AN ANALYSIS OF LAND DISTRIBUTION AND CONCENTRATION IN BOLIVIA

By

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TABLE OF CONTENTS

Page

LIST OF TABLES v

LIST OF FIGURES vii

LIST OF MAPS viii

Chapter

I. INTRODUCTION 1

A. Problem Statement 3
B. Objectives of the Research 6
C. Data Collection 7
D. Organization of the Research 13

II. MEASURES OF LAND CONCENTRATION 15

A. Use of Lorenz Curves and Measures of Land Inequality 16
B. Limitations of Gini Coefficients and Lorenz Curves 19
C. Empirical Evidence of Land Concentration 21
D. Mathematical Model to Measure Land Concentration 22

III. BOLIVIA'S BACKGROUND 26

A. Location 26
B. General Economic Indicators 26
C. Geography 28
D. Government Division 32
E. Climate 32
F. Population 34

IV. METHODOLOGY USED TO APPROXIMATE LAND CONCENTRATION ACCORDING TO ECOLOGICAL REGION 41

A. Land Cover and Land Use 42
B. Land Concentration by Ecological Regions 46

Page

V. REVIEW OF LITERATURE 51

A. Levels of Land Concentration in Latin America 52
B. Problems of High Levels of Land Concentration 53
C. Definition of Land Reform 54
D. Importance of Farm Size Distribution . 59
E. Land Fragmentation 62
F. Some Considerations with Respect to Income Distribution 63

VI. BOLIVIA'S STRUCTURAL TRANSFORMATION 67

A. The Pre-Reform Period 67
B. The Post-Reform Period 70
C. Evolution of Bolivia's Agricultural Sector Since the Land Reform 78

VII. BOLIVIA'S AGRARIAN STRUCTURE 92

A. Land Distribution in Bolivia 93
B. Results of the Second Agricultural Census 98
C. Land Use by Ecological Region 99
D. Rural Population by Ecological Region 107
E. Migration to the Subtropical Regions. . 112
F. Farm Size Distribution 119
G. Land Concentration 135
H. Measures of Inequality 141

VIII. CONCLUSIONS AND RECOMMENDATIONS 149

IX. BIBLIOGRAPHY 153

LIST OF TABLES

Tables		Page
1	Population Growth in Latin America	38
2	Life Expectancy at Birth in Latin America	39
3	Life Expectancy in Bolivia	39
4	State Area of Land Cover and Land Use by Altitude Parameter	44
5	Land Concentration in Latin America	53
6	Size of Holdings According to Bolivia's Agrarian Law	75
7	Share of the Agricultural Sector in the GNP	77
8	National and Foreign Settlement in Bolivia's Lowlands	80
9	Land Distribution from 1955 to 1980 by States in Bolivia	94
10	Land and Titles Distributed in the State of Santa Cruz	96
11	Distribution of Holdings and Land by Altitude Parameters	99
12	Land Use and Number of Holdings by Ecological Region	100
13	Cultivated Area of Main Crops in Bolivia	104
14	Cultivated Area Since the Pre-Reform Period	105
15	Rural Population in Bolivia by Ecological Region	108
16	Animal Population by Ecological Region	113
17	Type of Landholding in the Highlands and Valleys	118
18	Farm Size Distribution in 1950 and 1984	122
19	Landless and Near-landless Units by Ecological Region	132

		Page
20	Farm Size Distribution in Bolivia by Ecological Region	133
21	Proportion of Land and Holdings by Ecological Region	136
22	Average and Weight of Land and Holdings by Ecological Region	138
23	Land Concentration in Bolivia by Ecological Region	143
24	Number of Provinces and Levels of Land Concentration by Ecological Region in Bolivia	144
25	Farm Size Distribution of Crop Land by Ecological Region	148

LIST OF FIGURES

Figures		Page
1	Objectives of the Research	8
2	Lorenz Curve	17
3	Rural and Urban Population in Bolivia	35
4	Land Cover and Land Use in Bolivia	47
5	Production of Coca Leaves in Bolivia	85
6	Land Use for Coca Leave Production	88
7	Land Distribution from 1955 to 1980 in Bolivia	94
8	Cultivated Area Since the Pre-reform Period	106
9	Distribution of Holdings, Land and Rural Population in Bolivia	110
10	Bimodal Structure of Farm Size in Bolivia	111
11	Land Concentration in the Pre-reform Period	123
12	Land Concentration in the Post-reform Period	123
13	Farm Size Distribution of Total Land in the Highlands	138
14	Farm Size Distribution of Total Land in the Valleys	138
15	Farm Size Distribution of Total Land in the Rest of the Lowlands	138
16	Farm Size Distribution of Total Land in the Integrated Area of Santa Cruz	138
17	Farm Size Distribution of Crop Land in the Highlands	140
18	Farm Size Distribution of Crop Land in the Valleys	140
19	Farm Size Distribution of Crop Land in the Rest of the Lowlands	140
20	Farm Size Distribution of Crop Land in the Integrated Area of Santa Cruz	140

LIST OF MAPS

Map		Page
1	Topography and Ecology of Bolivia	29
2	Bolivia by Ecological Region	49
3	Rural Population Density in Bolivia	130

CHAPTER I

INTRODUCTION

Despite the implementation of Bolivia's land reform in 1953, the agrarian structure continues to have an extreme concentration of land. Furthermore, in the last two decades regional agrarian structures have been aggravated by population pressures and a lack of new technological practices for most small scale farmers and peasants. Public and private institutions and urban residents observe hundreds of landless and near-landless families in the cities searching for jobs. Most end up becoming part of the growing unemployed labor force in the urban sector.

The lack of industrialization policies to create job opportunities for the rural population and the explosive population growth in some rural area has contributed to the increasing levels of poverty among Bolivia's peasantry. Since a considerable proportion of the population increase must be absorbed by the agricultural sector, this has had a disadvantageous effect on those who are dependent on agriculture. Meanwhile, biased distribution of land has contributed to a reduction in the size of the land holding of most peasants in the subsistence or traditional sector. Many land holdings are becoming smaller, sometimes leading

to small scattered strips, while in other areas there is a gradual depletion of soil fertility due to exhaustive methods of production. It is believed that the demographic pressure is increasing so much that farming methods employed are causing environmental deterioration, such as soil exhaustation and erosion, with all the attendant effects on production. This land fragmentation has led to significant decreases in income of most family production units.

At the same time, tenure conditions are becoming less favorable for small farmers and peasants, since landowners are placed in a stronger position relative to the peasants. Furthermore, agricultural land prices in the lowlands and new frontiers have been increasing, which makes land more attractive for capitalists to buy as investments. With the difficult access to land, the high population growth rates in some areas, and the extreme concentration of land, Bolivian peasants are unable to make a living on their own and are forced to find employment as farm or urban laborers. As a result, wages have stagnated or even fallen through the years, while unemployment has risen dramatically.

While Bolivia has experienced a radical and highly publicized land reform, in the last four decades old inequalities and insecurities are reappearing. The family smallholding system with private ownership has lead to intense subdivision and fragmentation of land in the highlands and valleys. Furthermore, yields of most cash

crops are low in comparison to other Latin American countries. Research and extension have been practically nonexistent throughout the last two decades. Credit has been highly subsidized and concentrated among large scale enterprises. Substitution of illegal crops (coca leaves) has been increasing due to the lack of labor opportunities and agricultural incentives. Peasants are being pushed off their land in some prominent agricultural areas by large scale farmers, irrespective of the land markets and agrarian laws.

Under these conditions, poverty among Bolivia's peasantry continues due to the lack of coordinated development strategies in the agricultural sector. Two of the leading causes of this rural poverty is the lack of access to sufficient land for the peasantry and land distribution patterns that have arisen in the last two decades. Therefore, studies of land concentration, which has a direct relationship with the distribution of wealth in the rural economy, must be a priority in order to develop the sector.

A. PROBLEM STATEMENT

In Latin America, only in Mexico (1910), Bolivia (1953) and Cuba (1959) were redistributions of property rights in land precipitated by social revolutions. Bolivia's land reform attacked the inefficiency and inequity of the

hacienda system, but since subsequent policies failed to sustain productivity growth among the small scale farmers, the effect on the peasantry was muted. Moreover, most of the land in Bolivia's lowlands was given after the land reform to large scale enterprises for livestock raising and forestry.

From the first agricultural census (1950), it was inferred that Bolivia had the highest land concentration ratio in South America and possibly in the world[1]. One of the basic aims of post-1953 Bolivian agricultural policy was to guarantee peasants land titles and to eliminate extreme sizes in land holdings. After the land reform was decreed, the revolutionary government attempted to redistribute land according to the new specifications of the agrarian law, under which maximum and minimum size holdings ranged widely according to ecological regions. However, after a short period of time the peasantry redistributed ipso-facto most of the ex-haciendas in the highlands and valleys without the technical supervision of the government. In the lowlands anomalies began to prevail throughout the year, leading to the coexistence of large scale farms with small family units.

However, many scholars believe that in the highlands

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[1] According to the figures provided by the first agricultural census in 1950, the Gini concentration ratio before the land reform was 0.94.

and valleys there is a high peaked unimodal pattern in which farms are relatively uniform in size. This would ensure low levels of land concentration in the highlands and valleys. Scholars believe that only in the integrated area of Santa Cruz there is a bimodal pattern in which significant number of farms are found at both extremes of the size continuum. Meanwhile, in other tropical regions, such as the Beni plains, Brazilian Shields and Bolivia's Chaco, land distribution is more skewed among medium and large scale farmers.

In general it is believed that the subsistence or traditional agricultural sector has low levels of land concentration, while farm size distribution in the lowlands is evenly divided among large and medium scale enterprises.

Most policy documents address the fact that the highlands have an average of 2.5 hectares per holding and that most holdings tend to be equally distributed within peasant community boundaries. Same farm size distribution characteristics are also generalized for the valleys. Meanwhile, the farms in the lowlands are described as medium and large export-oriented. In this region farmers combine labor-saving technology with family labor from small holdings scattered around and migrant workers from other regions.

In order to have a better understanding of Bolivia's agrarian structure, it would be useful to question if

unimodal farm size patterns can properly describe the agrarian structures in the highlands, since it is known that most communities did not redistribute land according to the stipulation of the agrarian law. This research questions the unimodal patterns addressed by most scholars in the traditional sector and proposes the existence of bimodal patterns and consequently high levels of land concentration by ecological region and by provinces in Bolivia.

B. OBJECTIVES OF THE RESEARCH

In order to describe Bolivia's agrarian structure, this research intends to show that according to the latest agricultural census, different farm size distributions can be found all around the rural area, which leads to different levels of land concentration.

The main objective of this study is to provide partial information about the actual agrarian structure in order to provide a useful summary for research institutions and scholars to encourage better understanding of Bolivia's agricultural development.

The paper will (1) measure land concentration in Bolivia; (2) desegregate data on size and number of holdings according to ecological characteristics; (3) clarify the importance of policies with respect to the size of holdings; (4) summarize findings related to the size of farm holdings in Bolivia and their implication for agricultural

development: and (5) explain the causes and possible effects of land concentration in Bolivia (see Figure No. 1)

C. DATA COLLECTION

While the implementation of land reform in Bolivia was reported, no data were made public on the distribution of land. Data released by the Consejo Nacional de Reforma Agraria (CNRA) related only to the number of beneficiaries of land redistribution. Data regarding increasing population pressure in some areas, land transfers within and outside the market, data about ownership, size and number of landholding contained in government records remain protected from public scrutiny[2].

The lack of clarity on changes in patterns of landholding over the last three decades and highly generalized statements on land distribution have been accepted by many as a basis for persistent demands for new agricultural policies emphasizing labor saving technology. However, the deepening dualism of the agrarian structure and the incapacity of the Bolivian economy to generate sufficient employment opportunities to absorb the surplus rural labor force has motivated a lengthy debate among

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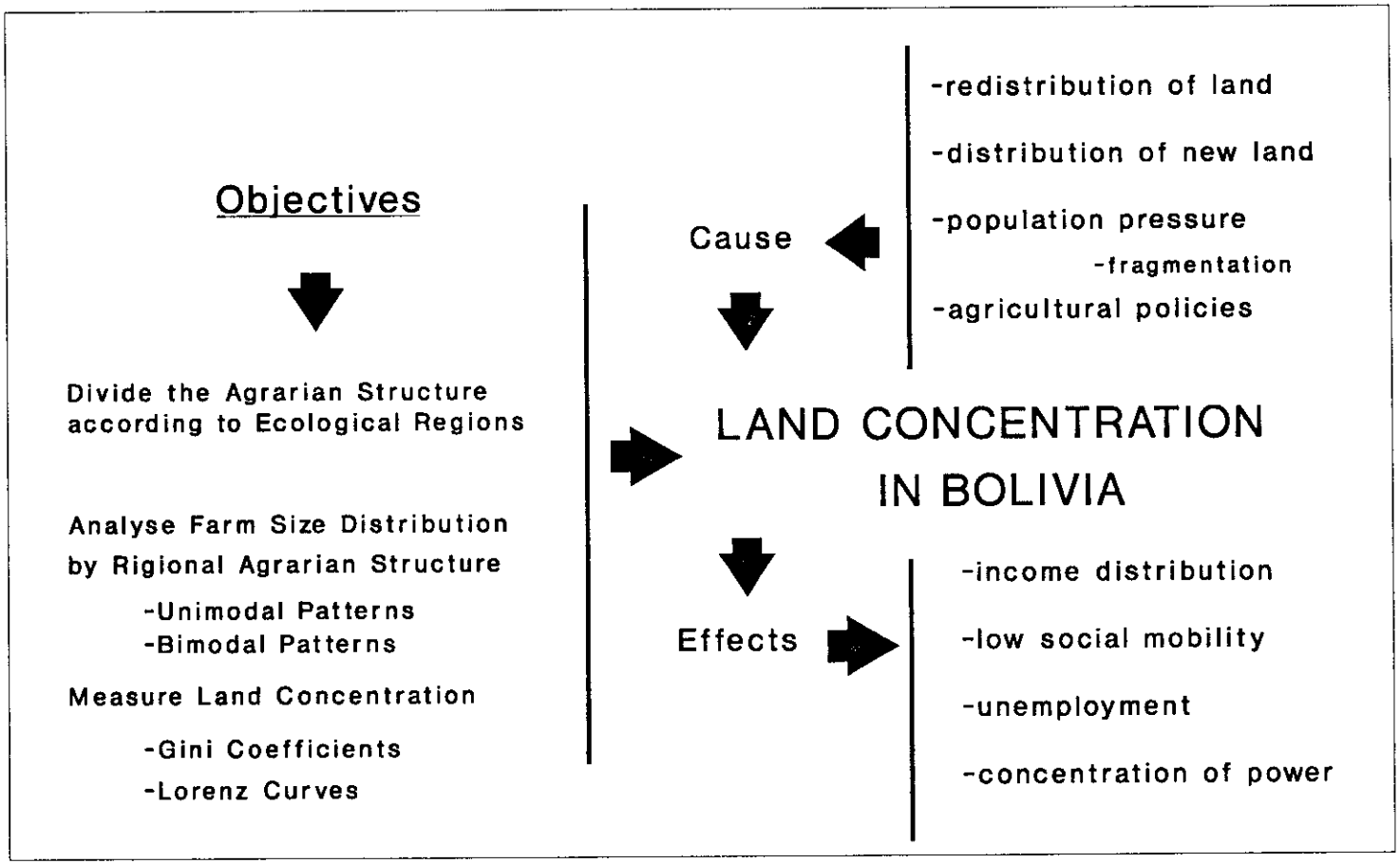
[2] The last case reported by the Bolivian Justice Department discusses on land transfers involving former president Garcia Meza (1980-1982). Public documents show land adjudication of 93,668 hectares to government officials and himself before the return to democracy in Bolivia. (Newspaper HOY International, June 10, 1990).

Figure 1
Objectives of the Research



government and rural organizations.

In order to clarify the agrarian structure, the Bolivian government carried out an agricultural census in 1984, publishing final results in 1987 and 1988. Due to extreme political instability, the foreign debt situation, drug trafficking, inflation and consequently unemployment, the data obtained from the state of Beni was inaccurate while no data was obtained from the State of La Paz. Furthermore, the census could not reach the objective of quantifying output by size of holding due to the budget constraints and political situation in the country. Thus, the information collected shows only a partial picture of Bolivia's agrarian structure.

Since the publication of the 1984 agricultural census, few research studies have been done on Bolivia's agricultural sector. A systematic study of Bolivia's agrarian structure has not appeared. Neither has there been any analysis of land concentration or land distribution. It is my intention to present a preliminary analysis of land concentration and land distribution in Bolivia.

This study uses secondary information about the size of holdings in Bolivia, based on official statistics as published in public documents. Most of the information comes from the final results of the first (I-CNA) and second agricultural census (II-CNA) carried out in 1950 and 1984, respectively. Empirical findings from previous studies

conducted by public and private institutions, and international organizations such as FAO, World Bank and USAID in Bolivia are used as well.

1. Limitations. In terms of the data used, both agricultural censuses have several limitation. The first census was organized and executed between 1946 and 1950 when Aymara and Quechua indians were in direct confrontation with the rural elites (Rivera 1986). Financial and technical difficulties were numerous[3]. Bolivian institutions did not have experience in monitoring censuses. Resources allocated were insufficient and prolonged meetings and negotiations between public and private institutions were necessary in order to guarantee the execution of the census[4]. As the former director of the census recalls, most hacendados were skeptical about the agricultural census and its potential

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[3] At first, the questionnaire was designed according to different ecological zones and languages used. However, due to financial difficulties faced by all public institutions, it was agreed that the same general questionnaire would be used for all regions and only one pre-test would be done near the main city of La Paz.

[4] The intention was to have enumerators from each geographic region, since they were familiar with the zone. However, the personnel assigned by each region proved to represent more the interests of the rural elites and were backed up by political parties. After several conflicts between the government and private institutions, the census was postponed until 1950. By September of that year eight departments out of nine began the census. The department of La Paz was delayed due to resistance of the most active peasant communities in the northern and central Altiplano. See Zenteno Pereira, Hernan. I Censo Agropecuario en Bolivia. Ministerio de Hacienda, La Paz 1950.

benefits for agriculture policy (INE 1985).

The 1984 agricultural census was plagued by different problems. Since 1980, the Bolivian economy had been suffering the consequences of political instability and economic crisis. The government attempted to ease the problem with a series of economic programs beginning in 1982. First, a 75 percent devaluation of Bolivia's currency, the Peso, was combined with 100 - 500 percent price increases on food and fuels. Most economic programs faced considerable opposition in the urban and rural areas.

In order to guarantee political alliance between peasant unions (sindicatos) and the urban workers, the main labor organization, Confederacion Obrera Boliviana (COB), declined to cooperate with the government and, hence, with the National Institute of Statistics (INE) and the Ministry of Agriculture and Peasant Affairs (MACA). After weeks of negotiations, most peasant unions allowed the government to continue with the census. Only the La Paz peasant union refused to cooperate with the government. Thus, the government executed the task in only eight out of nine states.

What made the negotiations and implementation of the census even more difficult was a natural disaster which occurred in 1983. The El Nino current, a Pacific ocean weather phenomenon, brought flooding to the lowlands and drought to the highlands. As a result, total farm output was

only 82 percent of the 1974 - 1976 average. Peasants requested more subsidies on fuel prices and a 30 percent increase in public investment in rural areas in order to counteract the effects of the natural disasters. The request was never met, however, and the political relationship between the organized peasantry and the government proceeded to deteriorate. Thus, the census was carried out during one of the most critical moments of Bolivia's economic history.

Drug trafficking was also a variable which affected the quality of the latest census. Most large-scale farms in the Beni area did not cooperate with the government because there was fear that the government would tax land or count the number of cattle in order to measure the wealth accumulated by the hacendados through drug trafficking. For this reason, the size of landholding and number of cattle reported were not accurate in this area. This further reduces the number of states accurately censuses.

Another limitation to this research is the few bibliographic references found during the research process. Most literature about Bolivia's agricultural sector was published before 1980. Detailed studies of the agrarian structure since then are hard to find. The same problem applies to basic agricultural statistics. In order to fill the information gap, data from several bulletins from the National Institute of Statistics (INE), the Central Bank (BCB) and Ministry of Agriculture and peasant Affairs (MACA)

were requested from Bolivia. However, part of the statistics are preliminary data, especially since 1987.

D. ORGANIZATION OF THE RESEARCH

The research will be divided into eight chapters. The second chapter covers the statistical model used to measure land concentration. Theoretical considerations are discussed concerning Lorenz curves and Lorenz areas (Gini coefficient ratios). The model used has been adopted from Nygard and Sandstrom (1981) and Kakwani and Podder (1980) papers dealing with income distribution and measures of inequality.

The case study begins in Chapter Three. This chapter highlights general economic characteristics of Bolivia's economy and agricultural sector, important ecological characteristics, population and climate.

The fourth chapter explains the methodology used to divide Bolivia's agrarian structure by ecological regions.

Chapter Five addresses some theoretical considerations related to land concentration and land reforms. This is presented in order to highlight the importance of the distribution of land in the process of agricultural development.

Chapter Six is a brief description of Bolivia's structural transformation. The main characteristics of the agricultural sector before and after the National Revolution and consequent land reform are addressed. Finally, the

performance of the agricultural sector during the structural transformation process and the actual problems faced by peasants, farmers and government in the agricultural sector is discussed.

Chapter Seven summarizes the results of Bolivia's second agricultural census and measures of land concentration. Tabulation of other variables such as population density, number of landless peasants and other rural variables will also be presented.

Finally, chapter Eight summarizes the research and highlight some conclusions about land distribution and concentration in Bolivia.

CHAPTER II

MEASURE OF LAND CONCENTRATION

This paper focuses primarily on issues of land concentration. Questions concerning the measurement of income distribution are not addressed. There are two reasons for this omission. First, such questions are too difficult to answer in Bolivia since there is a lack of statistics and most explanations, which are technical in nature, can only be properly addressed in specialized papers put together by multidisciplinary teams. Second, the level of analysis in this paper does not warrant detailed calculation of the effects of land concentration. The primary objective is to measure the degree of land concentration in Bolivia and the consequences of land distribution and redistribution through the process of land reform.

However, it is necessary to make clear the process by which land concentration can affect the distribution of income in the rural areas. It is also essential to be aware of the causes and effects of land concentration on the development of the agricultural sector. This is addressed in further chapters.

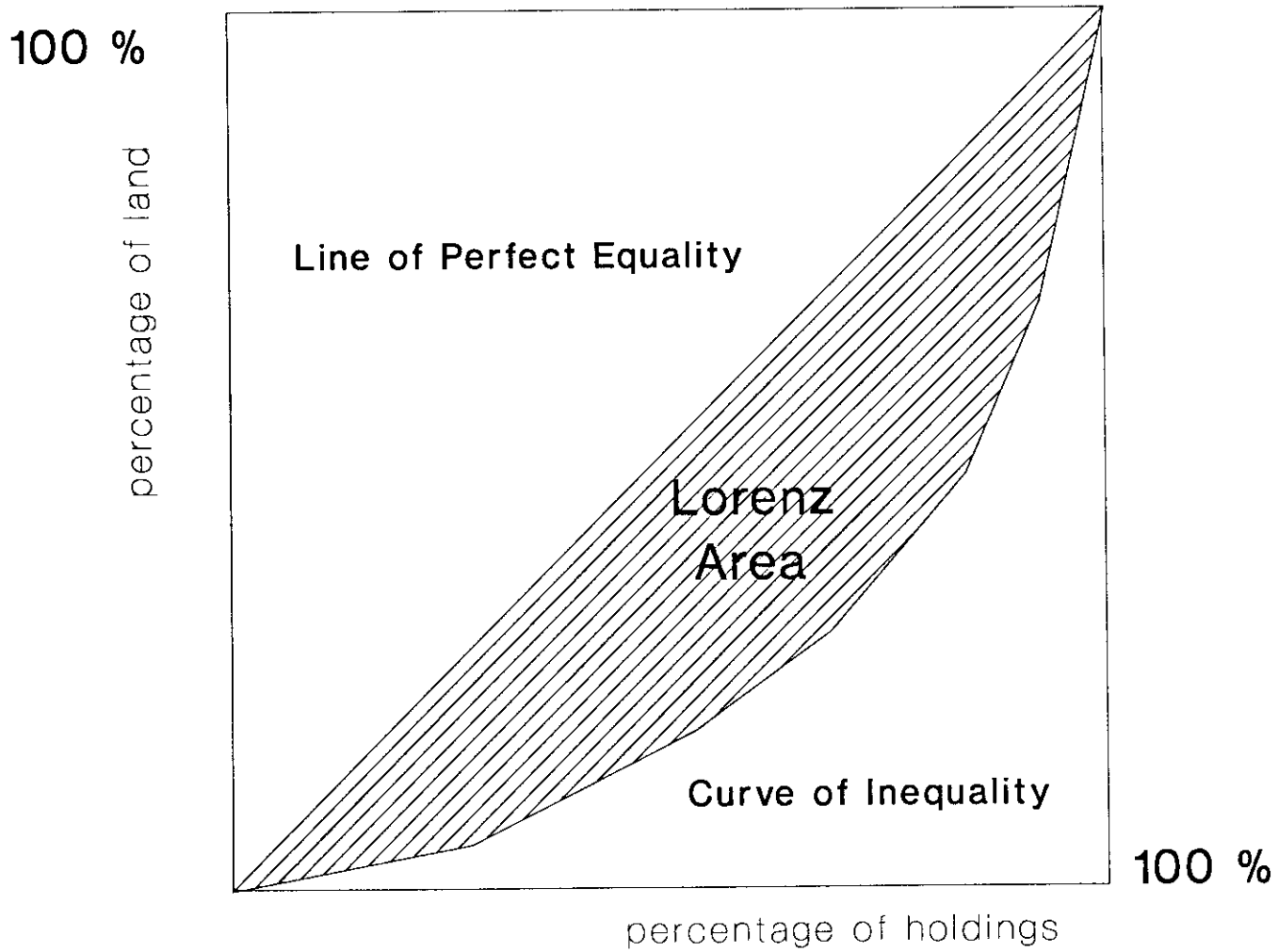
A. USE OF LORENZ CURVES AND MEASURE OF LAND INEQUALITY

Before describing characteristics of Bolivia's agrarian structure, it might be helpful to note the way in which the index of land concentration reported in further tables were calculated. Various measures exist which can be adopted to measure income or land inequality, including the Lorenz Curve (1905), Gini (1909), Mehran (1976), Piesch (1975), Bonferoni (1975) coefficients, and the Schultz (1951) index. Of these measures, the Lorenz curve and the Gini concentration ratio are most commonly used.

