FOOD PRODUCTION AND EQUITY IN AGRICULTURAL PRODUCER STRATEGIES

This is a preliminary paper drafted by A.I.D. staff and does not represent official Agency policy. It was prepared principally by Martha Horsley and has benefited from comments by Regional Bureau, TAB, and PPC staff. The paper is intended to lead to a better understanding of the many factors and complex relationships involved in the analysis of production and equity effects in agriculture and to serve as a point of departure for discussion leading to better articulated AID policy.

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Preface

The purpose of this paper is to investigate, at a very general level, the compatibility of two agricultural sector objectives, food production and equity (i.e. increasing the real incomes of the poor), under existing less developed country (LDC) conditions. Both of these objectives should be viewed as subordinate to the ultimate goal of establishing a minimum standard of living for the bulk of the LDC population. The purpose of the restriction "under existing LDC conditions," is to define the strategy choice in terms of options which are obvious and may be feasible in most LDCs. In crude terms, the two options considered are "small farmer development" and generally-unfocused agricultural development, which in fact turns out to be large farmer biased. The latter is therefore referred to as "large farmer development".

An optimum strategy in most LDCs would include major changes in the distribution of productive resources, in pricing policies, and in organizational forms; these are discussed briefly at the outset. The paper does not focus on such changes in detail, however. Rather, it concentrates on the effects of the two producer strategies under given organizational structures, forms of land and other asset ownership, and overall pricing policies.

Alternative means of achieving production increases -- investment in education, health, extension, credit or group-oriented institutions -- are discussed, implicitly, on an ad hoc basis only. Any assessment of their relative merits would require a more specific context.

The Two Objectives: Food Production and Equity

AID has two major objectives in its program of assistance for agricultural development. One is a "production" objective to help the less developed countries (LDCs) increase their domestic food production in order to alleviate hunger and malnutrition. The other is an "equity" objective to help increase the real incomes of the lower income groups, commonly referred to as the "poor majority".

The objectives of food production and equity stem directly from the Agency's Congressional Mandate as described in the Foreign Assistance Acts of 1973, 74, and 75 plus relevant Committee reports, as well as U.S. commitments stated in the World Food Conference.* Regarding the equity objective, the 1975 House of Representatives bill states that assistance to the food and nutrition sector -- which claims the majority of AID's development assistance -- "shall be used primarily for activities which are specifically designed to increase the productivity and income of the rural poor." Regarding the production objective, Resolution I of the Food Conference highlighted the seriousness of the world food problem in the following terms:

> An increase in agricultural productivity and sustained expansion of food production in (LDCs) at a rate much faster than in the past is essential in order to meet the rapidly growing demand for food, due to rising population and incomes (plus) the requirements for security stocks, and to raise the consumption of undernourished people to universally accepted standards...

The 1975 House Report of the Committee on International Relations states its belief that concentrating development assistance on the smaller, and hence poorer, farmers (which would have an equity impact in the sense that

*See refs 1, 19, 20, and 37.

their real incomes would be increased) and increasing food production are complementary activities .

> the committee reiterates its belief that small-farm, labor-intensive agriculture is the key to greater food production, as well as to more equitable distribution of income in the rural areas of the developing countries, where most of the world's poor live. (p.46)

The 1974 House Report, however, clearly recognizes the possibility that there may be a conflict in attempting to satisfy both objectives simultaneously.

Thus the Report states, while a small farmer strategy is more consistent with the Congressional injunction to support activities which "directly improve the lives of the poorest . . . people and their capacity to participate in the development of their countries", there may be circumstances imposed by the world food crisis which justify temporarily relinquishing a small farmer focus. The Report goes on to say:

> AID should, however, take care that its programs in support of short-term production increases in certain countries, as opposed to those in direct support of longer term structural changes needed to increase the productivity of the small farmer, are kept to the minimum required to deal with the current emergency situation and are not used to the detriment of the small farmer and the rural poor.

Perhaps the best way of looking at the issue is to say that the production and equity objectives are both intermediary to the ultimate goal of achieving a minimum standard of living for the bulk of the LDC population. Conceptually, the food production objective can be interpreted as concern with the supply side of the minimum standard of living objective, since food may account for half or more of consumption requirements among lower income groups. The equity objective can be interpreted as concern with the demand side. Unless the real incomes of the poor are increased, they will not be able to purchase the increased food supplies, or other goods necessary for a decent living standard, in the market place. The question to be addressed here is: Given the possibility of conflict, or trade-off, between the production and equity objectives, what is the best means of achieving the combined minimum standard of living objective? The balance of this first section of the paper

will seek to clarify the meanings given to the objectives of food production and equity before turning to this basic question.

Improved equity is defined here as improved ability on the part of those who need it, the poor, to obtain a higher standard of living. It would thus entail, at a minimum, an absolute increase in the real income of the poor, and, ideally, a concomitant improvement in their real income relative to that of higher income groups. The poor, or the "poor majority" in the terms of the Congressional Mandate, have been defined in income, nutrition and health status terms and probably include most LDC small farmers as defined below in Section III A. An increase in real income could of course result from a fall in food (or other basic consumer-good) prices or increased production and consumption of home-grown food as well as an increase in cash income (not offset by a rise in the general price level). A refinement of the equity concept can be made by distinguishing between a "direct" equity impact, where resources or benefits are channeled directly to the "poor majority" target group, and an "indirect" equity impact, where real incomes of the target group are raised through secondary effects, say, lowering relative food prices or increasing demand for landless labor. This distinction will be useful in subsequent sections which attempt to compare the equity effects of two producer strategies.

Regarding the food production objective, it might be argued that increasing aggregate supply rather than domestic food production alone, is the appropriate objective since imports from food surplus countries could provide an alternative means of increasing food supply. While not excluding the possibility of trading non-food exports for food, this paper will focus

on increased domestic production as having the major potential for increased LDC food supply. For some LDCs, such circumstances as relatively small size, unfavorable physical environment for food crops, and favorable foreign exchange position and prospects could justify significant reliance on imports to meet food deficits. But reliance on imports to meet the bulk of LDC food needs does not appear feasible for most LDCs./ Projections to 1985 based on current trends of income, population and agricultural production yield up to a five-fold increase (from 16 to 85 million tons) from 1970 to 1985 in the cereal deficit alone for LDCs.* Developed countries could conceivably provide the imports required to meet such a massive deficit but this assumes that the balance between demand and supply growth in these countries will yield the requisite surplus and that developed countries will be willing to provide concessional financing on a much larger scale than heretofore (see USDA source cited in footnote for further discussion).

