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CONSISTENT POLICY FORMULATION WITHIN A SKEWED FARM SIZE DISTRIBUTION: THE SMALL FARMER IN LATIN AMERICA

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Analysis of the Latin American agricultural sector of necessity has had to incorporate an extremely skewed distribution of land resources within the analytical framework. This structural feature is common to virtually all Latin American countries, producing in basically land surplus economies inequitable access to land by the bulk of the rural population. This feature has been the principal point of departure in the literature for a peculiarly Latin American approach to analyzing agricultural development.

The Latin American literature can be essentially divided into three schools. In the structuralist school (Barraclough and Collarte, 1973) the land tenure system is central to the analysis and focuses on the minifundia-latifundia dichotomy as determinants of production patterns and agricultural growth (or the lack there of). Neoclassical analysis, (Berry and Cline, 1979), on the other hand, tends to focus on imperfections in factor markets arising from the land tenure system, occasionally utilizing the more stylized dualistic models. Finally, neo-Marxist analysis (de Janvry, 1975) views the land tenure system as a means of surplus extraction and of reinforcing the creation of a wage labor class within "capitalistic" development. Raul Prebisch (1959) and ECLA economists extended this argument to incorporate capitalistic relationships between developed and developing countries in their concept of the center-periphery. In John Dillon's (1979) paraphase of the concept the result is to allow "an oligarchy at the periphery to form an unholy alliance with the center to exploit the small farmers in the periphery".

Though large, theoretical differences between the various schools exist, there are nevertheless commonalities. All three schools agree

that the skewed land distribution was due to historical determinants and that social processes have acted to keep it relatively fixed through time. Though the theoretical logic from cause to outcome is markedly different between the three schools, there is concensus that the end results of a skewed land distribution are a "logical" but inefficient use of factors of production and, over time, high rates of expansion in the urban, wage labor market. Starting from these relatively well accepted descriptors of Latin American agriculture, it is the purpose of this paper to explore in a very broad way the manner in which the land distribution influences or sets broad constraints on the formulation of agricultural policy. In particular, the paper will concentrate on specifying the role that the small farmer issue has played and could play in agricultural policies.

THE AGRICULTURAL POLICY MATRIX

Agricultural policy makers quite naturally focus on generating increases in production, not just as a goal in itself but as a means to achieving other policy objectives such as generating foreign exchange, increasing employment and improving nutrition. Moreover, any attempts at income improvement of the poor, especially through distributing income streams, are at least more polictically tractable within a growth situation. The growth versus equity debate, so often voiced in Latin America, has merely in the phrasing, portrayed the two as mutually exclusive, overlooking the necessary linkage between equity objectives and growth policies.[1] Moreover, if phrased in the

1/ As Ranis (1980) has noted, "growth, employment and distributional outcomes theoretically can be and, for policy reasons must be, tackled simultaneously." Johnston and Clark (1982) also argue persuasively that the growth versus equity debate is based on a spurious dichotomy.

construction of maximizing a government's multi-valued objective function (Sen, 1972) [2/] the debate is first over weights on the policy objectives and second, over identification of control variables and the design of appropriate strategies that would in fact maximize that objective function.

This paper will assume that in addition to growth objectives, employment, balance of payments and, nutrition goals either enter or should enter into policy-cum-objective functions in Latin American countries. This section will briefly review the current status of each of these policy areas and the constraints underlying trends in each area. The remaining sections will then link these policy objectives to the distribution of land and labor in the agricultural economy and will demonstrate that farm size structure is an over-riding determinant of rural development strategies designed to maximize this idealized, policy-cum-objective function.

Growth in agricultural production in Latin America over the past two decades has been on the order of 3.1% per year (FAO, 1981), exceeding population growth by about half a percentage point. This relatively sustained growth was significantly higher than in either Asia or Africa, yet the significant increase in agricultural imports compared to exports suggests that production growth was not sufficient to meet

2/ This conception is obviously distinct from a government acting so as to maximize the neoclassical, social welfare function, that is the aggregation of each households individual utility function. Interestingly, Gintis (1969) points out that neo-classical welfare theory treats "efficiency issues independently from issues of income distritubion" and "in the formal schema no decision based on efficiency criteria can be countermanded on grounds of equity." Musgrave (1969) highlights this analytical separation in the case of public investment where projects are first evaluated on the basis of efficiency and then "supplemented by the necessary distributional adjustment through a tax-transfer mechanism."

growth in demand. Also, associated with this significant overall growth rate, has been significant diversification in the product mix, with crops such as roots, tubers and legumes having low or negative growth rates and crops such as soybeans, sorghum and citrus having very high growth rates. Rapid product diversification and the inability of production growth to match demand growth are at least suggestive that the very respectable growth in agricultural production was to a significant degree demand led.

Latin American economies have undergone significant structural change in the last two decades and much of this change has directly affected food demand. Products such as poultry, dairy, and vegetable oils, which have a relatively high income elasticity, have achieved the highest growth rates in consumption. Per capita GNP grew at the rate of approximately 3.0% over the last two decades. Income growth together with the relatively skewed income distribution has resulted in rapid demand expansion for highly income elastic products. Moreover, even among the lower income strata in Latin America, as compared to Asia or Africa, a significant portion of the food budget is spent on income elastic products such as meat and dairy products.

Another factor shifting food consumption patterns was the very high rates of rural-urban migration during the past two decades. This urbanization process served to increase the size of domestic markets and the demand for marketable surpluses. Moreover, it shifted overall food demand from rural staples such as maize, cassava and potatoes to what are more consistently urban staples, rice and wheat.

