PROGRAM OF DEVELOPMENT STUDIES
121 Sewall Hall

WILLIAM MARSH RICE UNIVERSITY
Houston, Texas 77001

Paper No. 53

Some Aspects of Efficiency and Income Distribution in Colombian Land Reform

by

Wayne R. Thirsk

Summer, 1974

The author is Visiting Assistant Professor of Economics at Rice University The research reported here was done under Agency for International Development contract no. AID/csd-3302 on "Distribution of Gains, Wealth and Income from Development." Program Discussion Papers are preliminary materials circulated to stimulate discussion and critical comment. References in publications to Discussion Papers should be cleared with the authors to protect the tentative character of these papers.

SOME ASPECTS OF EFFICIENCY AND INCOME DISTRIBUTION IN COLOMBIAN LAND REFORM

Introduction

In different countries land reform has assumed a variety of shapes and forms. What has been defined as reform in one country would scarcely qualify as such in another. Converting tenants, mainly sharecroppers, into landowners of the land formerly rented has been the major vehicle of reform in the Asian countries of Japan, South Korea and Taiwan. In Latin America reform has often followed on the heels of political revolution and entailed the breaking up of large estates and their subsequent distribution to small farmers. Mexico, Bolivia, Cuba and Allende's Chile fit into this pattern. Colombia is an example of a country which has pursued peaceful land reform within the structure of a traditional political system and which has employed a wide array of reform instruments, including redistribution, tenancy conversion, colonization of new lands, and irrigation projects, with varying degrees of success.

There are many interesting facets of the Colombian land reform experience. Often interest has been riveted on the history of this experience and its evolution over the last four decades or on attempts to measure the adequacy or effectiveness of ongoing reform measures. This paper will also touch lightly on these matters. However, the major concern of this paper is with two narrower aspects of the land reform process. One of these is the quantification of the output gains which would be realized in the event of a full scale redistribution of land. It is suggested that cruder methodologies of evaluating this output benefit are apt to be significantly biased in an upward direction. Another important issue involves the precise distribution of the gains and losses attributable to reform. Until very recently it has been assumed that reform would contribute to a reduction of income inequality by transferring capital assets (land) to the poor farmer from the rich farmer. This conventional wisdom has been challenged on the ground that it ignores completely an important subset of the rural population, workers who remain landless after the reform is finished.[1] Under

---

[1] See R. Albert Berry, "Land Reform and Agricultural Income Distribution," Pakistan Development Review, vol. XI, no. 1 (Spring 1971).

some circumstances it may be possible that land reform has a mixed impact on income distribution in that small farmers become better off while rich large farmers and poor landless workers are made worse off. The relevance of these circumstances is examined for Colombia and it is concluded that, unless reform creates unusually small farms, both small farmers and landless workers will likely be better off as a result of land redistribution to small farmers.

In section one a brief look is taken at the legislative initiative behind Colombia's land reform policies. This is followed by a discussion of the impact of current land reform programs. Subsequent sections deal with the measurement of the output benefits of land reform and the repercussions of land reform on the labor market situation of landless workers. A concise summary concludes the paper.

1. History of Colombian Land Reform

The passage of Law 200 in 1936 by the central government marked the beginning of land reform measures in Colombia. This was accomplished against a background of land invasions and rural unrest in the 1930's. The intent of the legislation was twofold, to remove the enormous uncertainty about existing rights to land ownership and to exert legal pressure to use land resources productively.[1] Secure property rights were desired by squatters inhabiting lands in the public domain and some privately owned land that had been left unoccupied and uncultivated. In addition, security was desired by some large landowners who in many instances lacked legally valid documentary proof of ownership. The law leaned in favor of titling those who were currently on the land and making economic use of it. Eviction was made legally difficult and, where it was successful, squatters were to be compensated for the full value of all the improvements for which they were responsible. The upshot was that most existing squatters acquired secure title to the land they had occupied. As Hirschman notes, "the principal and substantive achievement of Law 200 was then to have consummated and legalized the breaking up of certain large estates and plantations which had been in

[1] An excellent, if not the best, review of land reform progress and problems in Colombia is Albert O. Hirschman, Journeys Toward Progress, (N.Y.: W.W. Norton and Company, Inc., 1973).

process during earlier years."[1] A further provision of the law was Article 6 which stipulated that properties of more than 300 hectares were to be relinquished to the public domain if they went uncultivated for ten consecutive years. Quoting Hirschman again this "amounted to a promissory note to stage an agrarian revolution in ten years' time."[2]

The note was not redeemed, however, as the legislative pendulum swung in a more conservative direction thereafter and 25 years were to elapse before another serious land reform effort was attempted. While Law 200 was a well intentioned step in the right direction it was not attended without some unintended and undesired side effects. One unfortunate repercussion of Law 200 was widespread tenant eviction on the part of large landowners and the transfer of large amounts of productive cropland to the less labor intensive activity of cattle raising. Landowners resorted to eviction in order to prevent renters from applying for ownership status on the small plots allocated to them for their own support. Consequently, some of the poorest people in rural areas probably suffered income losses as a result of Law 200.[3]

The next phase of legal pressures for land reform is represented by Decree 290 handed down in 1957. This edict of the Rojas regime established three categories of land quality and required minimum percentages of land in each category be cultivated once a year. Failure to comply was to be dealt with by annual increases in the rural property tax rate which was to be hiked to 10 percent after four years of default. Like the land tax schemes proposed earlier by a World Bank mission, this plan was destined to founder on the same rock of an inadequate cadastral survey of national lands. Although it is commonly viewed as an unmitigated failure, Hirschman cautions that Decree 290 may have provided significant impetus to the rental of underutilized but good, flat bottom land, to enterprising large farmers

---

[1] Hirschman, op.cit., p. 110.

[2] Hirschman, op.cit., p. 110.

