Research Paper

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WITH SPECIFIC REFERENCE TO THE PROVINCE OF CHIMBORAZO

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LAND
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CENTER

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PART I

RECENT CHANGES AND CURRENT TRENDS IN THE ECUADORIAN AGRARIAN STRUCTURE: SOME POLICY ISSUES AND IMPLICATIONS

The purpose of the first part of this paper is to: (1) sketch some of the salient features of the Ecuadorian agrarian structure prior to the official enactment and implementation of the country's Agrarian Reform Laws of 1964 and 1973; (2) summarize the contributions of the agrarian reform and the rather substantial changes that have occurred in the nation's agrarian structure during the past two decades; (3) discuss the major changes under way in the agrarian structure today and their policy implications for agrarian reform and other rural development strategies.

This report does not provide a comprehensive analysis of either the impact of the Ecuadorian agrarian reform program or the evolution of the country's agrarian structure. These themes have been explored by a number of researchers recently (cf. Blankstein and Zuvekas 1973; MAG 1976; Redclift 1978; Barsky et al. 1980; Handelman 1980; Peek 1980; Barsky et al., 1982; Chiriboga 1982; Dubly et al. 1982; Sepúlveda et al. 1982; Guerrero 1983; Zevallos 1984). They are also the focus of an applied research/training program within the Instituto Ecuatoriano de Reforma Agraria y Colonización (IERAC) which is presently conducting diagnostic and field studies in the provinces of Chimborazo and Manabí (IERAC 1981,1983). Rather, this paper is one attempt to point the way toward some policy responses to a growing number of structural problems in Ecuador's agriculture.

I. The Pre-Reform Situation

When agrarian reform was officially proclaimed as a hemispheric development theme during the Punta del Este Conference in 1961, Ecuador had one of the most lopsided agrarian structures of any Latin American country. The 1964 CIDA study, which provides an excellent benchmark analysis of Ecuador's land tenure situation prior to the implementation of the agrarian reform program, noted that:

> As a carryover from colonial feudalism, Ecuador has a skewed land tenure structure characterized by a concentration of a major part of the country's agricultural land in the hands of a few . . . . This existing paradox between the latifundia and minifundia constitutes an adverse factor in the distribution of income coming from the land and results in the economic and social stagnation of a considerable percentage of the Ecuadorian population [CIDA 1965:16].

A. Some Historical Background

As in many other countries of the region, there had been some previous efforts by the state to modify the nation's archaic agrarian structure. Beginning at the turn of the century under the leadership of President Eloy Alfaro, the "Liberal Revolution" attempted to break the Church's dominion over vast landholdings in the sierra through the Ley de Manos Muertos (1907), which confiscated clerical property and rented it to rich farmers. Later, the system of concertaje (tied labor) and debt peonage was abolished through modifications in the Código Civil (1918). The result of these earlier "reforms" was that the state ended up controlling nearly one-fifth of the sierra lands under its Asistencia Pública program, and the older feudal labor forms gave way to the more flexible semi-feudalistic huasipungaje system (in which tenants received usufruct rights to a subsistence plot of land in exchange for a work obligation to the hacienda and/or the hacendado's family) along with other associated forms of service tenancy. Despite these legal changes, which fostered some increased mobility of the productive factors (primarily labor), the private haciendas in the sierra maintained a monopoly over the productive physical resources (land, water, technology, infrastructure, etc.) and thereby preserved--and in some cases even strengthened--their domination over the growing supply of campesino labor through insecure tenancy arrangements (precarismo).

Meanwhile, a parallel latifundia-minifundia complex had formed on the coast, especially with the cultivation of cacao and such other commodities as sugar, coffee, and cattle and with the increased colonization of previously inaccessible areas by migrants from the densely settled highlands. New landlord-peasant relationships were established in the western piedmont and coastal plains, together with a powerful financial elite in Guayaquil (Guerrero 1980). To be sure, this process was uneven, subject to booms and busts in the international commodity markets and to internal problems of crop diseases and other natural calamities.

It was during the cacao bust of the 1920s and 1930s that rice production became firmly established in the Guayas basin (Redclift 1978:45). The boom in this domestic commodity led to some serious social conflicts. Initially, the landlords tried to maintain traditional sharecropping arrangements with the small producers (finqueros) and forced them into clearing new lands for rice production. Then during the 1940s and 1950s, when world commodity prices improved for bananas, coffee, and cacao, many landlords attempted to reestablish the plantation system. At times heavy-handed tactics were used to manipulate the peasants, and eventually these tactics contributed to the creation of peasant unions and generated pressures for agrarian reform legislation in the 1960s and 1970s.

By the late 1950s, when the government started debating the country's first agrarian reform law in earnest, many sierra landlords were already responding to growing external and internal political pressures (especially peasant unrest and mobilization) (Guerrero 1983) and to new economic opportunities (especially rising land prices, new technology, infrastructural improvements, and increasing domestic demand for agricultural goods such as milk and other dairy products) (Barsky 1978). In some cases, they carried out

"enclosures" by evicting peasants from their land. In other instances, they began selling off land (often marginal areas located on steep mountain slopes) to rich peasants or granting small parcels of marginal land to their former huasipungeros (Costales and Costales 1971).

Many landlords held on to the best land (often alluvial valley floors) and began to intensify production in these areas through irrigation, improved pastures and dairy cattle, mechanization, and the use of some hired labor. This inverted land utilization pattern (with intensively cultivated, deforested, overgrazed, and eroded peasant holdings on the steep slopes, contrasting sharply with the verdant, irrigated, pastoral holdings of medium-size and large-scale farms in the valleys) is a prominent characteristic of the Ecuadorian (and other Andean) highlands today.

To be sure, not all the large landlords immediately eliminated semi-feudal labor forms nor adopted strictly wage labor to facilitate the transition to the increasingly lucrative dairy business (Guerrero 1983:28ff). Apparently many found the semi-feudalistic labor system to be quite compatible with economic intensification, and in some instances actually increased the number of huasipungeros, arrimados (service tenants obliged to work off "debts," usually legal, to their landlord and/or with usufruct rights to a huasipungo lot), and yanaperos (tenants who received usufruct rights to hacienda resources such as trails or pastures in exchange for work obligations or payments in kind). Initially much of the new technology used in modernizing dairy farming was yield-increasing (irrigation, improved pastures, genetic improvements, etc.), which meant an increased demand for labor. Later, when rural electrification facilitated the introduction of mechanical milking and the availability of new farm equipment helped to mechanize field operations, labor requirements began to diminish on the haciendas.

TABLE I-1

DISTRIBUTION OF AGRICULTURAL PRODUCTION UNITS AND FARMLAND BY FARM SIZE FOR ECUADOR, 1954

Size Categories (ha)	Number of Production Units		Total Farmland	
	No.	%	000s of ha	%
Less than 5 hectares	251,686	73.1	432.2	7.2
5 to 19.9 hectares	57,650	16.7	565.8	9.4
20 to 99.9 hectares	27,742	8.1	1,138.7	19.0
100 to 499.9 hectares	5,787	1.7	1,156.3	19.3
500+ hectares	1,369	0.4	2,706.7	45.1
TOTAL	344,234	100.0	5,999.7	100.0

SOURCE: Comité Interamericano de Desarrollo Agrícola (CIDA), Tenencia de la tierra y desarrollo socio-económico del sector agrícola: Ecuador (Washington, DC: OAS, 1965), p. 17, adapted from INEC, Censo agropecuario de 1954.

B. The 1954 Agricultural Census

Despite its shortcomings, the 1954 Agricultural Census provided some indication of the serious distortions in the distribution of the country's land resources. According to the Census, 1,369 families controlled nearly one-half (45.1 percent) of the nation's total farmland. (See Table I-1.) At the other extreme, nearly three-fourths (73.1 percent) of the country's farms were under 5 hectares in size. These units accounted for only 7 percent of the total farmland, but provided basic sustenance for a quarter of a million families.

Although the analysis of sierra and coastal areas in Ecuador is complicated by the fact that most highland provinces also contain lowland areas in the Oriente and/or the Pacific Coast, the 1954 Census shows a similar polarization in land distribution for both regions. In the sierra, 0.3 percent of the production units (those with more than 500 ha) accounted for nearly one-half (48.7 percent) of the region's total farmland, while on the coast, 0.8 percent of the production units (those with more than 500 ha) encompassed about two-fifths (41.4 percent) of the region's farmland. (See Table I-2.) The minifundio problem was worse in the densely populated sierra. Over four-fifths (81.7 percent) of the sierra's agricultural production units had fewer than 5 hectares of land (11.4 percent of the total), while only about one-half (46.6 percent) of the coastal farms had under 5 hectares of land (3.1 percent of the total). The coast had a much greater representation of small and medium-sized units (5 to 100 ha), especially in the colonization areas. These units represented almost one-half (48.5 percent) of the region's total

TABLE I-2

PERCENT DISTRIBUTION OF AGRICULTURAL PRODUCTION UNITS AND FARMLAND BY FARM SIZE AND REGION FOR ECUADOR, 1954

	Sierra		Coast		Sierra-Coast	
	No. %	Area %	No. %	Area %	No. %	Area %
Less than 5 hectares	81.7	11.4	46.6	3.1	73.1	7.2
5 to 19.9 hectares	12.8	9.8	29.1	9.0	16.7	9.4
20 to 99.9 hectares	4.3	14.5	19.4	23.5	8.0	19.0
100 to 499.9 hectares	0.9	15.6	4.1	23.0	1.7	19.3
500+ hectares	0.3	48.7	0.8	41.4	0.5	45.1
TOTAL	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: CIDA, Tenencia de la tierra y desarrollo socio-económico del sector agrícola: Ecuador (Washington, DC: OAS, 1965), p. 18, as adapted by CONADE, from INEC, Censo agropecuario de 1954.

farms and about one-third (32.5 percent) of the total farmland. The coast also had a more significant representation of large units (100 to 500 ha), which accounted for 4.1 percent of the region's total farms and 23 percent of the total farmland. As we shall see later, however, the relative change which occurred during the intercensal period in the number of units and distribution of farmland in the smaller size groups was more dramatic for the coast than for the sierra.

Besides the skewed land distribution pattern, the 1954 Census revealed the prevalence of insecure tenancy arrangements and landless peasants in the country. Overall, about one-half (53 percent) of the nation's farm families owned their land, while the other half did not have titles, or were tenants (30 percent), or were landless peasants (22 percent). (See Table I-3.) On the coast, only about one-third (34 percent) of the farm families owned land, while more than one-half (52 percent) were landless.

In the sierra, two-thirds of the families owned land, while the other third were without titles or were tenants; only a few (2 percent) were landless. As the CIDA study (1965:14) pointed out, however, the so-called "subfamily units and agricultural workers without land" category accounted for 87 percent of the nation's farm families--including 81 percent of the country's

TABLE I-3

LAND TENURE STATUS OF ECUADOR'S AGRICULTURAL FAMILIES BY REGION, 1954

Tenure Categories of Agricultural Families	Sierra		Coast		Total	
	No. 000's	%	No. 000's	%	No. 000's	%
Owners	174.0	66	59.9	34	233.9	53
Mixed tenancy	27.3	10	3.4	2	30.7	7
Colonists without titles and others[a]	12.8	5	11.0	6	23.8	5
Huasipungeros	19.7	7	-	-	19.7	5
Cash renters	8.0	3	9.0	5	17.0	4
Sharecroppers	12.9	5	0.4	-	13.3	3
Comuneros	4.9	2	0.9	1	5.8	1
Landless ag. workers	4.4	2	91.4	52	95.8	22
TOTAL	264.0	100	176.0	100	440.0	100

SOURCE: Instituto Nacional de Estadística y Censos (INEC), Censo agropecuario nacional de 1954, Cuadro 4.

[a] Includes 5,970 arrimados who were concentrated primarily in the province of Loja.

farm owner families and 89 percent of the country's farm tenant families. (See Table I-4.) The rate of landownership increased with farm size--from 49.4 percent of the subfamily units to 87.5 percent of the large multi-family units. And while the dominant tenancy types (cash rent, sharecropping, service tenancy) were fairly evenly represented in the small farm categories, cash renting was more important on the larger units.

TABLE I-4

LAND TENURE STATUS OF ECUADOR'S AGRICULTURAL FAMILIES BY LABOR CATEGORY, 1954

Labor and Tenure Categories	Nuclear Family Production Units No. (000s)	%
A. Large multi-family production units	1.4	0.3
Landowners	1.2	0.3
Tenants (all types)	.2	-
B. Medium multi-family production units	9.3	2.1
Landowners	7.8	1.8
Tenants (all types)	1.5	0.3
C. Family-size production units	45.6	10.4
Landowners	35.3	8.0
Tenants (all types)	10.3	2.4
D. Sub-family production units and landless workers	383.7	87.2
Landowners	189.6	43.1
Tenants (all types)	98.3	22.3
Landless workers	95.8	21.8
TOTAL	440.0	100.0

SOURCE: CIDA, Tenencia de la tierra y desarrollo socio-económico del sector agrícola: Ecuador (Washington, DC: OAS, 1965), p. 14.

Despite the conclusion of the CIDA study that nearly 9 out of every 10 farms in Ecuador were too small to absorb the available family labor supply, these small units accounted for a significant portion of the nation's cultivated land and basic food production. Although they controlled only 7 percent of the country's total farmland, the farms under 5 hectares in size had nearly one-fifth (17.7 percent) of the nation's total cultivated land. (See Table I-5.) Units under 20 hectares in size accounted for only one-sixth of the country's total farmland, but embraced more than one-third (35.5 percent) of the total cropland. Eighty-five percent of the land on farms with fewer than 5 hectares were under cultivation, which was more than five times the

TABLE I-5

LAND USE BY FARM SIZE IN ECUADOR, 1954[a]

Land Use	Less than 5 ha		5-19.9 ha		20-99.9 ha		100-499.9 ha		500 + ha		Total	
	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total
Cultivated land[b]	368.2	17.7	370.5	17.8	516.3	24.8	394.5	19.0	431.5	20.7	2081.0	
Unimproved pastureland	32.6	2.6	73.6	5.8	128.9	10.3	209.2	16.7	810.4	64.6	1254.7	100
Forest land[c]	6.5	0.6	48.8	4.3	220.7	19.4	245.5	21.6	614.9	54.1	1136.4	100
Unproductive land	25.1	1.6	72.9	4.6	272.8	17.3	307.1	19.5	894.9	57.0	1572.8	100
TOTAL	432.4		565.8		1138.7		1156.3		2751.7		6044.9[d]	

SOURCE: INEC, Censo agropecuario nacional de 1954.

[a] Land use was reported for only about one-half of the country's total land area, which was indicated in Table I-1.

[b] Includes annual and perennial crops, improved pastures and forage crops, and fallow land (cultivated within the past five years).

[c] Includes natural forests and tree plantations.

[d] There is a discrepancy of 45,200 hectares in the Census data used for Table I-1 and Table I-5. Only 45.6 percent of the total land area reported in this table was included in the land use Census.

portion cultivated on farms with more than 500 hectares In contrast, these very large units had nearly two-thirds (64.6 percent) of the country's total unimproved pastureland and devoted nearly one-third (29.5 percent) of their total area to this use. The large-sized farms (100 to 500 ha) had about one-third of their total area under cultivation.

While the 1954 Census included data on all the leading agricultural exports (produced mainly by large-scale producers on the coast) and the major domestic staples (produced primarily by small and medium-sized producers in the sierra and coast), it either excluded or failed to provide details on dozens of other commodities such as fruits, vegetables, edible legumes, and other root and tuber crops which are produced mostly on small and medium-sized farms. Notwithstanding this limitation, the data show a significant direct contribution to the total value of agricultural production by small producers, especially in the sierra where one-half of the total value was produced on

TABLE I-6

PERCENT CONTRIBUTION OF THE TOTAL VALUE OF BASIC AGRICULTURAL COMMODITIES BY FARM SIZE AND REGION IN ECUADOR, 1954[a]

Region	Less than 5 has.	5-19.9 has.	20-99.9 has.	100-499.9 has.	500 + has.	Total has.
	%	%	%	%	%	%
Sierra	28.9	21.4	23.0	14.1	12.6	100.0
Coast	10.2	20.3	32.8	18.7	18.0	100.0
Total	15.8	20.6	29.9	17.3	16.4	100.0

SOURCE: INEC, Censo agropecuario nacional de 1954.

[a] The 11 basic agricultural commodities included in the 1954 Census were: bananas, barley, beans (dry), cacao, coffee, corn, plantains, potatoes, rice, sugarcane, and wheat.

units under 20 hectares in size. (See Table I-6.) In the sierra provinces of Azuay, Loja, and Tungurahua, nearly one-half of the total value was produced on farms under 5 hectares in size. At the other extreme, one-third of the total value was produced on farms with 500 hectares or more in the coastal provinces of Guayas and Los Rios. What the data do not show is the very significant indirect contribution of small farms to the value of agricultural output on the larger production units through the sale of excess labor at very low wages.

In addition to the earlier cautionary notes about the 1954 Census data, it should be pointed out that these figures mask many significant

qualitative differences in land resources among the different size strata for both the coast and the sierra. Because of historical circumstances alluded to earlier, which to some extent became exacerbated during the reform era, the smaller production units tend to be concentrated disproportionately on marginally productive land. And because most of this land is under cultivation, these units tend to have a higher rate of soil depletion than the larger units. In the sierra the minifundia are often located on steep, eroded, dry, and rocky soils which, despite their present intensive use, have limited prospects for sustainable agriculture. On the coast the minifundia are often found on poorly drained soils, eroded hills, or semi-arid lands with limited or no irrigation possibilities. There are notable exceptions to this tendency in both the sierra and the coast, where minifundia with good natural resources and with good access to market and off-farm employment opportunities have become highly productive.

C. Some Other Characteristics of the Pre-Reform Era

It should also be noted that most of the highland haciendas, including many of those that were subdivided either voluntarily or by the agrarian reform, had extensive marginal lands such as the fairy forests and *páramo* (areas above timberline) areas, which were to be used only for wood-gathering and extensive grazing activities. Indeed, a common feature of many highland haciendas in Ecuador and other Andean countries was the inclusion of diverse ecological niches and areas which facilitated land use diversification and enhanced economic self-sufficiency. Similarly, many of the large estates on the coast included extensive areas of poorly or excessively drained soils which were unsuitable for intensive agriculture without major improvements in drainage and irrigation.

Another important feature of the pre-reform agrarian structure not revealed in the Census data was the relatively low socioeconomic status of the country's indigenous population, which tended to be concentrated on densely settled, marginal lands in the rural areas of several sierra provinces. For example, in both Chimborazo and Imbabura, which had significant indigenous populations, about one-half of the farm population was involved in insecure tenure arrangements--*comuneros* (communal property users), huasipungeros, sharecroppers, etc. (See Table I-7.) Together, these two provinces accounted for only about one-fifth (21.1 percent) of the sierra farm population and one-sixth (15.7 percent) of the region's independent farm owners, but they had nearly one-third (32 percent) of the region's precarious tenants. The provinces of Cotopaxi, Pichincha, and Tungurahua also had significant indigenous populations and correspondingly high rates of semi-feudal tenure forms. Overall about one-third (32.7 percent) of the sierra's farm population was involved in these type of tenure relationships. Three-fifths (59.1 percent) of the these tenants were comuneros, a large portion of whom were indigenous people.

Like native populations elsewhere in the Americas, the Ecuadorian indigenous people have a long history of exploitation and marginalization (CIDA 1965: 25-44). With relatively few exceptions (e.g., the entrepreneurial Otavaleans),

TABLE I-7

TENANCY AND LANDOWNERSHIP IN RELATION TO TOTAL AGRICULTURAL POPULATION FOR SIERRA PROVINCES, 1952-58

Sierra Provinces	Total Agric. Population	%	Huasipungueros Comuneros Sharecroppers	%	Independent Owners	%
Azuay	176,034	14.4	18,069	4.5	157,965	19.1
Bolívar	94,141	7.7	10,684	2.7	83,457	10.1
Cañar	75,255	6.1	25,889	6.5	49,366	6.0
Carchi	47,888	4.0	26,064	6.5	21,824	2.6
Cotopaxi	132,957	10.8	53,711	13.4	79,246	9.6
Chimborazo	156,290	12.7	75,371	18.8	80,919	9.8
Pichincha	135,102	11.0	44,943	11.2	90,159	10.9
Tungurahua	135,520	11.1	56,260	14.0	79,260	9.6
Imbabura	102,029	8.4	53,054	13.2	48,975	5.9
Loja	172,064	13.8	36,927	9.2	135,137	16.4
TOTAL	1,227,280	100.0	400,972	100.0	826,308	100.0

SOURCE: CIDA Tenencia de la tierra y desarrollo socio-económico del sector agrícola: Ecuador (Washington, DC: OAS, 1965), p. 78.

the native Ecuadorians remain at the bottom of the country's highly differentiated society, in large part because of their limited access to productive resources since the time of the Conquest. Despite sustained efforts to organize the indigenous people of the country during the past 60 years or so and the legacy of several violent conflicts, the native Ecuadorian is still seen as an indio or india by most of his or her contemporaries.

In sum, the pre-reform era generated an increasing number of contradictions within Ecuador's agrarian structure which would set the stage for increased state intervention beginning in the 1960s. Above all, there were mounting economic and political pressures that would no longer permit a continuation of the semi-feudal labor forms in the agricultural sector. As Handelman (1980:8) notes, these "had become an embarrassment" to the country.

Nor was it possible to go on denying the growing rural masses access to the country's productive agricultural resources. There is little doubt that the traditional landowning class had been jolted by the Cuban Revolution and its spillover effects into other parts of Latin America (Handelman 1980). Ecuador had already experienced serious clashes between campesinos and hacendados in several sierra provinces during the late 1920s and early 1930s. The following decades brought intense organizational efforts and scattered strikes by campesinos in the sierra and agricultural workers on the coast. By the early 1960s, political activity among campesino groups appeared to be intensifying with numerous strikes, land invasions, and massive demonstrations including a march of 15,000 indigenous huasipungeros and comuneros in the streets of Quito (Guerrero 1983:23).

While the coast had been gradually pulled into the world capitalist system during the seventeenth and eighteenth centuries, the momentum picked up considerably during the latter part of the nineteenth century and into the twentieth century. The completion of the railroad between the coast and the sierra in 1908 brought increasing commerce to both regions. Temporary migrants from the densely settled highlands began spilling into the western littoral to satisfy the growing demand for labor on the large export-oriented farms (initially cacao and later sugar and bananas). Permanent migrants from the sierra provided much of the labor for the large rice farms and colonized the expanding agricultural frontier. While extensive ranching activities were established in the northern coastal region, subdivision in the older colonization areas and in the coffee zone of Manabí was already threatening the coast with its own minifundia problem.

Meanwhile the agrarian structure of the sierra was also undergoing profound changes. Political pressures and economic incentives had induced part of the traditional landowning class and their heirs into selling off some of their land and modernizing the rest. While some researchers (Barsky 1978; Murmis 1978) have argued that this "modernizing faction" of hacendados aligned with urban entrepreneurs to create a cleavage with the "traditional faction" and lend support to an agrarian reform that would liberate the rural labor supply, other researchers (Chiriboga 1982; Guerrero 1983) have argued that pressures from the campesinos provided the major impetus for the reform. Regardless of whether it was the "carrot" or "stick" that motivated the sierra hacendados, a significant reorganization of the haciendas was under way by the time IERAC sent its first convoy of jeeps into the countryside in late 1964 to liberate the huasipungeros. Vast areas of the sierra had already undergone subdivision, with serious environmental and social consequences which would pose a formidable challenge to even the most ambitious and thoroughgoing rural development programs.

II. The Reform Era

By most assessments the Ecuadorian Agrarian Reform can take relatively little credit for bringing about significant changes in the country's agrarian structure. As Handelman (1980:1) pointed out: "Rather than effecting radical change, . . . much of [the] legislation reinforced socioeconomic trends which had already been modifying rural land tenancy and landlord-peasant relationships."

Despite serious disagreements among the country's landowning elite on how far the nation should go in responding to the growing international and domestic pressures to reorganize its agrarian structure, there appeared to be general accord on the need for some state action to modify traditional labor forms and redistribute some public lands (Handelman 1980:7). The powerful Cámaras de Agricultura (large landowner associations) in the sierra and on the coast were adamantly opposed to a redistribution of private lands, ostensibly because it would discourage private investment in agriculture and lead to decreased production.

The initial state response to these mounting pressures came in 1959 in the form of a National Emergency Decree during the government of Camilo Ponce. This predictably conservative and evasive solution imitated the attempts of many other Latin American countries to promote colonization on unsettled public lands in the piedmont regions and to sponsor settlement projects on the Asistencia Pública haciendas in the sierra with the help of some foreign financing and technical assistance. While these measures bought enough time to permit a four-year national political debate on agrarian reform, they appeared to have little impact on mitigating the growing unrest in the countryside.

A. The 1964 Law

Two presidents later (Velasco, 1960-61; and Arosemena, 1961-63), on 11 July 1964, the ruling military junta finally issued the country's first agrarian reform decree and provided for its implementation under IERAC. While the law called for the abolition of service tenancy (huasipungos, arrimazgos, and yanapas) and provided for some compensation and resettlement of these tenants, it is likely that many of these and other precarious tenants never received due process under the new law. For one thing, the abolition of precarious tenancy was already well under way on many sierra haciendas (Barsky 1978). Furthermore, IERAC was ill-equipped as a new agency to process the large number of tenancy cases which remained. Finally, the law itself represented a series of compromises which clearly protected the country's landowning class from losing their good land if they chose to hang on to it. Coastal landowners were permitted to retain up to 3,500 ha, while sierra landowners were entitled to keep up to 1,800 ha. The law specifically excluded: (1) land which was "efficiently used" (a term which never acquired legal significance), (2) land devoted to supplying raw materials for industry (such as sugar, fiber and oil), and (3) tropical and subtropical ranchland.

Ostensibly, the 1964 Law was intended to promote improved living standards and increased productivity through the transfer of inefficiently used latifundia lands to the campesinos, the integration of smallholders into the national economy through the creation of production cooperatives along with technical assistance and social services, and the preservation of investment and production incentives on large holdings through the use of liberal exemptions (Cosse 1980:61). In practice, the first law concentrated on (1) de facto titling of the remaining huasipungos (about 15 percent of the huasipungeros received land via initiative of the hacendados), (2) creation of production cooperatives on the Asistencia Pública lands, and (3) land titling and infrastructural development in areas of spontaneous colonization.

Virtually no effort was made by IERAC to enforce the maximum size limits or land use restrictions specified in the law. Through 1969, IERAC expropriated only 14 haciendas (only 9 without compensation) and redistributed land on another 36 haciendas through direct-sale mechanisms (Blankstein and Zuvekas 1973:15).

De Janvry (1981b:386) characterized the Ecuadorian type of agrarian reform as "a transformation of semifeudal [estates] into capitalist estates . . . by prohibiting bonded labor and rent in labor services . . . ." He went on to note that "the purpose of a reform sector, in this case, is more to demonstrate the seriousness of the threats and to satisfy peasants' clamors for land than to increase production." Indeed, during its first five years of operation (1964-69), the Ecuadorian Agrarian Reform Program had legally incorporated only 1 percent of the country's total agricultural land and only 4 percent of the country's peasantry into the reform sector, making it one of the most modest of the 20 reforms studied by de Janvry (1981b:387). As de Janvry (1981b: 388,389) pointed out later, however:

> . . . the success of antifeudal reforms should . . . not be assessed in terms of the extensiveness of expropriations (the publicized explicit goal) but in terms of development of capitalism and political stabilization. . . . In that sense, countries like Colombia, Ecuador, and India had successful antifeudal land reforms without virtually having any in a distributive sense.

With few exceptions (such as the expropriation of some absentee cacao estates and part of a sugar plantation and some granting of land titles to squatters in colonization areas), the initial agrarian reform efforts centered on the abolition of huasipungos and the creation of peasant cooperatives on the Asistencia Pública lands in the sierra. During the first eight years of the agrarian reform program, over 90 percent of the beneficiaries and nearly 80 percent of the land involved in agrarian reform actions (excluding colonization) was in the sierra. (See Table I-8.) The average amount of land received
by the sierra beneficiaries during this period was less than 5 hectares.

While the total amount of land adjudicated in colonization areas during the first eight years of the agrarian reform program was nearly three times the amount adjudicated in agrarian reform actions, the number of colonization beneficiaries was less than one-half the number of agrarian reform beneficiaries in the same time period. (See Table I-9.) As was the case with most of the agrarian reform actions during the initial years of the program, most of the colonization adjudications were simply de facto titling procedures carried out in areas of spontaneous colonization. And like the agrarian reform actions, the colonization adjudications were also geographically concentrated: about two-fifths of the colonization lands and beneficiaries were located in the western lowlands of the "sierra" province of Pichincha.

