditional tenure patterns in many less-developed areas.

Since economic power is also associated with political power, the relatively disadvantaged have few alternatives for improving their well-being either through economic or political processes. Institutional credit, whether through the banking system or through credit and marketing cooperatives, usually requires land as collateral for loans--collateral to which tenants and landless laborers do not have access. They have to resort to noninstitutional lenders. Even if tenants and small landholders have the capacity for private investment in improved inputs, the proportion of net returns going to the landlord and(or) the proportion accruing to the marketing middlemen may tend to discourage such investment. The agriculturalist trying to eke out a living from a relatively small land base has few opportunities to improve his economic position, particularly when employment in the nonagricultural sectors is also limited.

The above discussion emphasizes the relative disadvantage of the small landholder, the tenant, and the landless laborer. While this group usually controls a relatively small proportion of available land, they account for a relatively large segment of the agricultural population.

[1] See references given in preceding footnote. Several counter examples exist such as the influence of Ghandi in India, the proponents of collective farms in Eastern Europe and the organizers of cooperative farming units in Israel.

Plantations and large estates exist at the other end of the landholding continuum. Coexistence of firms of such diverse size of operations is possible where production conditions permit nearly constant returns to scale within a range of firm sizes. Furthermore, the small, labor-intensive units, primarily employing family labor, can reduce actual per unit production costs by paying or imputing to family labor wages below the prevailing wage rate for hired labor. Finally, incomes from relatively small production units are often supplemented by income from hiring out labor and from engaging in petty processing and marketing activities.

Firm Size

For this study, firm size is defined as the quantity and quality of productive resources under the control of the manager, i.e., the decision-maker within the firm. This definition covers the continuum of subsistence plots to plantations producing export crops. The land base is often used as the indicator of firm size. However, this can only be a first approximation since no consideration is given to the intensity with which land is used.[1] Intensity of land use is determined by the quantity of nonland inputs which are applied to the land. Firm size is affected not only by the quantity of resources, but by resource productivity and the organization of resources. First, land and labor may have low per unit pro-

[1] Several land reform programs have had limited success, at least from a standpoint of economic viability of the firm, because an inordinate amount of emphasis was placed on the number of acres to be distributed to individual producers without careful consideration of the availability and necessity of complementary resources needed to make the new land distribution pattern an economically viable one.

ductivities as a consequence of past production practices, use of traditional production techniques, and social factors influencing labor productivity. Second, the distribution of land, that is, the size and contiguity of land tracts, and the organization and intensity of work patterns are organizational factors affecting the opportunities for adopting improved technology and the timeliness of completing farm operations. Producers' objectives and the exogenous effect of government programs are elements which further complicate the determination of firm size.

Firm size must be viewed from both the micro- and macro-viewpoints. The former focuses on producers' capability and motivation to alter size throughout their planning horizons. At the macro or national planning level, firm size represents both a parameter and instrument variable for attaining national objectives. The former exists where price support programs are implemented with land tenure invariant. Firm size may be an instrument variable in a program of agrarian reform which incorporates land redistribution and provision for agricultural credit, provisions which are designed to increase agricultural productivity. Even when treating firm size as a parameter, the differential impact of governmental policies has indirect effects on firm size in subsequent periods.

In addition to the attitudinal considerations of prestige, security, and wealth accumulation, firm size determines and is determined by the following economic factors:

(1) The capability to generate a surplus for saving, a part of which

is available for private, productive investment where such remunerative opportunities exist;

(2) The capacity of the firm to profitably absorb additional increments of various forms of capital;

(3) The choice of production technique where alternative techniques are economically and socially feasible and are available;

(4) The opportunities for diversifying firm enterprises to increase the flexibility of response to changing conditions and as a hedge against adverse economic conditions for individual enterprises; and

(5) The ability to secure access to additional resources, including public and private credit and extension services.

At points in time, firm size is a consequence of evolutionary and traditional forces: of a fixed amount of physical land and of land reform; of an expanding population and of persistent traditional family systems and inheritance rights; and of the availability of inputs and techniques to augment resource productivity and of the inadequacy of credit institutions to provide necessary financing plus producers' inertia toward change. In an attempt to systematize the discussion, the following formulation is employed.[1]

$$J = \sum_{i=1}^{n} p_i q_i + \mu \{K^o - \sum_{j=1}^{m} p_j q_j\} + \lambda \{[F] (q_1, \ldots, q_s)\} \qquad (3.1)$$

[1]The terms in Equation 3.1 are defined in Appendix D.

Equation 3.1 represents a constrained-revenue maximization formulation with the constraint being capital availability, K^{v}. For the subsistence producer, it may be interpreted as a constrained utility maximization approach where the p_i ($i = 1, \ldots, n$) are utility coefficients. The $\underline{n}$ outputs and $\underline{m}$ inputs are incorporated in the implicit production function $[F](q_1, \ldots, q_s)$ where $n + m = s$.

For short-run decision-making, producers are restricted to their respective short-run average cost curves, SAC, as in Figure 3.1. These are the consequences of past investments in fixed assets,[1] current technology employed, anticipated input prices, and producers' objectives. The SAC curves may be considered as indicators of firm size. In Figure 3.1, SAC^{o} may represent the initial cost structure for a market-oriented producer. Corresponding to

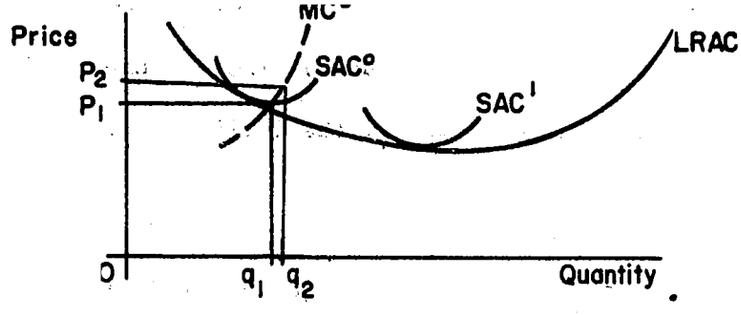


Figure 3.1 Hypothetical cost curve for the individual firm

[1] Included would be investments in land, in the quantity and quality of family labor, in draft and mechanical power, and in farm buildings. In addition, public investment in social overhead capital facilities would affect the shape and position of some producers' SAC curves.

SAC^o is an equation similar to Equation 3.1 where only one commodity is represented, i.e., n = 1. Firm size is affected by the following factors:

(1) The functional relationship [F] which incorporates consideration of the quantity and productivity of fixed inputs, including land; the physical relationships between the variable and fixed inputs; the production techniques employed; and the influence of exogenous factors. This functional relationship, along with input prices, represents the feasible points on SAC^o open to the producer;

(2) The magnitude of K^o, the working capital constraint. The amount of K^o, along with [F] and input prices, determines the feasible points on SAC^o actually available to the producer;

(3) The p_j (j = 1, ..., m) affect the number of q_j (j = 1, ..., m) that can be used since $\sum_{j=1}^{m} p_j q_j \leq K^o$. The q_j, in turn, affect the points on SAC^o that can be reached;

(4) Given SAC^o, the output price determines the profit-maximizing level of output. At p_2 in Figure 3.1, Oq_2 is produced, assuming that K^o is sufficiently large to permit production of Oq_2. If the price falls to p_1, the optimum, planned output level is Oq_1. Although the firm size implicit in SAC^o has remained invariant, the actual size in terms of output varies with the point at which the output price equals MC^o; and

(5) The producer's objective whether it is to maximize Equation 3.1 or to pursue some other objective.

The usual theoretical assumption relative to long-run planning decisions that all factors of production are variable may apply in individual cases but

not in those areas where man/land ratios are high. General economic expansion improves opportunities for resource availability and mobility. The rural-to-urban migration in relatively developed countries has facilitated the expansion of individual resource bases, especially land, on the part of those remaining in agriculture. In much of the less-developed areas, additional land is available for cultivation, but the private costs of developing this land for commercial production are prohibitive. Further, the nature of rural credit institutions inhibits the profitability and feasibility of private investment and expansion of firm size.

In Figure 3.1, a movement from SAC^o to SAC^1 as a result of private investment in the firm is an increase in the firm size or, more correctly, in the output capacity of the firm. In the longer-run, exogenous factors such as technological advances, public investment, and government programs of agrarian reform have both direct and indirect effects on firm size and on producers' motivation and capability for private, productive investment. The impact of such factors varies with individual producers and with points in time, that is, with stages of economic development.

Distribution of land holdings

The 1960 world census of agriculture (3.23) provides data relative to farm size, expressed as size of land holding, for a few less-developed countries. See Tables 3.1 - 3.3. As already noted, farm size in terms of land area is only an approximation of firm size. Where traditional production techniques embodying labor as the primary variable input are used, farm size is a better indicator of the size of operations than where a large

number of nonland inputs, in addition to labor, are used. Quite apparently, farm size in terms of land area has no implication for land productivity and, in turn, the producer's capacity to produce for direct consumption and for the market. Where environmental conditions are favorable for multiple cropping, relatively small land holdings need not be associated with low levels of annual production. Furthermore, land area per farming unit does not reflect the problems of land fragmentation and costs incurred in traveling to and from land tracts. Some individuals are only part-time farmers who have additional sources of income. Finally, consumption requirements, as affected by family size, need not be associated with size of land holding. Taxes and rents may also be so burdensome that even though the land area appears to be adequate, the residual production or income is not sufficient to sustain traditional consumption patterns and even less the capacity for saving and private investment. All of the above qualifiers must be kept in mind when attempting to evaluate the size of land holdings as the latter affects the producer's capacity to contribute to general economic expansion.

In Tables 3.1 to 3.3, the pattern of land distribution tends toward large land holdings at one extreme and a large number of extremely small production units at the other. The former are a few in number but include a major proportion of the total land. Conversely, the latter are numerous but have relatively small amounts of land under their control, both individually and collectively. This concentration of landownership is synonymous with economic and political power and with social status (3.3, 3.17, 3.21). Such polarization of power sustains a constellation of forces pervading nearly all

Table 3.1. Percentage distributions of agricultural holdings and total land areas according to size of land holding for specified South American countries*

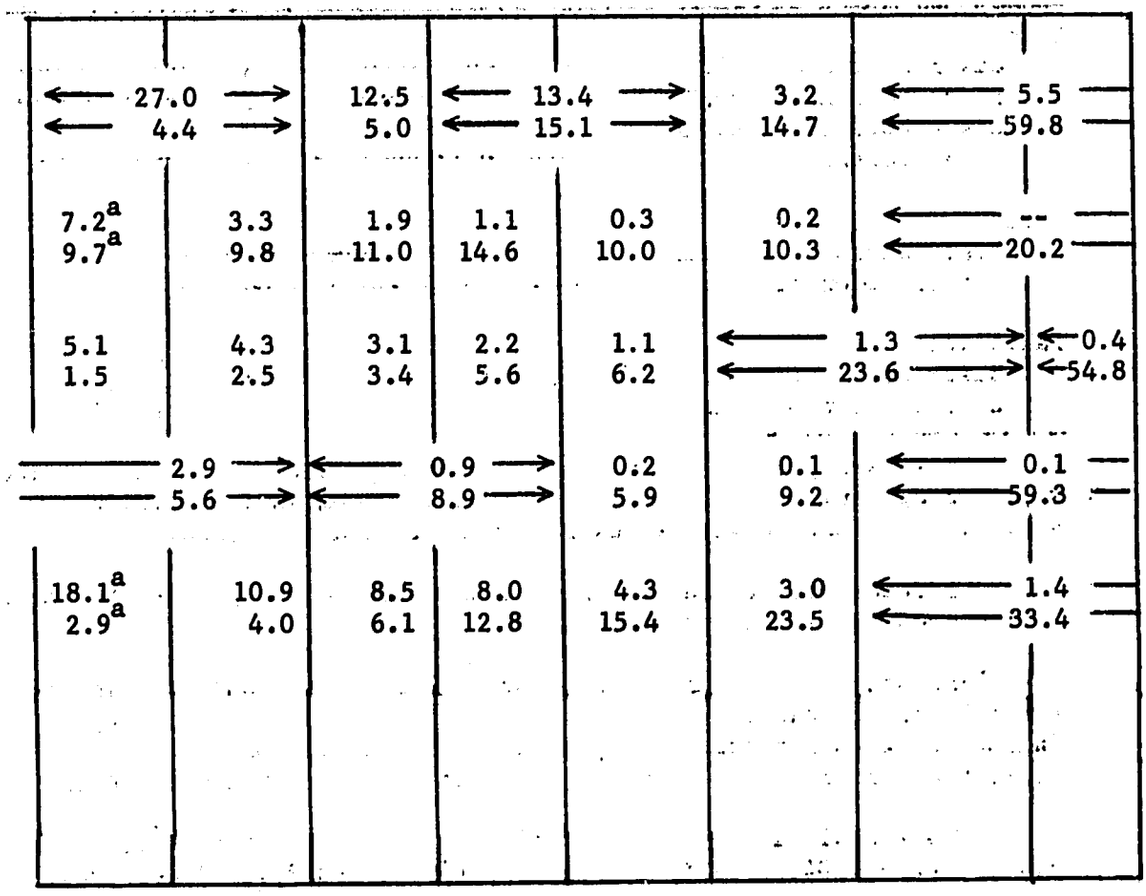
All sizes of land holdings, in hectares	0 < 2	2 < 5	5 < 10	10 < 25
Argentina:				
% distribution of holdings	←	15.2 →	←	23.2 →
% distribution of area	←	0.1 →	←	0.9 →
Colombia:				
% distribution of holdings	40.4	22.1	14.0	9.5[a]
% distribution of area	1.4	3.0	4.2	5.8[a]
Mexico:				
% distribution of holdings	←	65.9 →	6.9	9.7
% distribution of area	←	0.8 →	0.4	1.2
Peru:				
% distribution of holdings	←	83.3 →	←	12.5[c] → ←
% distribution of area	←	6.1 →	←	5.0[c] → ←
Uruguay:				
% distribution of holdings[b]	←	14.7 →	15.0	16.1[a]
% distribution of area[b]	←	0.2 →	0.5	1.2[a]

[a]The data are for 10 < 20 and 20 < 50 hectare groupings rather than those in the table heading.

[b]Only holdings greater than 1 hectare were enumerated. Area includes arable land, pastures, and woodlands.

[c]The data are for 5 < 20 and 20 < 100 hectare groupings.

*Source: Food and Agriculture Organization of the United Nations (3.23). Data for Peru from Brodsky and Oser (3.6, Table 2).


25 < 50
50 < 100
100 < 200
200 < 500
500 < 1000
1000 < 2500
2500 < 5000
> 5000
27.0
4.4
12.5
5.0
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15.1
3.2
14.7
5.5
59.8
7.2a
9.7a
3.3
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11.0
1.1
14.6
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20.2
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1.1
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1.3
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0.4
54.8
2.9
5.6
0.9
8.9
0.2
5.9
0.1
9.2
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8.5
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8.0
12.8
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15.4
3.0
23.5
1.4
33.4

Table 3.2. Percentage distributions of agricultural holdings and total land area according to size of landholding for specified Asian countries*

Size of land holdings, in hectares	0 → 1		
	Holdings without land[a]	.01 < .5	.5 < 1.0
Iraq:			
% distribution of holdings	←	28.9	→
% distribution of area[b]	←	0.3	→
% distribution of holdings (1950 census)	←	19.4	→
Iran:			
% distribution of holdings	← 16.7	→	9.6
% distribution of area[c]	← 0.6	→	1.1
Pakistan:			
% distribution of holdings[d]	9.5	18.4	20.8
% distribution of area[d]	-	1.5	5.9

[a]These are primarily livestock or poultry units of a minimum size, kept for agricultural purposes, but without accompanying cultivable agricultural land or with an extremely small tract of land.

[b]Includes fall on land. Areas double cropped or planted to inter-tilled crops were only counted once.

[c]Excludes 11,139,815 hectares of "agricultural land" outside of agricultural holdings: 272,616 hectares of land under temporary fallow; 6,740,675 hectares of permanent meadows and pastures, and 4,126,524 hectares of cultivable land requiring minor improvements.

[d]The actual size groupings reported were < .4, .4 < 1.01, 1.01 < 2.02, 2.02 < 3.04, 3.04 < 5.06, 5.06 < 10.12, and > 12.12 hectares.

*Source: Food and Agriculture Organization of the United Nations (3.23).

1 → 2	2 → 3	3 → 4	4 → 5	5 → 10	10 → 20	20 → 50	50 → 100	100 → 500	> 500
←	28.1	→		12.2	12.2	11.7	3.6	2.4	0.9
←	2.0	→		2.6	5.4	11.0	7.3	16.2	55.2
←	20.7	→		12.7	15.5	19.2	6.3	4.7	1.5
13.7	11.1	7.7	6.5	18.1	11.9	4.1	0.4	0.2	--
3.3	4.5	4.4	4.8	21.2	26.9	19.5	5.0	6.0	2.7
19.9	10.5	←	9.9 →	7.6	←	3.4	→		
12.2	10.9	←	16.3 →	22.1	←	31.1	→		

Table 3.2 (continued)

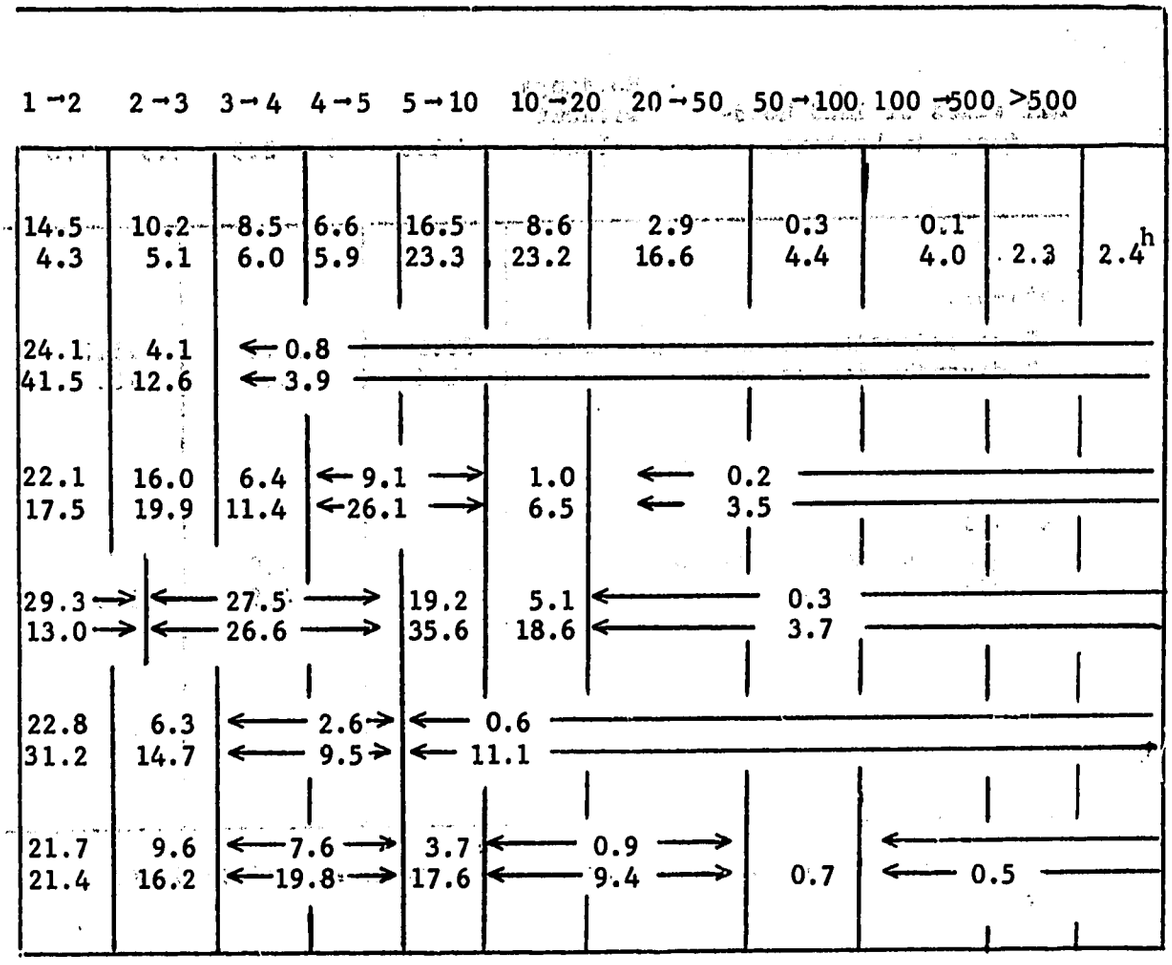
Size of land holdings, in hectares	0 → 1		
	Holdings without land[a]	.01 < .5	.5 < 1.0
Turkey:			
% distribution of holdings[e]	9.1	11.7	11.0
% distribution of area[e]	-	0.7	1.8
Republic of Korea:			
% distribution of holdings	← 35.0 →		36.0
% distribution of area	← 11.6 →		30.4
Malaysia:			
% distribution of holdings[f]	← 10.2 →		35.0
% distribution of area[f]	← 1.4 →		13.7
Thailand:			
% distribution of holdings[g]	← 18.6 →		
% distribution of area[g]	← 2.5 →		
China (Taiwan):			
% distribution of holdings	3.9	35.9	27.9
% distribution of area	0.6	11.8	21.1
Republic of Viet-Nam:			
% distribution of holdings	1.1	36.6	18.8
% distribution of area	-	4.9	9.5

[e] The actual size groups reported were 0.1 < 0.6, 0.6 < 1.1, 1.1 < 1.2 hectares, etc.

[f] The actual size groups reported were < 0.4, 0.4 < 0.8, 0.8 < 1.2, 1.2 < 1.6, 1.6 < 2.0, 2.0 < 3.0 hectares, etc.

[g] The actual size groupings reported were < .96, 0.96 < 2.4, 2.4 < 4.8, 4.8 < 9.6, 9.6 < 22.4, > 22.4 hectares.

[h] Government farms and estates.


1 → 2
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← 9.1 →
←26.1 →
1.0
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← 0.2
← 3.5
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13.0 →
← 27.5 →
← 26.6 →
19.2
35.6
5.1
18.6
← 0.3
← 3.7
22.8
31.2
6.3
14.7
← 2.6 →
← 9.5 →
← 0.6
← 11.1
21.7
21.4
9.6
16.2
← 7.6 →
←19.8 →
3.7
17.6
← 0.9 →
← 9.4 →
0.7
← 0.5

Table 3.3. Percentage distribution of agricultural holdings and total land area according to size of land holding for India, based on the 1961-62 and 1953-54 National Sample Surveys*

All sizes of land holdings, in hectares	Holdings without land	< 1.0	1 → 2.5	2.5 → 5.0
1961-62:				
% distribution of holdings	11.7	32.5	15.8	15.2
% distribution of area	-	1.6	6.0	12.4
1953-54:				
% distribution of holdings	23.1	24.2	14.0	13.5
% distribution of area	-	1.4	4.9	10.1

*Source: The Cabinet Secretariat: Government of India (3.9, Table 3.2).

5.0 → 7.5	7.5 → 10	10 → 15	15 → 20	20 → 25	25 → 30	30 → 50	> 50
8.3 11.6	4.6 9.0	5.1 14.0	2.5 9.7	1.5 7.6	0.9 5.3	1.4 11.8	0.6 11.1
7.8 10.0	4.7 8.4	5.0 12.8	2.7 9.6	1.5 6.8	1.0 5.7	1.7 12.9	0.9 17.5

aspects of rural life which tends to perpetuate and to likely make more pronounced the economic, political and social inequalities currently existent.[1] Such power tends to take the following forms:

(1) The resource base, land in particular, is severely constricted for the majority of agriculturalists. Coupled with the large and rapidly growing rural population, labor productivity and gross returns to labor are low and, in turn, per capita incomes rise very slowly, if at all;

(2) Low per capita incomes, together with the size of the rural population relative to farming opportunities, permit landlords to impose tenancy arrangements which primarily benefit them;

(3) Tenants are often dependent upon and(or) obliged to work for large landowners on a part-time basis with little or no compensation being paid. Further, tenants are required to market their output at a low price and secure credit at relatively high costs from landowners where these are terms of the tenancy arrangement, where alternative markets do not exist, and where tenants are further exploited because of low education levels;

(4) The institutional structure is geared to the needs of the landowners. For example, marketing outlets and financing on favorable terms are more readily available to them. This is further facilitated by their investment and consequent influence on the operations of some of these institutions. In Latin America, landowners frequently ignore the constitutional

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[1] In reference to Latin America, Barraclough and Domike state, "... traditional class structure and income distribution patterns that have brought stagnation to the economies and perennial poverty to the 'campesinos' are now repudiated by all major political groups. Better living levels, education for all and the full participation of 'campesinos' in national society are the avowed goals of every Latin American government and of the Alliance for Progress" (3.3, p. 394).

requirement that they provide schools at the centers of work (3.3, 3.6). At the same time, education is one of the most effective means for improving labor mobility and for increasing cultivators' awareness of their rights, and;

(5) Landowners often place low priorities on investment in agriculture and in their own production units.[1] Landowners are often content with the rents being received and have little inducement to increase land productivity through investment (3.11, 3.13, 3.14, 3.19).[2] This tends to maintain resource imputations and per capita incomes for workers at low levels. In some areas additional social status accrues to those who are not directly involved in the operation of their land, either in terms of supplying management inputs or making private investment in their land holdings.[3] Landlords' negative attitude toward involvement in agricultural operations, even

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[1] In the case of Peru, Whyte and Williams (3.24) note that among the coastal haciendas, new technology is rapidly adopted and a strong concern for economic efficiency prevails. Workers are paid wages and often represented by labor unions. Conversely, hacienda owners in the mountainous areas are more concerned with minimizing investments rather than maximizing net returns. As long as the owners' economically inefficient operations provide enough returns to support their existing level of living and the attendant social and political power, they are satisfied.

[2] Klat (3.14) adds that most of the large landholdings in the Middle East belong to a family or a group of families rather than to one individual. The owners, often numerous and each with small, individual claims, find little mutual interest in developing the land. Only a minority of enterpising landlords have developed their estates.

[3] According to Myrdal, in rural South Asia, "To own land is the highest mark of social esteem; to perform manual labor, the lowest. Considerable social status is attached to supervisory work, but the prestige enjoyed by people who abstain from work altogether is greater ... Small peasants also own land, but the fact that they do much of their own work debars them from the high social status enjoyed by other landowners" (3.19, p. 1057). A similar attitude is noted by M.H. Sufi, "Conditions of Farming in Pakistan" in Parsons, et al. (3.20, pp. 123-125). Also see Klat (3.14, pp. 50-1).

in a supervisory capacity, motivates them to rent their land to tenants.[1] The combination of the tenant having neither the incentive or capacity to improve land productivity and the landowner's attitude toward such private investment interact to inhibit agricultural growth. The problem is exacerbated when land productivity is not maintained but diminishes through improper cultivation practices.

Fragmentation of holdings

The 1960 world census of agriculture provides limited information on the degree of fragmentation among land holdings. The incidence and severity of fragmentation is more pronounced among Asian than Latin American countries.[2] In India, for example, the average size of agricultural holding was found to be about 6.5 acres and on the average, each holding was comprised of 5.7 fragments or noncontiguous land units (3.9, p. 8). In Turkey, less than 10 percent of all holdings were single units of land. Nearly one-fourth consisted of 6-9 parcels of land and one-fourth consisted of 10 or more units of land. In addition, fragmentation was most prevalent in holdings

[1] Dutta (3.7) takes at least a partially contrary position by stating that with the exception of absentee landlords and small landowners, landlords in India usually share the costs of farming and take an active interest in decision-making and managing their lands.

[2] Fragmentation in Asia has been furthered by inheritance patterns based on Hindu and Moslem law. Neither provides for primogeniture, i.e., an exclusive right of inheritance belonging to the first-born, nor is such provision made in the Buddhist countries of Southeast Asia (3.19, p. 1048; 3.14, p. 55-6). Rather, inheritances are to be equally divided among all heirs, at least all male heirs. The emphasis on equity promotes parcelization of land units. Rapid population increase and relatively short life spans accentuate the rate at which land units are subdivided into small, noncontiguous units.

of 10 or fewer hectares. In contrast, 46 percent of the holdings in Malaysia were nonfragmented and about 87 percent were comprised of 3 or fewer parcels of land. Fragmentation was most prevalent among holdings of 2-3 hectares in size.

The average number of land parcels in Iran was 6.1. For holdings of less than one hectare, the average number of parcels ranged from 2.5 to 3.7. The degree of fragmentation was positively correlated with the size of the landholding. In the case of Pakistan, only 23 percent of all holdings were single-unit holdings. Nearly 20 percent consisted of 10 or more parcels of land. For this latter group, the degree of fragmentation was highest in the 1-2 hectare size of holding.

Among Latin American countries, the average number of parcels per holding ranged from 1.0 to 1.6 in Colombia. In the Dominican Republic, nearly 99 percent of all holdings consisted of a single, contiguous unit of land. In Panama, nearly 60 percent of all holdings were single units while 35 percent were comprised of 2-3 parcels of land; the average number of units of land per holding varied from 1.2 to 2.9 with fragmentation generally increasing with the size of holding. Finally, in Costa Rica 63 percent of the holdings were represented by single parcels of land; nearly 30 percent consisted of 2-3 parcels. Fragmentation was most prevalent in the 4 to 50 hectare size groupings. The distribution of size holdings according to degree of fragmentation was skewed towards the smaller producing units.

Tenancy Systems

The terms of the tenancy arrangement affect the potential for growth within the existing institutional framework and with structural change. The two principal problems faced by tenants are insecurity of tenure and the cost-return sharing agreements with landlords. Both inhibit the tenant's incentive and capacity to improve agricultural productivity.[1] Both also tend to promote misuse of land resources which adversely affect future land productivity. In the Middle East, for example, tenurial insecurity is high. Tenancies are terminable at any time and without compensation for abrupt severance of tenancy arrangement or for any improvements in the land made by the tenant (3.13, 3.14). In a similar vein, tenancy systems in Latin America are described as follows:

> "Wage and rental agreements can be adjusted to suit the landowner's convenience so that all productivity increases and windfall gains accrue to him. Permanent improvements such as buildings or fruit trees belong to the estate even when all costs are borne by the tenant. On many large plantations residents are strictly forbidden to make improvements without permission for fear they would acquire vested interests in the land or take resources away from the production of the cash plantation crop. Residents of the large estates can be expelled at will in traditional areas where there is neither a strong central government nor a labor union to defend them . . . Tenants and workers depend on the 'patron' for credit, for marketing their products and even for medical aid in emergencies. Food and clothing are frequently obtained through the estate's commissary and charged against wages or crops" (3.3, p. 399).

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[1] Relative to tenants in India, Madiman writes, "The small tenant is gradually disappearing from the scene, not by moving up the ladder to become an owner-cultivatorbut by being dispossessed of land by the bigger cultivator and the rural non-cultivating landowner. Tenants of yesterday are today's agricultural laborers" (3.18, p. 283).

Tenure systems based on custom tend to be for short periods of time, ranging from a single cropping period to a few years (3.1, 3.3, 3.10). The tenant is often given a small parcel of land for his own cultivation. In turn, he is obligated to work for the landlord for a low salary, if any, or to "market" his production to the latter at a relatively low price. The general lack of written contracts makes most arrangements tenuous. As noted before, such insecurity has adverse consequences for private, productive investment and for use of nonexploiting cultivation practices. The relatively low returns to family labor, even prior to rent payments, provide few opportunities for the majority of tenants to improve their economic position, absolutely or relatively.

Even with assurance of continuation of tenure, the tenant usually has neither the capacity nor incentive to increase his output through private investment. He does not have the capacity since after payment of rent his share of the output is only sufficient to cover his subsistence needs. During lean times, he borrows; during favorable production periods, he must repay his previous borrowings. If he is able to invest privately, he is not able to realize the full benefits of his investment. Under crop-share arrangements, a portion goes to the landlord simply because he owns the land. Consequently, the tenant's incentive is to get as much as possible from the land without consideration of future productivity. Larger outputs through exploitative cultivation also mean higher absolute shares to the tenant.

Landless laborers and "squatters" are in even more vulnerable positions. The former have no home base, no matter how small. The latter have little, if any, legal status to the land they occupy and cultivate.[1] Tables 3.4 and 3.5 give the distribution of holdings and land area by class of tenure for countries for which data are available.[2]

Referring to Tables 3.4 and 3.5, the majority of holdings and the major portion of land area are associated with "Owners".[3] The exceptions are Uruguay and Iran where tenancy is relatively important. "Squatters" represent a significant tenurial category in Costa Rica and Venezuela. The limited data on the incidence of landless laborers indicate their importance in some Latin American countries.

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[1] Barraclough and Domike (3.3) note that almost all land is owned, and when new areas are opened to cultivation for previous landless laborers, owners often reclaim the land after it has been cleared and has acquired commercial value. The person clearing the land becomes a member of a new "latifundia" system or moves on to another uncleared area. "The temporary right to the use of land in exchange for clearing it is an established custom. Many campesinos spend their whole lives clearing small areas of bush or jungle, obtaining only a passing benefit because they have no permanent rights to the land" (3.3, p. 408).

[2] The percentage distribution of land by size of holding with each class of tenure is not available. In general, the method of enumeration was as follows: when a large establishment was made up of several units operated by different individuals, each unit was counted as a holding if the unit was operated as a separate technical unit. To the extent that those operating small landholdings are also tenants, the power associated with land distribution patterns is understated.

[3] See preceding footnote.

Table 3.4. Percentage distribution of number of holdings and(or) land area, by class of tenure, and landless laborers as a percent of total economic units in agriculture for selected Latin American countries.

	Parameter	Time period	Owners[a]	Tenant[b]	Squatters	Other[c]	Landless laborers
Argentina:							
	% holdings[d]	1947	36.8	33.4	--	29.8	
	% area[e]	1960	58.9	16.9		24.2	35.0[f]
Brazil:							
	% holdings[d]	1950	80.8	9.1	10.1	--	59.8[f]
	% area[d]	1950	90.1	5.6	4.3	--	
Costa Rica:							
	% holdings[e]	1960	76.3	4.0	2.5	17.2	
	% area[e]	1960	86.6	0.6[h]	1.3	11.4	

[a] In Brazil and Guatemala this category includes estate managers.

[b] Includes tenants under cash, share, and services-supplied arrangements and combinations of these.

[c] Includes mixed systems of tenure. In Costa Rica, squatters are included.

[d] Source: International Labor Office (3.10, Table I.). Area represents area under cultivation.

[e] Source: Food and Agriculture Organization of the United Nations (3.23). Area represents total land area in holdings.

[f] Source: Barraclough and Domike (3.3, Table II.).

Table 3.4 (continued)

	Parameter	Time period	Owners[a]	Tenant[b]	Squatters	Other[c]	Landless laborers
Colombia:							
	% holdings[e]	1960	62.4	23.3[h]	3.9	10.3	23.2[f]
	% area[e]	1960	72.4	7.3[h]	12.1	8.2	
Guatemala:							
	% holdings[d]	1950	48.3	16.4	3.9	31.4	24.8[f]
	% area[d]	1950	74.5	2.8	1.2	21.5	
Mexico:							
	% holdings[e]	1960	94.5	2.5	-	3.0 (1.4)[g]	
	% area[e]	1960	57.3	4.4	-	38.2 (26.3)[g]	
Nicaragua:							
	% holdings[e]	1960	46.0	12.6	15.7	25.7	
	% area[e]	1960	69.2	2.6	19.2	9.0	
Panama:							
	% holdings[e]	1960	24.6	6.0[h]	50.4	19.0	
	% area[e]	1960	37.1	2.4[h]	29.5	31.0	
Uruguay:							
	% holdings[e]	1960	49.9	33.3[h]	-	16.8	
	% area[e]	1960	44.5	28.8[h]	-	26.7	
Venezuela:							
	% holdings[d]	1950	41.3	20.6	35.8	2.3	

[g]Holdings operated under ejidal form of tenure.

[h]When total area is classed according to tenure, 8.9 percent of the land in Colombia, 1.6 percent in Costa Rica, 5.0 percent in Panama, and 40.5 percent in Uruguay is operated under tenancy arrangements. That is, the area included under the "Other" category includes both owned and rented land.

Table 3.5. Percentage distribution of number of holdings and(or) land area, by class of tenure, for selected Asian countries*

Country	Parameter	Time period	Owners[a]	Tenants	Others
Iran:					
	% holdings	1960	33.3	55.9	10.8
	% area	1960	26.2	62.2	11.6
Iraq:					
	% area	1960	72.5	← 27.5 →	
Korea, Republic of:					
	% holdings	1960	73.6	6.8	14.2[b] 5.4[c]
Malaysia:[d]					
	% holdings	1960	62.7	10.0	27.3
	% area	1960	62.6	5.7	31.7
Pakistan:					
	% holdings	1960	52.1	19.3	28.6
	% area	1960	43.0	27.5[e]	29.5
Taiwan:					
	% holdings	1960	64.5	14.1	13.8[b] 7.7[c]
	% area	1960	72.5	18.0	9.5
Thailand:					
	% holdings	1960	81.9	4.1	14.0
	% area	1960	85.1	3.8	11.1

[a]Includes mixed systems of tenure, including holdings on which land is both owned and rented.

[b]More than 50 percent owned by the holder.

[c]Less than 50 percent owned by the holder.

[d]Data for farm households only. Estates and government farms are excluded.

[e]When total area is classed according to tenure, 39.5 percent of land in Pakistan is operated under tenancy arrangements. That is, the area included under the "Other" category includes both owned and rented land.

*Source: Food and Agriculture Organization of the United Nations (3.23). Area represents total land area in holdings.

Communal tenure and shifting cultivation

In addition to plantations producing export crops and relatively small subsistence- and market-oriented freehold units found throughout less-developed areas, a communal or tribal form of agrarian structure whose members engage in shifting cultivation is indigenous to many parts of Africa.[1] Shifting cultivation is an outgrowth of both tribal cohesiveness and of economic necessity. The latter is largely the consequence of using traditional inputs and the effect of tropical climatic conditions on soil productivity. Shifting cultivation practices result in the "bush"[2] protecting the soil from the tropical heat, eventually restoring and preserving its capacity to yield crops, and lessening soil and mineral erosion.

Several implications of this tenure structure for resource use and productivity result. In general, the following would be included:

(1) A large amount of land is necessary to sustain traditional cropping practices. Restoration of soil fertility may require that the fallow land remain idle for thirty years or more (3.12).[3] Where demo-

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[1] Only fragmentary information from the 1960 world census of agriculture is available. Tribal or communal forms of tenure account for 35 percent of the land in Libya, 35 percent in South West Africa, and 13 percent in South Africa. La Anyane (3.15) discusses the widespread incidence of communal ownership in countries of Western Africa. Shifting cultivation is also practiced in parts of Asia. See Klat (3.14).

[2] The "bush" is the natural vegetation that covers the soil after cultivation has been stopped due to decline in soil productivity. In addition to reducing the danger of erosion, the vegetative growth which is subsequently cut and burned provides the fertilizer for the subsequent cropping period.

[3] In Western Africa, sufficient vegetative growth takes place so that cultivation can be resumed after a fallow period of three to seven years (3.15).

graphic pressure emerges and rights cannot be secured to additional land, a combination of reducing the length of the cropping cycle, partial member emigration or modification of traditional production techniques is necessary (3.5, 3.15). Emigration results in the severence of tribal ties while accelerated cropping under traditional techniques facilitates soil erosion and subsequent loss of fertility;

(2) The concentration of property rights in the hands of the tribal chief or a governing unit affects the pattern of land distribution for cultivation and, in turn, cultivators' attitudes toward cultivation practices and private investment in the production unit. Externalities arise where cultivators are not able to realize all the benefits from permanent improvements, planting tree cash crops, or superior production techniques since a portion of the land currently assigned to him may be reassigned to another member in subsequent production periods. That is, land assignments are often based on producers' needs and their socio-political position in the community. Thus, to the extent that individual cultivators exhibit the capacity to generate a "surplus" relative to their needs and the needs of others, their land base may be reduced to bring about a more egalitarian economic structure;

(3) The group-focused emphasis on economic equality, at least equality among the majority of the tribal members, results in land distribution patterns emphasizing individual land assignments of nearly equal quality with little attention to the size of individual tracts of land or to the spatial distribution of this land. For example, if the

communal property includes a hillside, an alluvial plain, and a grazing area and if there are n producers each having equal rights to the land area, the three classes of relatively, individually homogenous land would each be divided into n tracts. Therefore, if the land is qualitatively heterogeneous, producers operate a large number of small, noncontiguous tracts of land. Even after allowing for the "insurance" aspect of land dispersion, the implications for labor efficiency and production control are apparent;

(4) The tribal chief or governing unit usually has the authority to prescribe the production techniques to be employed and to evaluate producers' compliance with these policy prescriptions.[1] Producers' continuing rights of cultivation and inheritance are conditioned by their demonstration of using the "proper" cultivation methods. Although the insecurity aspect implicit in this system is a conditioning factor, the dictation of production techniques appears to be of real significance especially in terms of the prescriber's competence and receptiveness to altering traditional production methods when superior alternatives may be made available;

(5) The mobility associated with this semi-nomadic way of life coupled with the constriction of internal markets and relative isolation

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[1] Among indigenous peoples in Sierra Leone, a vertical structure of land management results in a centralization of powers which largely determines the distribution of land, farming practices, and even the timing for completing farm operations (3.15). Also, in the Congo, traditional tenure arrangements are characterized by communal ownership of the land with the elder or headman responsible for administering land use and granting rights of usufruct to the members. Ownership remains with the members but they are required to pay taxes and occasionally provide labor services to the headman or chief (3.15).

from other sectors of the economy interact to essentially preclude the inflow of private capital. In addition, the zero price of land and the absence of a land market tend to maintain productivity at the subsistence level and to reinforce the perpetuation of this seminomadism and

(6) Government investment in social overhead capital facilities and implementation of government programs, such as providing extension services, are hampered by the mobility and traditionalism which characterizes communities engaged in shifting cultivation.[1]

Population growth relative to a fixed supply of cultivable or potentially cultivable land has reduced the incidence of shifting cultivation. Also, the spreading cultivation of cash and permanent crops, largely due to an increased demand for income as additional consumer goods become available, has increased the trend toward rewarding private initiative and the demand for private ownership of land to ensure that cultivators receive the gains. Furthermore, land titles are usually needed to obtain the institutional credit necessary for growing these crops. The relatively recent emergency of land scarcity is cited in the following:

> "In many parts of Africa, the question of land scarcity is a very acute and difficult one. It is tied up with a great many factors: demographic, technological, ecological, economic and social; it is also linked with the alienation of lands in favour of strangers. and with the organized displacement or migration of groups. The fundamental problems involved seem to be the adequate redistribution of the population and the transformation of agricultural methods ...

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[1] La Anyane (3.15) comments that while shifting cultivation is common in all parts of West Africa, the cultivator considers himself to be as settled as his counterpart who engages in sedentary cultivation. Many shifting cultivators do not change their residences as they move from one tract of land to another.

> In many cases, scarcity of land or the feeling of such scarcity are due to extensive agricultural methods, to particular values attached to the land, to the great poverty of the soils and to the general level of economic development" (3.5, p. 58).

Problems arise, however, in the involuntary redistribution of the population. The economic potential of colonization schemes in previously unsettled areas is one inhibiting factor. A historic gravitation towards settlement on the most productive lands results in population redistribution taking place on less-productive lands. However, the human factor and social considerations appear to be the determining factors affecting the success of population redistributions. The nature of these factors as affecting resettlement programs is summarized as follows:

> " . . . particularly since the human factors involved--such as feelings of insecurity and frustration, attachment to the ancestral land, unadaptability of immigrants to the new social environment, structure of the family and lineage groupings, principles of inheritance, etc.--had been underestimated or were thought to be easily malleable" (3.5, p. 63).

In addition, population relocation has often been looked on by those involved with suspicion because of the belief that there were and are pre-existing rights in these lands; and consequently, their claims to ownership and cultivation rights are dubious (3.4, 3.5).[1]

The consequent stationarity associated with continued population growth and gradual disappearnace of shifting cultivation presents both

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[1] Bascom (3.4) makes the following undocumented comment: "For example, one French anthropologist working in French West Africa emphasized in his writings that there was no acre of land in Africa which was not owned by someone, no palm tree which was not the private property of some person. Africa is not a vacuum which can be occupied and developed" (3.4, p. 240).

opportunities for agricultural growth and problems of structural adjustment. Social interactions can continue to operate within the tribal organization with the tribal or communal tenurial arrangements persisting. The principal problem which arises, however, is that the traditional cultivation practices are not appropriate to sedentary farming[1]. To the extent that soil productivity is rapidly reduced by continuous cultivation coupled with tropical climatic conditions, fertilizer applications and alternative cultivation procedures are necessary. This, in turn, necessitates the application of additional working capital and new managerial techniques on the part of cultivators, both being in relatively short supply.[2] However, these phenomena also represent opportunities for some governing entity to offer programs of assistance to stimulate and direct agricultural growth.

As indicated earlier, firm size within the communal structure is a function of the producer's need and his status in the tribal organization.

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[1] In the Congo, traditional practices were maintained with settled farming, at least for a period of time. "The paysannat was a system of farming under which farmers were settled along a road on plots laid out adjacent to one another in strips perpendicular to the road. These strips were subdivided into fifteen or twenty sections. The farmers were to practice a kind of rolling rotation, moving down the strips with particular crops . . . leaving the sections behind in bush fallow. As various sections would be growing identical crops at the same time, it was possible to experiment with mechanical cultivation or harvesting going across the strips at right angles . . . the schemes collapsed due to the chaos that accompanied independence in 1960" (3.5, p. 112).

[2] In a few cases, due to exogenous forces, people had to establish permanent farming even though the soil was not amenable to permanent cultivation with traditional practices. The people had to invent a system of permanent agriculture to survive, and they were successful (3.5).

Among the freehold units, the firm size in terms of area under cultivation is largely restricted by labor requirements for one or two crucial operations. This constraint is often in the form of labor available for the weeding of crops, an operation which must be completed within a relatively short period of time (3.2, 3.16).[1] Labor requirements for harvesting is also a limiting factor. Firm size is further constrained by the extent to which the males participate in other employment and in tribal or local government affairs. As noted before, under communal or tribal systems little flexibility in farm sizes in response to personal initiative is evident.

Tenancy legislation

The emphasis on implementation and the relative success of tenure legislation have already been noted at the beginning of this chapter.[2] According to a 1957 study by the International Labor Office (3.10), only three Latin American countries, Argentina, Cuba and Uruguay, had legislation requiring a formal contract guaranteeing a minimum degree of tenurial security for tenant farmers.[3] Legislation in the remaining countries tends

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[1] In the Niger Development Scheme, households were given twenty-four acres to farm. Because of the short weeding period, land units of this magnitude required the labor input of ten men. This exceeded the labor available from the household (3.16).

[2] Mydral adds, "One of the great weaknesses of tenancy legislation in India and Pakistan and the countries of Southeast Asia is that its administration has been left to civil servants who often lack both the qualifications and the integrity necessary for the job, and are overburdened with responsibilities" (3.19, p. 1330).

[3] The study briefly reviews individual country legislation prior to 1957 covering tenurial regulations such as tenurial security, compensation for land improvements, payment for land use, and settlement of tenure disputes. Relatively little analysis of the degree to which this legislation is effectively implemented and the impact on actual tenancy systems is provided.

to be vague or ineffective and, in turn, the relative bargaining power is on the side of the landlord. Furthermore, the tenant has little legal recourse, assuming he has the financial capacity to initiate legal proceedings.[1]

Relative to South Asia, Myrdal states that all countries, except Indonesia, have enacted legislation to provide greater security and more equitable sharing arrangements with landlords (3.19, p. 1323).[2] Legislation such as provisions for compensating tenants who make improvements, establishing minimum periods for leasing, and placing ceilings on rents vary among countries. Landlords are often permitted to evict tenants for nonpayment of rent and(or) improper cultivation practices. Myrdal further comments that some countries also observe the Indian practice of permitting landlords to terminate leases prior to expiration if the landlord indicates that the land is going to be used for his own personal cultivation. Myrdal cites three reasons why the legislation designed to promote tenants' well-being is not fully realized. First, effective rents higher than those legally prescribed can be realized when landlords provide credit at high interest rates and tenants are required to sell any surpluses to the landlord at prices set by the latter. Furthermore, tenants may be required to make gifts to the landlord which are essentially a more

[1]See Whyte and Williams (3.24, pp. 8-18) for a discussion of the costs and problems associated with legal proceedings for establishing rights to land in Peru.

[2]Also see Kermani (3. 13, p. 148-53) for land reform legislation in Iran, Iraq, and Jordan.

subtle form of rent. Second, tenurial security can be bypassed if the landlord reassumes, pretends, or even threatens to reassume the land originally leased to the tenant. Third, local officials may be bribed to support the landlord's contention that the tenant had no valid lease to use the land. Also, pressure may be exerted on the tenant so that he releases any rights the lease may have conferred to him.

In nearly all states of India and Pakistan, tenancy legislation has provided the minority of tenants who pay fixed rentals benefits which are not available to the remaining majority, primarily sharecroppers, because of the latter's inferior social position (3.19). Higher rents are paid by sharecroppers than by the privileged tenant.[1] The absence of legal recourse by sharecroppers and(or) low financial capacity and lack of familiarity with legal proceedings where some legislative protection is operative promotes tenurial insecurity and manipulation of the rent structure by landlords.[2] Under these conditions, landlords are often motivated to abandon fixed-rent arrangements and increase the incidence of sharecropping.

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[1] Sharecroppers generally pay half or more of their gross output. Their net earnings are probably below those of most wage laborers (3.19, p. 1326, 1929). Dutta concurs and adds that the sharecropper often absorbs all production costs (3.7, pp. 80-81).

[2] According to Dutta, "It is a common experience all over the country that the landlords, taking advantage of the limited supply of land and weak bargaining capacity of the share-croppers, realize exorbitant rent and evict the share-croppers under different pretexts" (3.7, p. 80).

Potential for Increasing Land Under Cultivation

The high rates of population growth, especially in rural areas, in conjunction with the existing availability of cultivable land and prevailing landholding patterns accentuate the problems of creating additional employment opportunities in the agricultural sector and of increasing the individual producer's capacity to generate an output level sufficient to sustain at least a minimum consumption level. Such a consumption level would include a consideration of payments for rent, taxes, and purchased consumer goods. The adoption of improved technologies and land redistribution programs provide opportunities for increasing the intensity of land use. Multiple cropping and higher use-levels[1] for land increase output levels. The concentration of a disproportionately large number of people controlling only a relatively small amount of total land was noted earlier. The converse also holds true. In addition, the limited data on landless laborers and underemployment in the agricultural sector suggest the need for increasing the cultivable land area and(or) redistributing the existing area. Alternatively, employment in other areas of the economy must be created. Not only are economic considerations important, but the security and output derivable from land have direct implications for social and political stability. Finally, some forms of improved technology are adoptable only on contiguous land units and where such landholdings are of a minimum size. Expansion of the cultivable area potentially provides such opportunities.

[1] Higher use-levels implies a shift in cropping patterns and(or) intensity of production so that per unit resource productivity and total output, in terms of calorie or consumption equivalents, are increased.

Table 3.6. Estimates of potential cropland expansion under two assumption levels and percent increases relative to existing cultivable area for developing countries grouped according to percent increases

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
		(thousand hectares)				
GROUP 1 (0-25 percent)						
Asia:						
Cyprus	Low	129	274	71	474	110
	High	129	274	71	474	110
	FAO[a]				432	
Iran	Low	8,490	3,981	45	12,516	108
	High	8,626	4,432	45	13,103	113
	FAO[b]				11,593	
Iraq	Low	4,826	1,590	26	6,442	-
	High	6,545	1,590	26	8,161	109
	FAO[c]				7,496	
Jordan	Low	176	810	206	1,192	105
	High	231	810	206	1,247	109
	FAO[d]				1,140	
Syria	Low	1,379	1,794	-	3,173	-
	High	1,960	1,794	-	3,754	-
	FAO[e]				6,130	
Pakistan	Low	28,725	1,474	-	30,199	107
	High	35,102	1,474	-	36,577	130
	FAO[f]				28,214	

[a] 1966 data.