[3] This example illustrates the problems of ruling economic outcomes by edict and is reminescent of a Brazilian labor law making it nearly impossible to fire persons with ten years of seniority. This law, designed to increase employment security, has probably reduced it since employers have an incentive to release a worker in his ninth year.

interested in producing commercial cash crops.[1]

Spurred on in no small part by the Cuban revolutionary climate and disenchanted with land taxation as an alternative to land reform, Colombia passed a new and comprehensive agrarian reform law, Law 135, in 1961. Under the aegis of this law an Institute of Agrarian Reform (INCORA) was established and endowed with broad powers of discretion and multiple functions. INCORA's responsibility was to improve the income prospects of Colombia's numerous small and impoverished farmers through infrastructural assistance to the colonization of remote farm areas, the promotion of irrigation and land drainage projects, the creation of a supervised credit program and last, but not least, the distribution to small farmers of land in the public domain as well as private land acquired by gift, voluntary sale or expropriation. With so many spokes in its wheel it is not too surprising that INCORA has been characterized as more nearly resembling a rural development agency than a vehicle for substantial modification of land tenure conditions. For those who define land reform to include only the redistribution of existing land resources the multi-faceted nature of INCORA appears lamentable since its other activities may be used as a substitute for redistribution and cause a diversion of its administrative energies and financial capacities. At its inception INCORA did assume control over a number of development projects that were sponsored by various government agencies. Thus INCORA inherited the Coello and Saldaña irrigation districts in Tolima and various colonization projects from the Caja Agrara (the rural development bank) and the Roldanillo irrigation project from the Cauca Valley Corporation.

Law 135 explicitly defined the procedures to be followed in cases of expropriation or voluntary sale. In order of priority the targets for expropriation were uncultivated land, rented land, inadequately cultivated land and finally adequately cultivated land. Compensation terms were laid out in similar fashion with the most attractive financial terms set aside for adequately cultivated land and the least attractive terms (long term, low interest government bonds) reserved for uncultivated land. Expropriation was particularly encouraged in areas where irrigation or drainage projects

---

[1] Hirschman, op.cit., p. 129.

were undertaken in order to prevent private windfalls resulting from public works. Owners are required to estimate the value of their property every two years and this estimate forms the basis on which property taxes are assessed and sets an upper limit on the price paid in case of expropriation.

The adjudication (or titling) of land in the public domain was to be done without charge. However, recipients of parceled (private) land from INCORA were required to pay a price equal to INCORA's acquisition price while land beneficiaries in irrigation and drainage projects were to pay the sum of the acquisition value, the pro-rated cost of the improvements and the surveying costs involved in defining the land area. In addition, continuation of title is contingent upon acceptable performance for a limited period and rights to sell or rent the land at the end of this period are proscribed. Thus land under the reform program would never be eligible as collateral in obtaining a commercial loan and owners of this type of land are therefore discriminated against in terms of their access to this portion of the loan market.

A new reform element was added in 1968 with the initiation of Law 1 of that year aimed at the conversion of small renters and sharecroppers into owners. Under this legislation all land which was occupied or operated by small renters or sharecroppers was liable to expropriation. Approximately 43,000 campesinos are presently enrolled in this program and by March 1970 INCORA had obtained 34,074 hectares on 76 farms while about the same number of farms were undergoing expropriation.

From its inception INCORA has enjoyed a neasure of financial independence not available to other government agencies dependent on annual appropriations from the central fisc. INCORA was to receive 100 million pesos annually from the budget (later raised to 300 million pesos) plus the income from bonds to be issued in its favor. From a little over one million dollars U.S. in 1962 the annual budget of INCORA had grown to nearly 82 million U.S. by 1970. This latter amount corresponds to about 20 percent of the total resources (including those of the Caja Agraria) invested in agriculture from public sources.[1] An ambitious land reform program has

---

[1] U.S. AID - Colombia, Agriculture Sector Loan IV, Bogotá, June 1971, p. 144.

not been obviously starved for funds from the fiscal till.

2. Impact and Performance of Land Reform

This is not the appropriate place to engage in an extended discussion or critical evaluation of INCORA's achievements to data. Given the immense difficulty of the task facing INCORA it makes sense to distinquish two separate lines of inquiry into INCORA's operations. One question is whether INCORA could have done better in achieving its goals with the resources that were in fact committed to it. The other question is whether more resources in total should have been allocated towards INCORA. Failure to draw this distinction often results in unnecessarily confused debate on the impact of land reform.[1] Social values have a tendency to become blurred with allocative economic arguments when this occurs. Here, some impressionistic judgements about the effectiveness of various INCORA activities are combined with some data indicating how far INCORA has gone in transforming the countryside.

The initial structure of farm earnings and pattern of land ownership emphasize the enormity of INCORA's task. According to the 1964 population census there were 1,368,500 agricultural families in 1960 of whom about 175,000 could be considered as either virtually or entirely landless. Interpolating between the 1960 agricultural census and the 1967 sample census it has been estimated that 45,000 new rural families are formed each year. If INCORA's poverty line of 15,000 pesos per family (of 1970 value) is accepted as a criterion, about two-thirds of the total number of rural families were earning less than the equivalent amount in 1960. This implies that, allowing for migration to urban areas, perhaps 30,000 poor rural families are created annually. From the 1964 census and other sources it can be determined that, excluding white collar workers and employers, about 2,050,000 people were economically active in agriculture of whom about one million were employed on small noncoffee farms, 400,000 were occupied on coffee farms, 100,000 were permanent workers on large mechanized farms and the rest were employed on cattle ranches and large plantations.

Based on the 1960 agricultural census about one-half of the 1.2 million farms contained less than 3 hectares while only 14 per cent of the farms

---

[1] Nowhere is this confusion more evident than in the exchange of opinions contained in AID Spring Review, Agrarian Reform and Development in Colombia, (June 1970).

encompassed twenty or more hectares. Approximately three quarters of the total amount of land was held in producing units larger than 50 hectares. On an acreage basis output composition was divided among 3,531,958 hectares in annual crops, 1,515,130 hectares in permanent crops and 14,605,954 hectares in pasture for grazing. The overall picture is one of a sharply positive skewed size distribution of farms with relatively large amounts of land devoted to ranching.

Ranged against the preceding initial conditions the accomplishments of INCORA in altering the basic land tenure pattern can be deemed only as extremely modest. On the face of it INCORA's record is more impressive than a closer examination reveals it to be.[1] Over an eight year span from 1962 to the beginning of 1970 INCORA had adjudicated (given title to) 2,751,301 hectares involving 88,200 titles. However, 2,638,531 hectares of this latter amount represented the conferral of ownership to land formerly within the public domain, much of it of poor quality and subject to squatting prior to titling.[2] In most instances adjudication amounted to legal recognition of a fait accompli. To mid-June of 1969 INCORA had acquired by gift, purchase and expropriation only 209,965 hectares and only 64,333 hectares of this amount by expropriation. Moreover, an even smaller amount had been adjudicated (actually distributed) over the same period of time. Of the total inventory of purchased land, 13,653 hectares had been titled while 55,686 hectares had been allocated provisionally to prospective owners.[3] Much of the purchased land has been reserved for the conservation of natural resources or for the construction of infrastructure. None of the foregoing should be interpreted as a depreciation of the importance of giving secure title to squatters on public land. The act of titling is often crucial in enhancing small farmers' access to the credit market. In any event, by the end of 1971 INCORA had adjudicated 221,647 hectares of land acquired through voluntary purchase, expropriation or cessation and augmented the land resources of 11,798 families.

