AGRARIAN DEVELOPMENT IN LATIN AMERICA: ISSUES AND RESEARCH PROBLEMS

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I

INTRODUCTION

In this brief summary paper, I select for review only some of the issues which have become the focus of government policies or the concern of international development agencies. I am basically interested here with the growth of agriculture and the welfare of farmers rather than with efficiency and productivity. My bias is bolstered by the awareness that the welfare of rural residents has been damaged by the unharnessed growth of commercial agriculture and that industralization policies have been responsible for poverty and malnutrition amongst wage labourers and despair amongst rural migrants to urban centers. Furthermore, my selection of relevant issues amongst the myriad of planning problems is guided by the theme explored during the first day of meetings: the analysis of decisions. Consequently, I disregard planning issues like marketing reform not because I think them irrelevant or secondary in determining returns, affecting production and defining market prices, but because they are best examined using others research tools than the ones that concern us at the moment.

II

THE ECONOMIC ENVIRONMENT OF PEASANT PRODUCERS

Land availability

Peasant farmers have to face the shortage of one or more inputs that are required for optimum production levels. Land is often one of them, even in Latin America where, by contrast with Asia, offers the agricultural

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sector sufficient land for production of food and export crops. But land is rarely a free commodity [1]. Existing tax structures, low returns from alternative investments, have encouraged the retention of unused land by proprietors who were the repositors of colonial privileges [2]. Similar concentrations of land arose during post-colonial times with the growth of monocultures, heavily supported by foreign capital [3]. Whatever the reasons for the existing maldistribution, it certainly does not seem to help either the rural poor or the national economy. Food production has often remained below national needs: food prices are high respect to urban wages, export crops and livestock often have low growth rates and fail to become major foreign exchange earners. Even economists concerned with national problems rather than the plight of peasants have favored some form of redistributive land reform. Tax reforms have been suggested partly because they are believed to be politically viable but also because they are believed to force the flow of funds from the agricultural sector for industrial growth. Ironically, these suggestions are being voiced despite ominous earlier reviews of the inequities of land tax legislation (United Nations, 1951). Berry (1974), echoing a recently favored policy in Colombia, has suggested that a new land tax law is not only a viable mode of encouraging redistribution but will lead to higher municipal revenues (a serious problem in Colombia) and higher agricultural productivity. I myself doubt the viability of the policy, as landlords in marginal areas do manage to avoid paying the lower land taxes that presently prevail; furthermore, land revaluations in a country where many landlords lack titles is an expensive and time consuming proposition [4]. At any rate, as Berry himself points out, higher taxes may effect the subdivision of latifundios but the units that will emerge will be commercial farms rather than smaller family farms. In fact, Berry ends his paper with a warning that more research is needed

to pin down the precise effects of the proposed tax on factor proportion and crop composition in farming, or as an incentive to force the sale of land. The amount of land that is not sold despite higher taxation will depend on behavioral characteristics of farmers. Hence, if we want to evaluate the advisability of the policy, a micro behavioral model should be used in selected regions to gain the necessary information [5].

It was just two decades ago that development economists began seriously to sponsor land reform policies, not because they expected subdivision would stimulate production but because they thought land reform would effect greater equity and social justice. Some, however, remained adamantly against it; Myint feared a return to subsistence agriculture and stagnation (Myint, 1964, p. 141-42). The great debate that occupied economists and other social scientists through the sixties had little effect on development planning in Latin America which still focused on industralization rather than the growth of the non-commercial agricultural sector. Political events, however, brought other realities which in turn encouraged further research on land reform as a solution to some agrarian problems: Cuba's and Bolivia's revolutions offered two interesting case studies, the second more relevant to the points I discuss here.