[b] 1960 Agricultural Census.

[c] 1964 data.

[d] 1965 data.

[e] 1967 data.

[f] Excluding Kashmir-Jammu; 1964 data relate to the reporting area of 67,136,000 hectares.

Table 3.6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Afghanistan	Low	1,287	1,461		2,748	-
	High	1,287	1,461		2,748	-
	FAO[e]				7,844	
Turkey	Single	5,620	12,706	806	19,132	-
	FAO[a]				26,834	
India	Low	50,774	114,558	28,118	193,450	119
	High	55,488	114,558	28,118	198,165	122
	FAO[g]				162,434	
Nepal	Single	303	2,032	-	2,335	103
	FAO[a]				2,266	
Thailand	Low	3,071	6,386	3,824	13,281	116
	High	3,457	6,950	4,006	14,413	126
	FAO[d]				11,415	
Indonesia	Low	6,109	8,182	5,143	19,434	110
	High	8,115	9,883	5,797	23,795	135
	FAO[h]				17,681	
Africa:						
Algeria	Low	597	7,681	42	8,320	121
	High	844	7,681	42	8,567	125
	FAO[e]				6,867	
Morocco	Low	1,113	4,382	2,187	7,682	
	High	1,334	4,382	2,187	7,903	101
	FAO[a]				7,858	
Central African Republic	Single	16	5,048	161	5,225	119
	FAO[a,i]				4,400	

[g] Including Kashmir-Jammu; 1965 data relate to the reporting area of 305,947,000 hectares.

[h] 1954 data; total agricultural area excluding West Irian.

[i] The FAO estimate of 5,900,000 hectares of arable land of which 3,000,000 hectares are fallow has been reduced by 1,500,000 hectares to adjust for an assumed two-year fallow program.

Table 3. 6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Chad	Single	376	1,690	164	2,230	
	FAO[j]				7,000	
Ethiopia	Single	1,116	3,903	3,661	8,680	
	FAO[d]				12,525	
Mauritania	Single	97		93	190	-
	FAO[c]				263	
Senegal	Single	129	4,323	200	4,652	121
	FAO[k]				5,500	
Somalia	Single	152	64	129	345	
	FAO[l]				957	
South Africa	Single	690	11,261	1,352	13,303	110
	FAO[m]				12,058	
Tunisia	Single	216	1,023	558	1,797	-
	FAO[c]				4,334	
GROUP 2 (25-50 percent)						
Asia:						
Israel	Low	408	123	71	602	146
	High	516	123	71	710	173
	FAO[e]				411	

[j] 1967 data; unofficial estimate.

[k] 1960 data. The FAO estimate of 5,500,000 hectares of arable land of which 3,300,000 hectares are fallow has been reduced by 1,650,000 to adjust for an assumed two-year fallow program.

[l] 1956 data for former British Somaliland and 1960 data for former Italian Somaliland.

[m] In agricultural holdings, as from 1960 Agricultural Census. including the territory of Walvis Bay.

Table 3.6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Burma	Low	10,045	6,916	5,258	22,219	138
	High	14,063	7,765	5,274	27,102	169
	FAO[a,n]				16,087	
Africa:						
Cameroon	Single	32	6,532	1,794	8,358	149
	FAO[o]				5,593	
Uganda	Single	323	5,419	1,529	7,271	149
	FAO[e]				4,888	
GROUP 3 (50-100 percent)						
Asia:						
Lebanon	Low	145	263	52	460	150
	High	172	263	52	487	159
	FAO[e]				306	
Republic of Korea	Single	1,426	2,584	-	4,010	174
	FAO[e]				2,312	
Phillippines	Low	2,713	7,751	3,294	13,758	165
	High	3,274	10,048	3,474	16,796	202
	FAO[a]				8,330	
Latin America						
Mexico	Low	10,836	27,532	6,897	45,265	190
	High	11,710	27,532	6,897	46,139	194
	FAO[b]				23,817	
El Salvador	Low	323	742	177	1,242	192
	High	323	742	177	1,242	192
	FAO[p]				648	

[n]Arable land used for more than one crop during the year has been counted twice.

[o]1954 unofficial data for East Cameroon of which 5,410,000 hectares of the 8,298,000 reported by FAO are fallow. The FAO figure has been reduced by 2,705,000 to adjust for an assumed two-year fallow program.

[p]In agricultural holdings and based on 1961 Agricultural Census.

Table 3.6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Chile	Low	2,279	4,916	64	7,260	161
	High	2,823	4,916	64	7,803	173
	FAO[q]				4,511	
GROUP 4 (Over 100 percent)						
Asia:						
Cambodia	Low	4,194	1,987	1,548	7,729	259
	High	5,355	2,870	1,577	9,802	328
	FAO[e]				2,984	
Republic of Vietnam	Low	4,919	1,952	2,200	9,071	329
	High	5,794	2,342	2,239	10,375	376
	FAO[e]				2,760	
Laos	Low	1,458	2,045	2,800	6,303	788
	High	1,813	2,045	2,800	6,658	832
	FAO[c]				800	
Ceylon	Low	813	1,868	1,359	4,040	215
	High	942	1,868	1,359	4,169	222
	FAO[e]				1,875	
Taiwan	Low	1,464	455	-	1,919	213
	High	1,559	583	-	2,142	238
	FAO[e]				902	
Africa:						
Angola	Single	597	10,587	13,783	24,967	2,774
	FAO[r]				900	
Dahomey	Single	87	2,639	1,132	3,858	360
	FAO[s]				1,071	
Gabon	Single	129		7,871	8,000	6,299
	FAO[t]				127	

[q] In agricultural holdings and based on 1965 Agricultural Census.

[r] 1953 unofficial estimate.

[s] 1963 data. The FAO estimate of 1,546,000 hectares of arable land of which 950,000 hectares are in fallow has been reduced by 450,000 to adjust for an assumed two-year fallow program.

[t] 1962 data.

Table 3. 6.(continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Gambia	Single	100	403	67	570	570
	FAO[u]				100	
Ghana	Single	123	6,447	3,064	9,634	379
	FAO[v]				2,544	
Ivory Coast	Single	464	3,548	8,329	12,341	600
	FAO[w]				2,056	
Kenya	Single	103	1,684	3,707	5,494	324
	FAO[x]				1,696	
Liberia	Single	129	1,806	4,355	6,290	164
	FAO[y]				3,844	
Mali	Single	103	2,139	161	2,403	197
	FAO[z]				1,221	
Mozambique	Single	1,252	3,400	35,665	40,317	1,522
	FAO[x]				2,649	
Nigeria	Single	593	26,778	18,968	46,339	213
	FAO[x]				21,795	

[u]The 200,000 hectares reported by FAO is designated as the estimated area of shifting cultivation and of bush fallow. The estimate has been reduced by 100,000 to adjust for an assumed two-year fallow program.

[v]Excluding fallow and temporary meadows.

[w]1965 unofficial estimate.

[x]1961 data.

[y]1964 unofficial estimate.

[z]The FAO estimate of 3,664,000 hectares includes 3,612,000 hectares of fallow. The FAO estimate is reduced by 1,806,000 to adjust for an assumed two-year fallow program.

Table 3.6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Portuguese Guinea	Single	77	323	903	1,303	495
	FAO[x]				263	
Sierra Leone	Single	497	451	1,871	2,819	152
	FAO[c,z]				1,858	
Southern Rhodesia	Single	51	8,439	5,742	14,232	775
	FAO[aa]				1,837	
Southwest Africa	Single	107	477	839	1,423	222
	FAO[bb]				642	
Sudan	Single	3,000	10,513	9,458	22,971	322
	FAO[dd]				7,100	
Tanzania	Single	1,539	21,813	10,916	34,268	293
	FAO[cc]				11,702	
Togo	Single	84	2,003	332	2,419	160
	FAO[d,ee]				1,515	

[aa] 1956 data, excluding fallow in villages.

[bb] In agricultural holdings, as from 1960 Agricultural Census, including the territory of Walvis Bay.

[cc] 1966 data for Tanganyika and 1963 data for Zanzibar.

[dd] 1954 data.

[ee] The FAO estimate of 2,160,000 hectares includes 1,290,000 hectares of fallow. The FAO estimate is reduced by 645,000 to adjust for an assumed two-year fallow program.

Table 3.6. (continued)

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Zambia	Single[ff]	161	8,071	6.262	14,494	754
	FAO				1,923	
Latin America:						
Costa Rica	Low	658	1,336	916	2,910	468
	High	650	1,660	1.005	3,323	534
	FAO[gg]				622	
Haiti	Low	342	434	--	776	210
	High	342	434		776	210
	FAO[hh]				370	
Honduras	Low	1,026	2,523	435	3,984	484
	High	1,026	2,553	468	4,047	492
	FAO[ii]				823	
Nicaragua	Low	3,658	6,171	1,713	11,542	1,322
	High	3,658	11,094	2,251	17,003	1,948
	FAO[gg]				873	
Panama	Low	1,181	2,022	879	4,082	724
	High	1,181	3,161	903	5,245	930
	FAO[x]				564	
Argentina	Low	2,645	55,251	5,419	63,315	218
	High	2,774	55,251	5,419	63,444	218
	FAO[gg]				29,053	
Brazil	Low	3,948	106,128	83,628	193,704	651
	High	4,639	211,469	236,550	452,658	1,521
	FAO[b]				29,760	
Bolivia	Low	616	30,000	23,302	53,918	1,744
	High	670	40,980	26,854	68,504	2,216
	FAO[jj]				3,091	

[ff] 1963 data, excluding fallow.

[gg] 1963 Agricultural Census.

[hh] 1950 Agricultural Census.

[ii] 1963 data.

[jj] 1950 Agricultural Census which covered 32,750,000 hectares out of total area of 109,858,000 hectares.

Table 3.6. (continued).

	Land variant	Irrigation	Major crops	Minor crops	Total	Percent of FAO
Colombia	Low	4,510	8,876	2,435	15,821	314
	High[b]	4,510	51,036	42,202	97,748	1,937
	FAO[b]				5,047	
Ecuador	Low	948	3,255	2,632	6,835	236
	High[kk]	948	10,529	6,003	17,480	604
	FAO[kk]				2,894	
Paraguay	Low	--	6,885	2,316	9,201	990
	High[a]	--	8,405	2,511	10,916	1,175
	FAO[a]				929	
Peru	Low	2,790	3,173	3,099	9,062	336
	High[d]	2,994	29,452	29,134	61,580	2,280
	FAO[d]				2,701	
Uruguay	Low	645	13,058	65	13,768	611
	High[p]	645	19,587	97	20,329	903
	FAO[p]				2,252	
Venezuela	Low	1,514	11,885	13,121	26,520	508
	High[p]	2,530	23,710	32,254	58,494	1,121
	FAO[p]				5,219	

[kk] 1964 data, excluding temporary meadows and pastures.

Estimates of the land area which is potentially cultivable have been derived for several less-developed countries.[1] See Table 3.6. In the derived estimates, land for use in growing crops is classified according to suitability under either dry fallow, irrigated or rain-fed conditions. In many, but not all cases, it is possible to distinguish between presently irrigated and potentially irrigable land. The crops included in the "major crops" category vary with individual countries. These are generally the crops that have been historically and recently important. Cereals and other staples such as potatoes and cassava are the principal "major" crops. However, where industrial and(or) export crops account for a major proportion of the cropland area, such crops are also designated as "major" crops. The category of "minor" crops includes areas suitable for producing nonstaple crops presently grown on a relatively small proportion of the cropland area. The category also includes areas suitable for growing industrial and(or) export crops whose economic significance may far exceed their importance in terms of relative acreage. Where soil characteristics and climatic factors are amenable to producing both "major" and "minor" crops, the land was classified and evaluated only for use in producing "major" crops.

In deriving the low and high land estimates in Table 3.6, physical and topological soil characteristics, climatic factors, availability of irrigation water, possibilities of land reclamation, and distance from transportation facilities were all taken into account. The climatic

[1] The estimates were derived by Mr. William G. Harper and are based on unpublished materials on world soil resources and library reference materials of the Soil Conservation Service, U.S. Department of Agriculture. The study was completed through the cooperation of Charles E. Kellogg, Deputy Administrator for Soil Survey and Arnold C. Orvedal, Chief, World Soil Geography Unit, Soil Conservation Service, U.S. Department of Agriculture.

factors reflected length of growing season, annual rainfall, and the distribution of rain throughout the production period. The distance criterion was used to distinguish between those lands more than and less than about 50 miles from land and water transportation facilities. When possible regions within countries were evaluated. These were aggregated for the country cropland estimates.

The estimates implicit in the three categories of land also reflect the potential for multiple cropping. Soil characteristics, water availability, rainfall, and length of growing season are all taken into account A hectare of land designated as suitable for multiple cropping is counted as two hectares of cropland. Conversely, a hectare of cropland suitable for dry fallow rotation is included as only one-half hectare of cropland. That is, a two-year fallow program is assumed. Where cropland is designated as suitable for long-term crops, such as sugarcane and tree crops, no multiple cropping is considered.

Underlying all classification decisions is a relatively high management assumption. Management and cultivation practices similar to those on commercial North American and West European farms are assumed. Consideration is given to the potential productivity of soils relative to costs of required practices. Implied in this assumption is development of a locally-adapted technology, and in many cases, the lowering of farm input prices relative to farm product prices so that economic incentives for adopting this technology approach those in North America and Western Europe. Implicit in the management assumption is the assumption that those inputs complementary to land are available and that producers

have the financial means to obtain such inputs. Alternatively, inputs are supplied by public agencies with only a minimal cost outlay by producers.

The basis for establishing low and high variant upper bounds differs between Latin America and countries of the Near and Far East. For Latin American countries, the low variant is derived as the sum of all cropland located within fifty miles of rail, water or road transportation. Since relatively little of the cropland is presently planted more than once annually, the low variant includes no multiple cropping. The high variant reflects all cropland, regardless of location. In addition, multiple cropping is assumed possible on all irrigated land where sufficient water is available, and in upland areas having favorable soil characteristics and favorable temperature and moisture for eight months or longer annually.

For the countries of the Near East, multiple cropping is assumed possible only on presently or potentially irrigable land. No potential cropland is identified at distances greater than fifty miles from transportation facilities. The low variant reflects all cropland identified in upland areas and irrigated land presently in use. Multiple cropping is assumed to be at estimated present levels on irrigated land. Under the high assumption, potentially irrigable land is added, and multiple cropping is increased to reflect potential increases in supplies of irrigation water and better management of existing and future flows.

Beginning with the eastern part of India and moving eastward, annual precipitation, in some cases, is judged sufficient to permit multiple cropping on upland soils. In these areas, the basis for

differentiating between low and high variant estimates is the same as for the Near East with the exception of the assumed multiple cropping on non-irrigated cropland and the restriction of the distance criterion which is operative in parts of Indonesia. Under the high variant, multiple cropping is assumed possible on nonirrigated cropland having favorable soil characteristics, favorable temperature, and sufficient precipitation for an eight-month or longer annual growing season. Under the low variant, a minimum growing season of ten months is assumed to be needed. The relatively limited climatological and topological data for Africa precluded making estimates under the high and low assumptions. The single variant estimates would tend to represent the low assumption since multiple cropping on at least some irrigated land has not been admitted.

Two other considerations must be kept in mind. First, the costs of clearing and developing the land must be evaluated. Transportation and marketing facilities, provision for credit so that the land can be purchased and necessary complementary inputs can be obtained, and establishing education and local government systems likely represent substantial demands on public resources, both financial and administrative. The costs and returns, both economic and social, of land development must be weighed against alternative uses of public resources which can be used at other growth points within the economy.[1] Second, ownership rights exist to nearly all land in these countries. Where the land is privately

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[1] For brief discussions of the problems of land development and resettlement see Myrdal (3.19, pp. 1266-72) and Barraclough and Domike (3.3, pp. 410-12).

owned, expropriation with or without compensation is necessary when the owner is not willing or able to develop the land himself. When landowners are able to legally set land values at relatively high levels, compensation to acquire land represents another demand on available government funds.[1] Adjudication of land rights is usually costly and time-consuming. Until valid titles are obtained, private investors would tend to be reluctant to develop the land to which they expect to receive titles. Furthermore, in parts of Africa and Southeast Asia, people attach strong importance to ancestral rights in land which make them reluctant to transfer land titles and to physically relocate themselves.

The derived estimates are summarized in Table 3.6. To provide a basis for evaluating the relative, potential cropland area, the existing levels of cropland, as reported by FAO (3.22), are also presented. The FAO data are designated as arable land plus land under permanent crops. The year of reference varies with individual countries as does the treatment of including fallow land. In some cases, for example, Syria, the total fallow land has apparently been included in contrast to counting one-half of the fallow land if a two-year fallow program is operative. Consequently, the potential cultivable area as a percent of the FAO figure is less than 100 percent. This also appears to be the case for

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[1]Flores (3.8) maintains that Latin American landlords are not entitled to any compensation. Implicitly, they have already acquired substantial wealth and political and social influence from the land. Compensation need not be immediate. Rather, long-term bonds may be used which become due when, hopefully, the financial position of the economy is improved and the government has a greater capacity to make compensation through redemption of these bonds.

several African countries.

The countries are grouped into four classifications according to the total area derived for the low land variant as a percent of the FAO figure. The countries included in Group 1 (0 - 25 percent) are predominantly countries of the Near East where climatic factors are often limiting and the population density is relatively high. The group 4 category (> 100 percent) includes countries of the Far East and also several African and most Latin American countries. The potentials for cropland expansion in Latin America are exceptionally high.

Efficiency of Existing Tenure Systems

Comments at several points in the preceding discussion connote the degree of efficiency of existing tenure systems. The concept of efficiency, however, has several dimensions.[1] Static versus dynamic efficiency must be taken into account. Furthermore, the objectives being pursued must be specified along with the relative importance attached to each.

The question of static economic efficiency is concerned with how well the existing distribution of resources, including land and labor, is consistent with maximizing output levels and quantities marketed at points in time. Relative costs and returns must be considered. To the extent that inputs employed are indivisible, particularly machinery inputs, large landholders are in a position to realize economies of size and lower unit production costs. Conversely, small landholders would not have these opportunities. However, since family labor is the principal input, fewer indivisibilities need arise.

[1]For a related discussion, see the "Efficiency of Resource Allocation" section in Chapter IV.

According to Table 3.7, "minifundia" in Latin America consistentl show much higher average returns per hectare than the "latifundia", both from the standpoint of total farmland and area cultivated. This occurs despite the fact that the "minifundia" lands are located on land such as hillsides which is least suited for agricultural purposes. Conversely, "latifundia" are generally comprised of the most productive soils and favorably situated relative to transportation facilities, marketing outlets and water supplies. However, based on the study results, only one-sixth of the land in the "latifundia" of the seven countries studied is or has been under cultivation (3.4). The rest remains in native vegetation. These factors, by themselves, suggest a great potential for expanding physical output through a redistribution of some of the land resources. If the quantity and productivity of nonland inputs were increased, agricultural output could be further augmented.

Dynamic efficiency refers to the capacity of firms to adjust operations as market conditions vary and as improved technologies become available to producers. Dynamic efficiency also has implications for the producer's capacity to generate "surpluses" contributing to general, sustained economic expansion either through private investment in the firm or transfe of "surpluses" to other uses in the economy. A large proportion of cultivators in less-developed areas have neither the financial capacity nor the managerial competence to acquire and profitably use improved inputs. Their relatively small resource bases provide limited opportunities for generating "surpluses" so as to improve their economic well-being. Increasing present consumption is often the first demand on any "surpluses"

Table 3.7. Relationships between the value of agricultural production, agricultural land, cultivated land and the agricultural work-force by farm size-class in selected ICAD study countries [a]

Country and size groups	Percent of total in each country			Relative value of production as percent of that of sub-family farms		
	Agricultural land	Agricultural work force	Value of production	Per ha. of agricultural land	Per ha. of cultivated land	Per agricultural worker
Argentina: (1960)						
Sub-family[b]	3	30	12	100	100	100
Family[d]	46	49	47	30	51	251
Multi-family medium[d]	15	15	26	51	62	471
Multi-family large[e]	36	6	15	12	49	622
Total	100	100	100	30	57	261
Brazil: (1950)						
Sub-family[b]	0[f]	11	3	100	100	100
Family[c]	6	26	18	59	80	291
Multi-family medium[d]	34	42	43	24	53	422
Multi-family large[e]	60	21	36	11	42	688
Total	100	100	100	19	52	408
Colombia: (1960)						
Sub-family[b]	5	58	21	100	100	100
Family[c]	25	31	45	47	90	418
Multi-family medium[d]	25	7	19	19	84	753
Multi-family large[e]	45	4	15	7	80	995
Total	100	100	100	23	90	281
Chile: (1955)						
Sub-family[b]	0[f]	13	4	100	100	100
Family[c]	8	28	16	14	47	165
Multi-family medium[d]	13	21	23	12	39	309
Multi-family large[e]	79	38	57	5	30	437
Total	100	100	100	7	35	292

[a] Gross value of agricultural production in all countries except Argentina where the estimates are of added value. Comparable data are not available for Peru.

[b] Farms large enough to provide employment for less than two people with the typical incomes, markets and levels of technology and capital now prevailing in each region.

[c] Farms large enough to provide employment for 2 to 3.9 people on the assumption that most of the farm work is being carried out by the members of the farm family.

[1] Farms large enough to provide employment for 4 to 12 people

[2] Farms large enough to provide employment for over 12 people.

[f] Less than one percent.

Table 3.7. (Continued)

Country and size groups	Percent of total in each country: Agricultural land	Agricultural work force	Value of production	Relative value of production as percent of that of sub-family farms: Per ha. of agricultural land	Per ha. of cultivated land	Per agricultural worker
Ecuador: (1954)[g]						
Sub-family[b]	20	-	26	100	100	-
Family[c]	19	-	33	130	179	-
Multi-family medium[d]	19	-	22	87	153	-
Multi-family large[e]	42	-	19	35	126	-
Total	100	-	100	77	135	-
Guatemala: (1950)						
Sub-family[b]	15	68	30	100	100	100
Family[c]	13	13	13	56	80	220
Multi-family medium[d]	32	12	36	54	122	670
Multi-family large[e]	40	7	21	25	83	706
Total	100	100	100	48	99	224

[g]Dashes (-) indicate that no data are available.

Source: Barraclough and Domike (3.3, Table III).

that are realized. The various uncertainties and insecurities confronting producers lessen the likelihood of realizing a state of affairs approaching dynamic efficiency.

Another dimension of tenure system is the various tenancy arrangements. Tenants, particularly sharecroppers, must transfer a significant proportion of annual output to landlords. The principal contribution of the landlord is the land inputs. The consequence of tenants having to absorb most of the production costs without proportionate shares in the returns tends to constrain output levels.[1] Furthermore, the relatively low net returns accruing to the tenant limit his capacity to improve his economic well-being. Rents accruing to landlords are often invested or expended in activities not directly related to the agricultural sector. While a net transfer of income for use elsewhere in the economy takes place, the capacity of tenant operators to increase output and savings levels is not enhanced. This criticism is especially appropriate to absentee landlords. Resident landlords often provide necessary services such as credit financing, marketing outlets and consulting or managerial inputs. While these are necessary, they usually increase the bargaining power of the landlord over the tenant to the detriment of the latter.[2]

The ineffectiveness of tenurial legislation in controlling land use and land distribution patterns encourages misuse of the land. Tenurial

[1]See Appendix D.

[2]Chapters V and VI contain comments concerning the influence of landlords' lending and marketing functions on the economic well-being of tenants.

insecurity promotes exploitation of the land so that future productivity is often impaired. Population growth and traditional inheritance patterns further the parceling and fragmenting of land units

Since social and political considerations are also objectives affecting land use and distribution patterns, they are components of a larger efficiency construct. For example, communal holdings and those engaged in shifting cultivation weigh social and religious cohesiveness along with economic factors in determining production techniques and land distribution practices. Annual redistributions of land and allocations according to economic need and social position tend to discourage private initiative, including private investment in the land. At the same time, existing production techniques and environmental conditions interact to make shifting cultivation a suitable, if not economic, form of land use. If from a macro-economic point of view more intensive use of land is desirable, alternative production inputs and cultivation practices need to be devised. Without these changes, sedentary cultivation is neither productive nor efficient. Even with additional land available for cultivation (3.16, 3.25) and distribution to tribal groups to offset the pressure of an expanding population, the continuance, and implied encouragement, of shifting cultivation is not coterminous with increased agricultural productivity as a precondition to general economic expansion. The likely consequence is that of a greater number of rural people continuing to live at a low level of subsistence.

Finally, land distribution patterns affect social and political stability. Consequently, an efficient land tenure system is one that is

not only economically efficient but one that promotes the social and political stability necessary for implementing and realizing planning objectives. For example, the dynamic efficiency associated with larger-scale production units must be reconciled with a larger degree of political stability associated with a large number of small-scale, owner-operated firms.

Summary. Planning for Tenure Reform

Even if national planners could abstract from vested political and economic interests and from the costs of expropriation and redistribution of land units, they would be hard pressed to conceive of an optimal tenure system. Ownership would likely be favored by the cultivators. Yet, ownership and inheritance patterns have contributed to many of the existing tenure patterns. The optimal distribution of land, where land is only one input in the production system, would be affected by soil characteristics, climatic factors, and the distribution of complementary inputs. Furthermore, even if such an optimal distribution were determinable, the optimality would vary with changes in technology and the availability of complementary inputs. But so far such optimality has only an economic connotation such as optimality from the standpoint of economic efficiency. Economic efficiency, however, is only one component or objective in the national planners' framework. Economic efficiency is usually juxtaposed with considerations of economic and social equity affecting, in turn, the social and political stability necessary for implementing any optimal distribution of land.

Preferred tenure systems are also a function of economic conditions existent in other parts of the economy. An expanding export market may be best supplied by plantation-type systems producing export crops. Economies of size, quality control, and concentrated marketings at certain geographical points favor large-scale enterprises over a large number of small-scale producers growing export crops on a somewhat intermittent basis. The rate of growth of employment opportunities in other sectors of the economy influences the size of the labor force in the agricultural sector. Until agricultural labor becomes scarce and relatively expensive, small-scale, labor-intensive operations provide the maximum number of employment opportunities.

Regardless of the type of tenure system, security of tenure is important for both tenants and owner-operators. Such security affects the length of planning horizons which has a direct impact on decisions for land use and private investment. Security also affects cultivators' capability of securing external financing. Legislation providing security must be effectively implemented and enforced.

Land tenure patterns affect income distribution patterns and, in turn, the strength of internal markets for producer and consumer goods. Until the majority of cultivators realize higher individual incomes, either through rent controls, land redistribution, or government income policies, internal markets remain constricted which, in turn, dampen incentive for private investment in industrial and consumer goods sectors.

Optimal land tenure patterns are never achieved; the optimum is always changing. Once a distribution has been devised and implemented,

steps should be taken to prevent deterioration of tenure systems. Subsequent changes through the legislative, democratic process tend to be slow. This tardiness of legislative processes and the worsening of the economic position of the small landholder, the tenant, and the landless laborer tend to create an environment where revolution and all its attendant consequences may appear to be an acceptable, feasible alternative to these individuals. In any case, a "good" tenure system is never sufficient for sustaining developmental processes; complementary economic conditions must also exist.

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CHAPTER IV. PRODUCTION TECHNIQUE

To an observer from an economically-developed country, the use of traditional production techniques characterized by combining simple tools with relatively-large quantities of labor may be viewed as the major factor contributing to the economic predicament in which the majority of cultivators in less-developed areas find themselves. This low state of the technical arts can be seemingly upgraded by a transfer of modern technology to these areas so that production is increased and economic efficiency improved. Higher outputs should result in higher per capita incomes and the processes for agricultural development are set into motion.

Technology is not that easily transferred and that readily adopted, however. The seeds, fertilizers and cultivation practices which are productive in temperate climates of the developed countries are not equally productive or nearly as productive under different soil and climatic conditions and with different managerial inputs. Although machinery, especially tractors, is becoming increasingly available in smaller power units, mechanization is not an economically-feasible, alternative production technique for the majority of cultivators operating on relatively small land units, often fragmented into a number of individual parcels. In addition to the physical adaptability of these technologically-improved inputs, price relationships among inputs and outputs, tenurial arrangements and producers' objectives affect the rate at which these inputs are adopted.

The uncertainty of production response associated with new production techniques is of particular importance to those cultivators living near the margin of subsistence. For those who are essentially "survival-oriented", the potential costs of reduced production are apparent. True, these cultivators would not adopt such technology if they thought it was not to their advantage. But, this is a dimension of the problem of changing production practices even when superior inputs are available. Producers must be convinced that a shift to the new inputs is their best alternative. Furthermore, cultivators' capacity for acquiring improved inputs, either through accumulated reserves or external financing, is another limiting factor. Finally, transportation and marketing facilities condition net returns realized by adopting cultivators.

The term production technique refers to the manner in which inputs are combined and employed for productive purposes. Subsistence producers growing wheat on small plots of land, relying heavily on draft power and family labor, employ a production technique vastly different from that of highly-mechanized, extensive operations of Great Plains wheat producers in the United States. Both technical and economic factors account for the use of differing production techniques.[1] First, highly-mechanized operations are not economically feasible

[1] Economic feasibility is conditioned by technical relationships. For example, a tractor and combine can technically be used to produce wheat on land holdings of one hectare. But when the costs of these machinery inputs are taken into account, per unit production costs are prohibitive.

for producers operating small, often fragmented tracts of land. Second, the relative costs of capital versus labor inputs in the agricultural sectors of most less-developed areas favor using relatively large quantities of labor. Family labor often has a low opportunity cost and(or) is imputed a low wage. Third, few subsistence-oriented producers have the financial capacity permitting them to substitute capital for labor even when such substitutions are economically feasible. Finally, even if subsistence-oriented producers have access to what appears to be a superior, economically-feasible production technique, the uncertainty of production response juxtaposed with consumption requirements and the tradition-bound outlook of many producers interact to sustain use of traditional production practices.

Two questions arise: (1) Under varying economic and social conditions, what is the optimal production technique for the firm? and (2) With existing and alternative production techniques, what are the implications for growth of the firm and for developmental processes, in general? The first question is primarily concerned with economic efficiency, or more generally, the efficiency with which producers' objectives are met. The second includes a consideration of the impact of production techniques on capital accumulation within the firm for private investment or for saving. Private investment increases the productive capacity of the firm. Savings transferred to other parts of the economy represent the means to further expansion and diversification of the economy, including the agricultural sector.

[1]The study by Nair (7.39) provides a number of insights into attitudes and motivations of producers in India. Tradition-bound communities which ignore opportunities for economic advancement coexist with neighboring communities oriented toward exploiting any economic opportunities that arise.

From a national planning viewpoint, production and investment decisions can be conditioned by government policies affecting the nature and rate of availability of technological innovations and by public pricing policies. These, in turn, interact to influence the range of economically-feasible techniques open to the producer and the optimal technique for his firm.

Technological Change Versus Change in Production Technique

To clarify the terminology used, the difference between technological change and a change in technique is examined. Technological change usually results in a change in production technique. In Figure 4.1, the rays emanating from the origin represent alternative production techniques. These are alternative combinations of the two variable inputs which generate the same output level, ceteris paribus.[1] For example, 40 units of output can be produced using OT_1, OT_2, or OT_3. In fact, with isoquant B, implicitly reflecting that inputs are perfectly divisible, an infinite number of alternative production techniques theoretically exists.[2] If OT_1 is used in period one and OT_2 in period two to produce 100 units of output as the result of, for example, the

[1] In Figure 4.1, the axes have been labeled labor and capital. This is done for heuristic purposes rather than for reflecting reality. That is, an unambiguous distinction between capital and labor does not exist If capital is defined as anything that yields a flow of services over time, labor is certainly included in this categorization. Furthermore, the aggregation of nonhomogenous capital and labor inputs into their respective components is assumed possible by summing according to services supplied.

[2] Even with isoquant A in Figure 4.1, combinations of production techniques OT_1, OT_2 and OT_3 can be used to produce 40 units of output.

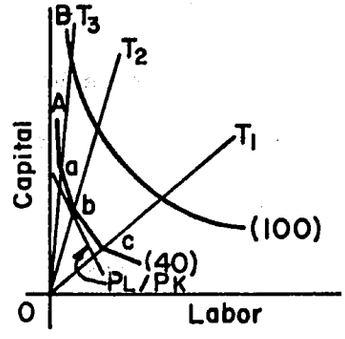

Figure 4.1. Alternative production techniques for realizing specified output levels

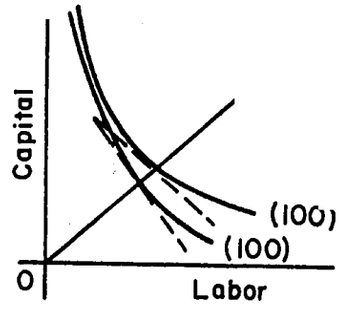

Figure 4.2. Illustration of technological change

price of labor increasing relative to the price of capital, a change in production technique has taken place. Since isoquant B is assumed unchanged from period one to two, no technological change affecting the productivity of labor, L, and capital, K, at some given K/L ratio has taken place.

Technological change is associated with the development of improved techniques--improved in the sense that the same quantity of inputs can be used to produce a larger output or the initial output can be produced with fewer inputs.[1] See Figure 4.2. If the input-output relationship is unchanged quantitatively but if an improved product is produced or if the uncertainty of production response is reduced, the new production technique is also an improved technique.

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[1] In Equation D.29 where $Y = aX_1^{b_1}X_2^{b_2}$, technological change may be represented by an increase in the value of a, b_1, b_2 or some combination of these. Because of differential rates of adoption, technological change affects the relative distribution of economic returns. In addition, and partially an outgrowth of this changing pattern of income distribution, the social structure is affected. Thus, technological change may have a number of seemingly negative side effects which producers and national planners do or should take into account.

Factors Affecting Change in Production Technique and Rate of Adoption of New Technology

A number of factors affect the choice of production techniques. Initially, producers' awareness of better techniques and of improved inputs is the primary constraining factor. Then, considerations of availability, adoptability and profitability must be weighed. Finally, any considerations of social acceptability must be taken into account. Some of these factors are examined below. The relative importance of each likely varies with the stage of economic development and attendant features such as levels and distribution of agricultural incomes, literacy rates, and attitudes toward change.

Awareness

The precondition to selecting an alternative production technique, either as the result of a change in price relationships or technological progress, is the awareness that a "better" means of production exists--"better" generally implying a more profitable technique.[1] The routes of increasing producers' awareness of alternative production techniques vary with individual situations. With high rates of illiteracy, printed information is intelligible only to a small proportion of the rural population. Under these conditions, such information is communicated more effectively by the "demonstration" effects of some producers adopting new techniques and by government programs of "demonstration" farms.

[1] "Better" has connotations other than increased profitability. Profitability considerations aside, techniques which reduce the physical strain of work and(or) permit increased amounts of leisure time are preferred, especially in those areas where social status is highly influenced by the amount of leisure and time devoted to social and local government functions as, for example, in parts of Southeast Asia and Africa. "Better" from a macro standpoint will be discussed in a later subsection dealing with optimal production techniques.

These phenomena are complemented when extension service personnel work with individual producers and farm organizations. The local merchant or trader, both as the supplier of inputs and purchaser of agricultural commodities, is in a position to provide information on market conditions for various commodities and on the availability of improved inputs. Conversely, he is also in a position to exploit producers through misinformation regarding prevailing and anticipated market price relationships. Cooperatives engaging in marketing and input-supplying activities provide another mechanism for transmitting information, at least to cooperative members.

But awareness is only a necessary, not a sufficient condition for producers switching to a "better" technique. The improved technique, in its present form, may not be adaptable to particular areas. For example, seed variety highly successful in one region of the world may not be productive in another area. Thus, the awareness and availability of alternative techniques are beneficial only if techniques are adoptable or adaptable by potential users. Communications media, especially radio, have an increasing impact on individuals' awareness and expectations. Awareness and expectations not matched by achievement are conducive to social and political instability with important consequences for stimulating and sustaining developmental processes. Thus, producers must also have the capacity, i.e., the financial resources and managerial talents to procure and successfully adopt technological innovations suited to their farming operations.

Adaptability and adoptability

Changes in technique and technological change both involve considerations of adaptability. Let adaptability refer to the producers' capacity to adjust farm operations by altering the proportions in which inputs are used in response to, for example, a change in relative prices. Referring to Figure 4.1, it was pointed out earlier that producers operating along isoquant A are not restricted to producing at points a, b, and c. They can combine processes OT_1 and OT_2, for example, to operate at points on segment bc. Since alternative techniques in Figure 4.1 represent combinations of existing, known inputs, producers can adapt relatively easily as economic conditions change, at least adapt within a range of input combinations. With technological change, however, this familiarity no longer exists. However, adaptability also refers to the capacity for modifying improved inputs which could not be profitably adopted in their current form. Fertilizer mixtures, cultivation practices, and feed rations suited to one region of a country may not be economically feasible in another area until some modifications have been made. The problems associated with international transfers of technology are more numerous and quite apparent.

Adoptability, on the other hand, denotes producers' capacity to profitably assimilate technologically-improved inputs in their present form into the firm. Locally-developed seed varieties, artificial insemination techniques, and irrigation pumps would be examples of this phenomenon.

In Figure 4.1, capital and labor are denoted as the variable inputs applied to some unspecified aggregation of fixed inputs. But what

type of capital is being represented in this diagram. X represents working capital such as production-period expenditures for seed, fertilizer, and irrigation water inputs to be combined with a collection of fixed inputs. The problems of adaptability and adoptability, assuming these working capital inputs are employable in their current form, are relatively small in contrast to changes in capital-use levels involving both working and fixed capital inputs. A number of reasons are applicable:

(1) The working capital inputs are largely used up during each production period even though some fertilizer and irrigation water residuals remain. Since producers must purchase these inputs for each production period, they have a good deal of flexibility in altering quantities used in response to anticipated changes in economic conditions and any technological innovations that may be available. Investment in fixed capital inputs provides a flow of returns over a longer period of time which generally reduces the rate and scope at which producers can adjust their operations to changing economic conditions;

(2) In addition to the shorter life of working capital inputs, expenditures are usually small relative to those for fixed capital. Expenses can be at least partially financed out of current income; credit can usually be obtained since financing is ostensibly for productive purposes, the returns of which will be realized within a relatively short period of time. Longer-term credit obligations associated with investments in the structure of the firm restrict producers' activities, especially during unfavorable production periods when additional financing is often necessary; and

working capital inputs place fewer demands on the need for complementary inputs to maximize returns. For producers accustomed to using a seed-fertilizer-irrigation water configuration the availability of an improved seed variety requiring a different application of fertilizer and water does not always tax the producers' managerial abilities since such adjustments have usually been made in the past. Conversely, the substitution of mechanical power for draft animals and human labor does present a situation where new managerial inputs are required to operate and maintain the machinery. In addition, a different complement of implements is often necessary. That is, a plow suitable for use with draft power may not be equally suitable for mechanical power

Technological change can originate exogenously or endogenously. The longer-term consequences for additional technological progress and for the rate of adoption are important, however. Technological change developed by indigenous institutions may have two beneficial aspects: (1) Technological development will be oriented toward local situations so that the ease and rate of adoption is facilitated; and (2) A more favorable attitude toward technological change, especially if endogenous efforts are highly successful, may develop and, in turn, an increased receptiveness and capacity for adopting exogenously-generated technological change. Conversely, technological progress is cumulative in nature which suggests that successful technological progress requires or is facilitated by earlier progress in this field. The major problem in generating internal technological advances is that most less-developed areas do not have that constellation of research facilities experienced

researchers, and monetary and political support conducive to making technological progress. This is not to say that individual producers do not attempt to improve the efficiency of their operations through devising their own production and management techniques. Rather, the major technological breakthroughs that significantly stimulate developmental processes are likely made in established research centers; these are not widespread in less-developed areas.[1] Exogenously-developed change will usually not promote endogenous technological advances unless there has been a fundamental modification of the indigenous social structure (4.7). Generally speaking, such a modification involves a change of attitude toward agricultural production, particularly by those elites who view agriculture and agriculturalists with relative distaste. Such a shift would include a different attitude toward workers engaged in manual operations, a reorientation of the educational system and the attitudes it generates toward physical sciences and away from the relatively strong emphasis on aesthetic studies, and a reduction in the incidence of absentee landlordism.

Producers' objectives

Only a few, general comments about producers' objectives as affecting choice of production technique are intended here.[2] It is perhaps almost axiomatic that the majority of individuals in any society are

[1] The successes of agronomic research in Mexico, the Philippines and Nigeria cannot be considered as primarily indigenous in nature, but rather cooperative undertakings with researchers from developed areas.

[2] Producers' objectives are discussed more comprehensively in Chapter VII.

"economic men". That is, even though they act under social and cultural restraints, both self- and externally-imposed, most individuals can be assumed to prefer more economic goods to less, subject to these constraints. As long as the net gain from procurement and consumption of goods is positive, utility is increased.

Subsistence-oriented producers who are also survival-oriented have little capacity or motivation to alter traditional production techniques and output configurations. The appeal of historically-proven and familiar production practices over unfamiliar alternatives is quite apparent. Given their decision-making environment, the choice against change is a rational choice.

Utility is a function of factors other than profits and consumer goods purchasable with these profits. Consequently, the rate at which producers adjust their operations to changing environmental conditions is affected. Referring again to Figure 4.1, even though the p_L/p_K ratio indicates that OT_2 is economically efficient rather than OT_1, some producers may rationally choose to maintain OT_1 since using OT_2 results in a substitution of capital for labor, thereby releasing a quantity of labor for which alternative productive employment within the firm is not available. Similarly, in certain societies individuals comparatively "well off" are expected to share their relative good fortune with less-fortunate relatives. Thus, even though OT_2 is appropriate for p_L/p_K as drawn, producers may employ a greater than economically-optimal number of labor inputs.

As noted in Chapter III, in areas where tenurial uncertainty is

high or where costs and returns are not shared in equitable proportions, tenants are often motivated to extract the maximum possible from landowners' resources without serious consideration to longer-term consequences for resource productivity. Thus, these production techniques may be optimal for the tenant in the short-run but not optimal to the landlord nor to society in the long-term context.

On large estates where land is often farmed extensively and a portion of productive land remains idle even though relatively inexpensive labor could be employed to bring this land under cultivation, landowners' objectives as related to choice of production technique would seem to give substantial weight to factors other than economic. To the extent that political and social power are derived from land ownership and favorably skewed income distributions, landowners may prefer maintaining the economic and social status quo within the agricultural sector. Even though intensive cultivation by tenants and landless laborers is economically remunerative to landowners, the attendant higher incomes for these low-income groups and the potential rise in their aspirations and expectations for a greater share in the product may be viewed by the landlord as forces eroding his increased returns with eventual social and political unrest threatening his continued possession of the land. In this situation, producers' production techniques are not optimal in a macro-economic sense since the majority of people tend to view these techniques as contributors to suppression of developmental processes and individual well-being.

Optimal Production Technique

In selecting their optimal production technique, producers give consideration to the number of economically-feasible alternatives, economic conditions as reflected in price configurations, objectives they pursue, factor or input endowments, and allowance for various forms of uncertainty. The weights assigned to these factors vary with types of producers. For those operating essentially outside the market economy, physical input-output relationships are more important than market prices. Noneconomic considerations may be incompatible with meeting the marginal conditions for economic efficiency. Owner-operators and producers with secure, long-term tenurial arrangements assign a zero weight, or nearly so, to tenurial uncertainty while tenant-producers may weigh heavily this uncertainty in making production and private investment decisions, decisions affecting both current and future production techniques used.

The optimal production technique is that one which is consistent with satisfaction of the marginal conditions for economic efficiency.[1] This implies profit maximization, the objective whose generality has been questioned; but more specifically, the objective is stated as a constrained profit maximization. A number of side conditions can be reflected in the constraints. The capital constraint, K^o, can be defined as net of "social" expenditures, hoarding, and other essentially non-

[1] Equations D.15, D.16 and D.18 in Appendix D plus the second-order conditions.

productive outlays.[1] Labor endowments reflected in labor inputs available from family members may be expressed in quantities which are net of leisure preferences and of time devoted to social and governmental functions. Large landowners opting to produce crops amenable to extensive cultivation can constrain labor by the amount they want to employ consistent with maintaining existing social and economic relationships.

Initially, determination of the optimal production technique from the static, micro-economic viewpoint is discussed. Subsequently, technological change is introduced.

Two input, one output, static case

In Figure 4.3, isoquants similar to those in Figure 4.1 have been drawn. The shape of the isoquants is determined by the technical relationships incorporated in the production function. When juxtaposed with the appropriate input price ratio, the optimum production technique associated with the specified output levels is determinable. The corresponding optimal production technique varies with different producer situations.

[1]To term these expenditures as nonproductive is perhaps incorrect. "Social" expenditures, for example, social observances of family events and giving gifts to relatives and patrons, can be viewed as means whereby the individual's position in local society is maintained or improved. Such practical consequences as being able to secure financing from relatives and landlords during adverse economic periods and to continue favorable tenancy arrangements may be partially contingent upon observing these social proprieties. Also, work-share arrangements among villagers are maintainable only with social stability within the village.

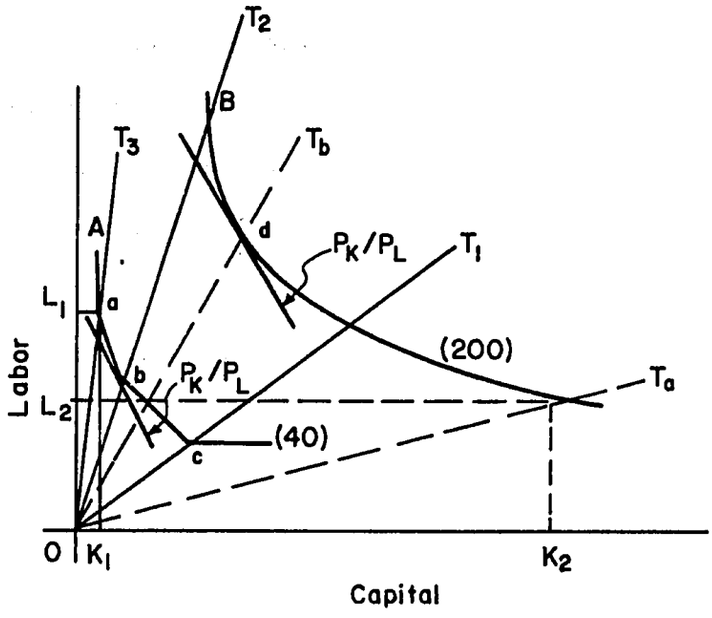

Figure 4.3. Derivation of optimal production techniques for two output levels under alternative input price relationships

With segmented isoquant A, rays OT_3 and OT_1 are also ridgelines denoting the extremities of the alternative, economically-feasible production techniques.[1] For isoquant B, any ray from the origin to any point on the isoquant is economically feasible. As observed earlier, producers operating along isoquant A are not restricted to producing at points a, b, and c. Superimposing the relevant budget constraints, i.e. the constraint on the amount of labor and capital which can be used, the appropriate least-cost combinations of inputs and the corresponding production technique are derived. The identical slopes of the two budget

[1]The ridgelines delimit that portion of the isoquant reflecting nonzero marginal products of the two inputs.

constraints indicate that both producers confront the same labor and capital costs. On isoquant A, $MRS_{K-L} = \frac{MPP_K}{MPP_L} = \frac{p_K}{p_L}$ at point b and technique OT_2 is used. On isoquant B, the corresponding optimum production technique is OT_b.[1]

Assume the slope of a new p_K / p_L ratio is equal to the slope of one of the segments in Figure 4.3, for example, $\overline{ab}$. From an economic standpoint the producer is indifferent as to which point on $\overline{ab}$ and the corresponding production technique he selects. However, his attitude towards using greater amounts of labor versus inanimate capital would condition his selection of a production technique.

For producers with relatively fixed input endowments, for example, subsistence-oriented producers with relatively-large amounts of labor, the optimal production technique is less affected by market prices for the two inputs. If endowments consist of OL_1 and OK_1 of labor and capital, respectively, OT_3 will be employed even though the ratio of input prices indicates that OT_2 is that technique consistent with the marginal conditions. If the producer measures p_L in terms of opportunity costs, taking into account his subjective estimates of social costs associated with his working as a laborer, the p_L may be considerably below the prevailing market wage rate so that the modified p_K / p_L

[1]Points b and d represent least-cost combinations of producing 40 and 200 units of output, respectively. Implicitly assumed is that the variable costs of production at these output levels are at least covered by revenues earned. Also, points b and d denote economic coexistence of the two firms of different sizes using different production techniques only if the short-run variable costs of each firm are covered.

ratio has a sufficiently high slope which tends to make OT_3 the production technique which also meets the marginal conditions for economic efficiency.

Estate owners may decide to constrain the level of labor use to OL_2 in Figure 4.3. To produce 200 units of output, production technique OT_a would be used. According to the p_K / p_L ratio, as drawn, OT_b is the optimum technique. Is OT_a nonoptimal for those producers who want to sustain existing economic and social patterns? As before, if p_L represents the opportunity costs for labor inputs, those producers who view the employment of more labor as having potential social, economic, and political costs can subjectively view p_L as being composed of the market wage plus these additional costs which producers may potentially incur. Thus, the p_K / p_L has a lower slope than that of the ratio drawn, and the corresponding optimal production technique may be one which approaches OT_a

Two input, two output, dynamic case

As discussed earlier, technological progress generally affects the production techniques and, in turn, relative input demand and output configurations for adopting producers. Changes occur in the shapes and positions of the isoquants associated with each input endowment and, in turn, the marginal rates of substitution between the two inputs and the consequent optimal production technique. The hypothetical effects can be qualitatively expressed by a simple mathematical expression. Let

Equation 4.1 denote the static production function and Equation 4.2 the dynamic form where the latter incorporates allowance for technological progress.[1]

$$Y = a\, L^{\alpha}\, K^{\beta} \tag{4.1}$$

$$Y_{(t)} = a\, L^{\alpha(1 + \gamma_t)}\, K^{\beta\,(1 + \phi_t)} \tag{4.2}$$

$$MRS_{K\text{-}L} = \frac{MPP_K}{MPP_L} = \frac{\beta(1 + \phi_t)}{\alpha(1 + \gamma_t)} \cdot \frac{L}{K} \quad (t = 1, 2, \ldots) \tag{4.3}$$

Technological change is admitted for capital and labor where γ_t = coefficient of technology for labor inputs and ϕ_t = coefficient of technology for capital, each corresponding to the specific time period, t, under consideration.[2] Since technological progress does not flow at a continuous, constant rate, the values of the technological coefficients vary with time periods, for example, $\gamma_1 = \gamma_2 < \gamma_3 = \gamma_4$. Consider only two time periods where $\gamma_2 \geqq \gamma_1$ and $\phi_2 \geqq \phi_1$. If from t_1 to t_2, ϕ increases relative to γ, ceteris paribus, the $\frac{MPP_K}{MPP_L}$ increases. That is,

[1]The more conventional method of incorporating technological progress into the production function is the following: $Y_{(t)} = e^{rt}\, aL^{\alpha}\, K^{\beta}$ where r = rate of technological advance per time period, t. In this formulation new technology is assumed to grow at the constant compound growth rate, r. Technological progress, however, does not appear to take this path; rather, progress appears at different rates and points in time and not in each successive time period in the planning horizon.

[2]In Equation 4.1, the term a reflects, among other factors, the impact of fixed inputs in the production process. By implication, the planning horizon is sufficiently short so that all inputs are not variable. Technological progress of a disembodied nature which affects the fixed inputs, for example, improvement in quality of management inputs, could be incorporated into Equation 4.2 in a form such as $a(1 + \pi_t)$.

MPP_K increases relatively more than the increase in MPP_L. Technological progress is capital-using in nature. Conversely, if γ increases relative to ϕ, the MPP_K / MPP_L ratio declines and the technological progress is labor-using or capital-saving. Technological progress tends to increase both ϕ and γ. Increased labor efficiency and improved managerial inputs through government extension services or some other educational program not only increase MPP_L; but since labor is in a position to use capital inputs more effectively, MPP_K is also augmented. The converse is also true.