To be sure, the limited progress of the agrarian reform and its geographical bias was no accident. Important political forces intervened in the process to virtually assure that the already watered-down law would not affect major coastal estates (Handelman 1980:9). And in 1966, interim civilian President Yeravi and newly elected President Otto Arosemena, who were both

TABLE I-8

AMOUNT OF LAND ADJUDICATED (IN HECTARES) AND NUMBER OF FAMILIES BENEFITED THROUGH AGRARIAN REFORM ACTIONS IN ECUADOR FROM 1964-1982 BY PERIOD AND REGION

Period	Sierra		Costa		Total	
	Ha	Families	Ha	Families	Ha	Families
1964-1966 Military government	68,448	17,018	17,155	1,142	85,603	18,160
1967-1971 Civilian government	72,191	12,102	21,105	1,198	93,296	13,300
1972-1979 Military government	253,239	22,377	122,670	12,683	376,407[a]	35,069[a]
1980-1982 Civilian government	83,482	6,115	46,834	3,598	130,557[b]	9,717[b]
TOTAL (1964-1982)	477,360	57,612	207,764	18,621	685,863[c]	76,246[c]

SOURCE: IERAC, "Estadísticas de las adjudicaciones legalizadas en reforma agraria y colonización" (Quito, 1979), pp. 1-2, and unpublished data compiled by Departamento de Evaluación y Estadística del IERAC (Quito, 1983).

a This includes 498 hectares adjudicated to 9 beneficiaries in the Oriente.

b This includes 186 hectares a adjudicated to 3 beneficiaries in the Oriente and 55 hectares adjudicated to 1 beneficiary in the Galápagos Archipelago.

c This includes 684 hectares adjudicated to 12 beneficiaries in the Oriente and 55 hectares adjudicated to 1 beneficiary in the Galápagos Archipelago.

tied to the Guayaquil agricultural exporting elite, engineered a 40 percent reduction in IERAC's budget and a purge of its progressive officials.

If the politics of limited reform brought some appeasement to the sierra campesinos, they certainly did little to ease tensions between landowners and tenants on the coast. Much of the turmoil there centered in the former cacao-producing region of the Guayas River Basin, which subsequently became the country's leading rice-growing region. While the 1964 law established an eight-year moratorium for abolishing sharecropping on the old cacao estates of the coast, it specifically exempted sharecropping in the rice-growing areas. In the face of mounting evidence that the rice farms were not being efficiently operated under the traditional sharecropping system and a sharp drop in rice

TABLE I-9

AMOUNT OF LAND ADJUDICATED (IN HECTARES) AND NUMBER OF FAMILIES BENEFITED THROUGH OFFICIAL COLONIZATION ACTIONS IN ECUADOR FROM 1964-1982 BY PERIOD AND REGION

Period	COLONIZATION Sierra Ha	Sierra Families	Costa Ha	Costa Families	Oriente Ha	Oriente Families	Total Ha	Total Families
1964-1966 Military government	116,551	3,403	43,444	1,156	47,274	1,547	207,557[a]	6,122[a]
1967-1971 Civilian government	118,904	3,151	95,168	2,839	95,983	2,220	310,443[b]	8,310[b]
1972-1979 Military government	156,036	3,939	228,517	5,844	609,190	11,224	1,012,880[c]	21,432[c]
1980-1982 Civilian government	38,555	1,222	116,150	2,887	157,038	2,727	312,392[d]	6,847[d]
TOTAL (1964-1982)	430,046	11,715	483,279	12,726	909,485	17,718	1,843,272[e]	42,711[e]

SOURCE: IERAC, "Estadísticas de las adjudicaciones legalizadas en reforma agraria y colonización" (Quito, 1979), pp. 1-2; and unpublished data compiled by Departamento de Evaluación y Estadística del IERAC (1983).

[a] This includes 288 hectares adjudicated to 16 beneficiaries in the Galápagos Archipelago.
[b] This includes 388 hectares adjudicated to 100 beneficiaries in the Galápagos Archipelago.
[c] This includes 19,137 hectares adjudicated to 425 beneficiaries in the Galápagos Archipelago.
[d] This includes 649 hectares adjudicated to 11 beneficiaries in the Galápagos Archipelago.
[e] This includes 20,462 hectares adjudicated to 552 beneficiaries in the Galápagos Archipelago.

production caused by a prolonged drought in the late 1960s, many finqueros seized control of their plots (Redclift 1978:74-93).

B. Decree 1001 of 1970

Having been returned to office for the fifth time, President Velasco responded to this increasingly tense situation in December 1970 by issuing Decree 1001, which abolished sharecropping in the rice-growing areas of the coast and made the properties subject to expropriation under IERAC's jurisdiction. This specific measure had been preceded by a new agrarian reform law, Decree 373, issued in September 1970, which called for the elimination of all rental arrangements and other precarious forms of tenure that had been excluded from the 1964 Law. Since a likely outcome of this controversial decree would have been an expulsion or further displacement of the former tenants to marginal lands while landlords retained the best land, Decree 1001 was certainly a more direct threat to the landlords in the rice-growing regions (Redclift 1978:86,87). The implementation of Decree 1001 is reflected in the increased number of agrarian reform actions on the coast in the 1972 to 1979 period. (See Table I-8.)

Decree 1001 was, however, hardly a radical agrarian reform measure. It was oriented more toward increasing land tenure security by issuing titles and toward fostering capitalist relations by extending credit, as opposed to effecting a genuine land redistribution (Redclift 1978:87,88). It left the door open to private negotiations between landlords and tenants, with IERAC's consent, and it specified clearly that former tenants were to pay for the land over a ten-year period. Through the creation of the Comisión de Estudios para el Desarrollo de la Cuenca del Río Guayas (CEDEGE), which received technical and financial assistance from AID and other international agencies beginning in the late 1960s and which benefited from the oil boom starting in 1973, the former finqueros began receiving credit for making cooperative land purchases from former landlords through the Programa para Promoción de Empresas Agrícolas (Land Sale Guaranty Program) along with assistance to set up production and marketing cooperatives (Blankstein and Zuvekas 1973). If Decree 1001 was only a moderate step toward correcting an unjust agrarian structure in one region of the country, it did lead to a sufficient level of public actions (including the enactment of a hefty price support for rice) to increase rice production and campesino incomes and defuse the region's discontent for the time being.

In 1970 there were some positive signs that the Quinto Velasquismo (the fifth time Velasco assumed the presidency) was pushing the Agrarian Reform Program toward more action: two new agrarian reform decrees were issued--IERAC was put directly under the control of the Ministry of Agriculture; and the market-oriented Programa para Promoción de Empresas Agrícolas was adopted as a way of dealing with the increasingly volatile situation in the rice-growing region of the coast. However, data for the early 1970s show few improvements in the tempo of reform activities (Redclift 1978:28). IERAC's activities during this period tended to focus primarily on opening up new colonization areas in the Oriente and along the western piedmont of the sierra. In part at least, this politically passive measure was intended as an escape valve to mounting land pressures and social conflicts in the rural sierra.

The total area of agrarian reform adjudications in 1970 dropped to about 7,000 hectares--a level which was only one-third the rate sustained during the late 1960s and which was by far the lowest since the Agrarian Reform Program began in 1964 (IERAC 1979:1,2). The decline was most precipitous in the sierra, where only about 2,400 hectares were adjudicated in that year. The decline in the number of beneficiaries in 1970 followed a similar pattern. By contrast, the area adjudicated in colonization regions in 1970 was ten times as great as the area adjudicated by agrarian reform measures, and the number of colonization beneficiaries was twice the number of agrarian reform beneficiaries in that year. By 1971, however, the area of agrarian reform adjudications rebounded to nearly the level of the late 1960s, while the area of colonization adjudications dropped by nearly one-fourth.

During its first eight years of existence, IERAC adjudicated nearly 3 hectares of colonization land for every hectare of agrarian reform land. (See Tables I-8 and I-9.) But because of the relatively large number of huasipungeros and arrimados who received titles to small plots of land during the early years of the Agrarian Reform Program, the ratio of agrarian reform beneficiaries to colonization beneficiaries during the same time span was about 2 to 1.

The Institute as an entity was not the only party responsible for the reform falling short of its goals and concentrating on activities other than land redistribution. Nevertheless, there were instances of collusion between landlords and IERAC personnel as well as poor management within the Institute (Redclift 1978:27). As in other Ecuadorian public agencies, there was a continual turnover of the top administrative personnel in IERAC (Blankstein and Zuvekas 1973:18). There was an almost complete lack of planning within the Institute, resulting in inconsistent practices which often had little to do with addressing the major problems in the agrarian structure (MAG/JUNAPLA/IERAC 1978:467). And the Institute was very slow in carrying out titling procedures and other legal actions on land which was already under its control (MAG/JUNAPLA/IERAC 1978:468). At the same time, there is little question that the Institute was created by a law which was not particularly threatening to the country's landowning class and which had practically no provisions for eliciting the support of the country's campesinos for its implementation (Redclift 1978:25,26). Nor did the politically and financially vulnerable Institute ever receive the necessary public support and funding to carry out an effective agrarian reform (Redclift 1978:26). At least three of the more energetic and committed Executive Directors of IERAC (Juan Casals, Marco Herrera, and Manuel Franco) apparently resigned their posts to protest public criticism and actions to restrict agrarian reform activities (Cosse 1980:72; and Handelman 1980:9,10).

In February 1972, Velasco was once again deposed by the Ecuadorian armed forces. The new military junta headed by General Rodríguez Lara also projected a progressive image (Handelman 1980:10). Growing rumors of an imminent and radical new agrarian reform law unleashed a heated debate between the coastal landlords, who threatened to stop paying land taxes, and the Federación Nacional de Campesinos (FENOC) along with some supporters within IERAC, who demanded sweeping changes in the existing Agrarian Reform Program (Redclift 1978:29). The debate was further complicated by the incipient petroleum boom which posed a paradox for the agricultural sector: the prospect of using the

new influx of foreign exchange earnings to finance a passive agrarian reform like that of Venezuela (the siembra de petróleo) versus the possibility of using these revenues to finance increased food imports and agricultural technology without effecting any significant changes in the existing agrarian structure.

C. The 1973 Law

The 1973 Agrarian Reform Law, which superseded all previous agrarian reform legislation, was hardly a radical departure from the 1964 Law. Showing the influences of intense lobbying efforts by the powerful and conservative Cámaras de Agricultura of Pichincha (Quito) and Guayas (Guayaquil), the new Law clearly opened the door for increased public and private participation in rural infrastructural development and for agricultural modernization without facing the problem of land maldistribution (Handelman 1980:10). While the new Law called for the abolishment once and for all of semi-feudal labor forms, its major thrust was toward bringing more land into cultivation and increasing production on existing agricultural land through the application of modern technology. This was to be facilitated by petroleum revenues which would direct an estimated tenfold increase of public funds into the agricultural sector (Redclift 1978:32).

In addition, the new Law provided for the establishment of "priority regions and zones for intervention which would permit the State to concentrate the necessary resources to completely transform the agrarian structure" (IERAC 1983:97). This rather vague mandate apparently was not aimed so much at correcting the lopsided distribution of agricultural resources in certain regions of the country as it was toward converting the producers of these regions into modern entrepreneurs through "a new social system of market enterprises" (Redclift 1978:31). This emphasis was expressed in the first Ley de Fomento Agropecuario y Forestal (Decree 962) of 1971, and its sequel, the Ley de Fomento y Desarrollo Agropecuario of 1979, which reconfirmed the State's primary concern with increased agricultural production and productivity (IERAC 1983:167-194).

Finally, the 1973 Law put to rest the issue of ceilings on size of landholdings by assuring landowners that private property would be respected as long as it were being worked properly. In practice this meant that the State would certify that landowners were respecting the "social function of property" as long as 80 percent of the land was under cultivation, including improved pastureland and forestland (Redclift 1978:31). Thus the new Law threatened only those recalcitrant landlords who were unable or unwilling to make even minimal investments or who allowed their land to be worked with tenants in blatant violation of the Law's definition of the "social function of property." In effect, however, many of the landlords in violation of the Law were never penalized because they worked out lucrative bargains directly with campesinos or with IERAC to sell their land for attractive sums of money.

Despite the weaknesses of the 1973 Law, the data show an acceleration of both agrarian reform and colonization activities during the two military governments which reigned from 1972 to 1979. (See Tables I-8 and I-9.) In part

this spurt in activity resulted from significant increases in government expenditures and credit to the agricultural sector as a consequence of the petroleum boom. IERAC's budget also benefited significantly from this increased government spending, especially during 1975 and 1976 when its budget nearly tripled (in nominal sucres) over the 1973-74 levels (Cosse 1980:79). In 1977, however, the national budget for the agricultural sector was seriously slashed and IERAC's budget was reduced to its 1973-74 levels. Not only did IERAC suffer an absolute cut in its budget, but its relative share of the national agricultural budget fell from nearly one-fourth to one-seventh. To make matters worse, actual disbursement of funds to IERAC has fallen far short of the Institute's approved budget since the mid-1960s, and the gap between IERAC's actual expenditures and its actual funding has continued to widen since 1970 (Cosse 1980:76).

Notwithstanding its widely fluctuating budgets and its persistent underspending, IERAC established new annual records in land adjudications in 1976 and 1977 by accelerating the titling of land already in its possession and by speeding up the titling of colonization lands. The military governments of the 1970s gave particular attention to increased colonization in the Oriente where accessibility was being improved with the expanding petroleum operations. Whereas only a little more than one-fifth of the colonization land adjudicated in the period 1964 to 1971 was in the Oriente, the proportion jumped to nearly two-thirds during the 1972 to 1979 period. (See Table I-9.)

This preference for fostering colonization in the Oriente over land redistribution elsewhere was apparently part of the rationale behind the issuance of the Ley de Colonización de la Región Amazónica Ecuatoriana (Decree 2092) in late 1977. Among other things, the Decree called for the creation of a new agency, the Instituto Nacional de Colonización de la Región Amazónica Ecuatoriana (INCRAE), which would supersede IERAC's functions and authority in this region. While the Decree made reference to the need "to promote [mestizo] culture and increase [agricultural] production" in the region through "the displacement of people from the more densely populated areas of the Sierra and the Coast," there were clearly other issues involved such as national security and territorial sovereignty (IERAC 1983:157-65). Whatever the material effects of the Decree may have been, its political ramifications were considerable. Indigenous leaders attacked it for its racial implications. Peasant leaders sided with disenchanted IERAC bureaucrats in accusing the military junta of backing off from agrarian reform and using INCRAE as a front for setting up lucrative land speculation opportunities for military officers.

D. The 1979 Law

The issuance of the Ley de Fomento y Desarrollo Agropecuario (Decree 3289) by the military junta in March 1979, only a few months before it relinquished power to the newly elected constitutional government, did little to quell the debate. The new Law's fixation on increasing agricultural production and agricultural productivity through more efficient use and organization of human and natural resources in the rural areas and through increased research, technology, mechanization, credit and infrastructural development (IERAC 1983: 169-93) delighted the Cámaras de Agricultura and disenchanted most of the

peasant organizations (Handelman 1980:10). In effect, the Law also imposed significant constraints on the process of agrarian reform by relaxing the criterion of "efficient use" as a basis for expropriation, by increasing the financial liability of the State for compensation in cases of expropriation, by making IERAC officials potentially liable for damages for not following strict procedures set forth to deal with cases of land invasions by peasant organizations, and by excluding participants in land invasions from ever receiving benefits from IERAC (Barsky et al. 1982:57-59).

The Law also seemed to have important symbolic significance. It may have marked the formal end to what de Janvry (1981a:224) refers to as "agrarian reformism via land reform" (even though the structural aspects of the agrarian crisis remain and will likely worsen) and the formal beginning of "agrarian reformism via rural development projects." Although these projects were not new to Ecuador, the growing contradictions emanating from the country's belated transformation to capitalist agriculture (e.g., the increasing concentration of the best resources in commercial farms, the growing marginalization of the peasantry, and widening regional disparities) and the abandonment of land redistribution as a politically acceptable form of public intervention have reinforced the role of rural development projects as substitutes for land reform and as complements to general agricultural development programs (de Janvry 1981a:226). Thus it is not surprising that "integrated rural development [IRD] projects" have overshadowed "agrarian [land] reform projects" as the central rural development strategy of the early 1980s. Not only do the IRD projects help to buffer class conflict in the rural sector as well as between rural and urban areas, but they also help to ensure a supply of cheap food and cheap labor through provision of public amenities aimed at satisfying "basic needs."

If in fact the 1979 Decree represented a symbolic watershed for Ecuador's approach to its lingering agrarian crisis, one might suppose that IERAC's role as a public institution would have become anachronistic. As de Janvry (1981a: 223) points out, however, land reform is likely to remain an active "political issue" even if it has reached its limits as a "policy issue." This means that as the debate over the agrarian question continues in the wider Ecuadorian society, opposing political alliances are likely to rationalize or support the continuation of IERAC for very different reasons. Although the data are obviously not complete for the present electoral period, it would appear that the rate of agrarian reform and colonization activities bears a similarity to that of the last civilian government. (See Tables I-8 and I-9.) A major difference appears to be a decline in agrarian reform and colonization adjudications in the sierra, which has been largely offset by an increase in these activities on the coast and in the Oriente.

As de Janvry (1981b:388) argues, it would be incorrect to measure the impact of what was basically an anti-feudal agrarian reform program by the conventional indices of relative area affected and relative number of beneficiaries. However, the 1964 agrarian reform legislation and its subsequent modifications specified other objectives as well. Among these were the redistribution of underutilized public and private lands, the redistribution of population from densely settled rural areas to more sparsely populated areas, the integration of minifundios into more efficient units, a fuller incorporation of marginal producers into the national economy, the improvement of

income and living conditions in rural areas to slow rural-urban migration, and, of course, increased agricultural production and productivity (IERAC 1983). Progress toward achieving these other objectives has been slow.

E. IERAC's Overall Record

The 10-year National Development Plan for 1964-73 envisioned that the agrarian reform activities called for in the 1964 Law would be completed within 15 years. (See Table I-10.) After its first 15 years of operation, however, IERAC had adjudicated only about one-fifth of the projected land to one-third of the projected families in agrarian reform activities. During the early years of the Reform, agrarian reform actions were disproportionately concentrated in the sierra where de facto titling of ex-huasipungo and ex-arrimazgo lands was particularly intense. From 1964 through 1979, a little over one-half of the beneficiaries and nearly two-fifths of the area adjudicated by agrarian reform actions resulted from the abolition of those forms of tenancy (IERAC 1979). The Institute also fell far short of the goals in colonization adjudications, reaching only 45 percent of the projected land and 32 percent of the projected families for the first decade of operations.

At the end of 1982, however, the total number of beneficiaries from both colonization and agrarian reform activities reported by IERAC was still far short of the overall goal established in the 1964-73 Plan. The 118,957 beneficiaries through 1982 (76,246 from agrarian reform and 42,711 from colonization) represented only 47 percent of the goal set in 1964.

It should be noted that there are substantial doubts even about these figures. A few regional IERAC officials have indicated that the data on beneficiaries and land adjudication are sometimes inflated to enhance the monthly and annual field reports. And because many beneficiaries have received titles to more than one land parcel (e.g., abolition of a huasipungo or arrimazgo lot, a collective title for a cooperative or comuna, a lot for house and subsistence plot, usufruct rights to páramo grazing lands, etc.), the actual number of families benefited may be substantially less than the reported figure. Nor are there data available on the number of beneficiaries who have abandoned judicated parcels. On the other hand, some IERAC officials argue that the number of beneficiaries is under-reported because regional personnel occasionally fail to report all adjudications to the Central Office and some of the adjudications are registered directly with the Registro de Propiedad at the cantón level through private lawyers instead of with the regional IERAC offices.

At the end of 1982, IERAC reported that approximately 2.5 million hectares had been adjudicated in both agrarian reform and colonization activities. This figure represented 58 percent of the overall goal set in 1964. About three-fourths of this total area were colonization adjudications. And 70 percent of the colonization area adjudicated was simply de facto titling of spontaneous colonization lands (Barsky et al. 1982:68).

In terms of the estimated 1982 agricultural land base (excluding forestland, páramos, and unproductive land) of 7,877,548 hectares estimated by the National Planning Agency (CONADE 1982), the IERAC estimates imply that the Agrarian Reform Program had already affected about one-third of the nation's

TABLE I-10

GOALS AND ACCOMPLISHMENTS OF AGRARIAN REFORM AND COLONIZATION ACTIVITIES, 1964-1979

Agrarian Reform	Goals		Accomplishments		
	Families	Hectares	Families	Hectares	Year[a]
Titling of precarious holdings[b]	15,300	565,000			1979
Other land redistribution	170,600	1,945,000			1977
Sub-total	185,900	2,510,000	65,262	547,008	1979
Colonization					
Titling of colono holdings and new land settlements	68,100	1,867,000	21,913	847,202	1974[c]
Total	254,000	4,377,000	87,175	1,394,210	

SOURCE: CIDA, Tenencia de la tierra y desarrollo socio-económico del sector agrícola: Ecuador (Washington, DC: OAS, 1965), p. 493; IERAC, "Estadísticas de las adjudicaciones legalizadas en reforma agraria y colonización" (Quito, 1979), pp. 1-2; and unpublished data compiled by Departamento de Evaluación y Estadística del IERAC (Quito, 1983).

[a] The year specified in the 1964 "Plan General de Desarrollo Económico y Social (1963-73)" under the section "Cambios en la Estructura de Tenencia y Expansión de la Frontera Agrícola" for reaching the goal.

[b] Referred to en situ titling of existing precarious holdings; because of the complicated procedures involved in carrying out the liquidation of precarious holdings (legalization en situ, land exchanges, resettlement, private initiatives, etc.), IERAC never reported legalization en situ as a separate category.

[c] Originally set for 1984 (20 years); later reduced to 1974.

farmland. This is a gross exaggeration, because vast amounts of natural forestland remain in colonization areas and considerable extensions of planted forests, páramo areas, and unproductive lands are included in agrarian reform projects. Thus, the CONADE base figure is not particularly appropriate for comparing the relative size of the reform and colonization sectors. By adding one-half of the total area in planted forests, páramos, eroded lands, and other unproductive areas (which account for nearly one-fourth of the country's total land area) and one-half of the area in natural forests (which account for about 54 percent of the country's total land area), to the country's agricultural land base, the augmented base figure would be 14,207,721 hectares (about one-half of the country's total land area). Using this augmented base figure, IERAC may have affected through both colonization and reform activities as much as 18 percent of the country's total area in agricultural and related uses. Discounting the possibility of multiple enumerations of beneficiaries, as many as 15 percent of the country's 790,726 rural families[1] may have received direct benefits from the overall Agrarian Reform Program. Even if the possibility of multiple counting is considered and some adjustments are made in the total agricultural land base, these figures still compare favorably with other Latin American countries like Colombia and Venezuela which experienced rather passive land reforms.

Compared with Mexico, Bolivia, and Peru, however, where the emphasis was upon more distributive reforms, the percentages of beneficiaries and land area actually affected by land redistribution programs have been relatively low. This is particularly true when it is recalled that 170,000 hectares (the Asistencia Pública lands), or nearly 25 percent of the total area adjudicated by agrarian reform actions, were already in the hands of the State at the time the 1964 Law was enacted and that the majority of the early agrarian reform actions were simply de facto titling of relatively small and often marginal plots of land of ex-huasipungeros and ex-arrimados.

III. Other Factors in the Transformation of the Agrarian Structure

Although it is methodologically difficult to assess the impact of agrarian reform (Wilkie 1974), a number of studies have seriously questioned the overall significance of Ecuador's Agrarian Reform Program in modifying the country's agrarian structure (e.g., Handelman 1980; de Janvry 1981b; Chiriboga 1982). As a political process, the Reform obviously has been subject to rather narrow limits of tolerance imposed by the dominant groups in the Ecuadorian society. Yet, insofar as Ecuador has been and continues to be one of the most rural societies of the hemisphere, the distribution of land and other productive agricultural resources is of paramount importance in the allocation of income-earning opportunities, accumulation of wealth, and exercise of political power.

Thus it should not be surprising if the modest changes permitted in the access to the country's productive resources by the sequence of agrarian legislation and its partial application during the past two decades fell substantially short of transforming the rural masses into full-fledged economic and

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1. Includes only those rural residences occupied at the time of the Census of population of 1982. See INEC, IV Censo de Población, III de Vivienda, Resultados Provisionales ([Quito]: 1983).

political citizens. If, as the evidence suggests, semi-feudal tenancy arrangements have indeed been substantially eliminated in favor of market-oriented approaches to the acquisition of resources and the disposition of products in the agricultural sector and beyond, there is ample reason to suspect that forces in addition to the rather passive political and bureaucratic processes of the Reform played important roles in this transition.

Foremost among the other factors which led to significant changes in the country's agrarian structure during the past couple of decades was the petroleum boom which substantially restructured the nation's economy.[2] Even though Ecuador had produced petroleum on the coast since 1925, this commodity was overshadowed by leading agricultural products--especially cacao, bananas, and coffee--in shaping the nation's economy until 1972, when new wells in the Oriente came into production. Almost immediately, oil became the country's leading export, displacing bananas which had generated one-third to one-half of the foreign exchange earnings during the previous two decades. By the end of the 1970s, petroleum had not only played the major role in contributing to a sixfold increase in the country's exports, but it also had helped to produce modest trade surpluses throughout most of the decade (Acosta 1982). By the end of the decade, petroleum activities were responsible for generating about 10 percent of the country's GNP, and they were the key factor in fostering an average annual increase of 9 percent in the nominal GNP during the 1972 to 1980 period. This growth rate was nearly twice that of the previous eight years, a period which was also marked by ever-widening foreign trade deficits.

But if the oil boom was a blessing to some segments of the economy, it was a curse to others. The siembra de petróleo was far from uniform, and it was carried out largely within the existing model of development based on unequal economic growth (Acosta 1982). Obviously the State was an immediate beneficiary of the boom. Overall, it experienced a tenfold increase in its revenues during the decade 1970-80 (Bocco 1982:189). Despite a relative decline from about 90 percent in 1972 to 70 percent in 1979, the category of economic-development received most of the increased public petroleum revenues. These activities included infrastructural development and expansion of such agricultural programs as credit and technical assistance. For example, the Public Works and Transportation Ministry increased its share of national expenditures from 10 percent in 1970 to 17 percent in 1973, and then gradually dropped back to 9 percent in 1979 (Bocco 1982:191). The Agricultural and Livestock Ministry (whose budget had been very small in the early 1970s when it was absorbed into the Production Ministry) received 12.4 percent of the national budget in 1974, and then experienced a gradual drop to 8.2 percent in 1979 (JUNAPLA 1979:95). During the decade of the 1970s, the national government's financial commitment to the agricultural sector grew at an average annual rate of 12 percent.

While these increased public expenditures might have been expected to have very positive effects on agricultural output, increases in agricultural production averaged less than 4 percent per year for the decade (Acosta 1982:47). This was hardly more than the rate of population increase. Even worse, much of the decade was characterized by both declining yields and reduced acreages

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2. For the impact of the petroleum boom on the Ecuadorian agricultural sector, see "Oil, Power and Rural Chage in Ecuador: 1972-1979," José Vicente Zevallos, PhD dissertation, University of Wisconsin-Madison, 1985.

for many basic domestic commodities such as wheat, barley, broadbeans, and potatoes (Chiriboga 1982:125). Furthermore, the volume of major export crops such as bananas and coffee did not increase significantly, even though relatively favorable prices contributed to a fivefold increase in the value of agricultural exports from 1970 to 1978 (JUNAPLA 1979:7). In contrast, rice as well as such agroindustrial commodities as African palm, soybeans, shelled corn, and peanuts showed significant increases in the volume of production. This was also the case with eggs and broilers, as well as beef and dairy production. In fact, increases in dairy and beef output appear to have come partly at the expense of small grains and traditional such export crops as cacao. While areas devoted to these crops declined precipitously during the 1970s, forage crop acreages showed a considerable expansion.

Part of the explanation for this paradox of declining yields and acreages of traditional farm products in the face of increased public expenditures in the agricultural sector lies in the continual deterioration in the terms of trade between agriculture and the other sectors of the economy. Despite high rates of inflation (approximately 15 percent per year between 1972 and 1980)--associated with the petroleum boom, dramatic increases in imports of a wide variety, protectionism for some incipient industries, changes in consumer preferences toward more processed goods, a rapidly expanding urban-based bureaucracy, and occasional shortages of agricultural commodities--farm prices have tended to lag behind prices in the other sectors of the economy. This happened in spite of considerable subsidies to the farm sector through cheap credit, publicly financed research and technical assistance, state-sponsored infrastructural development, and lenient import restrictions on some farm inputs. The point is, however, that these entitlements accrued disproportionally to large farmers with political and economic clout, whether exporters or domestic producers. As a case in point, Chiriboga (1982:116-19) notes that most of the tenfold increase in agricultural credit between 1970 and 1979 was dispersed in large loans to the large modern export and livestock farmers in three provinces--Pichincha, Guayas, and El Oro.

Of course the credit is not the only resource that was distributed on a selective basis within the agricultural sector. The middle and large producers of modernizing segment of the agricultural sector were in the best position to adopt much of the new agricultural technology that became available directly or indirectly as a consequence of the petroleum boom. For example, many of the modernizing dairy farmers in the sierra who had managed to hold on to their best lands with irrigation possibilities were able to take immediate advantage of subsidized credit to import and put into practice the latest labor-saving and yield-increasing technology from the developed countries (Barsky and Cosse 1981:127-41). Many of these producers made special trips to the United States, Canada, and Europe to visit private dairy farms and processing plants as well as university experiment stations and artificial insemination farms.[3] Some used these trips to arrange for special purchase of breeding stock, dairy equipment, tractors, and forage harvesting implements. And some sent their sons to study agricultural sciences in North American and European universities. Similar external contacts and negotiations were carried out by other types of large producers in other parts of the country.