Finally, the very large increase in capital flows into Latin American countries during the seventies allowed countries to pursue

cheap food policies, in part through overvalued exchange rates and through the provision of the foreign exchange resources to support increased food imports. Consumption of imported items such as wheat, powdered milk, and vegetable oils went up dramatically, due to lower relative prices together with their relatively high income elasticities. Structural change together with favorable price policies produced high rates of growth in effective demand for food products. Production growth to a significant degree responded accordingly.

However, the decade of the 1980's marks something of a turning point in Latin American economies. Growth in GNP has slowed significantly. As well, meeting the payments on much of the debt accumulated during the seventies has put excessive pressure on foreign exchange availabilities. Most countries have gone through a major currency devaluation. The foreign exchange and debt repayment issue has been exacerbated by the downturn in domestic economies and depression in most agricultural export markets, such as coffee, sugar and, for the Southern Cone, wheat and feed grains. These events in many respects will set the policy stage for the rest of the decade. Nevertheless, most projections (FAO, 1981; IFPRI, 1977) suggest substantial increases in food imports to meet requirements for those Latin American countries outside the Southern Cone. Given that foreign exchange availabilities will continue to be constraining in the medium term future, policies will be directed even more to self-sufficiency-- since growth in demand for agricultural imports is higher than for agricultural exports such as coffee, sugar, and bananas-- by attempting to maintain if not increase the growth rate of agricultural production.

Agricultural exports still make up a major portion of Latin America's foreign exchange earnings - for Argentina, Brazil, Colombia, Costa Rica, El Salvador, Guatemala and the Dominican Republic agricultural exports represent more than 50% of total export earnings (Valdez, 1983). Because of the debt-issue, Latin America could be drawn back to that controversial (and often sterile) dichotomy of promotion of export versus food crops. Latin America over the past decade has diversified its exports, reducing the export share of traditional products such as cotton, sugar and coffee and increasing the share of oilseeds, poultry meat, fruits, and feed grains (Lopez Cordovez, 1982). These are products for which there are large and growing domestic markets and the policy issues switch from differential production incentives much more to demand management, particularly through exchange rate policy and pricing policy. Trade-offs are in fact introduced between export expansion and domestic food consumption goals but the distribution decision between export and domestic markets is made on the demand side rather than the production side (see Table 1 for the case of meat in Brazil).

However, even with the significant rise in per capita production and the diversification of the product mix, malnutrition in Latin America remains pervasive. The causes, and in turn solutions, of malnutrition are complex (Taylor, 1977), but essentially arise from insufficient purchasing power as reflected in the skewed distribution of income. Latin American countries have fairly consistently tried to attack the issue through food price policy. The quite massive consumer price subsidies on wheat in Brazil, Ecuador, Peru, Venezuela, Guyana and

Mexico during the 1970's are but one example. 3/ Foreign exchange realignment and restrictions on public spending have significantly curtailed significant intervention in food price policy. This constraint points to a more indirect and more long-term attack on the malnutrition problem through policies in the agricultural sector. Lowering food prices through increased food production and agricultural productivity is the more obvious line of attack.

Most Latin American economies find themselves with a very real trade-off between domestic food consumption objectives and increasing the agricultural balance of trade. This situation puts a real premium on generating growth in agricultural production as the most viable means of meeting these other two objectives. How these three objectives are most appropriately reached is, of course, another matter. Currency devaluations, however, do imply the opportunity, if not necessity, for major restructuring of the very elaborate price policies and institutions erected to protect domestic agricultural production, on the one hand, and to control consumer food prices, on the other hand. Unfortunately these adjustments will most adversely affect the welfare of the urban poor, aggravating the magnitude of the malnutrition issue. More consistency between the set of policy goals and policy instruments is needed. Whether increased consistency is possible requires a closer examination of the underlying factors determining production growth, malnutrition and employment and at center stage in such an analysis is

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3/ The distinction between the theoretical schools is interesting on this point. On the neo-classical side the motivation is to improve the welfare of the low-income consumer (as well as the high-income consumer). On the neo-Marxist side the motivation is to reduce the price of the wage good and in turn maintain lower urban wages and higher rates of capital accumulation.

the farm size structure in the agricultural sector.

FACTOR DISTRIBUTION AND AGRICULTURAL POLICY

What does a stable and extremely skewed distribution of land imply for allocation of mobile factors of production, for product mix, and for technical change within the agricultural sector? Only a qualitative answer will be attempted here but a principal hypothesis is that relative factor prices under a skewed land distribution can be significantly different from those characterized by a homogenous farm size structure, that is those characterized by average, and thus social, factor endowments in the economy (Rosenzwieg, 1978). This is turn produces an inefficient allocation of resources in the sector.

Alternatively, the literature has generally phrased the issue in terms of an inverse relationship between farm size and both land utilization and land productivity. That is, the skewed land distribution creates in turn a skewed distribution of labor where land is very intensively used on small farms where the bulk of labor resides and very extensively used on large farms. Significant differences between farm sizes in the marginal product of labor are implied by this variation in land use, and a duality in the labor market is invoked to explain why marginal products are not equated to wages across farm sizes (Berry and Cline, 1979). Youmans and Schuh (1968) present data for Brazil which demonstrates that marginal value products indeed were above wage rates in large-farms areas and below wage rates in small-farm areas (Table 2). Moreover, Sahota and Rocca (1981), also in Brazil, found for estimated production functions for three farm size strata that "the coefficient of land is, in general, significantly different from zero in

small and medium farms, but either relatively low or scarcely different from zero in large farms".