Using survey information comparatively, social scientists tried to evaluate whether land reforms were successful in bringing new land under production [6] and whether productivity of new farms compared favorably with productivity of previously existing haciendas [7]. Such studies, though useful, failed to bring forth decisive data. Planners had to shift their arguments from efficiency considerations to moral and political consideration. Dorner, however, warned us that the moral argument would become inconsequential if the newly generated farm system could not generate sufficient investments and the necessary growth in agriculture to satisfy export needs and the food

needs of the rapidly growing population. The need for solid proof of small farm productivity once again became important. Dorner faulted the existing studies for their use of single factors measures, particularly when the single factor used to measure productivity was labour rather than land (Dorner, p. 119). More recent studies have attempted to measure efficiency as well, and to take into account the opportunity cost of each relevant factor. These studies are, however, based on aggregate census data that assume regional homogeneity of farms, forgetting that performance may be affected by possible crop mixes within each producing unit. To evaluate small farm's productive potential, we need to analyze the microstructure of farms, the ability of farmers as managers of efficient producing units, and the possibility of developing an infrastructure of services that distribute efficiently the necessary technical inputs and can bulk and market agricultural products at low costs. Studies of government bureaucracies and cooperative organizations will be helpful to determine whether seeds and fertilizer can be made available at reasonable mark-ups when needed [8]. At the moment such services leave much to be desired in more remote rural areas of Latin America and are disastrous in colonization areas. The complaint that inputs are not available when needed is rampant; the failure of retail cooperative and marketing cooperatives is disconcerting. Planners should encourage studies of existing marketing structures to see to what extent with minor reforms, existing systems may perform more adequately as distributors to the small farm sector and as marketeers of their products. An evaluation of the productive potential of small farms requires empirical micro behavioral studies (See Berry, 1975, p. 265); decision models may prove useful to determine which are the specific weak points of small, family farms and/or farming cooperatives.

Sharecropping and rental of land

Access to land can also be gained by renting. Some tenant contracts impose heavy burdens; in Latin America they have included heavy labor commitments and personal services. Yet not all tenant arrangements are that imbalanced, even in Latin America, nor are the landlords always omnipotent hacendados [9] . Nevertheless, any such contracts have, until recently, been regarded as discouraging optimum resource allocation by economists reared in Marshall-Pareto's tradition, or as exploitative by economists influenced by Marx. Cheung (1969) made us reconsider the subject by pointing out that tenantship may be advantageous to the tenant as it implies not just the sharing of output but also of risks. But this is all too simple. As Newberry points out, risk itself (1976) could not explain why farmers may choose to be tenants. A prospective tenant deciding whether to lease land or sell labor has to make decisions before the outcome is known. A decision to rely on wage income during the next crop year is a gamble on the continued availability of employment during the course of the year, so that neither farming nor wage employment avoids uncertainty. The advantage of sharecropping, instead, may be that peasants can thus avoid the hazards of the credit market and landlords can avoid managerial costs incurred in supervising capital inputs. Although Newberry's insights are argued with a decision-maker in mind, the mathematical evidence he presents in support of his hypothesis are based on micro-analysis of market interlinkage and the consequential costs to the landlord and farmer [10] . In a subsequent paper he co-authored with Stiglitz, he argues only with what he calls 'stylized facts' about sharecropping contracts. Other scholars, in an attempt to move away from 'stylized facts', have tried to test the assumption that sharecropping may be functional by surveying the comparative performance of sharecroppers and owner operators. Data from South Asia indicates that the Marshallian hypothesis needs

revisions (Bell, 1977). Such surveys are, however, inconclusive [11] as they rely on gross yield information without consideration of quality of land that may be offered for sharecropping, nor that peasants cultivate land other than on share contracts. Legislation to eradicate share tenancy or to discourage that market for land should be based on closer examination of case studies. The studies should follow closely the theme of the argument used by Newberry and Stiglitz to derive their hypothesis: that decision process most clearly reflects considerations of preference and efficiency of each type of land contract. Elimination of share contract may be imperative in cases where the terms of exchanged are highly biased by political or economic power [12]. At the same time policies geared to the elimination of all share contracts without careful examination of terms and bargaining conditions will not necessarily ease the plight of peasant cultivators. The replacement of share contracts with rent contract may not always produce positive results. It must also be remembered that such contractual arrangements are likely to prevail even after land reform, as there are modes of expanding production and not just of obtaining a basic plot [13].