As indicated earlier, awareness and availability of technologically-improved inputs are necessary before producers incorporate these into their operations. In addition, producers have to estimate the values of ϕ_t and γ_t and the consequent impact on resource productivity. Information of varying usefulness may be available on the productivity of a new seed variety, fertilizer mixture, or livestock ration. Even if producers have access to this information through extension services, communications media, or word-of- mouth, the production response obtained on a research farm or even on a neighboring producer farm is usually not directly applicable to the situation applicable to the potential adopter. Differing agronomic conditions, input complements, and weather factors affect the productivity that potential adopters expect to realize. For example, what is the expected shape and position of the isoquants under varying assumptions regarding weather factors and the effect of technological progress on the marginal physical productivities

of labor and capital? These expectations whether rational or irrational, precise or imprecise, affect investment decisions, physical productivity possibilities, and physical efficiency of input usage. Such considerations then must be juxtaposed with estimated input and output prices in order to determine the optimal production technique.

Efficiency of Resource Allocation

The evidence of economic efficiency among agriculturalists in less-developed areas is not abundant. The studies of Agarwal and Pathak (4.1), Barraclough and Domike (4.2), Chennareddy (4.3), Daniel (4.4), Desai (4.5), Hopper (4.9), Sahota (4.11), and Tax (4.13) provide constrasting views relative to the economic efficiency of producers. The question of the generality of these individual studies to conditions existent in other less-developed areas remains unanswered.[1]

To evaluate the efficiency of resource allocation, criteria for efficiency are necessary. But efficiency can be viewed from several viewpoints implying different criteria. Similarly, efficiency must be related to the objectives pursued. The standard for evaluating allocative efficiency is that set of conditions specifying the marginal

[1]In connection with the Tax (4.13) study of Panjachel, Guatemala, indicating that resources were being used in an economically efficient manner, Barraclough and Domike (4.2) state that their study which included a visit to Panjachel revealed th following: "Panjachel was one of the most commercially oriented small-holders' communities encou tered in upland Guatemala, confirming Tax's observation that it was atypical in the region with respect to its highly intensive land use. The small-holders were found to be using imported seeds from Holland. Nonetheless, there were serious institutional obstacles to improving incomes further even in this exceptionally progressive community, the principal one being the scarcity of cultivable land available" (4.2, footnote 6, p. 400).

conditions for economic efficiency. See Appendix D. The producer's objective in Equation D.9 is profit maximization subject to the capital constraint, K^{o}. The optimum resource allocation pattern, as in Equation D.18, requires that the marginal value product of each input in the production of each output must equal μ, the marginal value product associated with an increment of K. In the absence of perfect knowledge, all of the price and technical relationships must be estimated. Consequently, if an ex post evaluation indicated that the marginal conditions were satisfied, it would only be by coincidence. The fact that producers do not or are not able to satisfy these marginal conditions at least partially reflects that they must make their decisions with imperfect knowledge.

Considering the implicit production function $[F]\ (q_1, \ldots, q_s)$ in Equation D.9, the implicit assumption is made that the functional relationship [F] reflects the most technically-efficient production technique. That is, producers are not producing at any point interior to the production surface. Yet, the marginal conditions for economic efficiency can be satisfied with alternative functional relationships. For example, the producer may not be aware of an improved input or management practice which would alter the relationships implicit in [F]. In this situation, even though the producer may be acting so as to satisfy the marginal conditions, society could view him as operating inefficiently. Similarly, when production practices reflect accommodation to social preferences and religious beliefs, a divergence between efficiency as viewed by the producer and by, for example, an extension agent or national planner is likely.

As noted in Chapter III, tenants operating under short-term, insecure tenancy arrangements are rationally motivated to exploit resources so as to maximize present production. With this objective, efficiency of resource use is not coterminous with resource use over time from neither the landlord's nor society's viewpoint. A similar divergence appears to hold among "latifundia" owners and society in Latin America. If those whose assumed objective is that of maintaining the economic and social status quo of individuals in surrounding "minifundia", extensive cultivation of the land employing relatively small amounts of local labor is conducive to realizing that objective. Conversely, more intensive cultivation of the land providing additional employment opportunities and higher incomes to agricultural laborers is consistent with national planners' objectives such as expanding production, increasing individual income levels, and promoting social and political stability.

Finally, communal-type societies have objectives other than economic efficiency. This is expected to be true where shifting cultivation is sustained to promote social and religious objectives. Annual distributions of land by some central authority according to the cultivator's needs are not likely consistent with short- or longer-term efficiency. Individual initiative and private investment are not rewarded accordingly

Summary. Planning for Efficient Production Techniques

Whether labor is fully or less than fully employed in rural areas, the high rates of population growth relative to the rate at which new employment opportunities are generated in the economy suggest the need for labor-intensive production techniques in the agricultural sector. This need is accentuated as increased industrial production of consumer goods displaces rural artisans and craftsmen previously producing a portion of these goods. As noted in the preceding chapter, the proportions of labor and capital representing the production technique utilized are conditioned by land tenure systems. Reducing tenurial insecurity encourages nonexploitative cultivation practices. The tenant-cultivator, ceteris paribus, has a vested interest in maintaining and improving soil productivity.

The productivity differentials implicit in Table 3.7 suggest the potential for increasing production through at least partial redistribution of the extensively-cultivated "latifundia" to smaller-scale cultivators using the land more intensively. This potential is augmented if inputs complementary to land and family labor are made available to these cultivators. Production techniques are consequently altered in favor of labor-intensive practices. Redistribution of large land holdings into units which are not fragmented and are economically viable over time facilitates substitution of capital for labor at a later date if and when labor becomes relatively expensive compared with capital. Any redistribution program, however, is constrained by its political feasibility. That is, land redistribution into economically-viable units may

be incompatible with the number of individuals demanding units of land. Not only do tenants, squatters, and landless laborers have legitimate claims, but nonagriculturalists are often able to share in the redistribution program. The economic viability of these units is strained as long as high population growth rates, limited expansion of employment in nonagricultural sectors, and traditional production techniques continue.

Whether population pressure on land reduces the incidence of shifting cultivation or public policies are implemented to encourage a sedentary type of cultivation, previous production techniques are no longer appropriate. Reducing the length of shifting cultivation cycle and(or) engaging in stationary cultivation practices require new techniques for maintaining soil productivity. Consequently, research and experimentat on new seed varieties and fertilizer mixtures are necessary.

Labor-using improved inputs

Most improved inputs whether seed varieties, fertilizers, irrigation systems, or tools are usually labor-using despite the tendency t term these inputs as capital. They are labor-using because higher outp levels require increased labor for weeding, watering, harvesting, and threshing operations. On the other hand, mechanization of harvesting and threshing likely improve the timeliness of completing these operations but previously-employed labor is displaced in the process. Mechanization of farm operations must be subjected to a test of economic feasibility. Social considerations may subsequently be taken into account.

The ease with which improved inputs and cultivation practices can be grafted on to or integrated into existing firm activities is important. Costs and returns must also be considered. For example, improved varieties of crops currently grown are more readily adoptable than newly-introduced crops. Production and price uncertainty are relatively high for the latter crops. The rate of adoption is conditioned by producers' awareness, objectives, and financial and managerial capacity for obtaining and using these inputs.

Diversification of firm enterprises

Diversification has both positive and negative aspects. The positive aspect is that uncertainty is spread among more than one source of income and a more continual flow of income throughout the production year is possible. The economic plight of small-scale producers is partially due to their seasonality of income. They are effectively forced to sell immediately following harvest at a time when market prices are depressed. Conversely, they often have to incur debt so as to meet consumption and production expenses prior to harvest. This seasonality of income can also be reduced in those areas where multiple cropping is feasible.

The negative side of diversification is that producers do not realize those economies of size associated with specialization in production. Conversely, they avoid the economic vulnerability associated with production specialization with fluctuating markets.

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CHAPTER V. RURAL CREDIT INSTITUTIONS

At some point in time, external financing is required by most agriculturalists throughout the world. The factors creating demand for credit are universal: to sustain consumption patterns during periods of falling incomes, to accommodate emergency situations, to finance private investment and production expenses, and to engage in conspicuous consumption. The conditions affecting credit availability and use vary with the size of the firm and the stage of development of the agricultural sector and of the economy, in general. For subsistence-oriented producers, external financing is a means of alleviating the impact of those factors which upset the relatively stable pattern of production and consumption. For these individuals, the need is often so imperative that the terms under which credit is provided are not of immediate importance. The consequences, however, can be of long-term importance. High interest rates and repayment schedules not geared to the debtor's capacity to repay, a capacity which is extremely low for subsistence-oriented producers, essentially put the debtor at the mercy of private lenders. The consequence is often the need to secure additional credit and possible, eventual appropriation of the debtor's assets by the lender. Consequently, providers of funds, whether professional moneylenders, merchants, or landlords, are able to accumulate assets and labor services from the debtor, both which further weaken his bargaining power relative to those exerting influence on his economic and social well-being.

Because of a relatively larger stock of assets and better acumen for engaging in business relationships, the market-oriented producer is in a somewhat more favorable position than subsistence-oriented producers. Through the bargaining process, the terms of credit granted him are more reflective of the purpose for which the credit is to be used and of his credit worthiness. Yet, smaller, market-oriented producers are subjected to many of the pressures surrounding credit to subsistence-oriented producers. They have a relatively low capacity to save and, therefore, are highly dependent upon external financing.

The owners of large production units such as estates and plantations usually have recourse to the same sources of credit as industrialists and import-export firms. These commercial sources are in a position to provide relatively low-cost credit. Too often, the services of these institutions are not available to smaller producers or are available only on a very limited scale. Foreign-owned enterprises have access to relatively inexpensive capital available from the developed countries. These firms have the collateral, managerial competence, and business contacts permitting them to secure financing on favorable terms.

Definition of Credit

As a generalized definition, credit may be viewed as a temporary transfer of resources, either in monetary or real form, from those with a relative abundance to those in need of additional resources where the latter, in addition to repaying the initial value of the credit extended,

compensate the owner for the use of his resources. This compensation, that is, "interest", assumes a number of forms. It may be monetary or payment in kind, labor services provided by the debtor, or creditors having the use and product from some of the debtor's resources for a limited period of time. In addition to credit in the form of money, credit in kind is granted as seeds, fertilizers, and tools are advanced by a local merchant, landlord, or cooperative organization. Credit in the form of consumption goods is also usually available from merchants.

Demand for Credit

The necessity and usefulness of credit financing have already been alluded to in the first paragraph. The demand or necessity for credit arises from the fact that wealth and income are not distributed according to the various requirements of individuals engaged in economic activities. In the context of agricultural growth, credit represents the means whereby private investment in improved inputs, to the extent that such inputs are available, provides the potential for shifting the production function upward or for reducing the variability of output realized in any production period. Credit also is necessary to obtain working capital both in traditional and improved forms, so that the producer can begin cultivation and planting operations.

Credit provides one of the ingredients for transforming the structure of the agricultural sector so that both development and growth can potentially proceed. This longer-term credit may be used for digging wells and expanding irrigation systems. Long-term credit may

permit previous tenants to become landowners, thus modifying the tenure structure with potentially favorable effects on private investment and land-use patterns. Also, cooperatives engaged in marketing and input-supplying activities may be financed by private and public funds.

External credit enables cultivators to weather unexpected contingencies, seasonal discontinuities of income, and crop reductions or failures which in the absence of credit would force cultivators to sell a portion of their productive assets or labor services. Other things being equal, this reduction in productive inputs would tend to reduce future production and, in turn, the producer's capacity to meet annual production and consumption requirements.

The high incidence of credit obtained from private or informal sources, and these lenders' predilection not to keep records nor to divulge the nature of their transactions tend to obscure the reasons for demanding credit and the actual use made of funds provided by creditors. However, determination of the actual use of credit is important in devising credit institutions which can accommodate the needs of borrowers and in assessing the economic efficiency of using one of the scarcer resources in most less-developed areas.

Despite a general reluctance to incur the economic and social onus of debt, the data obtained in the All-India Rural Credit Survey (5.13) indicate that among cultivators and noncultivators, the percent of families borrowing was 58.6 and 38.6, respectively, during the 1951-52 period. In determining the demand for credit, both the number of prospective borrowers and their respective credit requirements must

be considered. In addition, the distribution of demand through time has an important bearing on the capacity of credit suppliers to provide the quantities of credit demanded.[1] Tables 5.1 and 5.2 contain the frequency distributions for the number of borrowing families and the amount borrowed for four classes of cultivators,[2] respectively.

According to Table 5.1, the percentage distribution of borrowers is not markedly different for the four classes of cultivators. The overall borrowing rates further substantiate this. The percent of families borrowing in all districts was 57 percent for the "big" cultivators, 59 percent for the "large" cultivators, and 61 and 55 percent for "medium" and "small" cultivators, respectively (5.7, p. 254).

Table 5.2 indicates a positive association between the size of the farming operation and the amount borrowed. "Small" cultivators borrow or are restricted to borrowing in relatively small amounts. This does not suggest, however, that small cultivators do not have need for or could use larger quantities of credit. "Big" cultivators not only

[1] A high proportion of short-term loans gives creditors relatively high liquidity with a capacity to accommodate credit needs as they arise. As will be suggested later, this liquidity is usually associated with higher credit costs to the borrower.

[2] Within each village, cultivating families were ranked in descending order by the size of cultivated holding into ten deciles of approximately equal numbers of families. For the village sample, two families from each of the first five deciles and one family from each of the last five deciles were randomly selected. At the district level, the deciles were grouped into three categories. The "large", "medium", and "small" cultivator categories represent the first three, the middle four, and the last three deciles, respectively. The "big" cultivator category is a subset of the "large" and represents only the first decile. Where the "upper and lower strata" terms are used, they represent the first five and last five deciles, respectively (5.13).

Table 5. 1. Frequency distribution of districts according to the proportion of borrowing families among four classes of cultivators in India during 1951-52*

Proportion of borrowing families	Number of districts			
	Big cultivators	Large cultivators	Medium cultivators	Small cultivators
Below 10 percent	-	-	1	-
10 to 20 percent	3	1	-	2
20 to 30 percent	1	3	6	8
30 to 40 percent	7	6	2	7
40 to 50 percent	18	11	15	15
50 to 60 percent	13	25	15	18
60 to 70 percent	15	12	15	11
70 to 80 percent	12	8	14	10
80 to 90 percent	6	8	4	3
90 to 100 percent	--	1	3	1
Total districts	75	75	75	75

*Source: Jakhade (5.7, Table II.).

Table 5.2. Frequency distribution of districts according to average size of borrowing among four classes of cultivators in India during 1951-52*

Average size of borrowing	Number of districts							
	Big cultivators		Large cultivators		Medium cultivators		Small cultivators	
	Per family	Per borrowing family	Per family	Per borrowing family	Per family	Per borrowing family	Per family	Per borrowing family
Nil	--	--	--	--	--	--	--	--
Below Rs. 100	5	--	5	--	21	3	37	10
Rs. 100 - 200	8	--	17	6	30	22	28	29
Rs. 200 - 300	13	8	14	8	13	18	8	20
Rs. 300 - 400	6	4	13	9	9	13	2	5
Rs. 400 - 500	10	9	10	12	2	10	--	8
Rs. 500 - 600	12	5	8	6	--	5	--	2
Rs. 600 - 700	5	7	2	7	--	3	--	1
Rs. 700 - 800	2	8	--	7	--	--	--	--
Rs. 800 - 900	4	7	2	5	--	1	--	--
Rs. 900 - 1000	1	1	2	6	--	--	--	--
Rs. 1000 - 2000	8	23	2	9	--	--	--	--
Rs. 2000 and above	1	3	--	--	--	--	--	--
Total districts	75	75	75	75	75	75	75	75

*Source: Jakhade (5.7, Table IV.).

have the collateral for securing large loans, but they would also be expected to require larger amounts for investment and working capital. This is borne out in Table 5.3 where capital and current expenditure on farms are positively associated with farm size while family or consumption expenditures have an inverse association with farm size. Nearly 60 percent of the credit obtained by small cultivators was reported as being used for family expenditures. This likely reflects the relatively low incomes and cash reserves of these individuals and their seasonality of income. Larger producers have more opportunities to diversify farm enterprises and to receive a more even flow of income throughout the year.

The distribution between short- and long-term loans for alternative purposes is given in Table 5.6. Considering average borrowings for agricultural uses, about two-thirds of the credit was obtained on a long-term basis and the remaining one-third was considered to be of a short-term nature. In comparison, average borrowings for consumption were nearly evenly divided between short- and long-term arrangements. The amounts borrowed for other uses were relatively unimportant. Again, it should be kept in mind that these data are those reported for 1951-52 only.

An intuitive discussion of the nature of the demand curves for the major uses of credit is presented in Figure 5.1. Demand curve D_1D_1 is drawn to reflect a low responsiveness of credit demand to changes in the interest rate.[1] Curve D_1D_1 is appropriate for small-scale cultivators

[1] The interest elasticity of demand varies with points on the demand curve. Thus, low responsiveness does not imply an inelastic demand. Rather, incremental changes in interest rates are associated with less-than-proportional changes in quantities of credit.

Table 5.3 Percentage distribution of borrowing according to purpose among four classes of cultivators in India during 1951-52*

Purpose of borrowing	Borrowing for the purpose specified as percentage of total borrowings				
	Big cultivators	Large cultivators	Medium cultivators	Small cultivators	All cultivators
	(Percent)				
Capital expenditure on farm	35.5	34.7	30.5	23.2	31.5
Current expenditure on farm	13.3	12.1	10.1	6.8	10.6
Non-farm business expenditure	6.4	4.9	3.3	6.0	4.5
Family expenditure	37.2	41.2	49.5	59.8	46.9
Other expenditure	7.2	6.6	6.0	3.9	6.0
More than one purpose	0.4	0.5	0.6	0.3	0.5
Total[a]	100.0 (25.2)	100.0 (51.1)	100.0 (33.0)	100.0 (15.9)	100.0

[a] Figures in brackets represent the percent of total borrowings accounted for by each class of cultivator.

*Source: All-India Rural Credit Survey II (5.13, p. 293).

borrowing for short-term consumption expenditures and for financing working expenses necessary for planting and cultivation of crops. Curve D_2D_2' may be appropriate for a different class of consumption expenditures These are, for example, marriages and other social events where social pressure may motivate borrowers to expend at least a minimum outlay, which is assumed to require C_- of credit. Beyond this level, however, the amount borrowed in order to increase the lavishness of the event is more responsive to changes in the interest rate (5.6).[1] The credit demand function for consumption expenditures is implicitly summarized in Equation 5.1 where i = effective interest rate, R = cash reserves or stocks of saleable commodities, C = consumption to meet physiological requirements. and S = social pressures influencing consumption patterns.

$$D_c = D_c(i, R, C, S) \qquad (5.1)$$

The weights attached to the independent variables differ with different consumption objectives. For D_1D_1, R and C assume importance while i and especially S have only a secondary impact. Conversely, for D_2D_2, i and S are of much greater importance. For large-scale cultivators, those with more assets and presumably higher reserves, both the shape and position of the demand curves in Figure 5.1 will be different from those specified.

An implicit demand function for credit to be used as working

[1]An important policy consideration should be apparent. With a demand curve such as D_1D_1, the borrower's need is so imperative that the price or interest rate is of secondary importance. This, juxtaposed with private lenders' monopolistic or oligopolistic powers, suggests that lenders are in a favorable position to exploit borrowers by charging higher than justified interest rates. That is, they can readily shift their supply schedules to individual borrowers to the left and exact higher interest rates.

capital is given in Equation 5.4. The p_i/p_j ratio reflects the product-input price relationships which condition the profitability of using the j production

$$D_w = D_w(i, p_i/p_j, MPP_w$$

inputs. The term MPP_w is a proxy for the MPP of the j inputs purchasable with the producer's working capital. The cost of securing credit, i, can be added to the p_j so that the purchase price plus interest costs represent the total cost of acquiring inputs through external financing. The input j can profitably be used in the production of output i up to the point where the $MVP_i^i = p_i$. $MPP_i^i = p_i$ where credit costs are included in p_j

Figure 5.2 is used to demonstrate the demand for credit for medium and long-term investments in individual farming operations.[1] The demand curve for capital which represents the optimum capital stock at each rate of interest is defined in terms of that level of cost for capital goods or services which would be operative if net investment were zero. This cost level is denoted as r in Panel c. In Panel a, points of optimum capital stock are represented by the marginal efficiency of capital curve, MEC. Each point on the MEC reflects expected net yields associated with the various levels of capital. The downward slope results from diminishing returns to additional increments of capital when replacement cost of capital amounts to r.

[1] For a more comprehensive discussion of Figure 5.2, see Shapiro (5.16), pp. 249-261. The macro-economic formulation he describes is adapted here to represent private investment decisions.

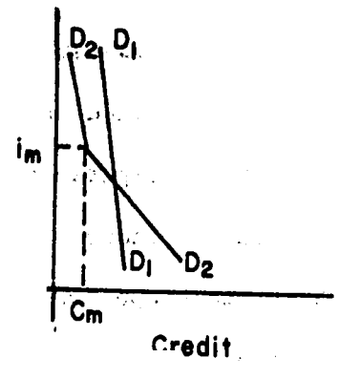

Figure 5.1. Demand schedules for short-term credit to meet consumption expenditures

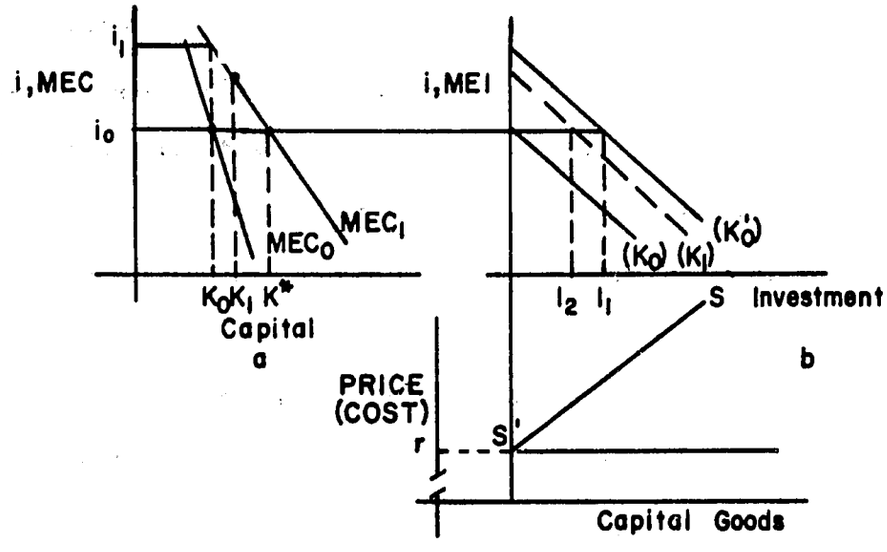

Figure 5.2. Derivation of demand for investment goods when secured through external financing

The initial capital position is postulated as K_o. Capital has been added to the point where MEC is equal to the prevailing interest rate, i_o. Panel b contains the marginal efficiency of investment curves associated with alternative capital positions. For example, (K_o) represents the net returns to increments of investment added to capital stock K_o. The MEI-curves slope downward for two reasons: (1) Diminishing returns are associated with increments of investment to the previous capital stock; and (2) The supply curve of capital or investment goods to the individual investor slopes upward. The supply curve, S'S, is drawn to reflect not only the acquisition costs of capital goods which are assumed to be constant to the individual investor but also the additional costs of financing the purchase of these goods through the use of credit. Assuming that credit costs increase with additional amounts borrowed, S'S is an upward-sloping supply function.[1] This is assumed due to higher opportunity costs and additional risk associated with larger quantities of credit provided. These factors should be partially offset by lower administrative costs associated with loans of larger amounts.

Let some exogenous change occur which causes MEC_o to shift to MEC_1 This might occur as a result of a change in the tenure arrangement, a newly-initiated government program of price supports or public investment in irrigation systems, or any other number of factors. The new

[1] Whether the supply curve S'S is linear or curvilinear, the rate at which it slopes upward, and the range throughout which it exists for individual borrowers are empirical questions. The assumption that the cost of investment goods, exclusive of interest charges, is constant is invalid when several investors are considered.

optimal capital position is $K^* > K_o$ where K_o is the initial position. The corresponding MEI curve is now (K_o'). In the first time period, investment is undertaken to point I_1, the new temporary equilibrium, where MEI equals i_o. This amount of investment is added to K_o and a new capital stock of, for example, K_1 is obtained. However, this is still short of K^*, the desired capital stock. Another MEI curve corresponding to K_1 is drawn and investment amounting to I_2 is made in period two. This process is repeated until sufficient investment is made so that K^* is realized. As is apparent, the rate of investment declines as successive additions to the capital stock are made.

The credit demand function for investment goods necessary to attain the optimum stock of capital is implicitly represented by Equation 5.3. The term D_I^t represents the demand for credit to finance payment of investment goods in period t, $(K^* - K_t)$ is the disequilibrium in optimal capital position, p_I is the total acquisition cost of capital or investment goods, and T represents an allowance for technological change.

$$D_I^t = D_I[i, MEC, (K^* - K_t), p_I, T] \qquad (5.3)$$

Some variations in the credit supply curve which have differential impacts on the rate of investment and on the length of time necessary to reach K^* can be postulated. For example, the debt incurred in investing I_1 may make the borrower a higher risk. The lender may then be motivated to alter the credit supply curve for period two, for example, S'S rotates about point S' in a counter-clockwise direction. This results in $MEI_{(K_1)}$ having a higher slope and, in turn, investment in period two is less than I_2. To the extent that this occurs in period two and

subsequent periods, more time elapses before K^* is reached. A variation with an opposite consequence might be the following: the borrower's credit worthiness is increased by some agency guaranteeing repayment of his loan. Instead of facing S'S, the credit supply curve rotates about S' in a clockwise manner so that investment in each time period is augmented and K^* is reached in a shorter period of time. In all of the above discussion related to Figure 5.2, it has been implicitly assumed that the only changes occurring are those which have been postulated. In reality, the shift in the MEC curve may also affect the shape and position of the S'S curve. Furthermore, changes in the interest rate alter optimum capital positions and the amount of investment that can be profitably added during each time period.

Estimates of demand elasticities for credit have been calculated for Indian cultivators based on the data obtained in the 1951-52 rural credit survey and follow-up surveys undertaken during 1956-60 (5.12).[1] Several tables are included in the study; only two are presented for consideration here. Table 5.4 is a composite of the derived marginal propensities to borrow and the estimated demand elasticities associated with various combinations of the independent variables

[1] Pani (5.12) used simple least squares techniques in deriving regression coefficients. The statistical model employed was Credit = a_0 $a_1R + a_2C + a_3F + a_4A + u$ where the independent variables are average rate of interest, capital expenditure on farm, family expenditure on selected items, and average value of selected assets, respectively; u is the error term. Pani discusses the limitations of his study on pp. 187-188 and concludes that "The results have been interpreted more on their consistency rather than their statistical inference" (5.12, p. 188).

Table 5.4. Marginal propensities to borrow and derived elasticities for credit demand among Indian cultivators for two time periods**

Constant	Marginal propensity to borrow in Rs. with respect to changes in: Average interest rate (percent per annum)[a]	Capital expenditure on farm (Rs.)	Family expenditure on selected items (Rs.)	Value of selected assets (Rs.)
1951-52 (75 districts):				
+ 72.35	- 4.43 (1.84)	+ 0.74 (0.14)	+ 0.16 (0.09)	+ 0.004 (0.004)
+ 71.99	- 4.52 (1.83)	+ 0.78 (0.13)	+ 0.19 (0.09)	*
+ 127.29	- 4.94 (1.87)	+ 0.93 (0.12)	*	*
+ 395.91	- 9.63 (2.42)	*	*	*
+ 11.37	*	+ 1.02 (0.11)	*	*
1956-60 (36 districts):				
+ 79.52	- 4.04 (2.80)	+ 0.63 (0.22)	+ 0.22 (0.15)	+ 0.001 (0.005)
+ 79.14	- 4.00 (2.74)	+ 0.65 (0.19)	+ 0.22 (0.14)	*
+ 109.78	- 2.64 (2.63)	+ 0.87 (0.13)	*	*
+ 452.69	-11.81 (3.43)	*	*	*
+ 52.81	*	+ 0.94 (0.11)	*	*

[a]The average interest rate is exclusive of loans at the "nil" rate of interest.

*Variable not included in the equation. Figures in parentheses are standard errors of the coefficients.

**Source: Pani (5.12, Table 9).

Multiple or simple correlation R or r	Elasticity at average level with respect to changes in: Average rate of interest	Capital expenditure on farm	Family expenditure on selected items	Average value of selected assets
+ 0.77	- 0.43	+ 0.68	+ 0.29	+ 0.10
+ 0.77	- 0.43	+ 0.72	+ 0.36	*
+ 0.75	- 0.47	+ 0.86	*	*
- 0.42	- 0.93	*	*	*
+ 0.72	*	+ 0.94	*	*
+ 0.84	- 0.25	+ 0.54	+ 0.39	+ 0.02
+ 0.84	- 0.24	+ 0.55	+ 0.39	*
+ 0.83	- 0.16	+ 0.74	*	*
- 0.50	- 0.72	*	*	*
).82	*	+ 0.80	*	*

The derived credit demand equations when all four independent variables are included are given in Equations 5.4 and 5.5 which correspond to the 1951-52 and 1956-60 data, respectively. Considering Equation 5.4, a one percent decline in the average interest rate, ceteris paribus, is estimated to increase borrowings by about 4.4 rupees. Similarly, if only capital expenditure is increased by 100 rupees, the amount borrowed is estimated to increase by 74 rupees. An increase in family expenditures by 100 rupees, with the values of other variables unchanged, is associated with an increase in borrowing by 16 rupees. The variable denoting "value of selected assets" has only a negligible effect on the marginal propensity to borrow. The marginal propensities to borrow derived from the 1956-60 data are of the same general magnitude as those in Equation 5.4. Borrowers, however, were expected to be somewhat less responsive to changes in capital expenditures and slightly more responsive to changes in family expenditures.

$$\text{Credit} = 72.35 - 4.43(R) + 0.74(C) + 0.16(F) + 0.004(A) \qquad (5.4)$$

$$\text{Credit} = 79.52 - 4.04(R) + 0.63(C) + 0.22(F) + 0.001(A) \qquad (5.5)$$

The derived demand elasticities in Table 5.4 have the expected signs. Based on the 1951-52 data when all independent variables are included in the regression equation, a reduction in the average rate of interest by one percent, ceteris paribus, is associated with and increase in credit borrowed by .43 percent. If capital expenditures on the farm increase by ten percent, borrowings are estimated to increase by 6.8 percent. In comparison to these estimates, the demand elasticities based on the 1956-60 data are all lower except for family expenditures on selected items. Thus, with the exception of family ex-

penditures, credit demand had become less responsive to changes in the selected variables. Pani does not attempt an interpretation of this. Cultivators in the later period may have been in a relatively poorer economic position so that more credit was necessary for consumption expenditures, and the interest rate was less important in meeting these and other expenditures.

The amount of variation explained by the independent variables is obtained by squaring R or r. The fit for the 1956-60 data is somewhat better, i.e., about .71 as compared with .59 for the 1951-52 data. As family expenditures and average value of selected assets are omitted from the equations, the coefficients of determination, r^2, are essentially unchanged. That is, these variables had little effect in explaining the variation in credit or amounts borrowed, the dependent variable.

The demand elasticities associated with subgroups of cultivators are given in Table 5.5. For the 1951-52 data, the interest elasticity of demand was much lower for the bottom fifty percent as compared with the top half. That is, the average interest rate is a relatively less important factor in determining the amount of credit borrowed for the lower half of the cultivators. The respective interest elasticities derived for the subgroups of cultivators in the 1956-60 surveys are more difficult to interpret. The interest elasticities for the last two groups would be expected to be lower than for the top ten or thirty percent of cultivators.[1] Looking at the 1956-60 portion of Table 5.5,

[1]Pani's only comment is that "This divergence is possible due to the fact that compared to the level of credit operations the marginal changes in loans are small in the case of the top group of cultivators" (5.12, p. 197).

Table 5.5. Elasticities of credit demand among Indian cultivators, classified according to decile, for two time periods*

Period/subgroup of cultivators	Elasticity at the average level with respect to changes in: Average interest rate[a]	Capital expenditure on farm	Family expenditure on selected items	Value of selected assets	Total expenditures (3 + 4)
1	2	3	4	5	6
1951-52:					
Top fifty percent	-0.51	+0.71	+0.28	+0.09	+0.99
Bottom fifty percent	-0.10	+0.62	+0.34	+0.11	+0.96
1956-60:					
Top ten percent	-0.15	+0.82	+0.12	-0.04	+0.94
Top thirty percent	-0.10	+0.88	+0.02	-0.01	+0.90
Middle forty percent	-0.39	+0.08	+0.91	-0.11	+0.99
Bottom thirty percent	-0.25	+0.05	+0.88	-0.02	+0.93

[a]The average interest rate is exclusive of loans at the "nil" rate of interest.

*Source: Pani (5.12, Table 14).

credit demand by the top two subgroups is quite responsive to changes in capital expenditures on the farm. In contrast, credit demand by the lower two subgroups, that is, those in relatively poor economic positions, is essentially unaffected by capital expenditures. Conversely, family expenditures are very important in affecting the credit demand of these economically less-"well-off" cultivators as compared with the top ten and thirty percent of cultivators.

Sources of Credit

Perhaps the best term to characterize sources of credit in less-developed areas is that they are heterogeneous--heterogeneous in their objectives associated with supplying credit, in the terms under which credit is offered, and in the nature of attendant services provided by creditors. Alternative sources often range from credit provided by relatives with low or no interest being paid to closely-supervised credit offered by agricultural banks or government-regulated marketing cooperatives requiring payment of interest. This variability complicates the design and implementation of public programs to effectively regulate and supplement private sources of credit.

Table 5.6 is a summarization of the data collected for 1951-52 in the All-India Rural Credit Survey (5.13). "Organized" or public sources, that is, government and commercial banks provided only 3.2 percent of the reported amount borrowed. On the other hand, moneylenders represented the most important source of credit, providing nearly two-thirds of the average amount borrowed per family. Slightly over 10

Table 5.6. Average borrowing of Indian cultivators and percentage distribution according to source of credit for 1951-52, classified according to purpose and source**

Credit agency (Amounts in rupees per family)	Total*		Purpose			
			Agricultural			
			Short-term		Long-term	
	Amount	Percent	Amount	Percent	Amount	Percent
Government	5.2	2.7	0.7	2.8	3.1	6.0
Cooperatives	6.2	3.2	2.8	11.3	1.2	2.4
Relatives	22.4	11.8	1.9	7.5	6.7	13.1
Landlords	4.2	2.2	0.5	2.1	1.4	2.8
Agriculturist moneylenders	63.3	33.2	8.4	34.1	19.9	38.7
Professional moneylenders	61.8	32.4	6.2	25.1	12.0	23.3
Traders and commission agents	16.3	8.5	2.5	10.1	4.4	8.6
Commercial banks	1.0	0.5	0.4	1.7	0.2	0.5
Others	10.6	5.5	1.3	5.3	2.4	4.6
Total	191.0	100.0	24.8	100.0	51.3	100.0

*Includes "others".

**Source: Jakhade (5.7, Table X).

Purpose									
Non-agricultural				Consumption					
Short-term		Long-term		Short-term		Long-term		Repayments of old debts	
Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent	Amount	Percent
--	--	--	0.6	0.8	2.1	0.4	1.0	--	0.8
--	0.5	--	--	0.8	2.2	0.4	0.9	0.4	8.7
--	1.4	0.5	7.1	5.3	14.6	6.3	5.2	0.5	10.6
--	1.8	--	--	0.8	2.1	0.9	2.2	0.1	2.0
0.6	25.2	0.4	6.2	11.1	30.6	15.1	6.5	2.5	50.4
0.5	22.9	5.6	84.1	11.2	30.9	13.6	32.9	0.5	10.6
0.3	15.6	0.1	1.7	4.6	12.6	1.8	4.3	0.6	12.6
	1.8	--	0.1	0.2	0.6	0.1	0.1	--	0.2
0.7	30.8	--	0.2	1.5	4.3	2.9	6.9	0.2	4.1
2.2	100.0	6.6	100.0	36.2	100.0	41.4	100.0	4.9	100.0

percent was furnished by relatives. In addition, moneylenders were the source of the largest loans obtained, both on a short- and long-term basis. The amounts provided by the "organized" credit market were not substantial.

As will subsequently be noted, the scope and operation of credit institutions, both public and private, have important consequences for the growth and development of the agricultural sector. Since the amount of credit provided by the "organized" or public sector is relatively low, attention will primarily be directed toward the organization and operation of the private or "unorganized" suppliers of credit such as landlords, professional moneylenders, merchants, and relatives. The volume of loans provided by commercial institutions at relatively low rates is small largely because the majority of agriculturalists have limited amounts of assets which do not provide adequate collateral for securing loans at low interest rates (5.13, 5.17). In addition, commercial banks have few offices in rural areas. The expense associated with traveling to bank locations, the relatively-detailed procedures required to apply for a loan, and a wary attitude toward these institutions motivate agriculturalists to rely primarily on local sources of credit.[1]

[1] In some areas, particular cultural attributes generate special sources of credit. According to Islamic doctrine, usury is prohibited, and the explicit charging of interest is viewed as a usurious practice. In Afghanistan, Hassana is altruistic form of lending with no interest charged on the loans (5.8). However, during prolonged periods of economic adversity, the capacity and willingness to provide funds to one's compatriots declines as individuals become more concerned with their own well-being. Even when loans at zero interest are made, collateral is frequently required. The lender often has the right to the product from the mortgaged property which in any average year would exceed the amount of "reasonable" interest charges if such interest were levied. The term of the loan, unless otherwise specified, is indefinite.

Terms of credit

The terms of credit are the principal factors which determine the rationing or distribution of available funds. If the credit market operated perfectly, funds would be distributed, both spatially and temporally, according to their highest uses.[2] The term structure of interest rates would reflect productivity and risk considerations, and interest rates would guide and determine the movement of funds among sectors of the economy and into short- and long-term employments. As will be discussed below, the magnitude and permanence of credit market

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[1](continued). In Chore, Ethiopia, informal mutual aid organizations are operative. For example, the eder is an organization which provides financial assistance to member households in cases of death or adversity. The equb is an informal small savings association to which members make regular contributions. The order in which members have access to the amounts collected is determined by lot (5.9).

[2]If the credit market operated perfectly, credit would be allocated according to the prices or interest rates borrowers would be willing to pay, i.e., borrowers realizing high returns would be willing to pay high rates. But, such returns are conditioned by resource distribution and, in turn, income distribution. Those cultivators with the largest resource bases perhaps also realize the highest returns form the use of credit because they have the necessary complementary resources. They also have the highest capacity to repay and, hence, can afford to pay high interest rates. However, the rates they pay are relatively low. To the extent this is true, smaller cultivators, relying primarily on traditional inputs which yield relatively low returns, are in a weak competitive position to obtain funds. Unless they have access to improved inputs, any gains generated by the development processes largely bypass them. In this connection, highest uses are also influenced by the degree of efficiency in other markets. Even if the input market operates well and a producer has access to inputs which increase his physical product, the economic returns from investment may be low if adequate transportation and marketing outlets are not available. In addition, returns are affected by the amount and accuracy of information producers have relative to market conditions, both for inputs and outputs.

imperfections inhibit the growth and development processes which less-developed areas plan and hope to achieve.

The interest rates paid by borrowers reflect the terms of credit. Small, short-term loans for consumption purposes are available at relatively high rates of interest, that is, relative to medium- and long-term loans of larger amounts for productive investment. In addition to the size and purpose of the loan, a number of other factors affect the structure of interest rates: (1) The availability of collateral to secure loans; (2) The supply and demand conditions which generate fluctuations in interest rates; (3) The opportunity costs of lending funds to agriculturalists; (4) The objectives and degree of competitiveness among the lenders; and (5) The number of services provided by the lender such as the marketing of produce and the retailing of producer and consumer goods.

Figures 5.3 and 5.4 represent a geometrical determination of the interest rate charged a hypothetical borrower. Figure 5.3 denotes a three-dimensional credit supply surface where the quantity supplied is a function of the interest rate and the discount factor. The interest rate increases with successive movements to the left of the origin. Conversely, the discount factor, d, decreases with movements to the right of the origin.[1] The isoquant C_o represents combinations of i and d for which the amount of credit supplied is invariant. That is, a high d is compensated for by a high i; when d is low, the creditor is

[1]The discount factor, d, incorporates the following factors: size of the loan, credit worthiness of the borrower, use of funds for productive or nonproductive purposes, and uncertainty of return associated with use.

willing to lend at a relatively low i. A two-dimensional demand curve, D_1, is superimposed, reflecting that quantity demanded varies with the interest rate. If the demand schedule is tangent to the credit supply surface at point A, i_4 is charged for quantity AB of credit. If the demand schedule shifts to D_2 so that more is demanded at each i, the interest rate increases to i_6 and the discount factor increases to d_8. The higher discount factor reflects the situation that a previous portion of debt AB has not been repaid or the borrower's collateral is not sufficient to provide additional credit at i_4. In short, the borrower's credit worthiness has declined.

Figure 5.4 is a two-dimensional representation of the determinati of i where the credit supply curves are derived from Figure 5.3. The demand curves are drawn fairly steeply indicating that the quantity de manded is not highly responsive to changes in i.[1] The supply schedule are drawn to indicate that additional increments of credit are supplie only at proportionately higher rates of interest. With the shifts in the two schedules resulting from a rightward movement of the demand schedule, the interest rate is increased to i_6. The increase from i_4 is decomposable into that due to the shift in demand and that generate by the increased risk associated with the increments in credit supplie The amounts OC_1 and OC_2 are equivalent to AB and $A'B'$, respectively, i Figure 5.3. The generalized formulation is $D(i^o) = S(i^o)$ where i^o is the equilibrium rate of interest. The equilibrium rate varies with th source of credit.

[1] If the demand curves in Figure 5.4 are assumed to be for consump tion expenditures, the stock-flow problem resolved in Figure 5.2 is no encountered here.

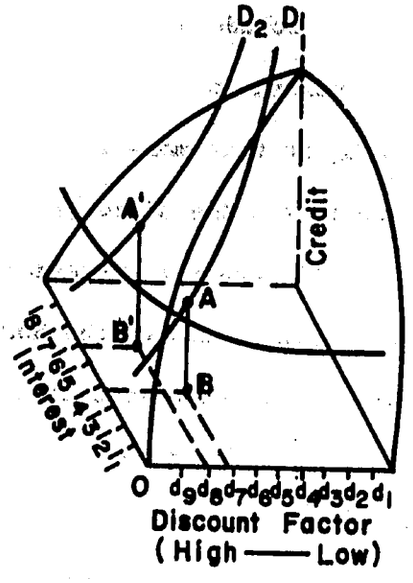

Figure 5.3. Credit supply surface and interest rate determination for individual borrower

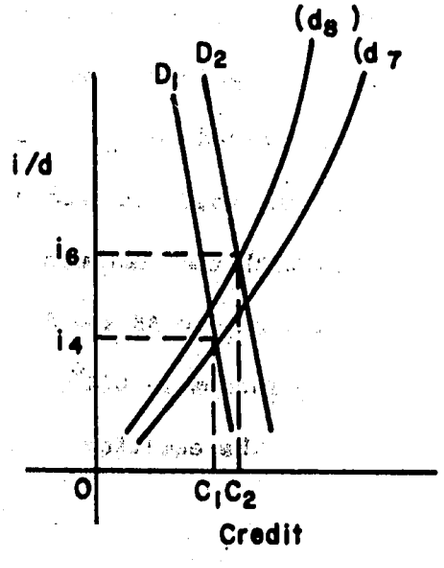

Figure 5.4. Credit supply schedule and interest rate determination for individual borrower

In addition to the factors determining i in Figures 5.3 and 5.4, lenders often raise the effective interest rate by hidden charges and unscrupulous practices such as the following (5.1. 5.12. 5.18):

(1) Deducting the interest charge at the time the loan is made or deducting a premium with interest to be paid on the full amount requested;

(2) Demanding repayment in kind and undervaluing the commodity used for repayment at a price much lower than that likely to be in effect at harvest time[1](5.1, 5.11, 5.18);

(3) Overpricing commodities when credit in kind is provided. This applies not only to fertilizers, seeds, and tools, but also to consumer goods;

(4) Demanding labor services, for example, by landlords providing credit to tenants, in addition to payment of interest; and

(5) Keeping improper records and not giving receipts so that the principal repaid is in excess of that borrowed. This applies to both monetary credit and credit in kind and is easily effected when borrowers have low levels of literacy.

As mentioned earlier, the informal nature of supplying funds by private lenders greatly complicates the determination of interest rates actually charged. Table 5.7 gives a tabulation of reported rates for selected countries. Wai (5.18) estimates that in the majority of countries, the weighted average rate of interest in the "unorganized" credit market varies between 24 and 36 percent per annum

[1]The lender stands to realize even greater returns during inflationary periods. Not only does he gain through the lower price he pays, he gains as the commodities paid to him as "interest" appreciate in value.

Table 5.7. Annual rates of interest charged by moneylenders in selected countries classified according to frequency of occurrence[a,*]

	Lower exceptional[b]	Usual[b]	Occasional[b]	Higher exceptional[b]
AFRICA				
Nigeria				
(1)				500
(2)		45		150
ASIA:				
Burma				
(1)	12-15	24-36	50-100	400-1800
(2)	12-18	24-36	50-60	100-250
Cambodia		36-84	120	
Ceylon				
(1)	13.5	18-24	67	100
(2)	6	6-18	18 and above	
(3)	10-15	17-20	27-36	50
(4)				600
China				
(1)		20-30	40 and above	
(2)		24-48	72-96	100-200 and above
India				
(1)		12-50		300-400
(2)		25-50		
Indonesia		50	200	500-600
Japan	10	10-15	15-20	20 and above
Malaya			100	

[a]Data refer to postwar years unless otherwise indicated in the section, "Descriptive Notes and Sources of Data, by Area", given in (5.18, pp. 141-142).

[b]"The usual rate is that at which more than half of the total loans of moneylenders are granted, while the occasional rate refers to loans constituting from 10 to 20 per cent of the total. The lower and higher exceptional rates refer to loans constituting less than 5 per cent of the total loans granted" (5.18, p. 102). Multiple reports for a given country denote alternative sources of data.

*Source: Wai (5.18, Table 11).

Table 5.7 (continued)

	Lower exceptional[b]	Usual[b]	Occasional[b]	Higher exceptional[b]
Pakistan				
(1)		30		300
(2)		25-30		150
Philippines				
(1)		60-200		300
(2)		25-30	100-200	400
(3)		20		300
Thailand				
(1)		36	60	
(2)	18 and below	25-30	40-60	92
Vietnam				
(1)	20	36-100		
(2)		50-100	240-300	3,650
LATIN AMERICA:				
Colombia		18-24	48	
Cuba				
(1)	12	24-30		
(2)	8-18	24-40		
Guatemala	8-12		100	
Haiti		100		over 100
Honduras		24-36		200-600
Mexico		60		300-1200
MIDDLE EAST:				
Egypt	15	25-40		200
Iran			200	775
Iraq				
(1)		20-50	100	
(2)		100	200-400	700
Israel				
(1)		140		
(2)		30		
(3)		18-24		
(4)		30		80-90
Jordan				
(1)		60		
(2)		20-40	exorbitant	

Table 5.7 (continued)

	Lower exceptional[b]	Usual[b]	Occasional[b]	Higher exceptional[b]
Lebanon				
(1)			50-100	
(2)		22-24	33	
Sudan, Northern			100	
Syria				
(1)	9-20	40-45	150	
(2)	18	40		

Another factor tending to cause high interest rates is that moneylenders often grant loans secured only by verbal promises to repay.[1] Where collateral with a secure title is offered as security, credit is usually obtainable at a much lower rate (5.1, 5.17). This is particularly true if the prospective borrower has access to funds provided by commercial and agricultural banks.[2] Private lenders, while charging higher rates, are in a better position to meet the credit needs of prospective borrowers, at least for loans of modest amounts. First, private lenders often have detailed knowledge of the prospective borrowers' needs and credit worthiness. Credit can be advanced rapidly with little or no red tape and with no publicity. Second, the terms of repayment, in particular the repayment dates, are often flexible so as to accommodate the debtor's repayment capacity. At times, no due date is specified; often, repayment is due only after the annual harvest. This flexibility may also be detrimental to the borrower because interest obligations accumulate as due dates are relaxed, and additional debt may be added to that already incurred increasing the danger of eventual appropriation of the borrower's assets if the lender should require complete repayment

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[1] Landlords and merchants are fairly certain that they will be reimbursed because they serve indispensable roles as employers of tenants and(or) marketing middlemen, respectively. In the Chilean credit survey, two-thirds of the loans supplied by merchants and moneylenders were not secured by financial or physical assets (5.11).

[2] In Thailand, the low interest rates charged by institutional lenders are so low as to be uneconomic in the sense that the interest payments are, at times, not sufficient to cover even the administration costs of the loans. In addition, a very large portion of the capital of cooperatives and other lending agencies has been lost through debt default (5.13).

on short notice.

The rates of interest charged by private lenders appear to be high, though not necessarily exorbitant, especially in those areas where monetization of the economy is at low levels and where cooperatives and commercial banks operate only on a very small scale. As economic activity expands, the level of monetization and of credit supplied by cooperative and public sources generally increases. The structure of interest rates, especially those charged by the private lenders, would be expected to fall. For individual borrowers, however, interest rates will likely not fall substantially until their credit worthiness is improved.[1] To the extent that these borrowers are beneficiaries of economic expansion, their credit position should be enhanced.

The rates reported being charged by cooperatives and tabulated by Wai (5.17) are substantially below those levied by moneylenders.[2] Since the cooperative movement has not been strong in Latin America, few data are reported. For Asia, the lending rate is usually between 8 and 12 percent. The lower bound is for medium-term credit while the higher rates are those for short-term advances. This range of rates also applies to the Middle Eastern countries. Few data are available for

[1] In relatively developed countries, small loans of essentially risky nature, for example, consumer credit, are often available at interest rates comparable to those levied on agriculturalists in less-developed areas. This is probably an outgrowth of administration and risk charges which are correspondingly high in the two situations (5.2).

[2] Wai (5.17) has tabulated in Table 10, pp. 134-139, the interest rates of cooperative societies and specialized agricultural banks or institutions owned or sponsored by the government for the period 1950-54 in a number of less-developed countries. He has added remarks relative to the duration of loans and collateral requirements.

Africa. The lending rates of specialized agricultural institutions are quite low. A sampling of these rates in annual percents follows:

(1) Land and Agricultural Bank of Kenya, 4½ percent for long-term loans;

(2) State Agricultural Bank of Burma, 6¼ percent for seasonal and medium-term loans;

(3) Agricultural Development Finance Corporation of Pakistan, 4-5 percent with the lower rate offered to cooperatives and the higher rate to individuals with land required as collateral;

(4) Agricultural Credit and Cooperative Bank of Egypt, 3-5 percent primarily for short-term loans but also for credit of longer duration. The higher rate applies to individuals; the lower to cooperatives;

(5) Agricultural Bank of Bolivia, 8 percent plus other expenses such as the cost of trips of the bank's technician and guarantor. The amount lent is up to 66 percent of collateral such as machinery and cattle; and

(6) Agricultural Development Bank of Peru, 6½-8 percent plus charges for technical aid for loans of all durations. The amount lent is up to 75-80 percent of the collateral offered.

Two points relative to these low rates should be made. First, the absolute amount of credit available for lending at these rates is not known. Second, in some cases, the borrowers have to pay additional costs which raise the effective rate of interest. Furthermore, the requirement that loans be secured by collateral reduces the number of

borrowers who have access to these sources.