A characterization of Latin American agriculture then would be a sector where market factor prices depart from shadow prices and where, even given these distortions, farmers to not equate marginal products to factor prices. The result is underemployment of both land and labor resources in the agricultural economy. More to the point, although these factor markets have been characterized as distorted or imperfect, the fact remains that these markets function as efficiently as is possible given the distribution of resources in the sector and the rational behaviour that arises out of that distribution.

Clearly, the land tenure structure influences the allocation of mobile factors. Given different factor intensities in the production of the various crops, it also will affect product mix. Finally, given that technical change is conditioned by factor prices, as lies at the heart of the induced innovation theory, land distribution also influences technological bias.

However, the critical feature of the land distribution for design of a rural development strategy is the insight that technical possibilities are given by factor proportions inherent in farm size and that factor price shifts over quite wide ranges do not change the underlying demand for factor-biased technology by different sized farms. That is, over a wide range of labor prices, labor-saving technology is still the principal cost-reducing technology for large-scale farmers and vice versa for small-scale farmers. In neoclassical terms, large and small-scale farms operate on completely different isoquants in factor space, each having limited factor substitution possibilities. As well

each scale farm faces very different opportunity costs of factors. At the center of the design of agricultural development strategies must be the recognition that changes in market factor prices affect comparative advantage between large and small-scale farms but do not substantially alter the underlying demand for technology bias on the part of the different scale farms.

Policies to increase agricultural production thus must take into account the farm size distribution to be effective. However, on balance in Latin America during the last two decades policies have been particularly directed at stimulating large-farm agriculture. Several factors made this approach particularly attractive. First, domestic demand was increasing rapidly for mechanizable crops such as feedgrains and oilseeds. Second, labor-saving technology was in general directly transferable or transferable with minimal adaptive research through multinational input supply firms. Overvalued exchange rates (Hertford, 1978) together with credit subsidies, minimum wage legislation, and commodity price supports significantly increased tractor demand. Finally, and not to be dismissed, such policies were politically very tractable.

Growth in Latin American agriculture during the past two decades has been due largely to the growth in use of non-traditional production factors, particularly tractors and fertilizer, and much of this growth has been concentrated in the large farm sector. Crop growth accounting suggests that in the 1960's two-thirds of growth in overall crop production was due to area expansion, declining in the 1970's to three-fifths (Lopez Cordovez, 1982). However, excluding Brazil, the figures are around half for the 1960's and nearer a quarter for the

1970's (Gomez and Perez, 1979), suggesting that area expansion through mechanization was not the only factor driving crop growth. A closer accounting of output and input growth (Lynam, 1981) suggests that growth in fertilizer input contributed as much or more to output growth as growth in machinery use, thus corroborating the influence of yield increases. The two together accounted for two thirds of agricultural output growth in the 1960's, declining to around 40% in the 1970's (Table 3).

Several issues have presented themselves as Latin American agriculture has entered the 1980's. First, if the relatively high rates of growth in agricultural output were achieved to a large degree by very high rates of growth in non-traditional inputs, can these be maintained or must Latin America look to other sources of growth? Second, and related to the first issue, has Latin American agriculture locked itself into a high cost structure, particularly as exchange rates and therefore input prices come more in line with their real costs to the economy? And, third, what has been the effect of these policies on the small-farm sector and to what extent could this sub-sector make a contribution to overall policy, if not just to growth in agricultural production? It is to this lower end of the land distribution that the discussion now turns as it focuses on this third issue.

The Small Farmer and Policy Objectives

The land tenure system in Latin America determines access to land and in turn employment and income levels. Because of these relationships discussion of the small farmer issue has been phrased in equity terms, and as an extension of the growth versus equity debate, there has been a tendency to view small-farm production programs more in

welfare terms rather than as a real contribution to agricultural growth. There is very little empirical support for this conclusion and at best the issue is an open one, some of the components of which will be explored in this section.

The small and large farm dichotomy, overly simplifies what is a quite complex agricultural structure and particularly obscures the existence and future role of the medium-scale, family farm in Latin American agriculture. The CIDA studies (Barraclough and Collarte, 1973: p.28) of the early 1960's paid "no special attention... to family sized units because of their limited importance in the countries studied". The rise of a visible strata of medium scale farms over the past two decades has its source in-- or so it is conjectured-- relatively significant changes in the small-farm sector, in particular the effective linkage of the campesino to agricultural markets. 4/ This market linkage has set in place dynamic change in agricultural structure. at least at the lower end of the distribution. The bulking of rural labor (both small-farmer and landless labour) in the small-farm sector and the resultant low productivity of labor have been increasingly unsustainable given the profit-seeking of the small-scale producer and the option of urban migration and employment. Furthermore, the neo-Marxist concept of marginalization does capture a significant aspect of change in the small farm sector in Latin America. Those small farmers with sufficient entrepreneurship and access to a certain minimum level of resources have evolved to more sustainable operations. The "marginalized" have of necessity migrated. Technical change in the

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4/ Most of the empirical evidence on this point comes from the neo-Marxist literature.

small farm sector will in many ways exacerbate this process, due in major part to the inelasticity of traditional, small-farm crops. How this process of change in the small farm sector impinges on the policy objectives set out in the first section is then the question at hand and this will be analyzed in terms of each individual objective.

Agricultural Production: Definitional problems make an exact calculation of the contribution of the small-farm sector to total agricultural output difficult. ECLA (Lopez Cordovez, 1982) estimates that about 40% of agricultural production for domestic consumption originates in the small farm sector (table 4), including the family type unit. This contribution is obviously significant and for crops such as cassava, beans and potatoes small-scale units dominate in the production process.