Colonization

Latin American farmers have for over a century attempted to deal with the problem of land shortage by migrating to less populous marginal areas. Some of these movements have passed unnoticed because of the minimal impact of colonized areas to national economy. Others movements have gained notoriety either because they were associated with the growth movement in export economy (coffee, tobacco, rubber, etc.) or because they have precipitated confrontations over land rights with established populations. On occasion national governments have directed and/or encouraged colonization moves by opening new roads, organizing a service infrastructure, making credit

available and/or providing technical assistance. Other times, national governments have allowed or encouraged private corporate enterprises to invest in land, build roads, and resell parcels to prospective colonists. Political and economic reasons have played a role in governmental involvements and private investments on colonization [14]. None of the cases have been successful if by success is implied the economic improvement of immigrating population and the solution of the minifundio problem. The political and economic implications of colonization should be considered by any planner; I disregard them here only because decision analysis will not help address the problem. Yet, there is another aspect of colonization that also needs close examination for which decision analysis is most useful: how government policies may directly or indirectly affect eventual farm size, rate of innovation, cost of inputs, use of credit and what will be the consequences of any such policies. Simulation decision models that also incorporate the social realities of farmer-head of household, would provide the arena to examine the impact of some of these policies. But such models should not just simulate decisions as timeless processes, but as a series of moments in the life span of the farmer manager. The models should take into account paternal control over labor resources, changes in availability of family labor (Ortiz, 1980a) developmental changes in managerial strategies (Bennett, 1980) and the sequential nature of most decisions (Gladwin, 1980). Such models could also be used to guide the credit agencies or project directors who must advise farmers. But their use need not imply government control of colonization through locality specific projects (most of which have ended in failure), rather government choice of rational policies to aid the small farmer to establish viable enterprises and to minimize the rate of failure amongst spontaneous migrants. It is relevant to keep in mind, at the same time, that the strains noticeable in mass

colonization movements are also due to the pressures of capitalist expansion on these areas; hence not easily set aright with rational government policies.

Access to capital

Advocates of land reform and colonization did not always consider the relevancy of inputs other than land and family labor for efficient farming. They were often politicians either concerned with power relations in rural areas, or they were echoing ideologies that stressed the identification of family with land and membership in a community with rights of access to the commons. In fact, the Mexican land reform very closely adhered to the colonial concept that villagers must have access to the corporation's territory. The need for credit was not always grasped by reformers. On the other hand, developers, mindful of Schultz' writing, were just as eager to design suitable credit programs for small farmers as they were to change any laws on tenure. They felt that credit programs would at least compensate for some of the existing inequities in the distribution of land. In some countries, like Colombia, credit agencies for small farmers preceeded serious attempts towards land reform. Caja Agraria came into being during the thirties and INCORA was organized in the sixties. In fact, there is yet no effective land reform program in Colombia. Yet, despite the concern of developers and the existence of institutional credit agencies, small farmers in Colombia find it difficult to obtain credit. In part it is for lack of adequate financial resources by institutional credit agencies but also because government has an ambivalent attitude towards small scale farming. At the moment, throughout Latin America, credit is mostly effectively limited to commercial farmers and cooperatives [15]. Concern has been expressed recently as to the advisability of using very low interest rates which, given inflationary rates, are indeed negative interest rates, as incentives for production or as mechanism to redress resource inequalities. The