There are, on the other hand, several real political and economic reasons why many LDCs desire self-sufficiency in food production. These include continuing restrictions on world trade in agricultural commodities, and the role of political considerations in influencing allocation of food aid. Finally, the fact that agricultural yields are quite low in most LDCs (including many with favorable natural endowments) relative to those prevailing

*This is an FAO estimate used by the World Food Conference (the base period is an annual average for 1969-71). The figures exclude Asian centrally planned economics. While alternative projections, based on different definitions and assumptions, prepared by USDA result in somewhat lower deficit the relative increase is still massive (from 20 million tons in 1970 to 50 to 70 million tons in 1985, depending on assumptions). For a comparison and discussion of various projections, see USDA, Economic Research Service, Foreign Agricultural Economic Report No. 98, The World Food Situation and Prospects to 1985, pp. 32-39. (ref.36 .)

in developed countries, suggests both to LDCs and donor agencies the potential for meeting the bulk of food needs within LDCs themselves through improved mobilization and allocation of local resources -- supplemented with aid from developed countries in the form of agricultural inputs, research and technical assistance.*

Section II identifies some of the major reforms required in many LDCs to create an environment conducive to achieving the minimum living standard goal. Although the discussion is brief, the policy implications for AID are clear. Section III, which constitutes the bulk of the paper, attempts to analyze the food production and equity effects of alternative producer strategies (small farmer and large farmer) under existing conditions, i.e. assuming no major reforms take place. Section IV summarizes the conclusions of the previous section and discusses briefly the program/policy implications for AID.

II. Major Reforms

There is considerable agreement among development experts that major reforms are required in most LDCs to create an environment conducive to achieving the minimum standard of living objective for the rural areas. There is less agreement, of course, on the particular form and extent of the reforms required although they can be generally characterized as falling into one of three categories:

i. reforms affecting the distribution of productive resources,

ii. reforms related to pricing policies, and

iii. reforms related to organizational forms and development approaches.

Certainly one of the factors inhibiting greater participation of the poor in the development process is their limited ownership of (or access to)

*This is not to argue that food aid cannot play a complementary role beyond meeting emergency situations. It will be suggested later in the paper that food aid can help meet short run food deficits in LDCs where broadly-based food production efforts have longer gestation periods.

productive resources:, land, physical capital, and "human capital". Land redistribution, land-to-the-tiller programs, and resettlement on new land are alternative means of providing lower income farmers or landless agricultural laborers with their complementary primary resource.* This is perhaps the most powerful redistribution mechanism in the rural areas since it has broad implications for political power and the distribution of government services. The wide-spread availability of agricultural inputs, and financial capital needed to acquire these inputs, can facilitate the accumulation of physical capital; and improving the quality and quantity of rural education can help upgrade the human capital factor by giving the individual the means of acquiring additional knowledge and skills. Similarly, improved health and nutrition will help him attain his potential. Finally, success in population control will increase the per capita level of all these resources and hence the likelihood that the minimum living standard objective will be achieved. The problem is, of course, that all these reforms, with the possible exception of the land redistribution and land-to-the-tiller program (and even these require substantial resource inputs if production levels are to be sustained), require massive human and financial resource inputs.

The second category of reforms, i.e. those relating to pricing policies, involve agricultural terms of trade with other sectors, the pricing of inputs and outputs so that proper and adequate production incentives are transmitted, and monetary and fiscal pricing policies which encourage saving, investment, adoption of appropriate technologies, and desired income redistribution. An agricultural land tax, based on potential rather than actual productivity, is a frequently recommended example of fiscal reform. Pricing policies are also difficult to change, however. Poor input and product prices are often due to

*See ref. 13 for a recent summary of the relationship between land reform and economic development.

misconceptions and/or political design. Cheap credit for small farmers, for example, sounds good but results in extremely limited total credit availability, partly because of decapitalization. Political constraints on other policies, e.g. the agricultural land tax, arise from the fact that political and economic power coincide.*

The third category of major reform, organizational forms and development approaches, would entail increased attention to spatial organization, regional planning, and integrated rural development. Depending on existing constraints, reaching the poor might involve rural infrastructure development, promotion of market towns and rural industrial development, and/or agricultural reorganization, including land consolidation, collectivization, or decommunalization. Proponents of more effective regional and rural development** argue that significant long-run benefits are associated with establishing rural growth poles even if there are short-run losses in efficiency. Rural industry tends to be more labor-intensive, for example, thus providing income-generating activities for a larger segment of the population. In addition, improved rural economic organization tends to stimulate increased investment in agriculture, improved input and product markets and more widespread and rapid adoption of innovations. There are problems, however. Although it has been shown in China that comprehensive regional or rural development can be largely self-financed, the typical LDC central government approach requires substantial resource allocation (or reallocation). In order to conserve scarce resources, the programs must be carefully integrated with pricing policies. In addition, it may not be clear what specific strategy is optimum in a given situation. As a result, few LDCs have made the necessary financial and manpower commitments.

*See ref 25 for general discussion of agricultural pricing policies
**See refs. 28, 29, and 30.

The reforms mentioned here, of course, have their less radical counterparts: land tenure reform rather than land redistribution, agricultural subsidies rather than basic pricing policy reform, and selected rural development project support rather than comprehensive regional planning efforts. Government action often takes these less radical forms, for both economic and political reasons. And therefore the following discussions of the effects of alternative producer strategies generally assumes existing patterns of resource holdings, market imperfections, and organizational forms. This is not to imply that change is impossible, only that it is slow in coming and, when it comes, it is partial. *

To clarify somewhat further, it will be important to keep two points in mind throughout the following discussion. One is that the assumption of no major reforms lends a conservative bias to the discussion of small versus large producer potential, i.e. more scepticism must be introduced about the ability of the small farmer to contribute to production goals than if major reform is assumed. In fact, in the terms of the following discussion, if all three types of major reforms were instituted, there would be less reason to specify a target group approach. The development process might well exhibit major complementarities, rather than conflicts, between the production and equity goals. The other point is that, despite the difficulty of reforms, those mentioned probably constitute the most effective means of achieving the minimum standard of living objective. Many development experts have come to the conclusion that the forces of inequality are so strong that "pro-poor" programs without the above reforms often end up primarily benefiting the non-poor. Nothing short of major equity-oriented programs, undertaken on several fronts simultaneously, will succeed in income redistribution.**

*Ref 31 provides an example of the economist's increasing interest in taking into explicit account the institutional setting of development.
**See refs 9 and 16 for additional observations on the "elusiveness of equity."