1. Lorenz Curves. The Lorenz curve involves the use of an arithmetic scale which, as a starting point, begins with the assumption that all holdings have the same size of land area. In other words, equality in the distribution of land is attained when every landholding consists of an equal share of the total land area.

In using a Lorenz curve, the curve of absolute equality would actually be a straight line extending upward from left to right, showing the percentage holdings on the horizontal axis (X axis) and the respective percentage of land on the vertical axis (Y axis). Any departure from this line is a departure from complete land equality (see Figure No. 2).

Figure 2
LORENZ CURVE



The measure of the degree of inequality in land distribution is represented by the concavity of the Lorenz curve relative to the straight line indicating complete equality. The concavity is nothing other than the cumulative proportion of the holdings ordered along the horizontal axis against the cumulative proportion of total land distributed among the holdings.

2. Gini Concentration Coefficients. Through the use of a measure of concavity, it is possible to avoid reliance solely on visual comparisons of Lorenz curves in order to draw inferences with respect to land distribution. This measure is called the Gini concentration coefficient.

The Gini coefficient is a ratio of (a) the area on a graph that lies between the Lorenz curve and the egalitarian line (or the line of perfect equality, which forms a 45 degree angle with both the X and Y axes) to (b) the area of the entire triangle formed by the egalitarian line and the X and Y axes. As a measure of land concentration, the Gini coefficient ranges from 0 to 1, the larger the coefficient, the greater the inequality. Thus, 0 represents perfect equality and 1 represents perfect inequality. If perfect inequality existed, the Lorenz curve would run the length of the horizontal axis and then rise vertically.

Hypothetically only two extreme distributions may occur: (a) The EGAL distribution, where all land area is

equally distributed. This is a egalitarian definition of an equitable distribution; and (b) The CON distribution, where one holding contains all land and the remaining holdings contain no land (Nygard and Sandstrom 1981). In summary, the Gini coefficient measures the area between the Lorenz curve and the 45 degree angle line and addresses how far the land distribution of holdings is from equality.

In this paper, the Gini coefficients were calculated based on the Nygard and Sandstrom Lorenz curve and Lorenz area for discrete cases[5], and Kakwani and Podder estimations for grouped observations[6].

B. LIMITATIONS OF GINI COEFFICIENTS AND LORENZ CURVES

An obvious weakness with the Gini coefficient is that this measure fails to recognize the difference in land quality. Differences in crop, inputs per hectare of labor, slope, terrain, irrigation or drainage can make vast differences in the production capacity per hectare (Lipton 1987). At the same time, under the definition of "holding unit" the nature of ownership is not specified. These dimensions constitute critical data for a better understanding of any agrarian structure.

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[5] See Nygard, Frederik and Arne Sandstrom. Measuring Income Inequality. Almqvist & Wiksell International, Stockholm 1981.

[6] See Kakwani, N.C. and Podder N. "On the Estimation of Lorenz Curves from Grouped Observations" in International Economic Review, Vol. 14, No. 2, June, 1973.

With respect to the concavity of the curve, in any Lorenz curve graph it is possible to show two or more distributions irrespective of being from different countries, dimensions or times. However, as Lambert (1989) has pointed out, it is important to address the fact that we are talking only about Lorenz curve inequality. Two distributions can be identical in every respect, except for the fact that the land in one is double the corresponding land distribution of the other. It is possible to have identical Lorenz curves within one graph, but the graph may vary drastically in absolute terms[7].

Because the Lorenz curve displays the deviation of each individual or group of units from perfect inequality, the curve can be used as a criterion for ranking land distribution. However, the ranking provided by the curve is only partial. When the Lorenz curve of one distribution is strictly inside that of another, it can be safely concluded that the first distribution is more equal than the second. But when two Lorenz curves intersect, neither distribution can be said to be more equal than the other. The only conclusion derived by this situation would be that one curve shows more inequality at the bottom, and less at the top (Lambert 1989).

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[7] See Lambert, J. Peter. The Distribution and Redistribution of Income: A Mathematical Analysis. Basil Blackwell, (p. 33) Great Britain 1989.

C. EMPIRICAL EVIDENCE OF LAND CONCENTRATION

Empirical evidence of land concentration has been compiled by Charlotte E. Lott[8] . The publication consists of tables listing the number and area of agricultural holdings classified by holding size all around the world. However, a word of caution must be said about these statistics. As the introduction of this document admits, the author has not checked the accuracy of the figures. Second, most figures are compiled from a variety of sources. Third, the definition of farms or holdings varies according to each country. Thus, data is not necessarily comparable among countries because of the various definitions of holdings and land. Fourth, using the number and area of holdings does not always accurately reflect the number of people dependent upon agricultural land. Fifth, the figures do not necessarily include landless peasants, who may be a large percentage of the total rural population in each country. Finally, the data does not distinguish between private property and communal holdings where the holding may support one or more families.

Empirical evidence shows that crop land in other Latin American countries tends to be less concentrated than pasture or marginal lands (Eckstein et. al 1978). According

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[8] See Charlotte E. Lott, Land Concentration in the Third World: Statistics on Number and Area of Farms classified by size of Farm. Land Tenure Center, University of Wisconsin, Madison 1978.

to these authors, crop land tends to be more valuable on the market, therefore, the Gini concentration ratio would overstate the level of concentration of landed wealth in such cases.

Taking into account these limitations, the model will use the landholding definition used by the second agricultural census in Bolivia, which excludes communal landholding. The definition assumes that agricultural activities are strictly under the supervision of the family unit and final output is not shared with other production units. With respect to pasture land, this assumption may not be true. Most pasture land in Bolivia's highland is shared among the peasants for grazing activities. However, the figures of the agricultural census show crop, pasture and forest land under the supervision of the family or production unit. Thus, Gini ratios will indicate if the distribution of land is concentrated among few holdings with respect to total land, and the same coefficients indicates the degree of concentration of crop land and pasture land by ecological region.

D. MATHEMATICAL MODEL TO MEASURE LAND CONCENTRATION

The second agricultural census in Bolivia is presented and published in a condensed form. Therefore, in order to measure the degree of land concentration we have to calculate estimates by using grouped data. The landholdings

have been already grouped and ordered into 13 unequal class intervals measured in hectares. The last interval is open-ended. The holding units are defined as "any land area used partially or totally for agricultural purposes measured in hectares without taking into account the tenure system and ownership of such area. The land area is under the responsibility of only one person" (II-CNA 1984).

We can estimate the Lorenz curve (LC) and the Lorenz area (LA) from grouped data using Nygard and Sandstrom approach. First, it is necessary to know the number of landholdings, each with its respective land area grouped in k mutually exclusive group boundaries $[a_i - b_i]$ or class intervals where $i = 1, 2, \ldots, k$, $a_1 \geq 0$, $a_i < b_i$ and $b_k < \infty$.

Class intervals	Holdings	Hectares
$[a_1 - b_1]$	$Y(i=1)$	$Y(j=1)$
$[a_2 - b_2]$	$Y(i=2)$	$Y(j=2)$
.	.	.
.	.	.
.	.	.
$[a_k - b_k]$	$Y(i=k)$	$Y(j=k)$
Total	$\sum_{i=1}^{k} Y(i)=N$	$\sum_{j=1}^{k} Y(j)=L$

The notation Y(j) means the corresponding rank-ordered land area, i.e. $Y(1) < Y(2) < Y(3) \ldots < Y(k)$ and by Y(i) the corresponding rank-ordered number of units or landholdings. The sum of Y(i) and Y(j) will give us the total number of holdings (N) and total hectares (L) in a specific area. The corresponding frequency functions are $f_i = i/N$ and $f_j = j/L$ where i and j are the number of

units and hectares in each class interval.

The cumulative distribution functions are defined as F Y(i), F Y(j). Once the cumulative frequencies are calculated, we plot two different points and connect them by straight lines. These points are [F Y(j), F Y(j)] and [F Y(i), F Y(j)]. Since $N < \infty$ and $L < \infty$, the Lorenz curve can be defined by adding one more point (k + 1). The point to be added is [F Y(i=0), F Y(j=0)] = (0,0). Then the first expression becomes the perfect equality line and the second expression is nothing else than the cumulative proportion of land against the cumulative proportion of holdings which will be called F1 Y(i) and is known as the Lorenz curve.

In order to estimate Gini coefficients we must first define the Lorenz area. The LA is nothing else than the area between the perfect equality line and the Lorenz curve. This can be written in several ways. The LA for the egalitarian line equals zero and the LA for the entire triangle formed by the 45 degree angle and the two axes (the CON distribution) equals 1/2(1-1/k), which clearly depends on k. A normalized LA can be defined by $LA^* = (k/k-1)LA$. Hence, the LA and LA^* are defined at [0, 1/2(1-1/k)] and [0, 1/2] respectively.

The following expression gives a simple interpretation of the Lorenz area:

$$LA = 1/k \sum_{i=1}^{k} A(F\ Y(i))$$

where

$$A(F\ Y(i)) = F\ Y(i) - Fi\ Y(i).$$

The normalized equivalent of the Lorenz area is:

$$LA^{*} = (k/k-1)LA$$

$$= (k/k-1) * \{(1/k)\sum_{i=k}^{k} F\ Y(i) - Fi\ Y(i)\}$$

The concentration ratio was defined by Gini as the ratio between the actual LA and the CON distribution which is half of the total area of the square:

$$G = LA/(1/2)$$

$$= 2LA$$

Since the Gini coefficient equals twice the Lorenz area, but $G \in [0,\ 1-1/N]$, we must normalize the gini coefficient so that $G^{*} \in [0,1]$. This new expression will be:

$$G^{*} = 2LA^{*}.$$

CHAPTER III

BOLIVIA'S BACKGROUND

A. LOCATION

Bolivia is a landlocked country located in the center of South America with an land area of 1,098,581 square kilometers, roughly the size of California and Texas combined. It shares borders with Peru, Brazil, Paraguay, Argentina and Chile. The geographic features provide the country with its major asset in terms of climate, soils, and minerals, but mountainous topography constitutes the most serious obstacle for the exploitation of these assets.

B. GENERAL ECONOMIC INDICATORS

The World Bank classifies Bolivia as a middle-income economy with a GNP per capita of $US 570. Gross Domestic Product (GDP) grew at a rate of 4.5 percent from 1965 to 1980. From 1980 to 1988 the GDP has decline with an average of -1.6 percent per year. Agriculture constitutes one of the most important sectors in the economy. In 1988 this sector shared 24 percent of the GDP and employed about 60 percent of the labor force. From 1965 to 1980 the agricultural sector increased at an average growth rate of 3.8 percent. From 1980 up to 1988, the sector growth rate declined to 2.1

percent (World Bank 1990). Due to political instability, inflation, natural disasters and the implementation of structural adjustment policies in order to correct major distortions inherited from different military governments, in the last decade the rate of growth in the agricultural sector has declined faster than the population growth rates.

The agricultural sector can be divided in a subsistence or traditional sector, which has 83.1 percent of the rural population, and a commercial sector with 16.9 percent. Each sector has different characteristics. The traditional sector is usually located in the highlands and valleys. This sector is characterized by small family units that rely on their own production and most units do not hire labor. Market surpluses are small and trade is usually done in regional markets. Since the agricultural activity does not ensure the family's subsistence, Households constantly search for job opportunities throughout the year. This leads to national and international rural - rural migration as well as rural - urban migration.

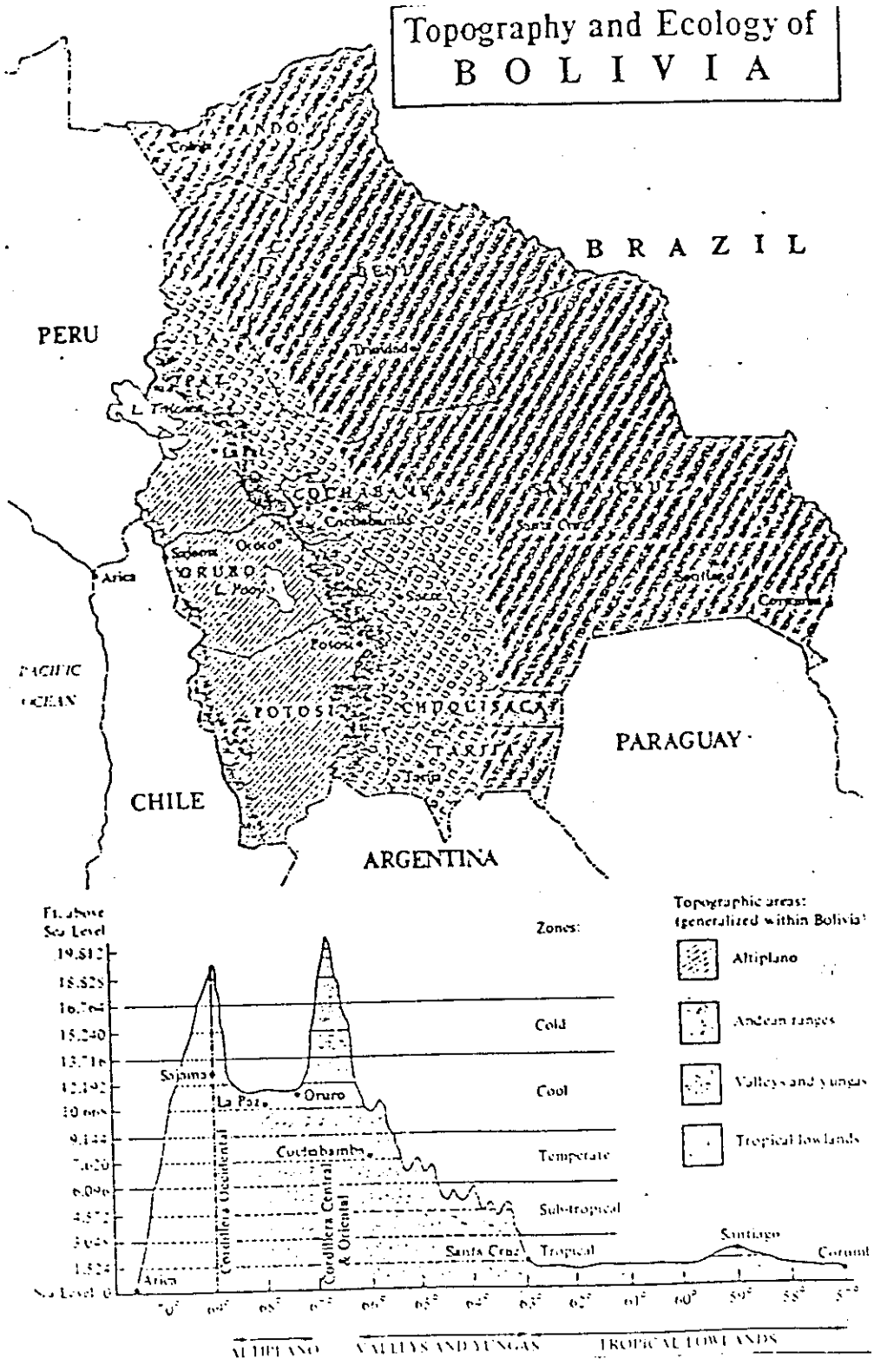
The commercial sector is scattered in the lowlands and in less extent in the subtropical areas. Some family units do not hire labor while others do. This depends on the size of the farm which varies according to the crop, traditional practices and location. In general the commercial sector is characterized as having medium and large scale farms which hire labor, use mechanical power and have easier access to

credit.

C. GEOGRAPHY

Although, Bolivia lies within tropical latitudes, differences in altitude and other climatological factors determine the contrasting ecological characteristics of this country. When evaluating the agricultural production, it is convenient to divide all the land area in three main distinct geographic zones: the highlands, the valleys and, the lowlands (see Map No. 1). Each of these zones could be subdivided according to the wide range of climates, types of soil and altitude.

1. Highlands. The highlands consists of an extensive high plateau . It begins just north of Lake Titicaca in the Peruvian Sierra and extends itself some 500 miles to the south to the Argentine frontier. These high plains are called the "Altiplano", and its area is shared with Peru. It ranges from 12,000 to 14,000 feet above sea level. The Bolivian area of this high plains is 246,254 square kilometers, about 22 percent of Bolivia's land area. This area is subdivided into three different ecological regions: the northern, central and southern Altiplano.



Source: Herbert S. Klein, Bolivia: the Evolution of a Multi-Ethnic Society. Oxford University Press, 1982.

The northern Altiplano, where the Lake Titicaca Basin influences the environment, is about 13,000 feet above sea level. It characteristically is a difficult environment for agriculture because of the low rainfall, poor and degraded soils and frequent and severe frost during the short growing seasons (Erickson 1988). The central Altiplano is at higher altitudes which makes the region more arid. In this area agricultural activities include a mix between cattle-raising and crop production. Finally, the southern Altiplano is a very dry, almost desert region with high solar radiation. Sometimes the plains are over 14,000 feet above sea level.

2. Sub-Puna and Subtropical Valleys. A second zone include the sub tropical valleys and all colder high-mountain valleys which range from 5,000 to 12,000 feet above sea level. This area covers 168,320 square kilometers, about 15 percent of the Bolivia's land area. These zones are called the meso and crothermic valleys and are classified as intermediate zones between the Altiplano and the lowlands (Pereira and Salinas 1982).

Within this zone, subtropical productive regions are known as "Los Yungas" and "El Chapare" while the other valleys are known as sub-puna valleys. They have for the most part a temperate environment and good ground water, although the climate is relatively dry and the elevation

average is about 8,200 feet above sea level.

3. **Lowlands**. The lowlands, or "Oriente", have different ecological characteristics: from wet tropical forests of the Amazons in the north to the dry savannah called "Grand or Bolivian Chaco" in the south east, going through vast dry and humid grasslands called Brazilian Shields. The altitude of these lands range from 1,400 to 5,000 feet above sea level. The area covers 684,007 square kilometers, about 62 percent of the Bolivia's land area.

Within the lowlands, about 360,000 square kilometers (52.3 percent) make up the Bolivian Amazon region. Specifically, the Bolivian Amazon is the north and northeastern region influenced by "Amazon hydrographic basin". This region comprises the entire state of Pando, the northern part of the state of La Paz and a great majority of the Beni state with other areas reaching into the states of Cochabamba and Santa Cruz.

Many people think the future of Bolivia depends on this area because of the good agricultural lands and potentials for oil and natural gas. However, most of the agricultural production is located between the temperate valleys in the west and the dry savannah lands in the south east, leaving the Beni plains for cattle raising. This sub- region is called the integrated area of Santa Cruz. Since the implementation of the Bolivian land reform, this area has

developed impressively in agriculture and agro-industry.

D. GOVERNMENT DIVISION

Bolivia is divided into nine administrative states called Departamentos, which in turn are divided into one hundred and two provinces[9]. The boundaries of each state are to some extent explained by ecological characteristics. However, one must be careful in generalizing this approach. For example, the states of La Paz, Oruro and Potosi are in the highlands, but parts of the state of La Paz belong to both basins mentioned and has diverse ecological characteristics; from rain forest to highlands 13,000 feet above sea level. Furthermore, in the state of Potosi, part of its population and agricultural activity are in temperate valleys while it classified as part of the Southern Altiplano.

E. CLIMATE

Climatic studies of Bolivia have been done by Trewatha, Robinson and Meigs (1975). They divide the country into four different climatic zones, taking as principal variables the environmental mean temperature and the terrain water deficit. Using this system, they identified the highland zone as areas where temperatures in the Altiplano show

[9] Throughout this paper, the English word "state" is used as equivalent to Departamento in order to describe political and administrative boundaries.

extreme variation between day and night because of the altitude. Summer temperatures average 75 to 80 degrees fahrenheit during the day and 35 degrees at night. During the winter, daytime temperatures average 50 degrees, while at night it can drop to 15 to 20 degrees.

The Titicaca basin lies in the northern portion of the Bolivian Altiplano. It is considered a semi-arid region where rainfall varies between 400 - 600 mm/year. Like the rest of the Altiplano, the rainfall is seasonal. There is usually ample water for the crop production between November and May. Sometimes excessive amounts of rainfall causes flooding, especially in January and February near Lake Titicaca.

A second and third zone encompass the northwestern and northeastern part of Bolivia. The first one is a wet tropical zone, characterized by having ten to twelve wet months. The northeastern region of the lowlands is characterized by environmental conditions that, while variable, are still typical tropical. The mean annual temperature is around 79 degrees Fahrenheit without marked seasonal changes. Annual rainfall ranges from 1,300 to 1,800 mm/year, and is concentrated (85 % of the total) between September and April.

The fourth zone includes those semi-arid zones where temperatures of the mountain or sub-puna valleys fluctuate around 65 degrees Fahrenheit, while the subtropics varies

from 72 to 78 degrees. In this dry, semi-arid zone rain is concentrated in the summer. The zone is located mostly in the south and central part of the country. Most provinces in the states of Cochabamba, Chuquisaca and Tarija are semi-arid.

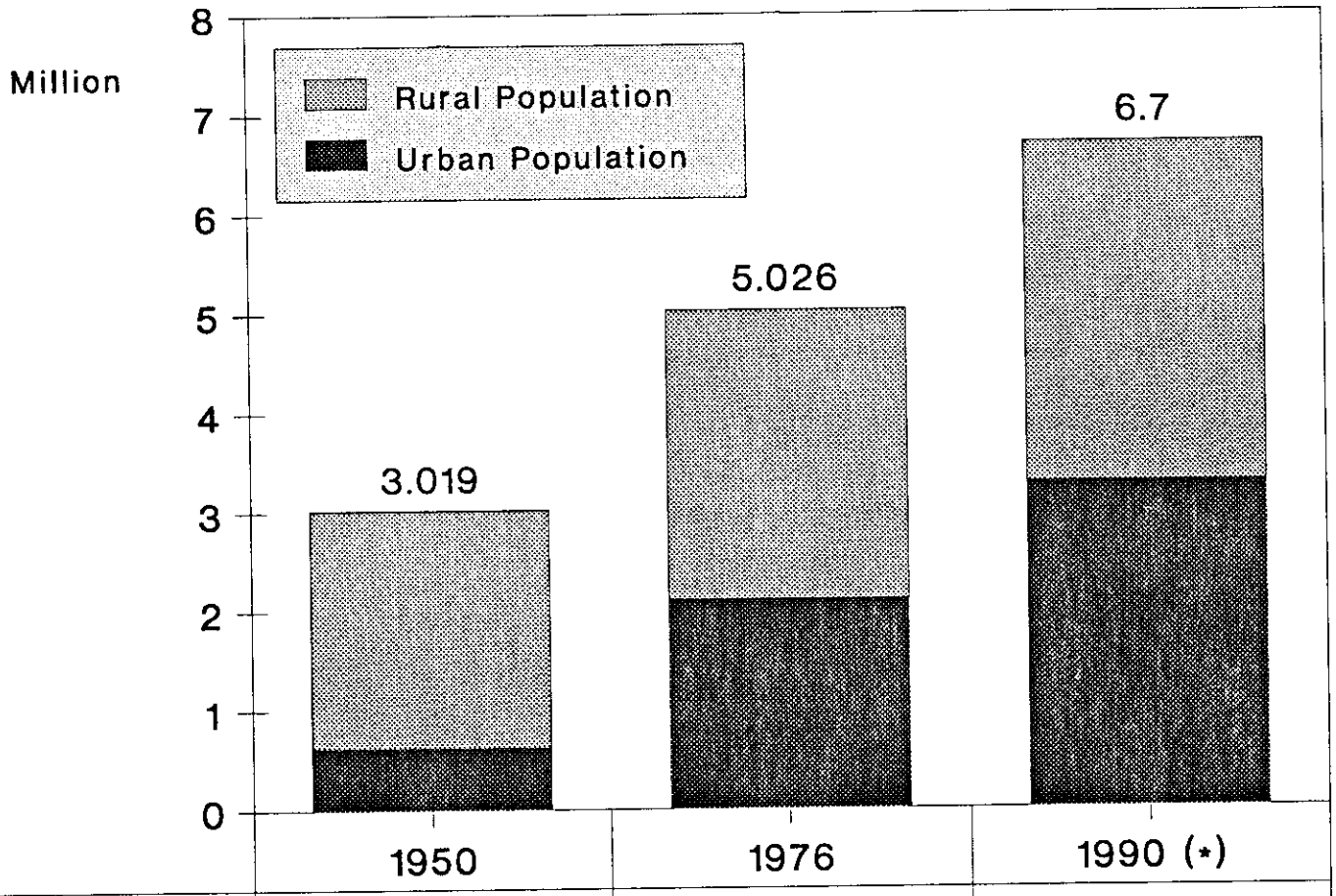
F. POPULATION

The Bolivian population is estimated at 6.7 million with a growth rate of 2.8 percent per year. By 1988 population under 15 years old was at 43.9 percent (World Bank 1990). American Indians account for 62 percent of the total population (Quechua Indians for 37 percent and Aymara Indians for 25 percent), mestizos 30 percent, Guaranis for 3 percent and 5 percent are descendants of European, mainly Spanish origin.