---

[1] Recent data are presented in DANE Boletin Mensual de Estadistica, nos. 222 and 234 which are also avilable in DANE, Debate Agrario Documentos, Bogotá, 1971.

[2] In a lucid description of the formative years of INCORA Duff notes that while 33,315 families had received new titles by 1966, "the land was the most undesirable and unproductive farm land in Colombia." Ernest A. Duff, Agrarian Reform in Colombia (N.Y.: Praeger, 1968), p. 91.

[3]

By the end of 1969 INCORA was in control of 48,000 hectares of irrigated land used as an input in current production. However, about 36,000 hectares of this total were inherited as a legacy of earlier projects undertaken by the Caja Agraria and the Cauca Valley Corporation. In effect, INCORA's overall investment of 770 million pesos was responsible for establishing about 12,000 hectares of irrigated land, although more land may be forthcoming in the future given the long gestation period of such projects.[1] Since individual parcels in irrigation districts are about six hectares on average perhaps 2,000 families have benefited from INCORA's irrigation projects. In colonization areas INCORA had adjudicated, at the end of 1969, some 617,000 hectares affecting 15,330 families. Most of these families were also the major recipients of benefits from the 490 kilometers of new road constructed by INCORA.[2] The other major INCORA program, supervised credit, was serving a clientele of about 30,000 persons at the beginning of 1970. The average size of a loan was approximately 16,000 pesos and carried a subsidized rate of interest of 7 per cent. Since the average annual rate of inflation for the decade 1960-70 was around 10 per cent the real cost of the loan was negative. Of the total number of campesinos receiving credit about 28 per cent were in irrigation districts, 32 per cent in colonization projects and 40 per cent were in supervised credit projects.[3]

When all of these figures are tallied, it appears that over the eight year span of 1962-69 INCORA reached about 40,000 different rural families.[4] Two thousand families approximately, were better off due to INCORA's irrigation effort, 12,000 benefited from the receipt of parceled land, 15,000 colonos received some financial assistance in their attempt to establish new farms in remote areas, and 12,000 other families were receiving supervised loans at subsidized rates. To this total might be

---

[1] For further details see Debate Agrario, op.cit., p. 19.

[2] For an estimate of these effects see Analisis de la Politica de Reforma Agraria, Colombian Department of National Planning, Document UEIA-DA-002, Bogotá, January 1971.

[3] Ibid., p. 35.

[4] The Colombian Planning Department, in Analisis de la Politica..., ibid., arrives at the same estimate for the shorter period 1962-68.

added the 43,000 renters and sharecroppers who are destined to become new owners at some undetermined point in the future. Even with this addition it is clear that INCORA has had a barely perceptible impact in transforming the countryside given the initial conditions mentioned earlier and especially in view of the formation of 30,000 more "poor" families annually.

There are two discernible reactions to the evidence concerning INCORA's contribution to rural development. To some, such as those at the Wisconsin Land Tenure Center, it is obvious that more resources need to be channeled into INCORA's budget, and in particular into the parcelization program, while irrigation and colonization schemes are simultaneously deemphasized.[1] To others it is not clear that more resources should be invested in INCORA when many of its approaches to the problem of rural poverty do not unambigously satisfy the criteria of either efficiency or equity very well. There is little doubt that INCORA officials have been inbued with a notion of the appropriate farm size as one which promises a gross income of 15,000 pesos (1970 prices), an amount which is achieved on average with a farm size of 20 hectares.[2] In its first reform project in the region of Cunday in Tolima coffee plantations were expropriated and sectioned into individual farms of 25 hectares in average size. About 80 farmers benefited from this action.[3] Duff also noted that the first parcelization areas to be established were endowed with farms of above average size.[4] For example, by the end of 1965 average size of a farm was 14 hectares in Project Tolima no. 1, 28.5 hectares in Project Narino no. 1 and 15 hectares in Project Tolima no. 3. Overall, since 221,647 hectares were titled from land acquired by voluntary sale, expropriation and cessation and 11,798 adjudications were made the average size per title granted can be calculated as 18.8 hectares. The questionable aspect of this farm size strategy is that, while it makes a

---

[1] This is the conclusion reached by H. Felstehausen, "A Review of Agrarian Reform and Development in Colombia," in AID Spring Review, June 1970.

[2] In irrigation districts about 6 hectares would meet this income target while in colonization areas as much as 50 to 80 hectares may be required.

[3] Hirschman, op.cit., p. 152.

[4] Duff, op.cit., pp. 75-90.

few farmers much better off than they were before, it also permits no improvement in the situation of the bulk of the rural poor. A policy of an average farm size of 10 hectares would have reached about twice as many people and still created farms of above average size. This point is graphically illustrated by Tomayo's work.[1] With a thorough land redistribution he estimates that only 300,000 of nearly one million rural poor earning less than 15,000 pesos can be established on farms of 20 hectares. For those left out Tomayo advocates the creation of 700,000 nonagricultural jobs which implies aiming for an unfeasible target in the short run and probably for the medium term as well. By pursuing unrealistic goals INCORA may have made the distribution of rural incomes worse than it need be. An elite set of middle-class farms may have been established at the expense of excluding and bypassing some of the poorest farmers in the country who may be even worse off if the extra output of middle-class farms has helped to reduce the prices they receive for their products.

The efficiency of INCORA's operations is important because it is the obverse side of the income distribution coin. With a fixed budget the distributive impact of that budget will be greatest if the funds are allocated to the least cost methods of helping a poor rural family earn a given income. There are two parts to this efficiency question. One part concerns the optimal division of INCORA's budget among its various programs. Presumably optimality requires roughly equivalent rates of return to different programs. The other part of the question refers to the best division of budgetary resources between INCORA and other government agencies assisting the rural sector. For example, INCORA's policies do not make much sense if it costs twice as much to settle a family in a colonization project as it does to create a nonagricultural job providing the same real income.