Crop specialization by farm size is a striking characteristic of Latin American agriculture. For individual countries the specialization is even more striking, as can be seen for the case of Colombia in table 5. Crop specialization has allowed different rates of technical change between large and small-scale farmers without necessarily creating a product treadmill effect. Specialization arises out of different factor intensities in production between crops, riskiness in production, ecological specificity, and size of, integration of and access to output markets. Also, there are historical reasons in that many small farm crops are traditional, rural subsistence crops. Nevertheless, it is the author's opinion that small farmers grow those crops which large-scale producers find too risky, either due to production risk or more likely to market risk, as reflected in price variability, difficulties in market access, and lack of price supports.

Because the contribution of the small farm sector to agricultural production is so large, growth in the small-farm production could make a significant contribution to overall growth in the sector. Moreover, since production growth in the small farm sector is the means of achieving many of the more equity-oriented goals, such growth translates into a range of second-order benefits. Yet, increases in small-farm production over the past couple decades has been spotty at best, particularly compared to growth in the large farm sector. Small farm programs, moreover, are generally perceived to be more costly, either in terms of lower returns on investment in government resources or in terms of some sacrifice in overall production growth in the sector, the latter usually being rather poorly defined as a purely dichotomous, policy decision.

This question is obviously empirical in nature but has not in general been answered in those terms. Certainly small-farm production programs are more difficult, partly because the resource base is more limited, especially the quantity and quality of land resources, partly because the terms of trade shift more dramatically against small farm crops, and partly because from an administrative point of view the target population is larger by at least an order of magnitude. Being more difficult may indeed translate into higher government costs, longer lag period, or lower output response. However, the fundamental, neo-classical question is whether small farm programs result in a more efficient use of resources from a social point of view, that is does production on small farms derive from a lower social resource cost; Berry and Cline (1979) certainly suggest that this is in fact the case.

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A production paradox of sorts arises out of the very skewed farm size distribution existing in Latin America; that is, higher growth rates in agricultural production are achieved by stimulating higher cost producers. Such a paradox is possible because of crop specialization by farm size, duality in factor markets, and the calculation of shadow prices - as in Berry and Cline (1979) - holding the farm size distribution constant [5/]. Optimizing production growth within a heterogeneous farm-size sturcture requires policies that generate growth in all farm size strata - instead of policies that focus on a single farm size strata.that is, policies formed more within the concept of comparative advantage drawn from international trade theory rather than the equalization of marginal products to factor prices based on the theory of the firm. Within such a viewpoint, small farm production programs make a contribution to agricultural growth. As will

5/ What are the shadow prices of land and labor in Latin American countries? The question is important from an empirical, a policy, as well as a conceptual point of view. At the heart of the conceptual issue is whether a highly skewed farm size distribution necessarily introduces distortions into price determination even within competitive factor markets. Although income distribution has been viewed in welfare economics to cause price distortions that result in non-optimality (Warr, 1974) such is not the case with factor distribution, which is taken as an initial condition to calculate Pareto optimality. Yet the evidence is clear that wage rates do not equate between the agricultural and non-agricultural sector, that marginal products of land and labor are not equated to the rental and wage rate, that underemployment of both land and labor resources exist, and that factor prices in the agricultural sector are nevertheless set within a generally competitive markets. This situation then creates the basic policy paradox: are shadow prices used that reflect the resource unemployment that exists within the farm size distribution and therefore attempt to shift the comparative advantage to small-scale farmers, or are shadow prices used that reflect the average factor endorments of the agricultural economy - as would be expressed under a more homogenous farm size distribution - and that therefore attempt to stimulate land-using, growth pattern? Neo-classical, welfare economics confuses more than clarifies this issue, nevertheless, the choice is fundamental to effective policy making.

be seen, such increases in small farm production can in turn have an impact on other policy goals.

Employment: Latin America over the course of the next two decades is locked into a population structure that produces very high rates of growth in the labor force. CELADE estimates annual growth rates of 2.8% to the year 2000 for Latin America as a whole, with much higher rates in individual countries. Employment is a principal policy issue in Latin America to the end of the century, and vis-a-vis agriculture the issue is, first, whether the agricultural sector should continue to serve as the residual employer in the economy and second, whether there are in fact policies that can create remunerative employment in the sector. The ability to effect policies that maintain the rural labor force in the agricultural sector has become much more difficult in the last two decades, due to the greater mobility of the rural population, the growing absorption capacity of urban areas, and in some cases, the mechanization of Latin American agriculture (Sanders and Ruttan, 1978).

The role of the agricultural sector in overall employment in the economy is, therefore, closely linked to the definition of an "optimum" inter-sectoral distribution of labor, which is in turn under the control of rural-urban migration as the equilibrating mechanism. The determination of this "optimum" is implicit in a large and diverse literature summarized by the term overurbanization (Cugler, 1982). The components of this argument are (1) that industrial growth has generated only little growth in employment and while it may lead to GNP growth, other sectors must account for the bulk of the employment, (2) that the low productivity, service sector has become the major sector of employment growth and the question arises whether both labor

productivity and welfare are higher in this sector or in the agricultural sector, and (3) that rapid rural-urban migration has substantially increased the social infrastructure costs of providing for a growing population. Debate surrounds these issues, particularly in generalizing micro-studies to policy implications, and as Gugler has noted, "a paradox arises between the rationality of the individual... decisions to migrate and the irrationality of the migratory movement when considered at the level of the national economy".

What factual evidence that can be brought to bear on the argument shows that average labor productivity is lower in the service sector than in the agricultural sector (Sanders and Lynam, 1981). However, for Latin America while the average may reflect the inefficiency of the migration process at the level of the economy, it is the distribution of labor vis-a-vis land that influences the decision to migrate. Lynam (1981) has estimated a migration equation developed by Mundlak (1979) for Latin America, and has introduced the Gini coefficient of land distribution as an explanatory variable. The coefficient was highly significant and demonstrated that the more skewed the distribution of land (and therefore labor), the higher the migration rate (table 6). Shaw (1974) provides similar evidence but at the country level of Chile and Peru. Finally, Gillespie (1983) analyzed the unique case of Paraguay, showing why the slowest urbanization rate in Latin America is associated with the most equitable land distribution.