Since 1950 the population has doubled (see Figure No. 3). According to the 1950 demographic census, Bolivia's population was 3,019,031, with 79.4 percent living in rural areas. The population growth rate in 1950 was 1.7 percent per year. By 1990 The National Institute of Statistics (INE) forecasted that Bolivia's population would equal 6.7 million inhabitants. Approximately 51 percent of the population (3,417,000 inhabitants) will live in rural areas. This population would be disperse mainly in three ecological regions. About 51.4 percent of the rural population would be concentrated in the highlands, while 31.5 percent will live

Figure 3

Rural and Urban Population in Bolivia



	1950	1976	1990 (*)
Rural Population	2.398	2.919	3.417
Urban Population	0.621	2.107	3.283

(*): Forcast based on 1976 Demographic Census.
Source: National Institute of Statistics, La Paz 1989.

in the temperate and subtropical valleys and 17.1 percent will reside in the lowlands (INE 1989).

1. **Urban Population**. The largest cities are La Paz, the seat of government and the effective capital city, with 1,126,000 inhabitants. Santa Cruz, an agricultural center, particularly for sugar, sorghum and cotton has 696,000 inhabitants and Cochabamba, another agricultural center has a population estimated around 413,000. These three cities constitute the "eje central" of Bolivia's economy. Other important cities are Oruro and Potosi, both mining and tin centers, and Sucre, the legal capital.

Urban population growth rates show that since 1950 the three main cities have been increasing above the average rate of population growth. According to the National Institute of Statistics, in the last decade the city of Santa Cruz experienced a 7.27 percent annual growth rate, while La Paz and Cochabamba grew by 3.51 and 3.95 percent, respectively (INE 1985). In recent years it is believed that the growth rate of the city of Santa Cruz has declined while the growth rate of Cochabamba has increased to 4.5 percent. It is believed that this demographic phenomena is explained by the increased informal economy related to the production of coca leaves and drug trafficking in the subtropical region of El Chapare.

2. **Demographic Indicators**. Various population estimates

show that Latin America grows at a yearly rate of about 2.5 percent, which implies a doubling of the population every twenty-eight years. Demographic growth in some rural areas is even higher, while in other rural areas growth rates are below the average. As de Janvry points out, it is only because the poverty levels are so pronounced in Latin America that death rates are relatively higher than in other countries. This situation keeps the population growth rates in general under 3.0 percent (de Janvry 1985). This situation applies to Bolivia where fertility as well as mortality rates are very high.

As we can see in Table 1, population growth rates vary among Latin American countries. While Guatemala has had a steady growth rate throughout the last decades of around 2.9 percent, in Colombia, Ecuador and Peru population growth rates have declined to less than the Latin American average of 2.5 percent. Meanwhile, Bolivia's rate has increased from 1.7 (1950) to a projected 2.8 percent for the 1985-90 period (CEPAL 1989).

Table 1
Population Growth in Latin America.

	Years				
Country	65-70	70-75	75-80	80-85	85-90
Guatemala	2.8	2.8	2.8	2.9	2.9
Colombia	2.8	2.2	2.2	2.2	2.1
Ecuador	3.2	3.0	2.9	2.9	2.8
Peru	2.8	2.8	2.6	2.6	2.5
Bolivia	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**

Source: Latin America Statistical Year Book, 1989 and World Development Report 1990.

In terms of life expectancy at birth, according to the figures of the World Bank, Bolivia has the second lowest rate in Latin America. In general, even with the economic growth experienced after its social revolution in the sixties and seventies, life expectancy in Bolivia has not increased through the years as much as it has in other third world countries. For example, it has only increased by 9.4 years in the last 37 years, while other countries such as Peru and Ecuador life expectancy has increased by more than ten years in less than two decades (see Table No. 2).

Table 2
Life Expectancy at Birth in Latin America.

	Years				
Country	65-70	70-75	75-80	85-85	85-90
Peru	51.5	55.5	56.9	58.6	61.4
Ecuador	56.8	58.9	61.4	64.3	65.4
Colombia	58.4	60.4	62.2	63.6	64.8
Bolivia	**45.1**	**46.7**	**48.6**	**50.7**	**53.1**

Source:Latin America Statistic Year Book 1989.

Furthermore, expected years of life range widely from region to region in Bolivia. As shown in Table No. 4, life expectancy is lowest in the rural area of Potosi (mainly highlands) while it is highest in the states of Beni and Santa Cruz (lowlands).

Table 3
Life Expectancy in Bolivia

State	Life expectancy (years)
La Paz	47.5
Oruro	41.6
Potosi	36,4
Cochabamba	41.5
Chuquisaca	38.8
Tarija	51.7
Pando	51.7
Beni	55.3
Santa Cruz	54.2

Source: Ministry of Planing and Coordination, Research of Poverty in Bolivia, La Paz 1984.

The World Bank's basic indicators show that the total fertility rate in Bolivia is among the highest in Latin America with an average of six children per woman. Meanwhile, infant mortality has remained among the highest in Latin America throughout the last decades. According to Miguel Urioste (1984), Quechua and Aymara peasants had a infant mortality rate of 277.7 and 238.8 per 1,000 children born between 1976 and 1981. In general, the infant mortality rate in the rural area is 148 of each 1000 children born and malnutrition affects 33 percent of all children between 3 and 36 months[10].

[10] See Urioste, Miguel. El Estado Anticampesino. Centro de Estudios de la Realidad Nacional (page 90 - 108), La Paz Bolivia 1984.

CHAPTER IV

METHODOLOGY USED TO APPROXIMATE LAND CONCENTRATION ACCORDING TO REGIONAL AGRARIAN STRUCTURE

It is very important to distinguish the potential land use from the actual land use in a country. The first requires a complex analysis of many land characteristics, such as geomorphological, geological, ecological, and edaphological (Brookmann 1978). This would allow the determination of the capacity of the land for certain specific uses, for example the cultivation of a particular crop. On the other hand, actual land use describes the current use of the land. In other words, it describes the landscape characteristics at a particular time, without taking into consideration its potential or future use.

In this case study, actual land use refers to Bolivia's land use in 1984. Since the publication of the agricultural census, no drastic changes have occurred in terms of important increases in cultivated land. However, within the slow expansion of cultivated area, there has been relatively important land use changes in the agricultural sector, mostly explained by the substitution of traditional crops by commercial and illegal crops.

A. LAND COVER AND LAND USE

The first studies of land cover and actual land use in Bolivia were done in 1974 by the regional planning office of the Ministry of Agricultural and Peasant Affairs (MACA) using the Earth Technology Satellite Program (ERTS-Bolivia). But the preliminary natural vegetation map did not have a proper land cover and actual land use legend[11].

The arrival of images from the satellites LANDSAT 1-2 in 1976, helped to classify Bolivia's land areas according to land use. Therefore, this has allowed the Bolivian Ministry of Agriculture to obtain the needed information for the preparation of the first preliminary data on land cover and land use in Bolivia. At the same time, the country was divided into different ecological regions according to different land characteristics. Since Bolivia's land area has a wide range of characteristics, there was a need to introduce an Altitude Above Sea Level parameter (AASL) in order to orient the categorization in a ecological way, since highland crops are different from intermediate altitude crops and these differ from lowland crops.

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[11] Specific systematic studies on land cover and actual use were not carried out in Bolivia, since it was difficult to obtain consistent data on the matter due to the lack of a proper legend which would homologate the existing categories in the country. Another fundamental factor was the absence of aerial photographs and topographical maps that would allow the spatial allocation of the study units, so as to obtain the land cover and actual land use inventory. In order to form a better understanding of land cover and land use in Bolivia, see Carlos E. Brookmann, "Mapa de Cobertura y uso Actual de la Tierra: ERTS - Bolivia", GEOBOL, La Paz 1978.

Thanks to this research, our paper uses the AASL parameters in order to divide the agrarian structure into different ecological regions or regional agrarian structures. Areas with crops appropriate for high altitude zones located above 3,000 meters above sea level (9,840 feet) where denominated as highland crops. Areas of cultivation located between 3,000 and 500 meters above sea level (9,840 - 1,640 feet) were denominated as intermediate altitude crops. Cultivated areas below 500 meters (less than 1,640 feet) were referred as to lowland crops. This classification would indirectly define in a general way the great morphological units, corresponding the highlands to the western Cordillera, eastern Cordillera and above all the Altiplano. The intermediate altitude would comprise all the remaining mountainous landscape of the country, previous referred to as the subtropical and sub-puna valleys. Finally, the Integrated Area of Santa Cruz, the Beni plains, Brazilian shield, Chaco savannas and the deep wet Amazonian forest would comprise the lowlands.

1. <u>Categories Used in Land Cover and Land Use</u>. In general, Bolivia's land cover and land use was divided into 8 categories (see Table No. 4):

(a) Crop lands included areas commonly employed in agriculture, including cultivated land, plantations, orchards, fallow and/or resting.

Table 4 State Area of Land Cover and Land Use by Altitude Parameter
(Area in Square Kilometers)

Categories	AREA COVERED BY THE RESEARCH							
	Oruro	Potosi	Cochabamba	Chuquisaca	Tarija	Pando	Santa Cruz	TOTAL
Pasture lands	25,391	36,089	23,431	32,205	9,684	2,137	85,594	214,531
Highlands	25,391	29,171	7,835	9,434	2,741	0	0	74,572
Intermediate	0	6,918	13,434	21,594	5,965	0	5,260	53,171
Lowlands	0	0	2,162	1,177	978	2,137	80,334	86,788
Forestlands	0	0	26,664	17,798	26,464	60,816	266,478	398,220
Highlands	0	0	1,280	0	0	0	0	1,280
Intermediate	0	0	15,972	14,359	15,585	0	25,234	71,150
Lowlands	0	0	8,923	3,439	10,879	60,816	238,554	322,611
Other Forests	0	0	489	0	0	0	2,690	3,179
Croplands	1,093	1,242	1,822	1,313	1,408	223	6,982	14,083
Highlands	1,093	1,182	502	460	0	0	0	3,237
Intermediate	0	60	1,170	853	687	0	54	2,824
Lowlands	0	0	150	0	721	223	6,928	8,022
Wet and/or Floodedlands	0	0	472	0	0	0	10,050	10,522
Highlands	0	0	0	0	0	0	0	0
Intermediate	0	0	0	0	0	0	0	0
Lowlands	0	0	472	0	0	0	10,050	10,522
Waterbodies	3,253	976	95	15	67	636	909	5,951
Highlands	3,253	976	44	0	18	0	0	4,291
Intermediate	0	0	21	0	0	0	0	21
Lowlands	0	0	30	15	49	636	909	1,639
Barrenlands	23,831	79,393	3,136	180	0	15	582	107,137
Highlands	23,831	79,393	3,136	180	0	0	0	106,540
Intermediate	0	0	0	0	0	0	0	0
Lowlands	0	0	0	0	0	15	582	597
Permanent Snow and Ice	9	518	0	0	0	0	0	527
Cultural Paterns	11	0	11	13	0	0	26	61
TOTAL AREA	53,588	118,218	55,631	51,524	37,623	63,827	370,621	751,032

Source: Land Cover and Actual Land Use: ERTS - Bolivia, La Paz 1978.

(b) Pasture land includes shrub lands. These are areas, either natural or influenced by man, where grassy or other herbaceous forage species and/or shrub predominate; This includes range and/or shrub lands in the highlands (Altiplano), intermediate altitude lands (valleys), and lowlands (savannas and prairies).

(c) Forest land is land covered by natural and/or artificial forest, capable of producing forest products and with intangible functions for the conservation, investigation and protection of the environment.

(d) Wet and/or Flooded lands are defined as areas of temporary or permanent water cover, with hydrophilic vegetation and characterized by deficient drainage.

(e) Waterbodies are natural or artificial bodies of water. Lakes lagoons, rivers and reservoirs are included in this category

(f) Barren lands are lands not usable for agriculture or are very limited in their use, sometimes covered with native vegetation species. This category can have uses other than agriculture.

(g) Permanent snow and ice are natural accumulations of snow in the high mountains, which for reasons of temperature and pressure, are transformed into permanent ice.

(h) Cultural Patterns, which correspond to all the land area under construction for human and animal activities,

excluding crops and reservoirs (ERTS-Bolivia 1978).

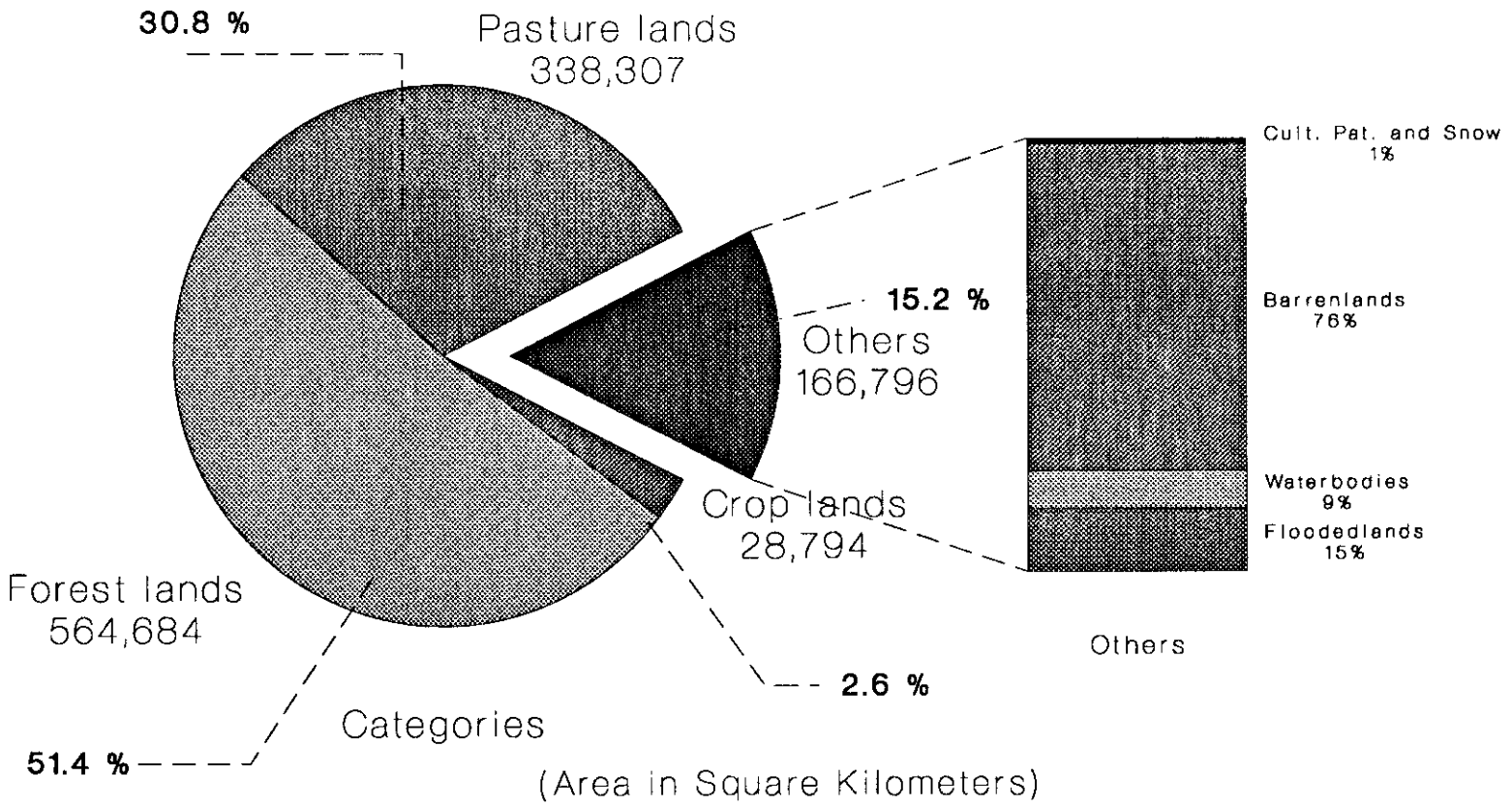
With respect to Bolivia's land area (see Figure No. 4), 30.8 percent of the land is classified as pastures or shrub lands. About 51.4 percent of the territory has forest lands. Croplands use approximately 2.6 percent of the land, while flooded lands, waterbodies, barren lands and others account for the remaining 15.2 percent.

Taking into account the land use and actual land cover, it is possible to aggregate the census data into several ecological regions where AASL parameters and other ecological characteristics define specific regions. This would give a better understanding of the regional agrarian structures of the country. At the same time it would provide policy makers with information about farm size distribution according to ecological regions.

B. LAND CONCENTRATION BY ECOLOGICAL REGIONS

In order to measure the degree of land concentration, data from the second agricultural census was used (1987). The census covered 68.4 percent of Bolivia's land area (751,032 square kilometers). Since the second agricultural census reports land area and number of holdings by size categories in seven states, the total percentages reported in Table 4 (land cover and land use by altitude parameters) may differ with those presented later.

Figure 4
Land Cover and Land Use in Bolivia



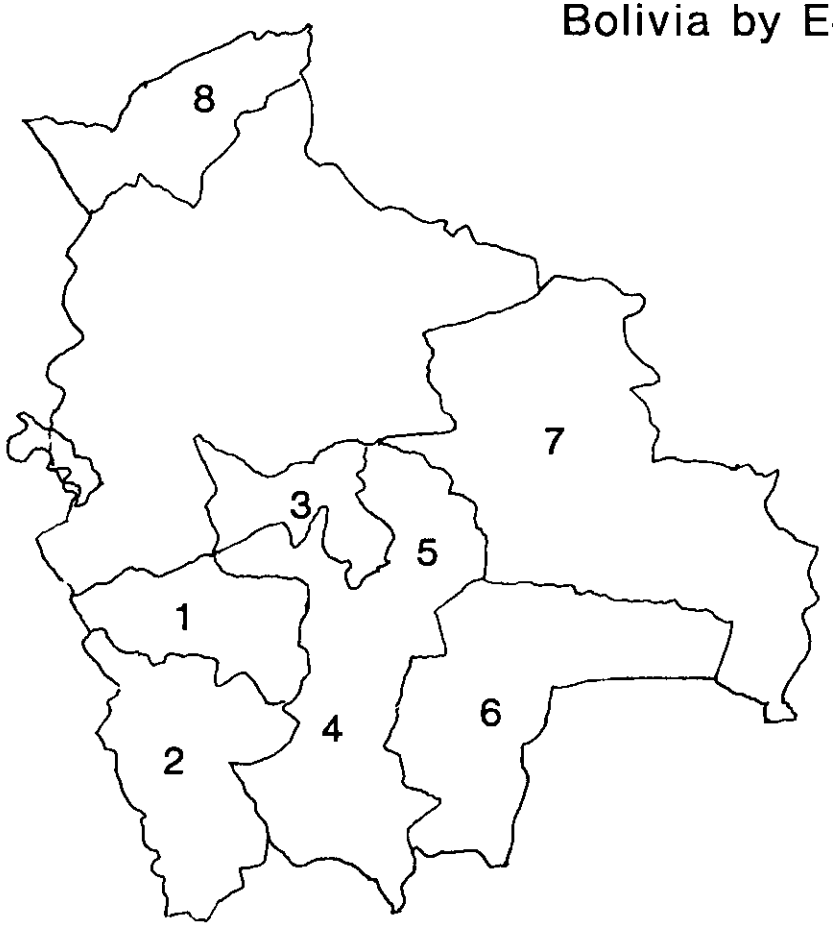
Source: Land Cover and Land Use: ERTS - Bolivia, La Paz 1978

The area covered by the census was divided into 76 political administrative boundaries (provinces) and were grouped roughly according to ecological characteristics and the altitude above sea level parameter. Seven ecological regions and an integrated area where agricultural development has occurred since the land reform has been addressed (see Map No. 2).

Each region has particular socio-historic characteristics, but in general farmers in most regions use traditional practices, apply low levels of fertilizer and rely on family labor. The integrated area of Santa Cruz has special characteristics, since after the land reform was designated as an area for commercial and export oriented agriculture. Colonization programs for peasants and foreign farmers were implemented throughout the region and the distribution of land to large scale enterprises was encouraged throughout the seventies.

This study measures land concentration in each province and by ecological region using Gini coefficients. In order to avoid overestimating landed wealth, three different Gini coefficients were calculated according to the use of land (i.e., total, crop and pasture land for each province and ecological region).

Map No. 2
Bolivia by Ecological Region



1. Central Altiplano
2. South Altiplano
3. Subtropical Valleys
4. Sub-Puna Valleys
5. Integrated Area
6. Bolivian Chaco
7. Brazilian Shields
8. Amazon Rain Forest

In order to see the relationship between land concentration and other variables, Gini coefficients were cross tabulated with population density. This variable was calculated according to different criteria. First by dividing the total population of each province by the total area of the province. Then, the rural population of each province was divided by the total land used for crops and/or pastures of each province, since some areas have a high proportion of barren lands and forest. This parameter provides a more accurate measure of population pressure in each province and ecological region.

Landless and near landless peasants with holdings below one and five hectare were also grouped by ecological region in order to see the level of fragmentation in the different regions. Another critical variable directly related to land concentration is the distribution of farm size by ecological region. The percentage of farms and corresponding percentage of land will be presented desegregated by total land use and crop land.

CHAPTER V

REVIEW OF LITERATURE

The interest in rent and ownership of land has long occupied economists. Ricardo, for example, devoted a great deal of his writings to this subject, when agriculture played a major role in the economy of the industrialized countries. In recent years, the renewed interest of development economists in equity, land concentration and growth in developing countries, has again brought this issue to the center of attention (Swindell, Baba and Mortimore 1989; Lipton 1987; de Janvry 1985; Griffin 1980; Berry and Cline 1979; Johnston and Kilby 1975; Mellor 1965).

This chapter will highlight some considerations related to land distribution. Special emphasis will be given to those related to land reform, income distribution and population growth.

With respect to the case study, two variables have been addressed as major causes of land concentration in the post-reform period: (a) redistribution of land in the process of land reform and (b) distribution of new land through colonization programs in the tropics. Two additional variables that contribute to increase land inequality in the rural areas are: (a) increasing population pressure and

hence fragmentation of holdings, and (b) agricultural policies that encourage large scale commercial enterprises.

These variables may have different effects on the agrarian structure. Emphasis will be given to: (a) migration (b) unemployment among the peasantry and small scale farmers in the rural area.

A. LEVELS OF LAND CONCENTRATION IN LATIN AMERICA

Ownership of land in many Latin American countries has been concentrated in relatively large units prior to the initiation of several land reforms after the World War II. As shown in Table 5, many Latin American countries (like those of the Andean Pact[12], Guatemala and Mexico), had excessively skewed distribution of land ownership causing very high index values of land concentration similar to Bolivia. It is believed that before the agrarian reform movements, Latin America had 17 countries with the highest land concentration ratios among 54 countries studied (Eckstein 1978). This situation has not changed throughout the years. According to the World Bank, land concentration in Latin America remains extremely high and constitutes one of the variables that explains the levels of poverty in the countryside (World Bank Report 1990).

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[12] The countries of the Andean Pact are: Venezuela, Colombia, Ecuador, Peru and Bolivia.

Table 5
Land Concentration in Latin America.

Country	year	Estimated Gini Coefficient.
Mexico	1930	0.96
Guatemala	1950	0.86
Venezuela	1956	0.91
Colombia	1960	0.86
Ecuador	1950	0.86
Peru	1950	0.88
Bolivia	**1950**	**0.94**

Source: Eckstein et al., Land Reform in Latin America. World Bank staff paper No. 275, Washington 1978.

B. PROBLEMS OF HIGH LEVELS OF LAND CONCENTRATION

Several empirical works show that skewed ownership and land concentration act as a bottleneck to development by depriving the wealthy large scale farmers and the very poor peasants and small scale farmers of any real incentive to work for higher productivity (Berry and Cline 1979). The high degree of land concentration, accompanied by a high proportion of landless agricultural workers and insecure tenancy arrangements, leads large scale farmers to practically control labor markets, land markets and the supply of capital to agriculture. Under this situation the possibilities for self-improvement for the peasants or small scale farmers are virtually nil, since there are few chances for upward socio-economic mobility.

In many developing countries land ownership is concentrated and because of this the income distribution

becomes highly unequal. In order to change the income distribution, land reform is necessary. However, it is the way in which the expropriated land is redistributed that will determine the post-reform income distribution in the agricultural sector. Since there is a lack of capital in the subsistence or traditional areas, land and labor become the most important factors of production. Where land is concerned, rents are generally very high as land is scarce.