Over the decade 1962-72 INCORA has distributed its investment expenditures among three broad but conceptually distinct spending categories: Judicial, Engineering and Agricultural Development. The first of these groups includes primarily the titling and acquisition of land, the second encompasses land improvement projects (irrigation and roads mainly) while

---

[1] Hector Tomayo, "Tendencia de los Principales Efectos de una Reforma Agraria en Colombia," en Debate Agrario, op.cit.

the dominant concern of the third is supervised credit. Table 1 shows the percentage distribution of total investment spending among these alternatives. Only recently has the share of the Judicial branch risen above 10 per cent towards a level of 15-18 per cent. The rest of the budget has been more or less divided evenly between the other two functions with each receiving in any particular year a share anywhere between 40 and 50 per cent. Although supervised credit shares the budgetary stage equally with Engineering, it absorbs most of INCORA's personnel.

One important decision made by INCORA is the relative emphasis to be accorded land acquisition vis-a-vis land improvement and land extension (colonization). The return to exercising any of these options is the present value of the extra income made available to a small farmer over and above what he would have earned anyway. The rate of return is this return expressed as a fraction of the present value of the cost of the investment. A ratio larger than one would indicate a project had positive present value and would be socially worthwhile as long as costs and returns are discounted by the proper shadow rate of interest. Unlike land acquistion, land improvement and extension typically involve a temporal distribution of expenditures which makes the estimation of total cost a somewhat harzardous exercise. Nonetheless, Tomayo has attempted to make comparable cost estimates.[1] To provide a family income of 15,000 pesos per year he estimates the cost of parcelization as 50,000-60,000 pesos per family with a land base of 23.4 hectares on average.[2] Only 5 to 6 hectares of irrigated land is required to earn the same income but it would cost about 220,000 pesos per family. Colonization projects appear to cost even more. In Sarare and Ariari (colonization projects in Arauca and Meta respectively) costs were estimated at 300,000 pesos per family on a family land area of 82 hectares.

---

[1] See H. Tomayo, "La Reforma Agraria en Colombia," in Debate Agrario, op.cit., pp. 151-193.

[2] Of course, the cost of land acquisition is not relevant from a social point of view as it involves an internal swap of assets. It is, however, relevant for INCORA in deciding where to spend its budget. Over 1962-1968 INCORA spent 227 million pesos to acquire 155,380 hectares, or an average cost of $1,460/hectare (in say 1965 pesos). Average costs for 1970 would be closer to $3,000/hectare which would be consistent with the parcelization cost above.

Table 1

PERCENTAGE DISTRIBUTION OF INCORA INVESTMENTS

Year	Judicial	Program Engineering	Economic Development
1963	28.4	60.7	10.9
1964	12.1	47.8	40.1
1965	9.3	48.0	42.7
1966	8.7	42.9	48.4
1967	8.97	38.4	52.6
1968	8.04	46.1	45.8
1969	10.1	49.5	40.4
1970	15.4	49.8	34.8
1971	18.6	46.9	34.5
1972	17.1	37.9	45.0

SOURCE: Financial Division of INCORA, Bogota, Colombia.

The reason for the high costs of colonization rest in the provision of infrastructure which is already at least partially available in more settled parts of the country. These costs are compatible with those reported by other sources. For example, INCORA itself estimates that the cost per family, including credit, is $80,000, $174,000 and $217,000 for a family that is to earn an income of $14,700 on parceled, irrigated and colonized land respectively.[1]

If the farmers benefited by INCORA would in fact make 15,000 pesos per year it is also likely that in 1970 they would have earned at least 5,000 pesos anyway. Twenty pesos per day is a rough average wage for rural workers who, if they labor 250 days each year, would earn $5,000.[2] According to the results of the 1960 census a full time rural laborer earns about as much as an owner-operator on 2-3 hectares.[3] Thus the

[1] In March 1971 the Bogotá newspaper El Siglo reported that in the Altantico no. 3 irrigation zone it cost $320,000 to settle a family on 5 hectares. In a colonization project (Sarare in Arauca) the per family cost was $210,000. The Colombian Planning Department in "Analisis de la Politica de Reforma Agraria," op.cit., p. 22 reports irrigation costs varying from $25,000 per hectare in Valle no. 1 to $40,000 per hectare in Atlantico no. 3.

[2] For agricultural wage estimates by region see any 1972 Dane Boletin Mensual de Estadistica.

[3] See R. Albert Berry, "Land Distribution, Income Distribution, and the Productive Efficiency of Colombian Agriculture," Food Research Institute Studies in Agricultural Economics, Trade and Development, vol. XII, no. 3,

return to INCORA beneficiaries (and presumably to society as well) is about 10,000 pesos in 1970 values. Expressed simply as a single period rate of return, the payoff to parcelization is about 13-18 per cent, 5 to 6 per cent for irrigation and 3-5 per cent for colonization. A more accurate method of estimation would consider the recurrent nature of some of the costs attached to land improvement and extension and make the appropriate discounting adjustments. If the cost estimates have any validity this exercise argues strongly for a shift of more resources to the Judicial branch and much less to the Engineering branch.[1] Another efficiency indicator, the cost of job creation, leads to the same conclusion. For an average of 14 modern munufacutring industries it has been estimated that the capital cost per job is $57,200 in 1958 pesos. Using implicit price deflators for investment a 1970 value would be about two and a half times larger, or 132,000 pesos. If there are two and a half workers per family the cost of colonization per worker would be about $120,000. Thus, at the margin, a rural worker could have been employed in the modern industrial sector for almost what it costs to colonize a remote jungle area and earn more income in the process. In short, there may be an independent equity rationale for greater land redistribution efforts by INCORA but there are equally forceful reasons on efficiency grounds favoring them as well.

3. Land Reform and Landless Workers

It is more than a little ironic that land reforms directed at lessening inequalities in income seldom extend to landless workers who are at the bottom of the income scale. In very few countries has this group been included as direct or explicitly intended beneficiaries of land reform. Colombia is no exception to this pattern as the approximately ten per cent of rural workers who are virtually without any land have never been considered

---

[1] A different type of calculation points in the same direction. If per hectare costs of irrigation are $25,000-$40,000 a 10 per cent rate of return requires a net income yield of $2,500-$3,000. Assuming irrigation doubles yields it can be inferred from data in J. Atkinson, Agricultural Productivity in Colombia, USDA, Economic Research Service, Foreign Agricultural Economic Report no. 66, that yields would increase by about 1/2 ton per hectare for corn, rice and barley. Using 1970 market prices the per hectare gross return is $925, $745 and $786 for rice, corn and barley. Even if yields tripled and one ton was the gain in output the rate of return to gross income would be still smaller than 10 per cent.

as a target group of land reform activities.[1] It is worth asking how their welfare may be affected by land reform benefitting only small farmers.