advisability of using credit subsidies raises some profound questions about political and social priorities as well as the economic advantage of certain intersectoral flows, questions that are beyond the scope of this short paper. The reality that must be examined here, is that the policy of very low or negative interest rates as subsidies to small farmers is at present making a small impact on rural production, because the financial support for such programs is not forthcoming. Such a depressing reality has made Lele (1975, p. 82) wonder whether planners should not hope for institutional financial aid, but instead first examine the savings capacity of farmers in the specific areas to be affected by a development project. She takes heart on African evidence that producers and marketeers do manage to raise capital for cooperative sharing. Although the suggestion may be applicable to Africa, it is unlikely to be relevant for Latin America where the savings of traders are not often shared with agriculturalists [16] and where inflation renders last year's savings ineffectual as funds for reinvestments. It is only traders and big landowners who will have amassed savings for capital investments. But as Nisbet (1967) and Feder (1960) note, rural credit markets are likely to be highly imperfect (because of lender's control of markets), hence rates charged are likely to be usurous [17] . Alternatively, government could mobilize rural savings by allowing institutional banking to offer more enticing rates. This would imply a total restructuring of credit markets in rural areas. Before embarking on such a reorganization, a more careful study of lender's market should be made to determine the likelihood that specific interest rates would attract savers and how that will affect pattern of investment of saver-producer's. A decision analysis of potential savers will certainly provide much needed information.

A rejection of the policy of negative interest rates requires first the evaluation of the impact of credit on farmers' decisions. Microeconomists

have attempted to examine this point using stylized information and mathematical models. Such models examine the viability of some strategies at specific interest rates. Their analysis has provided us with some polemical suggestions that are interesting but require more empirical testing:

- Small farmers cannot make use of technical innovations unless credit is available at a cost that is not greater than the losses that they may have to face if prospects fail (Hildreth, 1974).

- As credit is intended not just for investment but also to sustain enterprises during bad years, and as farmers are also consumers, consumer's credit programs should be considered along with producer's credit programs (Lipton, 1974). In fact, any policy geared to provide greater social insurance, like medical care, will insure availability and cheaper costs of family's labor and hence reduce chances of failure and costs of losses.

- Crop insurance may be viable (Oury, 1969) when bureaucratic costs are not too high.

- Demand for credit will depend on the risk level implied by the enterprise, hence credit demand may be low for innovation [18].

New technology and risk

The productivity and welfare of small farmers was believed to rest on the simple elimination of straight forward obstacles to efficient allocation of resources, as well as the provision of credit and of more productive technology [19]. What planners and technocrats failed to appreciate initially was that elite grain varieties are not often stable, that they are not often as adaptable, hence as tolerant of variations in environment. Thus, yield variability and crop failure may be greater after innovation, a risk that is compounded by the higher cost of inputs required to insure the promised higher yields [20]. In Latin America, CIMMYT and CIP in Mexico, CIAT in Colombia are the international organizations developing and testing new

varieties more suitable to local conditions and farming needs. It is through their work that we have learned to appreciate the significance of variability and the need to consider selection as a choice that must be concordant with other strategies. It is also through their work that we have learned to appreciate that in most cases innovations are risky, implying a 12% coefficient of variations and a marginal return of 20%. Marginal returns for farmers further away from major marketing centers are likely to be even lower in Latin America, for fertilizer and pesticides are for them more expensive and availability more inconsistent. Furthermore, unlike Asia, few farmers cultivate irrigated land (Mexico probably being the outstanding exception), hence they are more dependent on variable rainfall.

The task of planners has become more complex with their awareness that risk levels have to be considered in policy design, and that peasants do not shy innovations. What planners have to come to grips with now, is the potential value of techniques devised by small farmers to cope with uncertainty: diversification, intensive subsistence production, cattle farming, sharecropping, reduction of cash inputs, adoption of variability reducing techniques and adoption of strategies that allow for flexibility (Ortiz, 1979 and Gladwin, 1980). Farmers may use any combination of the risk reducing techniques listed above, the efficiency of which may sometimes be hampered by well-meaning government policies, as price support policies. Thus if we want to examine the impact of policy, we must not only rely on aggregate data which may obscure certain relation, but we must also examine, using a decision model, the allocative and reactive behaviors of farmers. Such studies will be useful, as well, as background information for small scale project directors.