The policy issue then reduces to whether the urban service sector or the small farm sector should be the residual employer in the economy. Associated with this issue is the question of social infrastructure costs of massive migration. Rural-urban migration is a natural part of

the process of economic growth; the argument is over the rate, especially currently when fiscal budgets are being cut and the absorption capacity of Latin American cities are strained to their limits. Any control over that rate is to be found in rural policies, especially small-farmer and landless laborers incomes. The employment and migration issue with their focus on small-farm agriculture, in turn, creates something of a dilemma for policies to improve nutrition, where the focus is more on the urban areas and sufficient food supplies.

Nutrition: Undernutrition is very prevalent in Latin America and the root cause is certainly the lack of purchasing power of the lower income strata rather than deficiencies in food availability. It is probably fair to say that global policies directed at malnutrition have tended to focus on the consumers' purchasing power through price policies rather than on production policies that will lead to increased incomes for the poor. Government intervention in price determination of basic staples has been rife in Latin America, often taking the form of direct subsidies between high producer support prices and lower consumer purchases prices. Although such policies can be implemented in the short-term, they have the disadvantages of redistributing benefits to the rich as well as to the poor - especially for the favorite subsidized commodity, wheat - and of often reducing incentives for production of those crops which are so important in the diets of the poor, eg farinha da mandioca in Brazil.

Policies designed to increase incomes of the poor are longer-term in nature, and, moreover, such rural policies are generally viewed as involving a trade-off between the nutrition of the urban poor and improved income of the small-scale producer. This supposed trade-off

requires more balanced empirical analysis than it has received. Certainly the locus of the undernutrition problem is essentially in the urban area, in part because of the distribution of the low income population and partly because the rural inhabitant can produce part of his own food supply. Ward and Sanders (1980) found in the Brazilian Northeast that in spite of an increased income of 13% for the urban poor, the nutritional levels of the rural poor were still higher. The intake by the rural poor in nine of ten major nutrient categories was superior to the intake of the urban poor in these categories. Thus, policies that induce increased migration has a direct impact on the dimensions of undernutrition, both through the higher probability of employment and income generation in rural areas and the lower percentage budget allocation of the urban migrant to food items.

The other side of the question is the most effective policies to produce basic staples most consumed by the poor. As has already been mentioned, growth in Latin American agriculture has been led by growth in highly elastic commodities. The top income quartile can account for as much as 40% of total expenditures on food (Pachico and Lynam, 1981) and income growth skewed toward the higher income strata has created a demand-led structural change in Latin American agriculture. Conversely, skewed income growth has caused stagnation in the production of those staple crops consumed by the poor, since demand growth has been negligible in these commodities. Malnutrition in Latin America is principally a problem of insufficient calories but growth in agricultural output has been increasingly biased towards protein sources. To best alleviate malnutrition the most rapid supply expansion should come in those commodities whose demand pressure, and thus farmer

incentives, are the least -- see Pachico and Lynam (1981) for a fuller discussion of this issue.

Maize, roots and tubers, beans and in some cases rice are essentially small farmer crops. The poor on both sides of the rural-urban divide are integrally linked in a peculiarly Latin American, low-income food trap. The issue is how to develop farmer incentives for staple commodities when the dynamics of the economy provide alternative incentives. Improved, cost-reducing production technology for these commodities is one principal solution. It can still possibly be argued that this technology should be directed at large farmers - the results in the following paper systematically evaluate these trade-offs -, but the weight of the various linkages - employment, migration and nutrition - as exacerbated by the resultant product treadmill suggest that a small farmer technology be given prime consideration.

SMALL FARM DEVELOPMENT POLICIES

To briefly recapitulate, the small farmer problem in Latin America is not due, as in Asia and parts of Africa, to excessively high labor-to-land ratios but rather to an historically determined system of property rights which more in the capacity of a social institution has enforced very limited access to land for the majority of the rural population. Moreover, the small-farmer, large-farmer dichotomy to a large degree grossly distorts what is a more complex agrarian structure. De Janvry (1981) stresses that the majority of the rural population is more appropriately described as proletarian rather than as small farmers (petty bourgeoisie). Relatively dated statistics suggest that 34% of the economically active rural population is in fact employed as wage labor and a significant portion of small farmers also occasionally enter

the labor market. This disproportionately large landless labor force again is not due to population pressure on a limited land base but to inequitable access to land.

Improved communications, breakdown of the traditional relations between latifundia and minifundia, and higher relative growth rates in urban centers have made what has always been a relatively mobile rural population - migration of labor for the coffee and cotton harvests in Central American countries and Colombia is but one example - even more so but redirected toward urban areas. Rural-urban migration is the mechanism that links small farmer development to the policy goals set out in the previous section and one of the primary determinants of this rate is relative small farm incomes. However, the small-farmer issue is defined precisely in terms of an insufficient access to resources, particularly land, which places a physical maximum on the income generation possibilities of these farms.

Policies directed toward small farmers then have a number of dimensions. The justification for such policies is not merely the improved welfare of this target population but the contribution such policies will have for agricultural production, employment and nutrition goals. Nevertheless, the means to achieving these goals will necessarily entail an increase in incomes and thus welfare of this target group. While the motivation for small farm development strategies is clear, the design of such strategies is not. The sources of income generation in small farm systems and the potential increases that can be aspired to need to be identified. The percentage coverage of the economically active population in the rural sector is directly related to the design of small farm programs. Definition of the target

population, including landless labors, will obviously determine the sources of increased incomes and therefore the design and complexity of the development programs.