As mentioned in the introduction, Berry has recently developed a model which explores this question and sets forth the conditions by which landless workers may be either harmed or helped by land reform.[2] Because small farms are suspected of harboring some surplus labor, in the sense that not all family members can obtain as much off-farm work as they desire, own labor and hired labor on small farms may be imperfect substitutes at the margin. Thus, if small farmers receive larger amounts of land they may hire smaller quantities of hired labor per unit of land than was formerly employed on larger farms prior to their dismemberment. If this difference in the quantity of hired labor per hectare exceeds the amount of labor small farms withdraw from the labor market, the demand for landless workers will diminish and either their wages will decline or (what is less likely) unemployment will occur. As Berry has stated this proposition in a slightly different way, the fate of landless workers depends on "whether the increase in total labor use (on all farms together) as a result of this transfer of land is greater or less than the increased use of labor of the family which receives the land (on their own and other people's land)."[3] This condition makes allowance for any increase in leisure which the farm family may demand as a result of its higher income in the post-reform situation. If more leisure is demanded small farmers will simply replace their effort with that of hired labor and small farmers will be observed to hire more labor per unit of land after the reform than before. The basic reason for this result is that with a functioning labor market production decisions should be independent of consumption choices since profit-maximizing small farmers will determine their total use of labor (on their farm) irrespective of their own supply.

Berry also offers a demonstration of how the demand for landless workers will be a function of the size of the land reform parcel that is distributed. In the range of very small sizes demand for landless workers may be reduced since the extra land distributed to small farmers may now fully employ family members. At intermediate sizes demand may be increased and at still larger sizes it will be reduced once more as the greater labor intensity

[1] To what extent the program for converting renters into owners will benefit some landless workers, if at all, is unknown.

[2] C.f. R. Albert Berry, op.cit.

[3] Berry, op. cit., p. 38.

of smaller farms is outweighed by the tendency of larger farms to employ labor saving technology and produce less labor intensive crops.

This analysis may be relevant in describing the experience of land reform in a number of countries. Berry, for instance, indicates that landless labor in Chile may have been harmed by land reform. In India, Dvoring notes that the landless became worse off after reform because they were given no land.[1] Ringlien makes the point that agricultural reform in Peru will not raise total employment but will merely redistribute it.[2] Landless workers and many small farmers who normally hire out are now being squeezed out as the increase in the demand for labor from reform is met entirely by a sharp dropoff in under-employment in the reformed sector.[3]

In Colombia the impact of land reform on the landless is an empirical matter whose resolution depends mainly on a comparison of the hired labor used on large, mechanized farms with the amount of that type of labor employed on smaller farms. A number of micro-farm studies are drawn together in Table 2 in order to shed some light on the issue.[4] From the data in this table it appears that, especially when comparisons are made for a single crop or the same region, small farms are likely to employ as much, if not more, hired labor per hectare as larger farms. Of course, if a small enough small farm is chosen this basic result probably would not continue to hold up. Excluding small farms in Meta, where a large area is needed to compensate for low yields, the range of average farm size for small farms

---

[1] F. Dvoring, "Economic Results of Land Reform," AID Spring Review of Land Reform (June 1970).

[2] W.R. Ringlien, "Some Economic and Institutional Results of the Agrarian Reform in Peru," LTC Newsletter, Land Tenure Center, University of Wisconsin, no. 38, October-November 1972.

[3] Recently voiced concern over the distribution of benefits from the Green Revolution is based on similar reasoning. Increases in labor demand wrought by new high yielding varieties may be met entirely from the labor supply of small farmers with no benefits for landless workers.

[4] Unpublished Ph.D. theses constitute the main source of data. These are: T. Haller, "Education and Rural Development in Colombia," Purdue University, 1972; W.R. Thirsk, "The Economics of Farm Mechanization in Colombia," Yale University, 1972; J. Grunig, "Information, Entrepreneurship and Economic Development," University of Wisconsin, 1968; E. Haney, "The Economic Reorganization of Minifundio in a Highland Community," University of Wisconsin, 1972.

in Table 2 is between 3 and 8 hectares. Large farms in the same Table, on the other hand, typically extend beyond 50 or even a 100 hectares. It might also be mentioned that within any region there is bound to be a great deal of variation among small farms in the use of family labor as a consequence of differences in the number of family workers per family. Nonetheless, small farms seem to be relatively intensive in the use of hired because, unlike many large farms, they specialize in the production of labor intensive products and do not utilize labor saving methods of production.[1] Quite

Table 2

Mandays of Hired Labor per Hectare by Farm Size

Small Farms (Average)

Valle	Boyaca	Caldas	Meta	Cundinamarca	Tolima	Santander
91.6[a]	49.8[a]	35.6[a]	8[a]	27[b]	29[c]	35.3[c]

Large Farms (Average)

Valle	Meta	Huila-Tolima				
		Cotton	Rice	Corn	Wheat-Barley	Beans
55.2[e]	6.06[a]	55-60[d]	30-35[d]	20-30[d]	7-8[e]	17-18[e]

National Estimates (According to Berry)[f]

Size (hectares)	2-3	3-4	4-5	5-10	10-20	30-40	40-50
	40.8	36.2	31.4	29.2	19	16.4	15

[a] J. Grunig, "Information, Entrepreneurship and Economic Development," unpublished Ph.D. thesis, University of Wisconsin, 1968.

[b] E. Haney, "The Economic Reorganization of Minifundio in a Highland Community," unpublished Ph.D. thesis, University of Wisconsin, 1969.

[c] T. Haller, "Education and Rural Development in Colombia," unpublished Ph.D. thesis, Purdue University, 1972.

[d] W. Thirsk, "The Economics of Farm Mechanization in Colombia," unpublished Ph.D. thesis, Yale University, 1972.

[e] Ministry of Agriculture, Consideration of the Role of Machinery in Colombian Agriculture, Bogotá, March 18, 1971.