Thus, where LDC governments are interested and willing to undertake reforms, AID might wisely adjust its funding priorities in favor of support efforts, involving, for example, multiple goal sector analysis, regional planning, land reform and revision of agricultural policies.

III. Alternative Producer Strategies

The discussion in this section is confined to alternative producer strategies. Producer strategies are considered important because they can affect both the supply and the demand side of the minimum living standard objective and because they directly involve the majority of the active agricultural population. No further value judgment regarding their superiority over other possible strategies -- focusing on say landless agricultural laborers or on increasing food availabilities to the consumer by reducing losses from off-farm handling and storage -- is intended. In particular, this section will analyze the food production and equity implications of a small farmer strategy versus a strategy which is neutral in intent with regard to its beneficiaries. The latter, in the absence of major reforms, turns out in practice to be a large farmer strategy and will be referred to as such below.

The selection of a small farmer target group as one strategy option is an explicit attempt to introduce an equity bias into a production-oriented program. The pros and cons of such a bias have been hotly debated among aid donors and within LDCs for the last few years, although not necessarily in the present context. It is sufficient to note here that although a small farmer strategy by definition entails greater <u>direct</u> equity effects than a large farmer strategy, the ultimate impact on a combined goal of food production and equity (including <u>indirect</u> equity effects) is not obvious.

Section A below discusses alternative criteria for defining a small farmer target group and proposes farm size as perhaps the best available proxy for income and wealth. Some rough target group definition is a prerequisite to any further analysis, even at the general level. Section B presents evidence

on relative productivities by farm size, and Section C investigates the total equity effects of small versus large farmer strategies. Section D attempts to draw the major implications of alternative strategies for overall rural and national development.

A. Target Group Definitions

As noted earlier AID's Congressional Mandate requires priority attention to assisting the "poor majority", in LDCs. It is not entirely clear, however, what constitutes a "small farmer" by reference to the poor majority. The working definition of the poor majority elaborated by the Congressional Mandate Implementation Task Force includes all individuals with a per capita income less than $150 (alternative definitions pertaining to nutrition and health status have also been offered -- see ref.1), however income data are difficult to acquire in the rural areas. Moreover, the ideal equity index in the agricultural sector would include a measure of assets, which is even more difficult to acquire.

Farm size is a poor proxy for rural poverty for a variety of reasons:

(a) It does not reflect non-agricultural income obtained by rural households;

(b) It may not reflect differences in yields resulting from differences (1) in land quality (2) degrees of irrigation and (3) cropping patterns;

(c) It may not reflect differences in price of given yields resulting from market imperfections -- monopoly - monopsony problems in agricultural markets.

Nevertheless, it is probably the best income/assets proxy for which data are available across countries, and it has the advantage of being a convenient definiton for measuring the evidence on productivity effects of alternative producer strategies.

TABLE I

CLASSIFICATION OF AGRICULTURAL POPULATIONS BY FARM SIZE

Target Groups	Relative Area Limits (hectares per holding)	Proportion of Agricultural population	Proportion of Land
Latin America			
Submarginals*	≤ 2.49	0.48	0.03
Small Farmers	2.5 to 14.9	0.33	0.18
Medium/large farmers	> 15	0.19	0.79
South Asia			
Submarginals*	≤ 2.49	0.50	0.07
Small Farmers	2.5 to 7.49	0.29	0.24
Medium/large farmers	> 7.5	0.21	0.69
Tropical Africa			
Submarginals*	≤ 1	0.60	not available
Small Farmers	1 to 4.9	0.30	"
Medium/large farmers	> 5	0.10	"

*"Submarginals" include landless agricultural workers, which constitute 30 per cent or more of the active agricultural population in some countries.

Source: Chapter V of ref. (6). The farm-size limitation for "small farmer" has been expanded upward by 2.5 hectares for both South Asia and Tropical Africa in order to increase inter-regional comparability of farm size and income.

The accompanying table gives a classification of agricultural populations by farm size for three of the major developing regions of the world -- Latin America, Tropical Africa, and South Asia. The agricultural population in each region is divided into three groups:

submarginals (including landless agricultural workers), which constitute approximately 50 percent of the populations; small farmers, which constitute another 30 percent; and medium/large farmers, which make up the remainder. The relative farm-area limits for the category "submarginals" have been determined by using country-level estimates of the size of holding necessary to achieve minimum accepted standards of family subsistence income. The smaller estimated subsistence holding in Africa, for example, can be explained in part by the typically smaller family size. The "small farmer" category is also a relative concept, based on regional norms.

Relating this table to AID's mandate to give direct assistance to the "poor majority", we might include both the "submarginals" and the "small farmers" in the target group. This would bring the percent of the agricultural population included in the target group to about 80 percent in Latin America and South Asia and 90 percent in Africa. (The percent directly covered by the small producer strategy would be less, however, by the percent of landless agricultural workers included under the submarginal category.) The percent of cultivated land eligible would amount to approximately 20 percent in Latin America, 30 percent in South Asia, and perhaps about 30 percent in Tropical Africa.

These regional averages disguise wide differences among countries and among subregions within each country. They are only illustrative and have limited operational significance. A small farmer strategy ultimately has to be defined within the specific context of the individual country and program examined. In such a definition, soil fertility and water availability (rainfall or irrigation) characteristics might establish a "standardized hectare" dividing line between small and large farmers. Besides farm size other distinguishing behavorial characteristics of farm groups might also be useful, e.g., a submarginal farmer might be distinguished from a small farmer as a net buyer of food and a net seller of labor; "medium" farmers might be defined to include only those interested in selective mechanization to smooth out their seasonal demands for labor, while the definition, "large farmers," might be reserved for those engaged in generalized labor-displacing mechanization. Corporate plantations using traditional, labor-intensive techniques for growing tea, rubber or sugar might form a fifth category.