Although variance and risk, or the impact of variance, should be incorporated in models when they are to be used to examine the viability

of new inputs, of price policies, of credit programs, simpler riskless models may often suffice. What still remains to be settled is how best to incorporate risk in the models [21] .

FOOTNOTES

1. In Latin America land that remains unused and effectively unclaimed falls under the category of baldío and available to any farmer. Laws defining baldío land vary from country to country. The availability of such land has served as the backbone for many migratory colonization movements in the andean area, particularly in Colombia. A colono can theoretically expect to eventually be granted a title to the land he clears as long as he keeps two-thirds of it under cultivation or pasture. He cannot, of course, occupy land "owned" by someone else unless the state had declared that title invalid and classed the land as baldío, which has on occasion happened.
2. Ecuador is the present day classical example of longstanding latifundio system. At least until 1968, 23.5% of farm land was in the hands of few latifundistas (representing .2% of farmers controlling not only land but also political power and economic resources (Bromley, 1977).
3. The best coffee land on highland areas and pastureland in lowland areas of Guatemala are in the hands of 2.1% of farmers, whereas 88.4% of farmers have to make do with 14.3% of available land (Griffin, 1976, p. 162). Banana agriculture and commercial cattle and cotton plantations have constrained the land resources available to Hondureño small farmers; the typical size holding is of at most 10 hectares with 75% of the farms falling in that category; commercial holdings are much larger and few have consolidated to the extent of concentrating 37.7% of land on the hands of .2% of farmers. In neighboring San Salvador, the situation has been more serious. Ninety-one percent of farms are under 10 hectares and .5% of farmers control 37.7% of land on farms over 200 Hts (Durham, 1979). Land is not so unevenly distributed in Colombia and the significance of very large holdings is not equal to

the smaller Central American countries. Yet the plight of small farmers is serious as large holdings control 41% of land (Adams, 1964). In Brazil 90% of farmers control 24% of land (Araujo & Meyer).

4. For a history of tax policy changes and attempt to implement them in Colombia, see Davis, 1967.

5. Davis (1967) studied the effect of tax reassessment by comparing two highland municipalities in Cundinamarca; in one of them property had been revalued and the tax burden was higher. Higher taxes did provide higher revenue to that particular municipality but the services offered by municipality did not improve. A regression analysis of survey data, furthermore, failed to prove a difference in allocation strategies or in intensity of production. Davis ends his study with a speculative explanation of failure to respond: the "strength of the profit motive". The cost to absent landlord of closer farm management, the costs implied for more intensive production and the absence of required inputs may account for the failure to take advantage of tax incentive and respond with more intensive production or sale of property. In other words, his study illustrates the point Berry himself makes, that we must examine the dynamics of allocation in order to evaluate the impact of tax policy reforms.

6. For a recent and general survey of effects of land reform in Latin America, see Ekstein, et al. Land Reform in Latin America. For a more detailed analysis of contradictions and shifts on policies in the Peruvian land reform program, as well as the effect of such shifts on the performance of the agricultural sector and on income distribution, see Zaldivar (1974). The contradictions are such that, according to Horton (1973) only a small proportion of land was actually distributed; the holdings that were affected by the reform were large

plantations which are now under government control in the form of cooperatives. Lehman (1974) provides us with a similar analysis for Chile and Thome (1971) reviews the effectiveness of legislation. The Bolivian land reform was much more drastic but even here it remains to be seen how thorough a transformation was achieved. There are vast areas where no reallocations were made and others where campesinos received token plot. What the reform has definitely done was to alter contractual obligation; if other inputs become available these changes may lead to more efficient exploitations. Heath (1969) and Heyduk (1974) review the success of Bolivia's experiment in achieving a better redistribution of land and increasing productivity of plots and higher welfare to small farmers. Land reform in some other countries, like Colombia and Venezuela, was limited to the expropriation of few haciendas and the development of colonization programs in baldío territory.

