LAND CONCENTRATION AND INCOME DISTRIBUTION IN SEVERAL LATIN AMERICAN COUNTRIES

Delbert A. Fitchett

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The RAND Corporation, Santa Monica, California

I. INTRODUCTION

In order to pursue part of the aims of the Alliance for Progress (as stated in the Charter of Punta del Este of 1961), the Inter-American Committee for Agricultrual Development (perhaps more commonly known by its initials in Spanish - CIDA) was formed in 1961. As the first stage of its research into agrarian conditions in Latin America, it is presently completing studies of land tenure arrangements and rural economic and social conditions in Argentina, Brazil, Chile, Colombia, Ecuador, Guatemala, and Peru. Some of the most interesting features of these studies have been recently summarized in a paper by Solon L. Barraclough and Arthur L. Domike of the Instituto de Capacitación y Investigación en Reforma Agraria in Santiago, Chile.[1] Most of the data utilized in our discussion have been drawn from various parts of their paper.

During the past quinquennium the volume of literature on the nature and implications of the distribution of agricultural land in Latin America has grown rapidly. One of the most interesting early surveys by Thomas F. Carroll appeared in A. O. Hirschman's Latin American Issues: Essays and Comments.[2] By 1965 the Fondo de Cultura Económica of Mexico felt justified to publish a voluminous (756 page) anthology containing excerpts from numerous articles and publications

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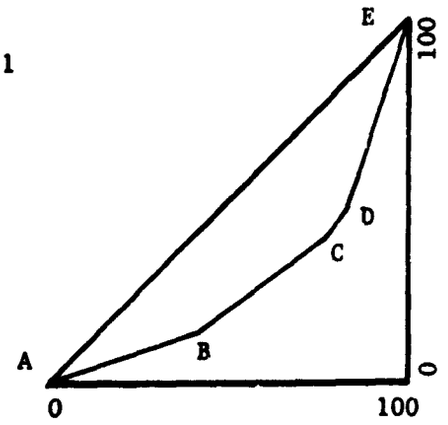
on various aspects of Latin American agrarian reform.[3] That the interest in these questions is not confined solely to this hemisphere is indicated by the formation in 1962 of the FAO's Agrarian Research and Intelligence Service which is intended to serve as an international documentation and information center for activities in and studies of agrarian reform and related questions. Of the Latin American countries only four (Argentina, El Salvador, Haiti and Uruguay) have not passed some kind of "agrarian reform" law by the end of 1965. All but four of the sixteen countries who have adopted these laws did so after mid-1961.[4]

With the data presented in the ICIRA Study referred to above, we are going to examine some aspects of the distribution of land, the economically active population in the agricultural sector and sectoral income in several Latin American countries. The methodology by which this data will be presented and examined has often been used to study the distribution of some characteristic among a population, the Lorenz curve.[5]

A Lorenz curve is constructed by comparing the cumulative frequency distribution of the population (ordered according to its "ownership" of some characteristic) with the cumulative frequency distribution of that characteristic among the population.[6] In Figure 1, along the abscissa is accumulated the percentage of farms and along the ordinate is accumulated the total area in farms. Consulting data on the size distribution of farmland (e.g., those in footnote 6), we may proceed to construct a "curve" ABCDE. The concentration ratio of

FIGURE 1



degree of concentration is then calculated by subtracting from the total area of the triangle (to which the formula presented in footnote 5 assigns a value of 1) that area of the triangle subtended by ABCDE. The resulting number is between 0 (perfect equality) and 1 (complete inequality).[7]

II. HOW LAND IS DISTRIBUTED AMONG FARMS

A favorite point of departure for some, if not most of the students in this field has been the size distribution of the land in farms in a nation or a region. The concentration measure of this characteristic for several countries appears below.[8]

Argentina	.640
Brazil	.747
Chile	.845
Colombia	.817
Ecuador	.787
Guatemala	.815
Peru	.898
United States	.708

Only Argentina has a lower degree of concentration of land in farms than the United States. Peru, Chile, Colombia and Guatemala appear to demonstrate a markedly greater degree of concentration.