[f] R. Albert Berry, "Land Distribution, Income Distribution and the Productive Efficiency of Colombian Agriculture," Food Research Institute Studies, XII, no. 3 (1973). Berry's estimates of the amounts of hired labor by farm size is combined with data from the 1960 Census of Agriculture to produce the figures above.

[1] In a colonization area occupied by small farmers Tinnermeir noted a strong correlation between output mix and farm size. Farmers with the most land engaged in livestock operations; those with the least land produced labor intensive crops. See R.L. Tinnermeir, "New Land Settlement in the Eastern Lowlands of Colombia," Wisconsin Land Tenure Center Paper no. 13, December, 1964.

likely most of the hiring done by small farms is seasonal and coincides with periods of peak labor demand.[1] Though of a temporary nature, this seasonal demand apparently provides as much or more employment per hectare than the mechanized techniques of large farms require. Differences in technology combined with the seasonality of labor demand appear to be more important in determing farm size variation in hired labor employment than the presence of surplus labor on small farms.

The preceding discussion brings up the interesting possibility that both small farmers and landless workers may benefit from land reform in Colombia. If the demand for landless workers increases after the reform their wages will also tend to increase and they will gain directly. However, if wage rates for this group rise the demand for workers on farms of every size will be reduced and the gains in total output expected to result from reform will be smaller than otherwise. Certainly they will be smaller than those predicted from a calculation which assumes labor employment on each farm size is the same before and after reform. With a smaller output increase the urban poor, who spend a higher fraction of their income on food than other urban income earners, will capture fewer of the benefits from reform than otherwise.[2] In this manner a competitive welfare relationship may exist between the rural poor and the urban poor with respect to land reform. The importance of the conflict depends in part on the anticipated size of the output effects, the next topic to be dealt with.

4. Output Effects of Land Reform

For a number of reasons land reform in Colombia would be expected to be accompanied by an increase in total agricultural output. Because of initial imperfections in the factor markets for land and labor reform would raise total output in at least two ways: (1) by combining under-utilized labor with underutilized land and (2) by creating a more even distribution of labor, and perhaps other variable inputs, over a given

---

[1] Another possibility is that labor is paid less on smaller than on larger farms. Not much is known about this phenomenon in Colombia.

[2] Of course if the aggregate price elasticity of demand for farm output is sufficiently less than one, the demand for landless workers will not increase and the problem will not occur.

area of cultivated land.[1] In the pre-reform situation it is typically observed that small farms are more labor intensive than larger ones and utilize their land area more intensively. Large farms, in contrast, are accused of failing to maximize profits by devoting too little of their land to cultivation. The result is the achievement of higher output per unit of total land area on smaller farms even though larger farms, by adopting superior technologies, may enjoy higher yields on cultivated land. As Dorner and Kanel have demonstrated the tendency of output per unit of land to decline with increasing farm size is observable in a large number of countries.[2] It is certainly evident in Colombia according to Berry's calculations from data generated by the 1960 agricultural census.[3] Larger farms tend to cultivate a smaller fraction of their land and operate with larger amounts of fallow.

Making some fairly simple and somewhat naive assumptions it is possible to calculate rather crude estimates of the once-for-all output benefit of land reform. The gains from reducing the initial dispersion in factor proportions can be assessed by assuming, first of all, that a thorough reform would create new and identical farm units having a ratio of labor to effective land equal to the average for the entire country.[4] If it is further assumed that these newly formed farm units would have an average productivity of land the same as that for existing farms of the same size, the potential gain in output is the product of this particular land yield and the total number of hectares in the country minus the current level of total output. Using Berry's data for 1960 this comparison can be made for Colombia.[5] In 1960 total agricultural land amounted to about 27,277,900

---

[1] Total output in the economy might also increase if capital otherwise employed on large mechanized farms were released to employ labor in non-agricultural sectors of the economy.

[2] P. Dorner and D. Kanel, "The Economic Case for Land Reform," AID Spring Review of Land Reform (June 1970).

[3] R. Albert Berry, "Land Distribution, Income Distribution and the Productive Efficiency of Colombian Agriculture," Food Research Institute Studies in Agricultural Economics, Trade and Development, vol. XII, no. 3 (1973).

[4] Effective hectares represent land units adjusted for quality variation. Data on land prices by size of farm are used to make this adjustment.

[5] R. Albert Berry, op.cit.

hectares on which was produced a total value-added of 7,790.9 million pesos. Berry provides two alternative estimates of the average labor-land ratio of .128 and .169 (expressed in man-years per effective hectare). The first estimate corresponds to an average farm size of 30-40 hectares and the second to a size of 20-30 hectares. Value-added per hectare for the latter size group is $3,523 while that for the other size class is $3,210. Thus total output from the establishment of identical 20-30 hectare farm units would be $9,610.0 million pesos, a gain of 23.3 per cent, and $8,900.6 million pesos, an increase of 14.2 per cent, if 30-40 hectare units were formed instead.

Tomayo has carried out a similar calculation and reached similar results.[1] He considers the hypothetical situation in which cattle ranches are limited to 100 hectares and all cropland is redistributed in parcels of 20 hectares each. One of the expected outcomes of this particular reform is an increase in total value-added of 24 per cent.

Estimates of this order of magnitude have been made by Cline in his analysis of the anticipated output gains consequent upon land reform in Brazil.[2] Cline concludes that in the case of a complete land reform where the entire agricultural sector was divided into family farms of equal size total output of agricultural products would increase between 20 and 25 per cent. With partial reform, involving only the expropriation of farms larger than 300 hectares whose land values were above average, production gains (ranging from 10 to 30 per cent) would be realized in four of seventeen agricultural sectors. Still, total output is estimated to rise by about 6 per cent and this figure is biased down because it assumes a subdivided cattle ranch would not be used to grow higher valued crops.

A worrisome feature of the preceding calculations is that they rely on farm size differences in average productivity rather than on the allocationally more relevant difference in marginal productivity. The main reason for the neglect of marginal factor returns is that they are not easy to obtain and, perhaps as a result, few efforts have been made to

---

[1] H. Tomayo, "Efectos de una Reforma Agraria en Colombia," in Debate Agrario, op.cit., pp. 123-147.