7. For Mexico, see Eckstein, et al 1978, Appendix C, where they report the results of a survey of productivity of ejidos, small and large farms. When production per hectare is measure, the small farms perform better than ejido in bean, cotton, and coffee agriculture. Although large farms produce more per hectare than small farms, their performance is not so outstanding considering that they have better access to credit, receive higher farmgate prices and have higher proportion of land under irrigation. The study concludes that small private farms make more efficient use of available resources. Dovring (1970), in fact, reports that there has been a rapid growth in the productivity of small farms in Mexico in recent years. Dorner and Felstehausen's (1970) review, however, indicates a smaller disparity of performance for Mexican farms than those in other countries; in Brazil small farms do produce more

per hectare than large farms. Similar conclusions have been reached for Colombia. According to a CIDA report, yield per hectare in small farms is much higher than in large farms, but so of course is the area that small farms maintain under cultivation. If efficiency of farms is measured by taking into account the opportunity cost of labor and product prices, small farms do not come out badly. Yet Berry (1975, 1976) warns us after a careful micraeconomic analysis of census information that "Although small, small farms as a group are relatively efficient when compared to large ones, they could not be called productive in absolute terms or in relation to their potential" (p. 256). A case study of productivity changes of an asentamiento in Chile gave inconclusive results (Swift, 1971). Changes in the performance of the farming sector, due to higher small farm productivity after land reform, were estimated by measuring the productivity of small farms that came into being in Bolivia after the subdivision of haciendas and the productivity of the neighboring Peruvian haciendas. Burke (1974) concluded that the post-reform small farms are as productive as the haciendas were, but that both units could improve performance. The validity of surveys and evaluations as true measures of farm productivity leaves much to be desired. Arguing from a theoretical standpoint but with a considerable experience in various areas, Lipton and Dorner are convinced that, in general, output per unit area must be inversely related to farm size. They also argue that though farmers may at first consume a larger share and that such consumption may sometimes go beyond nutritional needs of the family, appropriate price policies will insure their reversal.

8. There are a number of studies that touch on cooperative action; I list only a few to give an idea of some of the problems encountered in Latin America. In Colombia cooperatives receive heavy institutional support and flounder when they are to become independent; see INCORA Report on Colonization.

   The Peruvian situation has been neatly summarized by Büchler and by Lang and Roberts. There is a long list of studies of collective ejidos in Mexico, each one pointing to specific set of problems (Wilkie, Glantz). Studies on marketing structure and marketing problems are bringing to light some profound problems about regional inequalities. See the work of Smith, Appleby, Cook and Diskin, Ortiz, Bromley for country specific studies.

9. Glantz (1974) traces the sharecropping of ejido land in Mexico, which strictly speaking is illegal, to 1956. Shortage of credit and technical knowledge forced ejidatarios with irrigates land to accept offers by enterpreneurs who either payed a rental (22% of cases) or shared the harvest (13%). In Sinaloa the incentive to accept a share-cropping contract was the ejidatarios' need for irrigation water, not controlled by them directly, and capital (Cervantes et al, 1974). Finkler (1974, 1980) reports other variant forms of sharecropping arrangements of ejido land. In fact, sharecropping contracts vary to such an extent that sometimes come close to rental contracts and others to labor service contracts. In Colombia there are examples of every type; en compañía contracts come closer to the ensuing discussion on this text of utility of sharecropping contracts, such contracts prevail in minifundio areas of Boyacá (Fals Borda, 1957; Haney, 1971, 1972). At present in Colombia about 12% of farms in use are exploited under sharecropping contracts (Soles, 1974, p. 12-15), but the share may

increase with greater population inflow to areas being colonized (Ortiz, 1980). Brazil has even higher percent of farms in sharecropping contracts (Johnson, 1970). The relevance of this topic - an evaluation of productivity and utility of sharecropped land - for future policy considerations becomes apparent if one notices that sharecropping contracts are not things of the past but will have to be considered even after land reform. In Bolivia, for example, tenants' farmers still exist (see Heath; Heyduk).