The discussion in the following sections makes an arbitrary distinction between the polar approaches of "small farmer" and "large" farmer" strategies, though it is recognized that in practice there is a continuum of farm sizes and groups, as well as of strategies that affect them. It does this for purposes of presenting the broad conclusions from available investigations which are typically country specific. Thus, the conclusions offered here must be viewed only as broad tendencies and interpreted with care when they are to be applied to specific countries or sub-regions.

B. Evidence on Relative Productivities

Studies based on agricultural census data and sample surveys suggest that net benefit (or value-added) from food production in the LDCs is similar across farm size for a given value of resource inputs.* The findings draw heavily on studies of foodgrains production but include some data on total production by farm size. This emphasis is appropriate in view of our concern with the food consumption patterns of the poor. Thus, in the poorest countries, our primary concern might be for basic foodgrains production. In somewhat more developed countries, this concern might be extended to the supply of protein and food items satisfying other basic nutrition needs.

The findings are typically reported in terms of product per unit of labor, land, or capital (labor, land and capital productivity, respectively). There is a clear tendency for labor productivity to be higher on large farms, on the one hand, and for land productivity to be higher on small farms, on the other. While the relationship between capital productivity and farm size is less clear, available evidence suggests a peak in the small to medium farm range and a gradual decline as size increases. These countervailing relationships reflect different technologies employed on different size farms which, in turn, may be due to (a) different input and output prices facing the small and large farmer, (b) varying degrees of risk aversion and/or (c) different production possibilities due to different amounts of fixed factor endowments (especially land and family labor). They thus reflect a tendency for farmers to husband most carefully the resource(s) which they perceive to be in relatively scarcest supply (clearly land

*See references 2, 4, 6, and 34 for cross-country evidence and 8 for the Indian case.

for small farmers, and labor, especially in peak seasons, for large farmers). These considerations lead small farmers to choose types of crops and cropping systems (e.g., intercropping and multiple cropping) which require intensive use of labor and result in relatively high yields per acre. By contrast, large farmers may engage in land extensive activities, such as cattle raising, and enhance their labor input by combining it with substantial amounts of agricultural machinery. At any rate, the overall relationship, in terms of net returns per unit of total resource costs, appears to be roughly one of constancy across farm size.*

The significance of this constant ratio of net output to cost lies in its implication of similar levels of economic efficiency across farm size, and hence similar levels of food production for a given value of resource inputs.** The ratio might in fact be better described as a profitability measure rather than an economic efficiency measure, since it includes the effects of crop choice as well as the effects of crop-specific technology and input choice. In any case, the finding does bring into question any unqualified pessimism about the viability of the small farmer due to some inherent inefficiency.

*Reference 7 points out statistical biases in the U.S. farm data which have led to the commonly held view that this relationship does not hold true in the U.S. The author shows that when these biases -- related to farm class definition, estimated labor costs, and variations in land quality -- are adjusted for, the U.S. data do show a rough constancy of net returns to total resource inputs across farm size. (Note that higher yields per hectare on large farms do not necessarily imply higher net returns per unit of cost.)

**There is a sizeable literature on the measurement and interpretation of "efficiency" by farm size. The measure discussed here is a crude one and is sensitive to the prices, or imputed prices, used to weigh the components of the index. See ref 26 and 32 for a more precise measure which distinquishes price and technical efficiency.

A major limitation of all the findings on productivity discussed above is that they do not measure the change in food production in response to a change in policies, resource inputs, institutions or techniques. (Most of them measure average productivity or yield per hectare or per worker over a given time period.) One study attempting to examine this question finds the results to vary depending upon the input. Specifically, in the Punjab and Uttar Pradesh, India, production response to increased fertilizer application was found to be higher for small farmers, but it was found higher for large farmers in the case of the provision of irrigation.* A recent, less rigorous study looking at adoption rates and productivity changes in several Asian countries, due to the introduction of new rice technologies, concludes that:

> Farm size per se has little meaning. It acquires significance only when viewed within the context of the community, the productivity of the land, the infrastructure, the services available, the intensity of land use, population pressures, the tenure system, and the social and economic values attached to land ownership.**

Thus, it is apparently not farm size, but rather the conditions and circumstances associated with farm size, that we must consider in any assessment of potential production levels.

Perhaps the best available way to assess the potential change in relative productivities is by looking at case history type studies of individual projects and of specific agricultural development efforts.*** These studies often have a regional focus, such as studies of the "Green Revolution" in parts of Asia and Latin America. The time period turns

*See reference to study by G.R. Saini in 6.

**See reference 10.

***See for example refs. 12, 15, and 21.

out to be an important consideration in analyzing the evidence. The length of time it takes for program or policy actions to have an impact will depend on several factors, including: (1) the differing technical gestation periods of various inputs (application of fertilizer will have a more immediate impact on production than construction of major infrastructure, for example), (2) the time required to create or restructure institutions to serve the agricultural sector or a particular group of farmers, and (3) possible differences in the speed of adoption of new inputs and techniques between small and large farmers, owing to lack of familiarity or skill in employing new techniques, conflicting habits and customs, or aversion to perceived risk.

In the short run (say 1 to 2 years), these studies suggest that food production will be higher under a large farmer strategy than under a small farmer strategy. The reasons for this lie largely in the concept of access. Longer term inputs, such as irrigation, may be available for large farmers but not yet completed for small farmers. While seasonal inputs such as seeds, fertilizer and pesticides may be theoretically available to small farmers, the lack of rural roads and market facilities may inhibit physical access of the small farmer to off-farm inputs. The large farmer orientation of the agricultural credit and extension services may inhibit small farmers' institutional access. Finally, although the evidence is mixed, small farmers may be slower to adopt new practices than large farmers. The lag may be due to labor or financial bottlenecks, risk aversion, or acculturation problems -- unfamiliarity with new procedures, conflicting cultural habits and customs. Improved analysis of factors determining small farmer response requires additional empirical research.

Another factor related to access consideration is the degree of divisibility of inputs. The greater the degree of divisibility, the greater the accessibility of more productive inputs to small farmers. Seeds, fertilizers, and pesticides are obviously highly divisible. Other inputs may not be but can be rendered "divisible" with time and the proper institutional arrangements. Irrigation and basic farm implements, for example, can be made sufficiently divisible if appropriate technology is employed (e.g., feeder canals and more efficient animal drawn implements). Heavier equipment, where required (not for rice but perhaps for wheat in some types of soils) can be made divisible through rental arrangements.