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3. Interviews with dairy farmers in the Cayambe area.

The siembra de petróleo never afforded much opportunity for the rural masses, whose numbers were increasing at a rate faster than the ability of the State to make land and other resources available to them. In spite of an accelerated rate of rural-urban migration during the petroleum boom, the rural population grew at approximately 3.1 percent per year for the period 1970 to 1978 (JUNAPLA 1979:10).

For those farm families who could not afford to pursue new technology and techniques from abroad, the petroleum boom ostensibly fostered an increased flow of services through the proliferation of government agencies in the agricultural sector. Between 1970 and 1978, the number of public employees working in these agencies more than doubled (JUNAPLA 1979:59). Of the approximately 11,000 agricultural public servants in 1978, more than one-third were classified as "administrative and directive" personnel, over one-fourth were classified as "professionals" (agronomists, veterinarians, lawyers, engineers, economists, etc.), and about one-fifth were classified as "technicians." However, the number of employees in all of these categories tripled during the eight-year period. The only area in which the number of employees did not increase during the 1970 to 1978 period was in "services," where the relative share of the public agricultural labor force declined from two-fifths to one-sixth.

The increased public expenditures and bureaucratic expansion in the agricultural sector facilitated by the petroleum boom produced a proliferation of new regional and technical agencies and new programs within existing agencies. Many of these programs were geared primarily toward further modernization of the medium and larger size production units through the development and distribution of new technological inputs (JUNAPLA 1979:55-64). Because of the limited backward linkages within the Ecuadorian agricultural sector, this new demand necessitated significant increases in the import of such essential inputs as agricultural chemicals and machinery. With a very limited capacity for domestic production of chemical fertilizers and no domestic production facilities for chemical pesticides, the country experienced a threefold increase in the import of chemical fertilizers or components and chemical pesticides between 1970 and 1978 (JUNAPLA 1979:30,31). The use of protein supplements and pharmaceuticals for livestock also increased dramatically during this period. These were mostly imported or were produced with mostly imported materials. The number of tractors in the country doubled between 1972 and 1978 (JUNAPLA 1979:31). While the use of these new inputs showed a considerable expansion to medium and smaller size farms devoted to domestic livestock and crop production, this technology was still quite concentrated on the country's larger production units.

The petroleum boom also fostered an unprecedented growth in the country's cities--initially Guayaquil and Quito, but later secondary population centers as well. Between 1970 and 1978, the urban population grew at an annual rate of 4.4 percent while the national average was only 3.4 percent (JUNAPLA 1979: 9,10). It is generally recognized that the siembra de petróleo took place primarily in the country's cities. As much as 75 percent of public expenditures during the first eight years of the petroleum boom were oriented toward or restricted to urban areas (JUNAPLA 1979:11). On a per capita basis, this means that public expenditures were three times greater for urban residents than for rural inhabitants. And because the actual spending incidence of many rural programs occurs in urban areas, the urban bias of the petroleum boom is likely to have been even greater. Furthermore, it is reasonable to assume

that a very high portion of private earnings from petroleum was spent in urban areas. And of course this says nothing about the class incidence of petroleum spending.

The implications of this concentrated distribution of oil revenues in urban areas are fairly obvious. The augmented employment multiplier effect in urban areas undoubtedly provided a powerful centripetal force, not only for the redundant unskilled rural labor force, but for the educated rural youth as well. At the same time, the limited distribution of oil revenues in the countryside exacerbated the income gap within the rural areas and between the rural and urban areas, thus providing a centrifugal force for the rural masses. An estimated 1.2 million permanent rural-urban migrants have descended upon the cities during the past 30 years (Comercio, 1 June 1983).

In contrast to the sluggish growth of the agricultural sector during the decade of the 1970s, the manufacturing sector grew at an average annual rate of 10 percent. With the growth in the urban middle class and associated private businesses and government bureaucracy, together with a significant increase in mortgage credit, the construction industry became particularly robust in the urban areas. A large portion of the workers in this fairly labor-intensive industry were permanent or temporary rural male migrants (Likes and Salamea n.d.:29). For similar reasons, the rapid growth in the demand for personal services attracted large numbers of female migrants from the rural areas (Luzuriaga 1983:104-06).

The accelerated growth of urban areas not only meant increased opportunity costs for rural labor, but increased demand for domestic agricultural products as well. While income distribution remained quite skewed in the cities, it was worse in the countryside. In 1978, the poorest one-half (46.2 percent) of the rural labor force received less than one-fifth (17.4 percent) of the total income (JUNAPLA 1979:83). At the other extreme, the richest one-tenth (11.9 percent) of the rural labor force received more than one-half (51.2 percent) of the total income.

To be sure, these figures do not reflect the wealth effect which benefited the major asset-holding groups considerably during the inflationary period of the petroleum boom. Nor do they take into account the value of direct subsidies (primarily wheat and milk) nor indirect subsidies (credit, water, fertilizers, seeds, etc.) which have tended to benefit the larger producers differentially. In addition, the data do not indicate the benefits accruing primarily to larger production units from a number of tax laws passed after 1973 which favored the import of capital goods and the export of some agricultural products.

In 1975, the poorest one-half of the urban labor force received about one-fifth (19 percent) of the total income, while the richest one-tenth received about one-third (34.2 percent) of the total income (Rosales 1982:144). While only 30 percent of urban families were considered to be living below the poverty line (inadequate income to satisfy basic needs), 80 percent of rural families were below the poverty line (Rosales 1982:146,147). This income differential between rural and urban areas has fostered and continues to promote an exodus of the best rural workers to the cities at a time when the demand for domestic agricultural products is growing at unprecedented rates.

Despite the fact that official data show declines in the production of virtually all agricultural crops during the decade of the 1970s, a recent report (CENDES 1983:138) cites information from a 1974 study in Guayaquil that indicates extremely high demand elasticities with respect to income for a wide range of unprocessed food commodities. Even potatoes show a positive demand elasticity with respect to income of 0.24. The corresponding positive coefficients for horticultural products and fruits were 0.69 and 0.77, respectively.

These data suggest that the growth in urban population and real incomes over the past decade should have been accompanied by a substantial increase in the demand for domestic agricultural products. In the case of vegetables, oils, and grain, some of this demand has been supplied through increased imports. But this is not the case with fresh fruits and vegetables nor with dairy and poultry products, which are presently being exported in significant quantities to Colombia. If the data are correct that the production of these labor-intensive commodities has been decreasing and that the campesinos continue to abandon the countryside in record numbers, then the Government's present cheap food policies through the use of price ceilings and import subsidies appear all the more inconsistent with a rural development strategy which emphasizes increased production and a slowing of rural-urban migration.

A full accounting of the changes that have occurred in the country's agrarian structure since 1964 is not possible with the existing data base. Although the 1974 Agricultural Census provides some clues about these changes, it has serious shortcomings for assessing the country's present agrarian structure. Until a new national agricultural census of high quality is conducted in the 1980s, we will not have a good overview of the existing agrarian structure and the changes which have taken place during the past decade. In the meantime, several studies have shed additional light on the subject in specific provinces. Unfortunately, these studies tend to look at only certain components of the agrarian structure in particular places without examining the interactive and dynamic aspects of the overall agrarian structure.

Notwithstanding deficiencies in the existing data, a number of important changes in the agrarian structure are evident in a comparison of the 1954 and 1974 Censuses:[4]

1) The number of production units surveyed in the 1974 Census increased by 50.8 percent and the total farmland increased by 32.5 percent. (See Table I-11.) While much of this increase resulted from an expansion of the Census area, it also reflects the upsurge in both spontaneous and directed colonization--primarily from the sierra to the coast and the Oriente--as well as reform activities which were concentrated in the sierra during this period. Between 1964 and 1974, IERAC adjudicated 847,202 hectares of land to 21,913 beneficiaries in colonization (IERAC, 1979). The adjudications in agrarian reform were 244,559 hectares and 38,168 beneficiaries during the same time period (IERAC, 1979). While a significant portion of the IERAC adjudications

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4. For an excellent summary of these changes, see Barsky et al., Políticas agrarias, colonización y desarrollo rural en Ecuador (Quito: OEA/CEPLAES, 1982), especially pp. 75-80.

TABLE I-11

DISTRIBUTION OF AGRICULTURAL PRODUCTION UNITS AND FARMLAND
BY FARM SIZE FOR ECUADOR, 1974 AND 1954-74

Size Categories (ha)	1974 No. of Production Units		1974 Total Farmland		Change 1954-1974[a] No. of Production Units		Change 1954-1974[a] Total Farmland	
	No.	%	Ha 000s	%	No.	%	Ha 000s	%
Less than 5 hectares	346,847	66.7	538.7	6.8	95,161	37.8	106.5	24.6
5 to 19.9 hectares	96,360	18.6	935.3	11.8	38,710	67.1	369.5	65.3
20 to 99.9 hectares	64,813	12.5	2,664.7	33.5	37,071	133.6	1,526.0	134.0
100 to 499.9 hectares	9,657	1.9	1,676.5	21.1	3,870	66.9	520.2	45.0
500+ hectares	1,434	0.3	2,134.3	26.8	65	0.5	- 572.4	-21.1
TOTAL & PERCENT TOTAL CHANGE	519,111	100.0	7,949.5	100.0	174,877	50.8	1,949.8	32.5

SOURCE: INEC, Censo agropecuario nacional de 1954, y de 1974.

[a] For the 1954 data, see Table I-1.

Table I-12

PERCENT DISTRIBUTION OF AGRICULTURAL PRODUCTION UNITS AND FARMLAND BY FARM SIZE FOR ECUADOR, 1974 and 1954-74

Size Categories (has.)	Sierra, 1974		Change[a] Sierra 1954-74		Coast 1974		Change[a] Coast 1954-74	
	No.	Area	No.	Area	No.	Area	No.	Area
Less than 5 hectares	78.0	11.9	18.7	7.0	53.3	4.4	130.5	83.1
5 to 19.9 hectares	14.7	14.2	43.4	47.1	25.9	12.0	79.5	66.7
20 to 99.9 hectares	6.2	25.8	81.5	80.1	17.5	31.7	82.6	70.6
100 to 499.9 hectares	0.9	16.4	23.9	7.0	2.9	24.2	45.2	33.0
500+ hectares	0.2	31.8	-16.7	-33.6	0.4	27.7	14.5	-15.7
TOTAL & TOTAL CHANGE	100.0	100.0	24.5	2.0	100.0	100.0	102.0	26.2

SOURCE: INEC, Censo agropecuario nacional de 1954, y de 1974.

[a] For the 1954 data, see Table I-2.

merely legalized existing holdings, these actions alone would account for more than one-third of the new production units and over one-half of the additional farmland included in the 1974 Census.

To be sure, the tempo picked up for both colonization and agrarian reform activities during the military governments of the 1970s. By mid-1982--18 years after the Agrarian Reform Program had begun--IERAC had adjudicated a total of 1,843,272 hectares to 42,711 beneficiaries in colonization and 685,863 hectares to 76,246 beneficiaries in agrarian reform.

2) The data from the two censuses also show a significant decline in the amount of land concentrated in the larger production units. Even though the number of units with 500 hectares or more of land increased slightly, these farms accounted for 572,400 fewer hectares of land in the 1974 Census than they had in the 1954 Census. (See Table I-11.) Most of this decline occurred in the very large units (over 2,500 hectares) in the sierra whose numbers decreased by 52 (38 percent) and whose total land area diminished by more than 400,000 hectares (46 percent). The sierra lost 50 farms (20 percent) and over 60,000 hectares (17 percent) of land in the 1,000-to-2,500-hectare category. Reductions were less in the 500-to-1,000-hectare range. While some of these decreases were a direct consequence of the Agrarian Reform Program, many took place through land sales and inheritances (which undoubtedly were influenced by the Reform).

The coast lost 22 units (21 percent) and nearly a quarter million hectares (36 percent) from the very large farms. The 1,000-to-2,500-hectare category, which included many export units, remained relatively static. But there, the 500-to-1,000-hectare category gained 117 units (a 35 percent increase) and about 65,000 hectares (an increase of 28 percent). While the densely populated sierra, devoted largely to domestic enterprises, was more intensely affected by inheritance patterns and the emerging land market as well as the Agrarian Reform Program--at least up until 1973--much of the land from the very large units on the coast apparently was kept in or was incorporated into export production on a fairly large scale.

Notwithstanding these changes, a number of large units were still intact at the time of the 1974 Census. Units with 500 hectares or more still accounted for nearly one-third of the farmland in the sierra and more than one-fourth of the farmland on the coast. (See Table I-12.) Some of these units were comunas or cooperatives, but most of them were private holdings. A number of these private holdings in the sierra were located on high, rugged terrain unsuitable for cropping. On the coast, some included arid and swampy areas which are unsuitable for cropping without investments in irrigation or drainage.

3) Almost as a corollary of the previous discussion, the Census data show a dramatic increase in the number and total area of medium-sized production units. This is largely the consequence of colonization in the lowlands and subdivision of large properties through sales and inheri-

tance in the sierra. Both the number of units and the total land area in the 20-to-100-hectare category increased by 134 percent. (See Table I-11.) While these units represented only 6.2 percent of the total production units in the sierra in 1974, they accounted for more than one-fourth (25.8 percent) of the total farmland. As in the case of the national data, the relative increase in the number of and area in these units was far greater than for any other size group. On the coast, these medium-sized units accounted for more than one-sixth (17.5 percent) of the total number and nearly one-third (31.7 percent) of the total farmland. The relative increase in both the number and area of these units was less than that for the smallest size category.

4) The intercensal data show that the number of production units under 5 hectares in size increased by 37.8 percent and the total area encompassed by these units rose by 24.6 percent. This means that the average size of these units decreased from 1.71 to 1.54 hectares. In the 1974 Census, these minifundios accounted for two-thirds of the country's total production units, but they controlled only 6.8 percent of the total farmland. Even though only a little more than one-half (53.3 percent) of the production units on the coast were under 5 hectares in size, the relative increase in the number of these units was far greater than for any other size category.

While it is true that some of these new minifundios were a direct consequence of the Agrarian Reform Program, especially in the "liquidación de formas precarias," both inheritance and sales were far more important factors in the creation of smallholdings. The unrelenting demographic pressures in the countryside in the face of limited alternative employment opportunities for the rural masses have forced successive generations of campesino families to cling tenaciously to the land in spite of its deteriorating quality and exorbitant prices. Even in cases where one or more family members have secured off-farm employment on a more-or-less permanent basis--often in the cities, at great distances--other family members--typically the wife and children--have remained on the land in their communities of origin.

The average net annual farm income of units under 5 hectares in 1975 was less than 18,000 sucres--a figure substantially below the minimum wage for that period (Chiriboga 1982:104). But this represented only a little more than one-half (55 percent) of the income received by these small units. The rest came mostly from wages earned on the larger farms and in the cities.

The data from the mid-1970s, then, suggest that the country's farm population was becoming increasingly concentrated on minifundios and increasingly dependent on off-farm wage employment. Given the relatively restricted role of the Agrarian Reform Program in redistributing land up until that time (343,842 hectares, or 4.35 percent of the nation's farmland, to 46,473 families), one can hardly give credit to IERAC nor hold the Institute responsible for the proliferation of minifundios and the proletarianization of the rural population. On the other hand, when compared with the 172,810 new farm units reported in the 1974 Agricultural Census, the figure of 70,824 combined

beneficiaries from agrarian reform and colonization efforts at the end of 1975 does not appear all that insignificant--even allowing for some double-counting of beneficiaries and recognizing that many agrarian reform and colonization actions did not result in the creation of new farm units.

TABLE I-13

LAND TENURE STATUS OF ECUADOR'S AGRICULTURAL FAMILIES BY REGION, 1974

Tenure Categories of Agricultural Families	Sierra		Coast		Total	
	No. 000s	%	No. 000s	%	No. 000s	%
Owners	227.6	71.0	100.9	59.1	338.4	65.5
Mixed tenancy	47.4	14.8	13.0	7.6	62.3	12.0
Colonists without titles and others	9.6	3.0	30.4	17.8	51.2	9.9
Sharecroppers	15.8	5.0	4.8	2.8	20.9	4.0
Cash renters	4.3	1.4	10.6	6.2	15.0	2.9
Other precarious forms	1.7	0.1	2.4	1.4	4.1	1.0
Comuneros	10.7	3.3	2.9	1.7	15.5	2.9
Landless agricultural workers	3.5	1.1	5.8	3.4	9.5	1.8
TOTAL	320.6	100.0	170.8	100.0	516.9	100.0

SOURCE: INEC, Censo agropecuario nacional de 1974, Cuadro 12.

5) Data from the 1974 Agricultural Census show that about two-thirds (65.5 percent) of the country's farms were owner-operated. (See Table I-13.) By adding mixed tenancy (owner-operation plus some form of tenancy) to this category, over three-fourths (77.5 percent) of the nation's farms were operated in part at least by their owners. Owner-operators and part-owner-operators were somewhat more prevalent in the sierra (85.8 percent) than on the coast (67.1 percent). One out of

ten of the nation's farms was operated by colonos without title. And despite the outlawing of precarious tenancy by the 1973 Law, the 1974 Census showed that one out of every twenty farms was still operated by sharecropping or other tenancy arrangements. Nevertheless, the 1974 data suggest that the country's agrarian structure was no longer dominated by semi-feudal forms of land tenure.

6) Although the production units under 5 hectares in size controlled only 6.8 percent of the nation's total farmland, they accounted for 16.3 percent of the cropland in 1974. Four out of every five hectares (82.8 percent) on these small farms were under cultivation. (See Table I-14.) This ratio dropped to nearly one-half (55.4 percent) for the 5-to-20 hectare farms. While the largest farms cultivated about the same total number of hectares as the smallest farms, they had less than one-fifth (18.5 percent) of their total area under cultivation. Nearly one-half (46.1 percent) of the land on these large units was in unimproved pasture.

Inasmuch as the smallest farms tend to be disproportionately located on marginal lands, these data suggest a continuation, if not exacerbation, of the country's inverted land utilization pattern and the resulting threat to the natural resource base. And given the fact that many of the large farms occupy valley floors and other fertile areas, the data also point to the underutilized potential of these units, with their vast acreages in unimproved pasture.

TABLE I-14

LAND USE BY FARM SIZE IN ECUADOR, 1974

Land Use	Less than 5 ha		5-19.9 ha		20-99.9 ha		100-499.9 ha		500+ ha		Total	
	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total	Area (ha) 000s	% Total
Cropland	426.5	82.8	516.1	55.4	808.4	30.3	459.9	27.5	397.6	18.5	2,608.5	100.0
Unimproved pastureland	47.4	9.2	229.5	24.7	653.9	24.6	615.7	36.7	991.8	46.1	2,538.9	100.0
Forest land	23.2	4.5	139.0	14.9	1,057.3	39.7	510.0	30.4	579.4	27.0	2,308.9	100.0
Unproductive land	17.8	3.5	46.6	5.0	144.9	5.4	89.8	5.4	180.4	8.4	479.5	100.0
TOTAL	514.9	100.0	931.2	100.0	2,664.5	100.0	1,675.4	100.0	2,149.2	100.0	7,935.8	100.0

SOURCE: INEC, Censo agropecuario nacional de 1974, cuadro 11.

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PART II

THE AGRARIAN STRUCTURE IN CHIMBORAZO: ITS EVOLUTION, CURRENT TRENDS AND POLICY IMPLICATIONS

The second part of this research paper: (1) summarizes the major changes in the agrarian structure of the province of Chimborazo prior to and after the enactment and implementation of the country's Agrarian Reform Laws of 1964 and 1973; (2) identifies current trends in the evolution of the province's agrarian structure; and (3) examines some possible policy responses to deal with residual problems of the Reform and problems associated with current changes in the province's agrarian structure.

The data used for this part came from secondary sources and from a 1983 field study conducted as part of an AID/CONACYT research training project carried out jointly by IERAC and the Land Tenure Center of the University of Wisconsin. Along with extensive observations and selected case studies of families, the field study included 529 interviews of rural families selected from an area sample covering the major agro-political regions of the province. The study included three levels of analysis: (1) the economic organization of the family production units (including non-farm employment as well as farming); (2) the extraction and circulation of economic surplus from the production units; and (3) the socioeconomic differentiation of the production units and agro-political regions of the province.

While it would be impossible to identify a single province to completely represent the Ecuadorian sierra, Chimborazo does have many characteristics and problems which are common to the country's highland region and other parts of the Andes Mountains. It also has some features about its agrarian structure which are unique to Ecuador, but which offer important implications for agrarian reform and rural development in Ecuador and elsewhere.

Chimborazo was the first area in present-day Ecuador to be colonized by the Spanish. For a long time, it was thought to have the most archaic agrarian structure and the most backward rural areas in the country (CIDA 1965: 275). However, Chimborazo was the province most affected by the country's Agrarian Reform Program in terms of land area and number of beneficiaries. In part, this high level of public intervention responded to the intense political pressures from the province's large indigenous population, which was organized by leaders of the Federación Ecuatoriana de Indios (FEI) and the Catholic Bishop of Riobamba ("el Obispo de los Indios").

While semi-feudal labor forms and large haciendas have virtually disappeared from the province, widespread poverty persists. The traditional patrones of feudalism have been replaced by capitalist institutions whose brokers muster economic surpluses from the new owners and their land in ways

quite different from the old system. Some peasant families and individuals have adapted well to the new system. These include campesinos ricos and other farmers producing high cash value crops with new technological inputs; buyers of farm produce, especially those with their own trucks; sellers of the new agricultural imports; and other small enterpreneurs and bureaucrats. Other families and individuals have fallen behind. They have left the region permanently for the larger cities, or have sought temporary off-farm employment as farm laborers in the export agricultural plantations of the coast or as menial service or construction workers in the cities to sustain themselves on shrinking parcels of deteriorating land. Communal property and collective labor forms continue to erode under the pressures of growing market forces and individualism. Rural communities are seriously strained by powerful urban centripetal forces. And the province's fragile land base is abused unmercifully as campesinos and their new brokers focus on survival strategies and short-term profits.

While most of the countryside and rural towns and villages bear the scars of this ecological transition toward more advanced capitalism, some areas show more successful adaptation. The vegetable, fruit and milk producing areas around the provincial capital of Riobamba as well as the subtropical foothills and valleys in the southwestern part of the province exhibit more vitality. And the city of Riobamba, itself, appears to have regained some of the regional prominence that it had in the colonial periods. Not only it is successfully capturing and reinvesting a significant portion of the region's economic surplus, but it is also attracting outside investment by Guayaquil enterepreneurs as well as some foreign business interests. A number of domestic and foreign private and public development efforts have contributed funds and technical assistance to the province in recent years. One of the important products of this development effort has been the enhancement of the Politénica de Chimborazo, which now has a large, attractive campus on the outskirts of Riobamba. This effort has not only contributed to a substantial increase in the number of postsecondary students and instructional programs, but it has also fostered some applied research efforts directed toward regional problems.

I. Major Geographical Features of the Province

The province of Chimborazo lies just below the equator, between the 1°21' and 2°31' parallels and between the 78°21' and 79°25' meridians. Its 7,014 km^2 account for only 2.5 percent of Ecuador's total area, while its 329,922 inhabitants reported in the 1982 Population and Housing Census represented about 4 percent of the country's total. (See Figure I.)

A. Natural Features

The province's irregular topography is accentuated by two major northsouth cordilleras with four snow-capped peaks, including the country's highest -- Chimborazo at 20,561 feet. Except for some alluvial terraces along the province's two major rivers -- the Río Chambo in the north and the Río Chanchán in the south -- most of the land is rolling to very steep. This feature poses a severe constraint on agricultural activity, despite the fact

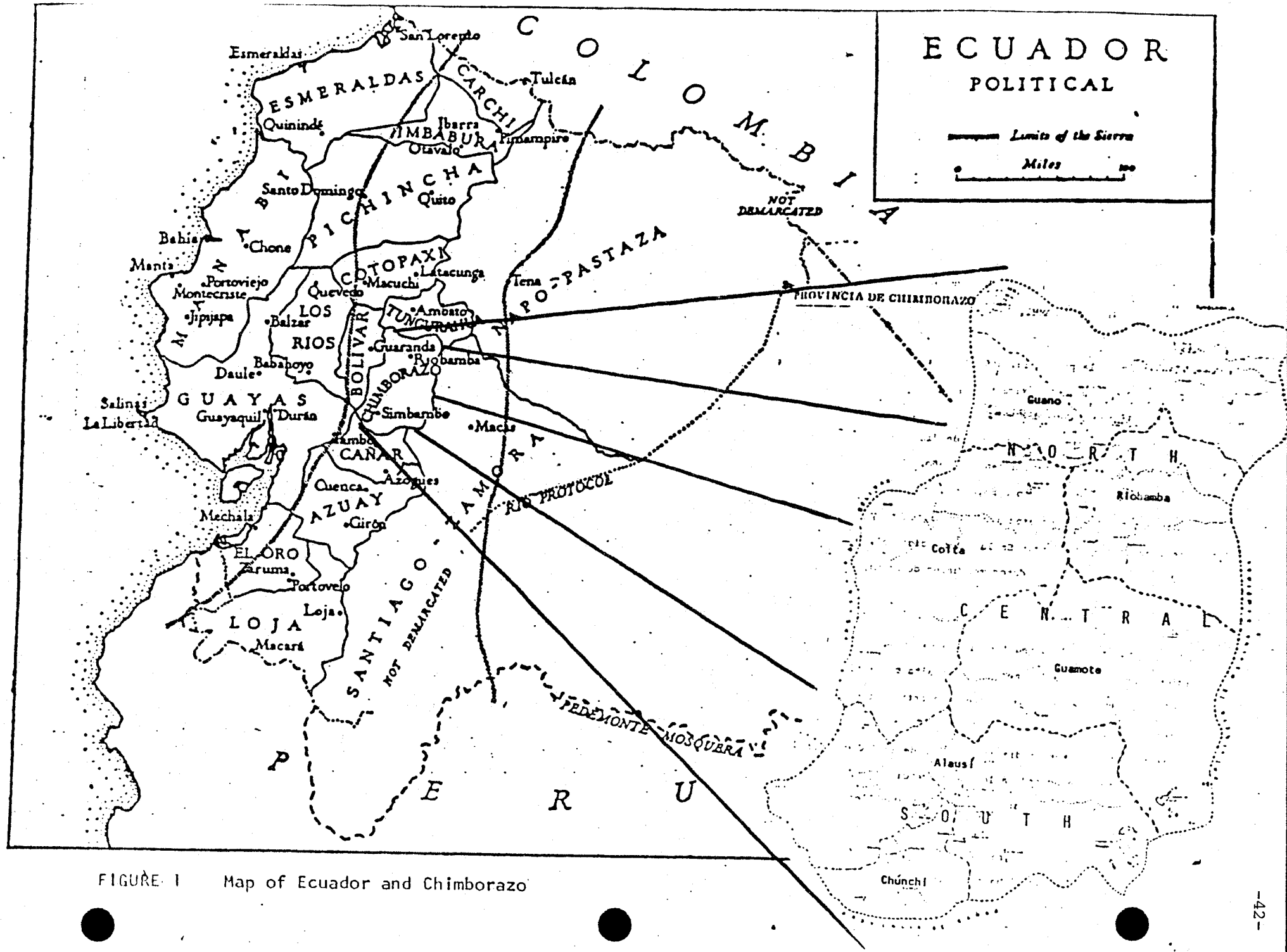

FIGURE 1 Map of Ecuador and Chimborazo

that many of the soils are of relatively recent volcanic origin with good permeability and natural fertility. Many of the older soils of volcanic and sedimentary origin have poor internal drainage and natural fertility. Others, such as the sandy areas around Riobamba and Palmira, are excessively drained. Increasing demographic pressure and intensive land use have combined to exact a heavy toll on the province's land base. In many areas, accelerated erosion has resulted in irreversible damage to the landscape.

Soil limitations are complicated by climatic factors which normally produce two alternating wet and dry periods per year. Within the province, however, annual rainfall often varies from 10 to 100 inches, depending on altitude, direction of prevailing air currents, local relief and other factors. In most parts of the province, agriculture without irrigation involves a high degree of uncertainty. Yet, only about 10 percent of the arable land is presently irrigated. And some of these irrigation systems are jeopardized by erratic water supplies and soil erosion.

B. Land Use

In 1981, less than one-third of Chimborazo's land area was cultivated or in fallow. (See Table II-1.) Given the natural limitations of the province's topography, soils and climate for intensive cultivation without major soil and water conservation measures, such a high proportion poses a continuing threat to the natural resource base. Soil depletion was apparently the primary factor in the loss of nearly 15,000 hectares of harvested cropland in the province during the decade 1970-1980. Increasing soil losses and inadequate market incentives for small grains may also have been the major causes for the conversion of 60,000 hectares from cropland to pastureland during the same decade (CENDES 1983: 31-32).

Over one-third of the land area in Chimborazo was in pastureland in 1981. This does not include areas in the páramo which are occasionally or seasonally grazed. Although relatively little pastureland has been improved and overgrazing is pervasive throughout the province, some of it could be used more intensively. Such areas of inverted land use (occasional cropping and extensive grazing of the fertile and level to gently sloping soils versus intensive cropping and grazing of poorer and steeper soils) are vestiges of the hacienda system which allocated the best lands to their own crops and cattle and assigned marginal lands to sheep production and to tenants for subsistence activities and sharecropping.