10. The arguments offered by Newberry (1975) and Newberry-Stiglitz (1979) are purely academic for they are based on the assumption that farmers have real choices between fair share contracts, rental of land, and fair wage payments. They also assume that the labor market directly relates to prices of products grown in small farms, forgetting that mode of production is not the same for each crop. Yet despite the unreality of the argument and despite the fact that could never be used to explain the existence of sharecropping as they like to claim, Newberry and Stiglitz force us to think more carefully about the subtle returns of certain economic relations.

11. See Herring, 1978 and Ruttan, 1966.

12. Certain political realities make nonsense of Newberry's and Stiglitz' arguments (see Newberry, 1975, p. 134 for his own qualification). In countries that had vagrancy laws, like in Guatemala, or where labor and services were due on the basis of status as well as on the use of land - like in Peru, Bolivia, Ecuador, Colombia, etc. - market forces had little to do with the terms of contract in sharecropping arrangements. Hence, when convenient to the landlord, rather than the tenant, the terms of the contract were changed (see Faron; Hobsbawm). There are numerous examples in all Latin American countries of

dispossession and eviction of tenants by landlords with mechanization and change of farm policy. In Colombia the problem of tenure uncertainty has been great even when there were no changes in farming strategy. Evictions implied a return to bellow subsistence wage labor rather than a shift to a fair market wage rate as implied in the micro-economic argument. It is because tenants in Latin America must, most of the time, assume exploitative, insecure contracts that, in a reform attempt, the Colombian government approved an amendment of the 1968 Land Law 135 of 1961, whereby all tenants should register. Needless to say, fearing eviction most tenants failed to do so.

13. Examples given for Mexico and Bolivia are relevant here. Sharecropping as already mentioned is emerging as an important mode of production in areas of colonization. In Colombia, if the colono is unable to obtain credit to exploit his land, he may lease it on short-term basis in order to avoid losing it to others who may then claim it as baldío. Short-term leases may allow him to gain time to obtain credit or accumulate savings to buy his own animals or to farm it when his sons are old enough to help him.

14. The literature on colonization is vast and would be pointless to select a set of relevant case studies for each country. Those who are not familiar with the policies and problems or the extent of such migratory movements will find Nelson's(1973) general survey of colonization useful. For a discussion of conflicts arising as a consequence of colonization in Brazil, see Souza Martins (1980) and Martine (1980).

15. Institutional credit is scarce even in countries like Mexico with considerable financial resources and a certain commitment to land reform and cooperative farming. The Banco de Crédito Ejidal can only finance 15% of ejidatarios (Stavenhagen, 1970) and can only afford to subsidize

production-with low interest credit-of 21% of land, hence limits its use to commercial farming and irrigated land. It is not surprising that Cervantes (Cervantes et al, 1973) records for Sinaloa that farmers have to borrow from traders at a monthly interest rate of 15%. In Bolivia, despite reform commitment, the institutional rate is much higher, which may be more realistic but has not managed to stimulate sufficient supply to meet the credit demand. Like in other countries, institutional credit is first used to subsidize the commercial farmers (Ladman and Tinnermeier). Financial constraints are also true for institutional credit in Colombia. Most of the loans of the Caja Agraria go for commercial farming; only 15% of them are small enough to have gone to small farmers, a conclusion that is supported by the fact that only 8% of borrowers have gross assets of less than Col $10,000. INCORA, another source of institutional credit in Colombia, calculates that theoretically it could reach 30% of farmers in areas of colonization, yet information on number of clients indicates that in reality has facilities to reach only 15% of colono population (Ortiz, 1980). But other countries are probably worse off. In Ecuador (Griffin) most loans go to larger landowners and in San Salvador, 82% of financial resources are reserved for export crop and thus do not reach small farmers (Cutie). In Brazil, government entities direct 63% of their credit resources to large landowners while the more productive small farmer have to rely on individuals as sources for credit. In 1970, 70% of farmers received no credit (Araujo and Meyer). Thus the policy of retaining low interest rate which, given inflation become negative interest rates,for institutional credit, in the long run,have not helped the small farmer. Credit agencies find it difficult to enlarge their financial base; attempts to carefully manage their resources has led to the neglect of the marginal farmer (See Adams, 1971; Rask and Reichert;