Land scarcity may exist because (a) the cost of incorporating new land is high, implying high land prices; (b) the amount of land already available to the rural population is little, and moreover, the land/labor relationship has declined because of population growth; (c) the landowner monopolizes the use of land, leaving part of it underutilized, thus making land even scarcer; and (d) there is little known, potentially good quality land available.

C. DEFINITION OF LAND REFORM

As Ruttan has emphasized, the classical definitions of land reform, were primarily in terms of equity and politics and were usually concerned with problems of land tenure and ownership (Ruttan 1965). Emphasis on land distribution was appropriate, given the assumption that land was the input of overwhelming importance. However, current and impending pressure of population on land resources in most countries,

plus the advance of scientific agriculture in recent decades, has removed land reform from this classic context. While some authors continue to narrowly define land reform as a means to provide only land to the landless, other scholars conceive it more broadly as a comprehensive program for the transformation of the entire agricultural economy.

Many scholars agree that land reform is by definition an equalizing policy, since one of its primary motivations is to reduce poverty by reducing inequality (Lipton 1974). Thus, any strategy directed at alleviating rural poverty must ensure an employment based strategy of economic growth where access to land is the major determinant of rural welfare (Mellor 1975).

Both perspectives mentioned above encompass redistributive programs such as land redistribution among peasants and/or development programs such as cooperative farming and land settlement in order to achieve the joint objectives of production growth and rural equity. However, after spectacular advances in crop yields through technological changes since the 1970's, land reform can no longer be defined simply as the distribution of holdings on the basis of political and equity considerations. Phillip Raup pointed out clearly this consideration:

> "A responsible view must attach coordinate importance to the consequences for agricultural productivity. A land reform conceived only as a redistribution of rights in property may fail to generate forces or measures that will achieve the sharp breaks with old customs, traditions, and technologies needed to promote development." (Ruap 1979)

Most public programs that seek to equitably and rationally restructure a defective land tenure system by compulsory, sometimes drastic, and rapid means without clear knowledge about demographic patterns, socio-economic characteristics of the population, new scientific methods used in agriculture and proper management of institutional infrastructure, may decrease the chances of economic and social development of the rural population.

In general, it is still argued that in third world countries, where land ownership still confers social prestige, wealth, control of labor and political power, land reform has contributed positively to some development goals, including overall equalization among the peasantry, economic growth and improved composition of output. Other intermediate goals achieved by land reforms have been the improvement of the balance of payment, mobilization of savings and the generation of larger marketed surplus.

Binswanger and Elgin (1989) suggests that land reform can only make sense when it results in an increase in income, consumption, or wealth among poor peasants or farmers. Otherwise, if consumption does not increase or is

reduced, the reform fails. As outstanding examples in the third world, these author points out countries such as Iran, Japan, China and eastern India. In Latin America important progress has been made in the provision of basic needs to the rural areas after a set of different land reforms. During the decades of rapid growth in the 1960's and 1970's, significant decline in infant mortality and improvement in life expectancy and adult literacy were recorded in rural areas.

But as some scholars have pointed out, the absolute number of rural poor has failed to decline. Income inequalities has either worsened or stay at the same high levels as in the 1960's. (de Janvry 1985).

1. <u>Size of Holdings After Land Reforms in Latin America</u>. Most land reforms have the main objective of reducing land inequality and poverty levels among farmers by redistributing land and increasing the size of there holding. If the few large scale farms are subdivided and redistributed, average size of farms would tend to increase. However, in Latin America there has been a gradual decrease in average size of the production units in the last decades (Emiliano Ortega 1986). According to Ortega's research, in a group of eight Latin American countries[13], between 1960 and

[13] Brazil, Chile, Colombia, Costa Rica, El Salvador, Honduras, Peru and Venezuela.

1970 the number of production units having an area of twenty hectares or less rose from 4.7 million to 6.5 million. This 38.5 percent increase suggests that the type of units most representative of peasant agriculture is increasing in general. Most often, the number of small units increased as a result of subdivision by inheritance, division of units in large scale holdings and, settlement of peasants in the new frontier areas and population growth in the rural areas. Ortega also estimates that, in general, between 1960 and 1970 the average size of the units had decreased from 55.8 to 48.7 hectares, while the average size of the units having more than twenty hectares dropped from 197.2 to 183.3 hectares.

As the averages considered above refers to very broad aggregations, the figures do not fully show the seriousness of the problem among small holdings. According to the survey conducted by Easman (1978), the majority of rural holdings in Latin America consist of near-landless and landless workers or marginal cultivators whose holdings are too small or too poor in quality to enable the peasant to earn a subsistence livelihood from their land. According to de Janvry (1985) data from several countries reveal that the number of small farms increased at an annual compound growth rate of 2.2 percent between 1950 and 1980 in Latin America. Meanwhile, the average size of these farms declined from 2.4 hectares in 1950 to 2.1 hectares in 1980, and there was

increasing concentration of land on large farms (de Janvry 1989).

D. IMPORTANCE OF THE FARM SIZE DISTRIBUTION

Stevens and Jabara (1988) mention the important effects of the distribution and redistribution of land on all aspects of agricultural development, "especially upon the kinds of agricultural technologies and institutions whose adoption will be induced"[14]. According to both authors, as social and economic development proceeds, the population may judge that disparities in the ownership of agricultural resources, with resulting large income disparities, are undesirable. This increases the unequal distribution of land, which can be so rigid throughout the years that social mobility among the rural population can be virtually impossible, leading to extreme situations of income distribution and concentration of wealth and power in the agricultural sector. This may lead to political action to obtain land reform.

Berry and Cline (1979) argue that in most Latin American countries, agricultural production has tended to be below its maximum potential level because land is underused on the large scale farms, while excess labor without

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[14] See Stevens, Robert D. and Cathy L. Jabara. Agricultural Development Principles: Economic Theory and Empirical Evidence. page 272 -274. Johns Hopkings University Press, Baltimore 1988.

opportunity for fully productive work is crowded onto the subsistence or traditional farm sector. At the same time, it is believed that over concentration of land has drawn capital from the rural areas without a proper use in the industrial sector. Raul Prebisch (1955) has pointed out such a situation in an early study:

> "Much of their income went into luxurious mansions, jewelry, works of art and many other nonproductive uses characteristic of wealthy leisure classes. A considerable part of their land income may have been invested in domestic and foreign industries and contributed to capital formation there"[15].

The flow of resources from the agricultural sector may contribute to the industrialization of the economy, but this industrialization may become highly capital-intensive, with little employment growth and consequently little growth in demand for food. In practice this would lead income to become more skewed and growth rates to decelerate in the long run.

In Latin America most landowners, particularly absentee landlords, often indulge in conspicuous consumption in the cities or abroad. When landowners invest in rural areas, the investment is more frequently in the form of additional land than in farm improvements. As a result, there is a tendency to increase even more the inequality of land distribution in the rural areas and worsen the economic situation of the

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[15] See Prebisch, Raul. "Hacia una Dinamica del Desarrollo Latino Americano" in Suplemento de Comercio Exterior. Mexico, 1963.

peasantry.

Land reforms can redistribute land from the large estates into new family production units of moderate size, thereby combining the underused land with the underused labor and raising production. In this process, it is expected that the potential increase in production will be sufficient to rise income among the family units and capital flows will increase backward and forward linkages between the agricultural sector and the rest of the economy. However, the implementation of most land reforms has brought several problems. First, the procedure of allocating land holdings usually depends on the scale of the reform and the number of officials available to implement it. In the Bolivian land reform, the complex process of expropriation and adjudication stretched the resources of the Ministry of Agriculture's technicians and dependent institutions entrusted with the land reform. Since it was impossible to handle the whole country at once, the government concentrated first in giving property rights to densely populated areas in the valleys and some provinces in the highlands. In this process, technical difficulties, such as water rights, impeded quick decisions and prolong disputes among beneficiaries of redistributed land. Another important problem to be solved is the terms of ownership to be granted and to determine the size of holding to be allocated to recipients. In Bolivia the land reform was planned after the

peasant take over. Therefore, the government couldn't determine a viable size of landholding during the first years of land reform.

A viable livelihood holding that would permit an average farmer or peasant to enjoy a decent minimum level of income varies in accordance with the time, type of crop, soil fertility, effectiveness of the infrastructure, other services available, the intensity of land-use, population pressure, tenure system and the availability of capital and skills of farmers and peasants. As we can appreciate, it is very difficult to establish any farm size category that would ensure a good livelihood for the peasantry after any land reform.

E. LAND FRAGMENTATION

After the redistribution of land is accomplished by the land reform, population pressure may begins to increase. Since then surplus labor workers may not be drained off by migration (due to the lack of job opportunities in other economic sectors). Consequently, there will be, at first, a progressive fragmentation of the land, which is often hastened by inheritance laws requiring strict equality in the division of inheritances among all the children.

In regions were life expectancy is extremely low, such as Bolivia, the process of fragmentation accelerates and has a pernicious effect over the rural population and

agricultural productivity. For succeeding generations land available becomes too small to sustain the family unit and cost of production begins to increase due to economies of scale.

In general, the decrease in size of holdings caused by subdivision is bound to have several economic consequences. According to Svend Raagaard (1987), first, marketable surplus of agricultural produce will be diminished unless agricultural methods are improved or cropping patterns and land-use are intensified. Due to this, the farmers cash income will decrease, hence, living standards and reinvestment in agriculture will be reduced. Other drawbacks of fragmentation and dispersion of land holdings are the increasing cost and wasted time on transportation. These can be extremely high if there are many plots and the distances between plots are great. Because of dispersion, agricultural operations require an unnecessary amount of labor and sometimes additional capital resources. At the same time, many agricultural operations become more complicated if there are different localities to watch and manage. Other considerations such as irrigation facilities, and accessibility to the land must also be evaluated.

F. SOME CONSIDERATIONS WITH RESPECT TO INCOME DISTRIBUTION

Empirical findings in many other third world countries establish that the distribution of landholding may be a

major determinant of income distribution in rural areas where a large proportion of the population is dependent on agriculture.

In the absence of well-developed capital markets, land is seen as an important asset since it is often a major source of rural household income. Since large disparities in size of holdings leads to a bimodal farm structure (Stevens and Jabara 1988), this pattern can lead to highly skewed income distributions throughout the rural population. However, a distinction must be drawn between the extent of a holding and the size of the cultivation unit. As some scholars have established (Lecaillon et al 1984), it is possible for landowners to rent lands to others with the objective of forming cultivation units that are economically viable; they may even rent plots of land to large landowners. Conversely, to avoid any type of land tax, landowners may transfer ownership of some of their land to members of their family while reserving the use of this land for themselves.

In Bolivia the practice of subdividing large scale farms between different members of the family have been common throughout the years. Irene Hernaiz (1986) has documented this situation in the northern part of the state of La Paz. According to her research, most of the land distributed in the provinces of Iturralde and Franz Tamayo between 1970 and 1980 (5,179,221 hectares total) had been

concentrated in the hands of 697 individuals or private enterprises with family linkages[16]. In other prominent agricultural areas in the lowlands, similar practices have also been documented.[17]

To conclude, Berry (1971) makes two important considerations with respect to income distribution and land reform. According to this author, taking large scale farms and splitting them up will not increase national income in the short run, even though peasants and small scale farmers may be more efficient. This situation occurs because there are transitional costs associated with the movement of people who previously farmed smaller plots to the larger units (or landless peasants farming land which they never did before). This suggests that peasants may have size-specific entrepreneurial skills -at least in the first years of land reform. Another consideration brought out is that small farms have higher coefficients of efficiency than large scale farm. However, this does not mean that this would remain so if distribution of land were changed substantially. Since the composition of output on small farms is quite different from those of larger farms, it is possible that with redistribution of land some large scale

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[16] See Hernaiz Salinas, Irene: "Tenencia de la Tierra en el Norte de La Paz", in El Norte Paceno y San Buenaventura. Edited by Antonio Bilbao la Vieja. CEDLA, La Paz 1987.

[17] See Alan Bojanic. Tenencia y Uso de la Tierra en Santa Cruz: Evaluacion de la Estructura Agraria en el Area Integrada de Santa Cruz. CEDLA, La Paz Bolivia 1988.

farms would lose some comparative advantages and shut down some services they provided to small scale farms. Possibly the marketing system would lose efficiency in the short run.

CHAPTER VI

BOLIVIA'S STRUCTURAL TRANSFORMATION

A. THE PRE-REFORM PERIOD

From independence to Bolivia's war with Paraguay (Chaco war 1932-1935), a semi-feudal system prevailed in rural areas, with huge estates owned by Bolivian elites and served by indian families. The control of land was combined with forms of racial submission which prevailed in all aspects of national life. The public institutions were agencies for the power of the Spaniard descendants and mestizos over the indian masses. Following the Chaco war, the national attitude toward the indian and land problem increasingly provoked the social consciousness of the middle class. In 1945 the government of Villaroel invited the indians to take part in a national congress, in which it was resolved to abolish some practices such as the rendering of personal services (pongueaje). However, after the new governmental decrees, in the haciendas and some indian communities the habitual extortions from the hacendados continued until 1952.

Within the agrarian structure a clear distinction must be made between the valley and highland haciendas in the pre-reform period. While both regions were dominated by large scale farms (latifundio), they differed in terms of

their production methods and markets. The sub-puna valley haciendas have been characterized by a relatively higher degree of capital investment before the radical changes introduced by the land reform. Agricultural output was usually sold to important mines scattered around the highlands while most labor was supplemented by seasonal workers from indian communities. In the highlands the traditional hacienda usually produced food for local markets. Although huge latifundia dominated the landscape, they coexisted with thousands of indian communities devoted to production.

Most hacendados had great influence at the local and community level. Within the hacienda itself, landowners exercised considerable power over the indians. The indians were often required to sell their crop surplus to the landowners at below market prices. In return for usufruct rights to a small plot of land and limited grazing rights, the landlord obtained virtually unpaid labor on the hacendado's land for as many as 150 - 200 days per year.

By 1950 the agricultural sector had become one of the most unjust and uneconomic in Latin America (Klein 1982). As the 1950 agricultural census shows, about 8.16 percent of the landowners, who owned each 500 hectares or more of land, controlled 95.2 percent of all cultivated land. Moreover, these large estates themselves were under-utilized, with the average estate of 500 or more hectares cultivating only 1.5

percent of its land. At the opposite extreme were 60.1 percent of the small scale landowners with 5 hectares or less. These small scale farms (minifundias), which accounted for just 0.23 percent of all the land, were forced on average to put 54 percent of their lands into cultivation. At the same time, around 3,779 indian communities had 21.9 percent of the land. (95 percent in the highlands, 4 percent in the valleys, 1 percent in the lowlands). The average land possessed by each community in the Altiplano was 2,091 hectares and 790 hectares in the valley. Total land cultivated by these communities was estimated to be 26 percent of all land.

Before the reform most landowners lacked the initiative and capital to undertake a more rational and intensive type of agricultural production. The capital per employed person in the agricultural sector was estimated to be about $US. 277 for the year 1950. According to the United Nations Economic Commission for Latin America (1957) this figure was the lowest amount of capital per active person of any economic sector in Bolivia. The total capital in the agricultural sector represented only about 20 percent of the total capital stock of the country, and about three quarters of it was livestock[18].

Resistance to this semi-feudal system throughout

[18] See Peinado Sotomayor, Marcelo. Land Reform in three Communities of Cochabamba, Bolivia. Ph.D. Dissertation, Utah State University, 1971.

Bolivia's history has been poorly recorded. However, it is known that between 1900 and 1953 there were many revolts in the northern valleys and hundreds of scattered primitive rebellions in the highlands, which were generally isolated movements easily crushed. After the Chaco war, insurrections of Aymara and Quechua indians began to intensify, leading to one of the most violent land reforms in Latin America (Rivera 1986).

As mentioned above, land concentration was extremely high. The large inequalities in farm size, the lack of political, social and economic opportunities for the indians and the fact that about three-quarters of the country's rural population had no property rights, or occupied the poorer steeper land, or existed in virtual serfdom, contributed to widespread political support for a radical change in Bolivia's economy and agrarian structure.

B. THE POST-REFORM PERIOD

One of the most important events in Bolivia's economic and social history was the National Revolution of 1952. This revolution implemented a set of radical measures as part of a global development strategy. The most important measures were the nationalization of mines, the incorporation of the peasantry into the political arena through the creation of peasant unions and armed militias, universal suffrage and recognition of the indians civil rights. Finally, after

years of intense political mobilization the land reform was developed[19].

As part of the strategy to develop and change Bolivia's economic structure, the revolutionary government attempted to reduce Bolivia's primary dependence on tin exports by increasing production and exports of nontraditional minerals, oil, gas and agricultural products. Until the social revolution the export of tin was Bolivia's mainstay, but because mineral extraction is usually very capital intensive and requires a large input of imported equipment and technical services, the mining sector did not generate the expected job opportunities among the population. However, the economy benefited from net foreign exchange earnings and economic rents which were captured by the central government in the form of profit taxes and royalties once the mining sector was nationalized.

These benefits were partly used to finance investments in infrastructure in the rural area, especially between the valleys and the lowlands. Estimates of the annual public investment prior to the agrarian reform indicate an average of $US. 1 million per year for the period 1945 - 1952. After the land reform, investments in the agricultural

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[19] In the late 40's, rural conflicts erupted constantly and peasant organizations began to invade the land. In some occasions this led to direct confrontation with the rural elite before the National Revolution. See Silvia Rivera Cusicanqui, Oprimidos pero No Vencidos: Luchas del Campesinado Aymara y Qhechwa 1900 - 1980. HISBOL. La Paz Bolivia, 1986.

sector increased substantially. Through the Bolivian Development Corporation (CBF), the ministry of Agriculture (MACA) and various other projects undertaken with the cooperation of international aid agencies, the amount in 1955 was on the order of $US. 10 million per year.

To stimulate the agricultural sector even more, the government retained most land in Santa Cruz, Beni and a few haciendas in the valleys after the land reform. Through different subsidized policies, the government gave emphasis to domestic production of food crops that were previously imported and encouraged the establishment of large commercial farms in the lowlands. Meanwhile, the government also began to redistribute land titles to most peasants in the highlands and valleys.

Given their sheer numbers (60 percent of the population) and their weight in the economy, the peasants obviously were a potential source of great political power. But as the revolutionary process developed in the countryside, ambitious individuals and factions of the government attempted to build their own specific links with peasant groups. Once the process of redistribution of land began in 1955, these groups encouraged the appropriation of land with minimum intervention of the state in most of the countryside.

From 1953 to 1955 most of the peasants in the central valleys and highlands began the process of land

redistribution, even before the agrarian law was enforced. In 1953 the government set up a multi-party commission in order to determine and formulate the procedure of the land reform. But the commission, under the direction of an nationalist party member, began the redistribution of land in 1955. That same year the commission launched most rules concerning ownership of land. At the same time, it retained the lowland haciendas and most productive farms in the south valleys in order to redistribute the land among loyal peasants, party members and old hacendados who supported the idea of new agricultural enterprises. This new redistribution of land was essentially a political measure designed to win the popular support that the revolutionary government needed in order to consolidate its political power among the middle classes and peasantry.

After a decade, the peasant had already redistributed most of the ex-haciendas in the highlands and valleys, ignoring the agrarian stipulations about size of holdings. Meanwhile, the newly empowered agrarian institutions (CNRA) ensured beneficiaries by providing the peasantry with titles of land ownership. Although effectively abolishing the latifundia in many parts of the country, the reform made no attempt to reorganize peasant production, and the majority of entitled land reform beneficiaries in the highlands and sup-puna valleys received little more than the parcels previously held in usufruct (Gill 1987).

The basic principle of the agrarian law consisted of the recognition of private property rights within the limitations and dispositions of the same law. The law prohibited the existence of latifundios, which were characterized as large agricultural properties with under-utilization of the available land and labor resources, and which would generate profits only from the difference between average productivity of the labor force and the wages paid to labor (Peinado 1971). Other property classification were used for the different geographical and ecological regions of the country (see Table No. 6). Within the new dispositions of the agrarian law, a new category called "agricultural enterprise" was created. An agricultural enterprise was distinguished from the latifundia by capital investment, the use of modern technology and wage labor, and unlike the underexploited latifundia, it was not subject to expropriation (Gill 1987). During the process of land reform most of these large scale farmers expanded their agricultural area. Others benefited with large land extensions from 500 to 2,500 hectares, to as much as 50,000 hectares for cattle rising.

As part of the strategy to transform the agricultural sector, the government also provided funds to establish a modern road system from the valleys to the productive zones of Santa Cruz. After years of heavy investments in physical capital, combined with a long-term secular trend of rising

Table 6
Size of Holdings According to Bolivia's Agrarian Law

Ecological Region	Small Property Maximum	Medium Property Maximum	Large Property (*) Maximum
Northern Altiplano	10	80	400
Central Altiplano	15	150	800
South Altiplano	35	250	500
Sub-puna valleys	12	40	500
Subtropical Valleys	10	150	2,000
Lowlands	50	500	2,000

(*): Category called large enterprise.

Source: Bolivia's Agrarian Law, La Paz 1953.

world mineral prices, it was in the mid-sixties when all these investments began to pay off. During the period 1961 - 1965 the government invested about $US. 17 million, most in colonization and irrigation programs through development loans.

After the national revolution and land reform, Bolivia's economic structure has changed gradually. The development of each region was determined by the central government and the dynamism of each region was explained by its regional comparative advantage. Oruro and Potosi became mining states. Santa Cruz and Cochabamba continued to be the most important agricultural regions. Meanwhile, in the same state of Santa Cruz and, to a lesser extent, Tarija and Chuquisaca, major investments were made for the exploration and extraction of oil and gas. Other smaller regions in the south were encouraged to develop a vegetable oil industry and sugar cane plantations.

In the process mineral ores, particularly tin, continued to be Bolivia's economic mainstay providing the largest export product in the post-reform period. Meanwhile, production of oil and gas increased steadily throughout the years.

Since 1980, with the low mineral prices in the international market and the high extraction costs, exports of tin and other nontraditional minerals began to decline. In 1984 natural gas overtook tin as the country's major

export earner.

Although Bolivia was usually known in this stage of development as a mining country, the importance of the agricultural sector to the economic system was very important. The share of the agricultural sector in the GDP continued to decline as productivity began to increase until the eighties (see Table No. 7).

Table 7
Share of the Agricultural Sector in the GNP.

Sector	1970	1975	1980	1985	1988
-Agricultural	19.5%	19.2%	18.9%	24.5%	22.6%
Mining	16.7%	14.6%	10.6%	6.9%	6.8%
Oil and Gas	4.6%	8.7%	5.6%	6.1%	6.2%
Services	41.1%	38.9%	46.1%	50.6%	50.6%

Source: Muller & Asociados, Economic Statistics, La Paz Bolivia, 1988.

Another indicator of the importance of the agricultural sector in Bolivia's economy was the contribution of the sector to the balance of payment. Total exports, and also imports of agricultural products, showed an upward trend in terms of dollars spent annually, but the relative importance of agricultural imports were decreasing considerably.

Exports of agricultural products have always been relatively small in comparison to total exports, which consist mainly of gas and minerals. However, since 1985, significant increases in agricultural exports have been

recorded.

C. EVOLUTION OF BOLIVIA'S AGRICULTURAL SECTOR SINCE THE LAND REFORM

As part of Bolivia's structural transformation (Johnston and Kilby 1975), three stages can be observed in the agricultural sector. First, from 1953 to 1961 when the agricultural GNP increased at a rate of 2.8 percent a year. At this stage it was believed that the process of land reform had severe effects on agricultural output. However, different case studies of ex-haciendas in the valleys and highland point out that the peasantry did increase production once land was redistributed (Pinedo 1971).

This belief comes from the fact that the urban population of the main cities in Bolivia experienced a shortage of food during the first years following the land reform. As many scholars point out, it was the marketing process which was unfamiliar to the peasantry that lead to a shortage of food in the main cities.

The second stage ranges from 1962 to 1976 when the growth rate averaged 4.1 percent per year. The high rates reflect the payoffs of the physical capital invested in the rural area after the land reform. The Cochabamba - Santa Cruz road which linked the sub-puna valleys with the city of Santa Cruz in the lowlands greatly influenced the performance of the agricultural sector. However, in this

stage government began to control prices of agricultural commodities produced by the traditional sector in order to provide cheap food for the urban population and to keep the costs of production of the mining sector competitive in the international markets.

After the mid-sixties important spontaneous and directed settlements began in the lowlands and sub-tropical valleys (see Table 8). The high returns from these regions attracted peasants from the highland and foreign colonizers. At the same time significant rural-rural and rural-urban migration from the highlands and valleys toward the main cities of Bolivia began to develop. Most rural migration patterns were explained by the demand of agricultural labor from the large commercial farms in the lowlands.

With the gradual changes in the agricultural sector and the increasing demand of agricultural commodities from the urban population, the patterns of exchange that prevailed in the highlands began to break down as peasants farming the lower valleys became integrated into the market economy. Most highland peasants, who were primarily llama herders, lost ready access to maize and other food crops produced at lower elevations, and many began to migrate in search of better livelihoods (Alaka Wali 1990).