With its primary emphasis on de facto titling and distribution of state lands, the Agrarian Reform Program in Chimborazo may have fostered the modernization of many haciendas in Chimborazo (CENDES 1983:31). The modern haciendas are smaller, more intensive operations than their precursors and rely almost exclusively on wage labor for their work force. With decreasing incentives for small grain production and increasing competition from small and medium-sized farms in horticultural production, they tend to be more oriented toward livestock -- especially dairying -- than their predecessors. And because most of these units have aped their counterparts in Europe and North America in moving toward drylot or semiconfined feeding arrangements and mechanized forage production, level areas are all the more appealing. The

inverted use pattern was also reinforced by the actions of many heirs and new investors who made deliberate choices to retain or acquire the best lands and give up or forego purchase of marginal lands where the peasantry was already concentrated.

As in most parts of the sierra, the natural forests of Chimborazo have been nearly eliminated in favor of cropland and pastureland. Most of the lumber, and even much of the firewood, must now be trucked in from the Eastern lowlands. With continuing heavy demographic pressure and increasing land values, relatively little progress has been made toward reforestation.

Much of the province's land area lies at or above treeline in extensive matorral (fairy forest) and páramo areas, which, except for limited cropping and extensive grazing, have little agricultural value. (See Table II-1.) When excessively cropped or overgrazed, as many of these areas have been, the water supplies originating from these natural reservoirs pose flood threats to areas at lower altitudes during the rainy seasons and disappear during the dry seasons. The delicate balance of nature in the páramos and their ecological linkage to the lower areas apparently led to restricted use and severe penalties for misuse of such areas on many of the traditional haciendas (CIDA 1965: 294).

C. Population

While the nation's population increased by nearly 25 percent during the 1974-82 intercensal periods, the population of Chimborazo grew by only 8 percent. In fact, three of the province's six cantones -- Guano, Alausí and Chunchi -- experienced net lose of population during this period. (See Table II-2.) The most significant population increase during the period took place in around the provincial capital of Riobamba, and to a lesser degree in the rural areas of Colta (primarily the sub-tropical Pallatanga region). Culturally, four of every ten inhabitants of the province are mestisos. The indigenous population is concentrated in the cantones of Guamote and Colta, (estimated at 80 and 85 percent of the population respectively) and the mountainous parts of Alausí, Riobamba and Guano.

1. Migration

Despite heavy outmigration from most rural areas and small towns toward Riobamba and to cities outside the province, Chimborazo remains one of the most rural provinces in the country, with nearly seven out of every ten inhabitants living in the countryside. Until the 1960s, Guayas was the principal pole for migrants from Chimborazo, while Pichincha was the second choice. This pattern had reversed by the 1974 Census, and the 1982 Census, showed Pinchincha gaining even more prominence over Guayas as a receiving center for persons leaving Chimborazo. According to the 1982 Census, Pinchincha's population included 37,691 persons born in Chimborazo compared with 23,131 migrants from Chimborazo living in Guayas. (See Table II-3.) For the country as a whole, the 1982 Census identified 79,256 Chimborazo-born persons living outside their province of origin. This means that one out of every five Chimborazo-born persons in the country was living outside their province of origin. To put it another way, the number of migrants from Chimborazo approached the number of urban inhabitants living in the province.

Table II-1 Land Use for Chimborazo, 1981.

	Area Has.	Percent of Total
Cultivated Land[a]	179,790	30
Improved Pastureland	19,970	3
Natural Pastureland	196,590	32
Forest Land	26,315	4
Páramo and Wasteland	185,335	31
Total	608,000	100

Source: Ministry of Agriculture (MAG), Plan Operative Provinicial Agropecuario Chimborazo 1981.

[a]Includes fallow land and permanent crops (most of which are intercultivated with seasonal crops) but excludes "pastos cultivados," which, refer primarily to improved pasture. The area in forage crops for hay, silage or soilage are not very extensive in the province. Most of the "pastos cultivados" or "pastos artificials" are grazed.

Table II-2 Population by Canton for Chimborazo 1974-1982.

Cantón	1974 Rural	1974 Urban	1974 Total	1982 Rural	1982 Urban	1982 Total	Change 1974-1982 Rural	Change 1974-1982 Urban	Change 1974-1982 Total
Alausí	44,987	7,137	52,124	39,204	5,202	44,406	-12.8	-2.7	-14.8
Colta	46,182	2,318	48,500	52,802	2,229	55,031	14.3	-0.4	13.5
Chunchi	11,793	2,802	14,595	11,364	3,214	14,578	-0.4	14.7	0.0
Guamote	20,114	2,438	22,552	22,490	2,285	24,775	1.2	-6.3	10.0
Guano	38,097	5,389	43,486	36,197	6,052	42,249	-5.0	12.3	-0.3
Riobamba	64,972	58,087	123,059	76,666	72,217	148,883	18.0	24.3	21.0
TOTAL AND TOTAL CHANGE	226,145	78,171	304,316	238,723	91,199	329,922	5.6	16.6	8.4

Source: INEC, III Censo de Población, 1974; and INEC, Datos Provisionales del IV Censo de Población y III de la Vivienda, 1982.

Table II-3 Distribution of Chimorazo-born Migrants, 1982.

Province of Settlement	Total Number of Chimborazo-born Migrants	Percent Total
Bolivar	2,333	2
Cauar	1,707	2
El Oro	1,483	1
Guayas	23,131	22
Pastaza	1,676	2
Pichincha	37,681	35
Tungurahua	3,339	3
All Other Provinces	7,941	7
Grand Total to All Provinces	79,291	74
Within Chimborazo	27,922	26
GRAND TOTAL	107,213	100

Source: INEC, III Censo de Población, 1982.

As further testimony to the mobility of Chimborazo-born persons, the 1982 Census showed that nearly 10 percent of the province's inhabitants were born in cantón other than the one in which they were residing. Most of these internal migrants were concentrated in the cantón of Riobamba.

With the completion of the railroad to Guayaquil early in the century, large numbers of temporary workers from Chimborazo began providing seasonal labor to the agro-export plantations on the coast. In fact, the emergence of a cash wage alternative for the rural labor force of Chimborazo helped to undermine the concertaje system, and later on, the huasipunguaje system. As the coastal areas filled up and produced their own labor surpluses and as the plantations became increasingly mechanized, the temporary migration flows from Chimborazo shifted toward the big cities, especially Guayaquil and Quito. Further impetus for this shift came from the construction boom associated with the siembra de petroleo in the early 1970s. According to a 1982 study, 697 of the households in the Guamote DRI Project area had at least one household member earning off-farm income during the previous 12 months -- typically including the father (74 percent) and employment in Quito (56 percent) (Andrade 1982).

2. Employment.

According to the 1982 Census, the economically active population of Chimborazo was 93,402 persons, or only 28 percent of the province's total population. Since most of the out migration responds to limited employment opportunities within the region, a disproportional number of economically dependent persons are left behind. And to make matters worse, the employment figures belie the high degree of underemployment amongst the landless, minifundistas and seasonal workers. On the other hand, women's and children's labor was still very much under-reported in the 1982 Census (Haney 1985).

Despite the concentration of the population in rural areas, only one-half of the labor force is employed in primary sector activities -- down from 62 percent in the 1974 Census. In the meantime, the relative importance of the service sector as a source of employment increased from 20 percent to 34 percent between 1974 and 1982. Much of the increase in tertiary sector employment occurred in Riobamba where the demand for personal services has grown along with expanded jobs in construction, administrative and commercial activities. In addition, small scale commerce remains an important source of part-time and full-time employment in the small towns and rural areas of the province. Riobamba has also created some new employment opportunities in the secondary sector in recent years, especially in food processing and construction materials. And despite a continual withering away of artisan activities, some such employment opportunities persist in parts of the province, particularly in sisal and wool products.

D. Infrastructure

Although considerable improvements have been made in Chimborazo's infrastructure during the past decade or so, the province still lags behind other regions of the country in many public facilities and services.

1. Transportation

Of the 1,638 kilometers of primary and secondary roads in the province, only 346 kilometers, or 21 percent, are paved. Most of this pavement is the sierra trunk of the Pan American Highway, which traverses the province from north to south. A major branch of this highway links the sierra, at Colta, to Guayaquil. Most of the province's secondary roads are dirt with little or no added surface materials and channelling structures. During the rainy seasons, many of these roads are impassable except by four-wheel drive vehicles. Overall, the road system in Chimborazo represents just under 5 percent of the nation's total. Surface transportation is quite good by private and cooperative buses, collectives and taxis between larger villages and towns within Chimborazo and to major cities outside the province.

Acredited earlier for having broken the province's relative isolation from Guayaquil and Quito, the narrow guage railway traversing the province has only one cargo train every other day and a daily passenger autocar to Quito. The service between Riobamba and Guayaquil is more frequent, but often interrupted by track repairs. Except for a daily mixed train, which usually includes some tourist cars, much of the rail traffic volume between Riobamba and Guayaquil is between relatively isolated villages enroute or between these villages and one of the two terminals.

Riobamba has an airport with paved runway capable of handling small jets, but there are no scheduled flights. Limited air taxi service is available.

2. Electricity

Although rural electrification has proceeded rapidly in recent years, especially in the more populated northern region of Chimborazo, both existing capacity and usage of electrical energy are below the national averages. In 1980, the installed capacity was only 61.4 watts per capital for the province versus 83.5 watts per capita for the nation. Average consumption for the province was 241 KWH per person versus 260 KWH per person nationally. Chimborazo accounted for only 2.6 percent of the nation's electrical capacity and consumption. According to the 1982 Census, 94 percent of the urban households in Chimborazo had electricity compared with only 22 percent of the rural households.

3. Water and Sewerage.

Although the 1982 Census indicated that 95 percent of the urban households and 32 percent of the rural households in Chimborazo had immediate access to tap water, very little of the water is safe for drinking. Provincial physicians and health authorities report that virtually all of the province's population is afflicted to some extent by internal parasites, which they associate primarily with contaminated water supplies. Eighty-eight percent of the urban households in the province have sewage hook-ups, compared with only 6 percent of the rural households.

4. Health

Although all six of the province's cantones have some basic health care facilities, most public and private services are concentrated in Riobamba.

There, 36 different facilities and 80 physicians serve an immediate population of about 150,000, plus other inhabitants from outlying areas. All of the major national health organizations have representatives in the provincial capital.

The other cantones are served only by entities of the Ministry of Public Health. In the cantón of Colta, for example, over 55,000 people depend on a single health center, along with seven outlying medical posts and dispensaries. The canton has only six physicians. Ratios in the other rural cantons range from 3500 to 8000 inhabitants per physician. In Guamote, there is one hospital bed for every 2000 inhabitants.

Not surprisingly, infant and general mortality rates for Chimborazo are higher than the national averages. The national averages were 71/1000 and 9.7/1000, respectively, in 1974 vs. 106/1000 and 17.6/1000 for Chimborazo. In cantones like Guamote, the mortality rates are even higher -- 156.8/1000 and 22.8/1000, respectively.

5. Education

For the 1979-80 school year, Chimborazo had a total of 590 primary schools and 42 secondary facilities. While the primary schools were distributed among the cantones and between rural and urban areas fairly evenly according to population, the secondary schools were disportionately concentrated in the city of Riobamba (17) and other urban centers (9). Together, the cantones of Riobamba and Alausí had over three-fourths of the province's secondary schools. Guamote, with 7.5 percent of the province's population had only one secondary school. The city of Riobamba accounted for three-fourths of the province's kindergarten students. Wealthier families in the province typically send their children to schools in Riobamba, Quito or Guayaquil.

Despite the increasing availability of primary schools, especially in the countryside, illiteracy rates in the province are double the national rates. Data compiled by the Central Bank of Ecuador show that before the National Literacy Program was introduced late in 1980, illiteracy rates for the cantones ranged from one-third (Guano) to three-fourths (Guamote) of the population 10 years and older. The rates were much higher in the countryside (estimates are typically 80-95 percent), especially in areas with substantial indigenous populations. On the other hand, the city of Riobamba's illiteracy rate was only about 10 percent.

The high rates of illiteracy in the rural areas are attributed to both the absence of formal education for the adult population and poor school attendance among the primary school age population. While about two-thirds of the 6 to 12 year olds attend school for the province as a whole, in Guamote the rate drops to one-fourth.

II. Pre-Reform Agrarian Structure

Although the 1964 Agrarian Reform Law and sequential decrees hastened the transition of Chimborazo's agrarian structure toward guided capitalism, market

forces within and outside the region had been undermining the semi-fedual institutions for decades. A major event which weakened the hacienda's grip on a captive labor supply was the completion of the railroad between the sierra and the coast shortly after the turn of the century. Despite significant cultural differences between the relatively closed indigenous communities of Chimborazo and the miscegenated population of the coast, increasing numbers of males responded to seasonal job opportunities on the agro-export plantations. The expanding urban population of Guayaquil also increased the demand for temperate horticultural crops, which, except for potatoes, became specialities of small to medium-sized production units. Despite the general preference for cattle ranching, the owners of the traditional haciendas in Chimborazo also specialized in small grains and tuber crops along with sheep. In fact, most of the tied and semi-tied labor associated with the haciendas typically was allocated to these traditional crops, with a smaller portion assigned to livestock enterprises.

The private haciendas were not the only forces behind Chimborazo's land monopoly. As recently as the 1970s, the twenty or so land-owning families of Riobamba along with the Church and Asistencia Publica (National Welfare Program) controlled 80 percent of the province's arable land (MAG/PRONAREG-OSTROM, 1979:81). Obviously, this concentration of land ownership produced powerful monopsonistic tendencies in the labor market as well. Unlike the private haciendas which still relied heavily on service tenancy arrangements, however, the clerical and public lands were operated increasingly through rental agreements which sometimes involved secondary tenancy arrangements. For this reason, these lands were oriented somewhat more to small grains and other cash crops than the private haciendas.

As opportunities increased for seasonal employment on the coastal plantations and on the commercial horticultural farms in parts of Chimborazo, some haciendas were apparently forced to cutback on the number of work days required of their service tenants (CIDA 1965). Failing to maintain or having to reduce the number of obligatory work days from existing huasipungeros, some haciendas apparently compensated by increasing the number of huasipungeros (Guerrero 1975).

Meanwhile, the number of yanaperos and arrimados on the haciendas apparently increased, suggesting a further evolution away from service tenancy toward share tenancy arrangements. Such arrangements were more compatible with the evolving market system than service tenancy.

Other changes sharpened the contradictions of the hacienda system as well. Since the families of the traditional haciendas were increasingly urban-based -- especially Quito and Guayaquil -- active professionals or married professionals and showed declining interest in the haciendas. Many haciendas were sold in their entirety to other wealthy urban families, including some recent European immigrants (CIDA 1965); others were divided and sold to less wealthy families in the cities and countryside.

The importation of relatively cheap wheat and the imposition of price ceilings on bread and flour also served to break the haciendas' monopoly on small grain production. In response, some shifted their crop production in favor of more potatoes (CIDA 1965). For others, these public actions set into motion an "enclosure movement" which reduced the need for labor and favored

livestock production, especially dairying. Other factors which nudged many haciendas toward commercial dairying with almost exclusive reliance on hired labor included the increasing availability of mechanization for forage production, public investment in roads and other transport facilities, rural electrification, and a growing market for milk and dairy products (Barsky 1978).

While many haciendas clug tenaciously to their traditional institutions of tied labor, market forces had begun to play tricks on them. Political changes ensued, with increasing pressures to fuel the labor market and to appease the rural masses with land. Though it was met with considerable resistance in Chimborazo, the 1964 Agrarian Reform Law was far more accommodating to a changing social order than it was a revolutionary instrument of change.

Reiterating the earlier cautions about census data, we use the 1954 Agricultural Census here as a rough benchmark for some leading features of the agrarian structure of Chimborazo in the period prior to the implementation of the 1964 Agrarian Reform Law. We then use the 1974 Agricultural Census to show possible changes associated with the early reform period. The 1980 data cited later on are used to suggest recent changes in the province's agrarian structure.

Despite the fact that the different data sets account for only about one-half of the province's land area and that there are several inexplicable aberrations in the intercensal comparisons, the general patterns and trends revealed by the data seem to coincide with descriptive accounts of changes in the provincial agrarian structure.

A. Farm Size

Above all, the 1954 Census shows a very skewed land distribution pattern with 68 percent of the farm units being under 5 hectares in size and controlling only one-sixth of the total farmland. (See Table II-4.) Ninety-four percent of the farms had fewer than 10 hectares of land (the cut-off used by the 1964 CIDA study for sub-family farms in the sierra). So, Chimborazo was certainly a province of minfundios before the Agrarian Reform began.

At the other extreme, 46 farms (0.15 percent of the total) controlled about two-fifths of the total farmland. The 84 farms (0.25 percent of the total) with 500 hectares or more controlled nearly one-half (47.5 percent) of the province's farmland. Thus, Chimborazo was also a province of latifundios before the Agrarian Reform began.

While the middle categories were fairly thin in numbers, it seems noteworthy that the farms in the 100-to-500 hectare range were six times as prevalent as those in the 500-to-1000 hectare group and controlled twice as much land. And even though the medium-sized farms in the 10-to-100 hectare range accounted for only 5.2 percent of the total, they did control 14.2 percent of the total farmland. This would suggest that inheritance practices and land markets were operating to create a fairly significant number of family-sized units which had acquired control over a reasonable amount of land

Table II-4. Distribution of Agricultural Production Units and Farmland by Farm Size for Chimborazo, 1954.

Size Categories (hectares)	1954 No. of Production Units No.	%	1954 Total Farmland Has.	%
Less than 1	8,580	25.8	4,600	1.5
1 to 4.9	20,045	60.3	47,700	15.1
5 to 9.9	2,550	7.7	17,700	5.6
10 to 19.9	936	2.8	12,000	3.8
20 to 49.9	585	1.8	18,800	5.9
50 to 99.9	205	.6	14,100	4.5
100 to 499.9	236	.7	50,700	16.1
500 to 999.9	38	.1	25,200	8.0
1000 to 2,499.9	29	.1	44,000	13.9
2,500 +	17	.05	80,800	25.6
TOTAL	33,221	100.0	315,600	100.0

SOURCE: INEC, Censo Agropecuario de 1954.

resources. Apparently, family farms were not to be an invention of the Agrarian Reform.

Although land subdivision was occurring throughout the province before the Reform period, it was most intense in the northern cantones of Riobamba and Guano. (See Table II-5.) According to the 1954 Census, these two cantones accounted for over one-half of the province's total farms, but only about one-third of the total farmland. The average farm size in both cantones was considerably below the provincial average. The small canton of Chunchi, in the southern part of the province, had also undergone considerable subdivision. With this accelerated land subdivision, Riobamba and Chunchi both had nearly three-fifths of their farmland in crops.

In contrast, Guamote -- and to some extent, Alausi and Colta, as well -- revealed less subdivision and greater concentration. Average farm size exceeded the provincial average in all three of these cantones and the percentage of land in crops was at or below the provincial average.

B. Land Tenure

Despite Chimborazo's reputation for having the most archaic land tenure structure in the country before the Agrarian Reform, the 1954 Census showed that two-thirds of the province's farm families were owner-operators. (See Table II-6.) And these families operated two-thirds of the province's farmland. However, the polarization of these units by size and the predominance of exploitative and insecure tenure arrangements among the remaining one-third of the producers and farmland provided grounds for the province's dubious distinction.

According to the Census, one out of every eight producers was a huasipungero. Presumably these huasipungeros farmed only 3.5 percent of the province's farmland -- a likely understatement in the application of their labor. They accounted for one-fifth of the sierra's total huasipungeros, surpassed only by Pichincha with one-third of the total (Arias 1954:51). While not so important in terms of numbers, the broad category of renters and sharecroppers operated a very significant portion of the province's farmland.

C. Land Use

Table II-7 shows the general distribution of land use by canton in 1954. While only one-third of the province's farmland was being tilled, Chunchi had over one-half (53 percent) of its farmland under cultivation; Riobamba had nearly one-half (47 percent). Only one-fifth of the farmland in Guamote was being cropped. This was partly because of the extensive paramo and other marginal agriculture lands n the canton. But the fact that two out of every three farmland hectares in the canton were devoted to pastoral activities was also a reflection of the entrenched hacienda system in that area. The southern region of the province still had significant areas in forest, but native forests had been virtually eliminated in other parts of the province. Except for some small eucalpytus plantations, reforestation was minimal. Wasteland and other uses accounted for only one-sixth or less of the total farmland area in all but Guano, where the portion exceeded one-fourth.

Table II-5 Distribution of Agricultural Production Units and Farmland by Cantón for Chimborazo, 1954

Cantón	Production Units No.	%	Total Farmland Has.	%	Average Size Has.	Total Cropland[a] Has.	Croplands as % of Farmland
Alausí	4,881	15	83,000	26	17.0	31,500	38
Colta	5,877	18	72,900	23	12.4	22,800	31
Chunchi	1,992	6	9,800	3	4.9	5,800	59
Guamote	2,202	7	49,100	16	22.3	10,800	22
Guano	7,096	21	45,800	15	6.5	16,400	36
Riobamba	11,173	33	55,000	17	4.9	32,000	58
TOTAL	33,221	100	315,600	100	9.5	119,300	38

SOURCE: INEC, Censo Agropecuario, 1954.

[a]Includes forage crops and permanent crops.

Table II-6 Land Tenure Status of Chimobrazo's Agricultural Families, 1954

Tenure Category	Percent of Total Producers	Percent of Total Area (Has.)
Owner-operator	67.2	67.7
Collective (communas)	6.1	2.5
Mixed tenancy	4.1	4.6
Case renters, share renters, share croppers	5.3	19.5
Hausipungueros	12.0	3.5
Colonist and others without title	5.3	2.2
Total number	33,221	315,600

Source: INEC, Censo Agropecuario, 1954. Based on calculations by Manuel Arias B. Análisis de la Estructura Agraria del Ecuador, 1954: 45-46.

Table II-7. Land Use by Cantón for Chimborazo, 1954

Cantón	Cultivated Land[a] Has.	%	Pasture Improved Has.	%	Natural Has.	%	Forests Has.	%	Other Uses Has.	%
Alausi	29,200	35	2,300	3	23,000	28	14,000	17	14,500	17
Colta	21,100	29	1,200	2	25,500	35	14,200	19	10,400	14
Chunchi	5,200	53	600	6	2,100	22	1,000	10	900	9
Guamote	10,000	20	800	2	31,000	63	--	-	7,200	15
Guano	14,000	31	2,400	5	15,900	35	500	1	13,000	28
Riobamba	26,000	47	6,000	11	14,600	27	500	1	7,900	14
TOTAL AND PERCENT GRAND TOTAL	105,500	33	13,300	4	112,100	36	30,200	10	53,900	17

Source: INEC, Censo Agropecuario, 1954.

[a]Includes fallow land and permanent crops (most of which are intercultivated with seasonal crops) but excludes "pastos cultivados" which refer primarily to improved pasture. Even today forage crops for hay, silage and soilage are not very extensive in the province. Most of the "pastos cultivados" or "pastos artificiales" are grazed.

In 1954, most of the agricultural production was staple food crops such as maize and barley. (See Table II-8.) Most of these crops were consumed by the producing families and any surpluses were sold in local markets. Canton-level data show that these basic food crops accounted for two-thirds to three-fourths of the total hectares in crops in 1954. Alausi, Colta and Riobamba had between 10 and 20 percent of their cropland devoted to vegetable production, including peas, beans, lentils, carrots, cabbage, and onions. About one-fifth of Riobamba and Guano's cropland was in forage production, while forage crops accounted for 10 percent of the total cropland in Alausi and Colta. Small grain production was most important in Guamote where it accounted for 10 percent of the total.

III. Post-Reform Agrarian Structure

While the abolition of huasipungos and related forms of service tenancy produced some immediate changes in the agrarian structure of Chimborazo as the 1964 Agrarian Reform Law was implemented, the effects of land redistribution and colonization programs dragged out into the 1970s and even 1980s. So, even though the 1974 Agricultural Census reported a 25 percent increase in the number of production units and 20 percent increase in farmland over the 1954 Census, it cannot be construed as reflecting the full impact of the Reform. Nevertheless, the intercensal comparison does reveal some important structual changes.

A. Farm Size

The 1974 Census indicated a dramatic increase in the number of small farms, especially those with less than a hectare, even though the proportions of farms under 5 hectares decreased slightly (from 86 to 83 percent) from 1954. (See Table II-9.) While the relative share of total farmland for farms under 3 hectares remained virtually the same, the number of hectares controlled rose by only 19 percent, thus the average size of these units decreased. The number of medium size farms also increased, but most notably those in the 10-20 hectare range, which quadrupled in number and in area controlled. While the number of large units did not decrease significantly (many large-scale reform properties were set up as communes or cooperatives), most of the larger size groups gave up considerable land area during the 20 year period.

While this pattern of change in the distribution of production units followed the general direction of national and regional trends, Chimborazo had a larger proportion of small units (83 percent under five hectares compared with 68 percent for the nation and 78 percent for the sierra) which held a larger proportion of farmland (16 percent compared with 7 percent for the county and 12 percent for the sierra) and a lower proportion of medium size units (2 percent with 20 to 100 hectares compared with 12.5 percent for the nation and 6 percent for the sierra) wiwth a lower proportion of farmland (8 percent of the farmland compared with 33.5 percent and 26 percent for the country and the sierra, respectively). Those with holdings of 500 hectares or more controlled nearly one-half of the land in the province compared with a little over one-fourth nationally and about one-third for the sierra. Thus, the census data suggested that Chimborazo continued to be, even after the Agrarian Reform, a province of very large and very small farms.

Table II-8 Agricultural Production by Cantón for Chimborazo, 1954

Cantón	Staple food crops		Industrial use		Small grains		Edible legume seeds & vegetables		Tubers		Fruits		Forage		Milk Liters
	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	(000s)
Alausi	16,200	16,215	1,230	93	-	-	5,535	2,080	85	29	650		2,300	ND	7,000
Colta	13,480	7,147	150	20	32	-	3,193	1,410	25	39	110	1	1,700	ND	6,800
Chunchi	3,540	3,110	40	1	-	-	940	515	-	-	-	-	600	ND	2,100
Guamote	6,450	7,225	-	-	709	ND	833	420	-	-	-	-	800	ND	3,500
Guano	8,340	6,085	-	-	-	-	1,160	335	-	-	12		2,400	ND	6,500
Riobamba	18,020	13,765	-	-	-	-	2,870	1,575	-	-	5		6,000	ND	16,000
TOTAL	66,030	53,547	1,420	114	741	ID	14,531	6,335	110	68	777		13,800	ID	41,900

Source: INEC, Censo agropecuario, 1954.

MT = metric tons

ND = no data

ID = incomplete data; thus the total cannot be calculated.

Table II-9 Distribution of Agricultural Production Units and Farmland by Farm Size for Chimborazo, 1974, and Changes 1954-1974

Size Categories (hectares)	1974 No. of Production Units No.	%	Change 54-74 No. of Units No.	%	1974 Total Farmland Has.	%	Change 54-74 Total Farmland Has.	%	1974 Average Size Has.
Less than 1	12,425	30.2	3,845	45	5,493	1	893	19	0.5
1 to 4.9	21,809	53.1	1,764	9	54,457	15	6,757	14	2.4
5 to 9.9	2,885	7.0	335	13	20,241	5	2,541	14	6.6
10 to 19.9	2,807	6.8	1,871	200	34,035	9	21,935	181	12.5
20 to 49.9	619	1.5	34	6	18,279	5	- 521	- 3	29.9
50 to 99.9	226	.6	21	10	10,290	3	- 3,810	- 27	67.0
100 to 499.9	234	.6	- 2	- 1	47,969	13	- 2,731	- 5	202.3
500 to 999.9	41	.06	3	8	26,160	7	1,060	4	641.5
1000 to 2,499.9	26	.06	- 3	- 10	33,959	9	-10,041	- 23	
2,500 +	16	.04	- 1	- 6	120,178	33	39,378	49	3,927.0
TOTAL & PERCENT TOTAL CHANGE	41,088	100	7,867	24	371,061	100	55,461	18	9.3

Source: INEC, Censos Agropecuarios, 1954 and 1974.

This dual structure, already somewhat drawn along canton lines by the 1950s, was exacerbated during the intercensal period. In 1974, the Gini coefficient of .98 in Guamote indicated a very high level of land concentration (Barsky 1984:363). This suggests a continuation of the classical large estate-small holding pattern in that canton. In neighboring Colta and Riobamba, however, land concentration was much lower; the Gini coefficients were .77 and .78, respectively. In these two cantones, 80 to 90 percent of the production units were under 5 hectares. These already densely settled areas experienced further land subdivision during the intercensal period. In 1974, Guano and Riobamba continued to account for about one-half of the province's farms. However, their proportion of farmland fell to less than one-fourth. Nearly all of the loss occurred in Guano where the average size of holding continued to decline. (See Table II-10.) However, land use data suggests that the reported loss of nearly 17,000 hectares of farmland is largely the result of an over-estimation of pastureland and wasteland in the 1954 Census.