Blitz and Long; USAID for a discussion with examples of this argument).

16. The data so far collected does not clearly point out to an active use of the informal credit market in Latin America, in contrast to Asia. See Adams, 1971 for review of evidence.

17. Lipton (1979) cites a number of studies that seem to disclaim the assertion that rural credit is controlled by exploitative money lenders or that rural interest rates are usurious. The authors are of the opinion that interest rates reflect true opportunity costs, risks, and default rates. At the same time Lipton notes (p. 343) that at least some analysts neglect to consider informal interest rates and hidden interest rates. My own personal experience is rich of usurious rates offered by traders and landowners who eventually always manage to recoup the amount of loan and interest, using repossession techniques or demanding labor and harvest repayments, which in fact it is to the landlord's and trader's advantage.

18. See Goreux, L.M. and Manne AS (eds.) for a theoretical discussion of the impact of given interest rates on credit demand and productivity.

19. Already during the sixties, Stavenhagen (1968) warned us that the Green Revolution was responsible for eviction of minifundistas; a phenomenon that Ossa Escobar illustrated with census information for the Cauca Valley. Berry and Urrutia, were able to extend the analysis to the whole of Colombia's agrarian sector and point that on the whole, land had become more concentrated and income more unevenly distributed; they did not isolate Green Revolution policies as the single culprit. Wharton (1969) warned us of other possible socio-economic impacts. By the seventies it became clear that better technology by itself would not solve agrarian problems; it would in fact make them worse. Griffin (1972) insisted that technological innovation is counterproductive

unless accompanied by other government policies regarding factor prices, farmgate prices, credit availability. Lipton (1979)stressed that the new varieties are often riskier and appropriate policies to protect farmers must be developed. Haven and Flinn (1975) illustrated some of these points for Colombia with a follow-up analysis of their Tamesis case study: the new coffee introduced by The FEDECAFE because it was not accompanied by credit facilities lead in this municipality to consolidation of holdings. In fact, the capital inputs which the new coffee requires has effectively decreased real income to farmers who are now advised to diversify farms and replant them with tomatoes or other high priced crop. See UNRID, 1974 for a summary of policies that should certainly accompany improved technical inputs. I fear that though the warnings have been recognized, they are not often fully considered perhaps because the assumption in any project is that credit will be made available and that other allocation problems will be resolved in due course.

20. See Zulberti et. al. for an explanation of differential reaction to imposed technology in the maize and potato project in Caqueza. They explain reaction in terms of loss function for new maize technology; their arguments may be more complete if they considered the relevance of each crop in their total farming and subsistence strategy (See Ortiz, 1979 and Lipton, 1979). See also the analysis of adoption of new technology in Puebla project by Moscardi and de Janvry (1977) and Gladwin; Colmenares for Colombia,(1979). Note also Cancian's general theory on other social variables affecting innovation (Cancian, 1979, 1980).

21. Risk may be incorporated as objective probabilities of each set of outcomes, as subjective probability estimates or as expected range of outcomes. We also have to consider that subjective estimates are

not stable but are affected by other factors like status, experience, education, etc., as Cancian's study reveals. The problem of how to introduce risk or uncertainty thus becomes complex and sometimes may be unnecessary. (See Young, 1979 and Ortiz, 1980 for a brief review of most relevant problems and existing literature.)

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