In sum, the implementation problems of helping small farmers obtain increased access -- and in particular the requirement of sequential programming -- may make it difficult to introduce changes in the short run. Rural road construction, manpower training, and introduction of new organizational modes all require both planning and execution time. On the other hand, some experts believe that, with proper extension advice, there is considerable scope in the short run for increasing total farm output through improved on-farm storage and more intensive land use. Also, there is evidence in some areas that the small farmer -- due to his intense commitment to the land -- may be more of a profit maximiser than the typical large farmer and that, where ecological conditions favor small-scale, labor-intensive farming, the small farmer will invest proportionally more of his available resources.* Thus, one might say that in the short run it is possible to get an increase in agricultural production under a small farmer strategy equivalent to that under a large farmer strategy but that it is not probable.

In the medium run, say from two to five years, where basic rural infrastructure and trained manpower already exist or can be put in place or trained quickly, and where appropriate organizational modes which

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* See reference 18

keep costs down can be identified, progress can be relatively quick. Significant results were obtained for example, in the early phases of the Comilla Program (East Pakistan) and the Ethiopia Minimum Package Program in two or three years. It should be noted, however, that a high-quality, intensive, pre-implementation planning effort was involved in both cases. Also, we must be concerned with factors -- such as manpower availabilities and political reaction from the elites -- required for sustained success.

In the longer run, say 6 to 15 or 20 years, where physical infrastructure can be extended to remote areas, where institutions -- for example, agricultural research institutions -- can be re-oriented toward the small farmer, and where information, education, and new organizational modes have had a chance to permeate the rural areas, food production under a small farmer strategy should be as large for a given amount of investment as under a large farmer strategy. Indeed, as explained below in Section D, it may well be greater.

Despite these findings, the difference in the financial costs of credit for small and large farmers is often cited as evidence of the inability of small farmers to compete in the market place. Indeed project analysis shows that interest rates charged to small farmers must clearly exceed those currently paid by large farmers if the value of the portfolio is to be maintained.* This may be a specious comparison, however, for several reasons. First, sources of credit to which only large farmers have access may be substantially subsidized below the opportunity cost of capital. An observed difference between interest rates charged to large vs. small

*Note that this does not mean that small farmers will not be able to borrow at the higher rate. If capital productivity is higher on small farms, they may be able and willing to pay the premium.

farmers would in this instance be misleading. Second, assuming that no subsidies exist, there are ways of reducing costs by administration of small farmer credit through group approaches, as is apparently the case for example in China. And third, even if higher costs of lending to small farmers cannot be absorbed through group approaches, the difference between total costs of all inputs per unit of output for small farms, as compared with large farms, may not be as great as the lending cost difference would suggest. This is because a smaller proportion of total inputs on small farms may be credit financed.

Finally, it is worth noting under the general heading of cost comparison that there are considerable "sunk costs" associated with large farm development which are typically already in place. These include roads to the farm gate, institutions oriented toward large producers, fixed capital investment (including, for example, irrigation) and investment in human capital . There are few "sunk costs" associated with small farm production however. Thus the short-run or "marginal cost" of financing small farmer development is greater because it includes virtually all fixed costs as well as variable costs, whereas the "marginal cost" of financing large farm development may consist primarily of variable costs, e.g., seasonal production or marketing credit. In the long-run, however, total costs of small farmer development need not exceed total costs of large farmer development.

C. Equity Effects under Alternative Strategies

This section considers the impact of small and large farmer strategies on equity; i.e., on increases in the real incomes of the poor. It concludes that the ability of a large farmer strategy to match the equity effects of a small farmer strategy in the short-to-medium run is open to question and even more doubtful in the long run.

Since small farmers are taken to be included in the "poor majority" (there may be exceptions in some countries, of course), a small farmer strategy, to the extent it succeeds in raising the real incomes of small farmers, would appear to be superior to a large farmer strategy on equity grounds by definition. This ignores, however, the distinction suggested at the beginning of the paper between a "direct" and an "indirect" equity impact. For a small farmer strategy (and similarly for a large farmer strategy), the direct impact is the change in real income accruing to participating small farmers from increased productivity and returns.* The indirect impact is the change in real income accruing to other groups in the poor majority (non-participating small farmers, the rural landless poor, and the urban poor) who as (1) net buyers of food, benefit from relative declines in food prices resulting from increased food production, as (2) net sellers of labor, benefit from increases in real wages through increased employment, and/or as (3) net sellers of food, suffer from a decline in product price. The adverse impact of (3) should be less under a small farmer strategy since non-participating farmers (who are net sellers of food) will be fewer and production increases (and hence product price declines) will be slower in coming. Indirect equity effects through (1) and (2) are, however, uncertain.

In principle, it should be possible to (a) increase food production with a large farmer strategy and (b) benefit those poor who are net buyers of food through the income effect of lower food prices -- since food expenditures constitute a large proportion of total expenditures by the "submarginals" and the urban poor -- or, (b') to the extent that food prices did not decline sufficiently to reduce

*Looking at the direct equity impact of a small farmer strategy, no distinction need be made in financing food versus non-food crops, much less high-value food crops versus basic food crops. The indirect equity impacts discussed here, however, do assume that primary emphasis in both strategies would be on basic food crops.

profits to former levels, tax away either in income or in kind part of the large farmer profits, using this revenue to finance poor-oriented production and/or welfare projects.* In addition, in theory, since wages are linked to subsistence needs, a decline in the price of food may result in a decline in wage costs relative to other factor costs and possibly encourage a substitution of labor for capital throughout the economy. This could generate additional employment opportunities for the rural and the urban poor. Thus, both the food price decline and the profits produced by a large farmer strategy could be linked to the equity goal of benefiting the "poor majority."

The critical assumption of this approach is that retail food prices will decline significantly or that part of the interim profits will be taxed away for development purposes. However, where agricultural price supports are maintained (at the retail as well as farm level) in the face of declining production costs--as they were at least in the early phase of the Mexican wheat production program, for example--food prices will not decline and food buyers among the poor will not be benefitted. In addition, few countries have had the political will to tax away large profits reaped by the rich under any circumstances. Referring again to the Mexican wheat production program, after the initial period when large farmers benefited enormously from (1) the new seed varieties, (2) the government-financed irrigation investment concentrated on large farms in the northwest, and (3) government-maintained prices, price supports were removed and product prices declined substantially. High interim profits of large farmers -- due in part to subsidies on capital inputs -- were not taxed away for development purposes, however, and the net result of the early years of the program was to further skew the distribution of income in the wheat growing areas.