Cantones in the central part of the province, Colta and Guamote, experienced considerable increase in the number of production units but fewer than one-half of the units were classified as very small holdings--under 2 hectares in size (Barsky 1984:362). In Colta, the increase resulted from further subdivision (the average size of holding fell from 12 to 7 hectares) together with an apparent loss of farmland. In Guamote, however, the average size of holding remained the largest in the province and increased slightly (from 22 to 26 hectares) as the amount of farmland doubled, in part perhaps, because of the softness of the 1954 data base, but also because of the Agrarian Reform. Over 20 percent of the farms in Guamote were between 5 and 20 hectares (Barsky 1984:362). The percent of land in crops in Guamote continued to lag far behind the provincial average.

Alausi and Chunchi in the south added both farmland and production units from continued colonization. In Chunchi, the average size of holding increased slightly and the percent of land in crops remained high. A lower proportion of the farms in this region were very small holdings. Over 30 percent of the units and the hectares were 2 to 5 hectares, while 10 to 20 percent of the units and hectares were 5 to 20 hectares in size (Barsky, 1984:362).

The important shift in the agrarian structure of Chimborazo between 1974 and 1980 was the increase in medium size farms. The number of farms with 20 to 100 hectares doubled, as did the amount of farmland they controlled; their proportion of both farms and farmlands also doubled. (See Table II-11.) Yet, Chimborazo in 1980 still had a lower proportion of medium size units than the country and the region had in 1974. Some of the growth in medium size farms is related to sharp losses, absolutely and relatively, in large holdings, especially those in excess of 1,000 hectares. At the other end of the distribution, small farms increased absolutely, but at a much reduced rate. The amount of farmland they controlled increased slightly in absolute and relative terms, yet the average size of holding was unchanged. These Ecuadorian Central Bank calculations suggest: the proportional loss of farms under 5 hectares was gained by farms of 5 to 100 hectare while the proportional loss of farmland controlled by farms of 100 hectares and more was also gained by units with 5 to 100 hectares.

Table II-10 Distribution of Agricultural Production Units and Farmland by Cantón for Chimborazo, 1954, and Changes 1954-1974.

Cantón	1974 No. of Production Units No.	%	Change 54-74 No. of Units No.	%	1974 Total Farmland Has.	%	Change 54-74 Total Farmland Has.	%	1974 Average Size Has.	1974 Total Cropland Has.	C/F[a]
Alausi	7,006	17	2,125	+44	113,800	30	30,800	+ 37	16.2	38,735	34
Colta	9,631	23	3,754	+64	66,486	18	- 6,414	- 9	6.9	38,199	57
Chunchi	2,007	5	85	+ 4	12,306	3	2,506	+ 26	6.1	8,134	66
Guamote	3,928	9	1,726	+78	100,592	26	51,492	+105	25.6	21,334	21
Guano	7,257	18	161	+ 2	29,075	8	-16,725	- 37	4.0	19,482	67
Riobamba	11,523	28	350	+ 3	57,865	15	2,865	+ 5	5.0	30,899	53
TOTAL & PERCENT TOTAL CHANGE	41,352[b]	100	8,201	+25	380,124[b]	100	64,534	+ 20	9.3	156,783	41

Source: INEC, Censos Agropecuarios, 1954 and 1974.

[a]Cropland as a percentage of farmland.

[b]The Cantón data, which were hand calculated from unpublished Census tables, show 264 additional production units and 9,063 additional hectares. These differences augment the overall percent changes in number of production units and hectares of farmland by one and two points, respectively.

Table II-11 Distribution of Agricultural Production Units and Farmland by Farm Size for Chimborazo, 1980, and Changes 1974-1980

Size Categories (hectares)	1980 No. of Production Units No.	%	Change 74-80 No. of Units No.	%	1980 Total Farmland Has.	%	Change Total Farmland Has.	%	1980 Average Size Has.
Less than 1	12,786	26.3	361	+ 3	6,039	2	546	+ 10	0.5
1 to 4.9	24,227	49.8	2,418	+ 11	58,280	15	3,823	+ 7	2.4
5 to 9.9	5,379	11.0	2,494	+ 86	37,277	10	17,036	+ 84	6.9
10 to 19.9	4,070	8.4	1,263	+ 45	52,808	14	18,773	+ 55	13.0
20 to 49.9	1,348	2.8	729	+118	39,499	10	21,220	+116	29.3
50 to 99.9	516	1.1	290	+128	30,333	8	20,043	+194	58.8
100 to 499.9	240	.5	6	+ 3	50,279	13	2,310	+ 5	209.5
500 to 999.9	31	.06	- 10	- 24	18,249	5	-7,911	- 30	588.7
1000 +	16	.03	- 26	- 62	87,564	23	-66,573	- 43	5,472.7
TOTAL & PERCENT TOTAL CHANGE	48,613	100.0	7,525	18	380,328	100	9,267	3	7.8

Source: INEC, Censo Agropecuario, 1974; IERAC, Departamento de Programación y Evaluación Estadística de Jefatura Regional Centro-Oriente; and Banco Central del Ecuador (CENDES, 1983:39).

B. Land Tenure

Ten years after the Agrarian Reform legislation, Census data suggest that the huasipungos had been eliminated and the number of sharecroppers and share renters had been drastically reduced. (See Table II-12.) The 15 percent increase reported in the amount of collectively held land largely reflects the policy of the Agrarian Reform Institute to facilitate the development of agricultural cooperatives through their title granting power together with the granting of land titles to traditional communes. The three cantones most affected by the agrarian reform -- Guamote, Riobamba, and Alausi -- have the highest proportion of collectively held land. Most of this land is in the páramo and devoted to pasture. It is these areas that continue to experience some of the most bitter and prolonged legal battles for title and control (MAG/PRONAREG-OSTROM, 1979:84-92).

C. Land Use

During the two decades between the agricultural censuses, the amount of Chimborazo's farmland being tilled remained at about one-third of the total. But, three of the six cantones apparently experienced dramatic land use changes during these two decades. (See Table II-13.) In Colta, the census data suggests that the amount of land being tilled has actually increased by two-thirds, largely at the expense of forest land and potentially productive but previously unutilized land, which plummeted from one-third to one-eighth of the total. Guano also experienced a sharp decline in the proportion of wasteland and a corresponding increase in cultivable land. On the other hand, in Riobamba the proportion of land being tilled fell 25 percent as the proportion of land in natural pasture increased by over one-half and unutilized land declined precipitously. The direction of all these changes is supported by other evidence, but the magnitude of the data is most likely the result of errors in the 1954 census estimates of the amount of forest and wasteland.

The colonization activity in Alausi in the 1960s and early 1970s brought a nearly 200 percent increase during the intercensal period in the number of hectares devoted to natural pasture; in Chunchi, also, natural pastureland increased, but by a much smaller amount. Between 1954 and 1974, Guamote also experienced an absolute and proportional increase in the amount of natural pastureland. In fact, by 1974 70 percent of the land in Guamote was in natural pasture, much of it in the paramo. This shows the continued importance of livestock raising to the agricultural economy of Guamote despite some changes in land tenure and land distribution brought about in part by the agrarian reform.

Thus, the canton level data suggests that the fragile resource base of Chimborazo has continued to experience severe pressure as forests and wastelands were brought under cultivation or converted to natural pastures. Table II-14 shows that for the province as a whole pastureland increased by three-fourths from 1954 to 1974 and cultivated land increased by one-fourth.

In 1974 staple foods retained their dominant position in the province, accounting for about 60 percent of the total hectares in cropland. However, these food staples underwent a dramatic increase in production during the

Table II-12 Land Tenure Status of Chimborazo's Agricultural Families by Cantón, 1974

Cantón	Owner Operated		Collective[a]		Mixed[b] Tenancy		Cash Renter		Sharecropper/ Service Tenant		Colonist & Others w/o Title	
	Has.	%	Has.	%	Has.	%	Has.	%	Has.	%	Has.	%
Alausi	64,076	56	36,682	32	6,507	6	747	1	4,337	4	1,443	1
Colta	54,195	81	4,412	7	3,743	6	38	-	2,644	4	1,462	2
Chunchi	10,128	82	167	1	1,291	11	142	1	457	4	116	1
Guamote	72,756	72	23,491	23	3,512	4	116	-	653	1	66	-
Guano	25,267	87	10	-	2,444	8	816	3	181	1	354	1
Riobamba	49,424	85	4,320	8	2,438	4	645	1	428	1	609	1
TOTAL & PERCENT GRAND TOTAL	275,846	73	69,082	18	19,935	5	2,504	1	8,700	2	4,050	1

Source: INEC, Censo Agropecuario, 1974

[a]Includes communal lands and agricultural cooperatives.

[b]Includes production units which combine ownership with some form of tenancy.

Table II-13 Land Use by Cantón for Chimborazo, 1974

Cantón	Cultivated Land[a]		Pasture				Forests		Other Uses	
			Improved		Natural					
	Has.	%	Has.	%	Has.	%	Has.	%	Has.	%
Alausi	33,212	29	5,523	5	64,753	57	8,725	8	1,587	1
Colta	32,155	48	6,064	9	20,731	31	5,903	9	1,653	3
Chunchi	6,365	52	1,769	14	2,682	22	1,241	10	249	2
Guamote	18,135	18	3,199	3	70,545	70	4,618	5	4,095	4
Guano	16,941	58	2,541	9	7,564	26	1,520	5	509	2
Riobamba	20,444	35	10,455	18	23,971	42	2,328	4	667	1
TOTAL & PERCENT GRAND TOTAL	127,252	34	29,551	8	190,246	50	24,335	6	8,760	2

Source: INEC, Censo Agropecuario, 1974.

[a]Includes fallow land and permanent crops (most of which are intercultivated with seasonal crops) but excludes "pastos cultivados" which refer primarily to improved pastures. The area in forage crops for hay, silage and soilage is quite limited in Chimborazo. Most of the "pastos cultivados" or "pastos artificiales" are grazed.

Table II-14 Changes in Land Use in Chimborazo, 1954-1974

Land Use	Area 1954 Has.	Area 1974 Has.	% Change 54 - 74
Cultivated	105,500	127,252	+21
Pasture	125,400	219,797	+75
Forest	30,200	24,335	-20
Land in other uses	53,900	8,760	-84
TOTAL & PERCENT TOTAL CHANGE	315,000	380,144	+21

Source: INEC, Censos Agropecuarios, 1954 and 1974.

intercensal period. In these two decades, these crops increased 20 percent in area and more than doubled in production. (See Table II-15 and Table II-16.) Meanwhile, the area devoted to edible legume seeds and vegetables increased 33 percent while production expanded nearly sevenfold. Production also doubled for tuber and forage crops as well as pom fruits.

At the cantonal level, the most significant shifts occurred in Alausi and Riobamba. In 1974, basic food crops continued to account for two-thirds to three-fourths of the total cropland, except in these two cantones where it fell to 51 and 44 percent, respectively. In Alausi, fruits and tubers were important in replacing basic food crops, while in Riobamba, an increase in forage crops accounted for most of the decline. Vegetable growing remained concentrated around the provincial capital in Colta, Guano and Riobamba, and Alausi in the south. Forage production was strong throughout the province with the exception of Chunchi. In Riobamba, where dairying expanded during the 20 years to account for about one-half of the province's milk production, nearly two-fifths of the cropland was devoted to forage production. Forage production also increased in Guamote, where livestock production began moving away from traditional grazing methods toward move intensive practices.

D. Agricultural Labor

In general, the 1974 Census portrayed the agricultural labor force of Chimborazo as independent agricultural producers who rely on some unpaid family labor along with seasonal wage labor. The reported ratio of non-salaried family workers per independent producer ranged from 0.25 in Guano, Guamote, and Riobamba to 1.7 in Colta. However, the average number of disposable family workers per production unit ranged from about 2 in Guano, Riobamba and Colta to 3 in Chunchi suggesting either a substantial unemployment of family labor and/or substantial off-farm employment of household members. (See Table II-17)

In contrast to the reported limited use of non-salaried family labor, the average number of part-time, seasonal agricultural workers ranged from 3 to 6.5 while the average number of full-time agricultural workers per production unit hiring full-time workers ranged from 2 to 3. Thus, in most cantones, the average number of part-time workers was at least twice that of full-time. No doubt this reflects the tendency for part-time or seasonal workers to be employed by both small and large production. On the other hand, the highest numbers of full-time agricultural workers were reported to Guamote and Chunchi were extensive private holdings devoted to livestock and important. In the other cantones, where the average number of permanent workers is slightly less, some survey data from this time period suggests that the permanent workers are hired by large dairy farms as well as medium size units engaged in intensive horticultural crop production (MAG/PRONAREG/ORSTOM 1982).

As expected from the size and tenure patterns, the number of independent agricultural producers per employer of hired farm labor was quite high in most of the province. Chunchi, Colta and Guano reported between 125 to 135 independent producers per employer. But the proportion dropped to 50:1 in Riobamba which probably reflects the widespread use of seasonal wage labor in vegetable production and permanent wage labor on dairy farms. The very large ratio of independent producers to employers in Guamote probably reflects the impact of agrarian reform.

Table II-15 Agricultural Production by Cantón for Chimborazo, 1974

Cantón	Staple food crops		Industrial use		Small grains		Edible legumes, seeds & vegetables		Tubers		Fruits		Forage		Milk
	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Liters
Alausi	16,664	18,241	2,698	1,074	69	138	5,480	6,328	653	739	1,533	14,264	5,545	ND	11,287
Colta	21,647	37,370	222	1,274	73	ND	6,058	19,430	457	202	45	436	6,475	ND	15,672
Chunchi	4,856	5,910	2	ND	9	ND	997	663	49	51	3	-	1,393	ND	7,425
Guamote	12,842	20,209	543	197	7	ND	982	872	27	25	-	-	3,273	ND	8,229
Guano	11,852	16,392	2	ND	5	ND	2,087	2,313	134	87	90	88	2,650	ND	9,812
Riobamba	12,437	17,493	1	ND	6	ND	3,645	19,940	1,472	150	9	11	10,628	ND	47,554
TOTAL	80,298	115,615	3,468	ID	169	ID	19,249	49,546	2,792	1,254	1,680	ID	29,964	ID	99,979

Source: INEC, Censos agropecuarios, 1974

MT = metric tons

ND = no data

ID = incomplete data; thus, the total cannot be calculated.

Table II-16 Changes in Agricultural Production by Cantón for Chimborazo, 1954-1974

Cantón	Staple food crops		Industrial use		Small grains		Edible legumes, seeds, vegetables		Tubers		Fruits		Forrage		Milk
	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Has.	MT	Liters
Alausi	464	2,026	1,468	901	ID	ID	- 55	4,248	568	710	883	ID	3,245	ID	4,287
Colta	8,167	30,223	72	1,254	41	ID	2,865	18,020	432	163	-65	435	4,775	ID	8,872
Chunchi	1,316	2,800	- 38	ID	9	ID	57	148	49	51	3	ID	793	ID	5,325
Guamote	6,392	12,984	543	197	-702	ID	149	452	27	25	ID	ID	2,473	ID	4,929
Guano	3,512	10,307	2	ID	5	ID	927	1,978	134	87	78	88	250	ID	3,312
Riobamba	-5,583	3,728	1	ID	6	ID	775	18,365	1,472	150	4	11	4,628	ID	31,554
TOTAL	14,268	62,068	2,048	ID	-641	ID	4,718	43,211	2,682	1,186	903	ID	16,164	ID	58,279

Source: INEC, Censos Agropecuarios, 1954 and 1974.

MT = metric ton

ID = incomplete data; thus the change cannot be calculated.

Table II-17 Agricultural Labor Force Indicators by Cantón for Chimborazo, 1974

Canton	Average No. of Family Workers/Disposable Production Unit	Non-Salaried Family Worker/Independent Agricultural Producer	Average No. Permanent Workers/Production Unit Hiring Labor	Average No. Part-Time Workers/Production Unit
Chunchi	3.0	0.40	2.5	6.5
Colta	2.2	1.73	2.0	5.8
Guano	1.9	0.25	1.9	3.2
Guamote	2.4	0.28	2.9	5.0
Riobamba	1.9	0.29	2.1	4.7

	Independent Agricultural Producers/Hired Agricultural Worker	Independent Agricultural Producers/Employer of Farm Labor	Economically Active Agricultural/Economically Active Rural	Economically Active Rural/Total Economically Active
Chunci	2.9	125.7	.89	.81
Colta	5.7	135.9	.87	.96
Guano	2.4	128.3	.60	.87
Guamote	11.2	425.0	.97	.91
Riobamba	20.0	50.2	.70	.57

Source: Calculation by Ignacio Llovet and Osvaldo Barsky reported in Osvaldo Barsky, La reforma agraria ecuatoriana, Quito: Corporación Editora Nacional, 1984: 362-363.

Comparing independent producers per employer with independent producers per hired agricultural worker, the data show that Chunchi, Colta and Guano have many independent producers who do not hire labor and a few employers who hire substantial amounts of agricultural wage labor. In Colta, for example, there are 136 producers/employer and 6 producers per hired laborer. On the other hand, Riobamba has about a third fewer independent producers per employer hiring wage labor but in relatively lesser amounts (e.g., 50 producers/employer and 20 producers/hired laborer). Finally, in Guamote, there are about three times more independent producers and a relatively smaller hired labor force (e.g., 425 producers/employer and 11 producers/hired laborer).

Finally, the 1974 Census data show that almost all of the rural labor force in Guamote -- and only slightly less in Chunchi and Colta -- is engaged in agriculture. In contrast, the cantones around the city of Riobamba -- Guano and Riobamba -- reported that 3 out of 10 and 4 out of 10 members of the rural labor force, respectively, were employed outside of agriculture. And only the cantone of Riobamba, which includes the provincial capital, showed any significant urban labor force participation. In Riobamba, about 6 out of 10 economically active persons were employed in the rural labor force, principally in agriculture.

The sexual division of labor reported in the 1974 Population Census suggested that women's involvement in agricultural production was very limited. It found that only 15 percent of the rural women were economically active and only 5 percent of the agricultural labor force was female. However, a 1975-78 MAG/PRONAREG/ORSTOM national survey of about 8,000 randomly selected production units gives a different indication of the sexual division of labor in terms of the type of activities performed and the form of employment. The study showed that rural Ecuadorian women accounted for about one-third of the total family labor dedicated to agricultural production. They provided 22 percent of the total family labor used in crop production, and slightly more than one-half of the family labor used in the care and management of livestock. Women also made substantial contributions to the family labor spent in forestry activities and to processing and marketing of farm products. While women accounted for only 2 percent of the temporary and permanent agricultural wage laborers, they were nearly as likely as men to add to family income through on-farm non-agricultural activities. Off-farm non-agricultural activities were not recorded in this study. (See Table II-18.)

Women of the sierra contributed an even greater proportion of the total family labor and temporary wage labor than did Ecuadorian women as group, and within the sierra, rural women from Chimborazo made the heaviest contributions to the family labor pool. Overall, the women of Chimborazo contributed 46 percent of the total family labor devoted to the production unit. (See Table II-19.) The women of Chimborazo accounted for about one-third of the total family labor devoted to crop production, two-thirds of the family labor devoted to livestock production, and about one-half of all family labor involved in forestry work (including firewood collection for domestic use), marketing and processing. Further analysis of this data shows that women's labor input to family crop production is highest on units under 10 hectares while their labor input to crop production as wage laborers is highest on larger units (MAG, et al. 1982:199-256).

Table II-18

Number of Person-Days Spent by Type of Activity, Type of Employment, and Sex for a Sample of Ecuadorian Agricultural Families in 1975

TYPE OF ACTIVITY	TYPE OF EMPLOYMENT							
	Family Labor		Permanent Wage Labor		Temporary Wage Labor		Assistants	
	Men	Women	Men	Women	Men	Women	Men	Women
Crop production	44,646,843	12,348,084	2,793,584	156,472	44,309,738	664,239	3,238,883	953,988
Seedbed preparation	8,288,397	2,133,880	310,038	32,987	5,680,826	53,956	936,015	5,597
Planting	3,941,374	1,404,812	152,821	24,416	3,165,624	140,138	423,143	8,587
Weeding, transplanting, cultivating, etc.	18,484,310	4,302,458	1,122,805	62,176	19,346,103	98,245	1,608,473	23,152
Harvesting	13,932,762	4,506,934	1,207,920	36,893	16,117,185	472,900	271,252	916,988
Land clearing	1,302,854	98,668	204,372	43,083	626,053		71,565	
General maintenance (e.g., mending fences, cleaning irrigation canals)	3,330,768	452,332	777,798	8,476	1,469,105	28,059	16,394	359
Livestock tending (feeding, care, milking, and management)	13,296,485	14,005,326	2,147,691	431,863	722,894	167,175	4,021	
Firewood gathering and other forestry activity (commercial and domestic)	15,946,305	8,255,299	165,730	12,172	734,905	1,870	30,600	15,388
Processing of farm products (commercial and domestic)	3,123,611	4,143,034	150,542	7,601	1,446,119	61,534	7,926	
Marketing of farm products (on-farm and at markets)	5,962,259	3,363,159	182,633	486	154,322		1,180	905
Participation in agricultural cooperatives	855,092	55,944			17,047			
Work by share renters, cash renters, and service tenants for the landlord	675,689	84,139						
Work exchange	1,628,100	171,056			2,713		20,134	
Nonagricultural on-farm work (e.g., barber, tailor, shoemaker)	7,182,512	6,233,531	51,655		76,709	8,734	3,020	36,468
Participation in collective infrastructure projects (e.g., school and road construction)	1,148,457	352,336	1,829		6,716		822	
Total person-days	99,098,975	49,562,908	6,475,834	660,153	49,566,321	931,611	3,394,545	1,007,105

SOURCE: Adapted from MAG/PRONAREG/ORSTOM, "Descomposición de la mano de obra agropecuaria" (Quito, 1982), pp.355, 531.

Table II-19

Number of Person-Days Spent by Type of Activity, Type of Employment, and Sex for a Sample of Agricultural Families from Chimborazo Province in 1975

TYPE OF ACTIVITY	TYPE OF EMPLOYMENT							
	Family Labor		Permanent Wage Labor		Temporary Wage Labor		Assistants	
	Men	Women	Men	Women	Men	Women	Men	Women
Crop production	1,699,358	1,007,469	363,354	27,008	3,358,065	57,678	235,678	4,900
Seedbed preparation	395,691	187,846	90,469	7,263	363,116	9,826	67,281	408
Planting	154,538	109,961	36,109	3,056	319,271	12,925	32,092	408
Weeding, transplanting, cultivating, etc.	617,669	336,103	131,669	11,336	1,314,429	9,445	58,872	2,024
Harvesting	531,460	373,559	105,080	5,350	1,361,249	25,062	77,433	2,042
Land clearing	66,671	1,620	57,111	3,083	2,440			
General maintenance (e.g., mending fences, cleaning irrigation canals)	189,337	75,559	144,305		94,048		351	
Livestock tending (feeding, care, milking, and management)	788,839	1,477,105	290,235	52,887	75,296	510		
Firewood gathering and other forestry activity (commercial and domestic)	780,643	686,592	23,951		66,139	1,870	2,107	
Processing of farm products (commercial and domestic)	237,993	237,868	27,766		177,122			
Marketing of farm products (on-farm and at markets)	362,172	368,853	8,251		31,975			
Participation in agricultural cooperatives	55,230	5,426						
Work by share renters, cash renters, and service tenants for the landlord	61,187	38,750						
Work exchange	112,571	4,794						
Nonagricultural on-farm work (e.g., barber, tailor, shoemaker)	582,255	364,215						
Participation in collective infrastructure projects (e.g., school and road construction)	141,113	44,000			3,144			
Total person-days	5,077,369	4,312,281	914,973	122,978	3,808,229	59,638	238,136	4,900

SOURCE: Adapted from MAG/PRONAREG/ORSTOM, "Descomposición de la mano de obra agropecuaria" (Quito, 1982), pp. 338, 514.

An underreporting of women's involvement in agricultural activities on family production units would significantly affect the relationship between non-salaried family labor and hired labor reported in Table II-17. Apparently, there is a much higher involvement of non-salaried family labor in production activities and, depending upon how disposable family labor was determined, a greater utilization of available labor. The field study will help us sort out the sexual division of labor on and off the production unit.

IV. Post-Reform Agrarian Structure: Field Study Analysis

This section continues the descriptive analysis of the agrarian structure of Chimborazo with 1983 survey data from 529 rural households selected via an area sample of major agro-political regions of the province. (See Appendix I.) The analysis focuses on the economic organization of family production units paying particular attention to their access to basic productive resources and their various employment and income strategies.

In order to show differences within and among regions and socio-economic strata, most of the tables are constructed by region and farm size. Since their numbers are relatively small and their characteristics are quite different, farms of 100 hectares and over were excluded from the sample. As is evident from the previous discussion, the CIDA study classification of the vast majority of farms in Chimborazo as "sub-family" units has changed only slightly.

Of the 529 interviews conducted in the province, 522 were complete and included in the analysis. They were distributed across the 3 agro-political regions as follows: 168 in the north, 147 in the central region, and 207 in the south.

A. Access to Land and Other Resources

1. Land Tenure and Farm Size

Only 6 percent of the interviewees did not own any land. (See Table II-20.) This proportion did not vary significantly among the three regions. At the same time relatively few landowners operated land owned by others. In the north, 14 percent of the landowners operated land owned by others, or were part-owners. The corresponding figures for the central and southern regions were 7 percent and 17 percent, respectively. In the south, this mixed tenancy included several medium production units and one large unit in which a small landowner also managed a 200 hectare cattle ranch. The study included only 5 respondents who operated some or all of their land in tenancy. Four of these involved "family sharecropping," in which independent families operated and shared the production from land owned by relatives.

If owner-operators have become the most prevalent type of producers in Chimborazo, they certainly have not inherited the power and wealth of preceding generations of landowners. The average amount of land held by owner-operators in the north was only 2.3 hectares. Thirty-eight percent of these owner-operators had less than 1 hectare; 86 percent had fewer than 5 hectares. As we shall see later, however, the owner-operators of the north

TABLE II-20

Distribution of the Agricultural Production Units by Region, Size and Tenure, Chimborazo

Size of Production Unit By Region	TENURE OF THE LAND OPERATED							
	Non-Owner		Owner-Operator		Mixed Tenancy[a]		TOTAL	
	No.	Av. Ha.	No.	Av. Ha.	No.	Av. Ha.	No.	Av. Ha.
North								
0-.9	9	.43	49	.50	7	.60	65	.50
1-1.9	-	-	32	1.35	9	1.54	41	1.39
2-4.9	2	2.29	30	2.88	7	2.43	39	2.77
5-9.9	-	-	11	6.63	-	-	11	6.63
10-19.9	-	-	6	12.83	1	12.41	7	12.77
20-49.9	-	-	1	28.73	-	-	1	28.73
Total	11	1.36	129	2.19	24	2.12	168[b]	2.13
Central								
0-.9	2		34	.47	1	.88	37	.46
1-1.9	3	1.21	17	1.33	6	1.35	26	1.32
2-4.9	1	2.00	33	3.27	3	3.11	37	3.22
5-9.9	-	-	33	7.20	-	-	33	7.21
10-19.9	-	-	5	12.85	1	18.00	6	13.71
20-49.9	-	-	2	21.00	-	-	2	21.00
50+	1	130.00	-	-	-	-	1	130.00
Total	7	2.57	124	2.71	11	2.45	147[b]	2.68
South[b]								
0-.9	6	.26	19	.39	4	.77	29	.41
1-1.9	1	1.00	20	1.23	3	1.14	24	1.21
2-4.9	3	2.51	36	3.08	13	3.27	52	3.10
5-9.9	2	5.50	20	6.80	8	6.79	30	6.71
10-19.9	2	10.50	27	12.55	2	14.68	31	12.55
20-49.9	-	-	14	29.78	4	26.79	18	29.11
50+	-	-	4	93.50	1	200.00	5	114.80
Total	14	2.50	140	3.53	35	3.48	189	3.67

SOURCE: Survey EEAE.

a. This category includes one landowner in the north, one in the central and three in the south who gi[illegible] out one or more parcels of land in share rent.
b. Missing data: north, 4 cases; central, 5 cases; and south, 18 cases.

were quite heterogeneous in terms of land quality and farm production. One thing they do seem to have in common is the need to commit their surplus labor to activities outside the production unit, primarily to construction jobs in Riobamba and Quito, to jobs as farm laborers in the region, or to cottage production of textile products.

The owner-operators in the central region had an average of 2.7 hectares. Two-thirds of them had under 5 hectares. The generally poor quality of the soils in the region and the relative isolation of many production units also forced the majority of these families to seek off-farm employment, traditionally in export agriculture activities on the coast and more recently in construction activities in the province and the country's two major cities.

Small owner-operated units also predominate in the south (56 percent with less than 5 hectares, and 68 percent with less than ten hectares), but there the proportion of medium and larger owner-operated units is greater. Although the productivity of the region is seriously limited by its topography and isolation, there are some areas with temperate climate in the lower altitudes that have very productive small and medium owner-operated farms.

2. Property Fragmentation

Because of limited opportunities for permanent employment outside of agriculture and because of the accelerated sub-division of land holdings through inheritance and sales, many production units have become seriously fragmented. Over two-thirds of the units in the north have more than 1 parcel and two-fifths have 3 or more parcels (See Table II-21.) These parcels are usually not contiguous. While it was quite typical for the traditional haciendas to extend into two or more ecological zones, a characteristic which facilitated enterprise diversification and complementarity, the proliferation of fragmented minifundios within the same ecological zone typically means a high degree of inefficiency and resource waste.