[2] W.R. Cline, The Economic Consequences of Land Reform in Brazil, North-Holland, Amsterdam, 1970. Although no quantitative evidence is offered, Dvoring states that ouput rose in Ecuador after reform as a result of an expansion in cultivated area. See Dvoring, op.cit., p. 9.

acquire estimates of them. One of the few is a study of Venezuelan agriculture by Hanson.[1] Of interest in its own right, Hanson's work is relevant for Colombia because of the similar agrarian structure in the two countries. Using census data for different states and a Cobb-Douglas specification of production, Hanson estimates that the marginal productivity of cultivated land is .47 on farms with fewer than 100 hectares of cultivated land and only .04 on farms with more than 100 hectares. Both of these estimates are statistically significant.[2] Although he is interested in testing for static misallocation Hanson stops short of attempting to quantify the cost of this distortion in the land market.[3] To do so requires the aid of an economic model.

Because Cobb-Douglas functions have been applied with some success to agriculture and are used by Hanson, assume that small farms (fewer than 100 hectares of cultivated land) are larger ones (more than 100 hectares) have access to the same scale neutral Cobb-Douglas production function of the following form: (1) $Q=BA_i^d L_i^{(1-d)}$; the index i=1,2 indicates small and large farms respectively.[1] The variable A denotes the use of land in the production of output Q while the letter L refers to all other inputs beside land. If factor markets functioned perfectly the marginal product of land would be the same on farms of either size. To permit deviations from this result it is useful to define a distortion parameter γ measuring the ratio of the marginal product of land on small and larger farms. Thus,

(2) $\gamma = \frac{MPA_1}{MPA_2} = \left(\frac{L_1}{A_1}\right)^{1-d} / \left(\frac{L_2}{A_2}\right)^{1-d}$. In the perfect market situation the parameter γ equals unity. Given a fixed amount L of the other factor besides land equation (2) can be rewritten as

(2)' $L^{1-d} = L_1^{1-d}\left(1 + \frac{A_2}{A_1}\gamma^{1/1-d}\right)^{1-d}$. With no factor market distortions factor proportions would be equal on all farms and total output of the

---

[1] J. Hanson, "Agricultural Productivity and the Distribution of Land: the Venezuelan Case," Economic Growth Center Discussion Paper no. 148, Yale University, June 1972.

[2] Hanson, ibid., Table 6, p. 26.

[3] Although the distortion shows up in the land market it could just as easily result from failures in the market for labor or capital.

sector could be expressed as

(3) $Q=B\,A^{d}\,L^{1-d}$ where $A = A_1 + A_2$ and $L = L_1 + L_2$.

This last result makes it possible to define the relative cost of the distortion R as

(4) $R = \frac{Q_1 + Q_2}{Q}$. Substituting into this expression for R from above gives

$$(4)'\quad R = \frac{Q_1 + Q_2}{Q} = \frac{B\,A_2^{d}\,(\frac{L1}{A_1} \cdot A_2)^{1-d}\,\gamma + B\,A_1^{d}\,L_1^{1-d}}{B\,A^{d}\,(1 + \frac{A2}{A1}\,\gamma^{1/1-d})^{1-d}\,L_1^{1-d}}$$ which simplifies to

$$(4)''\quad R = \frac{\gamma\,\frac{A2}{A} + \frac{A1}{A}}{(\frac{A1}{A} + \frac{A2}{A} \cdot \gamma^{1/1-d})^{1-d}}$$

With knowledge of the relative marginal products this equation can be implemented with a minimum of other data.[1] According to the 1961 census of agriculture in Venezuela the fraction of cultivated land on farms smaller than 100 hectares was .64.[2] The same figure for Colombia from the 1960 agricultural census is .667.[3] Hanson also is unable to refute the hypothesis that the output elasticity of land (d) is the same size, about .23, on all farms.[4] If this information is inserted into equation (4)" the result is

$R = \frac{.6706}{(.64+.0146)}.77 = \frac{.6706}{.7278}$. Thus if land reform equalized factor

---

[1] It may be noted that the cost of the distortion increases montonically with its size: $\frac{dR}{d\gamma} = \frac{A2}{A}\,(1 - \gamma^{1/1-d}\,\frac{A_2}{A}) / D^2 > 0$ where D denotes the denominator in equation (4)" above.

[2] Hanson, op.cit., Table 2, p. 9.

[3] Colombian Agricultural Census, 1960, Part 2, p. 45, DANE, Bogotá. This ratio is for temporary crops and fallow. Permanent crops were excluded because Venezuela grows little coffee. If they are included the ratio is changed to .71.

[4] Hanson, op.cit., Table 6, p. 26.

proportions the maximum gain in output would be about 8.5 per cent, as a percentage of pre-reform output levels. Even if the output elasticity of land were much higher, for example at .4 instead of .23, the percentage gain in output would be only 15.6 per cent.[1]

It is doubtful, but not entirely impossible, that the output benefit from land reform in Colombia would exceed that just calculated for Venezuela. The similarity in production by farm size has been already noted. Moreover, it would be surprising if the marginal productivity of land on smaller farms was more than 12 times that for larger farms. Berry, for instance, finds that the average productivity of land (value-added per hectare) on farms of 2-3 hectares is slightly less than seven times greater than that of farms in the 1000-2500 hectare range.[2] Under the Cobb-Douglas assumptions about production structure this would imply a value for the distortion parameter γ of about seven in Colombia and a smaller output benefit from land reform in that country than in Venezuela. It might be held, however, that the difference between this estimate and previous ones is that the analysis unrealistically assumes that small farm labor and large farm land are fully utilized. Admittedly this could be a source of downward bias but it would have to be weighed against an opposing source of upward bias, the neglect of the likelihood that larger farms employ a superior technology.[3]

Nothing has been said so far about the distribution of the output gain from land reform. The benefits of this gain will be divided between the small farmers who receive more land and consumers of food products, especially low income consumers, who will be better off if more food is marketed and the relative price of food declines. There is some concern that as land reform beneficiaries spend their higher incomes partly on food total marketed output will decline despite a higher volume of production. It is shown elsewhere that there may be no need for concern on this score.[4] With a higher land-labor ratio small farmers have an incentive to

---

[1] Hanson calculates an output elasticity for land of .4 on smaller farms in one instance. Hanson, op.cit., Table 6, p. 26.

[2] R. Albert Berry, op.cit.

[3] If the efficiency differences were neutral the value of the parameter B in the production function would be greater on larger farms.