*Another possibility, which may be more politically feasible, is for the government to finance say rural public works in part through deficit financing. Success would depend on the inherent income elasticity of the tax system and the ability of the economy to absorb inflationary pressures.

Thus, the theoretically favorable indirect equity impact of a large farmer strategy in the short-to-medium term is questionable. In the long-run it is even more doubtful, since demand for staple foods is income inelastic. Once basic calorie needs are satisfied, staple food demand will grow only as fast as population growth. An increase in staple foods obtained with short-run production increases on large farms may, in fact, pre-empt the small farmer for years to come. Not only will current incomes of small farmers fall with the decline in product price (depending on the relative size of their marketed surplus), but also, in the absence of substantial cost-reducing innovations, future production incentives will be depressed.

Distinguishing the rural from the urban poor highlights another fundamental flaw in the equity case for a large farmer strategy. Private and public food distribution networks and programs in developing countries are largely aimed at urban rather than rural areas. This may reflect the presence of more efficient transportation and marketing channels for linking rural with urban areas than for linking one rural area with another. It also reflects the fact that the urban poor typically have greater political power than the rural poor. Thus, increased food production from large farmers is not as likely to reach the rural poor as it is the urban poor (or if it does, the price may not be much lower). Similarly, among the rural poor, the submarginals are most likely to be excluded from the food distribution networks.

Given the important relationship between employment and income, an equity case for a large farmer strategy would exist if large farmers made intensive use of hired labor. Available evidence does not support this conjecture, however,

Farm management studies show that not only do small farmers use more labor per acre initially, but, when large farmers are provided profit increasing inputs, they tend to use less rather than more labor per acre (by investing in labor displacing equipment -- often made artificially attractive through subsidized credit and import advantages). Also, there is much controversy about the yield-increasing contribution of mechanisation. Many studies showing increased yields from tractorization, for example, have not adjusted for increased use of other inputs. It is rather clear, however, that the net effects of mechanisation on employment and income distribution have been adverse.*

In sum, while conclusive quantitative evidence of equity effects does not exist, a priori analysis of the various components of equity impact and some historical evidence suggest that, although there are potentially favorable indirect equity effects in the short-run, a large farmer strategy will not have a favorable equity impact in the long run, in either the direct or the indirect sense. The small farmer strategy, on the other hand, clearly has a favorable direct equity impact since the beneficiaries are members of the poor majority. The higher the proportion of the poor majority accounted for by small farmers, the greater the direct equity impact of the small farmer strategy. If such a strategy included land reform, the impact would be even greater. In addition, the long-run indirect equity impact of a small farmer strategy should also be favorable. As discussed below, the small farmer strategy appears to contribute more to sustained rural income generation in the long run.

*See ref. 8, ch. 5, and ref 22 for evidence and further discussion.

D. Impact on Key Factors in Rural/National Development

The contribution of alternative producer strategies to food production and equity objectives can be assessed at a given point in time; however we must also be concerned with the establishment of a self sustaining development process. This section discusses the probable impact of these strategies on key factors in overall rural and national development, namely on (1) the level of demand for domestic goods, (2) the labor intensity of the prevailing consumption pattern, (3) savings and (4) demographic trends.* The evidence suggests that the optimum strategy may again depend on the time frame. In the short run, the high savings rates and the large marketable surplus of large farmers are appealing. As small farmer incomes rise above the subsistence level, however, both savings and marketable surplus will increase, thus eroding the principle arguments for the large farmer approach and enhancing the superiority of the small farmer strategy as a means of obtaining increased rural income generation and sustained national growth.

Deficient demand, particularly in smaller countries, is recognized as a major deterrent to economic growth in some LDCs. For a given level of national income, the overall level of demand for domestic goods will be determined by the amount of income spent at home versus abroad. Typically, upper income agricultural producers have a higher marginal propensity to import -- to satisfy both consumption and investment demand -- than lower income agricultural producers; thus, a small farmer strategy is likely to generate more value-added activity in the domestic non-agricultural sector than a large farmer strategy. Assuming equal export performance, the balance of payments effect of the small farmer strategy would also be favorable.

*Another key factor might be education of the labor force. A small farmer strategy would appear superior here because of the broader participation implied.

By contrast, because of the higher "reservation demand" of small farmers for their own farm products, a smaller proportion of their output is actually sold on the market. This means that the income generated through ancillary activities such as transportation, handling, and processing is less, as is small farmer cash expenditures on other goods. The smaller marketable surplus tends to be a temporary phenomenon, however; research in the Philippines, for example, shows that annual per capita consumption of rice rises with income up to about 264 kilograms of paddy and then levels off.* Beyond this point, reservation demand declines and marketable surplus rises.**

Another important factor in the establishment of self sustaining growth in labor surplus economies is the labor-intensity of the prevailing consumption patterns. The labor-intensity of the goods demanded is important because of the employment generating effects, the higher propensity to consume out of income to labor than out of income to capital, and the need to conserve scarce capital. Most studies show that, except for the very low income groups which consume foodgrains (which might be produced with capital intensive methods), the labor-intensity of average consumption patterns decreases with income*** This implies that a small farmer strategy would promote a more labor-intensive consumption pattern than a large farmer strategy.

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*See ref 23 p. 73.

**Ref 17 is a recent study of the effects of alternative farm sizes (small, medium, and large) in the U.S. According to that study, the small-farm structure generates an estimated 30 percent more in off-farm income, primarily in the areas of agribusiness and consumer goods and services, than the large-farm structure. Of course in the U.S., the typical small farm is perhaps 100 hectares where it might be 1 or 2 hectares in the LDCs. No comparable LDC studies are known.