Because the central and southern regions have been subjected more recently to voluntary sub-division and to agrarian reform activities, they show somewhat less fragmentation. In the central region, only 21 percent of the sample units had 3 or more lots. Less than 15 percent of the units in the south had 3 or more units. Nevertheless, the field study revealed that land sales and inheritance transactions are increasing in both of these regions.

3. Form of Acquisition

Table II-22 shows the relative importance of these transfer mechanisms in the 3 regions. In the north, nearly two-thirds of the owned parcels were acquired by purchase and one-third were acquired through inheritance. Fewer than 3 percent of the parcels in this region were acquired through actions of the agrarian reform institute, IERAC. In terms of area, land purchases were by far the most important source of land, accounting for 80 percent of the land owned by respondents in the northern region. It is also noteworthy that both purchases and inheritances were important in this region even before the agrarian reform. More than two-fifths of the purchased land and nearly two-fifths of the inherited land was acquired before 1964.

TABLE II-21

Distribution of the Agricultural Production Units by Region, Size and Number of Separate Land Parcels

Size of Production Unit by Region	(N)	TOTAL NUMBER OF SEPARATE LAND PARCELS 1	2	3	4	5	6+
North							
0-.9	65	29	20	9	4	1	-
1-1.9	41	8	13	11	8	-	1
2-4.9	43	11	7	14	6	5	-
5-9.9	11	1	2	4	1	2	1
10-19.9	7	2	1	1	2	-	1
20-49.9	1	-	-	-	-	1	-
Total	168	51	43	39	21	9	3
Central							
0-.9	37	19	10	3	2	-	1
1-1.9	26	8	10	3	2	1	2
2-4.9	39	20	13	5	-	1	-
5-9.9	36	24	5	5	1	-	1
10-19.9	6	1	4	1	-	-	-
20-49.9	2	-	1	1	-	-	-
50+	1	1	-	-	-	-	-
Total	147	73	43	18	5	2	4
South							
0-.9	30	19	7	-	1	-	-
1-1.9	25	13	10	1	1	-	-
2-4.9	53	23	14	8	7	1	-
5-9.9	30	16	8	3	-	-	3
10-19.9	32	25	5	-	2	-	-
20-49.9	27	14	10	2	1	-	-
50+	10	7	3	-	-	-	-
Total	207	117	57	14	12	1	3

SOURCE: Survey EEAE.

TABLE I-22

Distribution of Land Parcels in the Agricultural Production Unit by Region, Size, Form and Year of Acquisition[a]

Size of Production Unit by Region	(N)[b]	NON-OWNED PARCELS		PARCELS ACQUIRED BY PURCHASE					
		Total No. Parcels	Total No. Hectares	Total No. Parcels	64 Ha.	64-72 Ha.	73-79 Ha.	80+ Ha.	Total Ha.
North									
0-.9	65	23	5.95	47	5.17	2.55	3.18	7.81	18.71
1-1.9	41	11	6.71	48	12.87	6.13	4.01	2.93	25.94
2-4.9	43	18	17.75	63	29.72	13.78	29.97	1.63	75.10
5-9.9	11	-	-	27	18.77	19.03	14.98	-	52.78
10-19.9	7	-	-	9	36.05	14.00	8.50	2.10	60.65
20-49.9	1	-	-	1	-	7.00	-	-	7.00
Total	168	52	30.41	195	102.58	62.49	60.64	14.47	240.18
Central									
0-.9	37	1	.35	34	3.04	2.23	2.65	1.71	9.63
1-1.9	26	20	8.88	29	2.73	2.41	4.90	5.61	15.65
2-4.9	39	5	-	41	9.75	20.28	40.63	7.04	77.70
5-9.9	36	-	-	32	3.25	42.86	67.75	2.87	116.73
10-19.9	6	2	15.00	8	-	10.00	32.20	.05	42.25
20-49.9	2	-	-	3	10.00	-	5.00	3.00	18.00
50+	1	1	130.00	-	-	-	-	-	-
Total	147	29	154.23	147	28.77	77.78	153.13	20.28	279.96
South									
0-.9	30	10	4.13	14	2.34	.59	1.08	.86	4.87
1-1.9	25	4	3.35	17	3.08	1.90	4.72	1.01	10.71
2-4.9	53	26	29.57	62	18.58	26.42	37.48	11.68	94.16
5-9.9	30	22	46.88	30	17.08	36.95	40.62	13.00	107.65
10-19.9	32	5	28.35	22	39.10	77.74	61.41	30.00	208.25
20-49.9	27	6	6.00	25	68.43	199.00	152.30	48.16	467.89
50+	10	1	50.00	6	80.00	224.00	164.00	50.00	518.00
Total	207	74	168.28	176	228.61	566.60	461.61	154.71	1411.53

(Table II-22 continued)

Distribution of Land Parcels in the Agricultural Production Unit
by Region, Size, Form and Year of Acquisition[a]

Size of Production Unit by Region	PARCELS ACQUIRED BY INHERITANCE						PARCELS ACQUIRED THROUGH AGRARIAN REFORM ACTION				
	Total No. Parcels	64 Ha.	64-72 Ha.	73-79 Ha.	80+ Ha.	Total Ha.	Total No. Parcels	64-72 Ha.	73-79 Ha.	80+ Ha.	Total Ha.
North											
0-.9	43	2.19	1.86	4.48	1.66	10.19	-	-	-	-	-
1-1.9	34	8.56	3.03	1.06	5.01	17.66	-	-	-	-	-
2-4.9	16	4.52	1.46	6.22	.18	12.38	8	-	4.66		4.66
5-9.9	7	5.42	1.61	1.30	-	8.33	-	-	-	-	-
10-19.9	2	.76	-	7.06	-	7.82	-	-	-	-	-
20-49.9	-	-	-	-	-	-	-	-	-	-	-
Total	102	21.45	7.96	20.12	6.85	56.38	8	-	4.66	-	4.66
Central											
0-.9	23	1.91	1.03	.61	2.63	6.18	1	-	.50	-	.50
1-1.9	14	3.12	2.73	1.68	-	7.53	3	1.50	1.50	-	3.00
2-4.9	8	.35	3.00	5.78	2.00	11.13	12	-	30.25	-	31.25
5-9.9	8	2.00	9.05	3.18	2.21	16.44	19	19.00	106.50	1.00	125.50
10-19.9	-	-	-	-	-	-	3	-	25.00	-	25.50
20-49.9	-	-	-	-	-	-	2	12.00	12.00	-	24.00
50+	-	-	-	-	-	-	-	-	-	-	-
Total	53	7.38	15.81	11.25	6.84	41.28	40	32.50	175.75	1.00	209.75
South											
0-.9	10	.18	.18	1.07	.87	2.30	2	-	.71	.13	.84
1-1.9	10	.53	1.25	4.11	2.90	8.79	8	1.25	3.10	1.00	5.35
2-4.9	15	5.20	7.06	6.22	2.21	20.69	12	.50	13.69	1.70	15.89
5-9.9	7	4.18	1.74	7.00	-	12.92	12	9.50	22.20	1.00	32.70
10-19.9	3	10.00	12.00	-	-	22.00	12	69.68	59.90	7.00	136.58
20-49.9	-	-	-	-	-	-	15	44.00	328.00	-	372.00
50+	-	-	-	-	-	-	5	-	300.00	-	300.00
Total	45	20.09	22.23	18.40	5.98	66.70	66	124.93	727.60	10.83	863.36

SOURCE: Survey EEAE.

a. The time periods are as follows: before 1964; 1964-1972; 1973-1979; and 1980-1983.
b. The Total number of agricultural production units.

Inherited lots tended to be quite small, averaging only 0.55 hectares, and were concentrated almost exclusively among the smaller production units. Ninety-one percent of the lots and 71 percent of the inherited land was in units under 5 hectares in size. Purchased lots tended to be somewhat larger, averaging 1.23 hectares, and were by far the major source of land for those units in the 2 to 20 hectare range, surpassing inherited land by nearly seven times.

Notwithstanding the relative importance of the agrarian reform program in the central region, land purchases accounted for 61 percent of the total number of owned lots and 53 percent of the owned land. Land acquired through agrarian reform actions constituted 17 percent of the owned lots and 39 percent of the owned land. (Collective property is considered here as owned land.) Inheritances accounted for 22 percent of the owned lots, but only 8 percent of the owned land.

Most of the land received through agrarian reform activities (84 percent) came in the 1973-79 period. Land purchases also picked up during that period, with 55 percent of the purchased land held by the respondents in the central region acquired then. Apparently the agrarian reform program helped to catalyze the land market in this region. Only 10 percent of the purchased land was acquired before 1964.

As in the north, inherited lots in the central region tended to be small and concentrated among the smallest producers. The average inheritance among the respondents was 0.78 hectares. Purchases were somewhat larger, averaging 1.9 hectares, and were a particularly significant source of land for those units with 2 hectares or more of land. The average agrarian reform acquisition was 5.23 hectares. Forty-eight percent of the lots and 60 percent of the land acquired through agrarian reform actions went to 36 farms (24 percent of the total) in the 5 to 10 hectare category.

Agrarian reform (including colonization) was also important in the southern region, accounting for 23 percent of the lots and 37 percent of the land owned by the respondents. Again, the 1973-79 period accounted for the lion's share (84 percent) of the land acquired by this method. The average size of agrarian reform acquisition was 13.1 hectares, but 78 percent of the land went to production units with more than 20 hectares.

Still, the most important source of land for respondents in the south was through purchases, which represented about three-fifths each of the number of lots owned and total area owned. There, the land market also appears to have picked up momentum since the agrarian reform program began. Only 16 percent of the land owned was acquired before 1969. The average size of land purchase in the south was 8 hectares, which is considerably more than the corresponding figure in the other 2 regions. While there is some participation in the land market by the smallest units, those with 2 hectares or more have been particularly active. Thirty percent of the lots and 85 percent of the land were purchased by farms with 10 hectares or more (one-third of the total).

Inheritances were less important in the south than in the other regions. They accounted for only 16 percent of the lots and 8 percent of the land owned.

As a final note on this section, non-owned lots did not constitute a very important source of land in the province. Because of the negative connotation of tenancy in the post reform period, we suspect that the instance of non-owned land revealed in the interviews is substantially understated. Legally, cash rent is the only form of tenancy permitted other than individual or collective ownership and various share arrangements within families. And, all cash rent contracts are supposed to be authorized by IERAC. Short of detailed case studies and much cross-checking, many de facto tenancy arrangements simply are not disclosed in this type of study involving single visitations without a systematic checking of property records. Another semantic discrepancy arises in the interpretation of "escritura" (deed). In Chimborazo, at least, families often consider provisional titles, and even collective titles (for communal properties) granted by IERAC the same as an "escritura." In fact, many of them have apparently acquired "escrituras" to such land with the assistance of private lawyers who see that the properties are recorded with the local "registros de propiedad." It is unlikely that many private parties or government officials would contest this procedure.

Thus, it is not surprising that only 15 percent of the total lots and 9 percent of the total land operated by respondents in the north was not owned. The portion of non-owned land jumped to 23 percent in the central region, but most of this land was attributable to one administrator who operated 130 hectares. Only 9 percent of the total lots in that region were operated with tenancy arrangements, mostly family sharecroppers. In the south, 20 percent of the total number of lots were operated with tenancy arrangements (including one administrator with 50 hectares), but these represented only 7 percent of the total land operated by the respondents.

4. Land Capability

Despite the limitations of a subjective measure of the general capability of the land, the data suggest some important variations by farm size and region. Overall, the land capability of two-thirds of the production units were classified by the respondents as average or poor. (See Table II-23.) The proportion of units with average or poor land capability was highest in the central and southern part of the province where it exceeded 70 percent. In the north, 57 percent of the small units (those with less than 5 hectares) classified their land average to poor in quality, while 50 percent of the medium size units (those with 10 to 50 hectares) considered their land to be of very good quality. A similar relationship emerged in the southern part of the province where 83 percent of the small producers classified the land as average to poor and 51 percent of the medium size producers felt their soils were very good.

Although the data confirm a tendency for the units to be on steeper terrain from north to south in the province, a relationship between the prevailing topography and farm size is less evident. (See Table II-24.) In the north, 37 percent of the production units are located on predomintly flat valley floors and highland plateau, while in the central and southern parts of the province only 19 and 20 percent, respectively, have predomintly level terrain. Indeed, in the south, 45 percent of the production units are on very steep slopes.

TABLE II-23

Distribution of the Agricultural Production Units

by Region, Size and Land Capability

Size of Production Unit by Region	(N)	LAND CAPABILITY Poor	Average	Very Good
North[a]				
0-.9	65	11	23	23
1-1.9	41	6	21	14
2-4.9	43	4	14	22
5-9.9	11	1	5	5
10-19.9	7	-	3	4
20-49.9	1	-	1	-
Total	168	22	67	68
Central[a]				
0-.9	37	3	26	6
1-1.9	26	1	14	8
2-4.9	39	3	24	10
5-9.9	36	-	24	12
10-19.9	6	-	5	1
20-49.9	2	-	1	1
50+	1	-	-	-
Total	147	7	94	38
South[a]				
0-.9	30	6	15	2
1-1.9	24	10	10	3
2-4.9	53	15	24	11
5-9.9	30	8	11	9
10-19.9	32	4	6	20
20-49.9	27	11	7	9
50+	10	-	8	2
Total	207	54	81	56

SOURCE: Survey EEAE.

a. Missing data: north, 1 case and 10 production units owned no land; central, 1 case and 7 production units owned no land; and south, 1 case and 15 production units owned no land.

TABLE II-24

Distribution of the Agricultural Production Units by Region, Size and Topography

Size of Production Unit by Region	(N)	DOMINANT TOPOGRAPHY Steep	Rolling	Nearly Level
North[a]				
0-.9	65	13	19	25
1-1.9	41	11	12	18
2-4.9	43	10	16	14
5-9.9	11	3	7	1
10-19.9	7	3	4	-
20-49.9	1	-	1	-
Total	168	40	59	58
Central[a]				
0-.9	37	9	19	7
1-1.9	26	4	14	5
2-4.9	39	7	23	7
5-9.9	36	3	27	6
10-19.9	6	3	2	1
20-49.9	2	-	1	1
50+	1	-	-	-
Total	147	26	86	27
South[a]				
0-.9	30	8	13	2
1-1.9	25	13	9	2
2-4.9	53	24	23	3
5-9.9	30	14	7	7
10-19.9	32	6	7	17
20-49.9	27	13	7	7
50+	10	8	1	1
Total	207	86	67	39

SOURCE: Survey EEAE.

a. Missing data: north, 1 case and 10 production units owned no land; central, 1 case and 7 production units owned no land; and south, 1 case and 15 production units owned no land.

When one looks at the total sample, there is a tendency for medium size units to occupy the flat lands. This is most evident in the south where 37 percent of the medium size units compared with only 7 percent of the small units are located on level terrain. In contrast, 46 percent of the small production units compared with 33 percent of the medium size ones are located on very steep slopes. At the same time, 8 of the 10 large units (50 hectares or more) were located on steep slopes.

5. Use of Irrigation

In general, the study shows very limited use of any type of irrigation. (See Table II-25.) Only one in seven respondents irrigated the entire production unit, while an additional 23 percent irrigated a portion of the production unit or irrigated occasionally. On the other hand, 63 percent of the respondents reported that they had neither permanent nor occasional irrigation. The proportions varied little from region to region in the province.

The data shows no definite relationship between size of production unit and access to irrigation. In the north, the proportion of medium size units without irrigation exceeds the corresponding figure for small units, while in the central and southern regions the relationship is the reverse. But in the latter two regions the proportion of medium size units with access to irrigation throughout the production unit exceeds the corresponding figure for small units. In these two regions, almost none of the very small units (those with less than a hectare) have any type of irrigation.

6. Capital Inventory and Credit

A complete financial analysis of agricultural production units is always a difficult task, but it is particularly difficult for peasant households where there is no clear separation of productive and reproductive activities and where there is no record keeping except for the memories of household members who are often understandably suspicious of strangers. Even longitudinal studies of peasant households leave much to be desired in this respect and reveal other problems with the use of survey methods for collecting agricultural accounting data, such as the selection of a typical agricultural year and the evaluation of non-monetized assets. Despite these limitations, the nature and size of the study permit some general understanding of capital accumulation in peasant households.

Table II-26 shows a strong direct relationship between size of production unit and capital accumulation of all types. Except for the very small production units in the south, in all size groups land is the asset of greatest value; the assessed value of land represents from three-fifths to two-thirds the value of total assets. A larger relative portion of medium and large units in the south inflated the median values for this region. The value of total assets tended to be higher for the small producers in the north than for small producers from the other parts of the province. Only the median values of livestock for small producers of the central and south approximated that of their northern counterparts. Also noteworthy is the higher median value of vehicles and equipment among the small producers in the north. In the other two regions, the median value of equipment is quite low for production units of less than 5 hectares.

TABLE II-25

Distribution of the Agricultural Production Units by Region, Size and Use of Irrigation

Size of Production Unit by Región	(N)	USE OF IRRIGATION None	Part of Unit Irrigated	Entire Unit Irrigated
North[a]				
0-.9	65	35	13	9
1-1.9	41	25	12	4
2-4.9	43	24	12	4
5-9.9	11	5	4	1
10-19.9	7	6	1	-
20-49.9	1	1	-	-
Total	168	96	42	18
Central[a]				
0-.9	37	28	5	2
1-1.9	26	13	8	2
2-4.9	39	24	10	4
5-9.9	36	16	14	6
10-19.9	6	3	-	3
20-49.9	2	1	-	1
50+	1	-	-	-
Total	147	85	37	18
South[a]				
0-.9	30	20	3	-
1-1.9	25	17	4	3
2-4.9	53	29	10	11
5-9.9	30	19	5	4
10-19.9	32	13	9	8
20-49.9	27	21	1	5
50+	10	7	3	-
Total	207	126	35	31

SOURCE: Survey EEAE.

a. Missing data: north, 1 case and 10 production units owned no land; central, 7 production units owned no land; and south, 1 case and 15 production units owned no land.

TABLE II-26

Median Value of Capital Assets and Formal Credit by Size and Region

Size of Production Unit by Region	CAPITAL ASSETS Land and Crops	Buildings and Improvements	Vehicles, Machinery & Tools	Livestock	Valor of Total Assets	Net Worth	CREDIT Formal Credit
	(Value expressed in thousands of Sucres[a]) →						
North							
0-.9	70	38	1	13	116	115	1.1
1-1.9	129	67	9	60	223	213	4.9
2-4.9	185	62	13	46	297	291	21.0
5-9.9	636	161	181	88	1.062	1.057	20.4
10-19.9	758	56	128	81	968	935	125.1
20-49.9	1,290	33	375	81	1.779	1.799	370.0
Total	184	60	26	41	333	283	15.8
Central							
0-.9	44	24	.2	17	79	75	2.1
1-1.9	98	33	.7	23	155	150	36.6
2-4.9	125	24	.2	43	190	178	7.8
5-9.9	277	32	18.4	70	395	347	11.8
10-19.9	675	44	1.8	72	792	609	23.0
20-49.9	1,330	754	150.0	416	2.650	2.620	60.0
50+	-	-	-	4	4	4	-
Total	176	38	6.9	45	263	238	14.0
South							
0-.9	17	15	-	22	55	52	.8
1-1.9	47	18	.1	35	99	97	1.6
2-4.9	153	27	3.9	80	189	180	29.0
5-9.9	179	51	22.9	63	321	314	10.1
10-19.9	331	59	18.8	43	556	432	32.9
20-49.9	603	66	46.7	180	895	872	16.0
50+	945	38	288.5	210	1.303	1.256	111.5
Total	249	38	27.2	77	380	352	21.7

SOURCE: Survey EEAE.

a. During 1983 the average free market rate was about 90 sucres per US dollar.

In all three regions, the limited difference between in the median value of total assets and the median value of net worth suggests a relatively low level of indebtedness. Only in the case of farms between 5 and 20 hectares in the central region and 10 and 20 hectares in the south does the equity ratio fall below 90 percent. Without question, the use of production credit by small producers in the province -- especially long-term formal credit -- is very limited, as was affirmed in the CENDES (1982) study.

In the north, only one-fifth of the farms had used formal credit during the last five years, while in the central region, the figure rose to one-third, and in the south, to one-fourth. Excluding the case of a medium size producer in the north with a 370,000 sucre loan to buy a vehicle, the remaining 37 producers who had used formal credit in the past five years managed portfolios with a median value of 70,000 sucres.

In the central region, one producer had a loan for 860,000 sucres to purchase a vehicle; this loan accounted for nearly one-half of the total amount of institutional credit reported by respondents in this region. Two other borrowers held loans totaling 320,000 sucres. Together, these three borrowers held two-thirds of the total amount of institutional credit reported for the central region, leaving the remaining 29 borrowers with portfolios with median values of 19,862 sucres used primarily for livestock purchases and inputs for crop production.

In the south, the credit situation is similar. One producer with 200 hectares of land had nearly a million sucres of institutional credit, which represented one-fourth of the total amount of formal credit for all respondents from the south. Omitting this case and five additional producers with loans exceeding 100,000 sucres, the 52 remaining borrowers in the south had institutional loans with a median value of 43,000 sucres, a median value between those of the other two regions. While the largest part of the formal credit was short-term loans for agricultural production, more than one-fourth of the total value of institutional credit and of the total number of loans was used for capital investments.

While it was not possible to acess accurately either the use or magnitude of informal credit among the respondents, this and other studies, such as the Banco Central (1982) attest to the importance of this form of capital for peasant households of Chimborazo. There are many types of informal credit, such as loans by truckers, buyers and other producers, all of whom lend at very high interest rates or in exchange for products at below market values. Only in the north in the vegetable growing area does the survey data suggest a high use of informal credit, but even here the amount borrowed is not large. For farms between 2 and 20 hectares, the median value of informal loans fluctuated between 4,000 and 6,000 sucres.

Other studies also point to the importance in Chimborazo of families' self-financing basic inputs such as seeds, fertilizers and pesticides from their own resources. Both the survey data and field observations affirm the predominance of this pattern especially among small producers who demonstrate a reluctance or inability to indebt themselves either to institutions or to individuals. The study identifies the importance of two mechanisms -- investment in livestock as a "piggy bank" and savings from off-farm work -- as primary sources for household financing of production on small and medium size

farms in Chimborazo. While the study shows that medium size producers (those with 10 to 50 hectares) use significant amounts of institutional credit, the proportion which take advantage of this type of credit does not exceed 50 percent of in any of the three regions.

B. Labor Composition and Migration

A second set of resource questions facing rural families is the allocation of family labor. The essential issue is to match the amount and quality of family labor to tasks within the agricultural production unit and to seek employment options for excess family labor and for those with interests and skills marketable in other sectors of the economy. Educational levels of family members, proximity to employment centers, access to land and other productive resources along with stage in the family life cycle, are factors which impinge on a family's allocation of its labor. By analyzing labor capacity, labor utilization and employment patterns in rural families we are able to identify strategies families are using to adapt and survive and to assess the reproductive capacity of household units.

1. Disposable Family Labor

Although it is impossible to determine exact labor inputs in a single visit survey instrument, an attempt was made to assess the availability of family labor and its use in farm production activities. (See Table II-27.) To measure a family's productive labor capacity, we assigned weights based on the age of household members. Male and female labor was weighed equally since there was no reason to assume that a sexual division of tasks lead to differential importance of male and female labor to the household.

Available family labor was somewhat lower in the central region, probably reflecting the relatively younger families in that region. The average labor capacity of families in the central region was slightly more than three adult units, while the comparable figure for the north and south was 3.8 and 4.2 adult labor units, respectively. Generally, average labor capacity was inversely related to farm size. However, the amount of available labor absorbed by the production units, suggests a substantial degree of under employed in this region. To be sure, the underutilization was worse on the smallest farms, despite the fact that these units contributed a disproportional share of the permanent migration from the region.

In the north and central regions a somewhat higher average number of days of family labor was committed to livestock activities than to crops, whereas the reverse was true in the south. For all three regions, the data suggest a curvilinear relationship between size and the use of family labor for crops. In a somewhat less consistent manner, the data show a similar relationship between size and the use of family labor for livestock production.

While relatively little labor is hired for livestock activities in any of the three regions, farms with five or more hectares of land tended to hire quite a bit of labor for crop production. In a few cases, this amount exceeded the average commitment of family labor used for producing crops. What we observed on many of the larger units was the use of occasional family labor (e.g., children helping during school vacations) to supplement the regular labor commitment of the household head or heads and paid labor.

TABLE II-27

Distribution of Agricultural Labor Inputs by Region and Size

Size of Production Unit by Region	(N)	Disposible Family Labor[a]	Family Labor Crops	Family Labor Livestock	Total Family Labor Agriculture	Hired Labor Crops	Hired Labor Livestock	Total Hired Labor Agriculture
North[b]								
0-.9	64	3.1	49	64	113	10	-	10
1-1.9	41	4.2	60	84	144	11	-	11
2-4.9	43	4.1	85	119	204	29	15	44
5-9.9	11	3.9	135	93	228	87	-	87
10-19.9	7	4.3	310	125	435	263	-	263
20-49.9	1	8.4	144	90	234	-	-	-
Total	166	3.8	78	88	166	31	4	35
Central[b]								
0-.9	37	3.1	27	43	70	1	3	4
1-1.9	25	3.5	47	49	96	6	-	6
2-4.9	37	3.1	57	81	138	4	-	4
5-9.9	32	3.1	65	115	180	15	4	19
10-19.9	6	4.2	81	130	211	22	-	22
20-49.9	2	4.3	37	66	103	51	45	96
50+	1	1.0	40	-	40	-	-	-
Total	140	3.2	50	74	124	8	2	10
South[b]								
0-.9	28	2.9	26	47	73	7	-	7
1-1.9	21	3.3	52	43	95	3	-	3
2-4.9	47	4.0	58	31	89	11	-	11
5-9.9	29	5.1	105	58	163	35	-	35
10-19.9	32	5.0	109	17	126	125	15	140
20-49.9	26	5.0	110	133	243	60	28	88
50+	9	4.3	137	253	390	161	12	173
Total	192	4.2	79	61	140	46	7	53

SOURCE: Survey EEAE.

a. Disposible family labor was calculated as follows: 4-5 years = 0.1; 6-8 years = 0.3; 9-12 years = 0.5; 13-17 years = 0.8; 18-59 years = 1.0; 60-65 years = 0.[illegible] 66-75 years = 0.5; and 76 years and over = 0.3.

b. Missing data: north, 2 cases; central, 7 cases; and south, 15 cases.

Given the inability of the production units to absorb the available family labor, it is important to examine more closely the economic activities of household members. In the next three sections, we analyze the occupational configurations of the parents, individually and collectively, and then the migrant and non-migrant children 14 years of age and older.

2. Economic Activities of the Parents

The average age of the men and women who headed the survey households was lowest in the central region--41 and 38 years, respectively. It was highest in the north--50 and 46 years, respectively. (See Tables II-28a and 28b.) The average educational level of these men and women was one to three years of primary schooling and was consistently about one year higher for men than for women. Men and women from the south reported the highest average educational level. In most cases, these men and women completed all the education that was available to them in their local communities. Nine out of ten were currently residing in their communities of birth, where their children typically were receiving a complete primary education -- five years.

Two-thirds of the husbands in households interviewed in the north held two or more jobs. About one-half of these men combined the operation of a farm under 10 hectares with agricultural wage labor. The other one-half combined farming with small-scale commercial activities or construction work. Overall, nearly 75 percent indicated that their primary economic activity was in the agricultural sector, while slightly over one-half were engaged in agriculture as a secondary income-earning activity. Five men pursued their primary occupations in other provinces and six others had migrated temporarily to other provinces to work during the year mostly as agricultural wage laborers.

Household and other reproductive activities were reported as the primary occupation of nearly three-fourths of the wives in the households interviewed in the north. However, two-thirds of these women were also agricultural producers, 20 percent of whom indicated that agricultural production was their principal occupation.

An analysis of the sexual division of labor in households of the north reveals five major configurations of primary and secondary occupations for the sample couples. (See Table II-29.) The configurations are as follows:

1. In 53 percent of the households, both the husband and wife were engaged primarily in agricultural activities. Slightly over three-fourths of these families combined labor on their own production unit with agricultural wage labor on either a permanent or occasional basis by only the husband (71 percent), only the wife (5 percent), or by both (24 percent).
2. In 16 percent of the households, the husband worked primarily off the production unit while his wife was the sole or primary agricultural producer.
3. In 6 percent of the households, the wife engaged in a non-agricultural occupation while the husband was responsible for the agricultural production unit.
4. In 13 percent of the households, the primary occupations of both the husband and wife were non-agricultural. In these households, the

TABLE II-28a

Average Age and Educational Level and Sector of Principal Occupation for Husbands by Region and Size

Size of Production Unit by Region	(N)	Average Age	Average Education	AGRICULTURE			INDUSTRY	SERVICES			
				Wage Labor	Farm Owner	Total	Artesan and Industrial	Personal	Commercial	Construction/ Transport	Professional
				%	%	%	%	%	%	%	%
North											
0-.9	59	44	3.0	47	22	69	7	5	9	10	-
1-1.9	37	55	2.1	27	49	76	8	-	3	11	3
2-4.9	42	50	3.6	22	52	74	2	2	5	17	-
5-9.9	11	55	2.8	-	73	73	-	-	18	9	-
10-19.9	7	58	2.9	-	86	86	-	14	-	-	-
20-49.9	1	59	0.0	-	100	100	-	-	-	-	-
Total	157	50	2.9	30	43	73	5	3	6	12	1
Central											
0-.9	37	40	2.7	30	30	60	-	8	5	24	3
1-1.9	26	43	3.0	27	50	77	8	-	-	8	7
2-4.9	37	39	2.5	22	65	87	-	-	-	8	5
5-9.9	33	40	2.3	12	79	91	-	-	6	3	-
10-19.9	6	48	3.5	-	83	83	-	-	17	-	-
20-49.9	2	58	2.0	-	100	100	-	-	-	-	-
Total	141	41	2.6	21	58	79	1	2	4	10	4
South											
0-.9	28	39	1.9	43	32	75	7	-	-	4	14
1-1.9	22	42	3.3	45	45	91	-	-	-	9	-
2-4.9	49	47	4.0	16	78	94	-	-	2	2	2
5-9.9	27	49	3.2	4	92	96	-	-	-	-	4
10-19.9	30	56	4.2	3	94	97	-	-	-	-	3
20-49.9	28	46	2.7	11	86	97	-	-	-	-	3
50+	9	45	2.0	33	67	100	-	-	-	-	-
Total	193	47	3.3	20	73	93	1	-	1	3	2

SOURCE: Survey EEAE.