In some of these countries, however, an appreciable part of the land in farms is not in use and perhaps is of such a nature, e.g., swamps, mountains, deserts, etc., that it is not utilizable. That percentage of farmland in these Latin American countries that is actually cultivated or used as natural, i.e., unimproved, pastures is as follows:

Argentina	82.1
Brazil	69.4
Chile	46.8
Colombia	71.9
Ecuador	55.6
Guatemala	55.3
Peru	70.1

As we are more interested in the distribution of an economic resource rather than just any land, we should more properly direct our attention to a measure of the concentration of land in use:

Argentina	.635
Brazil	.722
Chile	.817
Colombia	.801
Ecuador	.691
Guatemala	.719
Peru	.883

Actually, the pattern does not appear to have greatly altered. Once more, Argentina seems to be in a class of its own, while the greatest skewness in the distribution of farmland in use again is in Peru, Chile, and Colombia.

Let us eliminate the area in natural pastures and observe the behavior of the concentration measure. These appear below in column (1), together with the percentage that cultivated lands are of total land in farms, column (2).[9]

	(1)	(2)
Argentina	.539	19.4
Brazil	.531	29.4
Chile	.769	9.5
Colombia	.545	18.5
Ecuador	.576	34.7
Guatemala	.635	39.6
Peru	.556	13.7
United States	.545	35.8

Chile stands out in this group as having the greatest degree of concentration, followed by Guatemala and Brazil. While none of these values are low, it does appear that in every case the concentration measure is reduced from that for farmland in use (i.e., the immediately preceding table), especially in the case of Peru and Colombia. Perhaps it is no coincidence that these are also two of the countries in which large landlords are most often criticized for operating (?) extensive livestock grazing latifundia.

Our interest need not be limited to the nature of the distribution of land among farms. We might also examine how the farm labor force is distributed vis-a-vis the land in use.[10]

Argentina	.466
Brazil	.436
Chile	.419
Colombia	.739
Guatemala	.520

A relatively high value suggests small farms apply relatively labor-intensive techniques and/or large farms use relatively labor-extensive practices.[11] Lower values reflect a lesser disparity by farm size in the man/land input ratio. Colombia would be a good example of the first situation, where coffee minifundia are intensively cultivated, while livestock latifundia absorb a very small labor force per hectare of natural pasture. A lower concentration measure would characterize a situation in which while there might be wide disparities in land-owning patterns, large farms were fragmented into small units operated by colonos, huasipungueros, allegados, etc., applying techniques similar to those used by minifundista owner-operators. Ecuador would probably be a good illustration of this situation, although there are no data available to prove this. As the relatively low figure for Argentina suggests, this measure does not indicate the level of technical advance in an agricultural sector, but it may reflect the degree of diversity of the techniques applied in agriculture, i.e., a relatively large number indicates highly diverse techniques, while a smaller number suggests more homogeneous techniques, whether they be retarded (e.g., Guatemala) or advanced ones (e.g., Argentina).

III. LAND AS AN ECONOMIC RESOURCE

The following data illustrate the rather wide disparities in yields and labor productivity among the various sizes of farms in these countries.[12]

	Output per Cultivated Hectare: Size Class				Output per Worker: Size Class			
	1	2	3	4	1	2	3	4
Argentina	6.2	3.2	3.8	3.0	30.9	77.6	145.7	192.3
Brazil	1.7	1.4	0.9	0.8	1.2	3.5	5.1	8.2
Chile	291	126	96	83	268	443	828	1171
Colombia	2.0	2.0	2.5	2.8	1.0	4.1	7.3	9.7
Ecuador	3.0	3.3	3.0	2.8	n.a.			
Guatemala	71	57	87	59	74	163	496	523

n.a. = not available

There is a definite tendency (except in Colombia) for small farms to outperform large ones in terms of yields, while the opposite is the case with respect to labor productivity. This might be accounted for as follows:

(1) For small farms, the land input is typically constrained, the operator must aim for at least subsistence output levels (unless he has a sufficient additional source of income), and is thus willing to apply additional units of his own and family labor to obtain this output; although the marginal product may be low, opportunity costs in the sense of alternative employment possibilities are probably much lower.

(2) For larger farmers, there is less pressure to obtain high yields, especially since the costs of leaving land idle versus extensively utilizing it are low (and land taxes may be nominal or less), while the application of additional labor does involve a cost in the form of wages, permission for workers to use a plot of hacienda land, increased vigilance by the administrator

(often not the owner), opportunity costs of additional capital which may be needed, etc.