***See refs 5, 27, 33, and 35.

Regarding savings, recent studies of small farmers in Korea, Taiwan, Bangladesh, and Zambia show that their marginal private savings rates can be as high as 50 percent if the incentives to save -- generally considered to involve a profitable technology plus attractive deposit rates and convenient savings institutions -- exist.* Of course, average savings rates of large farmers are likely to be even higher than those of small farmers, although the productivity of large farmers' capital investments may be lower. On the other hand, heavier public taxation of the agricultural surplus for development purposes is considered more politically feasible under a small farmer approach than under a continuing emphasis on large farmers since the latter are in a stronger position than the former to exert restraining influence on tax rates and, in addition, on the distribution of government expenditures. If these behavior patterns are typical, reinvestment in the agricultural sector could, on balance, generate as high a growth rate under a small farmer approach as under a large farmer approach. One should note, however, that the incentive and ability to save by tenant farmers or share croppers -- not to mention landless agricultural workers -- is considerably less than for the owner-operator; thus the savings/investment potential will vary with tenure patterns.

Finally, regarding demographic trends, migration to cities should be discouraged by a small farmer strategy to the extent that the latter leads to a relatively higher standard of living for the poor in the rural areas. The increase in urban overhead costs associated with relieving congestion and extending existing urban service levels to new migrants may well render the provision of urban services more costly in the long run than the

*See ref . 3

provision of comparable rural services. In addition, rising incomes among a broad spectrum of rural families, when accompanied by other modernizing influences -- such as education, mass communications, and increased availability of consumer durables -- appears to be accompanied by a decline in fertility among those families.* Given limited non-human resources, this spontaneous decline in fertility permits per capita incomes, hence standards of living, to rise faster than would be otherwise possible.

IV. Conclusions and AID Program/Policy Implications

A. Conclusions

In summarizing the preceding discussion it is perhaps useful to begin with the equity objective. While something of a case can be made for a large farmer strategy serving the equity objective, it is a shaky one, especially when the two following considerations are taken into account. First, it may be more difficult (and costly) to shift to a small farmer strategy in the future - after programs and institutions biased toward large farmers have been strengthened and after real incomes and production incentives of small farmers have been reduced -- than to begin with a small farmer strategy in the first place. Second, the case for the large farmer strategy serving the equity objective is an indirect one based essentially on its effect on lowering food prices to the consumer; however, the price decline may not occur or may occur with some delay. The indirect case is further weakened when the previously discussed problems entailed by food distribution to the rural poor are taken into account. It

*See ref 24

follows that if a small farmer strategy has a roughly equivalent impact on food production, it must -- since small farmers are the primary beneficiaries -- have a superior impact on equity.

Thus, the assessment of the small farmer strategy in meeting the equity objective rests in part on its success in meeting the food production objective. The main conclusion from the analysis on relative productivities is that the choice of a small or large farmer strategy will depend largely upon the time period for achieving the food production objective. Consideration of the strategy choice impact on key factors in rural and national development reinforces this conclusion. The shorter the time period, or the more urgent the food crisis in a given country, the less appropriate strategies at the small farmer end of the spectrum are likely to be.

But this conclusion rests on two important assumptions. First, it rests on the assumption that existing physical and institutional infrastructure are seriously deficient for small farmers and/or a profitable technology does not exist in a readily usable form. To the extent that this is not true, the time period becomes less of a constraint. Second, it rests on the assumption that there are not alternative ways of meeting a short run food crisis. Countries with high-cost domestic production and/or limited agricultural resources might find it more economical to meet expanded needs through imports than through expanding domestic output. Thus, increases in domestic food production can be seen in these cases as a long-run objective, not a short-run requirement. Also, a relatively small country in a favorable foreign exchange situation has the option of importing some food and, assuming it has some physical potential for food production, can accordingly be more free to pursue a small farmer strategy even in the short run than a large country in an unfavorable foreign exchange situation. Even the latter type of country could be provided some "degrees of freedom", however,

to pursue a small farmer strategy in the short run, by being provided food aid until growth in domestic food production reaches an acceptable level.

II. AID Program/Policy Implications

The preceeding analysis suggests that, to the extent possible, AID should support major reforms which might allow a more rapid attainment of both food production and equity objectives. Where such reforms are not in progress, a small farmer strategy better meets a combined food production and equity objective. Thus, as is consistent with the Congressional Mandate, AID should concentrate its assistance to agricultural producers in the small farm sector. The implications for AID programs and policies arising in this context are even stronger if we keep two points in mind. The first is that other aid donors and LDC governments will continue to finance generally unfocused agricultural production programs which do not have a target group orientation; and the second is that, although small farms may occupy a small proportion of total agricultural land (as small as 20 percent according to Table 1), AID could not expect to affect a much larger area in any case, in view of the Agency's limited development budget. Thus, AID can focus on small farmers while other resources are allocated more broadly within the sector. It is also worth noting that a small farm strategy appears to better ensure the participation of women as decision-makers. Individual country studies in Africa, for example, show a significant number of female heads of farm in small farm areas where one or more males seek supplementary income through off-farm employment.

At the agricultural project and program level, the weight of the Congressional Mandate and the evidence discussed in this paper would appear sufficient, notwithstanding the various qualifications, to suggest that the Agency should, indeed, require agricultural production projects to be small-farmer oriented (<u>some</u> elements of such a strategy may also benefit medium and large farmers, but all elements should benefit small farmers).

Of course the ease of implementation will vary by country. There may be some countries, for example, which appear to have only small producers. Must we establish a cut-off point? There may be other countries where AID is financing large resource transfers. Is it possible to program large resources in the small farm sector in short time periods? AID must find reasonable answers to these questions which uphold the spirit of the Congressional Mandate.

Another obvious policy implication for AID is that carefully programmed PL 480 food aid -- certainly Title II and perhaps Title I -- be provided to those countries which, of course, have a need for the food aid for both domestic and balance of payments reasons, but also where AID is collaborating in mounting a small farmer-oriented development strategy. A major concern with food aid programs has been possible disincentive effects on domestic production. But if food aid is linked to a major small farmer - oriented food production strategy, including provision of relevant physical infrastructure through labor-intensive rural works programs, which would increase the demand for food, prices and incentives for producers could be maintained.

It is recognized that small farmer assistance is more difficult to program and will therefore require maximum programming flexibility, including local currency use in DLs, freedom to choose the most appropriate inputs and outputs, more use of technical assistance funds for local hire and local procurement, and rapid response and assistance from AID/W. A first operational step in pursuing this policy would be for each Mission to define more precisely, ideally in collaboration with the host government, the "small

farmer"
/target groups appropriate to that country, employing some of the notions discussed in Section III A above suitably amended to fit individual country situations. This definition would be employed as one criterion for identifying, designing and approving agricultural project proposals.