TABLE II-28b

Average Age and Educational Level and Sector of Principal Occupation for Wives by Region and Size

Size of Production Unit by Region	(N)	Average Age	Average Education	AGRICULTURE			INDUSTRY	SERVICES			
				Wage Labor	Farm Owner	Total	Artesan and Industrial	Personal	Commercial	Construction/ Transport	Professional
				%	%	%	%	%	%	%	%
North											
0-.9	59	40	1.9	12	15	27	-	64	7	2	-
1-1.9	36	52	1.0	11	11	22	3	72	3	-	-
2-4.9	41	47	2.8	2	10	12	-	83	2	-	2
5-9.9	11	53	1.6	-	18	18	-	82	-	-	-
10-19.9	7	50	1.4	-	14	14	-	86	-	-	-
20-49.9	1	44	2.0	-	-	-	-	100	-	-	-
Total	155	46	1.9	8	13	21	.6	73	5	.6	.6
Central											
0-.9	35	38	1.4	-	6	6	-	91	3	-	-
1-1.9	21	35	2.4	-	-	-	-	100	-	-	-
2-4.9	39	38	1.0	-	5	5	3	86	3	3	-
5-9.9	35	39	0.9	-	6	6	-	94	-	-	-
10-19.9	6	43	1.3	-	-	-	-	100	-	-	-
20-49.9	2	57	1.0	-	-	-	-	100	-	-	-
Total	138	38	1.3	-	4	4	1	93	1	1	-
South											
0-.9	30	41	1.4	3	-	3	-	97	-	-	-
1-1.9	24	41	2.8	4	4	8	4	88	-	-	-
2-4.9	51	43	3.3	2	8	10	-	88	-	-	2
5-9.9	29	46	2.6	-	10	10	-	87	-	-	3
10-19.9	28	47	3.6	-	7	7	-	93	-	-	-
20-49.9	27	42	2.4	-	7	7	-	93	-	-	-
50+	9	42	1.6	-	22	22	-	78	-	-	-
Total	198	43	2.7	1.5	6.5	8	.5	91	-	-	.5

SOURCE: Survey EEAE.

TABLE II-29

Labor Allocation of Couples by Region and Size[a]

Size of Production Unit by	(N)	Neither Work Off[b]		Both Work Off[b, c]		Wife Works Off[b, c]		Husband Works Off[b, c]		
		Both on farm	H only on farm	Both ag Both farm	Non-ag H farm	W ag H&W farm	W non-ag H farm	H ag H&W farm	H non-ag H farm	H non-ag H&W farm	H non-ag W farm
North											
0-.9	57	2	2	7	11	1	0	17	4	4	9
1-1.9	33	3	2	7	6	0	0	6	0	7	2
2-4.9	40	8	5	2	9	0	0	11	1	3	1
5-9.9	11	5	0	0	1	0	0	1	1	3	0
10-19.9	7	0	2	0	0	0	3	0	0	1	1
20-49.9	1	1	0	0	0	0	0	0	0	0	0
Total	149	19	11	16	27	1	3	35	6	18	13
Central											
0-.9	35	3	0	0	6	0	1	4	2	17	2
1-1.9	21	1	1	2	4	0	0	6	1	5	1
2-4.9	37	4	4	1	9	0	0	9	1	9	0
5-9.9	33	10	3	0	4	0	1	6	1	8	0
10-19.9	6	1	0	0	2	0	0	0	1	1	1
20-49.9	2	2	0	0	0	0	0	0	0	0	0
Total	134	21	8	3	25	0	2	25	6	40	4
South											
0-.9	24	2	0	4	3	0	1	9	1	2	2
1-1.9	19	3	4	0	2	0	0	8	0	2	0
2-4.9	48	15	5	2	1	0	3	14	0	7	1
5-9.9	26	9	5	0	1	0	0	9	1	1	0
10-19.9	28	10	13	2	0	0	2	0	1	0	0
20-49.9	26	8	8	0	1	0	3	3	1	1	1
50+	8	3	5	0	0	0	0	0	0	0	0
Total	179	50	40	8	8	0	9	43	4	13	4

SOURCE: Survey EEAE.

a. Sixty single parent households eliminated from this analysis.
b. Wife engaged in domestic work and child rearing.
c. Includes non-agricultural activities in home (e.g., artisan) and from the home (e.g., petty commerce).

husbands reportedly performed most of the agricultural activities on the family production units.

5. In 11 percent of the households the wife was reportedly not involved in any way in agricultural activities. These women were disproportionately from the larger production units.

In the central region, 82 percent of the husbands in the households interviewed reported both a primary and secondary occupation, principally in agriculture. Like the husbands in the north, about one-half of these men combined the operation of a small production unit with agricultural wage labor in Chimborazo or on the Coast. Among the 33 men engaged in a non-agricultural secondary occupation, one-half were employed in construction activities in Riobamba or Quito. The others were either artisans who worked in their homes, or peddlers who bought and sold products within the province and/or Guayaquil. About 10 percent of these men pursued their primary occupations in Pichincha or Guayas, and the same proportion performed their secondary occupations in these provinces. In total, 22 percent of the husbands in the central region reported temporary migration to work outside Chimborazo during 1983. As might be expected, these temporary migrants tended to be younger than the men who spent the entire year in Chimborazo.

Although 93 percent of the wives in the sample households of the central region reported household activities as their principal occupation, two-thirds were very involved in farming as well. In general, the sexual division of labor configurations for families in the central part of the province were similar to those in the northern region. However, there were some important differences in the proportions of families carrying out particular strategies. Most notably, one-fourth of the wives of the central region either handled alone or were primarily responsible for the farm while their husbands worked off the unit, chiefly in construction activities or in commerce. In an additional 43 percent of the families, the couple engaged in agricultural production on their own unit (52 percent) or combined labor on their unit with agricultural wage labor (48 percent).

Compared with women in the north, more wives in the central region had non-farm employment. Wives in 12 percent of the households (compared to 6 percent in the north) worked off the unit or produced handicraft items in the household. In 9 percent of the households, the primary occupations of both husband and wife were outside the agricultural sector. Only 10 percent of the households in this region reported that the husband handled all the agricultural production activities while the wife engaged solely in household labor.

In sharp contrast to our findings in the north and central regions, slightly over one-half of the husbands in the south were engaged in only one occupation, perhaps underscoring the area's lower proportion of very small holdings and its relative isolation from primary and secondary urban centers. Indeed, 93 percent of the husbands reported agriculture as their principal occupation. Eight percent of these men combined public sector employment with agricultural production and 7 percent combined farming with commercial activities, construction work or artisan activities. Fewer men in the south carried out their primary or secondary occupations in other provinces and fewer indicated that they had migrated temporarily to work outside Chimborazo during 1983.

In general, wives in the south resembled their counterparts elsewhere in the province in their combination of agricultural production with household reproductive activities. But fewer of these women had sole or primary responsibility for the production unit. In part, this pattern reflects the tendency of their husbands not to work off the farm outside the provice. In only 4 percent of the families in the south (compared with 16 and 25 percent in the north and central regions, respectively) did the wives manage the farm while their husbands worked elsewhere. A slightly greater proportion (6 percent) of the wives contributed to family income by engaging in artisan production or commercial activities on their own while their husbands managed the farm. The most notable difference among the wives from the three regions, however, was the larger proportion of southern wives (25 percent compared with 10 percent in each of the other regions) who reportedly devoted full time to housework.

3. Economic Activities of Sons 14 Years and Older

On the average, sons 14 years and older had completed slightly more than 5 years of primary schooling (See Tables II-30a and II-30b.) Sons from the north had attained the highest average educational level. In that region, migrant sons averaged one and one-half years of secondary school training and non-migrant sons nearly one year of secondary schooling. The sons of families from the north were also more likely to be students in 1983. Certainly the relative accessibility of the educational facilities in Riobamba, together with the greater availability of secondary schools, contributed to the higher educational attainment of these sons.

Although the average age of the sons 14 years and older varied little among the three regions, there was a striking difference in the percent of migration from each region. In the north, 40 percent of the sons had left the parroquia (a political division roughly equivalent to the town or township in the U.S.) where they were born. However, in 1983 only 17 percent of the sons in the central and 30 percent of those from the south were reportedly residing outside the parroquia.

Among those who had left their parroquia of birth (the definition of migrant), most had migrated to urban areas outside the province, principally to Quito and Guayaquil. Two-thirds of the migrant son from the central and southern regions were residing in urban areas outside of Chimborazo, but only 44 percent of those from the north lived in urban areas outside the province, mostly Quito. However, an additional 12 percent of the migrant sons from the north lived in Riobamba. Sons from the south who had migrated to urban areas, were living principally in Quito (55 percent) and Guayaquil (39 percent). Migrant sons who had located in other rural areas lived mostly in Chimborazo. In 1983, 12 percent of all migrant sons from the north and central regions and 20 percent from the south were living in rural areas within the province.

As might be expected by their concentration in major urban centers, agriculture was a relatively unimportant source of employment for migrant sons from all three regions. Only about one-fourth of the migrant sons from the north and central regions and slightly more than one-third from the south were absorbed in the agricultural sector. Construction work, bus & truck driving, teaching and jobs in other government bureaus, were the major types of employment reported for migrant sons.

TABLE II-30a

Average Age and Educational Level and Sector of Principal Occupation for Sons 14 Years and Over by Region and Size

M I G R A N T S

Size of Production Unit by Region	(N)	Ave. Age	Ave. Educ.	AGRICULTURE Student %	AGRICULTURE Wage Labor %	AGRICULTURE Family %	AGRICULTURE Farm Owner %	AGRICULTURE Total %	INDUSTRY Artesan & Industrial %	SERVICES Personal %	SERVICES Commercial %	SERVICES Construction Transport %	SERVICES Professional %
North													
0-.9	16	34	5.9	13	6	13	12	31	13	6	-	6	31
1-1.9	24	30	5.9	17	17	-	13	30	8	4	-	29	13
2-4.9	22	26	9.1	23	-	5	4	9	4	14	-	23	27
5-9.9	7	24	11.1	29	-	-	-	-	-	-	14	-	57
10-19.9	9	28	8.2	22	-	-	33	33	-	-	-	-	45
20-49.9	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	78	29	7.5	19	8	3	12	23	6	6	1	17	28
Central													
0-.9	-	-	-	-	-	-	-	-	-	-	-	-	-
1-1.9	4	32	3.0	-	25	-	-	25	-	-	50	-	25
2-4.9	6	30	1.0	-	33	-	-	33	-	-	33	33	-
5-9.9	2	20	7.0	-	-	-	-	-	-	-	-	100	-
10-19.9	-	-	-	-	-	-	-	-	-	-	-	-	-
20-49.9	-	-	-	-	-	-	-	-	-	-	-	-	-
50+	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	12	29	2.7	-	25	-	-	25	-	-	33	33	8
South													
0-.9	7	32	6.3	14	-	-	-	-	14	-	-	-	72
1-1.9	14	32	5.3	7	14	21	21	57	7	14	-	7	7
2-4.9	20	27	5.8	10	25	-	15	40	10	-	5	-	35
5-9.9	17	25	6.2	12	6	6	35	47	6	-	-	12	24
10-19.9	9	28	7.8	-	-	11	-	11	-	11	-	-	77
20-49.9	9	30	10.7	33	11	-	11	22	11	-	-	11	22
50+	6	30	6.7	33	-	17	17	34	-	-	-	17	17
Total	82	28	6.7	13	11	7	17	35	7	4	1	6	33

SOURCE: Survey EEAE.

TABLE II-30b

Average Age and Educational Level and Sector of Principal Occupation for Sons 14 Years and Over by Region and Size

Size of Production Unit by Region	(N)	Ave. Age	Ave. Educ.	NON-MIGRANTS										
					AGRICULTURE				INDUSTRY		SERVICES			
				Student %	Wage Labor %	Family %	Farm Owner %	Total %	Artesan & Industrial %	Personal %	Commercial %	Construction Transport %	Professional %	
North[a]														
0-.9	26	22	7.1	46	27	4	8	39	8	4	–	4	–	
1-1.9	41	24	6.1	34	29	17	8	54	6	–	3	3	3	
2-4.9	29	25	6.8	35	17	10	14	41	10	–	–	7	7	
5-9.9	12	24	7.1	17	–	75	–	75	–	–	–	8	–	
10-19.9	5	28	7.0	–	–	60	20	80	–	–	–	–	20	
20-49.9	4	18	4.8	–	–	100	–	100	–	–	–	–	–	
Total	117	24	6.6	32	21	23	9	53	6	1	1	4	3	
Central[a]														
0-.9	11	20	5.0	18	18	18	–	36	–	18	9	18	–	
1-1.9	12	21	7.0	33	25	17	–	42	8	8	–	8	–	
2-4.9	16	27	4.5	13	44	25	12	81	–	–	–	6	–	
5-9.9	10	19	5.4	20	20	30	20	70	–	–	10	–	–	
10-19.9	7	20	5.7	57	29	14	–	43	–	–	–	–	–	
20-49.9	2	20	3.5	100	–	–	–	–	–	–	–	–	–	
50+	1	24	9.0	–	100	–	–	–	–	–	–	–	–	
Total	59	22	5.8	27	29	20	7	56	2	5	3	7	–	
South[a]														
0-.9	11	24	3.3	9	27	–	37	64	9	–	–	–	18	
1-1.9	10	24	4.2	10	10	–	60	70	–	–	–	–	20	
2-4.9	43	21	4.1	19	7	14	51	72	–	5	–	2	2	
5-9.9	38	23	5.5	16	10	26	32	69	–	3	3	10	–	
10-19.9	41	25	6.4	34	2	17	29	49	–	–	–	2	15	
20-49.9	40	23	5.7	35	2	33	25	60	–	–	–	2.5	2.5	
50+	11	20	4.7	46	27	18	9	54	–	–	–	–	–	
Total	194	23	5.2	25	8	20	35	63	.5	1.5	.5	4	6	

SOURCE: Survey EEAE.

a. In the southern region, three sons not included here were return migrants; in the central region, one son was a return migrant; and in the southern region, 21 sons were return migrants.

In all three regions, non-migrant sons were concentrated in the agricultural sector. In the north, about 10 percent operated their own production unit, while another 45 percent were agricultural wage laborers (21 percent) or part of the family's agricultural labor force (23 percent). The wage laborers came from households with fewer than 5 hectares while those involved in agricultural production with their parents or parents-in-law came disproportionately from families with more than 5 hectares. Non-migrant sons from the central region were distributed similarly in the agricultural sector, with slightly more (29 percent) employed as wage laborers. However, non-migrant sons of families from the south were much more likely to have acquired their own production units (35 percent) and much less likely to be employed as wage laborers (8 percent), probably reflecting their relative proximity to colonization areas.

One-fourth to one-third of the non-migrants 14 years and over were students in 1983. The artisan industry in the north, commercial activities in the central region and teaching and other types of government employment -- especially as railroad workers -- in the south, together with construction and transport in all three regions, absorbed the remaining 15 to 20 percent of the non-migrant sons.

4. Economic Activities of Daughters 14 Years and Older

Overall, there are great similarities in the education, migration and occupational patterns of the sons and the daughters 14 years and older in the study sample. (See Tables II-31a and II-31b.) The average educational level of daughters was only slightly lower than that of sons. And about the same proportion of daughters as sons are students. More specifically, daughters from the north and south had usually completed primary schooling, while daughters from the central region on the average had completed about four years of the five year primary training.

As with the sons, fewer daughters from the central region (13 percent) had left their native parroquias. The comparable proportion of migrant daughters for both the north and south was one-third. On the average, non-migrant sons and daughters were about the same age, while migrant daughters were slightly younger than migrant sons.

There was considerable interregional variation among the migrant daughters in their place of settlement. While all the daughters from the central region migrated to urban areas and 80 percent of those from the south had settled in cities (primarily outside Chimborazo), migrant daughters from the north were less urban (only 60 percent resided in cities) and less likely to have left the province. One-third of the migrant daughters in the north resided in Riobamba and another one-fourth lived in rural areas in Chimborazo. Overall, daughters who had migrated to urban areas outside Chimborazo were about equally as likely to live in Quito as Guayaquil.

Migrant daughters from all regions were disproportionately full-time housewives; domestic service for pay outside the family absorbed an additional 10 to 15 percent. Despite their similar average educational levels, migrant daughters from all regions employed in the paid labor force held generally lower paid jobs. For example, the proportion of migrant daughters from the south employed as professionals was one-half that of migrant sons from that region.

TABLE II-31a

Average Age and Educational Level and Sector of Principal Occupation for Daughters 14 Years and Over by Region and Size

Size of Production Unit by Region	(N)	Ave. Age	Ave. Educ.	MIGRANTS AGRICULTURE Student %	Wage Labor %	Family %	Farm Owner %	Total %	FAMILY SERVICES Par-cial %	Com-plete %	Artesan/ Indus-trial %	SERVICES Personal %	Com-mercial %	Construction/ Transport %	Profes-sional %
North[a]															
0-.9	18	26	5.7	11	11	-	6	17	6	39	6	11	11	-	-
1-1.9	11	30	3.4	9	18	-	-	18	-	64	-	9	-	-	-
2-4.9	9	21	7.2	22	-	-	-	-	-	44	11	22	-	-	-
5-9.9	10	20	8.6	60	-	-	-	-	-	30	-	10	-	-	-
10-19.9	11	25	6.6	9	-	-	18	18	-	36	9	27	-	-	-
20-49.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	59	25	6.2	20	7	-	5	12	2	42	5	15	4	-	-
Central[a]															
0-.9	2	17	8.0	50	-	-	-	-	-	-	-	50	-	-	-
1-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-4.9	4	26	3.0	-	25	-	-	25	-	50	-	25	-	-	-
5-9.9	2	29	3.0	-	-	-	-	-	-	100	-	-	-	-	-
10-19.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20-49.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	8	24	4.3	12.5	12.5	-	-	12.5	-	50	-	12.5	-	-	-
South[a]															
0-.9	5	29	6.0	-	-	-	-	-	-	-	40	40	20	-	-
1-1.9	8	30	4.9	-	25	-	13	38	-	12	-	13	25	-	12
2-4.9	27	23	5.7	15	-	-	18	18	7	30	4	15	-	-	11
5-9.9	8	26	6.8	13	-	-	12	12	-	50	-	-	25	-	-
10-19.9	14	29	6.9	14	-	-	-	-	7	29	7	-	14	-	29
20-49.9	6	27	6.3	-	-	-	-	-	-	83	-	-	-	-	17
50+	2	30	4.5	50	-	-	-	-	-	-	-	-	-	-	50
Total	70	26	6.3	12	3	-	10	13	4	31	6	10	7	-	17

SOURCE: Survey EEAE.

a. Missing data: north, 3 cases; central, 3 cases; and south [illegible] cases.

TABLE -31b

Average Age and Educational Level and Sector of Principal Occupation for Daughters 14 Years and Over by Region and Size

Size of Production Unit by Region	(N)	Ave. Age	Ave. Educ.	NON-MIGRANTS: AGRICULTURE: Student %	Wage Labor %	Family %	Farm Owner %	Total %	FAMILY SERVICES: Parcial %	Complete %	Artesan/ Industrial %	Personal %	SERVICES: Commercial %	Construction/ Transport %	Professional %
North[a]															
0-.9	24	24	4.5	13	4	13	4	21	29	25	8	4	5	-	-
1-1.9	39	26	3.9	15	13	13	3	28	15	36	-	3	-	-	3
2-4.9	41	24	7.1	27	2	15	5	22	7	24	-	5	5	-	10
5-9.9	9	20	7.4	55	-	22	-	22	-	-	-	-	-	-	22
10-19.9	9	26	5.8	-	-	11	-	11	22	67	-	-	-	-	-
20-49.9	2	22	3.5	-	-	-	-	-	100	-	-	-	-	-	-
Total	124	25	5.5	20	6	14	3	23	16	29	2	3	2	-	6
Central															
0-.9	16	22	4.4	25	-	6	-	6	13	50	-	6	-	-	-
1-1.9	14	23	3.1	14	14	-	7	21	29	36	-	-	-	-	-
2-4.9	11	19	3.3	18	9	9	-	18	18	36	-	-	9	-	-
5-9.9	7	23	2.7	43	14	-	-	14	14	29	-	-	-	-	-
10-19.9	3	21	2.3	66	-	-	-	-	33	-	-	-	-	-	-
20-49.9	3	24	3.0	33	-	-	-	-	-	33	-	-	-	-	33
Total	54	22	4.0	26	6	6	2	14	18	37	-	2	2	-	2
South[a]															
0-.9	9	23	3.3	11	-	-	33	33	22	33	-	-	-	-	-
1-1.9	12	19	2.9	25	-	8	17	25	17	33	-	-	-	-	-
2-4.9	31	21	4.9	16	-	13	7	20	16	48	-	-	-	-	-
5-9.9	33	24	5.0	18	-	12	12	24	21	27	-	3	-	-	6
10-19.9	27	24	5.7	22	-	-	-	-	30	44	4	-	-	-	-
20-49.9	20	21	6.8	40	-	5	-	5	25	25	-	-	-	-	5
50+	10	24	7.2	20	-	-	-	-	-	40	20	-	-	-	20
Total	143	22	5.2	22	-	7	8	15	20	36	2	1	-	-	4

SOURCE: Survey EEAE.

a. In the northern region, two daughters not included here were return migrants and in the southern region, 13 daughters were return migrants.

As might also be expected, a lower proportion of non-migrant daughters than sons were employed in agriculture (from 12 to 23 percent) and a higher proportion were either full-time or part-time housewives. While the general pattern of women holding lower paid jobs prevailed for the non-migrant daughters, a slightly greater proportion of non-migrant daughters than sons from the north and central regions were engaged in professional work.

C. Production Strategies

Given a set of available resources within a certain institutional framework for employing them, rural families must decide what they are going to produce and what strategies they are going to use to carry out this production. As we have seen in previous sections, the amount and quality of available resources vary greatly among Chimborazo's rural families. We would assume that this variation would be reflected in the way in which these resources are employed amongst various alternatives.

1. Crop Production

Even the most casual observer must be impressed by the extensiveness of short-cycle crops on the Chimborazo landscape--often on extremely fragile lands which cannot sustain such intensive land use indefinitely. The study not only confirms the prevalence of short-cycle crops on the farms of the province, but it shows a strong inverse relationship between size and intensity of land use. (See Table II-32a.)

In the more densely populated northern region, 71 percent of the land included in the study was in short-term intensive crops. On the smallest units, virtually all of the land was committed to intensive cultivation. Recalling from the previous discussion that these units tended to be located on the poorest land, one can begin to comprehend the severity of the soil erosion problem in this region. While up to 20 percent or more of the land in short-cycle crops on units under 1 hectare in the north was in vegetable crops, corn typically accounted for one-half or more of the area in transitory crops. (See Table II-32b.) The relative portion in corn tended to decrease with size in exchange for increased area in tuber and small grain crops. As expected, the area in pasture and other permanent crops (especially apples and sisal in the north) increased in both absolute and relative terms. The area in improved forage crops and forests in the north was nil.

The same general land use pattern prevailed in the central region except for the diminished importance of corn and increased significance of small grains and pasture. Overall, the area in short-cycle crops was proportionally less, but the area in fallow increased. This is probably because the interviews took place at the end of the typical agricultural cycle and because many families in this region leave land in fallow during periods of temporary migration to work outside the province.

While the general land use pattern for the south appeared quite similar to the central region, there were some important differences within major land uses. The smaller units in this region had nearly all of their land in short-cycle crops, but vegetable crops were not important. Instead, these units allocated their land fairly evenly among small grains, corn, tubers

TABLE II-32a

Major Types of Land Use for the Agricultural Production Units by Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL AREA					
		Short Cycle Crops (%)	Permanent Crops (%)	Forage Crops (%)	Pasture (%)	Forest (%)	Fallow (%)
North							
0-.9	65	90	7	1	1	-	1
1-1.9	41	88	7	1	3	-	1
2-4.9	43	79	8	1	6	2	4
5-9.9	11	66	23	1	-	1	9
10-19.9	7	63	19	-	18	-	-
20-49.9	1	14	-	-	41	-	45
Total	168	71	12	1	9	1	6
Central							
0-.9	37	71	2	5	7	-	15
1-1.9	26	86	2	5	1	-	6
2-4.9	39	83	-	2	6	-	9
5-9.9	36	47	-	2	29	1	21
10-19.9	6	62	7	-	31	-	-
20-49.9	2	10	-	-	40	5	45
50+	1	23	-	-	77	-	-
Total	147	57	1	2	23	1	16
South							
0-.9	30	96	1	-	3	-	-
1-1.9	25	91	3	-	5	-	1
2-4.9	53	79	9	-	11	-	1
5-9.9	30	84	8	-	6	-	2
10-19.9	32	67	7	-	24	1	1
20-49.9	27	39	6	-	38	6	11
50+	10	36	9	-	22	8	15
Total	207	54	7	-	24	7	8

SOURCE: Survey EEAE.

TABLE II-32b

Distribution of Land Area in Short Cycle Crops by Region and Size

PERCENT OF TOTAL LAND AREA IN SHORT CYCLE CROPS (AND FALLOW)

Size of Production Unit by Region	Vegetables (%)	Small Grains (%)	Corn (%)	Tubers (%)	Edible Legume Seeds (beans, peas, lentils, lupines) (%)
North					
0-.9	23	6	49	11	10
1-1.9	7	3	78	6	5
2-4.9	19	11	45	13	8
5-9.9	16	10	16	37	10
10-19.9	4	-	38	53	5
20-49.9	-	12	-	12	-
Total	13	7	44	23	6
Central					
0-.9	14	25	22	11	12
1-1.9	21	18	15	25	15
2-4.9	6	34	13	27	11
5-9.9	2	22	9	23	14
10-19.9	27	18	14	32	9
20-49.9	-	4	2	7	4
50+	-	-	84	16	-
Total	8	23	11	24	12
South					
0-.9	-	19	41	22	18
1-1.9	1	38	20	19	21
2-4.9	4	28	27	5	35
5-9.9	16	21	18	3	40
10-19.9	10	3	45	4	37
20-49.9	2	1	32	7	37
50+	-	4	23	4	40
Total	6	10	30	5	37

SOURCE: Survey EEAE.

and edible legume seeds (leguminosos). The medium and larger size units concentrated their short-cycle cropland on corn and legume seeds. Permanent crops were more significant in the south where farms at lower altitudes usually have some fruit production. The larger farms in the south had significant areas in forest.

The importance of short-cycle crops among Chimborazo's peasants and farmers is further borne out in Table II-33, which shows the gross value of crop production. In the north, vegetables accounted for most of the value of crop production on the smaller units whereas potatoes were the most valuable crop on units of 5 hectares or more. Fruit (especially apples in Bayushig and Penipe) was also an important cash crop. Corn and potatoes were of moderate importance for the smaller farms where they are grown primarily for household consumption.

In the central region, the relative value of corn and vegetable crops on farms under 10 hectares tended to decrease with an increase in size of farms, while the value of tuber crops, small grains and edible legume seeds all increased. Tubers remained the most valuable crop on the medium size units, but small grains and edible legume seeds were also important. Except for pasture, permanent crops were insignificant in the central region. Since pastures and other forage crops are primarily intermediate enterprises (for livestock production), their value was relatively low.

In the south, edible legume seeds accounted for more than two-fifths of the overall value of crop production. They were relatively important for all size categories. Corn was a close second in importance, particularly on the medium and larger size farms. Tuber crops and small grains were relatively important on the units under 2 hectares, while fruit production contributed up to one-tenth or more of the value of crop production on the medium and large units. Except for the middle range, especially the 5-to-10 hectare category, vegetable production did not account for a significant share of the value of crop output in the south.

Crop productivity, shown by value of output per hectare, is summarized in Table II-34. Although somewhat irregular in pattern, the data tend to contradict universal trends which show an inverse relationship between size and productivity. Indeed, there was a fairly strong positive relationship for several crops (e.g., potatoes in the north and corn in the south). In other activities, however, the smallest producers often obtained above average productivity (e.g., vegetable and fruit production in the north, most crops in the central region, and small grains and vegetables in the south).