[4] See W.R. Thirsk, "A Note on Z Goods, Marketed Surplus and the Labor Intensity of Small Farm Agriculture," Rice University Program of Development Studies Discussion Paper no. 40.

expand their production of crop goods at the expense of noncrop activities while a substitution effect in consumption will work against the income effect leading to more food purchases. In this contest between extra production and extra consumption the marketed surplus of small farmers may increase rather than decline as has often been predicted. Still, it is possible that the marginal propensity to market output may be less on smaller than on larger farms. In this case the relative price of food would increase (assuming imports are not feasible at current prices) and a portion of the real income gain to land reform beneficiaries would be won at the expense of urban food consumers, poor ones in particular.

5. Conclusion

This paper has sought to analyze some of the issues of land reform in Colombia and assess their effects on income distribution. Other important distributional matters, such as who gains or loses from alternative methods of financing the process of land reform, have been purposefully overlooked. This neglect is, however, not meant to detract from their relevance. Three major findings emerge from the analysis of this paper: (1) there is some evidence in support of the notion that the reform agency INCORA could make more small farmers better off if it spent more of its budget on acquiring land and less on irrigation and colonization projects. (2) Landless workers will probably not suffer from land reform and could conceivably be made better off if the large farms expropriated by INCORA specialized in crops with low labor intensity (wheat or barley for example). (3) In addition to improving income distribution, a full scale land reform will provide a once-for-all increase in the level of total output, although the size of the increment may be smaller than has been anticipated in previous studies.

One would also be remiss if he did not point out that many, if not most, of the other factors responsible for widely disparate rural incomes are ultimately related to the skewed distribution of land ownership. A socially inefficient process of large farm mechanization would not have occurred if the initial distribution of land had been more equal. Moreover, deficiencies in the supply of rural education probably would have been remedied long ago if there were no large landowners residing in the cities and sending their children to urban schools. Finally, price support policies would have

a much less inequitable impact if they did not provide disproportionate rewards to some simply because they own more land and have more to sell than others. It is in this sense that land reform is the fundamental element in improving income distribution. Without it, so many other policies affecting the rural sector make the distribution of income more unequal than it otherwise would be.

PROGRAM OF DEVELOPMENT STUDIES
Discussion Papers

37. "General Equilibrium Incidence Analysis: The Harberger Model after Ten Years" (1972), 34 pp., Charles E. McLure, Jr.

38. "On the General Equilibrium Analysis of Tax Incidence" (1973), 34 pp., J. Gregory Ballentine and Ibrahim Eris

39. "The Impact of Demand on Labor Absorption and the Distribution of Earnings: The Case of Brazil" (1973), 47 pp., Samuel A. Morley and Jeffrey G. Williamson

40. "A Note on Z Goods, Marketed Surplus and the Labor Intensity of Small Farm Agriculture" (1973), 22 pp., Wayne R. Thirsk

41. "The Incidence of Colombian Taxes, 1970" (1973), 66 pp., C.E. McLure,Jr.

42. "What to Do about Foreign Direct Investment: A Host Country Perspective" (1973), 28 pp., Samuel A. Morley

43. "Income Distribution Consequences of Agricultural Price Supports in Colombia" (1973), 32 pp., Wayne R. Thirsk

44. "Factor Intensity of Consumption Patterns, Income Distribution and Employment Growth in Pakistan" (1973), 34 pp., Ronald Soligo

45. "Industrialization in Malaysia: A Penang Micro-Study" (1973), 42 pp., Fred R. von der Mehden

46. "Short-run Effects of Income Distribution on Some Macro-economic Variables: The Case of Turkey" (1973), 33 pp., Tuncay M. Sunman

47. "The Inequity of Taxing Iniquity: A Plea for Reduced Sumptuary Taxes in Developing Countries" (1973), 51 pp., C.E. McLure, Jr. & W.R. Thirsk

48. "A Numerical Exposition of the Harberger Model of Tax and Expenditure Incidence" (1973), 51 pp. C.E. McLure, Jr. & W.R. Thirsk

49. "Public Goods and Income Distribution: An Explanatory Comment" (1974) 17 pp., C.E. McLure, Jr.

50. "Education and Modernization in Zaire: A Case Study" (1974), 29 pp., Gaston V. Rimlinger

51. "Rural Credit and Income Distribution in Colombia" (1974), 26 pp., Wayne R. Thirsk

52. "The Short-run Burden of Taxes on the Turkish Agriculture in the Sixties" (1974), 41 pp., Marian Krzyzaniak and Süleyman Özmucur

53. "Some Aspects of Efficiency and Income Distribution in Colombian Land Reform" (1974), 25 pp., Wayne R. Thirsk

NOTE: Discussion Papers are available upon request to individual scholars and researchers and libraries of educational institutions.

Table 2

Mandays of Hired Labor per Hectare by Farm Size

Small Farms (Average)

Valle	Boyaca	Caldas	Meta	Cundinamarca	Tolima	Santander
91.6[a]	49.8[a]	35.6[a]	8[a]	27[b]	29[c]	35.3[c]

Large Farms (Average)

Valle	Meta	Huila-Tolima				
		Cotton	Rice	Corn	Wheat-Barley	Beans
55.2[a]	6.06[a]	55-60[d]	30-35[d]	20-30[d]	7-8[e]	17-18[e]

National Estimates (According to Berry)[f]

Size (hectares)	2-3	3-4	4-5	5-10	10-20	30-40	40-50
	40.8	36.2	31.4	29.2	19	16.4	15

---

[a] J. Grunig, "Information, Entrepreneurship and Economic Development," unpublished Ph.D. thesis, University of Wisconsin, 1968.

[b] E. Haney, "The Economic Reorganization of Minifundio in a Highland Community," unpublished Ph.D. thesis, University of Wisconsin, 1969.

[c] T. Haller, "Education and Rural Development in Colombia," unpublished Ph.D. thesis, Purdue University, 1972.

[d] W. Thirsk, "The Economics of Farm Mechanization in Colombia," unpublished Ph.D. thesis, Yale University, 1972.

[e] Ministry of Agriculture, Consideration of the Role of Machinery in Colombian Agriculture, Bogotá, March 18, 1971.

[f] R. Albert Berry, "Land Distribution, Income Distribution and the Productive Efficiency of Colombian Agriculture," Food Research Institute Studies, XII, no. 3 (1973). Berry's estimates of the amounts of hired labor by farm size is combined with data from the 1960 Census of Agriculture to produce the figures above.