Table 8 National and Foreign Settlement in Bolivia's Lowlands

Colonies	Year of Settlements	Number of Families	Population (1987)	Area (Hectares)
NATIONAL				
Yapacani	1958	4,600	23,300	38,800
Surutu	1955	200		10,000
Huayta	1954	300		10,000
Antofagasta	1960			19,613
Santa Rosa		800		17,989
Chene-Independencia	1956	1,500		18,584
Aroma-San Juan	1956	570		5,500
Chene-Pirai	1965	4,900	24,500	64,730
San Julian	1972	2,016	6,048	146,000
Rio Grande	1985	3,000	9,000	20,000
Total		17,886		351,216
JAPANESE				
Okinawa I	1958	102	577	13,500
San Juan de Yapacani	1958	230	1,300	27,132
Okinawa II	1960	69	395	16,745
Okinawa III	1962	31	213	18,346
Total		432	2,485	75,723
MENNONITES				
Tres Palmas	1956	3	20	1,190
Canadiense	1957	103	672	14,000
Bergthal	1961	83	537	3,900
Riva Palacio	1967	794	5,163	31,087
Swift Current	1968	301	1,955	20,250
Reinland	1968	155	1,010	5,401
Somerfield	1968	83	537	5,652
Paurito	1968	185	1,204	15,060
Las Piedras	1968	199	1,295	
San Jose	1974	86	562	
Nueva Esperanza	1975	83	537	27,000
Belice tres Cruces				14,000
Valle Esperanza				15,000
Nueva Holanda				11,000
El Cupesi				12,000
Total			13,492	175,540

Source: Based on tables presented by Alan Bojanic.
Tenencia y Uso de la Tierra en Santa Cruz. CEDLA, La Paz Bolivia 1988.

The third stage begins when Bolivia suffered from major political instabilities and external shocks, including the rise in world interest rates in the early 1980's, the cutoff in lending from international capital markets, and the decline in world prices of Bolivia's commodity exports. In 1983 - 1984, drought in the highlands and floods in the lowlands had a tremendous effect on agricultural output. The GNP of the sector declined 22 percent with respect to the year before. By the period 1984 - 1985 the sector had recovered with an increase of 16 percent. All these factors contributed to the hyperinflation registered between 1984 and 1985.

In order to correct such economic distortions, the government eliminated most price controls in the food system and implemented a set of macro policies in order to alleviate the crisis. As part of the program of stabilization, there was a stable unified exchange rate backed by tight fiscal and monetary policies. There was an increased public-sector wage bill, through reduction of employment in the state enterprises and reduced rates of real compensation and an effective elimination of debt servicing (Morales and Sachs 1989). Most subsidies for the agricultural sector were cut off and agricultural prices were liberalized (except sugar).

In this period, the economic viability of capital-intensive agriculture was called into question, largely as a

consequence of the country's economic performance using labor-saving technology against the factor endowments of the country. With an increasing rate of unemployment, 21.5 percent in 1987, the government continued to search for new incentives for the agricultural sector. However, peasants and small scale farmers continued to have little access to services, credit and improved technology.

1. **Problems in Bolivia's Agricultural Sector.** Six basic problems which have restricted the development of the agricultural sector in the second stage of structural transformation have been addressed by Whitaker and Wennergren (1978). These are (a) an extremely limited and deficient scientific base for the sector; (b) lack of human capital at both the general and technical-scientific levels of training; (c) ineffective administration of public services; (d) uncoordinated foreign donor programs; (e) deficient factor and production markets; and (f) restrictive general development policies.

As both authors point out, research capability was extremely limited because of inadequate budgets. Extension services to encourage institutional and technical change in the agricultural sector, were virtually static in most regions. At the same time, there was a critical shortage of agricultural scientists and technicians with advanced training or experience to manage research and extension

programs. Most professionals involved in the agricultural sector worked part-time in the public sector with low wages and no institutional backup to carry out research. Meanwhile, the administration of public agencies and institutions providing support services for agriculture was notoriously ineffective and inefficient. A critical problem faced then -and even today- is the lack of a public employment system with descriptions of positions and requisite qualifications and a system for competitive employment. Most public positions often provide their holders with opportunities for illicit gain in the form of bribes. Consequently, many public administrators have vested personal interests which preclude efficient public sector administration. The final result during this stage of development was little or no policy trust and superficial palliative reforms that were usually misdirected (Whitaker and Wennergren 1978).

2. <u>Bolivia's Informal Economy</u>. Within the structural transformation process, Bolivia has also created a highly disarticulated society in which formal economic activities have been the exception rather than the rule. While the formal economy has been characterized as "small, fragile, dependent upon its relationship with the world market and restricted to the small sphere of state-managed enterprises" (Blanes 1990), the informal sector, based on contraband and

drug trafficking, has been rapidly expanding throughout the last two decades.

The illegal production of cocaine has existed in Bolivia on a small scale for some time, but it is believed that since 1975 it has grown to immense proportions (see Figure No. 5). Coca leaves (Erythroxylum coca), from which cocaine is derived, has been an important part of indian culture for centuries, but during the 1970's the country started growing more coca than it legally consumed. The rural modernization programs undertaken by the Bolivian government in the late 1950's and early 1960's produced a new rural elite of landlords and merchants in the eastern states of Beni and Santa Cruz. But years after, with the collapse of cotton prices in 1975 and 1976 and shortage of hard currency in Bolivia's central bank, many wealthy farmers were forced to sell cocaine on the black market in order to repay their loans. In this process many landowners saw the opportunity to accumulate wealth and become respected members of the industrial and financial sectors.

Since the late 1970's the production and consumption of cocaine began to increase. The comparative advantage in the production of coca leaves and in the manufacture and marketing of sulfates attracted capital investments denied to other sectors of the domestic economy. Throughout the years the need for coca as a cash crop increased and growth of cocaine-processing hideouts in the lowlands boomed.

Figure 5

Source: Debate Agrario No. 9 ILDIS, La Paz 1987.

Since the 1980's, Bolivia has become one of the countries most often cited in connection with coca cultivation, coca preparation, and trafficking of coca paste and cocaine hydrochloride. However, while in industrial societies cocaine is a social evil, in the highlands and valleys of Bolivia, coca trafficking has become part of the traditional ecological exchange and cash source. In the subtropical and sub-puna valleys, the bartering of coca for goods produced by the peasants labor in different ecological niches has always been accepted. Originally, coca was grown to meet internal demand; the leaves are traditionally chewed and used for ritual purposes (Carter and Mamani 1986) and production did not surpass an annual average of 15 metric tons.

In recent years three major regions have been identified as major production areas: El Chapare, Los Yungas and Apolo, all parts of the subtropical region of Cochabamba and La Paz respectively. In the first two regions, the traditional way of life is more and more intertwined with coca trade, and the cash economic activities are directly related to occupations derived from the new coca trade. In the third zone coca production remains isolated.

Coca leaves do not grow in most of the lowland areas; coca is a moderate elevation crop, grown at 6,000 to 10,000 feet above sea level. It is generally in the hands of families with plots of land averaging six hectares, of which

two are dedicated to growing coca (Blanes 1983).

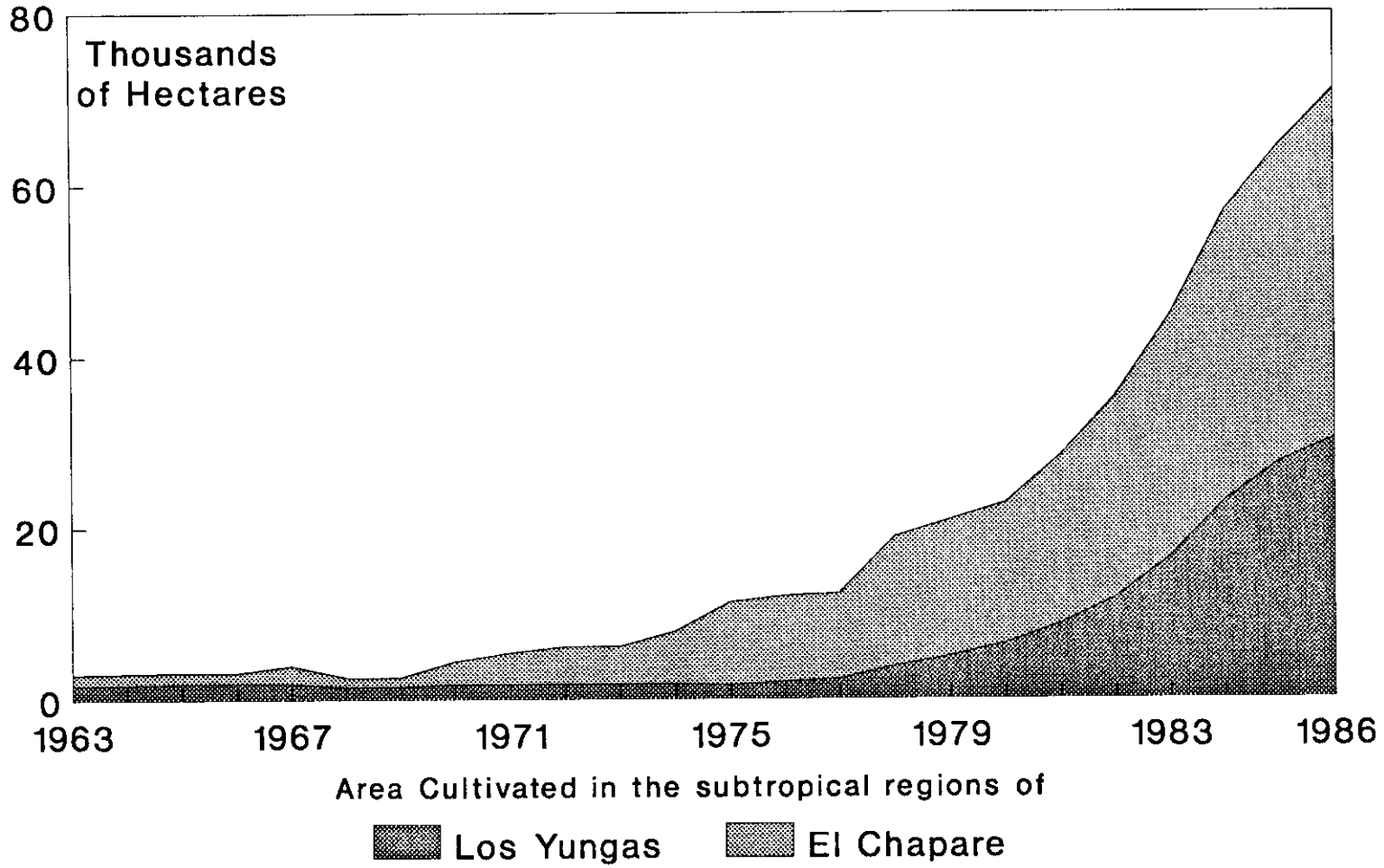
Since 1965, land used and crop production has increased more than any other cash crop in Bolivia (see Figure No. 6). By 1981, approximately 15,000 families, or 80,000 people, were living in the sub-tropical region of Chapare. These families were growing coca and selling it locally at prices so high that they provided excellent incomes for many peasants. Blanes (1981) estimated that a plot averaging twelve hectares, with two dedicated to coca, and not requiring more than family labor yielded annual earnings that fluctuate between $US. 15,000 and 20,000 in 1981. However, those who contribute most in the creation of the commodity (cocaine) are comparatively less economically rewarded than those who market the end product in the undergrounded industry.

Until 1983, the crystallization of cocaine powder had been done in Colombia, where loads of raw material arrived from hundreds of concealed landing fields in the Beni plains and Brazilian savannahs in the Bolivian lowlands. At the present, a large portion of crystallization is also being done in Bolivia.

According to governmental sources there is a fear that the drug cartel in Colombia is reallocating part of its headquarters into Bolivia's lowlands were police and governmental resistance are less developed (Hoy International 1990).

Figure 6

Land Use for Coca Leave Production



Source: Debate Agrario No. 9 ILDIS, La Paz 1987.

In 1986, about 70,000 to 80,000 families were growing coca in El Chapare, while another 25,000 were doing the same in Los Yungas. This represents a total population of about 550,000 people, seven times as many as were involved in coca production six years before. This differential advantage of coca production led to the reduction or elimination of other agricultural products such as rice, banana, and citrus fruit cultivation. At the same time, peasants from the highlands see the substitution of crops in the subtropical regions as an opportunity to earn income and leave their land in fallow in order to regain its productivity.

The cocaine economy also affects the labor market. A peasant or urban worker can earn in two nights the equivalent of the monthly wage of a construction worker in the nearby cities of La Paz or Cochabamba by stepping on bunches of coca leaves drenched in sulfuric acid and inmerseed in large pits covered with plastic. In general these high wages in the informal economy encourage large scale farmers to continue to use labor-saving technology instead of rural labor, despite the constant migration flows toward the lowlands and growing unemployment rates among the peasantry.

3. Coca and Cocaine Production. Estimates of cocaine output in Bolivia vary. Doria Medina (1986) assumes that 300 to 350 kilograms of coca leaves are needed to elaborate

approximately 1 kilogram of cocaine. Since coca leaves differ in size and level of alkaloid between both regions, it would not be unreasonable to assume that 350 kg. of coca leaves from Los Yungas are demanded to make one kilogram of cocaine, while 300 kg. of coca leaves from El Chapare are used for the same purpose. After subtracting 20 percent of production for local demand from Los Yungas and 8 percent from El Chapare region, the first figure would yield approximately 56 metric tons of cocaine plus another 406.2 metric tons from El Chapare. The value of the cocaine production will also be different depending on the type of leaf and on the chemical procedures used. Most peasants use primitive "laboratories" which yield generally highly impure paste and a lower yield per amount of raw coca (Blanes 1990).

If 1986 prices stipulated from the Drug Enforcement Agency (DEA) are taken into consideration, the total value of coca and cocaine production would fluctuate above Bolivia's official GNP. However, a small proportion of cocaine is consumed and exported for medical products and most is sold illegally and smuggled out of the country. Many activities involving many people are indirectly related to cocaine production. However, their magnitude is difficult to appraise given their clandestine character. Different attempts have been made to estimate the informal cocaine activity in Bolivia's economy. Machicado (1984) estimated

that around $US. 350 million circulate within the economy. Other figures estimate $US. 300 and up to 500 million (Doria Medina 1986). The latest estimation published by private research institutions shows figures near $US. 600 million in 1989 (Pablo Ramos 1990). In addition another $US. 1,500 million are sent to private banks out of Bolivia.

In order to clamp down on smuggling and to carry out substitution programs for the growers, the government has set new development programs in both areas. While these programs have been funded by the U.S., they also have been fiercely resisted by the local producers and peasant unions. In 1989 Bolivia developed a five-year plan to substitute illegal crops for other cash crops such as coffee and mint. However, the implementation of such a program depends primarily on international aid.

CHAPTER VII

FARM SIZE DISTRIBUTION BY ECOLOGICAL REGION AND LAND CONCENTRATION IN BOLIVIA

The Bolivian government has tried to discuss regional disparities in development using the administrative states as the basic units of aggregation. The results of using such large units has been that most conclusions have been generalized without a proper knowledge of regional agrarian structures where altitude and ecological characteristics are key variables to explain the differences within the agricultural sector. The choice of administrative regions as statistical units tends to hide the basic fact that the peasants operate in different environments. To avoid this problem, the present research divided Bolivia by ecological region desegregating the administrative states into provinces and by re-grouping these by ecological characteristics. It is at this level that a more detailed picture of spacial variations can be discussed.

The location and distribution of each ecological region has been presented in a previous chapter. The differences in altitude, climate, soils and precipitation plus the fact that farm size distribution is more or less different in each ecological region, suggests that environmental factors and land concentration may contribute to explain better the different levels of agricultural development in the agrarian

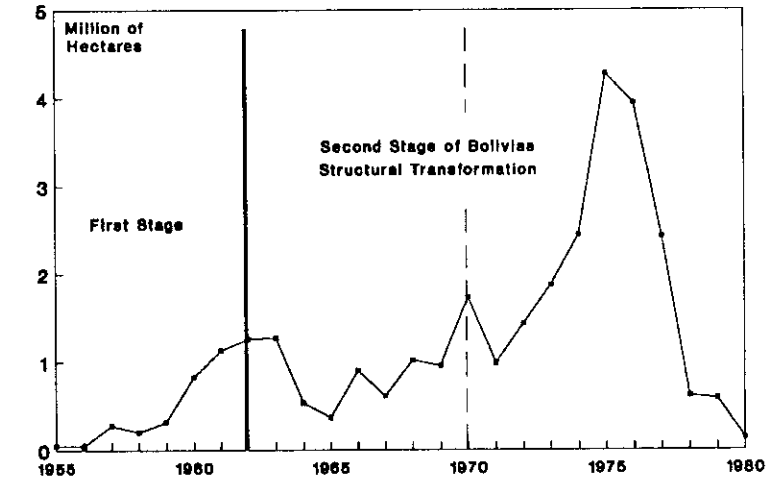
structure.

Taking into account the relationship between ecological characteristics and the socio-economic factors that have affected Bolivia's land distribution, this chapter will summarize the principle cause of land concentration and its different levels by ecological region. In summary, the chapter will present the results of Bolivia's latest agricultural census, dividing it by ecological regions and provinces. Other related parameters of the agrarian structure, such as rural population density, livestock distribution, migration and bimodal or unimodal structures of farm size will be presented as well.

A. LAND DISTRIBUTION IN BOLIVIA

Data on land redistribution and the allocation of titles to public land, presented in Figure No. 7, provide a starting point to assess the cause of high land concentration in Bolivia. In the process of Bolivia's structural transformation, land distribution has played an important role as part of the agricultural development policy. This is especially true in the tropics where lowland settlements have traditionally been seen by nationals and foreigners as one of the principal means of solving the many social and economic ills associated with life in the highlands and valleys.

Figure 7
Land Distribution from 1955 to 1980 in Bolivia



Source: C.N.R.A. La Paz, 1984

Table 9
Land Distribution from 1955 to 1980 by States in Bolivia

State	Redistribution of Land			
	1955 to 1970 (Hectares)	Percentage (•)	1970 to 1980 (Hectares)	Percentage (•)
La Paz	1,979,516	26 %	5,179,221	70 %
Oruro	550,578	17 %	909,568	36 %
Potosi	1,376,373	62 %	2,267,236	102 %
Cochabamba	1,436,534	40 %	2,250,516	62 %
Chuquisaca	1,420,664	27 %	2,981,161	56 %
Tarija	475,840	27 %	1,336,721	76 %
Pando	12,465	1 %	90,408	7 %
Beni	2,577,962	62 %	6,753,226	164 %
Santa Cruz	2,199,553	58 %	9,376,251	248 %
TOTAL	12,029,485	36 %	31,144,308	95 %

(•) Percentages with respect to total land used in 1950.
Source: C.N.R.A., La Paz 1987.

As state policies encouraged this process with the objective of boosting agricultural production, large and medium farm enterprises began to accumulate capital through real future appreciations, inflation premium, income tax exemptions, credit cost advantages of large ownership plus subsidies for the production of commercial crops. Furthermore, new agricultural enterprises began to raise land prices beyond the capitalized value of agricultural profits[20]. Consequently many large scale farmers began to pressure the government to distribute more land in the tropics.

In the beginning of the seventies, these demands were met. New extensions of land were distributed regardless of any economic consideration. Figures of the National Agrarian Reform Service (CNRA) show that land distribution between the states of Beni and Santa Cruz comprises about 52 percent of all Bolivia's land distributed between 1970 and 1980 (see Table No. 9). Data of Santa Cruz land titles and area distributed from 1955 to 1980 show an increasing size of land distributed per owner (see Table No. 10).

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[20] See Hans P. Binswanger and Miranda Elgin. Reflections on Land reform and Farm Size. Paper presented at the XX International Conference of Agricultural Economists, Buenos Aires, Argentina 1988.

Table 10

Land and Titles
Distributed in the State of Santa Cruz
(1955 - 1980)

Years	Titles Distributed	Hectares Distributed	Average per owner
1955 - 60	17	31,545	1,856
1961 - 65	72	135,221	1,878
1966 - 70	370	1,155,725	3.124
1971 - 75	781	2,700,362	3.458
1976 - 80	183	844,293	4,614

Source: Bojanic, Alan. Tenencia y uso de la Tierra en Santa Cruz. CEDLA, La Paz, Bolivia 1987.

While large public grants were made, small settler population were pushed further and further into the jungle. At the same time the large commercial farmers were introducing technological changes which had a profound effect on the labor process, substituting proletarian for family labor in successive frontier stages (Redclift 1987).

Meanwhile, most land titles in the valleys and highlands were distributed to small scale farmers and peasants that operated holdings with less than 20 hectares. In 1963 the Bolivian government made the first evaluation of land distribution. The results at that time indicated that 98 percent of the landholdings distributed were less than 20 hectares. Of these, 87 percent were less than five hectares. These small landholdings were at the time subdivided into small plots by the peasants (Clark 1971).

In this first stage of land distribution, the CNRA redistributed land to peasants based on pre-reform customary differences. Despite the individual owner-operator status of most peasants, certain groups in densely populated areas gained access to land by largely customary means. For example, it was quite common for the peasantry to begin to subdivide communal land -usually pasture land- among newly created families so that these families could have at least a minimal customary access to land upon marriage (Clark 1971). Other peasants without sufficient access to land resources worked out some kind of arrangement with other peasant families in the community or neighboring communities.

In 1975 a new evaluation of land distribution was done by the Bolivian government. The results show that 21.7 percent of the land titles distributed in the Altiplano and Valleys had less than one hectare and that 61% had less than five hectares (Dandler 1987). Many scholars began to observe that some communities did not have enough communal land which could be divided between newly created families. Under these circumstances most of the new families took up residence with one of the parents and searched for off-farm seasonal employment either in the cities or in other agricultural areas during the year. As we can appreciate, the land ownership structure, as well as the tenure system, was a composite of a legally-prescribed landholding system

based on the land reform law and the customary traditions of the peasants.

B. RESULTS OF THE SECOND AGRICULTURAL CENSUS

In 1987 the Bolivian government began to make public the results of the second agricultural census. The results show a total 291,986 holdings in seven states. While 284,881 surveyed holdings share 11,335,270 hectares, the remaining 7,282 units (2.5 percent of the total) are landless peasants scattered in the rural area. After regrouping the data into ecological regions[21], the distribution of these holdings are as follow: 22.4 percent belong to the central and southern Altiplano, 59.6 percent are in the subtropical and sub-puna valleys and the remaining 18.0 percent are in the lowlands.

The majority of the landholdings are located in the sub-puna valleys. However, these units share only 9.6 percent of the total land. In the tropics, peasants and farmers share 75.4 percent of the land while in the highlands peasants have the remaining 14.4 percent (see Table No. 11).

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[21] The present research has divided Bolivia by ecological regions desegregating the administrative states into provinces and re-grouping these by ecological characteristics and AASL parameters. See chapter IV, Methodology to approximate land concentration according to regional agrarian structures.

Table 11

Distribution of Holdings and Land
by Altitude Parameters (*)

Level	Holdings	(%)	Hectares	(%)
Highlands	63,746	22.4	1,627,844	14.4
Valleys	169,684	59.6	1,158,779	10.2
Lowlands	51,451	18.0	8,548,647	75.4
TOTAL	284,881	100.0	11,335,270	100.0

(*): Figures do not take into account the states of La Paz and Beni. Total figures do not show landless units.
Source: Based on II Agricultural Census, La Paz - Bolivia, 1987.

C. LAND USE BY ECOLOGICAL REGION

Land has been divided by use in each region. Crop land comprises 12.1 percent of the total hectares surveyed. Forest land comprises 52.1 percent and pasture land 33.7 percent. The remaining 2.1 percent of the land has been classified as other land not used for agricultural purposes (see Table No. 12).

A good indicator of the relative scarcity of land as a factor of production is the percentage of the average size farm devoted to crop land. It is expected that regions that are densely populated devote at least three-quarters of land in farm holdings to the production of crops (Johnston and Kilby 1975). As we will see the differences across regions in crop land per holding vary radically.

Table 12
Land Use and Number of Holdings by Ecological Region

Ecological Region	Number of Holdings	Total Hectares	Crop Land	Forest Land (Hectares)	Pasture Land
Central Altiplano	53,199	1,293,361	224,422	34,243	971,370
South Altiplano	10,547	334,483	49,460	33,708	253,230
Sub-Puna Valleys	149,223	1,089,490	364,820	264,302	392,683
Subtropical Valleys	20,461	69,289	52,853	4,053	10,404
Integrated Area	20,441	979,579	393,017	289,705	280.309
Brazilian Shields	12,598	3,366,939	113,118	1,835,265	464,456
Bolivian Chaco	14,706	2,461,895	145,675	1,774,745	1,426,139
Amazon Rain Forest	3,706	1,740,234	28,303	1,676,552	31,134
T O T A L	284,881	11,335,270	1,371,669	5,912,573	3,829,723

Source: II Agricultural Census, La Paz - Bolivia 1987.

The ecological characteristics and altitude of each region has induced the peasants to adopt different strategies of accumulation. In the highlands it is quite common for peasants to base there income on livestock production in addition to wage labor. We must note also that large variations in the intensity of cultivation also exist due to the different types of soils and favorable ecological characteristics in each region.