The term structure of interest rates and the mode of operations in the "organized" money markets of less-developed areas are not much different from those of counterpart institutions in the developed countries. This correspondence is not surprising since commercial banks, which account for most of the activity in the "organized" money markets, have been patterned after the structure and practices of commercial banks in the developed countries. In general, interest rates, including those charged in the "organized" money markets, are higher than those in the more-developed countries. The more pronounced difference between the two groups of countries is that the range of interest rates is generally much wider in the less-developed areas (5.17). Within each category of interest, the rates at which commercial banks lend are a function of the size of the loan, the credit worthiness of the borrower, and the type and amount of collateral available to secure the loan. Interest rates are higher for smaller loans secured by less liquid collateral and vice versa. However, it is quite possible for a prospective borrower with little collateral but with good credit rating to obtain loans at rates lower than another person with a good collateral position but not a good credit standing (5.17). In a few cases, commercial banks lend funds to agricultural banks and cooperatives who in turn attempt to provide "supervised" credit to cultivators. Again, however, those with the larger farm units and better asset positions are in a favored position to obtain loans. In any case, the volume of loans granted at relatively low rates is not sizeable. The principal

constraining factor is the limited amount of collateral against which these loans can be secured.

Another point should be mentioned. Commercial banks and government lending agencies have the capacity to increase the amount of funds for credit at a rate which is a multiple of their contingency reserves. If lending by these institutions is not financed by savings, taxation, and borrowing from the public, inflationary tendencies may be generated or accelerated. The effectiveness of monetary policy is questionable since the link between the organized and unorganized money markets is rather weak. But since the volume of credit going to the agricultural sector is low and since this credit is usually for productive purposes, the danger of inflation arising from credit granted to agriculturalists is perhaps rather low.

Evidence exists that the interest rates charged agriculturalists by commercial banks and cooperatives are not grossly dissimilar from those charged in the developed countries. The relatively high rates levied by private sources reflect a large demand for credit relative to limited, inelastic supplies of funds available for lending. The strong demand is primarily an outgrowth of the inability of agriculturalists to realize savings from their relatively-low incomes which would permit them to internally finance consumption and production expenses and to meet unforeseen contingencies. The amount borrowed from commercial banks for subsequent lending to agriculturalists is not large. Further, private lenders, unlike commercial banks, do not act as repositories for customers' savings nor have the capacity to issue a volume of credit

which is a multiple of required reserves.

High interest rates charged by private lenders are also the result of some of the same factors which cause high rates for consumer credit in developed countries, i.e., high administrative costs, default rates, and risk on the part of borrowers. Thus, high rates do not imply exorbitant rates. If exorbitant, they must be in excess of some standard or "fair" rate. As has been demonstrated, several opportunities exist for charging high interest rates. A good deal of competition among lenders does not exist. The integrated functions of landlords and merchants with borrowers provide opportunities for imposing hidden charges. Low levels of literacy and precarious economic positions among peasants make them vulnerable to paying high, if not excessive, interest rates. Only if the rates exceed allowance for opportunity costs, administrative overhead, and credit worthiness of borrowers, can the rates be termed excessive or exorbitant.

Based on the evidence available, contemporary credit institutio generally have a depressing effect on economic and social well-being for the majority of agriculturalists in less-developed areas. Becau of seasonality of income and abnormally low incomes in poor crop yea many producers must resort to credit financing in order to sustain consumption requirements. Even though the size of these loans is relatively small, the high interest rates compared to producers' incomes and capacity for saving place a burden on the borrowers. If al normally low incomes persist over a period of time, the debtor's economic position is exacerbated

Finally, the nature of the credit system, i.e., the essentially unintegrated "organized" and "unorganized" markets, tends to perpetuate conditions of economic dualism or quasi-dualism. For example, savings do not freely flow among sectors according to their most productive uses, either on a private or social product basis. The subsistence sectors continue to operate at low levels of monetization which, in turn, discourage the implementation of commercial credit institutions in these areas. Yet these are the institutions most likely to have the capacity for providing adequate credit on terms approaching the credit requirements and repayment capacities of agriculturalists in less-developed areas. The more aggregative problem is that of increasing the level and reducing the variability of cultivators' incomes. These phenomena would reduce the need for borrowing, especially for consumption expenditures, and would improve the credit worthiness of prospective borrowers.

Competition among lenders

Because of a high degree of immobility, lack of awareness of possible alternative sources, and the tying of loans to landlord and merchant relationships, cultivators largely confine their borrowing activities to their home villages or communities. They often purchase inputs and consumer goods, market outputs, and secure credit from the same individual. In each transaction, the middleman is in a position to exploit the cultivator to some degree. These integrated economic activities, together with a usually small number of sources of credit, provide lenders with oligopolistic or monopolistic powers (5.3, 5.4, 5.11). Even though

alternative sources exist, for example, relatives, landlords, and moneylenders, the amounts obtainable from the first two sources are often inadequate so that the bulk of the credit must be secured from moneylenders and merchants. Whether or not these lenders exploit their positions of power is a question of fact. The relatively high interest rates charged by them is not sufficient evidence.

In the Indian rural credit survey, villages having four or more resident moneylenders accounted for only 10.3 percent of the total (5.4). In the Chilean survey, the number of moneylenders ranged from none to three, with an average of one operating per rural credit market area. In no case did a moneylender operate in an adjoining market area.[1] Concerning the number of village stores providing credit, the number ranged from two to five with an average of three per rural credit market area (5.11).

The numbers of lenders per market area overstates the number of sources actually open to the prospective borrower. Some lenders provide marketing and retailing services which are interrelated with credit advances. Debtors may be effectively forced to secure any additional credit from the lender who originally advanced credit or face the threat of repayment and foreclosure (5.10, 5.19). Tenants may have to rely on landlords as their principal source of credit. The lender's relatively intimate knowledge of the borrower's position places him in a good com-

[1] Nisbet (5.11) indicates three reasons why moneylenders in Chile operate on a small scale and do not compete with each other: (1) They lack detailed knowledge of the larger market so they engage in relatively small-scale operations; (2) Since their operations are illegal, they are motivated to restrict both the number of individuals they service and the total volume of credit granted; and (3) Since they are primarily farmers whose volume of lending does not represent more than 50 percent of their annual gross income, only limited quantities of funds are available for lending.

petitive position especially if the borrower does not have good collateral with secure title. The strength of these personal relationships and the obligations therein suggest that borrowers do not have several sources to choose from even when several sources exist in the community.

The relatively high interest rates charged by moneylenders and merchants are not necessarily evidence of monopolistic power. High rates are at least partially the result of high administrative costs associated with small, short-term loans plus allowance for risk on poorly-secured loans (5.2). Only if the interest rate charged exceeds these costs plus the opportunity costs associated with the credit advanced does the rate reflect an additional component of monopoly profit. In addition, if the moneylenders' credit reserves remain idle throughout a part of the year, as with seasonal lending for working expenses and consumption expenditures before harvest, the lender may quite legitimately increase charges to compensate him for the time his funds and administrative abilities are idle because of borrowers' seasonal demand. If the lender invests the otherwise idle funds, the costs of liquidating these investments will likely be passed on to the borrower when loans are made.

Regulation of lending practices

Commercial banks and cooperatives have constraints or guidelines controlling their lending activities. In some areas, legislation controls the maximum rates that can be charged and the process by which the credit worthiness of prospective borrowers is determined. Also, due dates for loans more closely approximate the size and purpose of the loan. This is in contrast to the more flexible terms usually provided by professional

moneylenders. The credit provided by agricultural banks and cooperatives is, to some extent, "supervised" credit through which these lenders exert influence over the use of the credit advanced and provide additional services as an attempt to make the most productive use of credit. In the recent past, "supervised" credit has been used in a few Latin American countries (5.1, 5.17). For the majority of the less-developed areas, this control or assistance in the use of credit is lacking, although more attention will likely be given to this practice in the future.[1]

An exception to the general pattern of "unsupervised" credit is the integrated cooperative system which evolved in Egypt in the early 1960's (5.5). After the 1952 revolution, the government instituted a system of "supervised cooperatives", the administrators of which had the responsibility for organizing production and distributing available credit among the farmer members. The supply of credit was permitted to keep pace with farmers' demand for productive purposes. The Central Bank and the commercial banks controlled by the government channeled credit funds through the Agricultural Credit Bank.[2] To ensure that farmers with little collateral had access to credit, cooperatives were directed to provide credit to members on the basis of their credit requirements for production purposes. Simultaneously, the number of defaults was minimized by commissioning a government agency with marketing the farmers'

[1] Sen in commenting on supervised credit provided by cooperatives in India, indicates that this supervision induces some cultivators, in their ignorance, to prefer dealing with moneylenders rather than the cooperatives. This is reinforced by the high proportion of loans used for consumption purposes (5.15).

[2] The Central Bank purchased the long-term, low interest-bearing bonds issued by the Agricultural Credit Bank. By 1961, commercial banks had come under State ownership.

ash crops. Not only was repayment ensured, but a mechanism was created or altering the terms of trade to agriculture, i.e., the government ould determine the prices to be paid to growers. By 1962, cooperatives ad become the sole source of agricultural credit and cooperative membership was mandatory for all farmers. By 1965, cotton, wheat, onions and a ajor part of the rice crop were subject to compulsory marketing. Finally, o increase control over the cooperative activities, in 1963 the Agricultural Credit Bank was made a State organization under supervision of the inistry of Agriculture. This reformed rural credit system primarily benfited small owner-operators who previously lacked adequate capital to ecure low-cost loans from institutional sources. The plight of the landess tenants with few assets was not substantially alleviated, however.

Links Between Organized and Unorganized Credit Markets

There appears a general belief that only a weak link exists between he organized and unorganized markets in less-developed areas.[2] This ink, whatever its strength, does provide a connection between the two arkets whereby the central banks, already operating under regulations, an have an influence on the availability and terms of credit in the

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[1] "Available evidence indicates that in Egypt the price paid to armers for certain crops has been lower than the price at which the overnment has disposed of them in the internal market and abroad" (5.5, 106).

[2] In Japan a close link between the two markets has been achieved mainly through the agricultural bill system which has been incorporated nto the cooperative movement. In order to raise funds, agriculturalists nd cooperative associations draw promissory notes or 'agricultural ills.' These bills are discounted and rediscounted by the cooperative ssociations, the credit federations, and the Central Cooperative Bank or Agriculture and Forestry, which borrows funds from the Bank of Japan henever necessary" (5.18, p. 97).

"unorganized" money market, including that of the rural credit market (5.14, 5.17). The extent to which commercial banks have advanced funds to the agricultural sector is one indicator of the strength of the connection between the "organized" and "unorganized" credit markets. Commercial bank loans to the agricultural sector are less than 10 percent of these banks' total loans in most less-developed countries.[2] The exceptions are Indonesia, the Philippines, and some Latin America countries such as Columbia, Cuba, Peru, and Paraguay. This evidence, based on data as available, suggests a relatively weak link between the two markets.

Additional links exist between the two markets which operate to make monetary policy more effective. Depending upon individual situations, these links may include the following:

(1) In areas with a large agricultural export sector, exporters and traders borrow from commercial banks and make advances to producers, either directly or through smaller merchants, in order to ensure an adequate supply of exportable commodities at favorable prices (5.17);

(2) In Africa where marketing boards are operative, the buying agents of the boards secure much of their credit from commercial banks and then give credit to smaller traders who, in turn, advance credit to

[1]Sen indicates that commercial banks in India " ... do provide substantial amounts of short-term credit for financing the marketing of agricultural produce sometimes directly to the relatively-big farmers but generally through traders" ... "The chief reason why the commercial banks have not been able to advance even marketing finance directly to the agriculturists to any appreciable extent, is the absence of licensed warehouses through which the agriculturist can pledge his produce for an advance from commercial banks" (5.15, p. 723).

[2]See Wai (5.17, pp. 129-133, Table 9) for a complete tabulation of those countries for which data were available together with the sources of these data.

the cultivators;

(3) Importers, extending credit to wholesalers who, in turn, provide credit to village retailers who finally extend credit to agriculturalists provides yet another link; and

(4) In Latin America the "latifundia" owners not only have access to credit by the commercial banks for meeting their needs and advancing credit to the "minifundia" operators, but some also have administrative or other influence over commercial banking activities.

The essentially informal operations of private leaders make enforcement of any regulations of lending practices difficult. Even if a legal maximum is placed on interest rates that can be charged, the opportunities for adding hidden charges, and the general lack of credit records make the determination of actual interest rates difficult. In addition, those cultivators charged highest rates are also those who are likely unaware that they may be paying usurious rates. They are disinclined to report payment of such rates to the proper authorities, the names and locations of which are perhaps unknown to most of the small-scale cultivators. Social pressures within the community may motivate private lenders to engage in self-regulatory practices. Those living in but not integrated in the community structure, for example, foreign-born moneylenders, are largely immune from such pressures. In addition, the few alternative sources of credit relative to cultivators' demand lessen the importance of maintaining customer goodwill by charging what appear to be "reasonable" rates.

Government programs to regulate lending activities by private suppliers are not only difficult to enforce, but where effective, the

quantity of funds supplied for lending likely falls (5.15). This reduction in credit availability may more than offset the gains derived from obtaining credit on more favorable terms. Similarly, land reform programs disrupt normal credit channels between landlords and tenants. Thus, a complementary program of increased agricultural credit is necessary if reform programs are to be most effective.

Credit Availability Relative to Needs

The supply of credit is inelastic. The fact that commercial banks have a capacity to provide a volume of credit which is a multiple of actual funds on deposit is not of much significance to the agricultural sectors at this time because the proportion of funds provided by these banks to agriculturalists is small. The private lenders, on the other hand, are largely constrained in their lending activities by the amount of funds they have on hand. Large landlords and some moneylenders can augment their reserves by borrowing from the commercial banks but this practice does not appear to be widespread. Changes in the quantities available for credit are largely effected by variations in agricultural prosperity. For example, during favorable periods landlords who lent in the past now have expanded reserves. Others now find they have "surplus" funds on which a return can be made. Improved agricultural incomes provide opportunities for merchants to expand profits, and increased debt repayment to moneylenders increases their monetary reserves. As noted earlier, borrowers are often restricted to obtaining their credit from particular merchants, marketing middlemen, or landlords. Each of these sources, however, has only a limited quantity of funds available for lending.

The nature of demand elasticities is less clear. The demand for credit to be used for consumption expenditures and working capital is highly interest inelastic. Consumption loans are often needed for survival. Without the working capital, the normal crop cannot be planted, income is not forthcoming, and additional debt must be incurred. The demand for intermediate and long-term loans is expected to be more elastic because (1) These are expenditures which can be deferred; and (2) Loans are of larger amounts which may motivate cultivators to be more responsive to changes in the interest rate.

High interest rates levied by the private lenders are only partially symptomatic of a strong demand for credit relative to supply. As mentioned earlier, high administrative costs and high risks tend to maintain rates at relatively high levels. A high opportunity cost component in the structure of interest rates is another factor

To some extent the scarcity of credit may be more apparent than real, especially on a geographical basis. This is the consequence of too few credit institutions, not properly distributed, so that institutionalized mechanisms are not available for channeling the hoards and savings of some into the hands of those who have productive uses for these funds. In addition, peasants may be reluctant to entrust their savings to these institutions with which they are at least initially unfamiliar, and prospective borrowers also often have a preference for dealing with the local moneylender even though higher costs for using the credit must be paid.

In the final analysis, credit availability relative to needs is [illegible] an empirical question. The quantity of funds available for

mobilization and transfer to areas of excess demand is largely unknown. The establishment of additional outlets for saving should not only increase the aggregate quantity of funds available but, ceteris paribus, tend to have a depressing effect on the entire structure of interest rates. From the demand side, effective demand must be distinguished from a more generalized concept of demand. Nearly every cultivator has a demand for a certain quantity of credit, but whether he can use it productively or, more importantly, whether he can use it more productively than his competitors and whether he has the capacity to repay are additional questions which must be taken into account. In the larger context, credit demand and productivity within the agricultural sector should be reconciled with requirements and investment opportunities with the nonagricultural sectors. If credit markets operated perfectly, available credit would gravitate toward its most productive uses. In the absence of this credit structure, national planners must determine the most productive uses and the means for generating and channeling funds into these uses. If it is determinable that the opportunity costs for credit are highest in the agricultural sector and such intersectoral differentials persist, then a case can be made for concluding that credit available to the agricultural sector is inadequate relative to the demand for credit.

An additional qualifier is necessary. If the supply of agricultural credit is increased, are complementary programs also initiated or is the institutional structure essentially unchanged? For example, increased production expected to accompany the use of more credit may strain existing transportation and marketing facilities. In subsistence-oriented

areas, these facilities may have to be created in order to provide outlets for increased production. These factors and many more affect the estimated returns on additional credit made available to the agricultural sector. Thus, the attempted optimal distribution of available credit must take into account complementary development processes or the absence of these forces.

Summary. Planning for Rural Credit Institutions

An evaluation of the effectiveness of existing rural credit institutions in facilitating economic growth must also include the interrelationships with existing land tenure and marketing systems. Landlords providing credit to tenants, marketing middlemen providing credit to producers, and merchants providing credit to producer-consumers are also members of rural credit institutions. Land and marketing reforms alter the sources and supply of rural credit. In most less-developed areas, cooperatives, informal credit associations, and rural banks are not important sources of credit for the majority of producer-consumers, as well as nonagriculturalists living in rural areas. Rather, professional and agricultural moneylenders, landlords, traders, and merchants provide most of the credit.

If reform and(or) regulation of rural credit institutions is contemplated, national planners must weigh several factors. While these factors are likely peculiar to particular situations, some general considerations are postulated. They serve to emphasize the complexity and interdependence of proposed reforms. The intent and efficacy of

implementing well-sounding legislation must be juxtaposed with subsequent actions.

Planning objectives

The objectives and planning horizons of national planners condition the appropriateness of alternative credit reform programs. If one objective is to maximize the economic return on credit during a relatively short period of time, credit should likely be distributed to market-oriented producers using such credit for working capital and short-term investments. If the objective is heavily weighed toward improving the economic well-being of subsistence-oriented producers and integrating them more fully into the market economy, emphasis should be given to relatively low-cost, long-term credit for these individuals. While such credit may be necessary for improvement of economic well-being, it is not sufficient if net returns to investment are low or if credit is used primarily for consumptive rather than productive uses. Returns to investment may be low because of the following reasons: (1) Lack of adoptable, technologically-improved inputs; (2) Marketing systems unable to absorb increased marketings without prices falling; (3) Investors having limited managerial capabilities; and (4) Landlords and marketing middlemen appropriating a major proportion of increased output. These qualifications emphasize the need for coordinated agrarian reforms.

Regulation or replacement

The high, although not necessarily exhorbitant, interest rates levied by nonpublic lenders generate movements for regulating their

activities and(or) creating alternative sources of credit. Regulating the terms of credit is difficult and has been largely unsuccessful. Records are often not kept; borrowers are not aware of the real rates of interest they pay. Few borrowers have the means to initiate judicial proceedings.

If private lenders are to be replaced, either by making their operations illegal or establishing public agencies to supplant them, the new sources of credit must be competitive with these private lenders. The appeal of the latter is that loans are secured relatively quickly, usually in the borrower's village, and that stipulations are rarely imposed governing the use of credit. Furthermore, lenders often undertak some of the producer's marketing activities. Unless public agencies ar competitive in their services, private lenders will still be patronized even though their operations may be illegal. Finally, establishing and sustaining public credit agencies require financial and administrative inputs--inputs which have opportunity costs in terms of their alternati uses in developmental processes.

Terms of credit reflective of purpose

Theoretically, the terms of credit, i.e., interest rates and repay ment schedules, guide the allocation and use of available funds. As noted in the preceding discussion, however, several imperfections in credit markets alter their allocative efficiency. These imperfections include the following: (1) The sources of supply and demand tend to b localized with limited mobility of funds within the agricultural sector and among other sectors of the economy. Mobility is inhibited by

insufficient information and by inadequate systems for mobilizing and channeling funds; (2) Potential borrowers often do not have access to existing alternative sources of credit. Tenants are often tied to borrowing from landlords, producers to marketing middlemen, and individuals with debt outstanding to their previous source of credit; and (3) Lenders have several opportunities for adding hidden costs so that nominal interest rates are substantially different from the effective rates paid.

As a standard of efficiency for credit markets, credit should be allocated according to its highest marginal value product adjusted for the corresponding risks. In addition to the imperfections noted above, the fact that credit is often used for consumption rather than production expenditures generating utility rather than marginal value products obscures development of a criterion of efficiency.[1] Further, allocation through time implies a consideration of the term structure of interest rates. Finally, the criterion for market efficiency and the terms of credit extended vary within and between private and public lenders.

[1]The common denominator is utility. Marginal value products must be translated into utility equivalents.

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CHAPTER VI. MARKET SYSTEMS AS A COMPONENT OF SOCIAL OVERHEAD CAPITAL FACILITIES

Social overhead capital facilities are synonymous with the infrastructure of the economy. That is, they represent the constellation of transportation, communication, marketing, education and government facilities which provides the machine for economic activity and the foundation for economic growth.[1] This infrastructure conditions nearly all aspects of economic and social well-being; it functions both as a parameter and as an instrument variable for stimulating developmental processes. At low levels of economic development where economic stagnation tends to be the norm, these components of the infrastructure are essentially parameters in economic processes. True, traders, labor migrants, and extension agents alter somewhat the communication and education mechanisms. However, the impact of these largely-exogenous influences is only realized in a longer-term situation and when other changes in the structure of the economy are effected or evolved to generate a more favorable economic environment.

Poor transportation and communications facilities tend to isolate villages at distances from the actual or potential growth centers of

[1] The infrastructure includes institutions such as land tenure systems, sources of public and private credit, and social and economic systems affecting producers' attitudes and motivations. Since these attributes are abstracted for separate discussion in this study, their interrelationships with the above are only briefly described here.

the economy.[1] A series of subeconomies with few external linkages results. Consequently, the impact of any pressures and incentives generated by developmental processes, such as government policies and changes in market demand, is dissipated with little, if any, effect on producers' activities and economic systems in remote areas. Economic expansion largely confined to growth points in cities and industrial enclaves tends to create a relatively dualistic economic system. The "modern" sector expands through the adoption of modern technology and through private and public investment. Conversely, the "traditional" sector, while subjected to some external influences, continues to employ traditional production techniques; activities are oriented toward meeting local consumption requirements.

Economic dualism need not be detrimental to aggregate growth of the economy. The "modern" sector may be the source of export earnings and capital accumulation, a portion of which is invested in other sectors of the economy. Furthermore, certain "spread effects" may emanate from this sector. The qualifiers are necessary because such "modern" sectors have differential impacts on the economy. Contrast the petroleum industry in the Middle East with plantation systems producing cash crops in

[1]With regard to West Africa, Bauer notes: "Part of the Benue, the principal tributary of the Niger, is open for navigation during two months of the year only, and the annual requirements of the substantial hinterland of the upper Benue have to be transported within that short period. Considerable quantities of export are evacuated by the Benue and if they are not shipped in time, they may have to wait almost another year" (6.5, p. 14). Abbott (6.1, p. 48) cites additional examples applicable to parts of Asia.

parts of Africa and South Asia. Both generate foreign exchange earnings, part of which is transferred to other countries when the export-generating industry is foreign owned. The "spread effects" are different, however. The petroleum industry provides a limited demand for domestic labor. Domestically-produced, crude petroleum needs refining before it can be used locally. Local demand, however, is not likely substantial. Conversely, plantation systems not only generate substantial employment opportunities but introduce workers and producers in the surrounding area to new crops and production skills. Consequently, local producers have opportunities to produce cash crops and to diversify production patterns. The marketing mechanism established by the plantation owners also serves as an outlet for the same crops produced by local peasants. The new sources of output and income give impetus to local trading in both agricultural commodities and other consumer goods. Expansion of trading opportunities, in turn, tends to result in labor specialization and in the attraction or mobilization of additional capital inputs. As long as export markets remain strong and plantation crops are produced at competitive costs, the potential for additional "spread effects" remains favorable.

The lack of diversification in exports renders a country's foreign exchange position vulnerable to fluctuations in export demand and, in turn, export earnings. But foreign exchange is usually a basic component of the means for financing national developmental plans. This uncertainty regarding the stability of exchange earnings complicates the formulation and effective implementation of national plans. Consequently, national

planners have an interest in expanding the export base. Such an orientation tends to reduce the degree of "economic dualism". Other potential advantages of diversification are apparent: (1) Increased integration of various sectors of the economy enhances the effectiveness of government policies in guiding economic activity; (2) New and stronger sectoral interrelationships affect resource mobility and the internal distribution of consumer goods; and (3) From a social and political viewpoint, increased participation in the economy by previously relatively-isolated individuals and communities may be conducive to improving economic well-being and consequent social stability.[1] Diversification and integration require additional capital and administrative inputs.[2] Marketing reforms, public distribution of inputs, and dissemination of information on production techniques and marketing are usual necessary concomitants of public policies to stimulate coordinated growth of the economy.

A generalized discussion of the marketing and transportation systems in less-developed countries follows. Other components such as education and health systems are extremely important, buth they will not be directly considered here.[3] In addition, the structure and stability of the govern-

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[1]As noted in Chapter VII however, the inability to satisfy or realize new expectations and aspirations generated by increased contact with a money economy and public exhortations for harder work, increased saving, and productive investment motivates individuals to adjust aspirations downward or creates the potential for social and political unrest. Neither consequence is desirable.

[2]The delineation of capital and administrative inputs does not imply that administrative inputs are not also capital inputs.

[3]Public programs dealing with extension services, marketing boards, and tax-collecti-- measures are covered in Chapter VIII.

ment system undoubtedly affects investment decisions of indigenous and foreign investors and the receptiveness of individuals and villages to government policies and programs.

Role of the Marketing Mechanism

According to economic theory, the market mechanism performs an important role in guiding economic activity. In both product and factor markets, prices are the links between quantities supplied and demanded which cause markets to be cleared. Through the pricing system, consumers reflect their demand preferences for consumer goods and producers reflect their demand for factors of production, including intermediary goods. Also, producers and resource owners indicate the amounts of goods and factor services, respectively, which they will offer at various prices.[1] Acting in an environment of imperfect knowledge, economic agents must estimate these prices or exchange ratios before making their respective consumption, resource allocation, and factor supply decisions so as to maximize their individual objectives. These are considerations primarily affecting the static efficiency of the market in allocating resources and distributing the final product. As is subsequently discussed, the market mechanism as an instrument variable serves to generate and sustain developmental processes which affect the motivations and objectives of economic agents and the integration of these individuals into a more-fully interdependent economic system. It is in

[1]A theoretical discussion of quantities of agricultural commodities marketed as a function of price and some of the available empirical evidence are included in Chapter VIII.

this sense that the marketing sector may also be a leading sector in promoting economic development.

The nature and scope of the marketing systems vary with stages of economic development and with attendant transportation and communications systems. As already noted, at low stages of economic development, the economy's infrastructure tends to support a collection of essentially self-contained economic or functional areas with few links among these groupings. The individual areas are mostly self-sufficient and as yet largely unaware of exchange opportunities with other areas. The marketing system is largely confined to an exchange economy with only limited purchases of goods not locally produced. As producers rely less on diversification to meet most of their consumption needs and more toward specialization of labor and firm activities, the scope and need for participating in an exchange or money economy continually increase. But the fact that most are not entirely self-sufficient suggests that a wedge for disturbing the low-level equilibrium of these communities exists. This wedge is in the form of the local merchant or itinerant trader who initially supplies a limited range of goods which are not locally produced. He is the producer-consumers' link with the "outside world"; he represents a potential channel for initiating change and altering individuals' values and attitudes toward change. However, the scope of the merchant-trader's activities is also constrained. The relatively low incomes and consequent limited purchases by his customers, both individually and collectively, result in a small retail market. His

constricted retail market, in turn, limits his incentive for increasing the variety and quantity of goods offered. Poor transportation and communications facilities effectively limit the merchant-trader's range of contact and awareness of opportunities for altering traditional practices.

Change is essentially exogenous in nature; that is, exogenous to the majority of individuals affected.[1] For example, foreign investment in a plantation system for producing export crops, railway systems built by the government, creation of cooperatives and marketing boards, and activities of merchants and traders tend to set up pressures and incentives for economic change.[2] While these phenomena are essentially necessary for stimulating economic processes, they are not sufficient. The building of a railroad and the establishment of a marketing board do not result in increased production and marketings if economic incentives, resource productivities, and producers' goals are not conducive to increased production. The railroads, marketing boards, and school systems only provide the means through which economic change can be facilitated.

[1]Population growth and the consequent pressure of population on land forcing or causing labor migration and changes in production technique may be viewed as endogenous. However, the stimulant to population growth, whether through medicine or the impact of favorable weather on production, is still usually of an exogenous nature.

[2]Geertz (6.9), for example, comments on the impact of foreign-owned plantations on production and marketing systems in Indonesia. Kamarck (6.12) and Neumark (6.21) indicate the importance of railroads as a stimulant to production of export crops in Africa. The impact of marketing boards is briefly discussed in Chapter VIII. The significance of merchants and traders in providing credit and generating new wants is documented in this chapter.

Thus, the infrastructure of the economy provides the framework or machine for economic growth which must be juxtaposed with the objectives of producers, consumers, and resource owners and with the incentives and opportunities open to these individuals.

Expenditures on consumer goods affecting quantities marketed

A number of items are normally consumed but not produced within the village or marketing area. Included would be items such as sugar, salt, tobacco, kerosene, and manufactured textiles usually supplied by itinerant traders and local merchants. At very low stages of economic development the quantities of these goods consumed by subsistence-oriented producers can be assumed to be essentially fixed according to traditional consumption patterns.[1] The variety of goods supplied by traders and merchants is assumed to be essentially invariant from one time period to the next so that consumer preferences and consumption decisions do not vary.[2] Let $[\bar{E}]$ be a vector representing the respective quantities of these goods consumed. A corresponding price vector, $[p_E]$, reflects prices charged by the trader or merchant. The quantity of expenditures on consumer goods, E^*, is given in Equation 6.1. In order to make E^*, producers must

[1]Related to this assumption is the following statement by Neumark (6.21): "...the demand for money in a subsistence or embryonic exchange economy is derived from a demand for specific things for which there is a felt need. Once a limited objective has been attained, any further exertion to earn money would be meaningless. Such a demand for money may be called a target demand" (6.21, p. 48).

[2]Even though consumer preferences remain invariant, consumption patterns would vary with factors such as changes in family size, observance of special family events, and family illnesses.

$$E^* = [p_E] \cdot [\bar{E}] \tag{6.1}$$

sell a quantity of goods which has a value equivalent to E^*. For convenience, assume that only one good, q_n, is marketed. Other goods are exchanged according to the mechanics of the exchange economy. Given the prevailing market price for q_n, p_n, Equation 6.3 reflects the amount of q_n that must be marketed.

$$E^* = [p_E] \cdot [\bar{E}] = p_n q_n \tag{6.2}$$

$$q_n = \frac{[p_E]\,[\bar{E}]}{p_n} \tag{6.3}$$

If Equations 6.2 and 6.3 hold for producers at low stages of economic development, a few interesting relationships can be derived. If p_n increases, ceteris paribus, the quantity of q_n which needs to be marketed falls. Conversely, if p_n falls, ceteris paribus, a larger amount of q_n must be marketed. Thus, a perverse relationship between quantities marketed and prices received exists. See Figure 6.1.

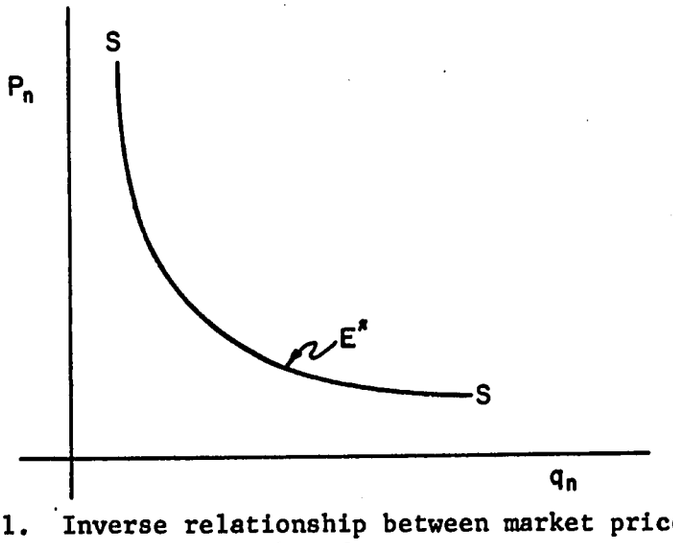

Figure 6.1. Inverse relationship between market price and quantities marketed

Curve SS is a rectangular hyperbola. The elasticity of quantity marketed with respect to price is equal to negative unity at all points on the curve. How realistic is this proposition?[1] Figure 6.2 is useful in giving an intuitive answer to this question.[2]

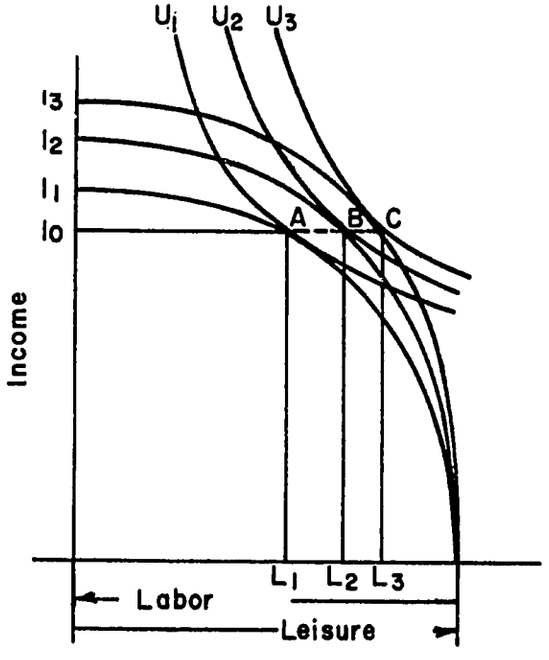

Figure 6.2. Optimum labor-use levels to maintain I_o as income-possibility curves shift upward

[1] A survey of studies focusing on the relationships between market prices and quantities marketed is given in a subsection of Chapter VIII. The derived estimates of the price elasticities of quantities marketed indicate that under certain conditions a perverse market relationship may be operative.

[2] The mechanics of Figures 6.2 and 6.3 are fairly straightforward. The discussion relative to Figures 7.1 and 7.3 is also applicable to the above figures.

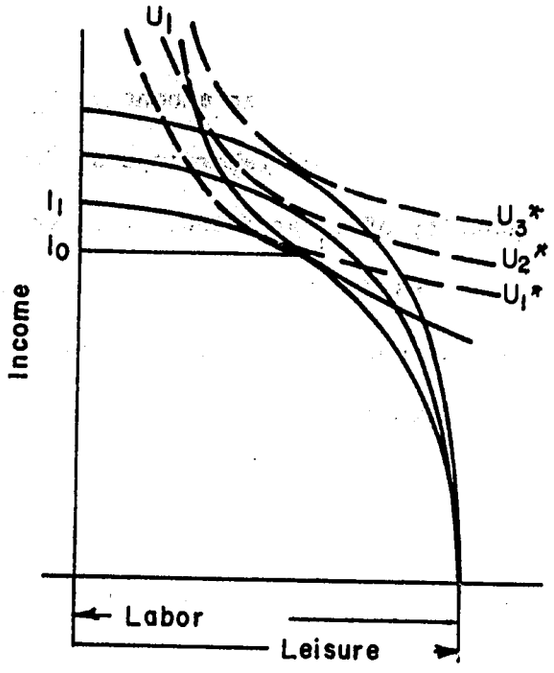

Figure 6.3. Optimum labor-use and income levels are income-possibility curves shift upward and shape and position of utility curves vary

Figure 6.2 represents a situation where the producer's objective is to achieve a fixed, target income denoted as I_o. Assume that I_1 is the income-possibility curve corresponding to the various levels of labor inputs, given the technical coefficients of labor and the values of outputs produced. Utility is maximized at point A when L_1 of labor generates I_o of income. Assume that with I_o, both E^* and $[C]$[1] are satisfied. If p_n increases, ceteris paribus, the entire income-possibility curve shifts upward for all labor-use levels. Since the producer's objective is still to realize I_o, the indifference curves must be drawn in a particular manner so that the points of tangency result in maintaining I_o

With the higher p_n generating income-possibility I_2, point B represents the new point of utility maximization. Since $U_2 > U_1$, a higher level of utility is obtained. With I_o, $[C]$ can still be met as can E^*

[1] $[C]$ is defined as a vector of goods produced and directly consumed.

But according to Equation 6.3, a lesser amount of q_n needs to be produced and(or) marketed. The reduction of labor inputs from L_1 to L_2 results in a reduction in the quantity of q_n produced. Leisure has been substituted for income. If p_n increases again so that I_3 is the relevant income-possibility curve, utility is maximized at point C where L_3 is used to generate I_o. Thus, with successive increases in p_n, ceteris paribus, less labor is employed and less q_n needs to be produced and marketed. Price and quantity marketed move in opposite directions. Similarly, if p_n successively falls resulting in I_3, I_2 and then I_1, increasing amounts of q_n must be marketed. To increase the production and marketing of q_n, more labor inputs must be utilized. If p_n continues to fall so that the point of tangency results in an income less than I_o, then (1) External financing to the extent that actual income plus financing equals I_o must be secured; and(or) (2) Income and consumption must be reduced if. in fact, this is a feasible alternative.

Referring to Equation 6.2 again, if $[p_E]$ increases, ceteris paribus, E^* increases as does the amount of q_n that must be marketed. The terms of trade have been turned against the producer. Utility maximization through consumption requires that Equation 6.4 must be satisfied.

$$\frac{MU_E}{[p_E]} = \frac{MU_{q_1}}{p_1} = \ldots = \frac{MU_{q_n}}{p_n} \qquad (6.4)$$

According to Equation 6.4, as $[p_E]$ increases but $[E]$ is unchanged, MU_n is invariant but the ratio $MU_E / [p_E]$ falls. This disequilibrium persists unless (1) $[\bar{E}]$ is reduced so that MU_E increases; or (2) The

marginal utilities of the q_i ($i = 1, \ldots, n$) are reduced by increasing the consumption levels of each. Alternative (2) is feasible if sufficient amounts of q_n are produced so that E^* can be made and q_n can be traded for the other q_i. This alternative, however, is tantamount to an increase in income demand which is inconsistent with maintaining I_o. The increase in $[p_E]$ must be offset by a reduction in $[E]$ so that total expenditure is unchanged and Equation 6.4 is satisfied. If $[\bar{E}]$ is to be maintained as $[p_E]$ increases, ceteris paribus, an income level higher than I_o is necessary. A higher income which is still consistent with utility maximization is possible if the shape and position of the indifference curves are changed as in Figure 6.3. Similarly, if $[E]$ is increased, ceteris paribus, a larger quantity of income is demanded or needed to meet consumption expenditures. This higher income is possible with a change in the map of indifference curves, as in Figure 6.3.[1]

Merchant-trader-landlord middlemen

In most less-developed areas, marketing middlemen are the most important links in the system that channels agricultural commodities from producers to domestic consumers and exporters. Marketing boards and marketing cooperatives are important outlets for certain crops in certain areas. While these organizations perform middlemen activities, the nature and scope of their operations differ from that of the large number of middlemen operating individually and on a small-scale basis. Despite a relatively high proportion of production consumed directly by

[1]The shape and position of the new indifference curve map condition the effect of upward shifts in the income-possibility curves on the labor-use levels and corresponding income levels which maximize the producer's utility.

small-scale producers, their aggregate marketings constitute a significant part of total marketings by all producers. In the case of non-edible cash crops which are grown by producers having operations of diverse size, a very high percentage of production realized is marketed.

At low stages of economic development, the number of marketing middlemen is generally high. However, their distribution throughout the economy is strongly conditioned by population densities, transportation facilities and costs, and the effectiveness of communications systems in denoting areas of marketable supplies and excess consumer demand. Furthermore, a system of credit advances by wholesalers which filter down to various individuals in the marketing structure affect the location and size of operations of these various middlemen. As the distance from established market areas increases, the number of middlemen at each stage of the marketing process decreases. The producer has progressively fewer alternative marketing outlets.

Numerous roles are actually and potentially performed by the middlemen. In such capacities, middlemen are in positions to both stimulate and inhibit developmental processes. Quite apparently, their impact on these processes is an indication of the need for market reform and the nature of needed reform measures. The roles which are subsequently discussed are generally applicable to most less-developed areas. Again, marketing boards, marketing cooperatives, and compulsory marketings to public agencies also affect marketing structures in many of these areas.

Want creation Since merchants and traders supply those goods consumed but not produced, they represent the vehicles for expanding the quantity and variety of consumer goods available to purchasers. The introduction of new consumer goods, often imported goods, and the creation of new consumer wants have favorably affected producers' behavior as evidenced by higher production levels and increased quantities marketed (6.3, 6.6, 6.19).[1] In Africa where increases in production and marketings have primarily been in nonedible export crops appended to traditional food production patterns, increased exports need not have reduced the domestic supply of food. However, as specialization in production of export crops occurs, producer-consumers obtain increasing amounts of food items in the market. This specialization may reduce domestic supplie of food in the short run, but the increased market demand tends to increas returns to domestic producers and suppliers of food items which, in turn, may stimulate production.

Want creation may have adverse consequences too. New consumer goods may increase the importance of present consumption over future consumption with an adverse impact on saving and private investment in the firm. However, this phenomenon may only be temporary and primarily applicable to consumer goods that can be purchased in small quantities. As goods are

[1]See Figure 7.5 in Chapter VII for a diagrammatical representation of this change in behavior. With regard to the lack of consumer goods, Yudelman writes, "At present in many parts of Central and East Africa the only sources of supply for 'incentive' goods are small trading posts. Most of these carry a narrow and uninspiring range of products. The apparent rewards for effort are restricted to the basic necessities of daily life" (6.24, p. 175).

introduced which require relatively substantial expenditures, the motivation for deferring present consumption may increase. At this point, another factor with longer-term consequences is relevant. This is the credit extended by merchants and moneylenders which borrowers use for obtaining new consumer goods. Higher indebtedness without an improved repayment capacity places the creditor in a stronger bargaining position vis-a-vis the indebted producer. The possible implications for required marketings to the creditor at prices determinable by the latter were discussed in Chapter V.

Credit to producers Producers are often forced or inclined to make the bulk of intended marketings shortly after harvest. The absence of storage facilities and the demand for money to pay rent, taxes, debt obligations, and expenditures for post-harvest social events are the primary reasons for this seasonality of marketing. These expenditures are often made in kind rather than money. In either case, the producer parts with his output. In areas where the more stable flow of income through multiple cropping or diversification of farm enterprises is not available, producers often have to resort to credit for financing consumption and production expenses until the next harvest period arrives. In addition, the need to make unplanned expenditures for unforeseen events often requires that the producer secures external financing. Such credit is provided by middlemen (6.10, 6.15, 6.22, 6.23). Wharton (6.23), for example, notes that producer indebtedness requires that the small-scale rubber producer in Malaya must continue to sell his rubber to the rubber buyer-lender who, in turn, makes regular deductions from his payments to

the producer until the latter's debt is repaid. In some areas the rubber buyer is also a local merchant retailing consumer goods and production inputs to the producer. Indebtedness and purchases on account insure that the buyer-lender has a reliable source of rubber.[1]

Similar situations exist elsewhere where vertical trading relationships are established through the use of credit (6.9, 6.16, 6.17). By providing credit and perhaps price concessions to producers, the middleman becomes the marketing outlet for the indebted producer. At the same time, the middleman often obtains financing from a wholesaler or the next individual in the marketing chain to whom marketing obligations now exist. A similar pattern of credit advancement by moneylender-traders in India exists which effectively forces indebted producers to market their commodities with them (6.10, 6.13). Where assistance is offered by landlords, their tenants are often obligated to use the landlords as market middlemen.

The importance of credit in production and marketing is apparent. Credit advances by market intermediaries satisfy a mutual interdependence. That is, producers require financing for production and consumption expenditures while middlemen-lenders represent local sources of credit and

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[1] Ward (6.22) indicates that a similar middleman-lender system exists among the Chinese rubber producers in Sarawak. She adds that the Melanan producing sago in Sarawak are not as industrious as the Chinese and are inclined to withdraw from work after a certain amount of sago flour has been produced. Consequently, the Chinese middlemen-retailers attempt to keep the Melanan in debt. Under the threat of withdrawing future credit, the middlemen attempt to coerce sago producers into maintaining a more continuous supply of sago flour to them. Further, the debtor-creditor relationship reduces the threat of competition for supplies from other middlemen in the area (6.22, p. 152-3).

marketing outlets. The latter individuals are also able to lessen the uncertainty surrounding continued source of supply from which to procure commodities and sources of demand for those consumer goods retailed. In addition, producers may find the relationship somewhat advantageous in that the uncertainty relative to marketing and credit decisions is reduced. Price and interest cost concessions may be given to clients of long standing. Tenants may be given preferential treatment in the distribution of plots of land for cultivation, in dispensation of personal and business counsel by the landlord, and in work obligations to and wage-labor opportunities provided by the landlord. Conversely, continued indebtedness maintains or increases the superior bargaining position of the lender relative to the borrower.

Collection, aggregation and distribution processes Producers located near marketing and consuming centers often engage in petty trading. That is, they do not rely on the first middleman to start their goods through the marketing channels; they are that first middleman. Producers located at successively farther distances from these centers are confronted with increasing transportation, labor and time costs and decreasing awareness of existing and anticipated market conditions if they are to market their goods themselves. Due to the state of transportation and communications facilities, wholesalers rely upon a hierarchy of middlemen to search out the relatively-small quantities sold by individual producers, grade and bulk these commodities of variable quality, and transport them to collection points (6.5, 6.6, 6.15, 6.22). These operations are costly, in terms of labor and time expended, relative to the value of the commodities involved.

Wholesalers find it economically advantageous not to employ and supervise a staff of employees to complete these labor-intensive operations (6.5). As mentioned previously, the opportunity cost associated with the middlemen's time and labor inputs is often not high. Consequently, each is willing to work for a relatively small absolute return. Collectively, such returns may be substantial in comparison to the prices received by producers and paid by consumers.

Middlemen perform similar operations in the distribution of domestically-produced and imported consumer goods. Due to relatively low per capita incomes and inadequate storage facilities, consumers make their purchases in small quantities at frequent intervals. Under such conditions, retail sales are highly labor-intensive. Consequently, middlemen and small retailers break down the aggregates into small lots and distribute the goods in the amounts demanded by consumers. Again, wholesalers would find these distribution procedures costly if they were to employ salaried workers to carry out these operations.

Communication of information on supply-demand conditions With limited transportation and communications facilities and low literacy rates, exchange of information among middlemen at different stages is a principal means of identifying market conditions. Information is transmitted on the quantities and sources of supply and on demand for both agricultural commodities and consumer goods. These individuals also are in positions to introduce producer-consumers to new crops for which a market exists, to improved production inputs, and to new consumer goods. Con-

versely, the same middlemen transmit information to wholesalers relative to the adoption of new crops and changes in consumer demand.

Entrepreneurship and mobilization of resources Entrepreneurship has important implications for economic development. Entrepreneurs are able to perceive and, subject to capital and social constraints, to exploit or take advantage of economic opportunities as they arise. Similarly, they are more responsive to changing market conditions and to public policies attempting to guide economic activity. Trading and performing other middlemen functions are important means for acquiring knowledge and experience of the workings of the market and of entrepreneurial activities (6.9, 6.15).[1] This is true for both small traders who aspire to expanding their scale of operations and for agricultural producers engaging in some trading activities. Since such trading often takes place in an environment of brisk competition, the economically and socially sagacious trader is rewarded for his efforts. Thus, the acquisition and perfection of entrepreneurial skills are seen as the means to economic survival.

The middleman's role in creating new wants leading to the mobilization and better use of available resources was discussed above. Further, his role in serving as the outlet for producers' marketings has been observed. Without adequate marketing outlets, increased production is

[1] Also see Marris (6.14)

largely consumed locally. Where such outlets exist, the means for channeling agricultural commodities and expenditures for consumer goods to other sectors of the economy exists. Thus, middlemen can serve as both the mobilizers and the redistributors of resources within the economy. Furthermore, middlemen's margins in both their marketing and retail distribution activities represent net transfers from the agricultural sector. Such capital accumulation can potentially be used for productive uses in other areas of the economy, including the marketing sector.

How does this new participant in the system affect the activities of others? First, the range of goods available to consumers is expanded. Second, the merchant-trader often both purchases and later retails to producer-consumers the same type of agricultural commodities for consumption. Third, the merchant-trader often provides credit in kind to producers who have insufficient incomes or inventories to tide them over from one production and harvest cycle to the next. Depending upon the number of competitors, the merchant-trader may have both monopolistic and monopsonistic powers. Where producers are located close to the marketing area, they may engage in direct retailing to consumers in competition with the merchant trader. Yet, because of the services provided by the latter, he is able to establish his own clientele and, in turn, exert influence over his purchasing and retailing activities . The development of improved transportation and communications facilities would tend to lessen these powers as competition among middlemen increases.

Figures 6.4 and 6.5 represent situations where the merchant-trader has both monopolistic and monopsonistic powers. The S curves represent

the supply schedules, i.e., offer curves, of agricultural commodities by producers to the merchant-trader.[1] Because the curves slope upward, the acquisition cost to the merchant-trader, i.e., the marginal expenditure for additional units denoted as ME_s, increases as purchases are expanded.[2] The merchant-trader has the options of selling these agricultural commodities to another trader and at a later date, to some of the same producers who initiated the marketings. In Figure 6.4, the merchant-trader is assumed to market his purchases with a trader or wholesaler at the next level in the marketing structure. Because of a limited number of competitors, imperfect communications systems, and differentiated products, the demand curve faced by the merchant-trader is assumed to have some downward slope. Consequently, marginal revenue is less than average revenue at each quantity demanded, and the marginal revenue curve lies below the demand curve at all points. If the merchant-trader is a profit-maximizer, he will purchase Oq_1 units from producers at price Op_1. To the left of point M in Figure 6.4, the marginal revenue associated with an increment of the good is larger than the marginal cost of acquiring the increment. At point M, marginal revenue is equal to marginal expendi-

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[1] Implicit in the supply schedules is the behavioral assumption that higher prices offered by the merchant elicit increased quantities of goods marketed with him. This assumption is re-examined in Chapter VII.

[2] Total cost = TC = pq and p = f(q). Therefore, $ME_s = \frac{dTC}{dq} = p + \frac{qdp}{dq}$. Because the supply curve, S, slopes upward, $\frac{dp}{dq} > 0$ and $ME_s > p$.