These variations in performance levels are reflected in the following concentration measure based on the proportion of agricultural output provided by each size class of farm:

Argentina	.489
Brazil	.534
Chile	.688
Colombia	.513
Ecuador	.664
Guatemala	.636
United States	.428[13]

Chile, Ecuador and Guatemala stand out. The rather low figure for Colombia would probably be noticeably altered if it were possible to eliminate the impact of the numerous small coffee fincas in that country. The relatively high figure for Ecuador is perhaps owing to the small disparity in yield levels among farms in the various size categories, thus causing the distribution of output to follow closely the distribution of land in use.

The data provided by Barraclough and Domike also permit us to observe the distribution of output vis-a-vis the farm labor force among the various size classes of farms. The spread of this concentration measure is as follows:

Argentina	.298
Brazil	.232
Chile	.247
Colombia	.429
Guatemala	.451

A low figure reflects that there were no great disparities between the proportion of the agricultural labor force engaged on various size classes of farms and the proportion of output coming from those farms; a higher figure indicates relatively greater disparities.

IV. LAND AS A SOURCE OF INCOME

Much of the pressure for land reform derives from observation of the great disparities in the size distribution of farmland in these countries and the great differences in levels of living (or, alternatively, the very low levels of living) of the rural population. It is a short step to the conclusion that the latter owes to the former, but there has been little empirical verification of this hypothesis. Unfortunately, the data under discussion here allow no direct test of this land distribution-income distribution hypothesis. In part, this owes to the presentation of only the gross value of output, except in the case of Argentina, where the amounts given are value-added. However, by making a few reasonable assumptions we can arrive at least at a range of figures which suggest the nature of income distribution in the agricultural sector. This is done by obtaining the number of workers not of the owners' families on the larger units and assuming either (1) they are paid the average value of output of a person working on a family-sized plot, or (2) they are paid the average value of output of a person working on a sub-family (minifundia) plot. The resulting two measures appear below for several countries, followed by (column 3) the concentration measure for personal income in that country when it is available and (column 4) the percentage of gross domestic product originating in the agricultural sector (except in the case of the United States, where it is the percentage of gross national product).[14]

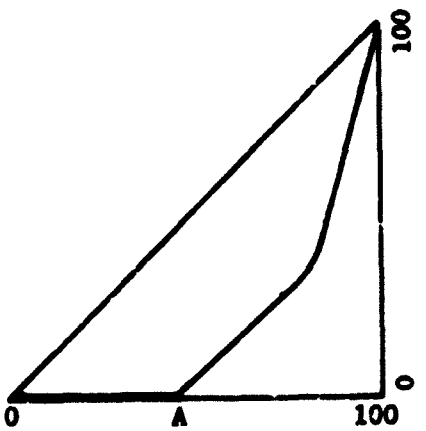
	(1)	(2)	(3)	(4)
Argentina	.30	.439	n.a.	13.4 (1961)
Brazil	.53	.594	n.a.	28.2 (1960)
Chile	.440	.555	.488 (1960)	9.2 (1963)
Colombia	.440	.493	.432 (1953)	31.1 (1962)
Ecuador	(15)	.498	.353 (1957)	37.7 (1963)
Guatemala	.495	.534	.436 (1947/48)	31.4 (1963)
United States			.348 (1952)	3.7 (1963)

n.a. = not available

The variation between columns (1) and (2) is appreciable for every country except Colombia and Guatemala. It is interesting to note that in Chile there does not appear to be a great difference between the country's overall income distribution and that which is suggested for the agricultural sector; our sectoral estimates bracket the economy-wide figure. In Guatemala, Ecuador and perhaps Colombia there may be a greater degree of inequality in the agricultural sector. And if we were to consider the income large landowners obtain from other sources than their haciendas, a much less likely occurrence for small owner-operators and the landless agricultural laborer, the concentration measures in (1) and (2) would be even higher. While even only suggestive, these figures are interesting. It may be that a highly unequal income distribution is the one most conducive to the saving and investment necessary for capital formation; but observation indicates that the Latin American large landowner often is not of this persuasion.[16]