1. Crop Land. Approximately 7.3 percent of the Bolivia's area (8 million hectares) can be classified as prime crop land for production (Roca 1988). However, 62 percent of this land has never produced agricultural crops. In the last years the average area under cultivation (1984-87) was nearly 1.4 million hectares (INE 1988). Therefore, less than 18 percent of the prime crop land was used. It is also estimated that another 7.4 million hectares of marginal land can be used for crop production. Most of this land is classified as pasture land and is difficult to access (Wennergren and Whitaker 1975).

As shown by the second agricultural census, the proportion of crop land differs widely due to the climate and altitude characteristics of each region. In the highlands, crop land counts for only 16.8 percent of the total land. Of these 273,882 hectares, only 18.1 percent are in the southern Altiplano while the remaining 81.9 percent

are in the central Altiplano. In the subtropical and sub-puna valleys 38.3 percent of the total land is used as crop lands. Of 1,089.5 thousand hectares in the sub-puna valleys, about 33.4 percent are for cultivation while in the subtropical valleys 76.2 percent of 69,289 hectares are cropland. In the integrated area of Santa Cruz, 393 thousand hectares out of 979.6 thousand (40.1 percent) are for cultivation. The rest of the lowlands, Amazon rain forest region, Brazilian shields and Bolivian Chaco use only 3.8 percent of their land for agriculture.

2. **Cultivated Area.** Bolivia has increased agricultural production mainly by expanding its cultivated areas. With heavy investment in the new road system between the city of Cochabamba and Santa Cruz, cotton, sugarcane and rice production expanded rapidly. By the 1960's the integrated area of Santa Cruz was producing more rice and sugarcane than could be absorbed by the national market. Efforts to export rice proved unsuccessful, so that those with the financial resources to export concentrated on more profitable crops, such as soybean and, to a lesser extent, sugar and cotton. Rice became increasingly identified as the smallholder's crop. Those who continued to grow it struggled among themselves for a share of the limited market (Painter 1985).

In the tropical and subtropical regions (including the states of La Paz and Beni), cultivated area has expanded by 490 thousand hectares since the land reform (see Table No. 13). This 5.7 percent increase per year is mostly explained by the new crop production in the integrated area of Santa Cruz. Meanwhile, cultivated area has doubled in the traditional sector with a growth rate of 1.8 percent since 1950 (including the state of La Paz).

From 1980 to 1987, Bolivia's total cultivated area continued to expand, but at slower rates (see Table No. 14). While cultivated areas for cereals have grown 2.8 percent year, crop land for potatoes has decline by -0.88 percent each year. Note that most potatoes plants grow in the highlands and sub-puna valleys and constitute the main cash crop among the peasants. Cultivated areas for vegetables, fruits, industrial and foraging crops have expanded by 4.1 percent, 2.6 percent, 1.3 percent and 1.3 percent, respectively. The most impressive growth rates are those of coca leaves. While cultivated area for coffee has increased at a rate of 2.5 percent per year, land for coca production has expanded 15.3 percent a year in the subtropical valleys.

According to Miguel Urioste estimates, in 1979 about 93 percent of the countries cultivated area was farmed by small scale farmers and peasants with holdings less than 20 hectares. Medium and large scale enterprises with more than 20 hectares use only 7 percent of the land,

Table 13 Cultivated Area of Main Crops in Bolivia (Hectares)

	Average 1961-64	Average 1965-68	Average 1976-79	Average 1980-83	Average 1984-87
CEREALS	466,098	459,759	432,331	541,035	651,850
Wheat	91,349	64,545	87,694	92,064	97,746
Rice	27,608	32,727	64,595	57,591	102,590
Barley	87,091	81,383	105,900	72,603	90,567
Maize Grain	231,824	259,710	239,797	288,304	311,165
TUBERCLES	123,636	126,906	174,673	183,960	199,139
Potatos	110,030	103,969	143,763	153,300	144,141
Cassava	12,721	14,512	18,874	18,405	38,811
VEGETABLES	74,624	92,586	84,169	69,995	98,353
Broad Been	20,843	19,349	25,420	20,928	34,438
Kidney Bean	8,587	8,697	3,463	5,256	8,302
Green Pea	10,633	10,996	11,279	9,456	13,791
Tomato	4,299	5,485	4,658	2,823	3,938
Green Onions	6,259	6,999	5,599	4,423	5,291
Maize	26,151	41,060	27,628	14,331	21,161
Pumpkin			8,820	7,705	7,507
FRUIT	23,947	29,020	51,109	57,499	72,749
Orange	2,519	2,864	7,280	10,799	11,501
Mandarin	978	1,113	2,440	3,421	3,551
Lemon	1,229	1,389	1,704	1,570	1,725
Grapes	1,230	1,430	4,603	4,100	3,654
Apples	3,270	3,250	2,708	1,793	1,109
Peach	6,069	5,563	6,129	6,351	5,886
Bananas	8,133	12,321	25,388	28,885	44,744
INDUSTRIAL CROPS	23,540	39,281	125,618	138,803	154,149
Peanuts	4,454	5,536	15,540	13,024	14,031
Soybean		372	16,875	40,824	57,758
Sugar Cane	21,937	28,675	68,753	70,217	71,949
Cotton	2,633	4,884	34,183	13,211	9,178
FORAGING CROPS	35,334	48,700	21,476	99,050	110,072
Green Alfalfa	5,000	10,050	14,965	15,785	21,847
Barley	34,084	38,650	67,120	67,696	63,721
Oats			2,020	8,098	6,315
Maize			1,800	3,086	4,104
Sorghum				4,385	14,086
ESTIMULANTES	10,941	16,337	40,906	63,380	79,839
Coca leaves	3,050	3,242	15,998	32,757	64,135
Coffee	6,087	9,839	20,289	26,358	27,178
Cacao	3,330	3,257	4,619	4,266	4,561

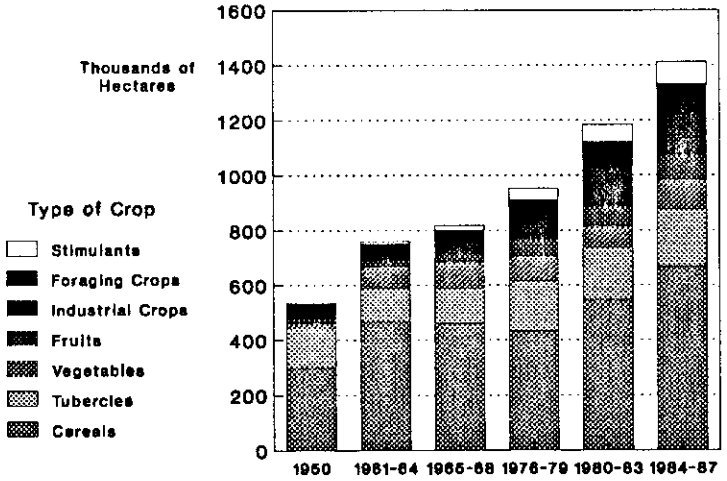
Source: I.N.E. Department of Agricultural Statistics, La Paz 1989.

Table 14
Cultivated Area Since the Pre-Reform Period in Bolivia
(Hectares)

Type of Crop	1950 (•)	1961-64	1965-68	1976-79	1980-83	1984-87
Cereals	298,943	466,098	459,759	434,223	546,958	667,778
Tubercles	143,859	123,636	128,156	180,578	189,489	208,011
Vegetables	16,895	76,967	95,516	90,465	76,843	106,015
Fruits	16,466	23,997	29,486	58,998	69,463	85,650
Industrial Crops	16,440	23,540	39,281	125,618	138,803	154,149
Foraging Crops	36,821	35,334	48,700	21,476	99,060	110,072
Stimulants	4,389	11,017	16,413	41,338	63,520	80,012
TOTAL	535,813	760,588	817,312	952,684	1,184,125	1,411,688

(•): Figures based on I Agricultural Census, La Paz 1950
Source: National Institute of Statistics, La Paz 1988

Figure 8
Cultivated Area Since the Pre-reform Period in Bolivia



(about 90,300 hectares) despite the fact that the distribution of land is skewed toward large landholdings. As we will see, this situation has not changed throughout the years.

3. **Pasture Land**. Total land categorized as pasture land comprises 33.7 percent of the total land surveyed. Of the 3,829,723 hectares, 31.9 percent are located in the highlands. In the central Altiplano, 79.3 percent is in pasture while the southern Altiplano has only 20.7 percent. Pasture lands are not common in the subtropical valleys. Only 0.27 percent of the land has this characteristic. In the sub-puna valleys the proportion of pasture land is 36 percent while in the integrated area of Santa Cruz a relatively small proportion of the land (28.6 percent) is for this purpose. In the rest of the ecological regions, pasture land reaches as high as 50.1 percent of the total land. Most of it (74.2 percent) is located to the south of the integrated area of Santa Cruz or what has been denominated Bolivian Chaco.

4. **Forest Land**. Forest land reaches as much as 52.1 percent of the total area surveyed. However, the proportion of forest lands in the lowlands is very high compared to the valleys and Altiplano. Most of the forest land is in the Brazilian Shields, Bolivian Chaco and Amazon region. All

these regions together have 89.4 percent of the forest land surveyed. The remaining 10.6 percent are distributed in the valleys and, to a lesser extent, in the highlands.

D. RURAL POPULATION BY ECOLOGICAL REGION

Rural population is also distributed widely according to ecological regions (see Table No. 15). The central Altiplano has a rural population of 473.7 thousand while the southern Altiplano has only 75.9 thousand. With respect to all the other regions, the highlands have about 25 percent of the rural population. Sub-puna and subtropical valleys have 52.6 percent of the rural population, however, 84 percent is located in the sub-puna valleys. All the regions in the lowlands have a total of 490.4 thousand rural inhabitants, with about 47 percent concentrated in the integrated area of Santa Cruz (see Figure No. 9).

1. Rural Density by Ecological Region. Taking into account the rural population figures and area surveyed in each ecological region, the sub-puna valleys have the highest rural population density. The demographic pressure has increased at an annual rate of 0.8 percent from 1950 to 1987. In contrast, in the integrated area of Santa Cruz, rural population density has grown by 4.2 percent per year.

Table 15
Rural Population in Bolivia by Ecological Region

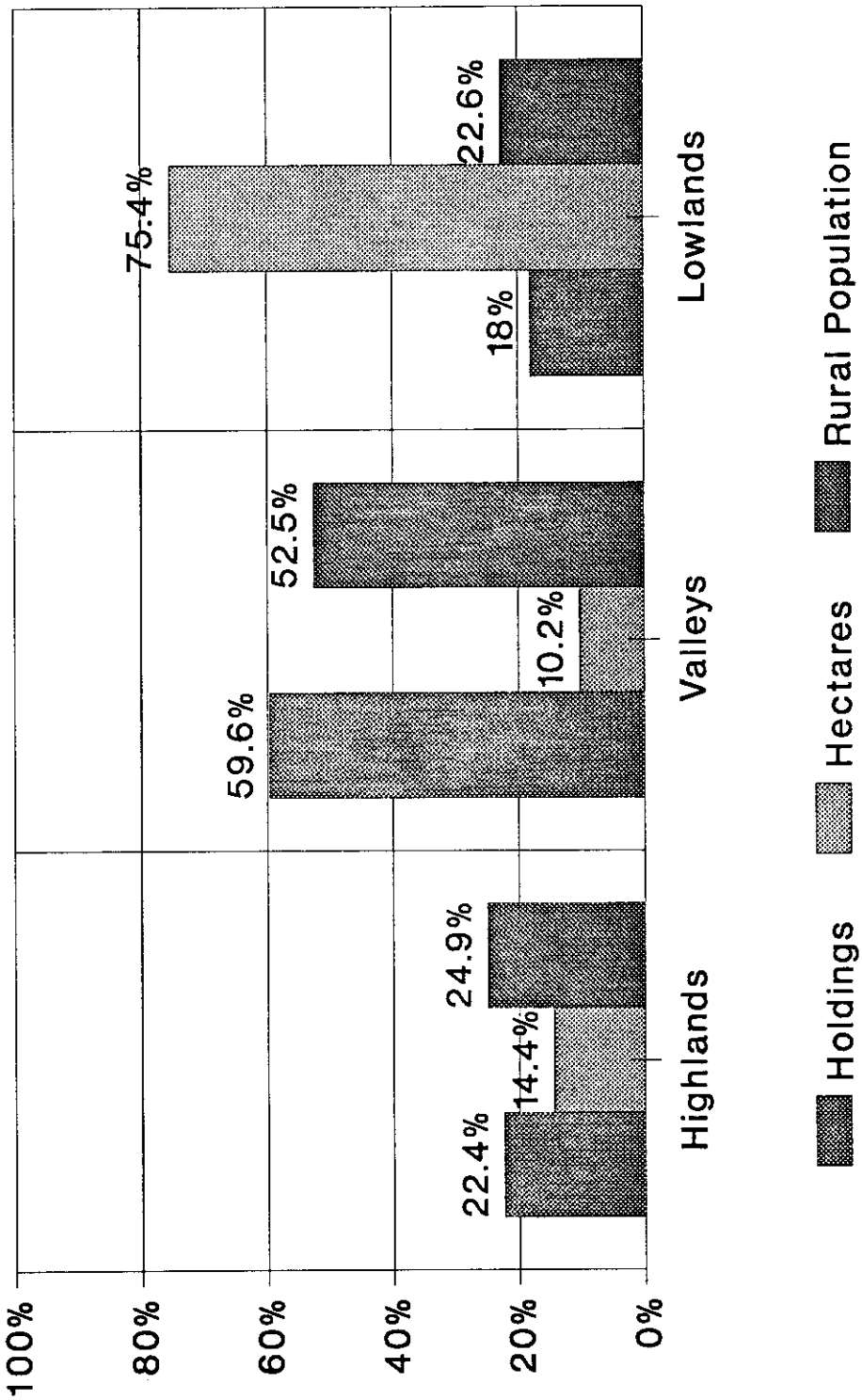
Ecological Region	Rural Population 1950	Rural Population 1987	Area in Km²	Density 1950	Density 1987
Central Altiplano	296,204	473,774	56,555	5.24	8.38
South Altiplano	42,899	75,932	87,985	0.49	0.86
Subtropical Valleys	101,290	187,431	37,110	2.73	5.05
Sub-puna Valleys	716,421	969,451	89,962	7.96	10.78
Integrated Area	49,730	228,244	34,960	1.42	6.53
Brazilian Shields	42,150	126,716	122,445	0.34	1.03
Bolivian Chaco	53,886	97,622	240,693	0.22	0.41
Amazon Rain Forest	18,078	40,793	63,827	0.28	0.64
T O T A L	1,320,658	2,199,963	733,537	1.80	3.00

Source: National Institute of Statistics, La Paz 1990.

Comparing the 1950 demographic census with the projections for population growth, based on the 1976 demographic census, the high increase in population density is due to (a) the physical capital invested in infrastructure after the agrarian reform; (b) the creation of different institutions that encouraged agricultural production through subsidies and (c) colonization programs in the lowlands. These three events explains why the Santa Cruz region is becoming densely populated while there is a low rural population density growth in the rest of the country. Most roads were constructed toward the tropics, which had a direct effect on access to land and an indirect effect on agricultural productivity. At the same time, many of the peasants who originally went to Santa Cruz as seasonal wage laborers remained there as settlers.

Another densely population region is the central Altiplano, with a 1.27 percent growth rate since 1950. In the subtropical valleys there is a 1.67 percent growth rate while in the lowlands, rural population has been concentrated in the integrated area. The Brazilian shields, Bolivian Chaco and Amazon region combined have a population density growth rate of 2.3 percent since 1950.

Figure 9



(*): Figures do not take into account landless units
Source: II Agricultural Census, and I.N.E, La Paz 1987

In order to show a better picture of population pressure in Bolivia, rural population and livestock was divided by cropland and pasture land and by ecological region. Livestock comprises cattle, goats and sheep, horses and donkeys, hogs and llamas. In general livestock distribution is highly skewed. Most of the holdings with large amounts of pasture land are dedicated to livestock production. Herd sizes range widely by region. In the highlands and valleys, herds are mostly kept in mixed farming areas. This enables the family unit to attend to both livestock and crop production, but exposes livestock to generally poorer grazing conditions. In the lowlands, a large proportion of the large scale enterprises are dedicated exclusively to cattle raising. In general, it is surprising that knowledge about spatial distribution and ownership of livestock has never been measured before. Table 16 provides a better understanding of animal and population pressure in Bolivia's agrarian structure.

E. MIGRATION TO THE SUBTROPICAL REGIONS

Migration flows are generally sensitive to the changing regional development levels of a country. The patterns in Bolivia during the last two decades suggests that two new regions have undergone a process of accumulation, based on illegal activities (drug trafficking). Recently, research has demonstrated that the new regions are characterized by

Table 16
Animal Population by Ecological Region

Ecological Region	Cattle	Hogs	Goats	Sheep	Llamas	Alpacas
Central Altiplano	82,159	43,262	144,620	934,448	148,507	8,470
South Altiplano	13,506	6,375	108,604	122,289	140,131	831
Sub-Puna Valleys	556,703	221,084	975,024	1,481,703	43,977	257
Subtropical Valleys	56,041	21,554	17,868	269,007	11,019	149
Integrated Area	315,024	60,089	3,828	14,066	0	6
Brazilian Shields	393,107	38,315	2,291	2,652	0	0
Bolivian Chaco	378,536	105,187	95,216	48,553	14	1
Amazon Rain Forest	13,261	14,268	90	1,679	0	0
T O T A L	1,808,337	510,268	1,347,541	2,874,377	343,648	9,714

Source: II Agricultural Census, La Paz - Bolivia 1987.

small scale farmers and are absorbing a considerable proportion of the labor force from the highlands (Flores and Blanes 1986). The new demand for labor can be explained by the boom of coca leaf production in the subtropical valleys in Bolivia[22]. In these regions, it is believed that there have been increasing wage rates due to the substitution of crops and high expectations for new seasonal employment opportunities. This increase in wages has led to higher opportunity costs for labor, thereby inducing many medium scale farms in the area and the large scale farms in the lowlands to adopt labor saving technology.

Despite the job opportunities related to coca leaf production, seasonal unemployment among the peasantry continues to increase. Even though unemployment figures for the agricultural sector in Bolivia do not exist, migration of rural Quechua and Aymara peasants to the eastern lowlands and subtropical valleys has been a major development within rural Bolivian society in the last decades, although it is barely keeping up with population growth in the highlands and the general economic crisis of the country.

At first it was believed that the increase of small shops and stores in many peasant communities and new towns in the highlands and valleys was a sign of economic dynamism after the land reform. However, surveys conducted in some

[22] According to our ecological boundaries, the subtropical valleys will cover most of El Chapare region.

communities indicate that "such enterprises were symptomatic of impoverished households trying to find a way to earn income rather than prosperous farm families investing revenues earned through agriculture"[23].

Since 1984 other important rural migration patterns have been observed as a result of the 1983-84 drought, especially those of the Quechua indians of Potosi and Chuquisaca highlands. Since then, most peasants have been migrating rapidly to the cities of La Paz, Sucre and Cochabamba in search of permanent residence[24]. Additionally, there has been a phenomenal increase in the activity of peasant trade. This has contributed even more the expansion of black markets in the cities.

1. Estimates of Rural Migration in Bolivia. Garcia-Tornell and Querejazu (1984) estimate that since 1950, about 135,000 people have migrated permanently to the integrated area of Santa Cruz from other regions. Such migration flows were encouraged by a succession of national governments, beginning with the revolutionary government of 1952 (Movimiento Nacionalista Revolucionario), which on one hand was concerned about relieving social and economic pressures

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[23] See Michael Painter, "Unequal Exchange: The Dynamics of Settler Impoverishment and Environmental Destruction in Lowland Bolivia" (p. 164-191), Westview Press 1988.

[24] See Schulze and Casanovas. Tierra y Campesinado en Potosi y Chuquisaca. CEDLA, La Paz 1988.

resulting from the inadequacy of the agrarian reform, and on the other hand hoped that the infusion of highlanders would undermine strong regionalist and separatist movements found in Santa Cruz (Painter 1985).

Zeballos (1988) estimated that more than 38,000 peasants migrate temporarily every year from the highlands and sub-puna valleys to the subtropical regions (especially to the Chapare region and Alto Beni) looking for job opportunities. Meanwhile, another 20,000 are involved in legal and illegal commercialization of coca and other illicit services during the year. In the lowlands, approximately 80,000 migrants go to the area of Santa Cruz and Bermejo (Tarija) in order to work for the large sugar cane and cotton farms[25].

Since the agricultural and industrial sector cannot absorb all the labor surplus and there is a lack of small-scale industry in the rural area, there has been increasing rates of international migration. It is estimated that 6.500 peasants migrate to the northern coast of Chile from the central and southern Altiplano every year, while 16,000 peasants of the southern sub-puna valleys go temporarily to Argentina. With the free trade zone in Iquique (Chile) and new copper mines in the desert of Atacama, many peasants began to haul cargo full-time for merchants shipping

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[25] See Hernan Zeballos, Agricultura y Desarrollo Economico. Editorial Bolivia 2000, (p. 144 - 150). La Paz 1988.

imported goods (and contraband) from Iquique across the mountains to Bolivia's main cities. Some become miners in Chile and stay until new opportunities are found by other members of the family in Bolivia.

2. Migration and Farm Size in Bolivia. The major cause of the migration patterns can be explained by the size of the landholdings operated by the peasants and the relative scarcity of land in each ecological region. According to Urioste (1985), in the central and northern Altiplano most holdings that range from one to five hectares can provide at most 40 percent of the minimal amount of calories to the family unit due to the ecological conditions, poor soils, and lack of new technology within the landholding.

In 1988 the technical division of the Ministry of Agriculture conducted a survey of peasants in the central and northern Altiplano and some sub-puna communities. The objective was to divide Bolivia's peasant landholdings into four types of production units: (a) infra-subsistence units, where the landholding cannot provide sufficient food for the family and most income is generated in the labor market; (b) subsistence units, where the landholdings can provide food for self-consumption while the family unit participates in the labor market during different seasons; (c) stationary units which are landholdings that use family labor and generate enough production in order to survive throughout

the year. These units have small surpluses which are exchanged with other agricultural commodities in small regional markets. However, this small surplus does not guarantee new investments in the landholdings in order to improve production; and finally (d) surplus units which are landholdings that provide sufficient food to the family unit and provide important surpluses to the market which are exchanged for commodities from the city and animals from other regions.

According to the results, infra-subsistence units account for as much as 65.6 percent of the peasants in the states of La Paz, Oruro, Cochabamba and Chuquisaca. Subsistence units comprise 10.0 percent; stationary units 12.3 percent and the remaining 12.1 percent are landholdings with surplus production (see Table No. 17).

Table 17

Type of Landholding in
the Highlands and Valleys.

Categories	La Paz	Oruro	Potosi	Cochabamba
Infra-subsistence	71	64	66	56
Subsistence	9	14	8	11
Stationary	10	12	13	16
Surplus units	10	10	13	17
T O T A L	100 %	100 %	100 %	100 %

Source: Ministry of Agriculture and Peasant Affairs, Tipologia de la Economia Campesina en Bolivia. La Paz 1987.

The size of these holdings by categories are not

necessarily the same in each state. The ecological differences confronted by each holding change significantly the farm size of each category used. In the central Altiplano surplus units were considered to be landholdings with more than 6 hectares, but in the sub-puna valleys some landholdings with more than 2.5 hectares were categorized as surplus units.

The limitations of this approach are obvious. First, the Ministry of Agriculture cannot generalize sample surveys to extended regions with different ecological characteristics. Each micro-region has a different crop production and hence each production unit may have different income levels. However, this information gives us a parameter of reference to see the relationship between migration and the size of the holding in the agricultural sector. As we can see, most units with less than five hectares search for job opportunities in order to increase their levels of income and hence their livelihood. If these estimates were accurate, most of the peasants surveyed in the second agricultural census would migrate in search for job opportunities.

F. FARM SIZE DISTRIBUTION

Farm size distribution constitutes one of the most critical variables in any agrarian structure. The size distribution of operational units is directly related to

rural income, migration, labor markets and other structural characteristics of the economy. In turn, all of these variables will have several effects on the pattern of agricultural modernization (Johnston and Kilby 1975).

Before showing the farm size distribution in Bolivia, and hence the level of land concentration in the agrarian structure, it is necessary to clarify that from a structural point of view, the term "bimodal" is correct only in the sense that the modes of the frequency distribution pertaining to the number of operational units and the area of each holding are at polar ends, whereas in the "unimodal" case the two modes tend to overlap (Johnston and Kilby 1975). In this section we shall be using the term "bimodal structure of farm size" in a generic sense to depict a situation where a small proportion of large scale farm units hold a large part of the land, while the greater part of the farm population is confined to very small, sometimes semi-subsistence holding.

1. <u>Farm Size Distribution in 1950 and 1984</u>. Comparing total figures from the first and second agricultural census, farm size distribution has improved in relative terms among the peasants and small scale farmers. Even though both areas censuses differ in absolute size and rural population has almost doubled (consequently there has been an increasing number of new landholdings in the rural area), the

proportion of landholdings operated by peasants and small scale farmers with more than one hectare account for a higher share of land , compared to the pre-reform period[26].