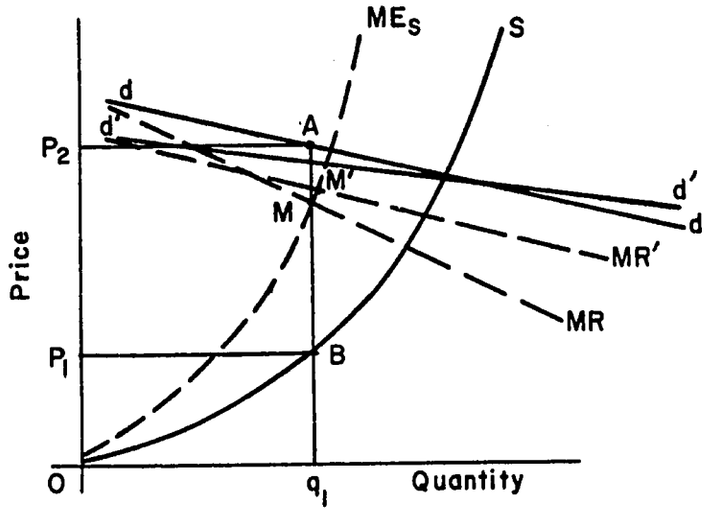

Figure 6.4. Monopolistic and monopsonistic positions of the merchant-trader in wholesale trade

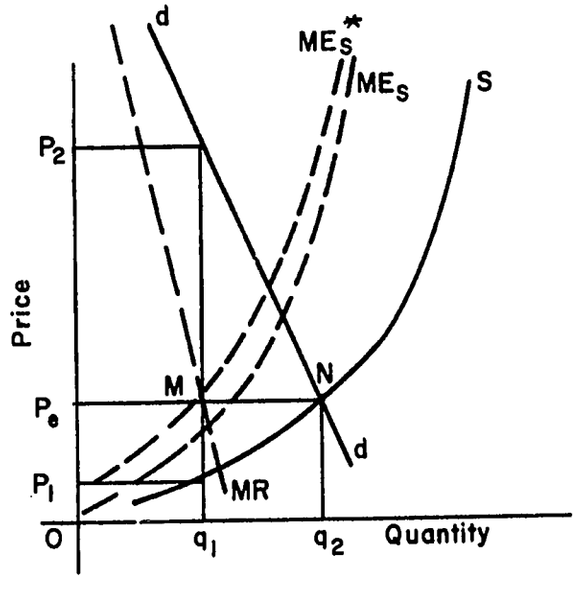

Figure 6.5. Monopolistic and monopsonistic positions of the merchant-trader as a retailer

ture and profit is maximized. In turn, the merchant-trader markets quantity Oq_1 at price Op_2 to another trader. Given the demand and supply schedules as drawn in Figure 6.4, the merchant is able to realize a margin of p_1p_2AB through his buying and selling activities. This margin represents total revenue of Op_2Aq_1 less expenditures of Op_1Bq_1. This margin also represents the merchant-trader's gross capital accumulation. The question then arises as to the disposition of this margin. The available alternatives depend upon the stage of economic development and would include some of the following:

(1) To purchase additional consumer goods thereby expanding both the quantity and variety of goods offered to consumers. The newly-offered consumer goods may motivate some producers to alter their preferences between income and leisure so that more labor inputs are utilized and agricultural output is increased. To the extent that margins are used to purchase imported goods for subsequent retail, capital leakages in the domestic economic system occur. Merchant-traders could also provide traditional and improved production inputs to producers to the extent they are available to the merchant;

(2) To invest in the marketing structure thereby creating links with other marketing areas through vertical ties with suppliers of consumer goods and purchasers of agricultural goods and through horizontal expansion of marketing outlets in other areas. Conceivably, the former increases the flow of goods into and out of the market area with possible reductions in acquisition and unit transportation costs. Horizontal

expansion of marketing facilities increases the number of retail and purchase outlets. The larger market may permit the merchant to realize some cost savings through bulk purchasing from both producers and wholesalers of consumer goods. It does not follow that such cost savings are passed on to others through higher producer prices and lower retail prices;

(3) To invest in areas other than marketing. Investments in land and housing are not directly productive. In fact, purchases of agricultural land further increase the control of the merchant-trader over producers. On the other hand, investment in government certificates increases the flow of government revenue, a part of which can be used for public investment and underwriting the cost of public policies; and

(4) To provide additional credit to producers and consumers. In doing so, the merchant-trader provides an important service. His position as a creditor, however, increases the potential for reducing the bargaining power and range of individual behavior of his clientele.

If additional merchant-traders enter the market to compete with the sales by the individual represented in Figure 6.4, the degree of monopolistic power accruing to the individual under consideration is reduced. The new demand curve faced by him will tend to have less slope than dd in Figure 6.4 and will shift toward the price axis. That is, at each price, the individual merchant-trader can only market a smaller quantity as competitors encroach upon his previously-existing market. Let this modified demand curve be denoted as d'd'. The new point of profit maximization is M'. A larger quantity is purchased from producers at a higher

price. The corresponding margin accruing to the merchant-trader is smaller than previously realized. A redistribution of income has taken place. In the aggregate, producers receive a larger revenue; the individual merchant-trader realizes a smaller marketing margin.

In Figure 6.5, the merchant-trader is represented as an individual who purchases, for example, rice from producers and then resells rice to them at a later date. The merchant retains the monopolistic powers he had in Figure 6.4 but has relatively greater monopolistic powers in Figure 6.5. The greater monopolistic power is implicit in the more steeply-sloping demand curve for the good he retails. The ME_s^* curve incorporates ME_s plus storage costs and any opportunity costs and, therefore, lies to the left of the ME_s curve. The merchant-trader's profits are maximized at point M. He purchases Oq_1 at price Op_1 from the producer. Later, he retails the same quantity but at price Op_2. The producer-consumer is exploited from two sides. If the price received by producers were Op_e corresponding to point N where the demand and supply schedules intersect, producers would not only be able to market a greater quantity at a price higher than Op_1; but, in addition, as consumers they would demand a larger quantity at a much lower price.[1] In fact, the merchant-trader would not be able to generate a capital surplus through his pricing, purchasing and retailing policies. He would only realize his normal profit from the transactions. Producers' revenues amounting

[1]The equilibrium at point N ignores a consideration of the storage costs and any opportunity costs.

to Op_eNq_2 would also equal their expenditures for the quantity Oq_2 of goods demanded at p_e.

Although the numerical scales in Figures 6.4 and 6.5 have not been specified, the market supply curves, the S curves, as drawn suggest that producers have a large number of price-quantity marketed combinations open to them. That is, the quantities marketed by producers are positively correlated with a wide range of prices received. As mentioned earlier, producers bring endowments to the market for exchange with other producers and for sale to the merchant-trader. With a given endowment during a marketing period, the producer has alternative outlets for his products and, in turn, can vary the quantities offered to individual purchasers as the price and exchange values vary. If the producer has storage facilities for relatively nonperishable goods, he has more power over regulating the marketing of his commodities as market conditions change over time. Thus, producers with storage facilities are able, in the aggregate, to influence both the position and shape of the S curve from one production period to the next. Of course, the maximum amount they can market in any period is constrained by endowments or inventory stocks. At this quantity, the S curve becomes vertical; beyond this point, the price elasticity of quantity supplied to the market is perfectly inelastic.

The absence of storage facilities tends to accentuate the variability in market prices. At the end of the harvesting, large quantities of produce are typically marketed. The local market supply curve shifts substantially to the right while the demand curve for agricultural products

would tend to shift to the left. The shift in demand is a consequence of producers now consuming from their own production rather than purchasing food grains in the market. The interaction of these two factors tends to depress market prices in the immediate post-harvest season. See Figure 6.6.[1] During the planting and pre-harvest period, diminishing inventories of agricultural produce cause the local market supply curve to shift to the left, for example, S_{ph}. At the same time, however, other producers who have exhausted their stocks demand greater quantities in the market in order to tide them over to the harvest season. Let this demand be represented by D_{ph}. Consequently, prices are forced upward such as p_{ph} in Figure 6.6. In order to sustain consumption patterns during this period, producers with low incomes and few savings often have to resort to credit financing from a moneylender or credit in kind from the merchant-trader. The debt obligations to the moneylender represent a demand on future income. The merchant-trader also has a claim on future income; but because of his role as a creditor and as a purchaser and retailer of commodities, he is in a strong position to directly influence the economic well-being of the producer. As a creditor, the merchant-trader can effectively force the indebted producer to sell his output and purchase his consumer goods from him at prices which are favorable to the merchant-trader. At times, the merchant-trader is able to purchase the crop prior to harvest at prices which are lower than would prevail in the market at the time of

[1] To simplify the exposition, corresponding ME_s and MR curves are not drawn in Figure 6.6.

harvest. In addition, the producer's reliance on the merchant-trader to provide credit in kind permits the latter to increase prices producers must pay for food and other consumer goods obtained from him. In this situation, the producer does not have the market supply and demand options implicit in Figures 6.3 and 6.4. The prices he receives and pays are determined, or potentially determinable, by means external to the forces of the market.

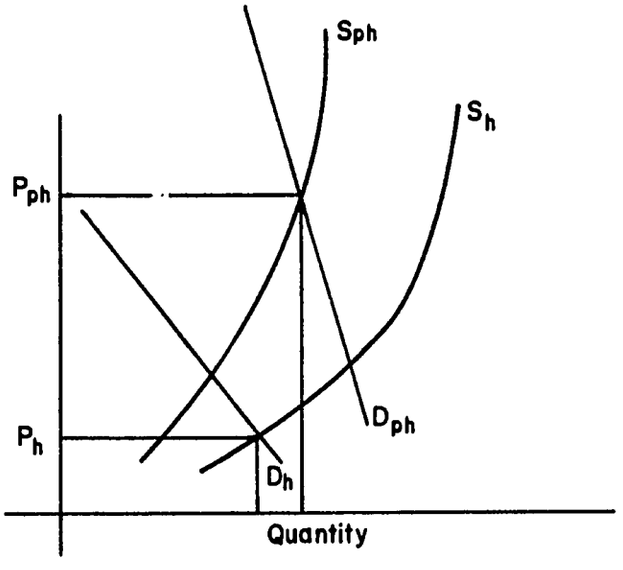

Figure 6.6. Market prices during pre-harvest and harvest periods

Inadequate storage facilities and the demand for money for meeting tax, rent, and interest payments force or induce many producers to market the major proportion of their commodities following harvest. The post-harvest supply curve is designated as S_h in Figure 6.6. As producers

harvest their crops, the market demand curve for these commodities shifts leftward, such as D_h. The direction and magnitude of these two shifts depress market prices in the post-harvest period, for example, p_h in Figure 6.6

Number of middlemen

As distance from marketing and consuming centers increases, the number of local buyers and middlemen generally decreases (6.6, 6.11).[1] This is due to high transportation costs, the relatively small quantities, individually sold by producers, and limited knowledge of local production and market supply conditions. As mentioned previously, differentiation in product quality and marketings in small quantities require substantial inputs of labor in grading, bulking, simple processing, and transporting these commodities prior to sale to the next middleman or wholesaler. In general, the concentration of middlemen is found at the marketing level where buyers have collected the goods from the countryside and have brought these to a middleman for sorting and bulking processes. Where producers are in close proximity to this marketing center, they may bring the com-

[1] In a study of cotton and groundnut marketing in the Indian district of Rajkot in Gujarat State, Jasdanwalla observed that progressively fewer buyers were available at successive distances from the market center (6.11, Table LIV, p. 85). However, only 19.4 percent of those interviewed said they sold to a monopolistic buyer. The rest sold to two or more buyers. In addition, there was not a close association between the producer's size of operations and the number of buyers to which sales were made (6.11, Table LIII, p. 84). Jasdanwalla adds that in India a superior marketing mechanism for cotton and groundnuts exists relative to other agricultural commodities.

modities directly thereby avoiding payment of the buyer's commission. More enterprising producers, together with landlords and merchants, often perform this initial collection and transportation operation.

The large concentration of middlemen at this level is due to few barriers to entry, a relatively low opportunity cost on time and labor expended, and the opportunity to earn income through simple "value-added" processes plus normal trading margins. Since these processing and trading activities are labor-intensive in nature, require limited capital outlays, utilize trading skills which can be fairly readily obtained, and provide a quick turnover of capital or commodity stocks, a large number of traders and producer-traders participate (6.5, 6.8, 6.15, 6.18). Similar attributes partially account for the large number of individuals involved in distributing and retailing consumer goods.

Two additional factors are important. When middlemen operations proceed beyond the scope manageable by an individual or his family, additional administrative skills are required. The relative scarcity of these skills and the uncertainties associated with hiring other individuals tend to motivate or constrain traders to operating on a small-scale basis. In addition, the relative scarcity of both individual savings and financing by public agencies for trading activities limit the scale of individual operations. Where credit is advanced by higher intermediaries, such credit is often provided on the security of personal relationships and to a relatively large number of individuals so as to spread the lender's risk. These factors interact to sustain a system of small-scale traders.

Planning for Public Investment in the Economy's Infrastructure

Public investment in the existing infrastructure is often implemented to generate a complex of pressures and incentives designed to be instrumental in mobilizing domestic resources, attracting foreign capital, and increasing resource productivity. For example, the building of a road to a region previously inaccessible by public transportation may induce settlement of the region and employment of previously-untapped resources. If already populated, transportation facilities offer opportunities for increased access to output, input, and consumer goods markets which have implications for resource mobility and production incentives.[1] In this case, the investment in transportation facilities can be viewed as an instrument variable. A favorable impact on communication and marketing facilities will likely be a secondary result. If education facilities are unchanged, they serve as a parameter in this program to stimulate developmental process.

It is intuitively apparent that given the objectives to be pursued by the government or national policymaker, an optimum government program for investment in social overhead capital facilities exists. The problem is to determine this optimum program subject to constraints such as (1) The limited amount of funds available for investment, (2) The availability

[1] In this connection, Neumark comments, "...it can hardly be overemphasized that lack of transport and related marketing facilities present the most considerable obstacle to the exploitation of the latent opportunities for the development of interregional trade in Africa" (6.21, p. 47).

of administrative resources to construct and implement the program, (3) The necessity to integrate and coordinate this program with other measures undertaken by the government, and (4) The availability of reliable data for planning purposes. Furthermore, considerations of political and social stability must be taken into account.[1] To some extent, these should be reflected in the policymaker's objectives.

Where economies of scale provide an economic rationalization for investment in relatively few but large-scale projects such as fertilizer plants and agronomic research farms, political pressures may effectively force the government to modify economic considerations and construct a series of small-scale operations which are more widely spread throughout the countryside. Also, since international airports, heavy machinery and ostentatious public buildings are viewed as characteristic of relatively-developed countries, nationalistic pressures may motivate governments to invest in these ventures in an attempt to provide visible evidence that the gaps between these two classes of countries are narrowing. Thus, national planners must engage in an assessment of the costs and benefits associated with alternative government investment programs of varying magnitudes and duration of time.

The impact of the infrastructure and modifications through public and private investment on resource use and productivity have already

[1]Relative to India, Bauer notes, "...India is more nearly a collection of peoples and countries than a single nation or country. This diversity bears, inter alia, on the importance of the development of the transport system (an urgent requirement on other grounds as well) to facilitate communication and thus promote the unity of the country" (6.4, p. 14).

been alluded to in the preceding discussion. The "spread effects" emanating from this infrastructure condition a number of phenomena influencing economic activity. Quite apparently, the strength and scope of these "spread effects" vary with the stage of economic development, the existence of complementary programs, and nature of the resource base, including the population component.

The thesis advanced here is that primary responsibility for the creation and operation of an infrastructure generating pressures and incentives facilitating economic progress must be borne by the government, whether central or regional. This responsibility is expensive both in terms of financial and administrative resources.[2] Furthermore, a balance between public and private initiative must be pursued whether national planning is done on a centralized or decentralized basis.

Returns to private investment

Two factors are operative which discourage private investment in the infrastructure of the economy. First, few individuals possess or have

[1]The magnitude, composition, and quality of a country's infrastructure can be improved through appropriate investment in these facilities. Conversely, deterioration with deleterious effects on economic activities can arise through lack of maintenance and public regulation.

[2]Capital requirements are relatively high with high capital/output ratios for building railroads, paved highways, and communications media. However, the construction of roads adequate for animal and bicycle transportation and the construction of bunds and terraces are or can be projects which are relatively labor-intensive in nature. Despite the unpretentiousness of the latter, they nevertheless constitute modifications of the economy's infrastructure resulting in a potentially-positive effect on agricultural productivity.

access to the financial resources necessary to construct a dam and irrigation facilities or to implement an educational system. Second, the inability to capture the costs and benefits of private investment, such as in reclamation and conservation measures, which become externalities to other producers in the area reduce the attractiveness of this type of investment. One exception, already noted, which is essentially unaffected by these two factors is the relative ease with which producers and family members can enter the area of petty marketing. Not only is this form of activity labor-intensive which provides an outlet to labor seasonally or chronically underemployed, but relatively little capital is necessary and the personal skills involved are not demanding and are acquired relatively easily.

As a result of public investment, some producers have improved opportunities for augmenting net returns through a reallocation of resources within the firm and through private investment in the firm. The impact on private investment can be discussed with reference to Figure 6.7.[1]

From a macro-economic viewpoint, the MEC curve for the agricultural sector, i.e., the aggregation of firms within the sector, is dependent upon the existing agricultural infrastructure. Thus, the government

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[1] A discussion of the nature of the curves and the mechanics of making investments to the capital stock in succeeding time periods was presented with reference to Figure 5.2 in Chapter V.

Additions to capital stock are now viewed from the macro-economic viewpoint. Consequently, the supply curve for capital goods, S, slopes upward because of rising costs in producing these goods. The MEI curves slope downward because of the rising costs of capital goods and diminishing physical returns to increments of investment, both tending to reduce net economic returns to investment.

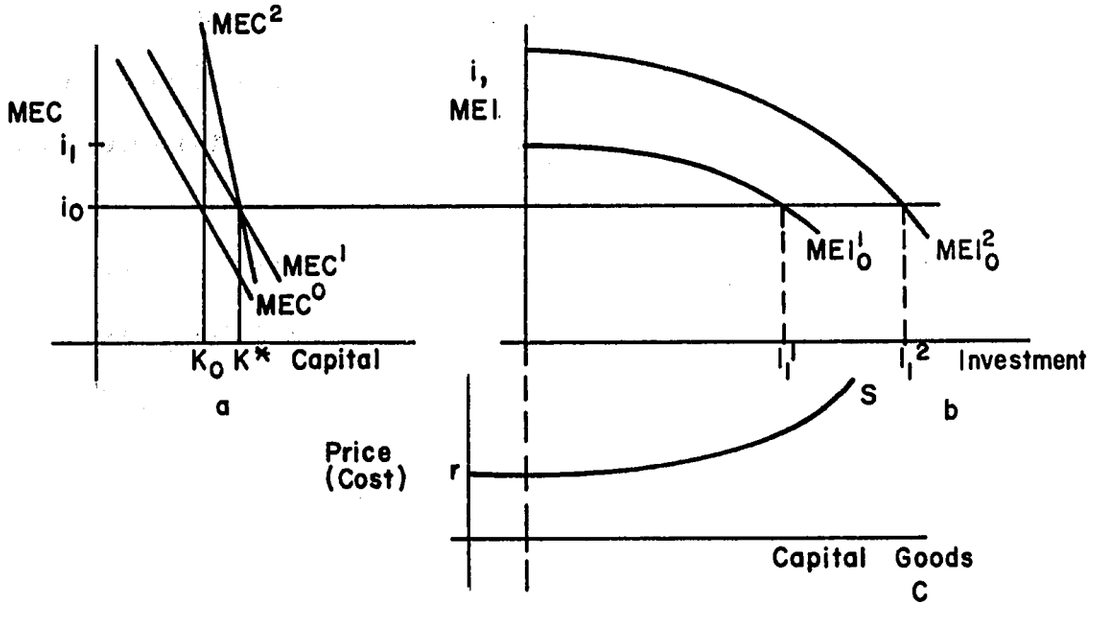

Figure 6.7. Theoretical impact of public investment on the level and rate of private investment

is able to modify the slope and position of the MEC curve through judicious investment programs designed to affect the rate of investment and capital accumulation in the agricultural sector. If MEC^1 results with government investment, ceteris paribus, the rates of investment and capital accumulation are unchanged. However, K^* representing the optimal capital stock has increased. If it is possible to twist the MEC curve

and change its position as with MEC^2, both the rate and absolute amounts of capital accumulation can be varied. If the MEC curve were twisted counter-clockwise, relative to MEC^o and MEC^1, the rate of capital accumulation would be accelerated and, in turn, the length of time necessary to reach K^* would be reduced. Furthermore, government investment in the capital goods industries could affect the shape of supply schedule for capital goods, S. This would alter the corresponding family of MEI curves and the rate at which private investment is undertaken. If S is horizontal up to the capacity constraint, the rate of investment is invariant; if S rises sharply, so does the rate of investment. In Figure 6.7, i_o is also an instrument variable through which the government can affect K^* and the level of investment.[1]

Need for an efficient marketing system

The marketing mechanism potentially performs an important role in stimulating and sustaining developmental processes. It can be viewed as an instrument variable and the leading sector in economic development.[2] At times, however, the marketing system is viewed either as performing a

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[1]The effectiveness of using i_o as an instrument variable by affecting the interest rate or structure of interest rates through monetary policies is dependent upon the degree of monetization of the economy and the strength of the linkages between the central bank or central monetary authority and existing credit institutions throughout the economy, i.e., the development of the monetary system as one component of the overall infrastructure of the economy.

[2]Barber comments, "Where access to markets has permitted the sale of agricultural surpluses, the African has apparently intensified his efforts as a farmer, produced more, and sold a surplus for cash" (6.2, p. 251).

passive role or as essentially adapting in the right direction and proportion as economic change takes place (6.7, 6.20). This is partially an outgrowth of the contention that marketing is unproductive. But as has been noted, the activities of marketing agents create utility of time, form, and space. Where utility has been created, a productive act has taken place.

The need for a marketing system arises when labor specialization is underway so that each producing unit is no longer entirely self-sufficient. In addition, the creation and growth of export markets require development of an indigenous marketing system which can supply export goods on a competitive basis. Now the need for an efficient system comes into focus. The export demand is for particular goods, at designated qualities, and at specified price-quantity relationships. An efficient marketing system would channel this information to potential producers. Even if some producers can produce the export crop at a price which covers their per unit costs, a partial shift of resources to cash crops may not be rational. First, allocating resources to cash crops may mean that producers are unable to produce enough food to meet their own consumption requirements. Thus, if other producers in the marketing area cannot fill this excess demand for food at cost less than or equal to the producer's net income from growing cash crops, the producer will choose to produce food not cash crops. The marketing system must be able to move goods from areas of "surplus" production to "deficit" areas at a cost such that sufficient effective demand in the latter areas is able to absorb these "surpluses". High middlemen

margins and transportation costs attendant to moving these goods, ceteris paribus, reduce effective demand in the "deficit" areas.

Second, if food consumption requirements can be met and additional income can be generated through producing a cash crop, the utility from this additional net income must be greater than the disutility of additional work plus allowance for any risks involved. That is, the amount of utility obtainable through increases in income depends upon the demand for income. Such demand, in turn, is largely a function of desired expenditures for consumer goods. At this point, another aspect of an efficient marketing system is introduced. This aspect is the efficiency with which wholesalers and retailers operate in the distribution of consumer goods, both imported and indigenously-produced. Evidence has been cited earlier of the effect of the availability and variety of consumer goods on producers' activities and, implicitly, their demand for additional income. The costs at which such goods are made available to consumers is obviously important. Obversely, the reliable transmission of consumers preferences to wholesalers and retailers is necessary for the procurement and efficient distribution of these goods.

The importance of low-cost food and agricultural raw materials in sustaining general economic development, the potential market for consumer and producer goods among the masses of rural people if they are able to realize higher per capita real incomes, and the potential flow of resources from the agricultural sector to support other sectors of the economy all suggest the need for an efficient marketing system. Reductions in per unit

transport costs and marketing margins, improved information on inter-regional supply-demand conditions, and the availability of improved production inputs at costs which make them accessible to large numbers of producers all tend to raise returns to producers and keep costs to consumers relatively low. Higher monetary returns to producers, ceteris paribus, increase their purchasing power for consumer and producer goods. Lower food costs tend to increase the real income of consumers. Given a relatively high income elasticity of demand for food in most less-developed areas, higher real incomes also increase the demand for agricultural commodities. Reduction in transport and marketing costs also improve the competitive position of agricultural commodities in the export market. Competiveness is extremely crucial here because of the importance of generating foreign exchange earnings for procuring capital and consumer goods for domestic consumption.

To maximize individuals' objectives, the market mechanism must reliably transmit consumers' and resource owners' preferences and producers' demand for production resources. Inaccurate transmission of consumers' preferences distorts resource allocation decisions for both agricultural producers and manufacturers. The efficient operation of resource or factor markets improves the possibility of resources moving to their best uses. This is essential for coordinating the growth of the economy. An efficient market system also facilitates longer-term planning on the part of all participants in the economy, including national planners.

Market reform alters the distribution of income in the economy. The

distribution of income, in turn, affects levels of saving and the effective demand for both producer and consumer goods. Consequently, both capital accumulation and the strength of internal markets are affected.

Since the marketing middlemen are often considered to be unproductive even though earning a return, their elimination is considered essential and desirable. Yet, their incomes represent forms of capital accumulation. From the standpoint of overall economic development, the question arises as to whether this capital, in the form of the middlemen margin, is used more effectively by marketing middlemen or by producers who realize higher incomes as marketing costs decline. The answer depends upon the effect on incentives and individuals' objectives. As has been noted, however, in many areas middlemen in the first stage of the marketing process are also agricultural producers realizing supplemental incomes. If marketing middlemen are to be reduced through reform measures, provision must be made for absorbing the services they provided. For example, in their role of providing credit to producers, their elimination requires that producers be able to secure credit elsewhere. Their role of transmitting market information must be assumed by government extension personnel and improved communications media. Their role of bulking, grading, and transporting the initially small quantities marketed must be assumed by other personnel or machines. The absorption of services provided by the middlemen is not without economic and social cost to the society in question. The monetary costs of reform are evident. The displacement of a large number of middlemen who, at least initially, cannot secure alternative employment

also involves social and perhaps political costs. These costs must be weighed against the potentially higher unit returns to producers and lower costs to consumers.

The problem facing the government is the ubiquitous one: the allocation of scarce resources to maximize planned objectives. Each use of these resources has an opportunity cost. The payoff to investment in social overhead capital facilities is enhanced by complementary programs such as tenure and rural credit reforms and public price and tax policies.

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CHAPTER VII. VALUES, ATTITUDES AND OBJECTIVES OF AGRICULTURALISTS AS PRODUCERS AND CONSUMERS[1]

In the preceding chapters, the nature and role of the infrastructure affecting the operation of the economy were discussed. Within this framework, decisions affecting production, investment and consumption are conditioned by economic indicators such as relative price relationships and by social or noneconomic factors such as values and attitudes affecting producers' and consumers' objectives. The introduction of this dichotomization of economic and noneconomic factors is for purposes of convenience rather than for a depicting reality. Where producers are primarily subsistence-oriented with limited participation in the money or exchange economy, the "prices" affecting resource allocation and production patterns are more indicative of attitudes toward consumption requirements. That is, the "prices" are implicit consumer valuations rather than the usual interpretation of prices as representing the values which equate market supply and demand. Another simple, but important, example will help to demonstrate the ambiguity of this dichotomization. Producers often resort to credit for financing production and consumption expenditures. The economic variable in this business transaction is the interest rate. However, the real interest rate is often a combination of the monetary rate plus an additional

[1] It is arguable that a discussion of these personal attributes is not within the sphere of most economists' professional competence. Inclusion of this chapter in the study does not imply expertise on the part of the writer. Rather, a limited survey of some of these factors offers additional insights into the human component of developmental processes.

cost to the borrower where the latter cost is a function of the relationship between borrower and lender. Because of his indebtedness to a merchant, trader or landlord, who may also be a relative--both an economic and social relationship--the borrower is effectively forced to continue purchases from the merchant at inflated prices, to sell to the trader in advance of the harvest season at a price much below the price at harvest, or to provide labor inputs and other services to the landlord. Conversely, relatives and preferred customers may be given price concessions and favorable terms for repayment. The point to be made is that the personal relationships between the two parties and their relative bargaining positions influence the terms under which credit is obtained. Furthermore, borrowers often have a preference for obtaining funds from local moneylenders even though such sources levy comparatively high costs. Where borrowers have access to government banks and cooperatives which ostensibly provide funds at a lower cost but yet patronize moneylenders, borrowers may be viewed as being parochial and economically irrational. But the appeal of moneylenders is that they provide funds with no paperwork involved, on short notice, and usually without stipulations as to use by the borrower. Also, because of current indebtedness the borrower may be constrained to secure additional financing from his current creditor. Cooperatives often do not lend for consumption purposes. Banks are often located at a distance which in terms of transportation, lodging, and time raise the effective interest rate even if the prospective borrower has the necessary collateral which banks usually require.

A good deal of nonspecificity is associated with the context in which noneconomic variables are used. Given the heterogeneity of man's composition and his activities, the definition of the context in which such variables is used must necessarily be general in nature. For example, a value may be viewed as a standard of what is desirable against which anticipated or actual outcomes can be evaluated. Thus, values connote what is desirable, and since they do not change quickly, the value structure represents a stabilizing force in social and economic systems, particularly when economic systems are at low stages of development. But since values both affect and are affected by the economic variables, the value structure of a society is modified as the developmental processes gain momentum.

Attitudes are defined here as the individual's outlook or subjective estimation, whether rational or irrational, of his capacity to control or influence the forces which interact to affect his economic and social well-being, i.e., the realization of his value structure. In a sense, attitudes represent the dynamic component of the value structure which induces differential changes in values over time. For example, a producer may positively value raising his family's consumption levels through increased production. If, however, he perceives his role in shaping the production process as being purely passive, i.e., his attitude is that his well-being is exogenously determined by some supernatural force, his likelihood of raising production and consumption levels is diminished. Furthermore, he does not understand how if in fact he can break out of this essentially low-level equilibrium which

tends to persist over time. His objective, in this example, would be something of the nature of attempting to appease and gain favorable stature with this supernatural force so that he will eventually be rewarded. Thus, objectives will be used in the context of representing summary statements of producers' values and attitudes which interact to determine his goals during the planning period. These goals will be stated in terms of constrained maximization problems where the constraints are the means available to the producer, his attitudes toward these means, and also some components of the value structure. Thus, the goals will be values or proxies for values and will also be constrained by other values.

To gain insights in to the nature of these noneconomic variables, what Spengler (7.49) terms the "content of men's minds", a selected number is examined below. The categorizations are not distinct nor are they independent of one another. The principal focus here is how these phenomena are influenced by existing conditions and how they act, qualitatively, as "friction points" in retarding or facilitating economic development. But, changes in economic indicators are not synonymous with changes in social well-being. Change rarely has a positive-sum outcome so that everyone is better off, relatively or absolutely.

Religion

The emphasis in the recent past given to the role of the Weberian "Protestant Ethic" as a positive force stimulating the economic development of parts of Western Europe and of North America suggests that

proselytization of non-Protestants in less-developed areas may be one of the keys unlocking economic development. Certainly, the personal attributes of thrift, hard work, and productive investment would be conducive to accelerating developmental processes, but they are by no means sufficient. Where producers have few resources, which they are currently using efficiently, but able to generate only a small "surplus", if any, and where few opportunities for productive investment exist, even if the capacity for investing is available, thrift and hard work can do little to raise the producer's level of living. Focusing on the producer's enterprise or indolence obscures the likelihood that some of his personal attributes are derived from the environment in which he operates. Apparent leisure and unproductive expenditures may be the consequence of a stagnant economic system which provides few rewards to additional labor and capital inputs. Furthermore, the physical capacity for work may be low. Where such conditions exist, religious beliefs and practices have little impact on economic well-being. Only when developmental processes are set in motion, for an individual or groups of individuals, does the facilitating or inhibiting nature of religious beliefs assume importance.

Of the noneconomic variables to be considered, religious beliefs and practices are likely the most resistant to change. Where they are inimical to economic and social change, additional obstacles to development exist. In Asian Drama, Myrdal writes:

> ". . . religion usually acts as a tremendous force for social inertia. The writer (Myrdal) knows of no instance in present-day South Asia where religion has induced social

> change. Least of all does it foster realization of the modernization ideals--though, of course, appeals to religion on the 'higher' level can be used for, as well as against, those ideals, while cruder religious conceptions can be exploited to incite people to resistance or to demonstrations, riots and lynchings. . . . But the religiously sanctioned beliefs and valuations not only act as obstacles among the people to getting the plan accepted and effectuated but also as inhibitions in the planners themselves insofar as they share them, or are afraid to counteract them" (7.38, pp. 103-4).

Quoting Myrdal once more:

> "In particular, social and economic stratification is accorded the sanction of religion . . . in general the inherited stratification implies low social and spatial mobility, little free competition in its wider sense, and great inequalities. This system of social relations is a product of history and is strongly supported by custom in traditional society; religious beliefs and valuations furnish the emotional support" (7.38, p. 104).[1]

He adds, however, that the major world religions are not necessarily adverse to economic change and developmental processes. They are subject to varied interpretations with such interpretations often adduced to project and support particular points of view and programs of action.

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[1] Myrdal's statement is similar to the view expressed by Max Weber in his book, The Religion of India, as interpreted by Morris (7.36). In attempting to account for the lack of economic development in India and China relative to Western Europe, even though "capitalism and capitalistic enterprises" existed all through history in the former, Weber emphasized the spread of Hinduism as a force creating and sustaining the caste system. The attendant social and economic rigidities were the principal forces that precluded the evolution of a "capitalistic" system and the corresponding high rates of economic growth.

Srinivas in Goheen, et al. (7.20) comments that, "It is not unlikely that the failure of Indians to improve their material conditions lay in the social and political institutions of the country. The institution of caste tended to confine the loyalties of individuals to a group which become progressively smaller owing to the marked tendency to fisson in the caste system" (7.20, p. 5). This phenomenon, in itself, would tend to dampen aspirational levels and the socially acceptable range of alternative economic activities.

They are also amenable to diverse economic systems. Excepting Hinduism, they have a common thread of egalitarianism which provides a potential justification for economic and social reforms.

Traditional African religion, if such an all-inclusive categorization can be made, is varied and exhibits a general capacity to accommodate other religions such as Christianity and Islam as well as the secular changes resulting from economic growth (7.23, 7.25). Traditional beliefs such as the power of magic, the role of spirits in influencing the physical environment, and the intertwining of ancestral spirits and land tenure systems, are not necessarily abandoned in this acculturation process. Rather, they tend to be temporarily suppressed or partially modified so as not to provide major obstacles to change, particularly economic change. In this respect, Fallers comments:

> "Whatever features of traditional African life may stand in the way of more rapid economic development, an absorbing interest in achieving states of inner spiritual perfection is not among them. On the contrary, Africans seem to have, on a whole, a very utilitarian, matter-of-fact view of goods and services. . . . There is no evidence that in traditional Africa, economic concerns were rejected as spiritually unworthy. Far from viewing the biological man and his wants as base and unworthy of concern, there is a certain tendency for traditional African religions to make the health, fertility and prosperity of the living individual and the living community matters of central importance" (7.16, p. 115).

Of course, this favorable attitude toward physical well-being does not imply that production and exchange are the principal objectives of human activities. Rather, production and exchange are responsive to economic conditions and must take place within a social framework.

The control and use of land among Africans is affected by the

recognition of ancestral rights to land. In addition to a personal attachment to land,[1] in some areas the "rights" obtained through inheritance forbid the sale or pledging of land. Even those who leave or abandon the land or transfer it generally retain some right or claim to this land (7.11). Consequently, the ability to secure clear titles to land through individual transfer, land reform programs and government resettlement programs is doubtful (7.5, 7.10). Under these circumstances, the incentives for land transfer, population mobility and private investment in land are not favorable.

The importance accorded magic and the various spirits affects the conception and execution of individuals' decision-making processes. Where one's understanding of nature and production processes is found in the interaction of various spirits, producers believe they have little control over their environment. To ensure good crops and health, sacrifices must be made to the appropriate spirits. Not only can such sacrifices be expensive and time-consuming, in terms of opportunity costs, but such an attitudinal structure is not in itself favorable to individual economic planning and adoption of new production techniques. This does not imply that producers are unresponsive to favorable opportunities, but it does suggest a time lag in the adoption of new

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[1] Included would be such factors as the importance attached to first occupancy through ancestral rights, often involving mythical relationships with the soil; the desire to attract one's relatives to the land; the economic return from land; and prestige associated with rights to land (7.11).

practices. If the desirability of practices is demonstrated in a convincing manner and producers have the means to adopt, the time lag may be extremely short.[1] The tendency to interpret nature in terms of spirits is reduced or suppressed as natural science curricula are introduced and expanded in educational systems.

Magic can serve other purposes. Magic may be the most effective means of social control in traditional areas. It can be used by both individuals in authority and by other members of the community to punish those who deviate from the customary ways of life in the community.[2] Schneider, in his study of the Pakot of western Kenya, writes that, "Because magic is accepted as a stern reality, deviation is rare and undoubtedly carefully considered" (7.47, p. 159). However, the threat of being subjected to magic also induces those in authority to conform to accepted community behavior so that their relationship to the community is that of serving rather than innovating or commanding.

[1]Hammond (7.23) provides some interesting insights into the cultural adjustments of the Mossi at the Niger Irrigation Project. He indicates that " . . . they fail to find the institutions upon which they have always depended for security; they find instead a natural environment governed by forces they do not know. Their water supply is no longer dependent upon the supernatural controls of the earth custodians but comes from a dam built by Europeans" (7.23, p. 252). Necessary production inputs and supervision by European agronomists were provided and the Mossi adapted themselves relatively rapidly and easily. The new source of water did not induce the Mossi to alter their traditional beliefs in spirits. Rather, they took the view that " . . . the forces of the natural order are different in their new habitat and accordingly must be controlled in a different way. Finding the indigenous inhabitants . . . to be zealous Moslems, the Mossi settlers have accepted Islam as the religion of their new country . . . new arrivals rapidly embrace Islam as the system by which the supernatural forces governing their new environment can be manipulated" (7.23, p. 253).

[2]Magic and witchcraft are used for similar purposes in some Latin American villages. See Wolf (7.52) and Nash (7.40).

Civil-religious hierarchy in Latin America

In some Latin American communities, a socio-economic structure termed a "corporate" peasant community is found.[1] Within this community, a civil-religious hierarchial structure is found which operates the public life of the community in both religious and secular aspects. The system imposes obligations of wealth and time on the male members but rewards them with power and prestige within the community (7.40, 7.52). Wolf (7.52) states that the achievement of power is a matter of community decision rather than through the efforts of the individual. This is because prestige within the community is largely a function of upward movement within their hierarchy along a prescribed ladder of achievement. Since the positions are without pay, expensive in terms of expected obligations, and do not permit the holder to engage in any other remunerative activities, accumulated wealth is rapidly dissipated within this system. Such accumulated wealth, largely in terms of livestock and land, cannot be hidden from other members of the community. Where individuals are reluctant to undertake these positions, they are punished or are forced to leave the community. In either case, deviant behavior is discouraged and the social structure remains essentially intact.

The financial obligations attendant with these hierarchial positions reduce any income inequalities that are generated within the community; and, in turn, lessen the likelihood of any internal dissention which would threaten the continued existence of the community

[1] Wolf (7.52) describes the "corporate" community as comprised of peasants mostly subsistence-oriented but with some market exchange. The social system, however, is bounded and with well-defined sets of rights and duties which prescribe and sustain traditional behavior.

While it would appear that this socially-enforced redistribution of wealth would discourage the incentive to accumulate such wealth, Nash states that " . . . the richer people vie for public recognition and as measures of their piety, for the opportunity to expend funds in the upkeep of a given saint for a year, with attendant festivals" (7.40, p. 293). The wealthier members assume office more frequently than the poorer members of the community.

Extended Family

The impact of the extended or joint family on economic development has been given much speculation. The extended family is characterized by various degrees of comprehensiveness. In general, however, it represents a suppression of individual goals in favor of family goals. Personal gains are expected to be shared with other members of the family and vice versa. The most frequent criticism made of the extended family is that it stifles individual initiative to assume risks, to work hard, and to adopt innovations--attributes which are considered necessary for generating a class of entrepreneurs which will capitalize on the pressures and incentives growing out of the developmental processes. Hoselitz (7.29) cautions, however, that such a pessimistic role of the extended family is " . . . based upon the assumption of a basically, individualistic society, such as is said to prevail in the West" (7.29, p. 112). Hoselitz further adds:

> "If we consider, on the other hand, that the traditional norms under which many persons in underdeveloped countries have come to regard their demands upon, and their

> duties toward, their extended families, we may perhaps understand that because of the prevalence of traditional norms different from those of the West, membership in an extended family may not be an impediment to the development of entrepreneurship or the willingness to work hard" (7.29, p. 112).

As will subsequently be indicated, the extended family system has both advantages and disadvantages. Thus, its impact on economic development[1] can only be assessed by examining, where possible, the operation of the system in particular situations. In addition, the extended family, like other social institutions, undergoes changes.[2] A growing pressure of population on the family land holdings and the attraction of employment opportunities elsewhere act to modify the extended family system so as to be more compatible with evolving economic conditions.

In its most extreme form, members of the extended family pool all of their resources for common use by members subject to the judgment of the family patriarch. Individual business enterprise is replaced by members cooperating for a collective goal (7.21). In addition to considerations of mutual concern for collective survival, particularly when living near the subsistence level and when annual production is

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[1] Bauer's (7.6) position is that the joint family system has beneficial economic and social consequences where the economy is at the subsistence or near-subsistence stage. Beyond this stage, however, the joint family system generally restrains economic growth.

[2] Comhaire comments that " . . . those tribal communities far from being stagnant, were living organisms long before the advent of Europeans . . . it is important to keep such a situation in mind, because institutions already tested that way should not be expected to give way without a fight under pressure of Western-inspired change" (7.14, p. 46).

variable,[1] the pooling of resources and an acceptable governing arrangement can result in certain economies of size.[2] Conceivably, the tendency toward land fragmentation is reduced, the combined assets offer a better collateral position for obtaining credit financing, and labor sharing at planting and harvesting permit a greater amount of land to be cultivated than the sum of holdings individually manageable.

In False Start in Africa, Dumont (7.15) is critical of the role of the extended family. He writes that, "By giving the greatest economic power to the heads of extended families, African society is confiding the levers of progress to the oldest people, often least receptive to modern techniques" (7.15, p. 134). Adoption of nontraditional techniques usually requires perception, innovative capacities, and the willingness to assume the risks associated with change. Dumont asserts that the family heads, usually the eldest member in the family, generally do not have these attributes.

A less-confining form of the extended family is perhaps the most prevalent form. Resources are not pooled for collective use. Rather, individual members retain ownership but share an affinity and social

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[1] Lewis (7.33) in his study of Tepoztlan in Mexico writes, "Families in Tepoztlan are strong and cohesive, held together by traditional bonds of loyalty, common economic strivings, mutual dependence, the prospect of inheritance, and, finally, the absence of any other social group to which the individual can turn. Cooperation within the immediate family is essential, for without a family the individual stands unprotected and isolated, a prey to every form of aggression, exploitation, and humiliation known in Tepoztlan" (7.33, p. 54).

[2] Belshaw's study of kin groups in Southeastern Papua provides some examples of cooperation to obtain certain economies (7.8, pp. 56-7).

responsibility for the well-being of the less-fortunate members of the family. Criticisms of this familial arrangement seem to be based on the assumption that members receiving a transfer of wealth, ignoring for the moment the fact that assistance can be in the form of labor assistance and lending of draft animals, are "free loaders" who represent a continual threat to the ability of the more ambitious to improve their economic position.[1] If this is the case, the criticisms seem totally valid, at least from an economic viewpoint. If, however, such financial assistance is more the form of a loan and is used productively by the recipient, these internal transfers represent a means of improving both individual and group economic positions.[2] Not only do individuals provide assistance, they may themselves receive similar assistance at a later date. Also, attempts to improve the economic viability of the less fortunate is a means by which the same individuals will make fewer claims on the wealth of others in the future.

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[1] Miracle (7.34) and, to a lesser extent, Bauer (7.7) and Herskovits (7.24) are of this opinion.

[2] Berna (7.9) in a study of entrepreneurship in South India cites the financial assistance of family members and relatives that was provided to permit individuals to undertake business enterprises. However, he does not indicate that these individuals were members of an extended family system.

In a similar vein Bauer cites the following positive aspect of the extended family system in Africa: "It often results in the pooling of family resources for such purposes as the education of promising children and setting up a family member in a trade or profession. In such circumstances it amounts to a circulation of capital within the family" (7.7, p. 8).

Also see comments by Ames (7.2), Belshaw (7.8), Comhaire (7.14) Lewis (7.33), and Ottenberg (7.42).

Miracle (7.34) emphasizes the negative aspects of the extended family, particularly as it affects capital accumulation. He states that regardless of how or by whom savings are accumulated, they are rapidly dissipated by meeting the demand and needs of kinsmen usually residing in nearby areas. Farmers must be skilled in concealing savings, must make highly liquid local investments, or must invest in livestock or buildings in an area distant to where he resides. As a result, the incentive for local, productive investment is reduced.[1] Secondary effects also exist. Miracle states that housewives buy nondurables in extremely-small quantities so as not to give the appearance of having wealth in the form of visible stocks of these commodities.[2] Such retailing practices would appear to be of a relatively high-cost nature. In addition, individuals are reluctant to utilize deposit accounts in banks because of the fear that through bribery or word-of-mouth relatives will become aware of such savings. These factors interact to increase the problems of the accumulation and most productive uses of capital. Thus, the African in transition from a communal structure to an essentially free enterprise economy often has to accommodate the socially-

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[1] In this connection, Bauer notes, "The fear of the obligations of the family system is partly responsible for the widespread use of textiles and trinkets as outlets for savings, in preference to more productive forms of investment which are more likely to attract the attention of relatives" (7.7, p. 8).

[2] For example, single cubes of sugar, half cups of cooking oil, single matches are purchased (7.34, p. 221).

sanctioned claims and needs of his family members.

Even when the individual enters occupations other than farming, he often does not escape his family obligations. If he becomes a shopkeeper, his ability to remain in business and his incentives to continue in this more competitive environment have to be affected by the social claim by relatives to take what they need from his shop (7.24). Similar problems are encountered by those providing professional services. Politicians, too, are not immune from discharging their social obligations; the logical consequence is the encouragement of nepotism (7.14, 7.24).

In summary, communal structures and extended family systems can have both positive and negative impacts on developmental processes. Such structures maintain and reinforce the relationships among members. In a hypothetically ideal sense, they provide an existing economic and social infrastructure onto which modernization components can be grafted, assuming such modifications are economically and socially feasible and available to the members. The competitiveness, inclination towards diversification, and the smaller scales of operation associated with private ownership are avoided. Lower per unit production costs and greater flexibility to accommodate changing market conditions may also result. Finally, the extended family system represents a potential foundation on which cooperative enterprises in marketing, credit, and retailing consumer goods can be built.

Other Values and Attitudes Influencing Individuals' Objectives

At early stages of economic development, values and attitudes are largely derivable from and sustained by religious beliefs. In their religions, individuals find guidance for their behavior toward other individuals and toward the secular world. Religion and tradition interact to exert varying degrees of social control over individual goals as translated into behavior patterns. Deviants are subjected to social pressure and to the displeasure of religious and magical spirits which are summoned to punish individuals or to purge them of the forces causing their nontraditional behavior.

Values and attitudes have other origins. They are often conditioned by individual experiences associated with nature and attempts to increase their control over nature. Interspatial contact through trading practices, intermittent employment away from the village, and military and local government responsibilities increase individual awareness of alternative forms of life and of the means potentially available to affect his own well-being. In addition, contact with other cultures through colonialism, warfare, and missionaries alters the structure of values and attitudes, or at least partially suppresses these phenomena.

Values evolve through time. In a sense, they represent man's accommodation with his environment. They are also instrumental in shaping his environment. Thus, values are not quickly discarded or replaced; but they do change as man's environment changes. Such is the nature of the pressures and incentives generated by economic development and by increased contact with other economic and social groups

within and external to the economy. From the standpoint of national planning, the problem is to determine the nature and strength of such values and attitudes, the substitution ratios among them, and the means whereby such social factors have a basis for facilitating the realization of national goals. But are the values and goals of the national planners consistent with or reflective of those characterizing the people for whom the plans are being devised and implemented?

The previous discussion on religion and familism bore out the contention that their influence on individual behavior need not be inimical to economic change. On the other hand, they do contain features which, if strongly stressed, could inhibit individuals' aspirations and their attitudes toward developmental processes. As change occurs, individuals are likely to find a justification in their religion for the roles they assume rather than regard religion as defining their role in the social and economic structure of society.

What values exist among agricultural producers in less-developed areas? At low stages of economic development where producers are essentially subsistence-oriented the emphasis is on security, i.e., acting so as to ensure survival of the family (7.21, 7.38, 7.43). Security is not only the value but the objective of these individuals

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[1] As indicated earlier, the extended family and village cooperation are means whereby communal survival is enhanced (7.21, 7.33). Jacoby (7.30) also makes this point but adds that such mutual dependence is a potential basis for establishing cooperatives: " . . . the time-honoured institution of mutual aid, which still today is a vital factor in the life of the peasant and time and again has helped him to overcome the frequently recurring periods of emergency. The decisive effort, therefore, should be concentrated on making him realize that his everyday life is a permanent state of emergency and thus transforming the mutual aid concept into an understanding of the benefits of cooperative activities. When first this basic change in mentality has been achieved and the cooperative ideology established the generally overestimated difficulties in introducing technical 'know-how' will be overcome relatively fast" (7.30, p. 32).

Planning horizons are largely confined to production cycles. Low levels of production relative to consumption requirements leave little "surplus" for saving or investment. The emphasis is on maintenance rather than expansion of capital stock. A small "surplus", if any, is generally not the consequence of inefficient use of available resources but rather the small quantity and low productivity of traditional resources. Over time, the stress on survival has contributed to the evolution of the most efficient production practices, given the resource configuration of the producer. Family labor is often underemployed during much of the year. This does not necessarily reflect a high value placed on leisure but rather an absence of diversification of farm enterprises and the lack of necessary complementary inputs. Furthermore, because of inadequate diets and poor physical health, laborers may have less ability to work over time. Despite the relatively-low levels of living, a high value is placed on the proper observance of marriage and funeral ceremonies, fiestas, and religious observances. Social pressure is so strong that producers incur debt in order to meet these social obligations.

How does the producer view his situation? If he does not understand the nature of the environment in which he operates but relies primarily on traditional interpretations to guide his motivations and behavior, he has difficulty in perceiving ways to influence his economic well-being.[1] Although he experiences the influence of natural forces

[1] In a study of eighty farm operat tta, Bose (7.12) attempted to determine the relationshi ucers' personal attributes and their behavior toward the adoption of improved agricultural practices. He found a statistically significant positive

on his farming operations and on his family's health, he does not view the causal relationships in terms consistent with scientific explanations but rather in terms of supernatural phenomena (7.6, 7.21, 7.24, 7.43). The continued observance of traditional behavior obviates the need for individual thought and innovative decision making, the latter both tending to create anxiety and uncertainty.[2] Such traditional guidance is provided by the village elders and tribal chiefs, guidance which usually tends to be conservative in nature (7.15, 7.43).

Even if favorable weather enables the producer to generate a "surplus" in excess of customary consumption levels, the net returns from investment in additional traditional inputs may be so low as to discourage investment (7.44, 7.48). Furthermore, increasing consumption levels would likely have highest priority. Where nontraditional inputs are available and their productivity demonstrated elsewhere, the producer may consider such inputs as too risky for his own operations. The

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[1](continued). correlation between the adoption of improved practices and (1) business attitude toward farming; (2) rationality; and (3) scientific attitude. Conversely, a statistically significant negative correlation with (1) traditional outlook and (2) religious inclinations was found. Familism had a low negative correlation which was not statistically significant. The sample respondents were cultivating owners operating three or more acres of land and had more than average education relative to the population in the region. For example, 36 respondents had between five and ten years of education, five had completed high school, and seven had two years of college education. Extensive communication with the city also existed.

[2]In his study of an Egyptian village, Adams (7.1) notes that the responsibility for individual decision making increases anxieties and that such individuals may find more security in the workings of Communism rather than liberal democracy. Adams suggests that individuals are attracted by the absolute assurances of Communism and the "religious fervor of its missionaries". "Traditional Islam's demand is that the elements of a working system be absolute, not that they be logically consistent" (7.1, p. 234).

costs of not meeting consumption requirements with his own production will range from going into debt to no longer having the means to survive. Traditional production patterns provide a good deal of security, even though at low levels of living. In addition, his receptivity to the suggestions by government representatives and merchants that he alter his cropping or resource allocation pattern is low. This follows from a general distrust for people from outside his immediate village, especially for government officials (7.3, 7.13, 7.18, 7.19). This distrust is largely a questioning of the motives of those who suggest changes.

Contact is also endogenously generated. The impact of population growth on limited land resources forces emigration and partial employment away from the village (7.32, 7.52). Where social pressure against wealth accumulation is strong, enterprising individuals either acquiesce or move to a less-traditional village. Similarly, if individuals find economic demands made on them to support the civil-religious hierarchy and the village fiestas to be oppressive, the alternative is to move to another area (7.40, 7.51).