V. LAND AS A SOURCE OF ECONOMIC AND POLITICAL POWER

In traditionally-oriented agrarian societies, such as one often finds in rural Latin America, farmland is not only a factor in the production process or a source of income. It also serves as a local, regional, or perhaps even a national power base. By examining the distribution of land between those who are relatively secure in their property rights (in this case, property owners) and those who are insecure (e.g., renters, sharecroppers, landless laborers) in their claim to a share in the bundle of land tenure rights, we might arrive at a suggestion of the extent of this power--reflecting, in part, what some might refer to as the "monopoly position" of large landowners. This measure is based on a variation of the Lorenz curve. On the abscissa is arrayed the economically active population in agriculture. Those with no rights or insecure or ephemeral rights in farmland (OA) are credited with a zero proportion of the characteristic (farmland) measured along the ordinate, while the remainder of the curve is constructed in the usual manner. The result is as appears below:



The power measure (1) for the countries we are discussing, together with (2) their degree of concentration of land in use (from Section II) and (3) the percentage of the economically active population in the agricultural sector which holds either no or only insecure or ephemeral rights to farmland are:

	(1)	(2)	(3)
Argentina	.853	.635	67.3
Brazil	.924	.722	71.5
Chile	.934	.817	55.2
Colombia	.883	.801	45.3
Ecuador	.807	.691	45.5
Guatemala	.860	.719	54.2

The dubious honor for first place goes to Chile, with Brazil a close second. Also with high values are Colombia, Guatemala and Argentina. In none of these countries has a vigorous agrarian reform program yet been undertaken, except for the aborted Guatemalan experience in the early 1950's. Relatively high power measures suggest that (1) if a government were to attempt to implement an agrarian reform program which would erode the power base of the rural elite, the latter would vigorously and perhaps with some high degree of success oppose it, and (2) a rural sector with a high proportion of (perhaps disenfranchised) elements with few or no material benefits or ties to the present order of things and encountering frustrations in the course of their "revolution of rising expectations," may be easily mobilized to vent their frustration and wrath on the small, probably easily identifiable <u>oligarquía latifundista</u>.

VI. CONCLUSION

In order to facilitate our closing discussion, we might draw together the more important concentration measures below:

	Argentina	Brazil	Chile	Colombia	Ecuador	Guatemala
Distribution of land in use	.635	.722	.817	.801	.691	.719
Distribution of rural income						
(1)	.330	.353	.440	.440	*	.495
(2)	.439	.594	.555	.493	.498	.534
Distribution of personal income	n.a.	n.a.	.488	.432	.392	.436
Distribution of power	.853	.924	.934	.833	.807	.860

*See footnote 15

n.a. = not available

It appears that agricultural income is not as highly concentrated as is agricultural land or power in this sector. It does seem to be the case, however, that higher income and/or power concentrations are characteristic of those countries which also tend to have higher concentrations of farmland. Our data are too inexact and our sample too small to come to a final conclusion on this question. Moreover, we might further investigate the power aspects of the relationship by examining the political and economic activities of the reigning members of the agricultural sector (i.e., the very large landowners) to observe the strategies they choose to achieve economic and political aims, the intensity with which these aims are sought, the obstacles or assistance from other economic and political sectors and the extent of their success or failure.

Might one of the Latin American countries which has experienced a land reform program provide some comparative information? Mexico is the only country with post-reform data available, and even it is very sparse. We find that in 1950 the concentration measure for

cultivated land is .310,[17] far below the figures above. If we separate out the land belonging to the ejidos and examine only the private sector, the figure rises to .581,[18] still below the preceding measures. (Officially, the Mexican government refers to the private sector as pequeñas propiedades--small properties.)[19] While we have no data on the distribution of income in the agricultural sector, for 1957 the economy-wide concentration measure is .486.[20] The agricultural sector accounts for about 18.2 percent of gross domestic product.[21] If the concentration measure for this sector's income distribution is close to the economy-wide figure, it would seem relatively high and in line with the figures we have observed above. The "lessons of the Mexican experience" are not precise or clearcut; her recent economic growth record has generally been an enviable one, although perhaps spotty with respect to some parts of the agricultural sector.