Table 18 and its respective Lorenz curves summarizes the change in the distribution of land between 1950 and 1984. Attention may be paid particularly to what is happening at the upper and lower levels of the agrarian structure, as a way of establishing whether the large scale farmers are getting more land and the subsistence peasants less in the distribution of land. Gini coefficients of land distribution are extremely high in both periods. The agrarian structure in the pre-reform period has a Gini ratio of 0.94. The gini ratio for 1984 was estimated in 0.93. Both coefficients are very high because of the different farm size distribution patterns in each ecological region. Despite these situations, the 1984 agricultural census shows us that about 63 percent of the holdings that range from 1 to 20 hectares account for at least 6.8 percent of the land. In the pre-reform period only 48.3 percent of the holdings with the same size accounted for 0.61 percent of the land.

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[26] A sizable fraction of the holding units rent their land from other peasants or larger scale farmers. Our concern here however, is only with operational units, that is, landholdings managed by an individual irrespective of whether land is owned or rented. Tenure arrangements will not be discussed in this paper.

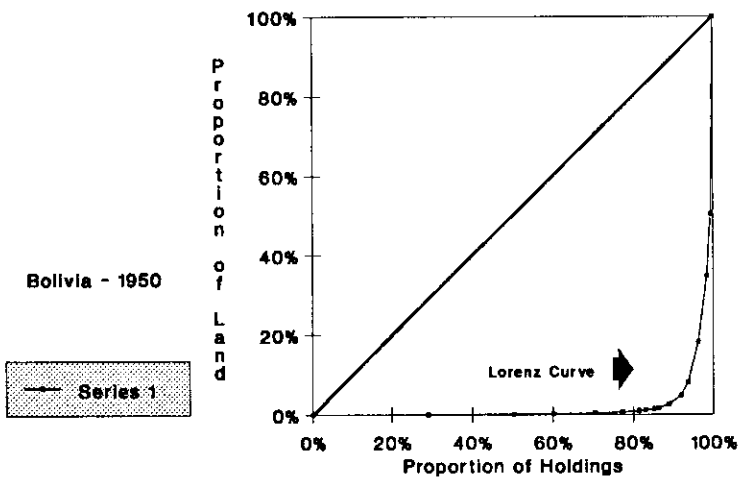
Table 18 Farm Size Distribution in 1950 and 1984

Size of Holdings	I Agricultural Census (1950)				II Agricultural Census (*) (1984)			
	Holdings	(%)	Hectares	(%)	Holdings	(%)	Hectares	(%)
< 1	24,747	29.06%	10,880	0.03%	67,628	23.74%	23,002	0.20%
1-5	26,451	31.06%	62,998	0.19%	124,764	43.80%	287,792	2.54%
5-20	14,671	17.23%	136,045	0.42%	55,479	19.47%	489,384	4.31%
20-100	7,608	8.93%	325,592	0.99%	27,907	9.80%	1,113,188	9.81%
100-500	4,732	5.56%	1,051,187	3.21%	5,657	1.99%	1,123,928	9.91%
> 500	6,951	8.16%	31,154,397	95.15%	3,446	1.21%	8,307,974	73.23%
TOTAL	85,160	100.00%	32,741,099	100.00%	284,881	100.00%	11,345,268	100.00%

(*): Figures do not take into account landless units. Second agricultural census comprises only seven out of nine states in Bolivia.

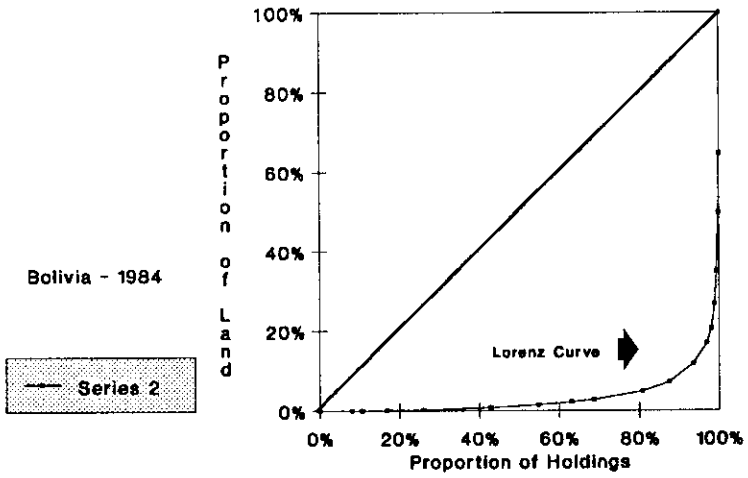
Source: I & II Agricultural Censuses, La Paz - Bolivia, 1950 and 1987.

Graph No. 11
Land Concentration in the Pre-reform Period



Source: I Agricultural Census, La Paz - Bolivia 1950

Graph No. 12
Land Concentration in the Post-reform Period



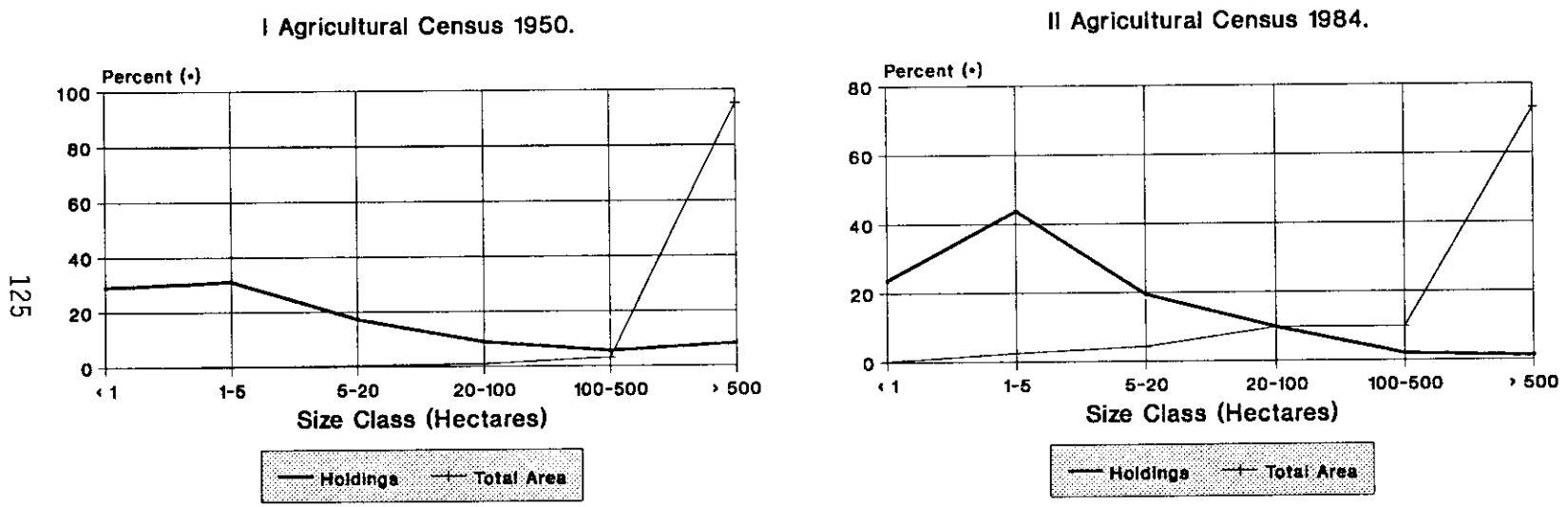
Source: II Agricultural Census, La Paz - Bolivia 1987.

Meanwhile, large landholdings with over 500 hectares, true latifundios in the pre-reform period, accounted for as much as 95.1 percent of the land. Since the land reform this proportion has diminished to 73.2 percent.

The two situations can be better represented in Graph 10 where the distribution of farm size in the pre-reform and post-reform period differ in terms of the percentage of total number of holdings and total land area. As we can see, both census show a typical dual structure of farms. This disparities in size can be conveniently compared with its respective Lorenz curves.

The question of interest is whether the concentration of land at the top is on a downward trend, to the advantage of the lower levels. The total results of the second agricultural census may indicate to us that this situation may be true, but a full knowledge of the dynamics of each regional agrarian structure would tell us that in some regions the opposite occurs. In the lowlands, especially in the integrated area of Santa Cruz, after the distribution of land during the seventies, there continues to be a tendency for large scale farms to purchase land from the peasants or invade their land. In the last 40 years some haciendas in the integrated area of Santa Cruz had been subdivided and redistributed to peasants after the land reform. Most of the landholdings redistributed had a size of between 20 and 30 hectares. Colonization programs were also developed.

Figure 10
Farm Size Distribution in 1950 and 1984



Source: I and II Agricultural Census, La Paz 1950 and 1984

Distribution of land to colonizers ranged from 20 to 100 hectares each. Meanwhile, although each large scale enterprises was distributed with more than 500 hectares, the establishment of land markets in the region led the new large agricultural enterprises to accumulate more land by purchasing part of the peasants landholdings or invade their land. It is quite probable that the rapid appreciation of land values has played an important role in the accumulation process in the commercial area. As credit policies facilitated the growth of commercial agriculture and land became a valuable commodity in the region, a struggle between existing settlers, peasants and large scale enterprises to control land became the most important feature of commercial agricultural development in the region.

As Redclift pointed out "the effect of this processes of land concentration and capital accumulation in the last years was not to induce generalized proletarianization, since most large enterprises cannot survive without the labor of the small scale farms in the cutting frontier" (Redclift 1987). Theoretically, the purchase of land by peasants is possible. But since most peasants have no equity and relay on the imputed value of the family labor, it will be difficult for the peasants to purchase land in the market (Binswanger and Elgin 1988).

With respect to the agrarian reform legislation, the

law is supportive of settlers rights, but it also acts as a double-edged sword. The reform laws advance the principle that "those who farm the land are its rightful owners" and states that "cultivated land should not be taken away from peasants, even if they have not yet acquired legal titles" (CNRA 1955). But since most settlers in the lowlands use family labor and cannot cultivate more than three or four hectares of land (while the rest is left fallow in order to regain its productivity), the remaining 20 or more fallow hectares are constantly invaded by neighboring large scale farmers who cultivate the area and claim part of the land as theirs. According to the land reform law, "land is of those who work it" (CNRA 1955). These simple statements has been manipulated by most large scale farmers in order to gain easy access to new land and claim ownership (Gill 1987).

Land invasion has also become an important issue in other agricultural regions, specially were large and small scale holdings coexist together. It is necessary to emphasis that the uncertainty of land ownership in the integrated area of Santa Cruz and other prominent agricultural areas may have important effects on the productivity and economic development of the agricultural sector. That this process happen in the most dynamic regions in the country is especially significant since a large proportion of the peasantry in this region relays on income from agriculture.

In the last five years, during which the government implemented the structural adjustment process (1985), the real value of wages had become so low that many miners and near-landless peasants in the cities migrated to the frontier of Santa Cruz -and especially to the northern region of La Paz- in search of new land. Since most of the land has been already assigned to large enterprises with absentee landowners, many miners and peasants decided to invade and become small scale subsistence cultivators.

After claiming ownership of the land, it has been observed that after two or three years, some of these peasants become coca producers or spend great amount of time in illegal activities. Most end up producing coca leaves and extracting gold from the rivers. Others work part-time in large scale farms next to them taking care of the livestock or the hacienda. Sometimes these haciendas hide little laboratories for the processing of coca leafs into cocaine.

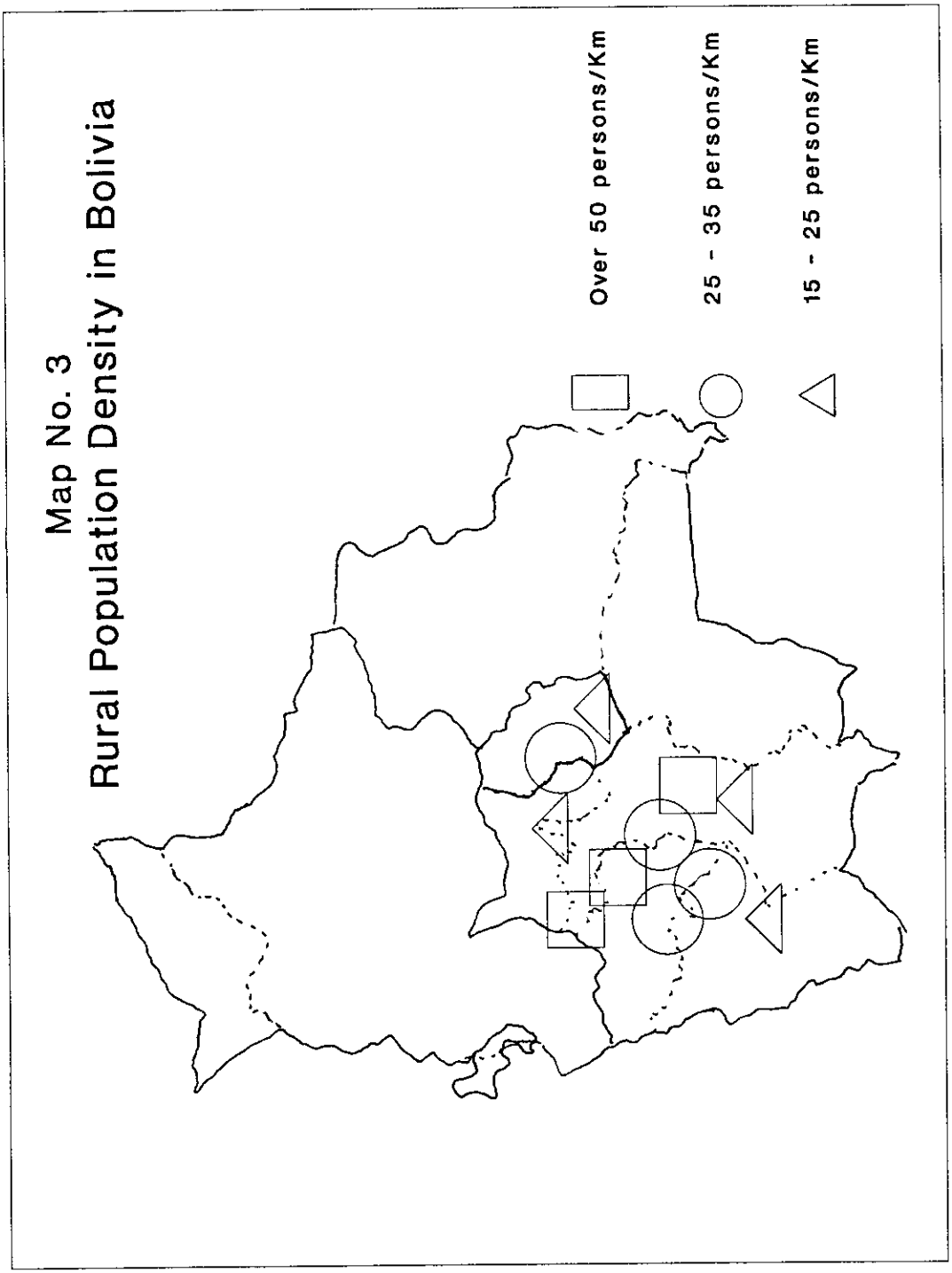
With the respective income generated from these illegal activities, the peasants organize active groups that challenge any attempt of interference from the government or non governmental organization in there respective region.

As we can appreciate, the concentration of land ownership and lack of land markets has increased the difficulty for many settlers to establish themselves as independent small farmers. A large proportion of them become an impoverished, wage-earning peasantry, while others

accumulate wealth and power through illegal activities. This situation has contributed substantially to the social differentiation among Bolivia's rural population.

2. Landless Near-landless Peasants. Even though we may think that there is plenty of land in Bolivia, in the last decade there has been a growth of landless and near-landless peasants in the agrarian structure. Some provinces in the Altiplano and sub-puna valleys are already densely populated and therefore suffering from a shortage of land. According to figures of rural population by provinces (INE 1987), the highest rural population density is found in the sub-puna valleys. Three provinces show a rural population density over 50 people per square kilometer. Population density from 25 to 35 inhabitants per square kilometer are found in five other provinces. Three are located in the sub-puna valleys, one is in the integrated area of Santa Cruz and the other in the central Altiplano. This is clearly represented in map No. 3.

3. Land Fragmentation. The Bolivian law of inheritance demands that the inherited land is divided equally among all the children. This may have been initially instituted for egalitarian reasons, but the agrarian law plus the precarious land market in the subsistence sector has lead to land fragmentation. The degree of fragmentation can be seen



Source: I.N.E. La Paz - Bolivia 1990.

in the 67,628 holdings that have less than one hectare and 7,282 landless units in the agrarian structure (see table No. 19). Most of the landless peasant are located in the central and southern Altiplano (46.4 percent) and the sub-puna valleys (39.8 percent). In the lowlands and subtropical regions, only 10.1 percent and 3.7 percent of the peasants are landless.

4. Farm Size Distribution by Ecological Region. According to the figures in Table 20, the proportion of units with less than one hectare varies with respect to the population density. Densely populated areas, such as the sub-puna valleys, hold about 62 percent of the landholdings with less than one hectare. Another important proportion of holdings with this farm size category are in the central Altiplano (16.8 percent) and subtropical valleys (7.8 percent).

There is 124,764 landholdings that have one to five hectares (42.7 percent of all the land holdings surveyed). Most of them are in the sub-puna valleys (42.4 percent) and in less extent in the central Altiplano (17.6 percent). All these landholdings comprises only 287,792 hectares. That means that the bulk of landholdings are concentrated in farms with one to five hectares, however, they shares only 2.5 percent of all the land.

Table 19 Landless and Near-landless Units by Ecological Region

Size	Central Altiplano	South Altiplano	Sub-puna Valleys	Subtropical Valleys	Integrated Area	Bolivian Chaco	Brazilian Shield	Amazon Region	TOTAL
HOLDINGS									
Landless Units	2,182	1,112	3,008	266	118	542	53	1	7,282
under 0.1	3,756	817	12,350	1,636	678	1,730	513	454	21,934
0.10-0.20	795	349	3,941	512	257	150	63	19	6,086
0.20-0.50	2,597	936	9,912	1,231	322	329	89	53	15,469
0.50-1.00	4,245	1,138	15,423	1,938	490	513	322	70	24,139
Total	11,393	3,240	41,626	5,317	1,747	2,722	987	596	67,628
HECTARES									
under 0.1	429	38	719	83	37	92	33	26	1,457
0.10-0.20	110	50	608	72	29	19	8	2	897
0.20-0.50	815	291	3,234	388	84	87	25	14	4,937
0.50-1.00	2,856	718	10,088	1,239	288	292	190	41	15,711
Total	4,209	1,096	14,649	1,782	439	489	256	82	23,002

Source: II Agricultural Census. La Paz - Bolivia, 1987.

Table 20 Farm Size Distribution in Bolivia by Ecological Region

Farm Size (hectares)	Central Altiplano	South Altiplano	Sub-puna Valleys	Sub-tropical Valleys	Integrated Area of Santa Cruz	Brazilian Shields	Bolivian Chaco	Amazon Rain Forest	TOTAL
HOLDINGS									
Below one	11,393	3,240	41,626	5,317	1,747	987	2,722	596	67,628
1 - 5	21,951	4,142	73,971	10,914	3,720	3,519	5,776	771	124,764
5 - 20	12,396	2,051	27,785	3,974	4,437	1,032	3,384	420	55,479
20 - 100	5,401	918	4,924	241	8,960	5,519	1,337	607	27,907
100 - 500	1,556	124	704	11	1,280	490	628	864	5,657
Over 500	502	72	213	4	297	1,051	859	448	3,446
TOTAL HOLDINGS	53,199	10,547	149,223	20,461	20,441	12,598	14,706	3,706	284,881
HECTARES									
Below one	4,209	1,096	14,649	1,782	439	256	489	82	23,002
1 - 5	52,075	9,492	170,047	24,735	8,632	7,853	13,289	1,669	287,793
5 - 20	118,571	19,780	228,278	31,364	47,181	8,899	30,476	4,835	489,384
20 - 100	212,622	37,368	180,364	7,317	346,527	247,080	52,050	29,860	1,113,188
100 - 500	310,042	23,860	132,034	1,612	238,674	99,907	134,461	183,339	1,123,928
Over 500	595,842	252,886	364,118	2,478	338,127	3,002,945	2,231,130	1,520,449	8,307,974
TOTAL HECTARES	1,293,361	344,483	1,089,490	69,289	979,579	3,366,939	2,461,895	1,740,234	11,345,269

Source: II Agricultural Census, La Paz 1987.

In the highlands, Altiplano farms with less than one hectare account for the highest number of holdings (22.9 percent) and they only share 0.32 percent of the land. Similar proportion of holdings are found with farms from 5 to 20 hectares. which share 8.4 percent of the land. The bimodal distribution can be better appreciated in those few holdings with more than 20 hectares (36.1 percent of the holdings) that share 87.4 percent of the land.

In the valleys, 27.6 percent of the holdings have less than one hectare while 18.7 percent of the holdings have 5 to 20 hectares. Each farm size category shares only 1.42 percent of the land and 22.4 percent respectively.

In the integrated area of Santa Cruz 42.8 percent of the holdings operate with 20 to 100 hectares. In a second level of importance are those units with 5 to 20 hectares (21.7 percent). Both farm size categories share important proportions of the land. Farms with 20 to 100 hectares have 35.4 percent of the land. Farms with 5 to 20 hectares share only 4.3 percent. In the rest of the lowlands (Bolivian Chaco, Brazilian Shield and Amazon region), most of the units have farms with 20 to 100 hectares (24 percent), however they share only 4.3 percent of the land. Holdings with less than twenty hectares account for as much as 62 percent of the holdings, but do not account for even 1 percent of the total land.

G. LAND CONCENTRATION

In order to show the magnitude of land concentration, the proportion of holdings and respective share of land, is summarized in Table 21. The average land operated by each farm size category is presented by ecological region. Its respective weight in terms of number and proportion of land in the agrarian structure is presented in table 22.

The large disparities in size and number of landholdings results in different bimodal structures in each ecological region and, hence, different land concentration coefficients. As shown in the next figures, the proportion of holdings and land in the highlands and rest of the lowlands (excluding the integrated area of Santa Cruz) have an extreme distribution of farms and land leading to a typical bimodal structure.

In the valleys and integrated area of Santa Cruz the proportion of holdings and land distributed tend to overlap. However, this intermediate situation cannot be described as a unimodal farm structure. With the rural population growth, the increasing flow of permanent migrants to the integrated area, the future appreciations of land values in the region and, therefore, property disputes between peasants and large enterprises suggests that the distribution of land ownership is becoming more concentrated among few farmers. At the same time, farm size distribution may also tend toward higher inequalities.

Table 21 Proportions of Land and Holdings by Ecological Region

Farm Size	Central Altiplano	South Altiplano	Sub-puna Valleys	Sub-tropical Valleys	Integrated Area	Brazilian Shields	Bolivian Chaco	Amazon Rain	TOTAL
HOLDINGS									
< 1	21.42%	30.72%	27.90%	25.99%	8.55%	7.83%	18.51%	16.08%	23.74%
1 - 5	41.26%	39.27%	49.57%	53.34%	18.20%	27.93%	39.28%	20.80%	43.80%
5 - 20	23.30%	19.45%	18.62%	19.42%	21.71%	8.19%	23.01%	11.33%	19.47%
20 - 100	10.15%	8.70%	3.30%	1.18%	43.83%	43.81%	9.09%	16.38%	9.80%
100 - 500	2.92%	1.18%	0.47%	0.05%	6.26%	3.89%	4.27%	23.31%	1.99%
> 500	0.94%	0.68%	0.14%	0.02%	1.45%	8.34%	5.84%	12.09%	1.21%
Total Holdings	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
HECTARES									
< 1	0.33%	0.32%	1.34%	2.57%	0.04%	0.01%	0.02%	0.00%	0.20%
1 - 5	4.03%	2.76%	15.61%	35.70%	0.88%	0.23%	0.54%	0.10%	2.54%
5 - 20	9.17%	5.74%	20.95%	45.27%	4.82%	0.26%	1.24%	0.28%	4.31%
20 - 100	16.44%	10.85%	16.55%	10.56%	35.38%	7.34%	2.11%	1.72%	9.81%
100 - 500	23.97%	6.93%	12.12%	2.33%	24.36%	2.97%	5.46%	10.54%	9.91%
> 500	46.07%	73.41%	33.42%	3.58%	34.52%	89.19%	90.63%	87.37%	73.23%
Total Hectares	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

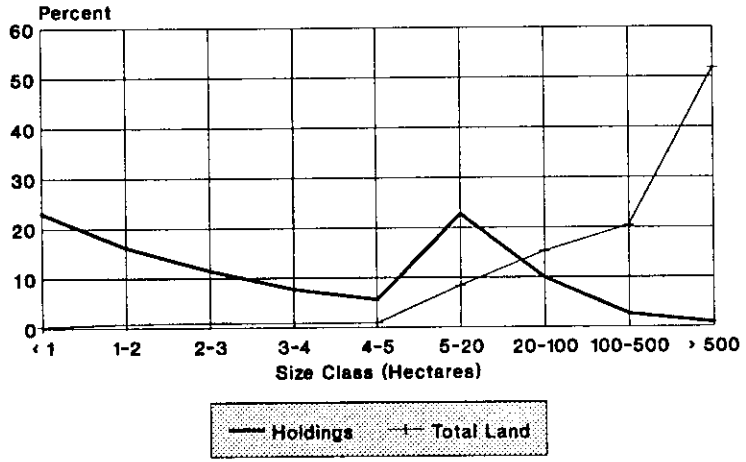
Source: Based on II Agricultural Census, La Paz 1987.