Sources of increased production come from either access to more resources or increased productivity of existing resources. This relatively basic dichotomy provides a useful division for the design of small-farm programs. Considering first policies directed at improving access of the small farmer, tenant and landless labor population to land, there have traditionally been two approaches: a comprehensive land reform or colonization schemes in the frontier areas, for those countries where such areas exist.

The 1950's and particularly the 1960's spawned both a significant literature on the subject as well as legislation to implement land reform in a large number of Latin American countries. However, only in Peru, Mexico - building on an earlier land reform - Bolivia and, upto the coup, Chile did any significant percentage (that is, 20 to 30%) of the population come under the land reform process (de Janvry, 1981). While the process undoubtedly improved the incomes of the land reform recipients by redistributing income streams, the more fundamental impact of the process on production, underemployment and wages, and nutrition remains an open question. The process was cut short in Chile, and in Peru, because the reform was based on cooperatives, foundered on restrictions in availability of management expertise and institutional support. Bolivia went through a major and initially disruptive land reform, but data availability has limited any systematic appraisal of economic impact (King, 1977). Hertford's (1971) detailed analysis of Mexican agricultural growth, on the other hand, led him to conclude that

land reform "appears to have been output-increasing ..... arising from increased total factor productivity".

In summarizing the impact of the land reform process in Latin American agriculture de Janvry (1981) rightly concludes that the fundamental result of the various programs was to bring campesinos into the market (capitalist) economy, contrary to much of the rhetoric surrounding the programs. Clark (1970) argues that in Bolivia the land reform resulted in a structural change in both commodity markets, particularly for small farm commodities, and labor markets. Yet, while dismantling traditional social patterns, the land reforms did not fundamentally improve the size distribution of land in Latin America, and, moreover, the land reform legislation acted as a deterrent on both expanding the land rental market and motivating investment within large-scale commercial farms. This uncertainty for large-scale commercial agriculture together with this capitalist transformation of peasant agriculture and labor markets, resulted in a retrenchment from land reform, with little scope for political realignments that might precipitate a renewal in land reform programs. Finally, land reform in and of itself was not sufficient for increased small-farm production. Completely different technologies - based on completely different factor proportions were as well required. The advent of the green revolution at the end of the 1960's shifted the focus of small farm development strategies. Unfortunately, where the two components are necessarily complementary, one has been substituted for the other.

A majority of countries in Latin America have an agricultural frontier and therefore the possibility of fostering growth at the extensive margin by resettling labor in areas where land is plentiful

and within the public domain. In many countries spontaneous immigration has characterized these agricultural frontiers and high rates of growth have occurred in such areas as Parana, Goias and Mato Grosso in Brazil, Santa Cruz in Bolivia and the Pulcalpa and Tingo Maria areas of Peru. However, growth in these areas is based on beef systems often combined with mechanized, commercial crops (Sanders and Bien, 1976), and access to land is usually determined by the amount of capital brought into area, with poor immigrants investing principally their labor in small subsistence systems and those with capital and/or access to credit investing in large, extensive farms. The skewed distribution of land is thus being perpetrated as the frontier expands.

A limited number of colonization schemes have also been attempted in many countries but the progress of these has mostly been disappointing, usually due to infrastructure, market, soil, and technological constraints. In summary the expanding agricultural frontier, firstly, has not resolved the minifundia problem in such areas as the Brazilian northeast or the Sierra regions of the Andean countries, and secondly, has basically replicated the existing agricultural structure. The one counter example is that of Paraguay where land settlement based on family-sized farms is the rule and Paraguay has achieved the most equitable farm size distribution in Latin America with its attendant benefits (Gillespie, 1983). However, in most of Latin America a homestead-type of frontier settlement, like a significant land reform, lacks the political concensus which would allow for effective implementation.

Since there has been limited scope for increasing the access of the

small farmer/landless labor population to additional land resources, [6/] small farmer development policies over the course of the 1970's and 1980's have focused instead an increasing the productivity of existing resources. The effectiveness of such programs in raising incomes depends, first, on the existing resources available to the farmer, second, on the productivity increase of improved technologies -incomes, as well, will depend on the impact of new technologies on output and input market prices-, and, third, on the effectiveness of the diffusion mechanisms --de Janvry (1981, p. 238) makes basically these same distinctions in a similar context. The effectiveness of such programs then will depend on some understanding and definition of the target population, the appropriateness of the technology within the farmer's production and market system, and the linkage of new technologies to compatible extension, credit, and input delivery systems.

Small farm development programs as currently formulated in Latin America necessarily depend on the design of appropriate technology as the income generating mechanism for small farm systems. The design of such technologies is a complex and potentially costly exercise for research institutions (see for example Pachico, 1983). A recent mechanism for defining such appropriate technologies, as well as providing the needed linkage to extension systems, is farming systems research (Byerlee, et. al., 1980). FSR programs are currently only being formulated in most of Latin America and their effectiveness

6/ How well the land rental market functions for small farmers is an empirical question which has not been vigorously addressed in Latin America. The hypothesis certainly is that they do not operate efficiently. Freeing up these markets remains an alternative policy measure worthy of exploration.

remains to be verified (see Martinez and Sain, 1982 for a Panamanian example).