Only the most isolated villages today do not have some interaction with a money economy. As the range and variety of contacts increase through "culture brokers", traders, communications media, and spatial mobility, the scope of individuals' awareness and experiences expands with at least a partial impact on behavior patterns of producers and consumers. As subsistence-oriented producers are drawn into the exchange or money economy to obtain those essentials they themselves do

not produce, they also become aware of the existence and availability of other consumer goods.[1] In order to obtain these, however, producers need to increase their demand for money income or for "surplus" commodities which can be exchanged. For some, the aspired level of living is above the existing level. But the aspired level is also above the attainable level if previous production and consumption patterns are maintained. The producer now faces a more complex matrix of decisions. Previously, he had a strong preference for present consumption over future consumption. This resulted primarily from his low levels of living. His problem now is to generate additional money income or obtain external credit which can be used to purchase some of these goods directly or can be invested in his production unit to increase future output and income levels. Where available, off-farm employment on a nearby plantation or in another sector of the economy is a means of augmenting income. In addition, such labor mobility may result in the acquisition of production skills and changes in producers' aspirations, not only in terms of consumer goods but also in housing, medical services, and education for their children. If these aspirations are held strongly, they can assume the role of values thereby exerting a stronger impact on producer behavior.

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[1]The existence and availability of goods is assumed here. Such goods may be obtained from village specialization and exchange, from a consumer goods industry in the economy, and from imports from abroad. Thus, the agricultural sector is developing as a market for the goods currently or potentially producible by other sectors of the economy.

Increased participation in the money economy also acquaints producers with the existence of nontraditional inputs, if they are available, and with the relative valuations placed on goods sold in the market. A few enterprising producers may perceive that by substituting a cash crop for a crop previously consumed, the income from selling the cash crop will more than cover the expenditures for purchasing the crop consumed but previously produced. Improved inputs for expanding production may be made available through financing by a local merchant or moneylender. In both cases, however, the producer has, in effect, made a partial substitution of values, i.e., wealth accumulation for security[1] and also has demonstrated an optimistic or favorable attitude toward realizing his goal. Another producer may also place a high value on increased income; but if his subjective probability toward realizing the higher income is low, he is motivated to continue his previous cropping pattern. Where investments are contemplated, the decision-making process becomes much more complex: (1) The planning horizon must be lengthened and the net returns from the investment estimated; (2) With a longer planning period, additional uncertainties are introduced; price variability, production variability, and tenurial security must be taken into account; and (3) The investor must decide between productive investments and those made for security, prestige,

[1]Since valuing wealth accumulation is incompatible with some professed religious beliefs, the value may alternatively be stated in terms such as better housing and clothing or better transportation with a bicycle.

and liquidity purposes. The determination of net returns from alternative investments is a complicated problem for producers, regardless of the stage of economic development.

Land is almost universally valued for the security and prestige it provides. This is true of the Indian peasant as it is of the Latin American hacienda owner. But the transfer of title to land through ownership does not in itself represent a productive investment. Only if ownership induces a shift to more productive cultivation practices or more investment in nonland inputs can land investments be termed productive investments. In Africa, cattle are valued for the prestige which accrues to the owner rather than for their profitability (7.4, 7.28).[1] In other societies, jewelry and ornaments are prized for the prestige they provide and for their high liquidity if money or credit financing is required to meet contingency situations (7.27, 7.43, 7.50).

As the economy expands through sectoral development and increased division of labor, a restructuring of the values attached to various occupations undergoes change. The prestige associated with occupations

[1] Hoselitz cites an interesting example of the consequences resulting from a failure to recognize the value East Africans place on cattle. The immunization of cattle against disease carried by tsetse fly was anticipated to result in larger, healthier herds which would permit large-scale exportation of beef. To the East African, cattle were a form of wealth and immunization would permit him to increase his wealth. But, according to Hoselitz, immunization did not generally lead to an increase in the amount of beef marketed but rather to problems of overgrazing as herd numbers expanded. Hoselitz concludes that " . . . the value system of the East Africans places emphasis on the number of heads owned by a person rather than on the returns he can gain by marketing them" (7.28, p. 413).

in agriculture and crafts declines relative to that accorded positions in public administration, education and law. There is some suggestion that both managerial innovation and capital formation are hindered by persistent high evaluation of a "leisure class" and the choice of current luxury consumption over reinvestment and productive expansion (7.17, 7.35). Values and attitudes oriented toward economic growth and development are only necessary but not sufficient. In addition, individuals must be aware of the opportunities, a proper configuration of economic incentives must exist, producers must have the resources or access to external assistance in order to exploit such opportunities, and the uncertainties facing the producer must be acceptable.

Objectives

To some extent, the objectives or goals which individuals pursue were discussed in the preceding sections of this chapter. The varying degrees of responsiveness to changing prices and to information provided by extension service personnel are discussed in Chapter VIII. In some cases, social factors tend to constrain the economic activity of individuals. However, the observance of these social proprieties are also objectives in themselves, at least by the conformists. In other areas, economic pursuits are limited only by individual's awareness and entrepreneurship and by the resources available to him. Even in the relatively "open" communities, income or profit maximization over time is only a means to the higher objective of utility maximization. But since utility is derived from consumption of both goods and leisure and from participation in community affairs, the usual assumption of profit maximization is rarely, if ever, synonymous with the more

generalized objective of utility maximization. Instead, the more meaningful objective of market-oriented producers is that of constrained profit maximization[1] with constraints not only on resource availabilities but also (1) Labor availability where a portion of the economically-productive labor inputs are devoted to social and local governmental affairs and (2) "Surpluses" available for productive investments must compete with less-productive or nonproductive investments. Again, the objective is utility maximization and not pure profit maximization. This objective is consistent with the general contention that nearly all producers are "economic men" in that they prefer more to fewer economic goods. Added here is the proposition that a number of implicit constraints are involved.

At low stages of economic development, producers' objectives tend toward production for survival and any investment is geared toward maintenance of the production plant rather than expansion of the size of operations. The principal constraint on investment is the inability to generate a production "surplus" in excess of consumption requirements. Consumption requirements, however, usually include expenditures for gifts, social events and religious activities. These latter expenditures

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[1] According to Kamarck (7.31), the African producer thinks in terms of increasing returns to his labor rather than profits. Nair (7.39) notes that among rice cultivators in most parts of India, both among landowners and tenants having varying sizes of operations, "The increase in gross output and therefore income does not interest them if the margin of profit per para or bag of rice decreases thereby, which it normally does of course, with heavier investments in fertilizer and labour such as the Japanese method or any more scientific method of cultivation must involve" (7.39, p. 44).

represent funds which could potentially be invested. However, two additional considerations are necessary. First, one of the producer's objectives is to maintain or improve his social standing in the community. Prestige accrues to those who satisfy these socially-approved activities, and prestige provides utility. Second, producer's planning horizons are extremely short; a high value is placed on present consumption over future consumption. In addition, the low returns from investment in traditional inputs may be discouraging, especially if producers are able to discount returns over time (7.44, 7.48). Few institutions exist in many rural areas for accepting and paying a return on savings. An attitude of distrust coupled with the costs associated with traveling to these institutions located outside of the community lessen the incentive to make savings deposits.

Consumption patterns for these subsistence-oriented producers are relatively inflexible through time. They are established by custom and tend to vary primarily with the family cycle. With only limited contact with the economy external to the village, these traditional consumption patterns continue. A number of goods not produced by the farmer must usually be obtained from a local merchant or trader. Such goods often include sugar, salt, tobacco, cooking utensils and some clothing. The quantity purchased of each is relatively invariant as long as the traditional consumption pattern is maintained.

As long as prices are invariant, traditional consumption patterns imply a corresponding income demand which is also essentially invariant. Production decisions in terms of essentially-fixed incomes are not

incompatible with producer behavior at low stages of economic development (7.41). As noted earlier, however, the demand for income varies with the prices paid for consumption goods not directly produced. Such behavior is primarily indigenous to essentially-closed communities where limited resources, restricted aspirations, and strong social pressure interact to maintain an economic and social status quo. As these communities are opened, the strength of these forces declines and producer-consumers are introduced to nontraditional influences.

For the subsistence-oriented producer, output is primarily a function of the quantity of labor applied to the resource base consisting of land, draft animals, and relatively-simple tools and implements. Figure 7.1 loosely summarizes the situation faced by the producer. The production possibility curve is drawn so that the MVP_{labor} rises rapidly with initial labor inputs but then rapidly declines as a relatively-large quantity of labor is employed. Movements to the left of L^* on the horizontal axis denote additional units of labor employed. The vertical axis represents income which reflects the total value of production aggregated by the exchange value of the individual commodities according to a numeraire or by some monetary unit. Superimposed in Figure 7.1 are the producer's subjective indifference curves representing the marginal rates of substitution between income and leisure. Leisure denotes nonwork but includes time spent in social and governmental activities. Income, translated into physical quantities, represents consumption requirements, including payments in kind for taxes and debt obligations, stocks for draft animals, allowance for

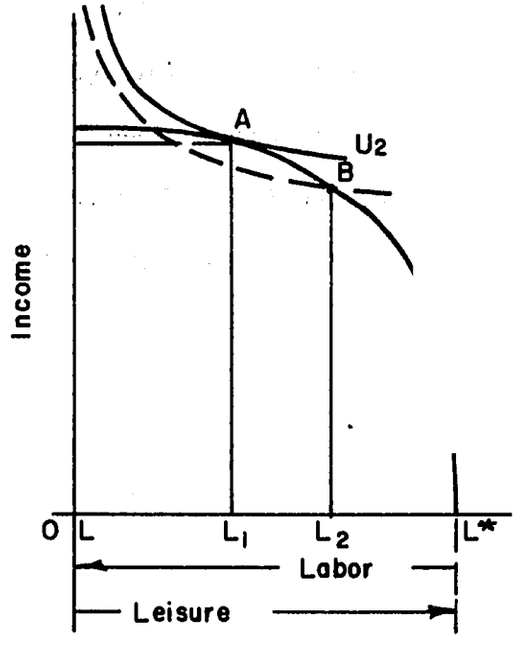

Figure 7.1. Optimum labor-use level for maximizing individual utility

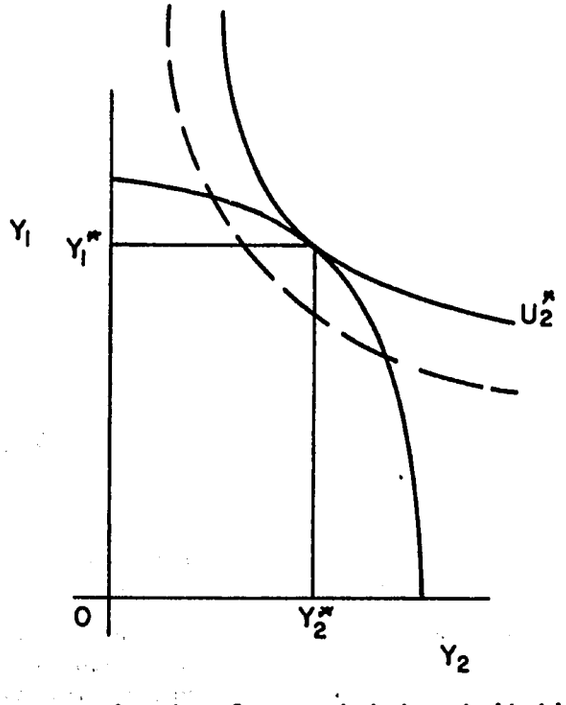

Figure 7.2. Optimum production for maximizing individual utility

maintenance of capital stock, income necessary to purchase or obtain goods consumed but not produced, and income for undertaking customary social expenditures. The indifference curves are drawn to indicate a high marginal rate of substitution of leisure or nonwork for income. This is postulated as the consequence of the ability to sustain traditional consumption patterns and of the limited aspirations and opportunities to alter consumption patterns. In Figure 7.1 utility is maximized by expending L_1L^* of labor to produce OI_1 of income.[1] Of the total quantity of labor inputs available for work, L^*, LL_1 is devoted to leisure. Assuming only two products are produced, Y_1 and Y_2, the production possibility curve representing the combinations of Y_1 and Y_2 which can be produced using L_1L^* of labor is diagrammed in Figure 7.2. The positions and shapes of the production possibility curves are a function of the labor-allocation decision made in Figure 7.1.[2] Superimposing the producer's indifference curve representing his preference in the consumption of Y_1 and Y_2, the planned optimal output configuration is denoted by Y_1^* and Y_2^*

[1] Referring to Equation D.9, the utilization of L_1L^* of labor implies that a sufficient quantity of K^0 is available to sustain this amount of labor. If not, only a lesser amount of labor can be employed which generates less income and a lower level of utility.

[2] The more realistic proposition is that the decisions made in Figures 7.1 and 7.2 are essentially simultaneously determined. That is, if Y_1^* and Y_2^* represent consumption requirements, then L_1L^* of labor, given fixed resources and production techniques employed, is required to produce these output levels. Thus, the producer's decision in Figure 7.2 determines the necessary, corresponding decision to be made in Figure 7.1.

In Figure 7.3, each unit of labor employed results in a higher income level either as a result of an increase in the exchange values, for example, the exchange value of wheat relative to sugar, salt and tobacco increases, or because of a favorable production period. The indifference curves are assumed to be essentially unchanged as income increases. This, again, is the assumed result of the producer's limited contact with an exchange economy which, as yet, supplies only the goods traditionally purchased and consumed. As income increases, the tangencies of the higher indifference curves with the respective income-possibility curves indicate that the producer maximizes utility by working less and enjoying more leisure. This phenomenon represents a backward-sloping labor supply function of the producer to his firm.[1] In Figure 7.4, the smaller physical quantities produced do not indicate that the producer has reduced the quantities of goods he consumes. Rather, the amount of Y_1 and(or) Y_2 necessary for exchange in order to obtain those goods consumed but not produced and some of those goods used in social events is reduced.[2]

As mentioned earlier, increased contact with an exchange or money economy, an economy which provides a larger variety of consumer goods

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[1] If income increased through higher exchange values only, the MPP_L of labor at various labor-use levels is unchanged but the MVP_L increases for the specific input level being considered. In this exercise, the MVP_L may be considered the implicit wage or salary of the producer. If his salary increases, he is inclined to work less.

[2] Such marketing behavior implies that changes in the quantity marketed are inversely related to price movements. The objective is to market that quantity whose value will permit the producer to obtain those goods consumed but not produced by him. This behavior is noted by a number of contributors to a discussion of marketed surpluses in India.

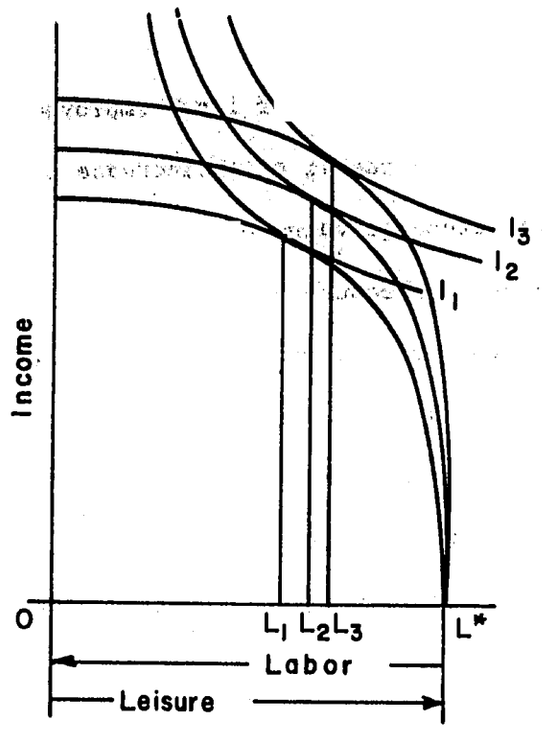

Figure 7.3. Changes in optimum labor-use levels as monetary income increases

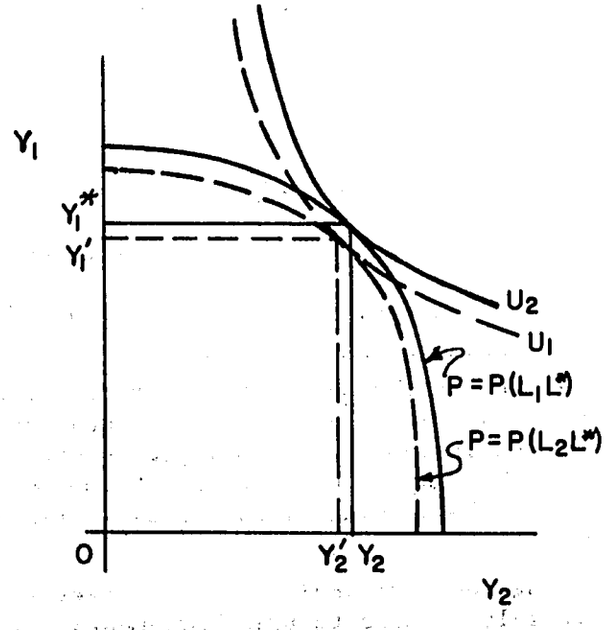

Figure 7.4. Changes in the optimum output configuration as labor-use levels vary

as development proceeds, induces more enterprising producers to raise their aspirations and alter their desired consumption pattern.[1] The principal objective is still that of utility maximization; however, the components and their respective utility coefficients undergo change. The question now arises as to whether or not these producers are able to generate the additional income through increased production which is needed to purchase these newly-demanded goods. If production remains largely invariant, one alternative is to secure external financing from a merchant, moneylender or landlord in order to purchase these goods. However, granting that producers have relatively short planning horizons, the newly-acquired indebtedness and the capacity for repayment must be taken into account. The potential dangers of continued indebtedness were discussed in Chapter V. Implicitly, the utility from consumption is greater than the disutility of indebtedness and the potentially attendant consequences of debt.

Another approach which is perhaps more likely and more desirable from the standpoint of economic development is represented in Figures 7.5 and 7.6.[2] Through increased market contact, the relative demands

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[1] For example, "The speed with which the peasants of South-East Asia and West Africa (with their different cultural backgrounds) acquired the taste for the new imported commodities and expanded their export production in order to be able to buy them offers us concrete evidence of their capacity to respond positively to economic incentives (7.37, pp. 41-42.)

[2] Such a statement, of course, is based on the questionable presumption that the values of economic planners, for example, are those shared by the producers. To economic planners, less leisure and productive investment of any surpluses generated are preferred to the converse. Producers, on the other hand, weigh these alternatives heavily only if such behavior results in higher levels of utility to them. The increased economic-orientation which economic development generally creates, at least within a range of incomes, and the emphasis on the insatiability of demand for consumer goods as markets expand would tend to alter producers' values towards those held by national planners subject, of course, to certain constraints. For example, resettlement programs in Africa have met resistance because of the attachment of people to particular units of land.

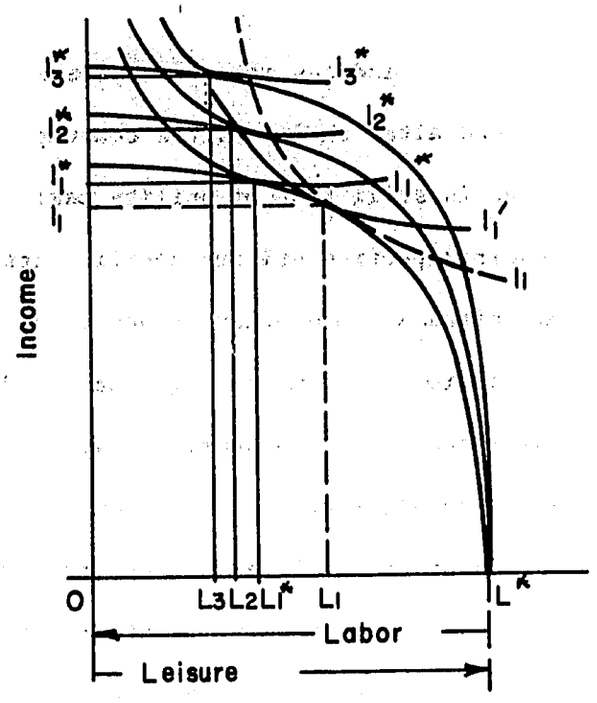

Figure 7.5. Changes in labor-use levels resulting from a change in MRS and from higher incomes

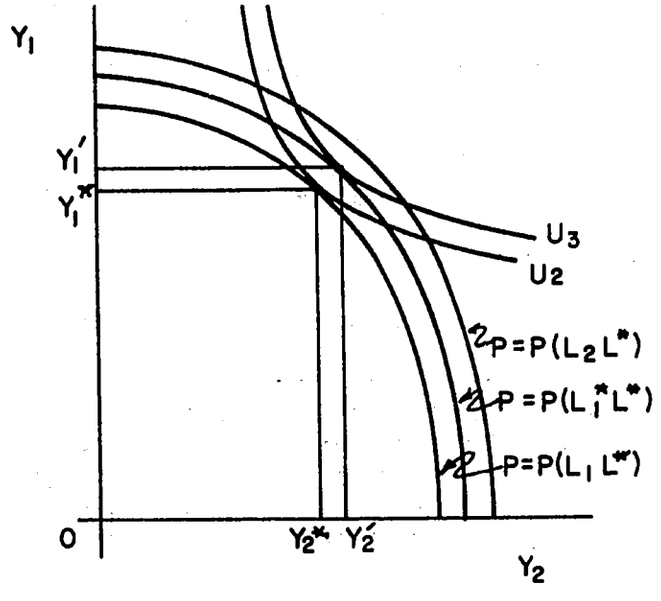

Figure 7.6. Changes in utility-maximizing output patterns corresponding to higher labor-use levels

for farm-produced goods, consumer goods and leisure are hypothesized to change in the direction that causes the marginal rate of substitution o leisure for income to fall. That is, income and the purchasing power i represents now have a higher value relative to leisure than was previously the case. In Figure 7.5, indifference curve I_1' reflects the change in preference between income and leisure and the resulting marginal rate of substitution between the two. If the new family of indifference curves not only has a different shape but assumes a different position on the income possibility curves, for example, I_1 the producer's optimal behavior is to now employ $L_1^*L^*$ of labor in order to produce I_1^*. The additional $L_1^*L_1$ of labor causes the production possibility curve in Figure 7.6 to shift to the right. A higher level of utility, U_3, is possible due to the shift in preferences and consequent additional amount of labor used. Consumption of both Y_1 and Y_2 can be increased as can the quantity of consumer goods purchased in the market. In the aggregate, higher consumption levels of consumer goods purchased in the market are possible only if the corresponding quantities of these goods demanded are available. If income and demand are present but not the goods, inflationary tendencies and consumer frustration result. Ceteris paribus, the terms of trade are turned against producers and an increased amount of income or capital potentially leaves the agricultural sector. A larger quantity of goods must be marketed in response to the rise in prices. The frustrated expectations of producer-consumers may condition subsequent attitudes and objectives relative to income accumulation and developmental processes in general.

As the opportunity to increase the consumption of all goods above the initial levels of Y_1^* and Y_2^* arises, so does the possibility of saving increments of income through nonconsumption. Capital formation has now been introduced. As long as the producer's planning horizon remains constricted to the next production period or harvest cycle, such savings will likely be hoarded or lent on a short-term basis to relatives and fellow villagers.[1] Utility is also derived from hoarding and from lending, regardless of whether or not any interest is paid. On the other hand, if through education, government programs, or observation of others the producer is able to expand his planning horizon, longer-term productive investment is a feasible alternative.

Savings

Savings provide only the means to invest; favorable investment opportunities must exist to mobilize and channel savings into productive uses. Where the saver and the investor are two different persons, institutions such as savings associations and rural banks are necessary to make the transfer. Private lending by the saver is an alternative. But the most important determinant of savings is the level of income. The relatively low per capita incomes in most less-developed areas suggest a low capacity for saving. However, per capita incomes do not reflect income distributions. The relatively few who

[1] The short planning horizons need not preclude producers from buying improved seeds, fertilizer and additional irrigation water inputs. The returns from these inputs are largely confined to the period in which they are used.

receive a major proportion of the income have a high capacity to save. Even those at the lower end of the income scale save.[1] But the All-India Rural Credit Survey (7.46) provides data indicating that the primary reason for not saving is the lack of a means for saving.[2] See Table 7.1. The indication that "no margin for saving" existed does not imply that expenditures in excess of basic consumption and production needs were not made.

Increasing present consumption through reducing savings always remains an alternative. The nature of the increased consumption is important. If savings are in the form of commodities produced and in excess of traditional consumption patterns, higher consumption means fewer goods marketed. The savings remain in the firm-household unit and within the agricultural sector without stimulating developmental processes. Higher per capita consumption may have a secondary impact on improving physical health and increasing labor productivity. Alternatively, such savings may be used to support larger families which are not exactly a boon to areas wrestling with problems of overpopulation.

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[1] Hagen writes, " . . . as we get more income data about low-income countries we find that even at incomes of $50 or $100 per capita, they can save, and adequately to achieve economic progress, if they are sufficiently motivated to do so" (7.22, p. 624). In a similar vein, Hirschman comments, "With respect to savings and capital, anthropologists have long known that primitive people who, by Western standards, live 'on the margin of subsistence' insist nevertheless on devoting a considerable portion of their time, energies, and resources to ceremonial purposes, giftmaking, and other activities not directly related to consumption" (7.26, p. 2).

[2] This conclusion is reinforced by the survey response that lack of facilities, low interest rates, and transactions difficulties were not significantly limiting factors.

Table 7.1 Distribution of districts, by number of cultivators for upper and lower strata,[a] according to reasons for not placing savings in accounts or not purchasing bonds, stock shares or insurance policies, All-India Rural Credit Survey, 1950-51*

	Total number of districts	Number of cultivators replying in the affirmative						
		Nil	1 to 4	5 to 9	10 to 19	20 to 29	30 to 39	40 to 59	60 and above
Is it because you have no margin for saving?									
Lower strata	75	-	-	2	-	14	←	59	→
Upper strata	75	-	-	-	1	1	3	26	44
Is it because you prefer to hold savings in cash?									
Lower strata	75	39	20	6	1	-	-	-	-
Upper strata	75	17	29	15	10	4	-	-	-
Do you prefer to purchase gold and jewelry?									
Lower strata	75	56	16	3	-	-	-	-	-
Upper strata	75	43	20	5	7	-	-	-	-
Do you prefer to lend money?									
Lower strata	75	61	12	1	1	-	-	-	-
Upper strata	75	33	28	8	6	-	-	-	-

[a] The definitions for "Upper" and "Lower" strata cultivators are given in Chapter V, footnote 1, p. 215.

* Source: Abstracts from Tables 11.3 and 11.4, All-India Rural Credit Survey (7.46).

Where savings are used to increase consumption of consumer goods produced in other sectors of the economy, such expenditures represent transfers out of the agricultural sector which may have a beneficial impact on stimulating the growth of these other sectors. When the supplies of these consumer goods do not keep pace with increases in demand, prices are bid up. Initially, the terms of trade are turned against the agricultural sector and larger quantities of income flow outward from this sector. If as prices rise producer-consumers expect prices to rise further in the future, additional incentive for increasing present consumption is created. Savings are reduced and price increases accentuated. The consumer goods sectors are growing, but the question of whether or not the quantity of agricultural commodities necessary to meet the food requirements of laborers and the raw materials of manufacturers will be forthcoming is raised. If not, prices for agricultural products will be bid up adding to the existing inflationary tendencies. Additional marketings or agricultural commodities are needed. Additional investment in the agricultural sector must take place if production and marketings are to be increased.

Investment

Investment may be either productive or nonproductive. From a developmental standpoint, the former is preferred. For a number of situations, the latter is entirely rational. Given a sufficiently-liberal interpretation, the present value rule in Equation 7.1 embodies the factor

influencing investment decisions. The criterion of the rule is to select that investment opportunity from existing alternatives which results in the highest nonnegative present value. If the PV is negative, the investment should not be made; if zero, the investor can be indifferent to that particular investment opportunity. It is not

$$PV = -(I) + \sum_{t=1}^{n} [R(t) - E(t)](1 + \rho)^{-t} + I_n(1 + \rho)^{-n} \qquad (7.1)$$

$$PV = [S\ (1 + i)^n\ (1 + \rho)^{-n}] - (S) \qquad (7.2)$$

suggested that investors are actually able to quantify Equations 7.1 and 7.2, but these equations summarize the factors which rational, prospective investors would tend to take into account. The components in Equation 7.1 have the following interpretations:

(1) -(I) is the initial monetary cost of the investment;

(2) n is the final time period of the planning horizon in terms of the length of time over which net returns accrue to the investment or a self-imposed, constricted time period during which the investment must show a favorable return;

(3) R(t) and E(t) are the estimated returns and costs, respectively, in the (t = 1, ..., n) time periods for the particular investment opportunity being contemplated;

(4) $(1 + \rho)^{-t}$ is the discounting mechanism for determining the PV of the estimated net returns through time. The discount factor, ρ, incorporates considerations of the economic opportunity cost of investment, uncertainty, and social factors; and

(5) $I_n(1+\rho)^{-n}$ is the discounted terminal value of the investment if the investment is not entirely used up in the production process.

Nonproductive investment Consider nonproductive investment first. Such investment may be in the form of jewelry and ornaments, consumer durables, improved housing, hoarding, and in some cases, land purchases.[1] Land is equally physically productive, ceteris paribus, whether it is owned or rented. It is in this context that investment through purchasing land is unproductive. Land ownership, however, likely motivates some producers to make investments which affect the land's productivity and to engage in cultivation practices which tend to maintain productivity through time. Where effective land rents are high, producers in favorable financial positions may have the incentive to purchase land thereby affecting the distribution of income and their own capacity to generate a capital surplus. In addition, land ownership provides psychic returns through the prestige and security it accords. The other forms of nonproductive investment provide similar returns. Jewelry and hoarding in the form of gold and other metals also provide a hedge against inflation and political instability affecting the value of paper currency. Since they have high liquidity, they can also be used readily to finance or secure financing for unforeseen contingencies.

[1]To those not believing in the influence of patron saints and magical spirits on individual well-being, expenditures for religious ceremonies are, in a sense, nonproductive investment. To the believer whose religion embodies reincarnation, such expenditures can be viewed as highly productive investment, although in the nonphysical sense. Similarly, gifts to landlords and patrons may provide an intertemporal pay-off to the giver in terms of counsel, allocation of more productive tracts of land and a more secure tenurial arrangement.

Referring to Equation 7.1, the following intuitive interpretation is given to the components when nonproductive investments are considered:

(1) The R(t) are the social and psychic returns referred to earlier which have a qualitative dimension. In the case of housing investment, maintenance costs would be reflected in the E(t);

(2) ρ includes the opportunity cost associated with these investments. For example, the opportunity cost is the rate of return foregone by not making productive investments or by not placing the funds in a credit institutions where interest could be earned. Estimates of the rate of return to productive investment are scarce. If Schultz 7.48) is correct in his contention that the rate of return on investment in traditional inputs is low, the opportunity cost component in ρ is fairly small. Where improved inputs are available and adaptable, the opportunity cost would be substantially higher. In addition, uncertainty associated with the estimated rate of return could be incorporated by reducing this estimated rate. Consequently, ρ would vary with the nature of productive inputs and with the price and production uncertainty estimated to accompany these inputs. With land, the possibility of land reform and expropriation introduces an element of institutional uncertainty. The lower ρ, the less net returns are discounted and the more attractive are nonproductive investments;

(3) As noted previously, n is the length of the planning horizon which may be one year or an intergenerational time span. Consumer durables have a limited life of usefulness, as does housing. Conversely, land, jewelry and gold are essentially indestructible and provide returns over an extended period of time. Planning horizons also vary with the

personal attributes and attitudes of the investor; and

(4) The more durable investments have a discounted terminal value since they are not used up or consumed during the planning period. Given the inflationary tendencies in many developing areas, the term $I_n(1+\rho)^{-n}$ should be stated in real terms, i.e., the monetary value is adjusted to reflect the impact of inflation on prices paid by producer-consumers. Since land and gold serve as a hedge against inflation, the monetary value of these investments at the end of the planning period would tend to rise with rising prices in the economy.

Productive investment This category of investment includes undertakings such as constructing terraces, drainage ditches and irrigation systems for land; adding new enterprises to the farm; purchasing draft animals and machinery; and placing funds in a credit institution or lending privately so that a return in addition to repayment of principal is realized.

For productive investment in the firm, Equation 7.1 has its usual connotations. The R(t) and E(t) are the returns and costs, respectively, associated with the investment considered. These monetary values should be expressed in real terms to take account of changes in price levels. The length of the planning period, n, is the life of the investment or a shorter period during which the investor requires the project to be profitable. Constricting the planning period is one means of allowing for the different forms of uncertainty that are present. Alternatively, tenurial insecurity and production variability can be taken into account by increasing ρ. In situations where social pressure is a factor in influencing wealth accumulation through private investment, such social

factors can be incorporated by subjectively raising ρ. That is, as ρ is increased, the net returns must be sufficiently large to compensate for uncertainty and for adverse social phenomena. The rate of interest obtainable on savings accounts or through private lending serve as approximations of the opportunity cost component of ρ. The data in Chapter V on interest charges levied by private lenders suggest that the opportunity cost of productive investment is high. In addition, the localization of lending and borrowing reduces the uncertainty of default by the borrower.

The discounted terminal value of the investment in Equation 7.1 is extremely important to potential investors. This is especially true for tenant operators. If the possibility of termination of tenure is high and the investor has no assurance of recovering the remaining capitalized real value of the investment, not only is the discounted terminal value equal to zero, but ρ is increased and(or) $\underline{n}$ is reduced. If allowance is made for compensating the investor for the remaining value of his investment, this component in Equation 7.1 will have a positive value and will influence the individual's investment decisions. If costs and returns are shared by the landlord and the tenant, the appropriate coefficients should be prefixed in Equation 7.1.

Placing funds in public savings institutions provides not only high liquidity but a good deal of security. As indicated previously, the lack of such institutions in some rural areas and a general attitude of skepticism toward government-affiliated agencies reduce the number of individuals who can or do patronize these organizations. In Equation 7.2, S is the quantity of funds placed in savings at the beginning of

t_1 and i is the interest rate paid which is compounded annually As before, n is the terminal point of the planning period. The discount factor, ρ, represents opportunity cost plus allowance for uncertainty. Since compounded interest and principal are in monetary terms, they should be adjusted to real terms to reflect expected future changes in general price level of the economy. The opportunity cost of saving is the rate of return foregone by not making the most productive, alternative investment. In the case of traditional inputs, this opportunity cost may be relatively low. The uncertainty component in ρ would be essentially zero because of the high liquidity and assured returns associated with savings accounts. If $\rho = i$, the PV is zero only if prices are stable so that the real value of S is unchanged. With inflation, the real value of S in $S(1 + i)^n$ will be less than the initial real value of the S deposited, i.e., the last term in Equation 7.2. Where savings institutions are not located in the saver's community, any expense incurred in making the initial deposit and final withdrawal must be considered.

Private moneylending is often a profitable alternative especially where traditional inputs result in a low opportunity cost associated with lending.[1] Short-term returns are relatively high and expenses low. Since lenders have a personal acquaintance with borrowers, the uncertainty associated with possible default is also low. Equation 7.2 is appropriate for moneylending also. In place of S, the quantity of

[1]In this connection, Rahim notes that the strong demand for credit among East Pakistan farmers permits the relatively affluent producers to earn a 50 to 100 percent return on private lendings (7.45), p. 417).

funds lent is substituted. If the loan is repaid at the end of t_1 and the principal plus interest is relent at the beginning of t_2, the monetary value of the initial loan plus interest is $L(1 + i_1)(1 + i_2)$. If the interest rates charged are invariant, at the end of the n-th period, the funds plus interest have a monetary value of $L(1 + i)^n$. More realistically, the value of the loan at the end of t_1 is $L(1 + i_1)$ less expenses involved in the lending transaction.

Summary. The Human Element in National Planning

The human element is an important component facilitating or inhibiting developmental processes. Values and attitudes shape objectives and the means and perception of achieving these objectives. Since these human attributes do not change rapidly, they are essentially parameters during short-term planning periods. Attributes favorable to developmental processes cannot be legislated; they can only be indirectly influenced through a changing economic and social environment. Similarly, these attributes cannot be ranked according to desirability. To do so would be tantamount to substituting the ranker's preferences for those of the individuals in question. Rather, some of those attributes more conducive to economic development can be specified. The following would be included:

(1) Since human attributes are conditioned by awareness and perceptibility, measures affecting communication and thought processes are important. Improved communications facilities, increased interspatial contact, and educational programs provide the means for exposing individuals to alternative life styles, consumption and production patterns, and perception for effecting change. Of course, raising individuals' expectations, whether or not these expectations are realistic, without providing the means or environment for satisfying these objectives generates frustration, social instability, and skepticism. Complementary programs to increase the availability of consumer and producer goods, to improve the economic incentives for production, and to provide man-

agerial assistance for adopting nontraditional inputs and new firm enterprises are important. While educational programs increase literacy levels and substitute an understanding of the forces of nature for reliance on supernatural phenomena, both decreasing the power of moneylenders and landlords and increasing the individual's perception of improving his economic well-being, education is often associated with a distaste for working to increase rural levels of living. The shift in occupational preferences and outmigration from the agricultural sector creates a new employment demand in the economy;

(2) Incentives for altering existing production and consumption patterns are related to the opportunity costs associated with maintaining traditional patterns. If the producer prefers to maintain traditional production patterns even though he has access to a demonstrably more-remunerative production technique, the opportunity cost associated with the former is in terms of income foregone and(or) consumer goods purchasable with this income. The implied assumption is that, ceteris paribus, individuals prefer more to fewer economic goods. Certain religious beliefs and social relationships may constrain the relevance of this assumption, but these phenomena are rarely absolutely binding. Similarly, importance is attached to observing religious and social events which often place heavy demands on the individual's financial position, especially when external financing is necessary. Expenditures for these events have opportunity costs in terms of other consumer goods foregone and in terms or an expanded flow of future income associated with private investment foregone in the firm. Such opportunity costs are increased as new consumer

goods become available and as the profitability of private investment is increased. This does not deny that social and religious expenditures generate utility but rather that alternative uses of these expenditures may create more utility.

(3) Related to (1) above is the importance of security in affecting human attributes. The security most large land holders possess enables them to favor and maintain the existing economic and social structure. Unless threatened by legislated reforms and(or) expropriation by cultivators, these land holders need not alter their attitudes and objectives. In a contrary situation, increased security on the part of small-scale cultivators and tenants is important for developmental processes. Such security affects land-use patterns and the incentive for private investment in the firm. Furthermore, the security implicit in certain extended families and in some close-knit villages may provide a basis for introducing marketing and retailing cooperatives; and

(4) Change is more easily introduced when it can be grafted on or integrated into prevailing social systems. Disruption is minimized and individuals can more easily rationalize adopting the change.

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CHAPTER VIII. GOVERNMENT PROGRAMS AND POLICIES

The concern by governments of less-developed areas for stimulating economic development is reflected in the emphasis given to national planning for growth and development. National planning and consequent mobilization and guided allocation of resources are viewed as the means for accelerating economic progress and lessening the economic gap with the relatively-developed countries. Devising a plan indicates a concern for rationality. This rationality is expressed in terms of maximizing planning objectives subject to resource and technical constraints and to political feasibilities.

National plans are of varying ambitions ranging from public exhortations and minimal investment programs to the centrally-planned economies of Communist countries. Planned development is expensive in terms of capital resources and administrative inputs, both considered to be relatively scarce in less-developed areas. Conversely, emphasis on a laissez faire approach to economic growth has been costly in terms of lagging growth rates, adverse foreign trade positions, and wide disparities in the distribution of wealth and income. Coupled with high population growth rates, these factors have interacted to impede general economic expansion in many countries. The shortage of reliable data limits the scope of planning. Poorly-conceived and poorly-implemented plans are rarely able to produce the results which planners have at least partially conditioned people to expect. Planners can attribute the inability to achieve publicized objectives to some exogenous force, but successive plans will likely be viewed with increased skepticism.

The success of implementing and sustaining government measures is contingent upon the existence of a stable government. In the absence of

stability, the consequent uncertainty surrounding future economic activity has adverse effects on private and foreign investment, on willingness to participate in government programs, and on the capacity and motivation to engage in long-term planning, both on the national and individual-firm levels.

Democratic processes theoretically provide individuals and individuals representatives with the means for expressing policy preferences. However, strict parochial interests are not likely consistent with national and regional provisions of a developmental plan which abstracts from political and social considerations and focuses primarily on economic targets. This does not preclude subsequent consideration of individual economic and social well-being, however. These aspects can be dealt with through policies of taxation, transfer payments, and national welfare programs. Stating the situation alternatively, a trade-off or substitution may exist between economic merits and political stability. This has been apparent in some land reform programs where political expediency or necessity resulted in redistribution of land into a large number of economically-unviable parcels of land--at least unviable over longer periods of time.

The politics and economics of change are necessarily intricate and intertwined. Considerations of social justice and lengths of planning horizons further complicate efforts of national planners to effect plans and policies which are administratively feasible, economically sound, and politically acceptable. Since few governments have the resources to involve

nearly all economic entities in developmental programs, national planners must select those sectors and geographic regions which will be most responsive to government instrument variables and which will operate as "leading sectors" in developmental processes. Certain geographical regions or groups of individuals in some regions may be temporarily "forgotten" in that government programs focus on the most responsive areas and where short-term returns are highest. Spreading resources so thinly that nearly everyone is involved usually precludes generation of those externalities and economies of scale important to stimulating private initiative. However, since social and economic costs will subsequently be involved in eventually integrating these groups more fully into the economic system, planners must also take these future costs into account. The dispersion of communications media reduces the possibility and rationality of temporarily "forgetting" individuals and areas.

The government can play a number of roles in influencing economic growth and development. Loosely, the government attempts to guide the fingers of Adam Smith's "Invisible Hand" so as to realize planned objectives. Public investment in the infrastructure of the economy to affect economic incentives and resource mobility was discussed in the preceding chapter. Monetary and fiscal policies provide means for influencing the growth and direction of economic activity. Sectoral policies such as land reform, provision for rural credit, price support programs, and expansion of export markets have a potentially-favorable impact on sectoral growth. Again, however, sectoral policies require capital and administrative

resources which have opportunity costs. For example, a unit of capital may be used in constructing an irrigation system, in expanding education facilities, or in importing capital goods for industrial uses. Thus, sectoral programs should be coordinated with other public policies in an attempt to maximize the return on resources over time. Yet, there is an inherent danger in the government's undertaking of these roles. This danger is that individuals rely too much on the government so that individual initiative and enterprise necessary for complementing government activities are not forthcoming.

Public Price Policies

To the extent that producers and consumers respond to price incentives and changes in price relationships, the government has a means for influencing producers' production patterns, quantities marketed, and demand for consumer and producer goods. The direction and scope of pricing policies depend on the extent to which the existing state of economic activity differs from a preferred but feasible state. These preferred situations are usually associated with implicit or explicit national plans which have target objectives in terms of domestic food and fiber supplies and import-export balances. For coordinated and integrated developmental plans, the failure to realize planned production and market supply levels tends to inflate domestic food and fiber prices. In the absence of trade restrictions, price rises may be dampened by reduced exports and increased imports which increase supplies available for domestic consumption. That is, higher internal prices attract imports and decrease the opportunities for exports. The

foreign exchange position, however, tends to deteriorate which, in turn, reduces the country's capacity to import needed capital goods--capital goods which are integral to implementing and sustaining the development plan.

If producers are responsive to rising market prices, especially if production costs tend to increase at a slower rate, increased production and larger quantities marketed would dampen price advances. Increased production and direct consumption and consequent improved physical well-being may have a positive influence on subsequent production. However, in terms of supplying the food needs of noncultivators and export demand, the quantity marketed is the important phenomenon. The level of marketings is conditioned by existing consumption levels and by producers' objectives.

Several studies have attempted to provide an empirical basis for postulating producer behavior. Others attempt answers on an a priori basis. An increasing amount of effort has been devoted to examining the degree of responsiveness in production patterns as price relationships vary. These production response studies are usually based on time-series data and relate to adjustment in cropping patterns rather than aggregate production response. In some cases, the time-series data on prices represent a confounding of positive public price policies and of changes due to variations in market supply-demand conditions independent of public pricing policies. Relatively less is known about responsiveness in terms of quantities marketed.

Considering a single commodity, output is the product of area and yield, as in Equation 8.1 where

$$O = A \cdot Y \qquad (8.1)$$

$$= a(P) \cdot y(P:X)$$

O = Output

A = Area planted

Y = Yield per unit of area

$P = \frac{P_o}{P_j}$ = Ratio of price received for output to an index of input prices

X = Environmental factors

Both area and yield are a function of P. That is, A = a(P) where a represents the functional relationship between A and P. Similarly, y is the functional relationship between Y and P. Differentiating Equation 8.1 with respect to P, Equation 8.2 is derived. Multiplying Equation 8.2 by

$$\frac{dO}{dP} = \frac{da}{dP} y(P:X) + \frac{dy}{dP} a(P) \qquad (8.2)$$

$$\epsilon_P^O = \epsilon_P^A + \epsilon_P^Y \qquad (8.3)$$

P/O, the price elasticity of output is represented by the sum of the price elasticity of area and price elasticity of yield.[1]

[1]Using dP in Equation 8.2 indicates that the price change is extremely small. Few producers in any country would respond to such price changes. The use of derivates here is for hueristic purposes to examine the qualitative impact of price changes. The use of ΔP, reflecting discrete price changes, is more meaningful.

In addition to altering price relationships, public price policies often reduce price uncertainty. For example, price supports and price floors lessen the possible range of prices producers confront. On a longer-term basis, uncertainty surrounding continuation of public price policies likely affects private investment decisions.

Acreage response to output price relationships

A few studies have been completed to estimate the aggregate response of producers in adjusting cropping patterns as relative prices of crops vary. The estimating procedure employed is that of simple regression analysis where the dependent variable is the relative acreage of the crop under study and the independent variable is the lagged price of the crop relative to a lagged index of prices of principal competing crops. The mathematical formulation of this relationship is given in Equation 8.4. A_k is the acreage of the crop studied while the $A_{i\neq k}$ are acreages of competing crops. The p_k and $p_{i\neq k}$ are interpreted similarly while t=1 to the end point of the time-series data.

$$\left[\frac{A_k}{\sum_{i=1}^{n} A_{i\neq k}}\right]_t = f\left[\frac{p_k}{\sum_{i=1}^{n} p_{i\neq k}}\right]_{t-1} \qquad (i, k = 1, \ldots, n) \qquad (8.4)$$

Relative acreage, as the dependent variable, is used as a proxy for

planned cropping patterns where these patterns are a function of expected or anticipated prices for alternative, competing crops. The use of acreages abstracts from the direct influence of weather conditions on yields and production[1] and from the impact of prices on the intensity with which nonland inputs are applied to land, i.e., per acre yields when the influence of weather has been removed. The degree of responsiveness in altering cropping patterns is influenced by a number of factors, some of which are not included in Equation 8.4:

(1) The number of alternative crops which can be grown by the producer and the ease with which inputs can be shifted among crops is important. The length of time necessary for adjustment has a direct effect on the degree of short-run response versus response over a longer period of time. As the number of feasible crops increases, the cropping pattern is expected to be more responsive to changing price relationships;

(2) Even though alternative crops are feasible, many low-income, small-scale producers are inclined to gear production decisions to meet consumption requirements. For example, where an inedible, cash crop can profitably be grown, producers growing the crop and using the income to purchase necessary consumption goods in the market place confront price uncertainty from two sides. Uncertainty surrounding market conditions for the cash crop and, in turn, a major proportion of his monetary income

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[1]The planned output configuration is a function not only of prices received and paid but also estimates of the MPP of the inputs. In estimating these MPP's, past and anticipated weather conditions are important factors especially where dryland farming is prevalent.

exists. The cash crop is often an export crop subject to substantial price variations. In addition, the producer confronts the uncertainty of prices he must pay for his food items and other consumer goods. When the producer receives low prices for the cash crop and must pay relatively-high prices for consumer goods, his economic vulnerability increases. Resorting to credit, or increased use of credit, introduces another potential set of problems. Consequently, many producers do not gear cropping patterns to anticipated or existing market prices when producing for direct consumption is their major objective;[1]

(3) In addition to productivity considerations, acreage response is affected by access to markets, transportation costs, and by tenurial arrangements. Furthermore, using relative prices as the independent variable does not take into account variations in input prices and any technological change which affect production decisions. Finally, indices of wholesale prices or prices received by producers do not give any indication of public price policies reducing price uncertainty where such uncertainty affects production decisions nor of other public policies subsidizing or taxing the costs of production inputs. Variations in wholesale

[1]The extent to which time-series data on acreages devoted to various crops include the land cropped by the peasant producers likely varies with the quality and comprehensiveness of the country's system for conducting agricultural censuses and collecting annual data. The land of larger producers is more likely to be included. They are also the ones who usually account for a major proportion of all land cultivated and quantities supplied to the market and are the most sensitive to changing market conditions. Consequently, this class of producers is weighted more heavily in any time-series data.

prices may not be accompanied by similar changes in prices received by producers where the latter are important for production decisions.

The results of a number of studies investigating producers' response to changes in price relationships and some noneconomic factors are summarized in Table 8.1a.[1] Although the variables in each study are identified, the individual studies are not described. Rather, subsequent discussion concentrates on producers' responsiveness in terms of quantities marketed. Quantities marketed incorporate production responses and are the more important phenomenon in developmental processes.

[1]Table 8.1b represents a specification of the various independent variables used in deriving the price elasticity of area estimates.

Table 8.1a. Estimates of price elasticity of crop area for various crops and geographic regions corresponding to varying time periods and estimating procedures, as specified

Crop and geographic area	Price elasticity of area SR	LR	Dependent variable
RICE:			
East Pakistan			Ratio of rice area to rice + jute area
(Summer + winter)	.03[a]		
(Summer only)	.09[a]		
9 districts[c]			
(Summer + winter)	.05[a]		
(Summer only)	.12[a]		
Punjab (undivided)	.31[b]	.59[b]	Irrigated rice area
Thailand	.18[b]	.31[b]	
Regions:			
Northeast	.04-.57[b,d]	.06-1.04[b,d]	Rice area planted
(mean)	.23	.30	
Central	.02-.62[b,d]	.07-3.12[b,d]	Rice area planted
(mean)	.18	.32	
Western Highlands	.07-.50[b,d]	.07-.46[b,d]	Rice area planted
(mean)	.23	.22	
Peninsula	.29-.34[b,d]	.29-.30[b,d]	Rice area planted
(mean)	.32	.30	
Java-Madura			
(wet)	.05[a]		
(dry)	.08[a]		Rice area planted

[a] Simple model.

[b] Distributed lag model.

[c] These districts are the nine important jute-growing areas.

[d] Range of estimates derived for provinces within regions

Period	R^2	Independent variable	Source
1948/49 - 1962/63	.64 .65	A A	(8.17) (8.17)
1948/49 - 1962/63	.54 .60	A A	(8.17) (8.17)
1914/15 - 1945/46	.62	B	(8.22)
1940/63	.89	C	(8.3)
1940-63	.29-.96[d]	C	(8.3)
1940-63	.08-.95[d]	C	(8.3)
1940-63	.38-.72[d]	C	(8.3)
1940-63	.36-.75[d]	C	(8.3)
1951-62 1951-62	.73 .99	D D	(8.29) (8.29)

Table 8.1a (continued)

Crop and geographic area	Price elasticity of area SR	Price elasticity of area LR	Dependent variable
Regency (wet + dry):			
Krawang	.03[a]		Rice area planted
Wonosobo	.56[a]		Rice area planted
Djember	-.03[a]		Rice area planted
Philippines	.15[a,e] .04[b,e]	1.16[b,e]	Rice area
Regions:			
Central Luzon	.13-.27[b,e]	.62-2.15[b,e]	Rice area
Bicol	.38[b,e]		Rice area
West Visayas	.91[b,e]	3.52[b,e]	Rice area
Cagayan Valley	negative[b]	negative[b]	Rice area
WHEAT			
Punjab (undivided)			
(Irrigated)	.08[b]	.14[b]	Irrigated wheat area
(Unirrigated)	--	.22[a]	Unirrigated wheat area
West Pakistan[f]	.1-.2[a]		Irrigated wheat area
CORN:			
Punjab (undivided)	.23[b]	.56[b]	Irrigated corn area
Thailand			
Provinces:			
Nakhornsawan	1.92[b]	1.92[b]	Corn area planted

[e]Based on results from second-trial regression.