Table 22 Average and Weight of Land and Holdings by Ecological Region

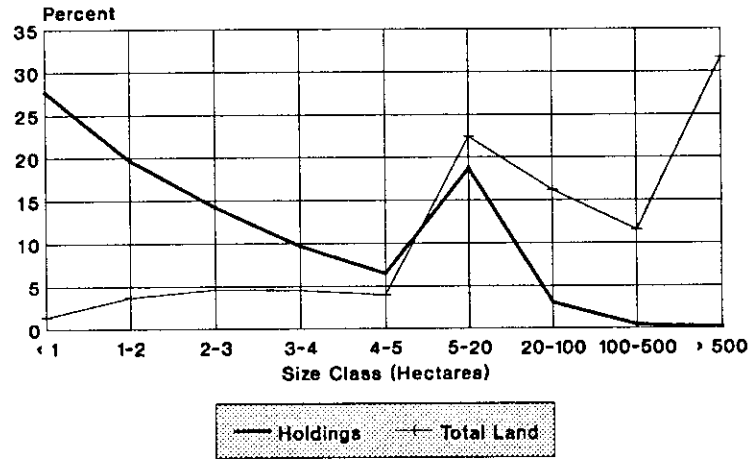
Farm Size	Central Altiplano	South Altiplano	Sub-puna Valleys	Sub-tropical Valleys	Integrated Area	Brazilian Shields	Bolivian Chaco	Amazon Rain	TOTAL
AVERAGE									
< 1	0.37	0.34	0.35	0.34	0.25	0.26	0.18	0.14	0.34
1 - 5	2.37	2.29	2.30	2.27	2.32	2.23	2.30	2.16	2.31
5 - 20	9.57	9.64	8.22	7.89	10.63	8.62	9.01	11.51	8.82
20 - 100	39.37	40.71	36.63	30.36	38.67	44.77	38.93	49.19	39.89
100 - 500	199.26	192.42	187.55	146.57	186.46	203.89	214.11	212.20	198.68
> 500	1186.94	3512.31	1709.48	619.50	1138.47	2857.23	2597.36	3393.86	2410.90
Total Average	24.31	32.66	7.30	3.39	47.92	267.26	167.41	469.57	39.82
HOLDINGS									
< 1	16.85%	4.79%	61.55%	7.86%	2.58%	1.46%	4.02%	0.88%	100.00%
1 - 5	17.59%	3.32%	59.29%	8.75%	2.98%	2.82%	4.63%	0.62%	100.00%
5 - 20	22.34%	3.70%	50.08%	7.16%	8.00%	1.86%	6.10%	0.76%	100.00%
20 - 100	19.35%	3.29%	17.64%	0.86%	32.11%	19.78%	4.79%	2.18%	100.00%
100 - 500	27.51%	2.19%	12.44%	0.19%	22.63%	8.66%	11.10%	15.27%	100.00%
> 500	14.57%	2.09%	6.18%	0.12%	8.62%	30.50%	24.93%	13.00%	100.00%
Total Holdings	18.67%	3.70%	52.38%	7.18%	7.18%	4.42%	5.16%	1.30%	100.00%
HECTARES									
< 1	18.30%	4.77%	63.68%	7.75%	1.91%	1.11%	2.13%	0.36%	100.00%
1 - 5	18.09%	3.30%	59.09%	8.59%	3.00%	2.73%	4.62%	0.58%	100.00%
5 - 20	24.23%	4.04%	46.65%	6.41%	9.64%	1.82%	6.23%	0.99%	100.00%
20 - 100	19.10%	3.36%	16.20%	0.66%	31.13%	22.20%	4.68%	2.68%	100.00%
100 - 500	27.59%	2.12%	11.75%	0.14%	21.24%	8.89%	11.96%	16.31%	100.00%
> 500	7.17%	3.04%	4.38%	0.03%	4.07%	36.15%	26.86%	18.30%	100.00%
Total Hectares	11.40%	3.04%	9.60%	0.61%	8.63%	29.68%	21.70%	15.34%	100.00%

Source: Based on II Agricultural Census, La Paz 1987.

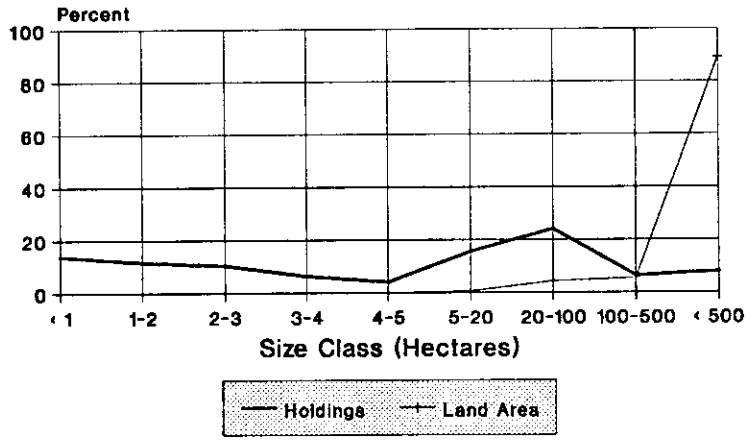
Grapn No. 13
Farm Size Distribution of Total Land
in the Highlands



Graph No. 14
Farm Size Distribution of Total Land
in the Valleys

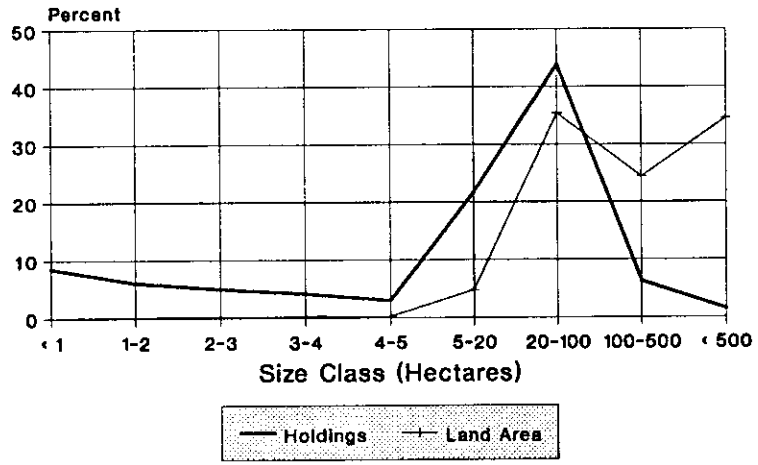


Graph No. 15
Farm Size Distribution of Total Land
in the Rest of the Lowlands



Source: Based on II Agricultural Census
La Paz - Bolivia, 1987.

Graph No. 16
Farm Size Distribution of Total Land
in the Integrated Area of Santa Cruz

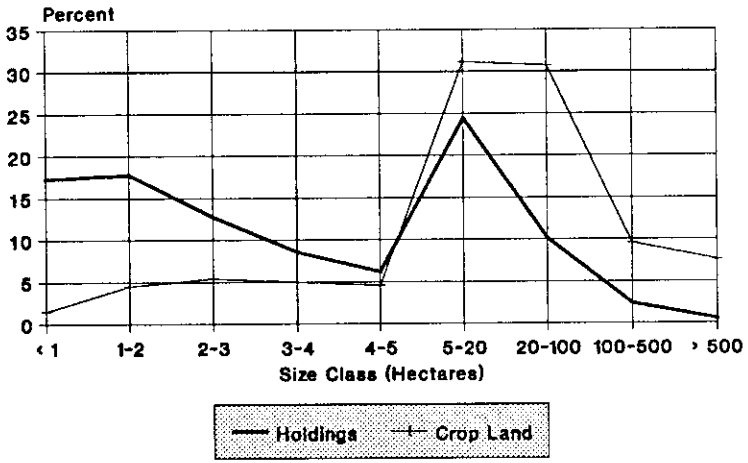


In contrast, in the sub-tropical region, the tendency of land concentration would be the opposite. As a result of population pressure, the already fragmented regional agrarian structure and agricultural opportunities for small-scale farming, the distribution of farms tends to have an unimodal pattern where small and medium-scale farms share a relatively equal proportion of land.

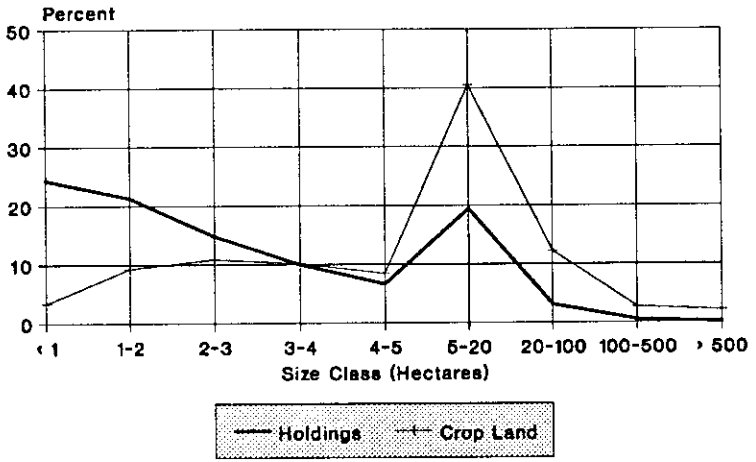
1. Crop Land Concentration. Figures 17 through 20 show how crop land is distributed by displaying the proportion of holdings and crop land in each farm size category. Farm size distribution of crop land is completely different from the size distribution of total land. It seems that each ecological region tends to have unimodal distributions.

In the southern and central Altiplano a large proportion of holdings dedicated to cultivation have less than one hectare. In the integrated area, two farm size categories have most of the holdings dedicated to agriculture. Farms in the first size category (20-100 has.) are typical commercial farms with an average of 38.7 has. Most of the crop land is planted to sugar cane, cotton and soya. These farms use considerable labor-saving technology. Mean annual gross farm income has been estimated at US$ 23,800 in 1982-84 (Thiele and Farrington 1988). Japanese colonizers are also in this farm size category. They have an average of 46 hectares and grow primarily soya and

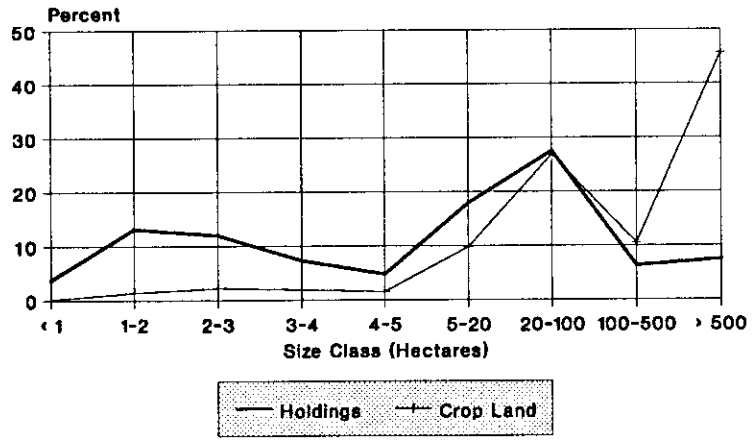
Graph No. 17
Farm Size Distribution of Crop Land
in the Highlands.



Graph No. 18
Farm Size Distribution of Crop Land
in the Valleys.

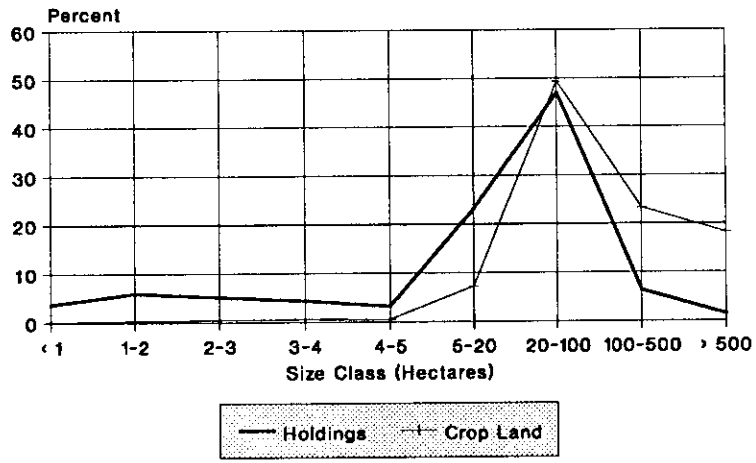


Graph No. 19
Farm Size Distribution of Crop Land
in the Rest of the Lowlands.



Source: Based on II Agricultural Census
La Paz - Bolivia, 1987.

Graph No. 20
Farm Size Distribution of Crop Land
in the Integrated Area of Santa Cruz



cotton. However, most of their agricultural production consists of eggs and chickens. In terms of gross farm income (1982-84) they rank first with an average of US$ 33,000 (Thiele and Farrington 1988). Farms in the second category (5-20 has.) are typically small-scale farmers including colonizers such as Mennonites. They have an average of 18 hectares per holding and most of their production consists of soya, maize and, to a lesser extent, rice. Farms with less than five hectares are managed by peasants and settlers. Most of them cultivate rice, cassava and vegetables.

The rest of the lowlands shows an extreme situation. Farms with 5 to 20 hectares (24 percent) share only 0.6 percent of the land. Bigger landholdings with 20 to 100 hectares share 4.3 percent of the land. Most of the land is concentrated in holdings with more than 500 hectares. About 2,358 holdings (8.3 percent of the holdings in the region) share 89.2 percent of the land (6,754,523 hectares).

H. MEASURES OF INEQUALITY

As noted previously, the large disparities in size of holdings lead to typical bimodal structures. The level of land inequality among the units can be conveniently measured through Gini coefficients. Continuing with the methodology of re-grouping provinces by ecological region, Gini coefficients were estimated for each region and province in

order to see the degree of land concentration in Bolivia.

The Gini coefficients estimated for total land show us that each ecological region has very high or extreme land concentration ratios (see Table No. 23). Gini coefficients were also estimated for each province. The highest concentration ratios by provinces are in the highlands and lowlands. Ten provinces in these regions show Gini ratios within the category of 0.90 to 1.0. At the other extreme, there are provinces with very low levels of land concentration. For example, 16 provinces which have Gini coefficients between 0.3 and 0.6. Most of these provinces are in the sub-puna valleys and in the highlands (see Table No. 24).

Re-grouping each province by ecological characteristics and altitude parameters, shows the different levels of land concentration in each ecological region. The results indicate that extreme situations of land concentration exist in the Bolivian Chaco, southern and central Altiplano, Brazilian shields and Amazon region. Very high levels of land inequality are found in the sub-puna valleys, even though most of this region was supervised by the National Agrarian Reform Services and confronted tight redistribution policies in some provinces after the land reform.

Surprisingly, land concentration in the integrated area of Santa Cruz (which is believed to have an extreme bimodal farm size structure) and subtropical valleys have lower

Table 23

Land Concentration in Bolivia by Ecological Region

Ecological Region	Gini Concentration Coefficients		
	Total Land	Crop Land	Pasture Land
Central Altiplano	0.8690	0.5487	0.8748
South Altiplano	0.9332	0.6504	0.9337
Sub-Puna Valleys	0.7926	0.4981	0.8330
Subtropical Valleys	0.5780	0.4719	0.5819
Integrated Area	0.7205	0.5737	0.7562
Brazilian Shields	0.9004	0.5959	0.8232
Bolivian Chaco	0.9467	0.6488	0.8300
Amazon Rain Forest	0.8961	0.4297	0.5948

Source: II Agricultural Census, La Paz 1987.

Table No. 24

Number of Provinces and Levels of Land Concentration by Ecological Region in Bolivia

Ecological Regions	Gini Concentration Coefficients (•)					
	0.3-0.5	0.5-0.6	0.6-0.7	0.7-0.8	0.8-0.9	0.9-1.0
Central Altiplano	1	2	8	3	3	
South Altiplano	1	1		1		3
Sub-puna Valleys	1	6	8	7	7	
Subtropical Valleys		2	1			
Brazilian Shields					3	1
Bolivian Chaco						4
Integrated Area		1	1	4		
Amazon Rain Forest		1		1	1	2

(•): Number of Provinces 74.

Source: Based on II Agricultural Census, La Paz 1987.

levels of land inequality than the rest of the country. Many reasons may explain the lower levels of land concentration in the integrated area of Santa Cruz. First, the governmental efforts of colonization have distributed land to settlers in equal proportions in the lowlands. Most of the holdings and land is concentrated in landholdings with size between 20 and 100 hectares. Second, land is less scarce with respect to other regions and it does not experience the same population pressures and levels of land fragmentation as in the valleys and highlands. Since life expectancy in the lowlands is relatively higher than in the other regions, the subdivision of land is not so rapid. Third, land has been distributed in its largest part to large scale enterprises. In order to use the land for agricultural purposes, the owners agree to rent specific size landholdings to peasants so they can clear the forest land and shrub land. Fourth, since the region is based on commercial agriculture, and land markets are better developed than in the traditional sector, it is possible to think that peasants are aware of the future values of their land. This hypothetical situation may encourage small scale farmers and peasants to appreciate future land values and economies of scale, hence they would try to keep their holdings at a minimum size.

The lowest level of land inequality is found in the subtropical regions. Even though the region experiences a

shortage of land, high population pressure and consequent land fragmentation, the region has few large-scale enterprises. This regional agrarian structure can be described as a dualistic structure were peasants have relatively small landholdings and coexist with medium scale commercial farms.

In the central and southern Altiplano, the Gini ratios of total land are estimated at 0.87 and 0.93, respectively. In this region it was believed that landholdings were equally distributed among the peasantry. The high measures of inequality show the opposite situation. Land concentration in the highlands is extreme because some peasants engage in other activity besides agriculture: raising cattle, llamas, sheep and other animals. Since crop production is not the most attractive activity in the region, most peasants prefer to allocate their scarce labor resources to other activities first, such as wage employment and livestock holding. The level of animals accumulated by each family unit demands large proportions of land. Because land is very poor in soils and there is no incentive for crop production, some peasants tend to accumulate land according to the livestock growth. Between peasants, livestock distribution is highly skewed, but at the same time constitutes the most rewarding rural income opportunity.

Crop land in the highlands is less concentration than total land. For example, the level of crop land inequality among peasants in the central and southern Altiplano shows Gini coefficients of 0.54 and 0.65, respectively. In the valleys the levels of crop land concentration are the lowest with respect to the other regions. The regional agrarian structure of the subtropics shows a Gini concentration ratio of 0.47 for crop land. The sub-puna valleys have a concentration coefficient of 0.49 for crop land.

To show the differences between total land and crop land, Table 25 summarizes the distribution of crop land in each holding by ecological region. Crop land in each land holding category does not vary as much as total land and pasture lands. In many of the land holdings with more than ten hectares, the size of family restrict the possible expansion of cultivated area. At the same time there is poor incentives to expand crop production. Therefore, most holdings have a small proportion of their land under cultivation, however, they are interest to purchase or rent land with large proportions of pasture land. This happens because most units are interested to accumulate livestock as a form of security while the young migrate and search for better opportunities in other regions and in other activities.

Table 25 Farm Size Distribution of Crop Land by Ecological Region

Farm Size (Hectares)	Central Altiplano	South Altiplano	Sub-puna Valleys	Subtropical Valleys	Integratred Area	Brazilian Shields	Bolivian Chaco	Amazon Region	TOTAL
HOLDINGS									
< 1	7,221	2,540	35,961	3,528	681	370	517	89	50,907
1 - 2	8,296	1,740	30,132	4,437	1,103	1,281	1,872	322	49,183
2 - 3	6,133	1,082	20,974	3,027	951	1,212	1,723	238	35,340
3 - 4	4,092	743	14,124	2,076	807	626	1,197	106	23,771
4 - 5	3,001	492	9,416	1,348	584	347	813	94	16,095
5 - 10	6,951	1,183	19,525	3,026	1,635	637	2,014	142	35,113
10 - 20	4,828	840	8,034	936	2,656	369	1,318	260	19,241
20 - 50	3,555	627	3,663	200	5,737	2,112	907	281	17,082
50 - 100	1,310	230	1,084	28	2,985	3,283	398	306	9,624
100 - 200	724	64	416	9	728	227	283	297	2,748
200 - 500	502	42	224	1	445	199	309	347	2,069
< 500	253	42	141	2	254	829	724	420	2,665
TOTAL HOLDINGS	46,866	9,625	143,694	18,618	18,566	11,492	12,075	2,902	263,838
HECTARES									
< 1	3,130	982	15,034	1,523	242	159	205	38	21,312
1 - 2	10,119	2,178	35,990	5,230	1,168	1,535	2,033	358	58,610
2 - 3	12,425	2,334	42,093	6,204	1,829	2,460	3,433	489	71,266
3 - 4	11,447	2,227	39,256	5,823	2,211	1,816	3,343	305	66,429
4 - 5	10,575	1,893	32,607	4,831	2,001	1,216	2,839	353	56,315
5 - 10	33,753	6,633	94,123	15,719	8,505	2,953	10,022	708	172,415
10 - 20	37,106	7,830	61,116	8,626	20,074	2,062	10,825	1,490	149,129
20 - 50	43,093	10,011	36,592	2,985	102,989	19,314	11,639	2,684	229,307
50 - 100	26,662	4,451	13,996	663	90,878	33,692	5,706	4,042	180,090
100 - 200	14,599	1,718	6,488	664	42,635	4,991	4,883	3,083	79,060
200 - 500	8,669	1,225	4,724	34	48,928	5,553	7,636	3,904	80,673
> 500	12,845	7,978	8,895	551	71,558	69,925	50,554	10,750	233,057
TOTAL HECTARES	224,422	49,460	390,915	52,853	393,017	145,675	113,118	28,203	1,397,663

Source: II Agricultural Census, La Paz - Bolivia 1987.

CHAPTER VIII

SUMMARY AND CONCLUSIONS

A. SUMMARY

Despite all the impressive figures and often fine rhetoric in the official literature, there is much that can be criticized about Bolivia's land reform and consequent rural development policies. According to the figures provided by the second agricultural census, land concentration has not diminished sufficiently. The agrarian structure continues to have a extreme situations of land concentration where the majority of the peasants share a small proportion of the land while few a farms share a large proportion of the land.

After forty years of the land reform, Bolivian scholars expected to find low levels of land concentration in the traditional sector. It was argued that the National Agrarian Reform Service and peasants had redistributed most land in equal proportions after they took over the haciendas. Through the years, the National Agrarian Reform Service insisted that in most cases, peasants were encouraged to redistribute land according to the stipulations of the agrarian law where minimum and maximum farm sizes were established by ecological region. Meanwhile, large extensions of land were granted to a few farmers in the

lowlands. It was even reported that some agricultural enterprises had taken the opportunity to appropriate more land than permitted by the agrarian law. Aware of this situation, policy makers believed that the high levels of land concentration in Bolivia were explained because the size of the farms in each ecological region were aggregated irrespective of their differences.

In order to see if this argument was true, the present research regrouped the second agricultural census in different units. First, altitude parameters were used to define three major regions (highlands, valleys and lowlands). Then, each major region was subdivided according to ecological and production characteristics. Once each region was defined, a statistical model was used to measure land inequality by ecological region and province.

B. CONCLUSIONS

The research shows us the following conclusions:

1. The concentration coefficients estimated showed that each ecological region has the same extreme situation of land concentration as in the whole agrarian structure. The argument that the traditional sector tends to have an unimodal structure and the lowlands a typical bimodal structure was not supported by the analysis.

2. Surprisingly, the traditional sector which is located in the highlands and valleys have Gini concentration

coefficients as high as the lowlands.

3. After the land reform, the integrated area of Santa Cruz has become the most prominent agricultural area. Farmers in this region are aware of the future values of land. Since peasants and small scale cultivators rely on family labor and have little or no equity to purchase land. Most large scale farmers have been expanding their respective haciendas by different means.

4. In the process of land accumulation, three different forms of expansion can be observed. (a) by purchase of land (b) by demanding new grants of land to the government, and (c) by invading small farms.

5. The unequal farm size distribution and the population pressure in the traditional sectors have forced the peasants to adapt themselves to other systems and sectors of the economy. As a result, most peasants have been relying on external sources of income by developing and increasing the informal sectors in Bolivia.

6. Despite the levels of production achieved after the land reform, absolute poverty among Bolivia's peasantry remains extremely high. Meanwhile, they continue to face the serious problem of land scarcity, at least in most areas. The analysis provides reasons to believe that some peasant communities are experiencing rapid population growth rates and consequently rapid land fragmentation. These are clear signs that rural policies have been ineffective in the

traditional sector. The objective of providing the peasantry with the means to increase there livelihood in equal proportions has never been met since the land reform.

7. In terms of property rights, the agrarian law does not guarantee secure ownership of new economic resources. Instead it has created ambiguities over rights, facilitating the conditions for natural resource abuse. Under this context of uncertainty, politically powerful groups are able to manipulate rules to claim land and overuse resources.

8. When land began to be redistributed among the peasantry after the land reform, low priority was given to technological research and institutional assistance to small scale agriculture. This has created wide regional disparities in levels of socio-economic development and standards of living among the peasantry. These inequalities can be easily appreciated between the major urban centers and large commercial agricultural areas on the one hand, and extensive subsistence agricultural areas on the other hand. The former are generally better provided in terms of quantity and quality of services, as well as having higher per capita incomes. Meanwhile, the traditional sector has generally inadequate services, poor infrastructure, low per capita incomes and, thereby, low living standards.

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