Even FSR programs must take credit, input delivery, and output markets as given, areas which can effectively constrain the diffusion of new technologies. Viewing small-farmer development as dependent on the simultaneous provision of both new technology and these associated services formed the basis in 1967 of the Puebla Project in Mexico, the prototype of what was to evolve into integrated rural development projects. This concept was adopted and promoted by many of the funding agencies in Latin America, particularly the World Bank, the Inter-American Development Bank and the Canadian aid agencies. The results of almost a decade of effort have not been vigorously evaluated but three general conclusions probably characterize the impact of these programs. First, the principal benefit has been on the institutional side. In many countries there is now, at least, an institutional voice for small farm development and, moreover, in most cases there has been an improvement in access of small farmers to public institutional services, particularly credit. However, such services are only effective if an income generating source is identified, usually a new technology. Most projects have been constrained by either the lack of an appropriate technology or lack of effective demand for the increased output, where that technology has existed. And, finally in those cases where incomes have improved, such increases have been limited to those farmers with a sufficiently large resource base, which insured that the increased income was sufficiently large and could be captured.

Small farm development programs are both complex and heterogeneous. No single program intervention, such as credit, new technology, etc. is

usually effective in a particular case and an adequately designed program is usually effective only across a circumscribed target area. In fact, adequate design in many ways implies limited applicability. Such a situation creates the need for institutions where both vertical (between different functional entities) and horizontal (national, regional and local lines of administration) linkages are effective, where field research is an essential input into program design, and where human capital requirements are high. It also implies the need for a set of components and generalized methodologies for putting those components together. Farming systems research is an example of such an approach within a more limited domain.

Finally, two overriding characteristics describe small farm development programs that can have the type of policy impact that was described in previous sections. Income generation for small farmers depends on new technologies for commodities with either relatively elastic demand or with large, well integrated markets. Cassava (for existing markets), potatoes, choclo or floury maize and plantains are not such crops. For small farmers near to urban areas with adequate market services and with appropriate soil and climates the expansion into dairying and vegetable production is an autonomous process that is already taking place. However, such commodities will not reach the majority of small farmers, particularly those farther from urban markets and with more marginal agro-climatic conditions. Moreover, commodities will in most cases have to have as well characteristics which maintain a comparative advantage for small farmers. Unfortunately, such commodities are few in number.

Second, small farm development programs, dependent as they are on new technologies, will inevitably reduce the incomes of non-adopters, the more so the more inelastic the demand for the commodity. This so-called marginilization of some portion of the target population could, at least hypothetically, speed up the process of rural-urban migration if the technologies were particularly productive and demand particularly inelastic. This situation reinforces the point that commodity choice is critical to small farm development programs; alternatively, such programs may have to be linked to a price support policy. This calculus of gainers and losers as well applies to the effects of new technology on labor demand and wage income and, the trade-off between increases in wage income and small farmer income. A major, if not majority, portion of landless labor employment is in the small to family farm sector. However, it would be a reflection of this persistent agrarian paradox to recommend more labor intensive production techniques in a Latin American situation where land-labor ratios are so high. Certainly among small farmers adoption of mechanized land preparation and herbicides is in evidence and suggests that labor substitution is likely with rising wages. Employment generation will best rely on shifts to more labor intensive crops (eg. vegetables) and the employment impact of expanding area - again the importance of elastic demand - rather than increasing the labor intensity of particular crops.

A final comment, bordering on a summary of small farmer development programs, is that the above, while difficult enough to formulate into consistent policy options, is relatively easy compared to the practical

problems of implementing small farm programs, particularly where institutional and management resources are limited.

CONCLUSIONS

A conventional generalization governing the development literature for the past decade has portrayed macroeconomic policies, that have principally been oriented towards stimulating industrial expansion, as resulting in disincentives to agriculture. This certainly applies to traditional export crops, eg., coffee and bananas, and to agricultural economies that are net exporters, eg. Argentina. However, domestic food markets have undergone the most change in the last decade and have been the particular focus of policy interventions. In Latin America a fairer generalization is that, on the one hand, macroeconomic policies on balance have not been biased against agriculture but rather that policies stimulated high growth in the use of non-traditional inputs, and on the other hand, producers for domestic markets have been protected from excessive international competition, due to overvalued exchange rates, by various market interventions.

However, whereas there has been some consistency between industrial and agricultural policies, these policies have tended to focus only on growth and have been inconsistent with other more equity-oriented policy goals particularly in the areas of employment, nutrition, and income distribution. These "inconsistencies" arise from policy-making within an agrarian structure defined by a very skewed farm-size distribution, where policy formulation overlooks the linkages between the agrarian structure and output supply, factor allocation, and income distribution within the agricultural sector.

Industrialization together with the labor mobility inherent in the agrarian structure precipitated massive population flows. It has been argued that this was contrary to what could have been a more rational distribution of labor in the economy, where a portion of those migrants could have been more productively employed in the agricultural sector. Apart from the potential benefits this process has had on population growth, the social costs, in terms of underemployment, undernutrition, and social infrastructure costs, have been high and fairly obvious. The equilibrating mechanisms normally inherent in the migration process have not been operative because of the agrarian structure and current conditions would argue that such mechanisms be made operative.

However, going from a clear justification for agrarian reform to effective policies within a skewed farm size distribution is another matter. The issue of land reform, for all the pure economic efficiency gains that follow from a neo-classical analysis, is best framed in a political economy context and the political constraints in the form of vested economic interests preclude further progress in this area. The necessary adjustments will have to be accomplished through other than a land reform and de Janvry (1981) quite accurately describes such policies as a strategy for managing agrarian dualism. The principal component of such a strategy is, in a sense, "separate but equal" development of the large and small farm sector. The difficulty lies in designing small farm development strategies that effectively increase farmer incomes, given the very real treadmill effects that can arise within a highly skewed agrarian structure - small farmer programs in an Asian setting, by comparison, present far fewer design constraints.