[f]Estimates for irrigated production in seven districts.

[g]The time period corresponding to the derived estimates is not specified. The time span indicated is that used for deriving the price elasticities of cotton area.

Period	R^2	Independent variables	Source
1951-62	.85	D	(8.29)
1951-62	.58	D	(8.29)
1951-62	.80	D	(8.29)
1910/11 1940/41		E	(8.25)
1953/54 1963/64		E	(8.25)
"		E	(8.25)
"		E	(8.25)
"		E	(8.25)
1914/15 - 1943/44	.85	F	(8.22)
1914/15 - 1945/46	.50	G	(8.22)
1933/34 - 1958/59[g]	.25	H	(8.10)
1914/15 - 1943/44	.62	I	(8.22)
1950-63	.20	J	(8.3)

Table 8.1a (continued)

Crop and geographic area	Price elasticity of area SR	Price elasticity of area LR	Dependent variable
Lopburi	1.58[b]	1.81[b]	Corn area planted
Nakhornratsima	.27[b]	.41[b]	Corn area planted
Phetchbun	4.47[b]	14.17[b]	Corn area planted
Philippines	.12[a,e]	negative[b,e]	Corn area
	negative[b,e]	negative[b,e]	
	negative[a,e]		
Regions:	.23[b,e]	1.14[b,e]	
Central Luzon	negative[b,e]	negative[b,e]	
Bicol	negative[b,e]	negative[b,e]	
West Visayas	.03[b,e]	.04[b,e]	Corn area
Cagayan Valley	.17[b,e]	.43[b,e]	
BAJRA			
Punjab (undivided)	.09[b]	.36[b]	L
JOWAR			
Punjab (undivided)	--	-.58[a]	Unirrigated jowar area
BARLEY			
Punjab (undivided)	.39[b]	.50[b]	Unirrigated barley area
GRAM			
Punjab (undivided)	--	-.33[a]	Unirrigated gram area
CASSAVA			
Thailand			
Rayong Province	1.09[b]	1.09[b]	Cassava area planted
COTTON			
Punjab (undivided)			
American varieties	.72[b]	1.62[b]	Irrigated area
Local varieties	.59[b]	1.08[b]	Irrigated area
West Pakistan[h]	.41[a]		Cotton area

[h]Estimates for the eight major cotton-producing districts.

Period	R^2	Independent variables	Source
1950-63	.96	J	(8.3)
1950-63	.85	J	(8.3)
1950-63	.73	J	(8.3)
1910/11 - 1940/41		K	(8.25)
1946/47 - 1963/64		K	(8.25)
1947/48 - 1963/64		K	(8.25)
1947/48 - 1963/64		K	(8.25)
1947/48 - 1963/64		K	(8.25)
1947/48 - 1963/64		K	(8.25)
1914/15 - 1945/46	.85	M	(8.22)
1914/15 - 1943/44	.35	N	(8.22)
1914/15 - 1945/46	.29	O	(8.22)
1914/15 - 1945/46	.44	P	(8.22)
1955-63	.14	Q	(8.3)
1922/23 - 1941/42	.92	R	(8.22)
1922/23 - 1943/44	.72	S	(8.22)
1933/34 - 1958/59	.70	T	(8.10)

Table 8.1a (continued)

Crop and geographic area	Price elasticity of area SR	Price elasticity of area LR	Dependent variable
Egypt	.37[a]		Ratio of cotton area to competing crops area
SUGAR CANE			
Punjab (undivided)	.17[b,i] .34[b,j]	.30[b,i] .60[b,j]	Irrigated sugarcane area
JUTE			
East Bengal	.60[a]		Jute production
Bengal, Bihar and Orissa	.65[a]		Ratio of jute area to competing crops area
Bengal	.75[a] .68[b]	1.03[b]	Ratio of jute area to competing crops area
East Pakistan	.36[a]		Ratio of jute area to rice + jute area
9 districts[c]	.42[a]		

[i]Relative price lagged one year.

[j]Relative price lagged two years.

Period	R^2	Independent variables	Source
1913/14 - 1937/38		U	(8.37)
1915/16 - 1943/44	.44	V	(8.22)
1931/32 - 1953/54	.68	W	(8.8)
1911/12 - 1938/39	.25	X	(8.38)
1911/12 - 1938/39	.30 .65	X X	(8.38) (8.38)
1948/49 - 1962/63	.54	Y	(8.17)
1948/49 - 1962/63	.65	Y	(8.17)

Table 8.1b Specification of respective independent variables associated with elasticity estimates in Table 8.1a.

A Lagged price ratio of (summer) rice to jute.

B Lagged price ratio of rice to six alternative kharif (summer) crops, lagged yield ratio similar in construction to the price ratio, and lagged rice area.

C All equations include the lagged relative price of rice and lagged rice areas. The equations vary according to the inclusion of relative yield of rice, variations in prices and yields, and population.

D Lagged and deflated price of rice, seasonal rainfall, and time in all equations. For Java-Madura (wet), the standing area of rice at the end of the prior dry-season rice crop is included; for Java-Madura (dry), the standing area of the prior wet-season rice crop is added.

E Lagged price ratio of rice to a single, major competitive crop; ladded yield ratio of rice to a single crop; lagged wage rate for hired agricultural workers; and t as a trend variable.

F Lagged price ratio of wheat to index of ten alternative crops, lagged total irrigated area of all crops, and lagged irrigated wheat area.

G Lagged price ratio of wheat to gram, lagged yield ratio of wheat to gram, and rainfall.

H Lagged price ratio of wheat to sugarcane.

I Lagged price ratio of corn to six alternative kharif (summer) crops and lagged corn area.

J All equations include the lagged relative price of corn. The other equations vary relative to additional variables included. See C above.

K Same as E above, but substitute corn for rice.

L The dependent variable is the ratio of unirrigated area under bajra to the unirrigated area in all kharif (summer) crops.

M Lagged price ratio of bajra to six alternative kharif (summer) crops, lagged irrigation and bajra area, and rainfall.

N Lagged price ratio of jowar to bajra, lagged irrigation area, and rainfall.

O Lagged price ratio of barley to wheat, rainfall, and lagged barley area.

P Lagged price ratio of gram to wheat and rainfall.

Q Lagged relative price and proxy variable for price variation.

R Lagged price ratio of cotton (American) to six alternative kharif (summer) crops, lagged irrigation area, and lagged cotton (American) area.

S Lagged price ratio of cotton (local) to six alternative kharif (summer) crops, lagged yield ratio similar in construction to the price ratio, and lagged cotton (local) area.

T Lagged price ratio of cotton to index of rice, bajra, jowar, corn and sugarcane.

U Lagged price ratio of cotton to competing crops.

V Lagged price ratio of sugarcane to six alternative kharif (summer) crops and lagged sugarcane area.

W Lagged average jute price.

X Lagged price ratio of jute to rice plus ten other crops, all prices at the wholesale level. The lagged jute area ratio is added for the distributed lag model.

Y Lagged price ratio of jute to (summer)rice.

Yield response to price relationships

The price elasticity of area component of Equation 8.3 was discussed above.[1] Relatively-fewer estimates of the price elasticity of yield, ϵ_p^Y, are available. Since $P = \frac{p_o}{p_j}$, changes in the relative output/input price relationships affect the sign of dP. If p_o increases relative to p_j, ceteris paribus, producers find it profitable to increase the use-levels of at least some of the j inputs. As additional labor, fertilizer, and irrigation water inputs are used, yield and output are expected to increase.

The estimates derived by Mubyarto and Fletcher (8.29) and by Behrman (8.3) are presented in Table 8.2a.[2] The derived elasticities for rice are positive but of relatively-low magnitude. The estimates are quite variable for corn and kenaf.

Clark (8.8) states that agricultural practices and costs of production for jute were relatively constant in East Bengal during the period in his study. He adds that variations in jute yields were primarily random with environmental conditions rather than economic variables being the principal factor.

In regressing cotton yields on the lagged price ratio of cotton to alternative crops, the R^2's derived by Falcon (8.10) were extremely low.

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[1] The derived price elasticities are not always comparable in form to ϵ_p^A expressed in Equation 8.3.

[2] Table 8.2b represents a specification of the various independent variables used in deriving the price elasticity of yield estimates.

Table 8.2a. Estimates of price elasticity of crop yields for specified crops and geographic areas corresponding to varying time periods and estimating procedures, as specified

Crop and geographic area	Price elasticity of yield SR	LR	Period
RICE:			
Java-Madura			
(wet)	.20[a]		1951-62
(dry)	.06[a]		"
Thailand			
Loei Province	.28[b]	.28[b]	1940-63
CORN:			
Thailand			
Province:			
Nakhornrats	.60[b]	.15[b]	1950-63
Phitsnulok	6.07[b]	28.4[b]	1950-63
KENAF:			
Thailand			
4 provinces[d]	.09-.81[b,c]	.10-.81[b,c]	1954-63

[a]Simple model.

[b]Distributed lag model.

[c]Range of estimates derived for individual provinces.

[d]The four provinces are Ubonratthani, Khon-kaen, Srisaket, and Roi-et.

R^2	Independent variables	Source
.89	A	(8.29)
.80	B	(8.29)
.52	C	(8.3)
.75	D	(8.3)
.63	E	(8.3)
.40-.96[c]	F	(8.3)

able 8.2b. Specification of respective independent variables associated with elasticity estimates in Table 7.2a

Lagged and deflated price of rice, rainfall, standing rice area at end of December of the previous dry season, and time.

Same as A except substitute standing rice area at the end of August of the previous wet season.

Lagged relative price of rice, lagged rice area, farm population, and annual rainfall.

Lagged relative price of corn, lagged corn area, proxy for price uncertainty and annual rainfall.

Same as D plus proxy for yield uncertainty.

All equations include lagged relative price of kenaf and lagged kenaf area. The equations vary as to the inclusion of proxy variables for price and yield uncertainty.

That is, the price variable "explained" extremely little of the variation in cotton yields. Rather, Falcon states that lack of incentives, physical unavailability of inputs, capital rationing, uncertainty, and ignorance of better production practices were the determining factors. Because of these factors, the lack of yield response to changing relative prices cannot be imputed as economic irrationality on the part of producers.

In his study of rice and jute production in East Pakistan, Hussain (8.17) notes that inputs other than land and labor are not widely used. Consequently, variations in prices of variable inputs other than labor have little effect on input-use levels. He concludes that no statistically significant relationship exists between the lagged rice/jute price ratio and rice yields. Increases in the price ratio are associated with larger areas planted to rice and not to more-intensive cultivation of rice.

Mangahas, et al. (8.25) estimated yield-response equations for rice and corn. However, the coefficients of the relative price variable were nearly all rejected because they were found to be negative or not statistically significant even at rather high probability levels. They add that,

> "These results may have been due mainly to large differences between actual yields and intended yields, caused by unforeseen weather or other exogenous factors affecting yield" (8.25, p. 691).

Quantities marketed as a function of market prices

Production and resource allocation decisions are directly conditioned by consumption requirements and(or) anticipated market prices or exchange values. After resources have been committed, the effect of changes in market price expectations on output levels can, for some crops, be reflected

in the intensity of weeding operations and use-levels of irrigation water. As the crop matures for harvesting, producers can decide whether or not to harvest. This decision applies primarily to the production of nonedible, cash crops where producers are often located at some distance from marketing outlets so that transportation costs and reliability of market information are important factors in harvesting and marketing decisions. That is, the expected net returns may not be sufficient to induce the producer to harvest the crop. Of course, market uncertainties, transportation costs, and marketing margins affect producers at all locations from marketing centers. However, these uncertainties tend to increase with distance from the marketing point. Finally, once the crop has been harvested, the producer-consumer faces the decision of whether to consume or market, at least for edible commodities.

This relation between quantities marketed and changes in market price, presumably the price received by the producer, has been the subject of discussion for several years. The controversy centers on whether quantities marketed are inversely related to prices received so that a downward-sloping supply function exists or whether the converse relationship holds. But the controversy has been muddled by writers referring to noncomparable situations and(or) not being very explicit about the conditions they are attempting to describe and evaluate. Some studies are based on a priori arguments; others are supported by data.

For those proponents of an inverse relationship between quantities marketed and prevailing market prices, the point of departure is the

assumption of a relatively-fixed demand for cash by producers such as $\bar{D}_c = p_n q_n$. As the market price received increases, the quantity of q_n that must be marketed so as to obtain $\bar{D}_c$ is reduced. See Figure 8.1. The converse also holds.

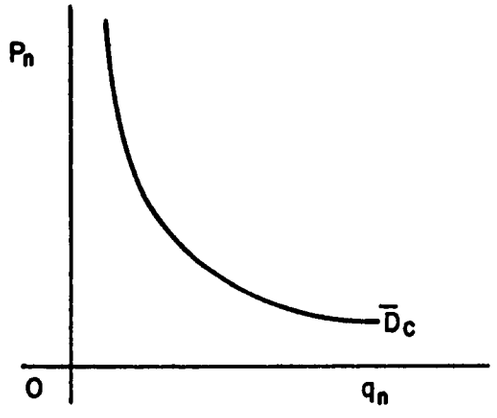

Figure 8.1. Inverse relationship between price and quantity marketed for obtaining $\bar{D}_c$

In Figure 8.1, the $\bar{D}_c$ curve is a rectangular hyperbola with a price elasticity of quantity marketed equal to negative unity. If external financing, savings, or hoards are not used to at least partially satisfy $\bar{D}_c$, the quantity which must be marketed has first claim on production realized. The quantities available for consumption are a residual. As this residual is chronically inadequate for many small-scale producers, they must resort to financing or credit in kind in order to sustain consumption patterns. The above viewpoint is best articulated by Mathur and

Ezekiel (8.27), Khatkhate (8.21), and Neumark (8.31).[1] Mathur and Ezekiel and Neumark are explicit in stating that this market behavior is applicable to producers operating in " . . . an intrinsically nonmonetized economy operating on the margins of subsistence to the monetized world around..." (8.27, p. 399) and in " . . . an embryonic exchange economy . . ." (8.31, p. 48). Because producers operate in this environment of limited contact with forces of change so that the essentially traditional production and consumption patterns are sustained, the demand for cash to pay rent and taxes and to purchase a limited number of consumer goods is assumed to be nearly invariant. Implicitly, the price elasticity of substitution between those commodities produced and directly consumed and those purchased as consumer goods is zero. The income elasticity of demand for these consumer goods is also assumed to be zero.[2]

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[1] One of the earlier proponents of a perverse market supply function was Boeke (8.5, pp. 29-30) who considered this phenomenon representative of Eastern society as compared with Western society. For a discussion of a perverse market supply function for rubber by native growers in the Netherlands Indies, see Boeke (8.4, p. 49). This perverse relationship for rubber marketings appears to be adequately but conditionally refuted by Joosten (8.19). Joosten concludes, "If the peasant farmer has alternative opportunities no perverse supply curves are to be expected in the case of cash crop commodities. In this connection it is interesting to note that the statistical data on the production of the great rubber estates tend to exhibit a perverse supply curve...The rubber estates had no alternatives" (8.19, p. 102). The condition imposed by Joosten is that the peasant has alternative production opportunities.

This perversity is also noted by Chaturvedi (8.6, p. 20) and Bansil (8.1, p. 30), both on an a priori basis.

[2] Mathur and Ezekiel assert that the income elasticity of demand is only close to zero. This follows from their statement that "It is probably likely that an increase in food consumption will be accompanied by some increases in the consumption of non-food consumer goods for which an increase in cash income will be necessary" (8.27, p. 398).

Only Mathur and Ezekiel (8.27) adduce evidence to support their proposition of a downward-sloping market supply function. Their evidence is the following:[1]

> "In an investigation conducted under the auspices of the Gokhale Institute of Politics and Economics in the Akola and Amraoti districts of the state of Maharashtra in India during 1955-56 and 1956-57, it was found that while prices increased by about 33 percent between the two years, sales decreased by about 7.5 percent. This was in spite of the fact that total production had increased by about 38 percent" (8.27, footnote 4, p. 397).

Mathur and Ezekiel (8.27) reinforce their proposition by asserting that producers save in kind rather than in monetary terms. That is, any output in excess of the amount necessary to satisfy $\bar{D}_c$ and customary consumption patterns is placed in contingency stocks as a hedge against adverse production and market price conditions. Furthermore, as market prices fall so that a larger quantity of q_n must be marketed, a portion of increased marketings comes from contingency stocks. The increased marketings tend to drive market prices even lower until rightward shifts in the market demand curve lessen the downward pressure on prices

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[1] Presumably, Mathur and Ezekiel are referring to food grains production and sales. However, Dandekar (8.9), after consulting with Mathur, states that the co-authors were actually referring to all farm products. Furthermore, Dandekar cites another analysis of the same data made by Mathur (8.26) which indicates that prices and quantities marketed moved in the same direction for wheat, jowar, and other cereals. Since these are food grains, the results are contrary to Mathur and Ezekiel's proposition. Dandekar also notes that the price elasticities of market supply are negative for cotton and groundnuts. He concludes that the perverse market supply relationship for all farm products observed by Mathur and Ezekiel resulted because these two crops accounted for 50 and 10 percent, respectively, of total sales of farm products.

and a temporary equilibrium is realized. The demand curve shifts to the right because falling food grains prices raise producers' real incomes.

Although Mathur and Ezekiel (8.27) are explicit that the market behavior they postulate applies to semi-subsistence farmers operating in an essentially-nonmonetized economy, their evidence of perverse marketing behavior is based on data reflecting the aggregate effect of marketing decisions by producers of all size holdings. Mathur and Ezekiel do not state what size of holdings characterizes semi-subsistence producers. However, the relatively-large proportion of the total value of marketings attributed to small-scale producers who act in the manner postulated by Mathur and Ezekiel may tend to generate a perverse market supply relationship.

Implicitly, Mathur and Ezekiel (8.27) do not admit any effect of changes in market prices on production decisions and quantities produced. For example, rising market prices requiring less to be marketed and permitting more to be consumed do not have a favorable impact on production. However, this is rather consistent with the economic environment they postulate. However, the authors state, " . . . when the per capita income of the farmer rises above the level at which the farmer's food grain needs are more or less satisfied, the inverse relationship between price and marketed surplus will be less likely to hold and the existing instability in the food grain market will probably be considerably reduced" (8.27, p. 400). The authors do not discuss how or when per capita incomes increase. Consequently, it is not possible to impute their postulated

market supply behavior as being of a short-run or long-term nature. Presumably, this behavior persists as long as per capita production of food grains remains below per capita "food grains needs". Despite the scattered successes of the so-called "Green Revolution", the extremely high population growth rates, especially in rural areas, suggest that substantial increases in per capita production of food grains will only be a longer-term phenomenon in many less-developed areas.

Krishnan (8.24) relaxes the Mathur-Ezekiel assumption of a fixed demand for cash and constructs a short-run behavioral model describing the relationship between aggregate marketing of food grains by producers-consumers and market prices. The point of departure is that quantity of food grains produced, $\bar{Q}$, which can be consumed or marketed.[1] Krishnan uses a demand function incorporating constant price and income elasticities, Equation 8.5, which is appropriate for a time period confined to the production year.

$$r\bar{Q} = AP^{-\alpha}(\bar{Q}P)^{\beta} \tag{8.5}$$

$$M = (1-r)\,\bar{Q} \tag{8.6}$$

The terms in Equations 8.5 and 8.6 are interpreted as follows:

r = Proportion of net food grains produced that are directly consumed

P = Food grains price

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[1] $\bar{Q}$ may also include any contingency stocks which are potentially marketable. Krishnan (8.24) notes that $\bar{Q}$ is net of seed requirements, etc. Presumably, et cetera includes any payments in kind.

α and β = Price and income elasticities of demand, respectively

$\bar{PQ}$ = Income or value of the endowment of food grains

A = A constant

$$M_e = -(\beta - \alpha)\frac{r}{1-r} \qquad (8.7)$$

Equation 8.6 represents the amount of $\bar{Q}$ which is marketed. As P varies, so do producers' income, $\bar{QP}$, and $r\bar{Q}$. The price elasticity of quantity marketed is given in Equation 8.7.[1] Since the term $\frac{r}{1-r}$ is always non-negative, the sign of M_e depends upon the relative magnitude of β and α. If the price elasticity of demand, α, is greater than the income elasticity of demand, β, M_e will be positive indicating that, ceteris paribus, prices and quantities marketed move in the same direction. If the converse holds, M_e is negative and a perverse price-quantity marketed relationship holds. Krishnan quantifies Equation 8.7 by substituting $-\alpha = -0.3584$, $\beta = 0.5216$, and $r = .65$.[2] With these data, the derived $M_e = -0.303$. That is, with small changes in P, given $\bar{\alpha}$, $\bar{\beta}$, and $\bar{Q}$, price and quantity marketed move in opposite directions. He carefully points out, however, that he is dealing with a short-run phenomenon and that any effect of price variations on production have not been taken into account. His model and analysis are only appropriate when $\bar{Q}$ is assumed.

[1]The derivation of M_e is given in Appendix B. A similar derivation is made when Q is disaggregated into two food grain commodities. This is a more meaningful construct since it reflects the impact of a change in the relative prices of the two goods on consumption and marketing decisions.

[2]The elasticity estimates were derived in an earlier study by Krishnan which is cited in (8.24). The estimate of r = .65 is based on results from the All-India Rural Credit Survey (7.46).

Furthermore, as economic development proceeds, both $\frac{\lambda}{1-r}$ and β decline. Conversely, the absolute value of α increases. Consequently, M_e is expected to eventually be positive but with a low value. In the extreme where all food grains are marketed such that $r = 0$ and food is purchased as processed goods, $M_e = 0$. That is, the market supply function is perfectly inelastic and price changes have no effect on quantities marketed. This result necessarily follows from the implicit assumption in Krishnan's model that food grains can only be consumed or marketed. The possibilities of storage and utilization as livestock feed are not admitted.

Bardhan (8.2) has recently completed an econometric study of the market supply function for food grains in twenty-seven villages in the Indian states of Punjab and Uttar Pradesh. Multiple regression analysis was used to assess the impact of six independent variables upon the dependent variable, the latter designated as the percent of total production of food grains sold. The dependent variable reflects both cereals and pulses. Payments in kind represented one of the six independent variables. The remaining five variables follow:

X_1 = Food grains production (in maunds) per adult unit of the cultivating population of the village

X_2 = Derived average price of food grains in a village[1]

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[1]The average food grain price for each village was derived by dividing the total value of food grains production by the total physica output. The regressions were also run using another average price derived by dividing the total value of food grains sales by the total volume of sales. In general, the average price based on sales resulted in larger negative regression coefficient for X_2, a higher R^2, and larg negative price elasticity of percentage marketed.

X_3 = Value of commercial crops produced, not including food grains per adult unit of the cultivating population

X_4 = Value of milk and milk products per adult unit of the cultivating population

X_5 = Index of concentration of cultivated acreage in a village

Essentially two sets of regression were completed. The first included all cultivators in the village surveys. The second set included only those who were in a relatively-good position in terms of land holdings and annual incomes.[1] The individual village surveys were conducted at differing times over the 1954-61 period. Four villages were surveyed twice. Each village survey related to the economic activities for a single year.

Only the importance of X_1 and X_2 in explaining Y, the dependent variable, will be discussed here. Consider X_1 first. In all regressions, the derived regression coefficient for X_1 was positive and was statistically significant at the 1-5 percent level. That is, increases in per capita food grain production were associated with an increase in the percent of total food grains produced which are marketed. In the regression including all cultivators surveyed, the production elasticity of percent marketed was estimated to be about .8. With the regression subsets of

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[1] For example, one regression run was only for cultivators with "operational holdings" of ten acres or more. A further subset was used: those cultivators having ten acres or more which generated an annual income of Rs. 1,000 or more, net of outlays for cultivation costs. Bardhan indicates that this net income figure "may be regarded as above the subsistence minimum for the period under consideration" (8, p. 57).

cultivators having ten cultivable acres or more and those having ten or more acres plus annual incomes of Rs. 1,000 or more, the production elasticities dropped to .6 and .4, respectively.

Similarly, the magnitudes of the X_1 regression coefficients were reduced. Consequently, among those cultivators in relatively good economic positions, the effect of per capita food grain production on percent marketed was less than when those producers in poorer economic positions were included in the analysis.

The derived regression coefficients for X_2 were negative for all regressions completed. The coefficient was statistically significant at the 1-5 percent level when all cultivators were included. It was significant at the 10-25 percent level when the subsets based on acreage and income considerations were analyzed. Thus, increases in the derived average price of food grains, ceteris paribus, were associated with reductions in the quantities of food grains marketed and an inverse market supply function was expected to be operative. But, as already noted, these results were based on survey data covering only one crop year. The price elasticity of proportion marketed was about -.6 for the sample of all cultivators. For those having ten or more acres and at least Rs. 1,000, the price elasticities increased to -.33 and -.45, respectively.[1] That is, for those in relatively better economic positions,

[1]Intuitively, the latter subset, i.e., those having 10 or more acres and at least Rs. 1,000, would be expected to be associated with a higher price elasticity, i.e., a less-negative elasticity, than the subset not having any income constraint. The derived elasticities do not support this contention.

the perverse response to price changes is expected to diminish.

As Bardhan (8.2) points out, even though rising prices apparently cause the income effect to outweigh the substitution effect so that more food grains were consumed and quantities marketed reduced, higher prices may be an incentive to private investment and increased output. On the basis of the data, as analyzed, improved economic positions tend to lessen the strength of the inverse price relationship. Further, the results apply to the aggregate marketings by producers surveyed and for a particular region of India. The activities of individual producers are not discernible. The results need not apply to other regions of India.

Krishna (8.23) developed a construct for estimating the price elasticity of market supply for a single crop. The construct incorporates the effect of price changes on both consumption and production. The basic formulation is given in Equation 8.8 where M, Q, and C are the quantities of wheat marketed, produced, and consumed, respectively. Shocking Equation 8.8 with respect to P, the relative price of wheat, Equation 8.9 is obtained. Equation 8.9 is restated in terms of elasticities in Equation 8.10 where $r = \frac{Q}{M}$, b = price elasticity of production, and d = total elasticity of home consumption with respect to P.[1] Based on estimates available for the various components of Equation 8.10. Krishna derives estimates of $\underline{e}$, the price elasticity of quantity of wheat marketed in the Punjab.

[1]The construct and interpretations are developed in Appendix C.

$$M = Q - C \tag{8.9}$$

$$\frac{dM}{dP} = \frac{dQ}{dP} - \frac{dC}{dP} \tag{8.10}$$

$$e = rb - (r-1)d \tag{8.11}$$

See Table 8.3. The estimates are all positive as long as price elasticity of the substitution effect on consumption is negative. See Appendix B. However, both Nowshirvani (3.32) and Behrman (8.3) correct an error in Krishna's formulation. See Appendix B. Using the ranges of values for the parameters, as cited by Krishna (8.23, p. 83), the minimum and maximum values for the estimated price elasticities of marketings for the three different formulations are given in Table 8.3.

Table 8.3. Minimum and maximum values for the estimated price elasticity of quantity of wheat marketed based on three different estimating procedures

	m = .1	m = .5	m = .9
Krishna	2.30 to 5.56	.12 to .78	.08 to .26
Nowshirvani	-2.74 to 5.56	-.22 to .74	.07 to .56
Behrman	-2.56 to 6.03	-.19 to .85	.07 to .26

When relatively-small proportions are marketed, such as m = .1 → .5, some of the derived elasticities are negative indicating that a perverse market supply function may be operative under these conditions. Therefore, when the effect of price changes on production as well as on direct consumption is admitted, the occurrence of a backward-sloping market supply function cannot be ruled out. This conclusion is based on the effect of small price movements and given the estimates of the parameters used.

Mubyarto and Fletcher (8.29), using the uncorrected Krishna formulation, derived estimates of the price elasticity of rice marketings in Java-Madura. Based on their estimates that b = .1 and d = .5, the price elasticities are -3.5 and -.3 when 10 percent and 50 percent are marketed, respectively. Similarly, Mangahas, et al. (8.25) use the Krishna model to derive estimates of the price elasticities of rice and corn marketings in the Philippines. Since they do not have estimates of d, their elasticities reduce to e = rb. They point out that this is a low estimate since the second term in Equation 8.10 is expected to be negative. Since they set d equal to zero, the error observed by Nowshirvani and Behrman does not enter into their derived estimates. The estimates for b were given in Table 8.1 for several regions of the Philippines. The values for r vary among regions ranging from .37 to .65 for rice and .19 to .40 for corn. Out of the 18 regions for which estimates of e are derived, only three are negative. The positive values range from .18 to 1.28 for rice and .17 to 2.5 for corn.

Finally, Behrman (8.3) uses his construct, as in Equation C.20 in Appendix C, to estimate the price elasticity of rice marketings for Thailand. But since he assumes that g = h = 0,[1] his estimating formulation reduces to $e = rb_1$. The derived short-run values for e are around .4.

At the beginning of this section, it was noted that those attempting

[1] Behrman states, "Regardless of what factors underlie the results which were obtained no significant relative price or income response in Thai per capita domestic rice consumption has been supported statistically. (8.3, p. 313).

to determine the nature of the market supply function base their conclusions on differing situations. Yet, whether the quantity produced is fixed or variable, the possibility of a perverse market supply function for aggregate marketings exists.

Public price supports, ceilings, and subsidizations

Public price policies have a differential impact on producers. In the case of price supports designed to raise and(or) stabilize producers' incomes, the level of benefits realized is essentially proportional to the level of marketings. Subsistence-oriented producers, tenants required to market to their landlords, and debtors required to market to their creditors are little affected, if any, by the prices supported in the market. The relative levels at which prices are supported affect the relative profitability of competing crops and, in turn, production patterns. Much of the data in Table 8.1 lend support to this postulated behavior, at least among producers of cash crops.

Supported prices reduce the price uncertainty producers confront when making production and private investment decisions. This, of course, assumes that prices are announced in advance of the production period. But supported prices are also associated with a guarantee that the government will actually purchase these commodities if the market price falls below the announced price. Consequently, the government must allow for financial and administrative resources for purchasing and storing these commodities. Not all commodities are easily storable, especially in tropical climates. Therefore, spoilage and quality deterioration are

additional costs that must be considered. However, the accumulated stocks can serve as contingencies for adverse production periods and as buffer stocks to be released on to the market when market prices rise too high. Price variability is reduced and food and fiber costs to consumers are kept from rising.

Public subsidization of input costs can be used to encourage the use of fertilizers, improved seeds, and pesticides. Referring to the capital constraint in Equation 3.1, $K^o - \sum_{j=1}^{m} p_j q_j$, as some of the p_j are reduced, more q_j are obtainable with K^o. As with price supports, the subsidization of input prices primarily benefits the market-oriented producers--those who are the largest purchasers of inputs in the market. If the levels at which the q_j are used increase, a major proportion of the increase in production would be expected to appear in the market. The rightward shift in the market supply curve would tend to keep market prices down. Consumers and exporters would benefit. Producers participating in the market but not using the price-subsidized inputs would be penalized by the lower prices they receive. In addition, the public must assume the costs of the subsidies; these funds have opportunity costs.

The use of price ceilings to keep market prices from rising benefit consumers, manufacturers using agricultural commodities, and exporters. On the other hand, if the price controls are set at too low a level, production and quantities marketed may be reduced. Consequently, while consumers prefer the low prices, the quantity supplied may be insufficient to meet the demand and some rationing program must be implemented.

Fiscal Policies Affecting the Agricultural Sector

The importance of the agricultural sector, both in terms of number of people employed and proportion of national income originating within the sector, has already been noted. The contribution of the agricultural sector to general economic expansion is, of course, conditioned by growth within the sector itself. Higher per capita real incomes may be associated with higher absolute levels of savings with some transfers to other sectors of the economy, the potential for higher direct and indirect tax revenues, and an expanding market for consumer and producer goods. Conversely, higher per capita incomes, through output increases and(or) price advances, may result in a decrease in the quantities of agricultural commodities marketed. Evidence of this behavior was noted in the previous section. Even assuming that the price elasticity of quantities marketed is positive, government policies may be implemented in an attempt to increase the magnitude of this elasticity.

A net transfer of income out of the agricultural sector may be effected by turning the terms of trade against producers, by implementing more rigorous tax policies, and by creating institutions to facilitate saving which can be used for private investment elsewhere in the economy. In economic systems based on Communistic principles or where remnants of feudal systems are still operative, output and income transfers are effected through marketing quotas and compulsory deliveries.[1] However, turning the

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[1]The relative emphasis given to income transfers through the marketing mechanism or through compulsory transfers is the crux of Owen's (8.33) discussion of the Marshallian and Marxian approaches to capital transfers within the economy. Compulsory deliveries to the government have been required in several Asian countries having capitalistic-oriented economic systems (8.40) In a vein similar to Owen, Schultz (8.35) uses the terms "market approach" and "command approach".

terms of trade against agriculturalists, increasing the tax burden, and raising marketing quotas may act as disincentives to increasing output levels and undertaking private investment in the firm. Consequently, the increased need for larger transfers of income to the government and to other sectors of the economy must be balanced against the possibility of a reduced rate of growth of agricultural output and marketings. Reduced per capita real, disposable incomes result in many low-income producers having neither the financial capacity nor incentive to expand productivity. A partial withdrawal from the monetized economy may also result, especially for subsistence-oriented producers.

As is apparent, the effectiveness of monetary and fiscal policies in stimulating and guiding economic activity at preferred growth points depends on the infrastructure of the economy and its stage of economic development. Where activities of the banking system are primarily confined to the relatively urban areas, increases in the money supply through the central bank system have a relatively minor impact on the money supply in rural areas. Where the degree of monetization in the economy is low, the administrative structure for assessing and collecting taxes is weak, and the opportunities for tax evasion are widespread, governments cannot rely on personal income taxes as a principal source of public revenues. Yet, such revenues are necessary for implementing national development plans and alleviating bottlenecks retarding developmental processes.

Fiscal policies take the form of programs of public taxation and public expenditures designed to influence the direction of economic

activity and the distribution of wealth and income in the economy. The major portion of this discussion will focus on taxation policies; however, a few comments will be made on public expenditures. In Chapter VI, the need for public investment in social overhead capital was discussed. Such investment is necessary to remove some of the structural bottlenecks in the economy. The tendency may be to view the importance of such investment by utilizing the concept of the "multiplier".

If income equals Y_o in t_o, investment in t_1, I, raises income in t_1 to $Y_1 = Y_o + I$, assuming Y_o is sustained. Defining b as the marginal propensity to consume, I in t_1 is income of which bI is expended or consumed in t_2. Consequently, income in t_2 is $Y_2 = Y_o + I + bI$, assuming that I and Y_o are sustained in t_2. In a similar manner, $Y_t = Y_o + I + (b + b^2 + \ldots + b^{t-1})I$. This geometric series can be reduced, as in Equation 8.11. Since $b < 1.0$, as t becomes sufficiently large, $b^t \rightarrow 0$

$$Y_t = Y_o + \frac{(1 - b^t)}{(1 - b)} \quad (I) \qquad (8.11)$$

$$Y_t = Y_o + \frac{1}{1-b} \quad (I) \qquad (8.12)$$

and Equation 8.12 results. The term $\frac{1}{1 - b}$ is designated as the "multiplier". If b = .9, the multiplier has a value of 10. If I = 100 units, $Y_t - Y_o = 1000$ which is the additional income generated by I.

Implicit in the formulation is an assumption of constant prices. But more importantly, the assumption that bI is expended in t_1 is based on another implicit assumption that sufficient consumer goods become available for purchase so that prices are not forced upward. Therefore,

the use of the "multiplier" presumes the absence of structural bottlenecks in the economy so that inputs and commodities flow freely within and among sectors. Where transportation, marketing, and communications facilities seriously retard this flow, use of the "multiplier" is inappropriate. Such is the case for most, if not all, less-developed countries.

Government revenues are necessary for underwriting the costs of maintaining the government system and for implementing development programs. Such revenues are raised through a variety of tax devices.[1] The alternative is deficit spending. The feasibility of alternative tax devices depends upon the comprehensiveness of an administrative structure for assessing and collecting taxes and on the stage of economic development of the society.[2]

Since agriculture is the principal sector in most less-developed countries, this sector also provides a major fraction of tax revenues. In the absence of higher output and income levels, an across-the-board increase in taxes results in reduced consumption and(or) savings levels. But if this forced saving is at the expense of consumption levels, labor efficiency and productivity may be impaired. For these same individuals,

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[1] Generating public revenues through marketing quotas and compulsory deliveries is essentially a direct tax on producer-consumers, though not specifically designated as taxes.

[2] Referring to Equation 8.12, since the term b in the multiplier (1/1-b) is the marginal propensity to consume, an increase in the tax level would be expected to lower b and, in turn, reduce the value of the multiplier. To the extent the tax structure is progressive, a mechanism exists for partially stabilizing economic activity.

an increase in taxes reduces their capacity for private investment and for an improvement in their economic well-being. The question arises as to whether the tax funds are used more productively by the individual producer or by the government. A partial answer follows: as long as per capita consumption levels remain low, if the tax increments were returned to the producer, an increase in consumption rather than private investment is likely. This follows from physical requirements and a high income elasticity of demand for food.[1] Low returns to private investment would accentuate this behavior. What is needed is a tax program which has a differential impact on taxpayers so that private initiative is not discouraged while the government obtains funds necessary to defray the costs of programs stimulating and complementing private initiative. The difficulties in devising such a program are quite apparent. For example, given the numerous uncertainties facing producers, what is the appropriate level of profits the risk-taker should be permitted to earn? As uncertainties increase, profit margins must usually also increase before additional private investment is made. In this situation, a progressive tax on profits would dampen investment incentives. Conversely, tax relief in some areas may stimulate economic activity and future tax remittances to the government.

[1]Joan Robinson states the problem more clearly: "But for the most part, the mass of their people are living below the minimum of subsistence necessary for working efficiency. The problem can be stated in a straightforward manner in terms of the need to provide for an increase in necessary consumption while restraining unnecessary consumption" as quoted in Myrdal (8.30, p. 2097).

The need for a comprehensive tax program is reinforced by the unequal distribution of wealth and income found in most less-developed countries. That is, tax programs are one means for redistribution of income. Given the high marginal propensities to consume among low-income groups, a redistribution of income in their favor would stimulate the market for consumer and producer goods, including imported goods.[1]

Wai (8.42) provides some interesting insights as to the levels of taxation among various countries, classified according to per capita income level. The variation is quite large within income groupings, but government revenue as a percent of national income tends to be higher among the "high" income countries.[2] The median percentage is 25.0 for the "high" income countries and 15.2 and 13.7 for the "medium" and "low" income countries, respectively.[3] Within the "low" income countries, the percentages which are based on 1959 data range from 23.7 for the United Arab Republic to 7.7 for India. The comparable figures for Western

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[1] In this connection, Bauer writes, "Many branches of the consumer goods industries, the development of which is ultimately closely linked to agricultural advance, have been working below capacity for some years. This is the result of several factors. These include the extremely low productivity of agriculture and its consequent failure to provide a growing market for industrial output" (7.6, p. 57).

[2] Government revenue includes all taxes, transfer payments, surpluses of government trading associations, interest and dividends received, sales of public assets, and repayments of loans.

[3] The three income groupings are based on per capita annual incomes greater than $500, $200-500, and less than $200. Wai (8.42) adds that revenues from local governments are not included in the median percentages. For example, he estimates that the 7.7 percent for India would be doubled if revenues from local governments were included.

European countries are in the 20-30 percent range, with the exception of Switzerland at 8.1 percent. The lower, apparent incidence of taxation among the "low" income countries[1] is likely due to a number of factors. First, low per capita incomes, realizing that these are only averages, reflect a low capacity to pay taxes especially where inflation drives up the cost of living. Second, the relatively-low degree of monetization of the economy in some countries or areas within countries provides a low tax base for income taxes and turnover taxes on commodities sold and purchased. The difficulties of identifying and valuing commodities and services is apparent. Third, the administrative mechanism for assessing and collecting taxes affects both the scope and intensiveness of taxation and, in turn, the effectiveness of tax policies. Even more fundamental is the need for appropriate legislation which can be enforced. The politically powerful have either a direct or indirect self-interest in supporting legislation which provides them tax loopholes and exemptions with few penalties for tax evasion (8.11, 8.14, 8.30).[2] Not only are potential

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[1] As noted in the previous footnote, taxes generating local government revenues are not included. Furthermore, information on who bears or pays the taxes is not available. Where a relatively-small group accounting for a proportionately larger amount of national income are not taxed or are able to evade taxes, the tax burdens of those paying taxes would be considerably higher than the percentages indicated above.

[2] In this connection Myrdal states, " . . . in colonial times taxation was looked upon as an instrument of exploitation and that resistance to paying taxes was often part of the nationalist struggle for independence. Although that day is long past, the idea that taxes should be paid according to the intention of the legislator has never become part of the mores of the business community. Tax offenders are seldom prosecuted; when they are and are found guilty, the punishment is very mild and no publicity attends it" (8.30, p. 2100).

government revenues reduced but tax avoidance by the elite certainly does not encourage tax compliance by the nonelite.

Two broad distinctions in tax policies of "low" income countries relative to those of "high" income are discernible (8.30, 8.42). Most "high" income countries place relatively more emphasis on direct taxes such as income and property taxes. The median percentages for direct taxes as a percent of total central government revenue for 1959 were 43, 29, and 20 percent for the "high", "medium", and "low" income countries, respectively (8.42). The second distinction is that lower income countries obtain a major portion of their tax revenues from taxes on foreign trade and from other indirect taxes which can be shifted to other individuals.[1] For the "low" income countries, taxes on foreign trade as a percent of all government revenue ranged from 20 percent for countries of the Near East to 50-60 percent for Ghana and Central American countries (8.42).

In a sense, personal income taxes are a form of forced saving. This tax represents a claim on income earned, usually net income. The immediate consequence of imposing or raising this tax is that the profits or return to management is reduced. If an allowance for tax is built into the firm's cost structure, the cost curves are shifted upward reducing profits realized, ceteris paribus. When profits are reduced, the capacity for saving and(or)

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[1]The following situation is noted in Thailand: "Under the present tax system, tax on foreign trade accounts for about one-half of total government revenue while income tax constitutes less than 10 percent. There is no property tax, and the rate of land tax is relatively low compared with that in neighboring countries. Professional incomes remain practically untouched" (8.39, p. 173).

private investment is also reduced. This reasoning is often used as the basis for arguing against progressive income tax. But as Goode (8.14) and others have noted, the relatively wealthy in many less-developed areas are often conspicuous for their nonproductive investments and expenditures rather than for productively reinvesting earned profits.[1] Higher taxes for these individuals need not adversely affect economic activity. Furthermore, a portion of taxes from rural areas may be indirectly returned to producers in the form of public investment in the infrastructure of the economy which raises the productivity of agricultural inputs and opens new marketing outlets for agricultural commodities and consumer goods.[2]

An increase in taxes, ceteris paribus, is associated with a decrease in disposable, personal incomes. If individuals are to maintain their level of living, either external financing must be obtained or incomes must be raised through increased output, lower production costs, or off-farm income from hiring out labor or engaging in small-scale processing and marketing activities. If the demand for income increases, as in Figure 7.5, through using more labor inputs and necessary complementary inputs, the firm's output level may be increased. If the marketing and demand structure is such that market prices are not lowered as the aggregate output is increased, gross incomes and perhaps net incomes

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[1] Some of the attributes of investment behavior by landlords were noted. in Chapter III. Chapter VII includes a discussion of factors other than net returns affecting decisions for private investment.

[2] For example, taxes on rubber exports in Malaya were used to subsidize replanting costs as relatively unproductive trees were removed from production (8.44).

are increased. However, producers must have access to the necessary complementary inputs.

Since income taxes are usually paid in cash, an increase in taxes is equivalent to an increase in the demand for cash. Abstracting from external income, the increased demand for cash is met by increased marketings or through credit financing. Indebtedness or a higher debt burden often has a deleterious effect on the borrower's future economic well-being. Increased marketings while output levels are invariant are only possible through reductions in consumption or inventories. For the subsistence-oriented, reducing per capita consumption must be juxtaposed with the potentially adverse consequences for personal health and labor productivity. Higher present marketings often mean that these individuals must repurchase the same commodities at a later date, usually through credit from local merchants and moneylenders. The producer gets it from both sides: he must sell when market prices are relatively low and purchase when prices are high plus repay credit costs.

Even where income taxes are attempted to be levied according to the individual's ability to pay, the problems of enforcing compliance and determining income levels are sizeable. The peasant who may be illiterate and unaccustomed to keeping a system of accounts is not in a position to provide records indicating his income. A large proportion of the edible commodities produced is consumed directly. Another portion is bartered rather than sold in the market. The difficulties in determining his income are apparent. At the other extreme, high income individuals are more aware of means of evading taxes and have

the political and economic influence to escape the major brunt of their implicit tax load.

Finally, devising and implementing an effective income tax program requires a large input of administrative resources. The reliance on local collectors alters social relationships in the villages. This newly-found power by tax collectors often generates opportunities for preferential treatment and often extracurricular tax collections. Furthermore, the low per capita incomes and consequent large number of relatively-small tax receipts to be collected must be weighed against the costs of such collections. An alternative form of taxation may be both more physically and economically feasible.

Marketing Boards

The use of marketing boards is another public instrument to affect economic activity. Although functions relating to quality control in assembling and processing goods for export markets and dispensing technical information are important, the principal objective of marketing boards is to stabilize prices and, in turn, producers' incomes of those commodities covered by board activities. Another important objective is the generation of board profits or reserves to finance public expenditures on the economy's infrastructure and for production loans to growers. Furthermore, a number of marketing middlemen are eliminated (8.40).

Monetary reserves are accumulated during periods of relatively-high prices when the differentials between prices received by producers and export prices are high. Since producers' incomes are not raised corres-

pondingly, they are, in effect, taxed.[1] Conversely, during periods of lagging export prices, producer prices are supported at higher than market levels so that producers' monetary incomes are nearly maintained. The cost of income maintenance is financed by board profits or reserves accumulated in the past.

Immediately following World War II, marketing boards were at least partially successful in dampening inflationary pressures associated with potentially rising export incomes which would be used to demand relatively limited quantities of imported manufactured goods (8.7, 8.20). While prices were partially stabilized, producers realized prices substantially below export prices. The monetary reserves which consequently were accumulated, in excess of operating expenses of the boards, were used to underwrite the costs of development projects especially in Ghana, Nigeria, and Uganda through board projects or through loans and grants to public programs (8.7, 8.20, 8.40). The financial contributions of marketing boards to development programs were reduced as export prices became less favorable in the late 1950's and as governments placed more emphasis on variable export taxes as a source of revenue.

A similar situation existed in Burma where public investments have been primarily financed by profits earned by the State Agricultural Marketing Board on rice. Since this organization has a monopoly on rice

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[1] The amount of the tax is equivalent to the difference between the producer and export prices after transportation, processing, and marketing costs have been deducted plus some allowance for the producer's contribution to the price stabilizing fund (8.40).

exports, substantial profits have been realized by the price differentials between prices paid producers and export prices. Profits from these activities have ranged from 25 to 40 percent of total government revenue (8.41, p. 25). Government control of rice exports in Thailand also resulted in sizeable profits, a major portion of which was channeled into government revenue (8.39).[1]

Whether a country's economic development has been furthered through the operation of marketing boards is open to conjecture (8.20). Sufficient evidence is not available. The contributions of boards to dampening inflation and generating funds for public uses have been noted. The question is whether this "taxing" of producers is preferable to letting producer incomes vary with export prices.[2] The consequences for saving, private investment, and personal enterprise on the part of producers are subject to debate.

If marketing boards are to be economically successful, they must be implemented when export prices are low so that necessary reserves for operating expenses can be accumulated as export prices increase (8.42). In addition, sufficient control over private marketing is necessary to eliminate private sales which would undermine the board's monopoly position.

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[1]Government control of rice exports was discontinued in 1955 and emphasis was shifted to use of export taxes. The tax level varied with export prices. Prices to domestic consumers were kept relatively low (8.39).

[2]Kamarck (8.20, p. 126) gives a summary of the criticisms leveled against marketing boards by the East African Royal Commission.

Agricultural Extension Services

Extension personnel are generally viewed as the transmitters of information relative to costs and returns of improved inputs, alternative production techniques, and economic outlook data for use by producers. More generally, they have three broad functions: (1) To perceive and diagnose problems confronting the producer whether such problems deal with technical aspects of production, securing credit, or gaining access to remunerative marketing outlets; (2) To devise means for alleviating or solving these problems; and (3) To communicate and to persuade producers to adopt these recommended means. They essentially act as consultants to producers or producer organizations so that the latter can more rationally accommodate their decision-making processes to a changing environment. The general responsiveness of producers to changing price and profit situations was borne out in the previous section on public pricing policies. This responsiveness, however, does not imply that producers, especially subsistence-oriented producers, have the capability to acquire or digest technical information on improved inputs and cultivation practices. Competent extension agents can fill that need. But the flow of information need not be unidirectional. Extension workers are, theoretically, in the best position to communicate the needs and potentials of producers to regional and national planning groups. The effectiveness of extension personnel is contingent upon a number of factors, some of which are listed below:

(1) As representatives of the government, their creditability and

motives are regarded with various degrees of suspicion (8.16, 8.34, 8.44).[1] Producers living in relatively-isolated villages are more skeptical. If extension services are provided through a local cooperative or through cooperation of a village leader, individuals contacted are likely more receptive.[2]

(2) They need to have a working knowledge of agricultural operations and of existing patterns of economic and social relationships.[3]

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[1] While this suspicion is expected to be more pronounced among low-income, subsistence-oriented individuals the following quotation relative to the Community Development Program in India adds another dimension: " . . . high caste people (are likely) to be suspicious of any program sponsored by the government, and to fear that any cooperation on their part will contribute to the ultimate destruction of their cherished status and their advantageous economic position. Therefore, they oppose the Community Development Program; it is seen as a palliative to gain their confidence in order to undermine their social, ritual, and economic status", as quoted in Myrdal (8.30, p. 1343). A similar point is made by Hoselitz (8.16, p. 411).

[2] According to Rahim, "Field research conducted by the Academy (Pakistan Academy for Rural Development) revealed that in a village certain persons occupy 'strategic positions' in the communication network, and to these persons other villagers went for information and advice. These 'central persons' or 'opinion leaders' have one characteristic in common: they maintain regular contacts with sources of information and influence in the town and other places outside the village" (8.34, p. 420). A similar phenomenon among tribal and communal groups was noted in Chapter III.

[3] In this connection, Kamarck writes, " . . . when the colonial powers departed, the (extension) services they had established were still in their infancy. Paradoxically, while political independence has improved the African farmers' receptivity to the services' advice, the departure of 'expatriates' before Africans had been trained to replace them has weakened the effectiveness of the services" (8.20, p. 114).

They also need information to extend.[1]

Contrary to the tendency to view the information provided by extension personnel as relating to improved inputs and new cultivation practices. a considerable potential exists for increasing productivity through communicating information on existing production techniques (8.7, 8.18, 8.30). Consequently, within a range of production increases, the limited flow of information from current research need not seriously impede agricultural expansion. Certainly, the discovery of higher-yielding inputs and superior production practices would complement this expansion. Where demonstration is possible, the effectiveness of transmitting such information is improved.[2] Even where improved inputs and information are forthcoming from indigenous research institutions, their applicability is limited by differing soil and climatic conditions and by variation in social systems. Even though the proposed change is technically feasible,

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[1] Johnston (8.18) makes this point relative to extension activities in Africa where agricultural research, particularly research on food crops, has been on such a small scale that only a limited amount of information is available for transmission. The concentration of research activities in the tropics on improving export crops is mentioned by McPherson and Johnston (8.28). However, Johnston (8.18) also notes the rapidity with which cash crops such as cotton and cocoa have been adopted. Extension workers and other government programs were instrumental in promoting the spread of cash crops production. The tardiness with which relevant information flows from research institutions is also mentioned by Rahim (8.34).