Appendix

Argentina (1963)

	% of farms	% of farmland	% of used farmland	% of cultivated farmland	% of agricultural labor force	% of agricultural output
Sub-family	43.2	3.4	3.5	6.6	30.5	11.7
Family	48.7	44.7	45.3	51.6	48.6	44.7
Medium Multi-family	7.3	15.0	15.3	24.2	14.5	26.3
Large Multi-family	0.8	36.9	35.9	17.6	6.4	15.3

Brazil (1950)

Sub-family	22.5	0.5	0.7	1.5	11.4	2.8
Family	39.1	6.0	6.6	12.1	26.0	18.5
Medium Multi-family	33.7	34.0	36.4	42.0	41.4	42.9
Large Multi-family	4.7	59.5	56.3	44.4	21.2	35.8

Chile
(1955)

	% of farms	% of farmland	% of used farmland	% of cultivated farmland	% of agricultural labor force	% of agricultural output
Sub-family	**11.4**	**0.2**	**0.5**	1.5	12.6	4.3
Family	**40.0**	**7.1**	**9.0**	11.6	27.6	15.6
Medium Multi-family	**16.2**	**11.4**	**15.0**	20.3	21.3	22.5
Large Multi-family	**6.9**	**81.3**	**75.3**	66.6	38.5	57.6

Colombia
(1960)

Sub-family	**64.0**	4.9	6.0	18.6	58.3	20.8
Family	**30.2**	22.3	23.0	44.3	30.3	45.2
Medium Multi-family	4.5	23.3	21.0	20.3	7.2	19.1
Large Multi-family	1.3	49.5	50.0	16.8	4.2	14.9

Ecuador (1954)

	% of farms	% of farmland	% of used farmland	% of cultivated farmland	% of agricultural labor force	% of agricultural output
Sub-family	**89.9**	**16.6**	**25.4**	35.6	n.a.	26.3
Family	**8.0**	**19.0**	**19.3**	24.8		32.9
Medium Multi-family	**1.7**	**19.3**	**18.1**	19.0		21.6
Large Multi-family	**0.4**	**45.1**	**37.2**	20.6		19.2

Guatemala (1950)

Sub-family	**88.4**	**14.3**	**22.5**	**30.1**	68.1	30.3
Family	**9.5**	**13.4**	**16.0**	16.3	13.4	13.2
Medium-Multi-family	**2.0**	**31.5**	**33.5**	28.7	11.9	35.6
Large Multi-family	**0.1**	**40.8**	**28.0**	24.9	6.6	20.9

Peru
(1961)

	% of farms (1961)	% of farmland (1961)	% of used farmland (1961)	% of cultivated farmland (1961)
Sub-family	88.0	7.4	8.7	36.7
Family	8.5	4.5	5.0	15.0
Medium Multi-family	2.4	5.7	5.5	11.5
Large Multi-family	1.1	82.4	80.8	36.8

Source: Barraclough and Domike, op. cit., p. 5 and Tables 9A, 10A, and 11A.

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

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

Medium Multi-family: Farms large enough to provide employment for 4 to 12 people.

Large Multi-family: Farms large enough to provide employment for more than 12 people.

FOOTNOTES

1. Evolution and Reform of Agrarian Structure in Latin America, ICIRA. These data are summarized in the Appendix.

2. T. F. Carrol, "The Land Reform Issue in Latin America," in A. O. Hirshman, op. cit., New York, The Twentieth Century Fund, 1961, pp. 161-201.

3. Oscar Delgado, ed., Reformas Agrarias en la América Latina, Mexico City, Fondo de Cultura Económica, 1965.

4. Social Progress Trust Fund, Fourth Annual Report, 1964, Washington, Inter-American Development Bank, 1965, p. 109. Of course, degree of implementation is an entirely different question.

5. Cf., A. D. Bilimovich, "Concentration of Agriculture in the United States," Economia Internazionale, Vol. XII, No. 3, August, 1959, p. 521. The formula used to calculate the concentration measure (C) is:

$$C = 1 - \frac{\sum_{i=1}^{n} f_i(A_{i-1} + A_i)}{10{,}000}$$

where:

f_1 = the percentage of farms in each size class (here $i = 1, \ldots, 4$)

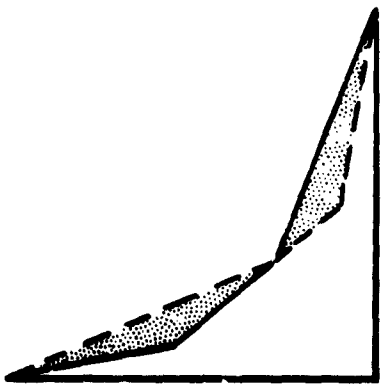
A_i = the percentage of land in all size classes up to and including class i.