Managing agrarian dualism, moreover, requires something of a dualistic approach in credit agencies, in extension services, and particularly in agricultural research institutions. A certain level of sophistication in research decision-making is needed in appropriate design of small farm technologies for small farm crops and large farm technologies for large farm crops. Research under such a strategy, in fact, would attempt to strengthen the comparative advantage of crops grown by small farmers and focus on those crops within this small farmer set with significantly elastic demand. Given that increasing small farm income will depend on new technology, the development of that technology will rest first on an evaluation of crop priorities, second on appropriate design, and finally on appropriate delivery system and support services.

Much has been said about the scale neutrality of improved varieties, but for most crops the technological treadmill makes that a mute argument in a Latin American setting. In most rainfed crops, at least, there are design criteria, even in varietal development, to incorporate scale bias in the improved technologies (Pachico, 1983). The larger and even more germane issue, however, is whether dualism can be built into institutions, particularly centralized, agricultural research institutions, or whether the separate but equal principle must apply here as well. Institutional evolution to date, especially integrated rural development projects, would suggest the latter. Dualism, it seems, must cleave the whole of the agrarian political economy to be manageable.

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Table 1. Brazil: Production, Export and per capita consumption of Meats, 1970-84

Year	Poultry			Beef			Total per capita Consumption 1/
	Production (000 t)	Export (000 t)	Consumption (Kg)	Production (000 t)	Export (000 t)	Consumption (Kg)	(Kg)
1970	217	--	2.3	1845	189	17.8	27.7
1971	224	--	2.3	1921	219	17.8	28.0
1972	294	--	3.0	1997	324	17.1	26.8
1973	401	--	4.0	2035	237	17.9	28.9
1974	484	--	4.7	2095	116	19.3	31.0
1975	519	3.5	4.9	2157	113	19.4	30.1
1976	604	19.6	5.4	2178	177	18.5	31,1
1977	698	38.8	6.0	2445	217	20.1	33.5
1978	858	50.8	7.1	2319	148	19.1	33.7
1979	1096	81.1	7.1	2106	118	17.1	33.5
1980	1306	168.7	8.7	2050	189	15.6	33.9
1981	1490	294.0	10.1	2250	315	15.9	33.7
1982	1604	295.5	9.8	2400	398	16.0	34.3
1983	1584	297.4	10.5	2360	500	14.5	32.1
1984	1505	250.0	9.6	2350	680	12.7	29.7

1/ Includes pork consumption

Source: Agroanalysis, Volume 8, Fundaçao Getulio Vargas, Rio de Janeiro, June 1984.

Table 2. A comparison between wages and marginal value products in five Municipios in the State of Minas Gerais, Brazil, 1961-63

Municipio	MVP (000 Cruzeiros)	Reported Wage (000 Cruzeiros)
Uba	8.5	2.7
Caratinga	2.0	3.1
Ituiutaba	19.0	6.0
Leopoldina	0.8	5.3
Montes Claros	72.2	10.6

Source: Youmans and Schuh, 1968.

Table 3. Percentage contribution of growth in inputs to output growth in Latin American agriculture, 1950-78.

PERIOD	OUTPUT GROWTH	PERCENT CONTRIBUTION TO OUTPUT GROWTH BY:					
		Land	Labor	Fertilizer	Machinery	Livestock	Residual
1950-60	3.36	8.2	9.7	35.4	43.2	11.9	- 8.3
1960-70	3.11	8.4	8.4	34.6	32.8	23.8	- 7.7
1970-78	3.66	6.0	8.9	25.7	16.1	25.7	17.5

Source: Lynam, 1981

Table 4. Latin America: Provisional estimates of dimensions of entrepreneurial and small-producer agriculture at the beginning of the 1980s.

Indicators	Entrepreneurial agriculture (%)	Small producer[a] (%)
Number of economic units	22	78
Total area covered by the units	82	18
Cultivable area covered by the units	63	37
Area utilized by the units[b]	56	44
Production for domestic consumption	59	41
Production for export	68	32
Production of permanent crops	59	41
Production of short-cycle crops	47	53
Production of maize	49	51
Production of beans	23	77
Production of potatoes	39	61
Production of rice	68	32
Production of cofee	59	41
Production of sugar cane	79	21
Number of cattle	76	24
Number of pigs	22	78

Source: Lopez Cordovez, 1982.

[a] The "small producer" column covers family-type units. To differentiate between them and the entrepreneurial units, criteria of size were used.

[b] Includes area used for crops; does not include pastureland.

Table 5. Colombia: Participation of Small-Scale Production in National Agricultural Production, 1983.

Crop	National		Small Farmer	
	Area (000 ha)	Production (000 t)	Area (000 ha)	% Total (%)
Sesame	11.3	6.3	9.4	83
Cotton	87.7	139.4	7.9	9
Rice	398.5	1791.4	47.8	12
Beans	118.2	28.7	111.2	94
Maize	618.0	76.7	525.3	85
Potato	161.3	926.1	143.5	89
Sorghum	268.7	2234.2	5.4	2
Soybean	63.7	133.4	1.3	2
Wheat	47.9	77.9	44.6	93

Source: Ministerio de Agricultura, Bogotá, April 1984.

Table 6. Parameters of Latin American Migration Equation

Variable	Parameter Estimate	Standard Deviation
Income Ratio	1.10	.22
Population Ratio	0.47	.17
Gini Coefficient	2.00	.82
Populaton Growth Rate	-36.85	15.27

Note: Rate of migration was dependent variable and all variables were expressed in log form. The R-square was .60

Source: Lynam, 1981.