Additional research, analysis of existing research, and guidance is clearly in order. In devising specific strategy options attention should be given to decreasing small farmer costs of production relative to those of the large farmer. This can best be accomplished through a combination of small farmer oriented agricultural research and farm management studies for typical small farms. We need in particular to address the difficult problem of helping "submarginal" small farmers to increase their food production in cost-effective ways. Although the limited size and/or quality of their land holdings may preclude their ever being full-time farmers, and their inaccessibility by reason of location or fragmented holdings may make the cost of reaching them directly with small farmer institutions prohibitive, financial and technical assistance on pricing policies, markets, input supplies and research could help them, as well as more "viable" small farmers, substantially increase food production. The problem of submarginal farmers takes on particular importance in view of the fact that they, along with completely landless laborers (who constitute 30 per cent or more of the active agricultural population in some countries), constitute the poorest and worst-nourished of the poor majority, and that their position, if not taken explicitly into account, could be worsened. Small farmer projects should be carefully designed to facilitate the participation of submarginals.

List of References*

1. AID/PPC. A-263, 4-30-75, Congressional Mandate and attached paper, "The Congressional Mandate: Aiding the Poor Majority."

2. AID/TAB. "Small Producers Economics" (Rough draft of AID paper).

3. AID. Spring Review of Small Farmer Credit (1973). Papers by Dale Adams and Richard Roberts.

4. Bachman, Kenneth L. and Raymond P. Christensen. "The Economics of Farm Size" in Southworth and Johnston, editors, Agricultural Development and Economic Growth, 1967.

5. Ballentine, Gregory, and Ronald Soligo. "Consumption and Earnings Patterns, and Income Redistribution: The Case of Colombia: (unpublished draft, 1974).

6. Berry, Albert. "Cross Country Evidence on Farm Size/Factor Productivity Relationships," (unpublished paper presented at The Purdue Workshop on Empirical Studies on Small Farm Agriculture in Developing Nations, Purdue University, November 1972).

7. Berry, R.A. "Farm Size and Factor Productivity in U.S. Agriculture" (unpublished draft, January 1973).

8. Bharadwaj, Krishna. Production Conditions in Indian Agriculture: A Study Based on Farm Management Surveys. University of Cambridge, Department of Applied Economics, Occasional Paper No. 35. (London and New York: Cambridge University Press, 1974).

9. Blair, Harry W. "The Elusiveness of Equity: Institutional Approaches to Rural Development In Bangladesh", Cornell University Special Series on Rural Local Government, November 1974.

10. Castillo, Gelia T. "Diversity in Unity: The Social Component of Changes in Rice Farming in Asian Villages" in Changes in Rice Farming in Selected Areas of Asia, International Rice Research Institute, 1975.

11. Chenery, Hollis et al. Redistribution with Growth, 1974.

12. Dalrymple, Dana and William I. Jones. "Evaluating the Green Revolution" (June 1973).

13. Dorner, Peter. Land Reform and Economic Development, 1972.

*There is an extensive literature on most of the topics discussed in this paper. The "List of References" is just that. It does not constitute a selected, much less an exhaustive, bibliography. An effort has been made, however, to refer to (1) recent research and (2) publications of particular interest to AID as well as to (3) summary material.

14. Ford Foundation. "Employment in Developing Countries: (July 1974).

15. Griffin, Keith. The Political Economy of Agrarian Change: An Essay on the Green Revolution (1974)

16. Harberger, Arnold C. "Fiscal Policy and Income Redistribution" (unpublished draft for AID Princeton-Brookings Contract, 1974).

17. Heady, Earl O. and Steven T. Sonka. "Farm Size, Rural Community Income, and Consumer Welfare", American Journal of Agricultural Economics, August, 1974.

18. Herz, Barbara. Demographic Pressure and Economic Change: The Case of Kenyan Land Reforms. (unpublished Ph.D. dissertation, Yale University, 1974).

19. House of Representatives, Foreign Affairs Committee, Report on Foreign Assistance Act of 1974. House Report No. 93-1471, October 25, 1974.

20. House of Representatives Bill H.R. 9005 (August, 1975) and Committee on International Relations Report, "International Development and Food Assistance Act of 1975" (Report No. 94-442).

21. IBRD. Rural Development: Sector Policy Paper (February 1975)

22. International Labor Office. Mechanization and Employment in Agriculture, 1974.

23. IRRI Research Highlights for 1974, 1975.

24. Kocher, James E. "Rural Development, Income Distribution and Fertility Decline," published by the Population Council, 1973.

25. Krishna, Raj. "Agricultural Price Policy and Economic Development" in Southworth and Johnston, editors Agricultural Development and Economic Growth, 1967.

26. Lau, L.J. and P. A. Yotopoulos, "A Test for Relative Efficiency and Application to India Agriculture", American Economic Review (March 1971).

27. Mellor, John and Uma J. Lele. "Growth Linkages of the New Foodgrain Technologies." AID Employment and Income Distribution Project - Occasional Paper No. 50.

28. Miller, James C. "Regional Devel opment: A Review of the State-of-the-Art" TAB/UD, Agency for International Development (August 1974)

29. Mosher, Arthur. Creating a Progressive Rural Structure, 1969, and To Create a Modern Agriculture, 1971.

30. Owens, Edgar, and Robert Shaw. Development Reconsidered: Bridging the Gap Between Government and People (1972).

31. Sen, Amartya. Employment Technology and Development, 1975.

32. Sidhu, Surjit S. "Relative Efficiency in Wheat Production in the Indian Punjab", American Economic Review (September, 1974).

33. Soligo, Ronald. "Factor Intensity of Consumption Patterns, Income Distribution and Employment Growth in Pakistan", Rice University Program of Development Studies, Discussion Paper No. 44 (1973).

34. Statement of Edgar Owens, House Foreign Affairs Committee Sub-Committees on International Organizations and Foreign Economic Policy (September 1974).

35. Summan, Tucay M. "Short-run Effects of Income Distribution on Some Macro-Economic Variables: The Case of Turkey" Rice University Program of Development Studies, Discussion Paper No. 46 (1973).

36. USDA, Economic Research Service, Foreign Agricultural Economic Report No. 98, The World Food Situation and Prospects to 1985 (1974).

37. World Food Conference (November 1974). Draft Resolutions.