6. We cannot use the orthodox Lorenz curve/concentration ratio procedure here, owing to the manner in which the data are presented by Barraclough and Domike. They would have to be available in this manner:

Size Class	Number Farms	Percent Farms	Area in Farms Acres	Cumulative Frequency
0-9	200	40	1,000	10
10-19	150	30	2,250	33
20-29	30	6	750	40
...	...	...	...	...
Total	500	100	10,000	

As the authors present the data, the farms are classified as sub-family, family, medium multi-family and large multi-family. (These groups are defined in the Appendix.) We here compare between several countries the distribution of land, labor force and output among farms as they have been classified in the ICIRA report. That we must resort to a variant of the orthodox Lorenz curve analysis should not detract from the interest of the results.

7. Of course, the result is not unique. Two Lorenz curves describing different distributions might have identical concentration measures if they intersected. Consider the two Lorenz curves traced by the solid and dotted lines in the following figure:



In the above figure, if the shaded regions are of equal area, the concentration measures will be equal, although the distribution of the characteristic is different for the two populations.

8. Latin American data are from Barraclough and Domike, op. cit.; U.S. data are from the Statistical Abstract of the United States, U. S. Government Printing Office, Washington, Table 874, p. 614.

9. Latin American data are from Barraclough and Domike, op. cit.; U.S. data are from 1959 Census of Agriculture: Vol.II, Statistics by Subject, U. S. Government Printing Office, Washington, 1962, Table 6, pp. 376-377. In the case of Colombia, improved pastures--about 14 percent of total pasture land--are not included, and for the United States the data are for cropland harvested. The Latin American figures include land in fallow.

10. This information is not available for Ecuador and Peru.

11. I.e., a small proportion of the land in use absorbs a large proportion of the labor force and vice versa.

12. Barraclough and Domike, op. cit., Table 10a. The various size classes are described in the Appendix. Values are thousands of national monetary units, except for Chile and Guatemala.

13. This is the figure for the sales of agricultural products vis-a-vis all farms in the United States. It was calculated from the 1959 Census of Agriculture, op. cit., Table 6, pp. 384-385. The figure for commercial farms which sell more than $2500 in agricultural products a year (and account for 95 percent of the total value of sales of agricultural products) is .397 (1959). (This last measure is calculated from the Statistical Abstract of the United States, 1965, Table 877, p. 617.)

14. Column (3) data sources:
U.S., Ecuador and Chile: U. N. Economic Commission for Latin America, The Economic Development of Latin America in the Post-War Period, Vol. II, E/CN.12/659/Add.1, April, 1963, pp. 124, 152, 153.

Guatemala and Colombia: Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations: VIII. Distribution of Income by Size," Economic Development and Cultural Change, Vol. XI, No. 2, Part II, Januray, 1963, p. 13.

Column (4) data sources:
Latin American countries: U. N. Economic Commission for Latin America, Boletín Estadístico de América Latina, Vol. II, No. 1, March, 1965, pp. 8, 17, 24, 43, 50, 64.

U.S. data: Economic Report of the President, Washington, U. S. Government Printing Office, January, 1964, Table C-8, p. 218.

For a discussion of income distribution in U. S. agriculture, see David H. Boyne, "Changes in the Income Distribution in Agriculture," Journal of Farm Economics, Vol. 47, No. 5 (December 1965), pp. 1213-1224.

15. This level of remuneration would more than exhaust the total value product of medium and large multi-family farms.

16. One of the few studies on this question is by Marvin Sternberg, Chilean Land Tenure and Land Reform, unpublished Ph.D. dissertation, University of California, Berkeley, 1962. Dr. Sternberg reports (pp. 83, 88) that in his sample large landlords devoted 80 percent of their income to consumption expenditures and classified 75 percent of these as "luxuries" (with a high proportion consisting of imported goods).

17. Comite Interamericano de Desarrollo Agricola, Inventario de la Información Básica para la Programación del Desarrollo Agrícola en la América Latina: México, Union Panamericana, Washington, 1964, p. 89.

18. Ibid., p. 89.

19. A curious title, for it includes some 10,500 farms averaging 7,700 hectares each. Cf. O. Delgado, op. cit., Cuadro 4.

20. U. N. Economic Commission for Latin America, The Economic Development of Latin America in the Post-War Period, Vol. II, p. 154.

21. U. N. Economic Commission for Latin America, Boletín Estadístico de América Latina, Vol. II, No. 1, March, 1965, p. 88.