[2] Whyte and Williams (8.43) note some of the problems of input availability and need for complementary, technical information in Peru. For example, the extension agent explains the merits of using insecticides and the mechanics of application, but does not have the insecticide nor applicators to demonstrate its use. Some producers are persuaded to experiment, but when the insecticide arrives, the extension agent is not present to assist or supervise the actual use. Consequently, application rates for some were too high so that crops were damaged or too low so that no tangible results could be observed.

extension agents do not always give sufficient consideration to economic feasibility (8.18, 8.20, 8.28).[1] The ingenuity necessary for making adaptations to local conditions is particularly scarce in most developing countries.

(3) The number of producers in the area serviced by the extension representative must be manageable. Otherwise, the agent must spread his expertise and time too thinly and lose some of his effectiveness. Local participation in initial discussions and planning of extension projects helps to ensure their acceptance and rapid adoption.[2] At the same time, the extension representatives are perhaps encouraged to rethink the economic and social feasibility of their programs as applied to specific localities and cultures. Repeated visits to the same villages and same producers not only convey an appearance of genuine interest but provide the representative with an opportunity to monitor producer operations. Where producers are collectively bound by a cooperative, communal organization, or confidence in a village leader, the extension agent may spend the major portion of his time with these organizational or social leaders, in effect, employing them as his assistants, thereby permitting the agent to indirectly contact a larger number of producers.[3]

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[1]Furthermore, in Africa producers are included to think in terms of returns to his labor rather than the extension agents' stress on increasing the technical yields per unit of land. Consequently, producers may favor extensive over intensive cultivation (8.20, pp. 114-15).

[2]The papers by Singh (8.36) and Holmberg (8.15) emphasize this point that insufficient local involvement in early stages contributed to the failure or limited success of proposals which were clearly in the economic interests of producers.

[3]See Rahim (8.34) for a discussion of techniques used for disseminating information to members of cooperatives in Comilla, East Pakistan.

Of course, the effectiveness of such an arrangement would depend upon the competence and willingness of these leaders to absorb and transmit the information provided by the extension agent.[1]

(4) Finally, while the work of extension personnel may be a necessary ingredient to stimulating agricultural productivity, it definitely is not sufficient. That is, competent extension agents may effectively explain the merits of a nontraditional input or a new cash crop; but if the producer has a high-risk aversion, does not have access to necessary financing, does not have the managerial capability, or does not have a strong ego-focused image of change,[2] the recommendations offered will not be implemented and the cultivator will continue traditional production practices.[3] Furthermore, where tenurial insecurity encourages exploitative cultivation practices and discourages private investment, few producers are interested in soil conservation and investment in productivity-increasing inputs whose benefits are realized over a period of time.

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[1]The conservative or traditional orientation of tribal societies was modified somewhat by British and Belgian colonialists through encouraging formal education of tribal chiefs and their sons so as to make these current and subsequent leaders more receptive to change (8.20).

[2]As used by Hirschman (7.26). Briefly, individuals having an ego-focused image of change think in terms of improving their relative position and are not strongly constrained by the lack of group approval or by the absence of positive-sum outcomes to the group.

[3]Even if individuals have a strong orientation towards personal gain, altering planting times and disease and pest control programs require the cooperation of surrounding producers.

These individuals have a strong time preference for current income. Inadequate transportation and marketing facilities reduce net returns to increments of labor and capital and dampen the producer's economic incentive to change. Finally, where belief in magic and reliance on patron saints for promoting economic well-being is strong, recommendations by extension agents will carry little weight.

Implicit in (4) above is the fact that the benefits of extension programs primarily accrue to landowners and particularly those having sizeable land holdings (8.30).[1] These are the individuals who are more literate and more market-oriented, and who have a greater capacity, both in terms of financing and in adjusting activities within the firm, for introducing change. Few benefits are realized by sharecroppers and landless laborers.

As noted above, a number of factors interact to condition the rate at which change occurs. Not only must the economic feasibility be con-

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[1] Myrdal (8.30) in writing about the community development programs in India, notes that activities of the agricultural extension service had a side effect detrimental to other objectives of the government. Relative to the peasant landlord group, Myrdal states, "At least some of the members of this politically influential group--mainly those who cultivated the land themselves--learned that money can be earned by the modernization of agriculture and that liberal aid can be obtained from the government for this purpose. Having absorbed that lesson, peasant landlords are less disposed than ever to agree that their holdings should be broken up for the benefit of less fortunate villagers. Because it preceded rather than followed the completion of land reforms, the extension program has impeded ceiling legislation, tenancy reform, and attempts to foster cooperative farming . . . Although Indian leaders profess to want to see agriculture assume a more 'socialist pattern', their own community development program has the effect of making agricultural practice more capitalistic" (8.30, p. 1345).

vincing, but proposed changes are more attractive when they can be grafted on to existing personal relationships and work patterns without largely disrupting the latter. For example, where land tracts are relatively small and noncontiguous, digging irrigation wells and constructing modest irrigation systems require cooperation of several landowners. While certain changes may be associated with positive-sum outcomes, the costs and benefits are not equally shared by all participants. Consequently, the differential net returns affect relative economic positions and, in turn, relative social and local political positions. Recognizing these eventualities, extension agents should anticipate the longer-term consequences of change. While Goldschmidt (8.13) emphasizes this point as a potential deterrent to adopting change, Frankel's (8.12) orientation is that such changes are necessary concomitants of economic change. That is, economic and social consequences cannot be segregated but both interact and are necessary for initiating and sustaining change. These reservations are most important for villages and societies at low points on the continuum of agricultural development. Fully market-oriented producers and operators of plantation systems are not constrained by social pressures for conformity. As noted in Chapter III and elsewhere, large landowners are often opposed to change because of the danger of altering economic and social relationships with their sharecroppers and landless laborers in favor of the latter groups.

A portion of Chapter VI was devoted to investment in the infrastructure of the economy. Including a discussion of extension services in this

chapter does not imply that expenditures on extension activities is not an investment in the economy's infrastructure. Such expenditures are as much an investment as developing transportation and marketing facilities and building schools and banking systems.

Other Public Programs and Policies

Indirectly, the need for a number of other public measures has been observed. In Chapter III, the inhibiting nature of current tenure systems suggested the need for land reform. The constraining impact of private credit markets in rural areas on producers' capability for improving their economic well-being and for private investment was examined in Chapter V. The importance of adequate transportation and marketing systems was outlined in Chapter VI. As should be apparent, relaxing one of these bottlenecks to agricultural development without removing other obstacles only partially alleviates the constraints on economic growth. For most developing countries, high rates of population growth are an additional impediment. The need is for agrarian reform, i.e., a coordinated program of alleviating obstacles simultaneously. However, few countries have the financial and administrative resources even if they have the will. They face the ubiquitous economic problem: allocating scarce resources among competing, though often mutually supporting, means so as to maximize objectives being pursued. Investment in roads, extension service systems, or rural credit institutions cannot be based only on a priori reasoning. Each potential allocation of financial and administrative resources must be subjected to at least an economic test of its merits relative to alternative uses.

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APPENDIX A: TABLES

Table 1. Percent of total population in the agricultural sector for selected countries as of 1965*

	Percent		Percent
AFRICA:		LATIN AMERICA:	
Algeria	60	Mexico	52
Ethiopia	89	Haiti	80
Ghana	60	Honduras	62
Kenya	84	Panama	43
Morocco	55	Bolivia	63
Nigeria	79	Brazil	50
South Africa	29	Peru	50
Sudan	77	Venezuela	29
Tanzania	95	Chile	28
Uganda	91	Argentina	20
UAR	55		
Zambia	81		
ASIA:			
Afghanistan	84		
Iraq	48		
Jordan	33		
Turkey	73		
Pakistan	68		
India	70		
Nepal	92		
Indonesia	67		
Malaysia	55		
Philippines	58		
Thailand	78		

*Source: United Nations (A.4).

Table 2: Average value and percent of imports and exports of three classes of commodities to total imports and exports for selected countries, 1964-67*

	(1) Total imports	(2) Food and live animals	(2) as percent of (1)
AFRICA			
Ivory Coast[a]	61,794	(8,584)	13.9
Morocco[b]	2,396	(648)	27.0
Nigeria[c]	252	(23)	9.1
Sudan[d]	80	(17)	21.2
UAR[e]	407	(108)	26.5
ASIA			
India[f]	17,025	903)	28.8
Pakistan[g]	4,806	(723)	15.0

[a]Million francs C.F.A. Agricultural exports include food and live animals, oil-seeds and oil nuts.

[b]Million dirhams. Agricultural exports include food and live animals, alcoholic beverages, wool and other animal hair, and cotton.

[c]Million Nigerian pounds. Agricultural exports include food and live animals, oil-seeds and oil nuts, natural rubber and rubber-like gum, and cotton.

[d]Million Sudanese pounds. Agricultural exports include food and live animals, oil-seeds and oil nuts, and cotton.

[e]Million Egyptian pounds. Agricultural exports include food and live animals, and textile fibres and waste.

[f]Million rupees. Agricultural exports include food and live animals, beverages and tobacco, and textile fibres and waste.

[g]Million rupees. Agricultural exports include food and live animals and textile fibres and waste.

*Source: United Nations (A.2).

(3) Manufactured goods and machinery	(3) as percent of (1)	(4) Total exports	(5) Agricultural exports	(5) as percent of (4)
(36,696)	59.4	74,980	(49,271)	65.7
(1,010)	42.2	2,169	(1,099)	50.7
(166)	65.9	248	(126)	50.8
(43)	53.8	70	(59)	84.3
(158)	38.8	249	(176)	70.7
(7,445)	43.7	9,901	(3,611)	36.5
(2,827)	58.8	2,700	(1,501)	55.6

Table 2 (continued)

	(1) Total imports	(2) Food and live animals	(2) as percent of (1)
Philippines[h]	893	(146)	16.3
Thailand[i]	19,364	(1,244)	6.4
W. Malaysia[j]	2,592	(635)	24.5
LATIN AMERICA			
Argentina[k]	1,124	(65)	5.8
Brazil[l]	1,381	(266)	19.3
Colombia[m]	552,700	(31,470)	5.7
Mexico[n]	20,010	(768)	3.8

[h]Million U. S. dollars. Agricultural exports include food and live animals, beverages and tobacco, copra, vegetable fibres, and animal and vegetable oils and fats.

[i]Million bahts. Agricultural exports include food, beverages and tobacco, oil-seeds, crude rubber, jute and vegetable fibres.

[j]Million Malaysian dollars. Agricultural exports include food and live animals, beverages and tobacco, oil-seeds, and natural rubber and rubber-like gum.

[k]Million U. S. dollars. Agricultural exports include food and live animals, hides and skins, and textile fibres and waste.

[l]Million U. S. dollars. Agricultural exports include food and live animals, beverages and tobacco, oil-seeds, wool and animal hair, cotton, and vegetable fibres.

[m]Thousand U. S. dollars. Agricultural exports include food and live animals, beverages and tobacco, and textile fibres and waste.

[n]Million pesos. Agricultural exports include food and live animals, beverages and tobacco, oil-seeds, and textile fibres.

(3) Manufactured goods and machinery	(3) as percent of (1)	(4) Total exports	(5) Agricultural exports	(5) as percent of (4)
(509)	57.0	825	(463)	56.1
(11,537)	59.6	13,054	(10,408)	79.7
(1,083)	41.8	2,981	(1,494)	50.1
(618)	55.0	1,490	(1,271)	85.3
(553)	40.0	1,605	(1,208)	75.3
(333,406)	60.3	526,198	(400,047)	76.0
(12,468)	62.3	14,047	(8,650)	61.6

Table 3. Annual average growth rates for selected economic indicators and for population, for selected countries and specified time periods*

	Gross domestic product[a]				
	Period	Total	Per capita	Agriculture[b]	Period[c] Population
AFRICA:					
Ethiopia	1960-66	4.8	3.0	2.3	I 1.7
					II 1.8
Morocco	1952-60	0.5[d]	-2.3[d]	0.7	I 2.7
	1960-67	3.2[d]	0.4[d]	2.9	II 2.8
Nigeria	1950-60	10.5	8.4	9.1	I 3.0
	1960-66	4.5	2.2	2.0	II 2.7
Sudan	1955-60	4.0	1.0	2.7	I 3.1
	1962-64	4.5	1.7	4.7	II 2.8
Uganda	1954-60	4.0	1.5	4.1	I 2.5
	1960-67	4.5	2.0	3.8	II 2.3
UAR	1962-66	4.9	2.2	2.5	I 2.4
					II 2.5
ASIA:					
Iraq	1953-60	5.6	2.4	-2.7	I 2.7
	1960-66	6.7	3.3	6.1	II 2.5
India	1950-60	3.5[e]	1.6[e]	2.8	I 2.0
	1960-67	1.0[e]	-1.5[e]	-0.4	II 2.4
Pakistan	1950-60	2.5	0.4	1.4	I 2.2
	1960-67	5.6	3.4	3.3	II 2.1
Philippines	1950-60	6.8[e]	3.6[e]	5.1	I 3.1
	1960-67	5.1[e]	1.6[e]	4.6	II 3.5

[a] Gross domestic product at constant factor cost.

[b] Includes agriculture, foresty, hunting, and fishing.

[c] Period I = 1950-1962. Period II = 1963-1967.

[d] Gross domestic production at constant market prices.

[e] Net domestic product at constant factor cost.

* Source: GDP and agriculture data are from United Nations (A.3). Population data are from United Nations (A.1).

Table 3 (continued)

	Gross domestic product[a]				
	Period	Total	Per capita	Agriculture[b]	Period[c] Population
Indonesia	1958-60	2.3	--	2.3	I 2.1
	1960-67	2.2	-0.2	1.7	II 2.4
W. Malaysia	1955-60	3.6	0.4	2.9	I 3.2[f]
	1960-66	5.8	2.6	4.2	II 3.0
Thailand	1957-60	7.4[f]	4.3[f]	8.1	I 3.1
	1960-67	7.6[f]	4.3[f]	4.0	II 3.1
LATIN AMERICA:					
Argentina	1950-60	3.4	1.4	2.3	I 1.9
	1960-67	2.9	1.3	2.8	II 1.5
Brazil	1950-60	5.7	2.7	4.6	I 3.0
	1960-67	3.9	0.9	4.5	II 3.0
Colombia	1950-60	4.6	1.4	3.4	I 2.7
	1960-67	4.7	1.5	2.9	II 3.2
Honduras	1950-60	3.4	0.4	2.2	I 2.9
	1960-67	5.5	2.1	1.7	II 3.4
Mexico	1950-60	6.3[g]	3.0[g]	4.8	I 3.1
	1960-67	6.7[g]	3.1[g]	4.0	II 3.5
Paraguay	1950-60	3.2[g]	0.8[g]	2.2	I 2.4
	1960-67	4.4[g]	1.3[g]	3.0	II 3.1
Peru	1950-60	4.7[h]	2.3[h]	3.8	I 2.4
	1960-67	6.1[h]	2.9[h]	2.3	II 3.1
Venezuela	1950-60	8.5[g]	4.2[g]	5.0	I 3.8
	1960-67	5.0[g]	1.4[g]	6.6	II 3.5

[f] Malaysia and Singapore.

[g] Gross domestic product at constant market prices.

[h] Gross national product at constant market prices.

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APPENDIX B: KRISHNAN'S FORMULATION FOR PRICE ELASTICITY OF MARKETED SURPLUS

The formulation developed below is applicable to short-run situations where the output level is given, and the producer has the options of consuming directly and(or) marketing this output. Prior to deriving the construct, the following terms used by Krishnan (7.29) are identified:

$\bar{Q}$ = Total output of food grains available for consumption and(or) marketing, net of payments in kind and seed requirements

P = Producer's price received for food grains

$Y = \bar{Q}P$ = Producer's income if $\bar{Q}$ is marketed

r = Proportion of $\bar{Q}$ directly consumed by the producer

$M = (1-r)\,\bar{Q}$ = Producer's marketable "surplus" of $\bar{Q}$

$$r\bar{Q} = f(P, \bar{Q}P) \tag{B.1}$$

$$r\bar{Q} = AP^{-\alpha}(\bar{Q}P)^{\beta} \tag{B.2}$$

$$= A(\bar{Q})^{\beta} P^{\beta-\alpha}$$

$$r = A(\bar{Q})^{\beta-1} P^{\beta-\alpha} \tag{B.3}$$

$$1-r = 1 - A(\bar{Q})^{\beta-1} P^{\beta-\alpha} \tag{B.4}$$

$$M = (1-r)\,\bar{Q} = \bar{Q} - A(\bar{Q})^{\beta} P^{\beta-\alpha} \tag{B.5}$$

Equations B.1 and B.2 indicate that the level of direct consumption is a function of price and income. The terms α and β are the price and income elasticities of demand, respectively. The market price is the appropriate price term for the consumption function since it is the opportunity cost; i.e., the real cost, associated with direct consumption. The derivation of Equations B.3 - B.5 is straightforward. Upon taking the first derivative of Equation B.5 with respect to P, Equation B.6 is

obtained Multiplying Equation B.6 by P/M and substituting in the previously-defined symbols, the price elasticity of marketed surplus is derived, as in Equation B.7. Since the term $\frac{r}{(1-r)}$ is always positive,

$$\frac{dM}{dP} = -(\beta-\alpha)\left\{A(\bar{Q})^{\beta} P^{\beta-\alpha} - 1\right\} \tag{B.6}$$

$$M_e = \frac{dM}{dP}\frac{P}{M} = -(\beta-\alpha)\left[\frac{A(\bar{Q})^{\beta} P^{\beta-\alpha}}{(1-r)\bar{Q}}\right] \tag{B.7}$$

$$= -(\beta-\alpha)\ \frac{r}{1-r}$$

the sign of M_e depends upon the relative values of α and β. Based on the data used by Krishnan, $\alpha \cong .36$ and $\beta \cong .52$. The derived M_e has a negative value indicating that price and quantities marketed move in opposite directions.

Equation B.7 represents Krishnan's formulation. However, if two separate food grains which are substitutes in consumption are admitted, a more meaningful formulation is readily derivable.

The producer's income is now written as $Y = P_1\bar{Q}_1 + P_2\bar{Q}_2$. The counterpart of Equation B.2, representing the proportion of $\bar{Q}_1$ consumed directly, is given in Equation B.8 where δ is the cross-price elasticity of demand. The positive sign of δ indicates that Q_1 and Q_2 are substitutes in consumption. Equation B.10 represents the total differential of Equation B.9.

$$r_1\bar{Q}_1 = aP_1^{-\alpha} P_2^{\delta}(Y)^{\beta} \tag{B.8}$$

$$M_1 = (1-r_1)\ \bar{Q}_1 = \bar{Q}_1 - aP_1^{-\alpha} P_2^{\delta}(Y)^{\beta} \tag{B.9}$$

$$dM_1 = \left\{\alpha\ a\ P_1^{-\alpha-1}\ P_2^{\delta}(Y)^{\beta} - \beta a\ P_1^{-\alpha}\ P_2^{\delta}\ \bar{Q}_1\ (Y)^{\beta-1}\right\}\ dP_1 + \left\{-\delta\ a\ P_1^{-\alpha}\ P_2^{\delta-1}(Y)^{\beta} - \beta a\ P_1^{-\alpha}\ P_2^{\delta}\ \bar{Q}_2\ (Y)^{\beta-1}\right\}\ dP_2 \qquad (B.10)$$

To simplify the derivation of the price elasticity of M_1 with respect to P_1, let $dP_2 = 0$. Then, upon dividing Equation B.10 by dP_1, multiplying by P_1/M_1, and substituting $r_1\bar{Q}_1$ and $(1-r)\bar{Q}_1$, Equation B.11 is obtained. The sign of the price elasticity of the marketable sur-

$$M^1_{e_1} = \frac{dM_1}{dP_1}\ \frac{P_1}{M_1} = \frac{r_1}{(1-r_1)}\left[\frac{\alpha-\beta P_1\bar{Q}_1}{Y}\right] \qquad (B.11)$$

plus of $\bar{Q}_1$ with respect to P_1 when $dP_2 = 0$ depends upon the relative magnitude of the two terms within the brackets. In addition to the values of α and β, the sign of $M^1_{e_1}$ now depends upon the value of $P_1\bar{Q}_1 \;/\; \left\{P_1\bar{Q}_1 + P_2\bar{Q}_2\right\}$.[1] If this value equals about .7, then $M^1_{e_1}$ is near zero. The term $M^1_{e_1}$ is negative only if the ratio is greater than .7. Thus the relative value of $\bar{Q}_1$ also influences the impact of changes in P_1 on changes in quantities of Q_1 marketed.

The qualitative impact of changes in P_2 when P_1 is invariant is described below. Dividing Equation B.10 by dP_2 when $dP_1 = 0$, substituting $r_1\bar{Q}_1$ and $(1-r_1)\bar{Q}_1$, multiplying by P_2/M_1, the price elasticity of M_1 with respect to P_2 is obtained, as in Equation B.12. As long as δ and

$$M^1_{e_2} = \frac{r_1}{1-r_1}\left[-\delta - \frac{\beta P_2\bar{Q}_2}{Y}\right] \qquad (B.12)$$

β are positive; i.e., Q_1 and Q_2 are substitutes and Q_1 is not an in-

[1] The term $M^1_{e_1}$ = price elasticity of Q_1 marketed with respect to P_1.

ferior good, dP_2 and dM_1 move in opposite directions. As P_2 increases, more Q_1, the relatively-cheaper good, is retained for direct consumption.

APPENDIX C: ALTERNATIVE FORMULATIONS FOR PRICE ELASTICITY OF QUANTITIES MARKETED

Krishna's (7.28) formulation for the price elasticity of quantities marketed is not based on an assumption of a fixed output level, as was Krishnan's (7.29) in Appendix B. Rather, changes in the price level are permitted to affect resource allocation decisions and the consequent output level. Krishna's notation is duplicated here.

Q = Quantity of wheat produced

C = Quantity of wheat consumed

M = Quantity of wheat marketed

$m = \frac{M}{Q}$ = Sales ratio

$r = \frac{Q}{M}$ = Reciprocal of sales ratio

P = Relative price of wheat

Y = Total income of the peasants

e = Elasticity of market supply with respect to P

d = Total elasticity of home consumption with respect to P

b = Elasticity of output with respect to P

g = Elasticity of the substitution effect in consumption

h = Elasticity of the income effect in consumption

The market supply equation is given in Equation C.1 where Q and C are functions of P. Shocking Equation C.1 with respect to P, Equation C.2 is obtained. Multiplying Equation C.2 by P/M and using the relationship $(1-r) = (M-Q)/M$, the price elasticity of quantity marketed is de-

$$M = Q - C \tag{C.1}$$

$$\frac{dM}{dP} = \frac{dQ}{dP} - \frac{dC}{dP} \tag{C.2}$$

rived in Equation C.3. Since (r-1) is greater than 1, the sign of e de-

$$e = \frac{dM}{dP} \frac{P}{M} = rb - (r-1)d \tag{C.3}$$

pends upon the relative magnitude of b and d and their respective signs. Since Krishna does not have estimates of $d = \frac{dC}{dP} / \frac{P}{C}$, he decomposes the $\frac{dC}{C}$ term into components for which estimates are available.[1] If $C = f(P,Y)$, the total differential is specified in Equation C.4. Then dividing by C and multiplying the two right-hand terms by $\frac{P}{P}$ and $\frac{Y}{Y}$, respectively, Equation C.5 is obtained where Krishna terms g the elasticity of the substitution effect and h the elasticity of the income effect.[2] Krishna then indicates that if the individual were a pure producer in that he produces but does not consume Q and if dP

$$dC = \frac{\partial C}{\partial P} dP + \frac{\partial C}{\partial Y} dY \tag{C.4}$$

$$\frac{dC}{C} = g \frac{dP}{P} + h \frac{dY}{Y} \tag{C.5}$$

occurs, then $dY = QdP$. Any other sources of income unaffected by dP do not enter into dY. Dividing dY by Y, Equation C.6 is obtained where $k = \frac{PQ}{Y}$. Similarly, if the individual is a pure consumer in that he consumes

$$\frac{dY}{Y} = \frac{QdP}{Y} = \frac{dP}{P} \frac{PQ}{Y} = k \frac{dP}{P} \tag{C.6}$$

$$\frac{dY}{Y} = \frac{dP}{P} \frac{PC}{Y} \tag{C.7}$$

---

[1] Krishna does not specify the reasoning used in deriving these components. Nowshirvani (7.38) systematically derives the components.

[2] Alternatively, g and h are the price and income elasticities of demand for direct consumption, respectively.

but does not produce Q, and expends his entire income so that E = Y, then dP affects his expenditures for Q in his consumption. Let C represent the physical quantity of Q consumed where PC = PQ is one component of Y = E. Then dY = dE = CdP and upon dividing by Y, Equation C.7 is obtained. Since the individual producer is also a consumer, the relative change in his income is represented by subtracting Equation C.6 from C.7:

$$\frac{dY}{Y} = \frac{dP}{P}\left(\frac{PQ}{Y} - \frac{PC}{Y}\right) \tag{C.8}$$

By using the relationships M = Q-C, $m = \frac{M}{Q}$, and $k = \frac{PQ}{Y}$, Equation C.8 is rewritten as Equation C.9.. Substituting Equation C.9 into Equation C.5, Equation C.10 is derived which when multiplied by $\frac{P}{dP}$

$$\frac{dY}{Y} = \frac{dP}{P}\,\frac{PQ}{Y}\,\frac{M}{Q} = mk\,\frac{dP}{P} \tag{C.9}$$

yields Equation C.11. Substituting the new expression for d into Equation C.3, Krishna has rewritten e, Equation C.12, in terms of components for which estimates are available. These estimates are listed

$$\frac{dC}{C} = g\,\frac{dP}{P} + hmk\,\frac{dP}{P} \tag{C.10}$$

$$\frac{dC}{C} = \frac{P}{dP} = d = g + hmk \tag{C.11}$$

$$e = rb - (r-1)(g + hmk) \tag{C.12}$$

below:

(1) $b = b_1 = .1$ to $.2$

(2) $g = -.2$ to $-.4$

(3) $h = .5$ to $.8$

(4) $k = .1$ to $.7$

(5)[1] $b_2 = -.1$ to $-.2$

Nowshirvani (7.38) correctly observes that when Y = (QP + any other monetary income unaffected by dP), the total differential of Y should be indicated in Equation C.13. Nowshirvani further questions Krishna's use of Equation C.8 which implies that the individual's change in monetary income, in terms of PQ, is affected by the impact

$$dY = QdP + P\frac{dQ}{dP}dP \qquad \text{(C.13}$$

of dP on consumption. No such effect is implicit in the definition of monetary income in Krishna's model. Using Equation C.13, Nowshirvani rewrites Equation C.5 as follows:

$$\frac{dC}{C} = g\frac{dP}{P} + h\left[\frac{Q + P\frac{dQ}{dP}}{Y}\right]dP \qquad \text{(C.14}$$

$$\frac{dC}{C} = g\frac{dP}{P} + hk\frac{dP}{P} + hkb\frac{dP}{P} \qquad \text{(C.15}$$

Again, using $k = \frac{QP}{Y}$, Equation C.14 can be rewritten as Equation C.15. Multiplying the components of Equation C.15 by $\frac{P}{dP}$, the corrected formulation for d to be used in Equation C.3 is derived, as in Equation C.16. This differs from Krishna's $d = g + mhk$.

$$\frac{dC}{C}\frac{P}{dP} = d = g + hk + hkb \qquad \text{(C.16}$$

---

[1] Behrman (7.5) uses the b_1 and b_2 terms in his formulation, Equation C.20. He assumes that b_2 has the same range of values as b. but with negative signs because b_2 is in terms of p_1/p_2 rather than p_2/p_1.

Behrman (7.5) has a slightly different corrected version of the Krishna model. However, Behrman also constructs a formulation which in addition to the subsistence crop being considered, introduces allowance for income from other sources and for prices paid for other consumer goods. Although time is introduced to represent the adjustment process, only a static version of his formulation is presented below so that comparisons with the Krishna and Nowshirvani formulation can be made. The necessary components and symbols are defined below:

Q_1 = Planned quantity of the subsistence crop to be produced as a function of (P_1/P_2)

Q_2 = Planned quantity of goods and services, other than Q_1 to be produced as a function of (P_1/P_2)

P_1 = Absolute price of Q_1

P_2 = Aggregate price for Q_2

P_3 = Aggregate price of all commodities other than Q_1 which are consumed by the producer of Q_1

I = Total net income of the producer

C_1 = Direct consumption of Q_1 by the producer as a function of (P_1/P_3) and I

b_1 = Price elasticity of Q_1 with respect to (P_1/P_2)

b_2 = Price elasticity of Q_2 with respect to (P_1/P_2)

g = Price elasticity of C_1 with respect to (P_1/P_3)

h = Income elasticity of C_1 with respect to I

$m = M_1/Q_1$, the proportion of Q_1 which is marketed

$r = 1/m$

$k = P_1Q_1/I$, the proportion of total net income accounted for by the e of Q_1 produced; and

e = Price elasticity of M_1 with respect to P_1.

$$M_1 = Q_1 - C_1 \tag{C.17}$$

$$\frac{\partial M_1}{\partial P_1} = \frac{\partial Q_1}{\partial (P_1/P_2)} \frac{\partial (P_1/P_2)}{\partial P_1} - \frac{\partial C_1}{\partial (P_1/P_3)} \frac{\partial (P_1/P_3)}{\partial P_1}$$

$$- \frac{\partial C_1}{\partial I} \frac{\partial I}{\partial P_1} \tag{C.18}$$

$$\frac{\partial M_1}{\partial P_1} \cong \frac{1}{P_2} \frac{\partial Q_1}{\partial (P_1/P_2)} - \frac{1}{P_3} \frac{\partial C_1}{\partial (P_1/P_3)}$$

$$- \frac{\partial C_1}{\partial I} \left[Q_1 + \frac{P_1}{P_2} \frac{\partial Q_1}{\partial (P_1/P_2)} + \frac{\partial Q_2}{\partial (P_1/P_2)} \right] \tag{C.19}$$

$$e_1 = \frac{\partial M_1}{\partial P_1} \frac{P_1}{M_1} \cong rb_1 - (r-1)\,[g + hk(1 + b_1)]$$

$$- (r-1)hb_2(1-k) \tag{C.20}$$

Taking the first partial derivative of M_1, keeping in mind that Q_1 and C_1 are functions of price ratios, Equation C.18 is derived. Equation C.19 approximates Equation C.18 since $\partial I/\partial P_1$ is now in terms of gross income rather than net income. The gross income of the individual is $P_1Q_1 + P_2Q_2$. Equation C.20 is derived by multiplying Equation C.19 by P_1/M_1, rearranging the terms, and substituting in the previously-defined symbols.

APPENDIX D: MARGINAL CONDITIONS FOR ECONOMIC EFFICIENCY

The marginal conditions for economic efficiency vary with producers' objectives. For example, market-oriented producers whose objective is that of constrained profit maximization will be guided by market prices in making their production decisions. Subsistence-oriented producers, on the other hand, will primarily gear production decisions to consumption requirements and be less affected by changing market conditions. The marginal conditions for profit maximization will be outlined[1] with subsequent modification to represent those applicable to subsistence-oriented producers.

The production function represents the physical input-output relationships for the firm. It, together with the relevent price ratios or other choice indicators, provides the framework from which such phenomena as optimum resource use patterns, resource demand functions, and product supply functions can be derived. A generalized form of the production function is given in Equation D.1.[2]

$$Y_i = [F] (X_1, \ldots, X_m : O, E) \quad (i = 1, \ldots, n) \qquad (D.1)$$

---

[1] As indicated previously, profit maximization is constrained by resource availabilities where such resource supplies may be considered as being net of expenditures and investment outside of the firm and net of leisure and social demands on time for capital and labor, respectively.

[2] For a discussion of the formulation and appropriateness of alternative production functions for the firm see Earl O. Heady and John L. Dillon. Agricultural Production Functions. Iowa State University Press. Ames 1961. Chapter 3.

Y_i denotes a vector of n outputs while [F] represents the functional relationships between the m inputs and the n outputs. [F] embodies the technical input-output relationships which are affected by factors such as the size and contiguity of the tracts of land. These factors, in turn, have implications for the production technique employed and for realization of any economies of size. In addition, [F] is conditioned by O ≡ objectives of producers and E ≡ exogenous factors such as weather, availability of production techniques, and information concerning factor and product markets. The potential effect of the exogenous factors is quite apparent.[1]

Least-cost combinations of resources

Taking the partial derivates of Equation D.1 with respect to X_i ($i = 1, \ldots, m$), the marginal physical products of the respective X_i in the production of Y_i are obtained as follows:

$$\frac{\partial Y_i}{\partial X_j} = F^i_j = MPP^i_j \qquad \begin{matrix}(i = 1, \ldots, n)\\(j = 1, \ldots, m)\end{matrix} \tag{D.2}$$

---

[1]The impact of exogenous factors need not result in producers operating at points interior to their production possibility frontier. For example, the lack of information regarding a superior alternative production technique which a producer could feasibly adopt simply results in the production possibility frontier being below a superior one but with the producer producing at points on the frontier of the curve relevant to his situation.

Considering the allocation of resources, costs are minimized when the MPP per unit value of production input, the p_{X_j}, is equal in all alternative employments, the Y_i, as in Equation D.3.

$$\frac{MPP_1^1}{p_{X_1}} = \frac{MPP_2^1}{p_{X_2}} = \ldots = \frac{MPP_m^1}{p_{X_m}} = \frac{MPP_j^i}{p_{X_j}} \quad \begin{matrix}(i = 2, \ldots, n)\\(j = 1, \ldots, m)\end{matrix} \qquad (D.3)$$

If this condition does not hold, resources can be reallocated so as to realize increased production with the same amount of expenditure for inputs utilized.

Optimal output configuration

An additional restriction is necessary. Employing inputs in least-cost combinations is not sufficient for determining the optimum levels of output. This optimum pattern of output for the individual Y_i is obtained when each Y_i is produced at the level where the price or marginal revenue received for that output is equated to its marginal cost of production, Equation D.4.

$$\frac{MPP_1^i}{p_{X_1}} = \ldots = \frac{MPP_m^i}{p_{X_m}} = \frac{1}{MR^i} = \frac{1}{SMC^i} \qquad (i = 1, \ldots, n) \qquad (D.4)$$

If $MR^i = P^i$, as in the case of producers operating under conditions of pure competition, Equation D.4 can be rewritten:

$$\frac{MPP_1^i \cdot P^i}{p_{X_1}} = \ldots = \frac{MPP_m^i \cdot P^i}{p_{X_m}} = \frac{P^i}{SMC^i} = 1.0 \quad (i = 1, \ldots, n) \qquad (D.5)$$

$$\frac{MVP_1^i}{P_{X_1}} = \ldots = \frac{MVP_m^i}{P_{X_m}} = 1.0 \qquad (i = 1, \ldots, n) \qquad (D.6)$$

The first-order marginal conditions for economic efficiency in the short run are obtained when Equation D.6 holds for all outputs produced. That is, the MVP per unit of input cost must be equal in all alternative uses. Inputs are now used in the correct proportions and correct amounts. From a long-term standpoint, the conditions in Equation D.5 must hold but with the added restriction that $SMC^i = LRMC^i$. Long-run equilibrium for the firm where perfect competition exists in both the resource and product markets is obtained when the conditions in Equation D.7 and D.8 are met.

$$\frac{MPP_1^i \cdot P^i}{P_{X_1}} = \ldots = \frac{MPP_m^i \cdot P^i}{P_{X_m}} = \frac{P^i}{SMC^i = SAC^i = LRMC^i = LRAC^i} \qquad (i = 1, \ldots, n) \qquad (D.7)$$

$$\frac{MVP_1^i}{P_{X_1}} = \ldots = \frac{MVP_m^i}{P_{X_m}} = 1.0 \qquad (i = 1, \ldots, n) \qquad (D.8)$$

Second-order conditions for profit maximization require that the marginal cost of each output must be increasing.

To demonstrate the derivation of the marginal conditions, a functional form using Lagranean multipliers is postulated as in Equation D.9. The formulation is expressed in terms of a constrained revenue-maximization problem with the constraint being capital availability, K^o.[1]

[1] As constructed in Equation D.9, the constrained revenue-maximization formulation is synonymous with a constrained profit-maximization formulation.

$$R = \sum_{i=1}^{n} p_i q_i + \mu \left[K^o - \sum_{j=1}^{m} p_j q_j \right] + \lambda \left[F \right] \quad (q_1, \ldots, q_s) \qquad (D.9)$$

The n outputs and m inputs are incorporated in the implicit production function $F(q_1, \ldots, q_s)$ when $n + m = s$. Upon taking the partial derivates of Equation D.9, the following $n(m + 1) + 2$ equations are derived:

$$\frac{\partial R}{\partial q_i} = P_i + \lambda F^i = 0 \qquad (i = 1, \ldots, n) \qquad (D.10)$$

$$\frac{\partial R}{\partial q_j} = -\mu P_j + \lambda F^i_j = 0 \qquad (j = 1, \ldots, m) \quad (i = 1, \ldots, n) \qquad (D.11)$$

$$\frac{\partial R}{\partial \mu} = K^o - \sum_{j=1}^{m} p_j q_j = 0 \qquad (D.12)$$

$$\frac{\partial R}{\partial \lambda} = \left[F \right] (q_1, \ldots, q_s) = 0 \qquad (D.13)$$

Selecting any two equations from Equation D.11 and dividing the two, the least-cost combinations of using inputs are obtained, Equation D.14. This result holds for any combination of inputs.

$$\frac{p_j}{p_k} = \frac{F^i_j}{F^i_k} = \frac{MPP^i_j}{MPP^i_k} = \frac{\partial q^i_k}{\partial q^i_j} = MRS_{j-k} \qquad (j, k = 1, \ldots, m) \qquad (D.14)$$

$$\frac{MPP^i_k}{p_k} = \frac{MPP^i_j}{p_j} \qquad (j, k = 1, \ldots, m) \quad (i = 1, \ldots, n) \qquad (D.15)$$

Similarly, selecting any two equations from Equation D.10 and dividing, the optimal output configuration is obtained in Equation

D.16. That is, the rate of product transformation, the RPT, is equal to the corresponding inverse price ratio. This result holds for any combination of outputs.

$$\frac{p_i}{p_h} = \frac{F^i}{F^h} = -\frac{\partial q_h}{\partial q_i} = \text{RPT} \qquad (i, h = 1, \ldots, n) \qquad \text{(D.16)}$$

Finally, selecting any one equation from Equation D.11 and dividing this by any equation selected from Equation D.10 yields the familiar input-output relationships, as in Equation D.17 and D.18.

$$\frac{-\mu p_j}{p_i} = \frac{F^i_j}{F^i} = -\frac{\partial q_i}{\partial q_j} \qquad \text{(D.17)}$$

$$\frac{MPP^i_j \cdot P_i}{p_j} = MVP^i_j = \mu \qquad (i = 1, \ldots, n) \quad (j = 1, \ldots, m) \qquad \text{(D.18)}$$

Since the constraint in Equation D.9 is in terms of capital availability, the Lagrangean multiplier μ can be interpreted as the marginal value product associated with an additional increment of capital.[1]

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[1] See Equation D.18. When Equation D.10 to D.13 are solved simultaneously and assuming that the second-order conditions for profit maximization are satisfied, equilibrium values for the $\bar{q}_i$, $\bar{q}_j$, $\bar{\mu}$ and $\bar{\lambda}$ are derived. Equation D.9 is then rewritten as:

$R = \sum_{i=1}^{n} p_i \bar{q}_i + \bar{\mu} \left[K^o - \sum_{j=1}^{m} p_j \bar{q}_j\right] + \bar{\lambda} \left[F\right] (\bar{q}_1, \ldots, \bar{q}_s)$. The p_i and p_j are fixed. Taking the first partial derivative with respect to K^o, $\frac{\partial R}{\partial K^o} = \mu$. That is, μ is interpreted as the marginal value product associated with an infinitesimal increment of K^o.

Alternatively, μ can be viewed as the opportunity cost of using capital in the production of the n outputs. The form of Equation D.18 is essentially identical to that of Equation D.6 in that $\mu = 1.0$ under conditions of perfect competition. All of the assumptions associated with perfect competition have not necessarily been operative in deriving Equation D.18

The equations outlined above specify the first-order conditions necessary for the maximization process. It has been implicitly assumed that all inputs, outputs, and prices have nonnegative values. Satisfaction of the second-order conditions is necessary to ensure that the levels of output reflect profit maximization rather than profit minimization. Satisfaction of the second-order conditions requires that the relevant bordered Hessian determinants alternative in sign beginning with a plus for all (i = 1, ..., n). This is denoted in the following manner:

$$R_{11} > 0 \quad \begin{vmatrix} R_{11} & R_{12} & \lambda F_1^i \\ R_{21} & R_{22} & \lambda F_2^i \\ \lambda F_1^i & \lambda F_2^i & 0 \end{vmatrix} < 0$$

$$\begin{vmatrix} R_{11} & \cdots & R_{1s} & \lambda F_1^i \\ \vdots & & & \\ R_{s_1} & \cdots & R_{ss} & -\mu p_s + \lambda F_s^i \\ \lambda F_1^i & \cdots & -\mu p_s + \lambda F_s^i & 0 \end{vmatrix}$$

Tenurial arrangements and the marginal conditions

To assess the impact of tenurial arrangements for sharing costs and returns on the marginal conditions for economic efficiency, Equation D.9 is rewritten as follows:

$$R = \sum_{i=1}^{n} r_i p_i q_i + \mu \left[K^o - \sum_{j=1}^{\bar{} } c_j p_j q_j \right] + \lambda \left[F \right] (q_1, \ldots, q_s) \qquad (D.19)$$

$$\frac{\partial R}{\partial q_i} = r_i p_i + \lambda F^i = 0 \qquad (i = 1, \ldots, n) \qquad (D.20)$$

$$\frac{\partial R}{\partial q_j} = -\mu c_j p_j + \lambda F^i_j = 0 \qquad (j = 1, \ldots, m) \quad (i = 1, \ldots, n) \qquad (D.21)$$

$$\frac{\partial R}{\partial \mu} = K^o - \sum_{j=1}^{m} c_j p_j q_j = 0 \qquad (D.22)$$

$$\frac{\partial R}{\partial \lambda} = \left[F \right] (q_1, \ldots, q_s) = 0 \qquad (D.23)$$

In Equation D.19 r_i and c_i are the shares of the revenue received from the i-th output and costs of the j-th input paid by the tenant, respectively. Upon taking the partial derivates, n(m+1)+2 equations with n(m+1)+2 unknowns are obtained; second-order conditions are assumed to exist.

Selecting any two equations from Equation D.20 dividing one by the other, the following is obtained:

$$\frac{r_i p_i}{r_h p_h} = \frac{F^i}{F_h} = \frac{\partial q_h}{\partial q_i} \qquad (i, h = 1, \ldots, n) \qquad (D.24)$$

Equation D.24 stipulates that the RPT for any two outputs, ceteris paribus, must be equal to the inverse ratio of their prices, each weighted by the respective proportion of revenue to be received by the tenant. If $r_1 = \ldots = r_i = r_h = \ldots r_n$, the marginal conditions for economic efficiency are undisturbed.

Similarly, selecting any two equations from Equation D.21 and dividing:

$$\frac{c_j p_j}{c_k p_k} = \frac{F^i_j}{F^i_k} = \frac{MPP^i_j}{MPP^i_k} = \frac{\partial q_k}{\partial q_j} = MRS_{j-k} \qquad (j, k = 1, \ldots, m) \qquad (D.25)$$

If $c_1 = \ldots = c_j = c_k = \ldots = c_m$, the marginal conditions are unaffected. Conversely, if $c_j = .3$ and p_j = price of fertilizer and if $c_k = .5$ and p_k = price of irrigation, then $\frac{MPP^i_j}{.3p_j} = \frac{MPP^i_k}{.5p_k}$. But since $c_j < c_k$, more fertilizer is utilized, relative to irrigation water, than would be consistent with the marginal conditions as specified.

Finally, in considering input-output relationships, dividing any equation in Equation D.20 by any in Equation D.21 results in the following:

$$\frac{r_i p_i}{-\mu c_j p_j} = \frac{F^i_j}{F^i_j} = -\frac{\partial q_j}{\partial q_i} = \frac{1}{MPP^i_j}$$

$$\frac{r_i p_i \; MMP^i_j}{c_j p_j} = \mu \qquad \begin{matrix}(i = 1, \ldots, n) \\ (j = 1, \ldots, m)\end{matrix} \qquad (D.26)$$

if $r_1 = c_1$, for example, if the tenant receives two-thirds of the output revenue and at the same time incurs two-thirds of the input cost the marginal conditions remain intact and the MVP per unit of input cost is equal to μ, the opportunity cost or the MVP of an increment of K.

In the case of cash rent, Equation D.9 can be rewritten:

$$S = \sum_{i=1}^{n} p_i q_i - R + \mu \left[K^o - \sum_{j=1}^{m} p_j q_j \right] + \lambda [F] \quad (q_1, \ldots, q_s) \qquad (D.27)$$

where R = total cash rent to be paid. Upon deriving the partial derivates of Equation D.27, the constant R disappears and the marginal conditions for economic efficiency are obtained. For a labor-share arrangement where the tenant provides labor inputs to the landlord in exchange for units of land, the MVP of the labor foregone by the tenant in excnange ror the land represents the input cost of the land to the tenant. Thus, if the ratio $\frac{MVP_{land}}{MVP_{labor}} = P_{land}$ is equal to the MVP per unit of input cost for all other inputs, the marginal conditions for the labor-share tenant are satisfied. The above discussion applies to both market- and subsistence-oriented producers.

Single input, static demand

Where all factors of production are invariant but one, the rule for maximizing behavior is that this variable factor should be employed up to the point at which its MVP is equal to its marginal factor cost, MFC, i.e., its acquisition cost to producers. If X_1 is the only vari-

able factor in Equation D.1, the rule is expressed as follows:

$$\frac{\partial Y_i}{\partial X_1} = MPP_1^i \; ; \; MPP_1^i \quad P^i = p_{X_1} = MFC_{X_1} \quad (i = 1, \ldots, n) \quad (D.28)$$

Postulating a specific production function, for example, one of the Cobb-Douglas form as in Equation D.29, the corresponding factor demand function for X_1 can be derived.

$$Y = a X_1^{b_1} X_2^{b_2} \quad (D.29)$$

$$\frac{\partial Y}{\partial X_1} = a b_1 X_1^{b_1-1} X_2^{b_2} = MPP_1 \quad (D.30)$$

In order to obtain the MVP_{X_1}, the components of Equation D.30 are multiplied by p_y. Finally, the derived MVP_{X_1} is equated to the factor cost. Upon solving for X_1, the functional form for X_1 is determined, as in Equation D.31.

$$X_1 = \left[a b_1 X_2^{b_2} p_Y p_{X_1}^{-1}\right]^{\frac{1}{1-b_1}} \quad (D.31)$$

Equation D.31 reflects that X_1 varies inversely only with p_{X_1}. That is, if p_{X_1} increases ceteris paribus, the quantity of X_1 demanded decreases. Conversely, if technological innovations increase the technical coefficients of the factors, if the output price increases, or if the use-level of X_2 increases, increased amounts of X_1 can be profitably used.

The price elasticity of resource demand for X_1 is a coefficient of the responsiveness in quantity demanded as the input price varies. This

elasticity is designated in Equation D.32. The negative sign denotes that prices and quantities demanded move in opposite directions provided that $b_1 < 1.0$. Conversely, the price elasticity of demand with respect to p_y is positive assuming $b_1 < 1.0$, i.e., increases in p_y stimulate demand for X_1. This formulation is given in Equation D.33.

$$\varepsilon_{1,\, p_{X_1}} = \frac{dX_1}{dp_{X_1}} \cdot \frac{p_{X_1}}{X_1} = - \frac{1}{(1-b_1)} \tag{D.32}$$

$$\varepsilon_{1,\, p_y} = \frac{dX_1}{dp_y} \cdot \frac{p_y}{X_1} = \frac{1}{(1-b_1)} \tag{D.33}$$

Product Supply

The quantity supplied to the market is dependent upon a number of factors. Production decisions are usually made on the basis of anticipated factor and output prices and on expected technical relationships.[1] Both are subject to allowance for price uncertainty and operation of exogenous forces.

Profit maximizing producers gear production decisions so that the optional output level is where the SMC of production is equal to the price expected to be received for the product, Equation D.38.

$$Y = f(X_1, X_2) \tag{D.34}$$

$$TC = p_{X_1} X_1 + p_{X_2} X_2 + F \tag{D.35}$$

$$TC = C(Y) + F \tag{D.36}$$

$$\text{Profit} = \pi = p_y Y - C(Y) - F \tag{D.37}$$

[1] Price supports and controls reduce price uncertainty. For a discussion of price expectation models, see Earl O. Heady. Economics of Agricultural Production and Resource Use. Prentice-Hall, Inc. Englewood Cliffs, N.J. 1952. Chapter 16, pp. 475-496.

$$\frac{d\pi}{dY} = p_v - C'(Y) = 0$$

$$\therefore p_v = C'(Y) = MC_y \tag{D.38}$$

In Equation D.35 the total cost of producing Y is the summation of the fixed and variable costs. The total variable cost has been rewritten as C(Y) in Equation D.36, i.e., the least-cost combinations of X_1 and X_2 for various levels of Y can be translated into the corresponding quantities of X_1 and X_2 required to produce Y. When multiplied by their respective prices, the total variable cost associated with various levels of Y is derived. Equation D.37 represents profits realized. Equation D.38 stipulates that output be altered until $p_y = MC_y$. Second-order conditions require that $\frac{d^2\pi}{d_y^2} = -C''(Y) < 0$. That is, MC_y must be increasing at the profit-maximizing output.

A specific production supply function will be derived from Equation D.29. Initially, a short-run supply function will be constructed. For example, $aX_2^{b_2} = k$ and X_1 is the only variable input. Equation D.31 is substituted into Equation D.29 in order to express output in terms of prices, technical coefficients, and the fixed resource. The resulting product supply function is given in Equation D.39. The derived elasticities are given in Equation D.40 and D.41.

$$Y = \left[k^{\frac{1}{b_1}} b_1 \, p_y \, p_X^{-1}\right]^{\frac{b_1}{1-b_1}} \tag{D.39}$$

$$\varepsilon_{y,\, p_{X_1}} = \frac{b_1}{1 - b_1} \tag{D.40}$$

$$\varepsilon_{y,\, p_y} = \frac{1}{1 - b_1} \tag{D.41}$$

The corresponding long-run product supply function where both X_1 and X_2 are variable inputs is given in Equation D.42.

$$Y = \left[a\, b_1^{b_1}\, b_2^{b_2}\, (p_y\, p_{X_1}^{-1})^{b_1}\, (p_y\, p_{X_2}^{-1})^{b_2} \right]^{\frac{1}{1-b_1-b_2}} \tag{D.42}$$

The above supply function is homogenous of degree zero in prices.[1] Output varies inversely with changes in the input prices. As input prices increase, ceteris paribus, the quantity produced and supplied decreases. Conversely, output varies directly with the price of the output. The elasticities of supply relative to p_{X_1}, p_{X_2} and p_y are easily derived with the following results:

$$\varepsilon_{y,\, p_{X_1}} = - \frac{b_1}{1 - b_1 - b_2} \tag{D.43}$$

$$\varepsilon_{y,\, p_{X_2}} = - \frac{b_2}{1 - b_1 - b_2} \tag{D.44}$$

$$\varepsilon_{y,\, p_y} = \frac{b_1 + b_2}{1 - b_1 - b_2} \tag{D.45}$$

A comparison of the price elasticities of supply with respect to p_{X_1} and p_y shows that these elasticities are higher in the long-run product supply function than in the short-run formulation.

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[1] To refer to Equation D.42 as a product supply function is to implicitly assume that quantities produced and quantities marketed are identical under these conditions.