Some of the irregularities evident in the productivity data derive from the difficulty in estimating area, especially on the small holdings where crops are often intercultivated and planted on very small, irregular plots. Weather patterns were also quite irregular in the province during 1983. And as discussed earlier, soil quality and access to water and other inputs vary considerably among and within the three regions.

The productivity for tuber, vegetable and fruit crops was notably higher in the north--two to three times that in the other two regions and in the order of 10 times that of the traditional subsistence crops of corn and small

TABLE II-33

Value of Crop Production by Type, Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL VALUE OF CROP PRODUCTION					
		Short Cycle Crops (%)	Corn (%)	Tubers (%)	Small Grains (%)	Vegetables (%)	Edible Legume Seeds (%)
North							
0-.9	65	88	16	13	1	56	2
1-1.9	41	74	21	10	1	41	1
2-4.9	43	75	15	21	2	36	1
5-9.9	11	95	5	69	1	17	3
10-19.9	7	69	4	61	-	3	1
20-49.9	1	100	-	97	3	-	-
Total	168	78	10	44	1	22	1
Central							
0-0.9	37	93	15	21	21	21	15
1-1.9	26	95	5	44	7	34	5
2-4.9	39	99	6	44	18	24	7
5-9.9	36	99	4	55	14	6	21
10-19.9	6	100	3	78	4	11	4
20-49.9	2	100	9	37	14	-	40
50+	1	66	37	29	-	-	-
Total	147	98	5	51	13	17	12
South							
0-.9	30	100	15	24	24	5	32
1-1.9	25	98	18	24	33	-	23
2-4.9	53	97	16	13	12	4	52
5-9.9	30	89	11	4	12	6	56
10-19.9	32	91	42	3	.4	3	43
20-49.9	27	90	47	16	.5	.6	26
50+	10	88	34	4	4	-	46
Total	207	91	35	8	4	3	44

SOURCE: Survey EEAE.

TABLE II-33 (continued)

Value of Crop Production by Type, Region and Size

Size of Production Unit by Region	(N)	Perennial Crops (%)	Fruit (%)	Fiber Crops (%)	Other[a] Crops (%)
North					
0-.9	65	11	11	.2	1
1-1.9	41	22	21	1	4
2-4.9	43	25	24.5	-	.5
5-9.9	11	3	3	-	2
10-19.9	7	29	29	-	2
20-49.9	1	-	-	-	-
Total	168	21	21	.1	1
Central					
0-0.9	37	-	-	-	7
1-1.9	26	-	-	-	5
2-4.9	39	-	-	-	1
5-9.9	36	-	-	-	1
10-19.9	6	-	-	-	-
20-49.9	2	-	-	-	-
50+	1	-	-	-	34
Total	147	-	-	-	2
South					
0-.9	30	-	-	-	-
1-1.9	25	2	2	-	-
2-4.9	53	3	3	-	-
5-9.9	30	11	11	-	-
10-19.9	32	8	8	-	1
20-49.9	27	10	10	-	-
50+	10	12	12	-	-
Total	207	9	9	-	.3

SOURCE: Survey EEAE.

a. Includes forage crops, pasture and forests.

TABLE II-34

Productivity by Type of Crop, Region and Size

Size of Production Unit by Region	(N)	AVERAGE VALUE OF PRODUCTION PER HECTARE[a] Short Cycle Crops S/ha.	Corn S/ha.	Tubers S/ha.	Small Grains S/ha.	Vegetables S/ha.	Edible Legume Seeds S/ha.	Fruits S/ha.
North								
0-.9	65	12.334	4.470	15.499	1.973	33.822	3.185	25.721
1-1.9	41	7.052	2.515	14.957	2.092	58.016	3.163	27.094
2-4.9	43	11.693	4.996	23.062	3.002	28.764	1.899	39.332
5-9.9	11	22.136	6.130	38.907	1.691	22.992	5.341	2.114
10-19.9	7	24.430	3.807	41.039	-	25.472	8.000	34.663
20-49.9	1	29.275	-	56.750	1.800	-	-	-
Total		15.170	3.939	34.948	2.413	31.560	3.893	24.778
Central								
0-.9	37	8.759	5.424	15.615	6.425	12.092	9.904	-
1-1.9	26	16.181	4.977	27.819	5.926	25.860	6.015	-
2-4.9	39	8.254	3.465	12.118	4.099	29.402	5.233	-
5-9.9	36	7.967	2.249	13.194	3.554	25.804	8.144	-
10-19.9	6	7.286	1.492	17.711	1.707	3.045	2.990	-
20-49.9	2	11.163	8.000	11.110	6.000	-	18.000	-
50+	1	5.758	3.855	15.625	-	-	-	-
Total	147	8.766	3.143	14.796	3.908	15.688	7.110	-
South								
0-.9	30	5.621	2.106	6.037	7.130	11.666[a]	10.216	-
1-1.9	25	4.055	3.705	5.112	3.561	-	4.553	3.041
2-4.9	53	6.538	3.834	19.228	2.838	6.706	9.887	1.445
5-9.9	30	12.008	4.047	10.763	3.693	4.586	9.370	7.490
10-19.9	32	10.908	10.842	9.090	1.632	3.344	14.052	9.266
20-49.9	27	10.921	14.116	20.868	3.913	3.733	6.737	8.087
50+	10	6.035	7.235	5.000	4.500	-	5.600	3.344
Total	207	9.256	9.211	12.818	3.424	4.945	8.792	5.733

SOURCE: EEAE.

[a] Sucres per hectare. During 1983, the average free market rate was about 90 sucres per US dollar.

grains in the same region. This difference between cash crops and subsistence crops was much less in the central and southern regions--in the order of two to three times. Average corn yields were considerably higher in the south than in the north and central regions. Small grains and edible legume seed productivity was significantly higher in the central and southern regions than in the north.

2. Livestock Production

In terms of value, cattle accounted for most of the livestock inventory among respondents in all three regions. (See Table II-35.) Sheep were fairly important in the central region. In general, swine and other animal enterprises each made up less than 10 percent of the overall livestock inventory in most size categories in the three regions. Livestock production tended to be somewhat more intensive in the northern region, where the average carrying capacity was 1.41 units per hectare. In the central and southern regions, the carrying capacity averaged less than 1 animal unit per hectare.

The value of livestock production was distributed only slightly differently than the livestock inventory among the different animal enterprises and regions. (See Table II-36.) Overall, cattle accounted for most of the value of livestock output.

D. Costs of Production

By analyzing the costs of production, one can see the importance of participation in the input market as well as the relative importance of different enterprises.

1. Crop Production Costs

Table II-37 shows that virtually all cash expenditures for crop production went for short-cycle crops, with only minor cash outlays for fruit production in the north and south. Most of the cash expenditures in the northern and central regions were for horticultural and tuber crops, with lesser amounts allocated to corn (primarily the north) and to small grains (mostly the central region). The proportion of expenditures going to tuber crops (mainly potatoes) tended to increase with farm size. In the south, corn and edible legume seeds absorbed most of the expenditures, with tuber crops and small grains receiving relatively high priority on the smaller units.

Purchased physical inputs (primarily fertilizers and pesticides) accounted for most of the crop expenditures in the northern and central regions. (See Table II-38.) Hired labor and other central expenditures were of secondary importance. Hired labor was relatively more important in the north where vegetable production was important. The portion of crop expenditures for hired labor was fairly constant for all size categories.

In the central region, where tied or semi-tied labor forms were particularly prevalent just two decades ago, only 10 percent of crop expenditures went to hired labor. In the south, outlays for hired labor and physical inputs were of about equal importance. Hired labor as a portion of total crop expenditures tended to increase slightly with farm size while purchased inputs as a portion declined with farm size.

TABLE II-35
Value of Livestock Inventory by Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL VALUE OF LIVESTOCK INVENTORY Cattle (%)	Sheep and Goats (%)	Swine (%)	Other (%)	Average Carrying Capacity[a]
North[b]						
0-.9	65	68	14	9	9	2.27
1-1.9	41	77	7	9	7	1.28
2-4.9	43	81	4	8	7	.51
5-9.9	11	92	3	3	2	1.07
10-19.9	7	84	6	4	6	.40
20-49.9	1	71	12	8	9	1.02
Total	168	80	6	7	7	1.41
Central[b]						
0-.9	37	67	13	12	8	.73
1-1.9	26	62	22	8	8	1.33
2-4.9	39	69	17	5	9	.49
5-9.9	36	65	20	3	12	.11
10-19.9	6	46	40	7	7	.61
20-49.9	2	94	-	2	4	1.42
50+	1	-	-	-	100	-
Total	147	69	17	5	9	.62
South[b]						
0-.9	30	75	12	6	7	5.05
1-1.9	25	78	5	6	11	.21
2-4.9	53	80	5	4	11	.21
5-9.9	30	87	-	3	7	.40
10-19.9	32	85	-	6	9	.05
20-49.9	27	83	12	1	4	.10
50+	10	87	8	1	4	.22
Total	207	83	7	3	7	.9

SOURCE: Survey EEAE.

a. Expressed in equivalent cow units per hectare of unimproved and inproved pasture.

b. Missing data: north 1 case; central, 1 case; and south 4 cases.

TABLE II-36

Value of Livestock Production by Type, Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL VALUE OF LIVESTOCK PRODUCTION Cattle (%)	Sheep and Goats (%)	Swine (%)	Other (%)
North[a]					
0-.9	65	70	10	11	9
1-1.9	41	76	7	8	9
2-4.9	43	63	2	18	17
5-9.9	11	85	3	7	5
10-19.9	7	96	1	1	2
20-49.9	1	71	4	22	3
Total	168	74	4	12	10
Central[a]					
0-.9	37	48	12	13	27
1-1.9	26	48	22	13	17
2-4.9	39	37	27	7	29
5-9.9	36	59	15	3	23
10-19.9	6	73	15	6	6
20-49.9	2	99	-	-	-
50+	1	-	-	-	-
Total	147	62	14	5	19
South[a]					
0-.9	30	51	15	9	25
1-1.9	25	81	2	4	13
2-4.9	53	76	5	11	8
5-9.9	30	87	-	5	8
10-19.9	32	66	1	16	16
20-49.9	27	79	11	9	1
50+	10	72	23	2	3
Total	207	76	8	9	7

SOURCE: Survey EEAE.

a. Missing data: north, 1 case; central, 1 case; south, 4 cases.

TABLE II-37

Production Costs by Type of Crop, Region and Size

Size of Production Unit By Region	(N)	PERCENT OF TOTAL COST Short Cycle Crops (%)	Permanent Crops (%)	Forage Crops (%)	Vegetables (%)	PERCENT OF TOTAL SHORT CYCLE Small Grains (%)	Corn (%)	Tubers (%)	Edible Legume Seeds (%)
North									
0-.9	65	99.7	0.2	0.1	70	2	8	17	3
1-1.9	41	88	11	1	42	1	25	20	-
2-4.9	43	88	11	1	44	1	20	20	3
5-9.9	11	99.4	0.6	-	34	3	9	52	1
10-19.9	7	87	13	-	23	-	3	60	1
20-49.9	1	100	-	-	-	-	-	100	-
Total	168	91	9	.4	37	1	10	41	2
Central									
0-.9	37	97	-	3	39	19	4	34	1
1-1.9	26	96	-	4	29	4	2	53	8
2-4.9	39	99	-	1	27	13	4	51	4
5-9.9	36	98	-	2	4	10	4	71	9
10-19.9	6	100	-	-	32	3	1	62	2
20-49.9	2	100	-	-	-	-	22	78	-
50+	1	100	-	-	-	-	-	100	-
Total	147	98	-	2	22	8	3	60	5
South									
0-.9	30	100	-	-	-	10	28	30	32
1-1.9	25	100	-	-	-	24	12	49	15
2-4.9	53	97	3	-	1	16	11	16	53
5-9.9	30	96	4	-	18	5	24	4	45
10-19.9	32	92	8	-	1	-	57	1	33
20-49.9	27	86	14	-	3	-	43	24	16
50+	10	93	7	-	-	4	40	11	38
Total	207	92	8	-	3	3	44	10	32

SOURCE: Survey EEAE.

Cash Expenditures for Agricultural Production by Type, Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL CROP COSTS					PERCENT OF TOTAL SHORT CYCLE				
		Hired Labor (%)	Hired Animal (%)	Hired Machinery (%)	Physical Inputs (%)	Other (%)	Hired Labor (%)	Food (%)	Vet Supplies (%)	Animal Purchases (%)	Others (%)
North[a]											
0-.9	65	21	6	2	58	13	-	34	7	57	2
1-1.9	41	32	12	8	47	1	-	27	12	60	1
2-4.9	43	21	4	4	46	25	16	24	5	51	4
5-9.9	11	22	1	2	72	3	-	36	2	61	1
10-19.9	7	31	.5	5	59	5	-	-	-	-	-
20-49.9	1	-	-	-	100	-	-	100	-	-	-
Total	168	25	3	4	57	11	9	28	6	54	3
Central[a]											
0-.9	37	7	13	19	53	8	-	6	4	90	.2
1-1.9	26	19	5	4	67	5	-	20	5	75	-
2-4.9	38	7	8	4	76	5	-	19	3	77	.5
5-9.9	36	13	6	11	67	3	-	13	4	83	.2
10-19.9	6	6	3	9	82	.4	-	26	22	52	-
20-49.9	2	15	-	7	78	-	18	13	4	65	-
50+	1	-	-	-	100	-	-	-	-	-	-
Total	147	10	5	8	74	3	6	14	5	75	.2
South[a]											
0-.9	30	27	28	-	43	2	-	30	3	67	-
1-1.9	25	30	10	-	55	5	-	21	1	78	-
2-4.9	53	18	26	7	47	2	-	10	5	85	-
5-9.9	30	27	16	11	44	2	-	20	9	63	8
10-19.9	32	43	2	20	34	1	40	8	7	45	.4
20-49.9	27	32	4	20	40	4	30	25	8	34	3
50+	10	41	36	-	14	9	9	16	24	45	6
Total	207	37	9	16	36	2	17	19	10	51	3

SOURCE: Survey EEAE.

a. Missing data: north, 1 case; central, 1 case; south, 4 cases.

Subsistence crops, such as basic grains and potatoes, predominate on the generally poor soils of the central and southern regions. Although these enterprises typically have peak labor requirements at planting and harvest, families usually do not hire much labor to produce them unless significant quantities are sold. It is quite evident in the central region that temporary migration of the men and older sons to work in other parts of the country tends to mesh fairly well with these periods of increased labor requirements. It also appears that the traditional forms of labor exchange among families remain somewhat more intact in the predomintly indigenous central region than in the mestizo regions of the province.

Hiring animal draft power, mostly oxen for plowing, is about as important as hiring labor in the northern and southern regions. This is particularly true on the smaller farms which do not have sufficient forage to maintain their own draft animals. Although tractors are rapidly replacing oxen in Chimborazo, the study shows that animal traction is still relatively more important. The small fields and rugged terrain impede mechanization in many parts of the province. And except for intensive vegetable-growing areas, such as Chambo, small-scale mechanization is quite limited.

2. Livestock Production Costs

Animal purchases accounted for most of the livestock expenditures in all three regions. (See Table II-38.) Since many small producers buy and sell livestock in accordance with the cropping cycle (to take advantage of available forage and provide operating capital), there is a fairly direct correlation between size of unit and animal purchases as a portion of livestock expenditures. Feed purchases followed in importance. Except for the medium size farms in the south, hired labor was not used very much in livestock operations. Veterinary services and supplies averaged less than 10 percent of total livestock expenditures for most size categories in the three regions.

E. Distribution of the Farm Products

An analysis of the distribution of farm products shows the degree to which study families were integrated into product markets. In addition, the study provided information on the nature of regional markets by product.

1. Distribution of Crops

Table II-39 shows that most crop production is sold. To be sure, the proportion sold tended to be directly related to size, just as the proportion consumed showed an inverse relationship to size. But only in the two smallest size categories in the south did the proportion of total crop production sold drop below 50 percent.

While production units under 10 hectares in size are hardly oriented strictly to subsistence production, the study showed considerable variation in their degree of market orientation. With the greater amount of vegetable production in the north, these farms tended to be more involved in both factor and product markets than their counterparts in the other two regions on the other hand, market participation amongst the medium size farms tended to be quite high in all three regions.

TABLE II-39

Distribution of Agricultural Production by Value, Region and Size

Size of Production Unit by Region	(N)	PERCENT OF TOTAL PRODUCTION								
		CROP				LIVESTOCK				
		Family (%)	Farm (%)	Losses (%)	Sales (%)	Family (Animals) (%)	Losses (%)	Sales (Animals) (%)	Family (Products) (%)	Sales (Products) (%)
North[a]										
0-.9	65	12	8	2	78	5	17	31	15	32
1-1.9	41	17	9	5	69	10	2	31	18	39
2-4.9	43	12	9	.5	79	8	10	27	18	37
5-9.9	11	5	9	.1	86	5	4	17	11	63
10-19.9	7	2	14	1	83	2	-	77	4	17
20-49.9	1	6	15	-	79	4	4	60	32	-
Total	168	8	11	1	80	6	7	37	14	36
Central[a]										
0-.9	37	35	6	2	57	9	21	6	19	45
1-1.9	26	19	11	5	65	8	.5	47	7	38
2-4.9	39	20	8	6	66	20	2	26	19	33
5-9.9	36	12	6	3	79	4	3	26	11	55
10-19.9	6	7	9	1	83	10	5	18	7	60
20-49.9	2	18	3	5	74	.2	4	2	2	92
50+	1	-	-	-	100	-	-	-	-	-
Total	147	16	8	4	72	7	4	21	10	58
South[a]										
0-.9	30	32	19	1	48	7	16	44	18	15
1-1.9	25	40	13	3	44	7	19	28	23	23
2-4.9	53	17	7	12	64	19	13	45	9	14
5-9.9	30	10	6	3	81	4	17	38	19	22
10-19.9	32	4	4	6	86	2	8	66	6	18
20-49.9	27	5	4	.3	91	4	4	36	4	52
50+	10	5	5	7	83	7	15	39	16	23
Total	207	7	5	4	84	7	10	43	9	31

SOURCE: Survey EEAE.

a. Missing data: north, 1 case; central, 1 case; and south, 2 cases.

The study showed that most crops were sold to intermediaries in regional market plazas. In the north, a very high percentage of crop sales is channelled through Riobamba. Some intermediaries with trucks purchase vegetables, potatoes, and apples at the farm level to sell in Guayaquil. Sales to intermediaries in local or village markets and at the farm level tended to be somewhat more prevalent in the central and southern regions. Very little crop production was marketed directly to consumers or through cooperatives in any of the three regions.

2. Distribution of Livestock and Livestock Products

Table II-39 also shows that most livestock and livestock products are sold. Taken together, sales of animals and animal products typically accounted for two-thirds or more of total livestock production, even on smaller production units. And while consumption of livestock products tended to be greater than that of animals for most size categories in all three regions, it usually did not exceed one-fourth of the total value of livestock production. The study revealed that animal losses were fairly significant throughout the province.

While most livestock sales were realized in local and regional market plazas in all three regions, the sale of animal products at the farm level to intermediaries for resale or to neighbors for direct consumption was much more common.

F. Income Analysis

1. Farm Income

As might be expected in a region dominated by farms too small to absorb the available family labor and provide basic family needs, farm income tended to be positively correlated with farm size. (See Table II-40.) Nevertheless, both gross and net farm income fell for the top size categories in all three regions.

The average gross farm income for the two smallest size groups (those with less than 2 hectares, accounting for 43 percent of the respondents) was remarkably similar for all three regions. The 1 to 2 hectare category earned about twice as much gross farm income as the less than 1 hectare group in the north and central regions. In the south, the 1 to 2 hectare group received nearly three times as much gross farm income as the less than 1 hectare group.

On farms above 2 hectares, the average gross farm income increased faster by size in the north than in the other two regions. Vegetable production is quite important on the 2-to-10 hectare units in the north.

Overall, crops were about three times as important as livestock in generating gross farm income in the north. In fact, the portion of gross farm income coming from crops increased with farm size. A similar pattern emerged in the south where, overall, crops were nearly four times as important as livestock in generating gross farm income. This proportion jumped to nearly 10 to 1 for the 10-to-20 hectare size group.

TABLE II-40

Farm Income Analysis by Region and Size

Size of Production Unit by Region	(N)	AVERAGE GROSS FARM INCOME Crops	Livestock	Total	AVERAGE FARM EXPENDITURES Crops	Livestock	Other[a]	Total	AVERAGE NET FARM INCOME
North[b]									
0-.9	63	10.633	4.938	15.572	2.679	628	3.069	6.377	9.195
1-1.9	39	15.724	9.916	25.640	2.543	1.394	7.791	11.728	13.913
2-4.9	41	32.525	17.026	49.551	7.840	6.161	15.628	29.629	19.922
5-9.9	10	85.100	20.361	105.461	30.910	9.230	38.700	78.840	26.621
10-19.9	7	290.743	53.200	343.943	62.023	-	47.407	109.430	234.513
20-49.9	1	116.100	35.050	151.150	13.620	2.500	41.150	57.270	93.880
Total	161	34.900	12.466	47.366	8.362	2.741	11.789	22.892	24.474
Central[b]									
0-0.9	37	4.291	4.909	9.200	309	876	2.796	3.981	5.219
1-1.9	26	18.201	9.526	27.728	3.518	917	3.861	8.295	19.433
2-4.9	38	18.422	8.366	26.788	3.048	811	4.370	8.229	18.558
5-9.9	36	26.290	32.840	59.130	4.961	4.096	8.737	17.795	41.335
10-19.9	6	54.927	24.354	79.281	18.768	1.917	7.755	28.440	50.841
20-49.9	2	22.325	233.990	256.315	22.130	68.000	83.020	173.150	83.165
50+	1	8.700	-	8.700	303	-	433	736	7.964
Total	146	18.229	17.422	35.650	3.798	2.617	6.147	12.561	23.089
South[b]									
0-.9	29	5.308	4.722	10.030	532	1.132	3.605	5.269	4.761
1-1.9	23	4.273	7.016	11.289	785	1.810	4.630	7.225	4.065
2-4.9	52	20.252	14.141	34.393	2.676	2.472	6.935	12.083	22.309
5-9.9	29	45.735	12.469	58.204	8.519	1.949	10.144	20.611	37.592
10-19.9	32	190.643	13.537	204.180	26.612	2.830	14.747	44.188	159.992
20-49.9	27	180.254	52.670	232.925	39.793	10.967	17.958	68.717	164.207
50+	10	167.050	31.560	198.610	32.617	18.179	60.644	111.440	87.170
Total	202	75.592	17.654	93.246	13.227	4.099	12.024	29.350	63.895

SOURCE: Survey EEAE.

a. Includes cash rent, irrigation payments, depreciation, interest and membership fees to producer cooperatives.

b. Missing data: north, 7 cases; central 1 case; and south, 5 cases.

On the other hand, livestock tended to be somewhat more important than crops in generating gross farm income in the central region. This is a particularly interesting finding in light of the relatively greater importance of agrarian reform activities in this region. The original haciendas of the region were heavily oriented toward livestock production, especially cattle and sheep. Despite the relatively poor soils of this region, it would appear that the agrarian reform program freed up enough land to the peasants to allow them to continue livestock activities and, initially at least, not be forced to sell most of their labor outside the region.

Net farm income followed a pattern similar to the gross concept in all three regions. It is interesting to note that the central region compared very favorably with the north and south in average net farm income for farms up to 10 hectares in size. This is partly the result of relatively lower farm expenditures in these groups in the central region. Total farm expenditures tended to be higher in the north where depreciation and interest payments were greater. Livestock expenditures constituted a relatively small portion of total farm expenditures in all three regions.

2. Family Income

As suggested by the occupational data, an income and analysis indicates that non-farm employment is a relatively more important survival strategy among rural families in the north than in the other two regions. (See Tables II-41 and II-42.) On the average, net farm income contributed only 40 percent of gross family income in this region. Wages and salaries were a close second, contributing on the average 30 percent of the gross family income, while commerce and artisan activities provided one-fourth. Indeed, the study data from the north suggest that farming has become almost a secondary occupation for most rural families in terms of its importance in generating gross family income. Since extensive land subdivision in this region goes back several decades and since the agrarian reform program was not very active in this part of the province, it is likely that non-farm employment has simultaneously contributed to and resulted from the large number of very small holdings. It is obvious that most rural families in this region perceive that they are better off clinging to a small parcel of land in the countryside and putting up with the uncertainties of the volatile artisan and labor markets than moving their families to the city. Should these non-farm employment opportunities dry up, the country's urban areas would undoubtedly be inundated with new waves of permanent rural-urban migrants.

Commerce and artisan activities as survival strategies were relatively insignificant for rural families in the central region, but wage labor was quite important. Most of the wages are earned as either temporary agricultural laborers or temporary construction workers. Except for the smallest size category and the one farm with more than 50 hectares, however, farming activities provided the most important source of gross family income. This is significant, especially in light of the fact that the averages for both gross family income and net family income compared quite favorably with the corresponding size categories in the north and south. Since the central cantones of Chimborazo have long been considered amongst the poorest in the nation and since the agrarian reform was especially intense in this region, it appears that the land redistribution efforts produced a positive effect on incomes.

TABLE II-41

Family Income Analysis by Region and Size

Size of Production Unit by Region	(N)	AVERAGE GROSS FAMILY INCOME					FAMILY EXPENDITURES	AVERAGE NET FARM INCOME
		Net Farm Income	Wages and Salaries	Artesan & Commerce	Other[a]	Total		
North[b]								
0-.9	63	9.195	17.149	16.303	1.967	44.613	27.493	17.120
1-1.9	39	13.913	21.155	14.069	2.913	52.050	32.336	19.714
2-4.9	41	19.922	23.444	10.686	3.005	57.057	38.527	18.530
5-9.9	10	26.621	6.664	42.640	1.300	77.225	42.402	34.823
10-19.9	7	234.513	3.586	686	19.014	257.799	58.724	199.075
20-49.9	1	93.880	-	-	-	93.880	64.000	29.880
Total	161	24.474	18.375	15.187	3.148	61.184	33.473	27.197
Central								
0-.9	37	5.219	22.227	8.049	1.702	37.197	25.908	11.288
1-1.9	26	19.433	12.885	1.589	2.400	36.307	26.359	9.949
2-4.9	38	18.558	13.087	1.447	1.216	34.308	21.602	12.706
5-9.9	36	41.335	11.994	1.125	8.428	62.882	26.222	36.660
10-19.9	6	50.841	2.267	3.000	-	56.108	28.333	27.774
20-49.9	2	83.165	-	-	52.500	135.665	83.650	52.015
50+	1	7.964	9.000	-	-	16.964	11.000	5.964
Total	146	23.089	14.446	3.100	3.972	44.607	25.733	18.874
South								
0-.9	29	4.761	29.415	3.310	1.966	39.452	29.732	9.720
1-1.9	23	4.065	10.590	-	4.226	18.881	33.206	-14.325
2-4.9	52	22.309	16.493	1.306	3.576	43.685	33.191	10.493
5-9.9	29	37.592	10.072	-	6.548	54.212	41.925	12.286
10-19.9	32	159.992	3.529	4.617	3.355	171.493	57.394	114.099
20-49.9	27	164.207	12.533	542	299	177.582	60.318	117.264
50+	10	87.170	432	-	6.500	94.102	62.090	32.012
Total	202	63.895	13.376	1.615	3.517	82.404	42.481	39.923

SOURCE: Survey EEAE.

a. Includes income received from rent, migrant children, sale of capital assets and inheritance.
b. Missing data: north, 7 cases.

TABLE II-42

Gross Family Income Analysis by Income Source, Region and Size

Size of Production Unit by Region	(N)	Net Farm Income Average %	Income from Wages & Salaries Average %	Income from Commercial or Artesan Activities Average %	
North[a]					
0-.9	63	21	38	37	4
1-1.9	39	27	41	27	5
2-4.9	41	35	41	19	5
5-9.9	10	34	9	55	2
10-19.9	7	91	2	.2	7
20-49.9	1	100	-	-	-
Total	161	40	30	25	5
Central[a]					
0-.9	37	14	60	22	4
1-1.9	26	54	35	4	7
2-4.9	38	54	38	4	4
5-9.9	36	66	19	2	13
10-19.9	6	91	4	5	-
20-49.9	2	61	-	-	39
50+	1	47	53	-	-
Total	146	52	32	7	9
South[a]					
0-.9	29	12	75	8	5
1-1.9	23	22	56	-	22
2-4.9	52	51	38	3	8
5-9.9	29	69	19	-	12
10-19.9	32	93	2	3	2
20-49.9	27	92	7	.3	.2
50+	10	93	.5	-	7
Total	202	78	16	2	4

SOURCE: Survey EEAE.

a. Missing data: north, 7 cases; central, 1 case; and south, 5 cases.

With the exception of the smallest farms in the south, which derived nearly all of their income from wages, farming activities constituted the major source of gross family income for respondents in this region. It should be pointed out, however, that farm income for this region was negatively affected by the extensive flood damage during the long and severe rainy season of 1982-83. And since temporary migrants of this region are especially oriented toward the export plantations on the coast, their off-farm earnings also suffered from the flooding. Moreover, many families in this region reported unusually high expenditures attributable to flood damages. These factors probably accounted for the low (and in one case, negative) net family income averages for the smallest farm size categories.

Despite all the limitations of attempting an income analysis among rural families, the data do point toward some general conclusions. In all but one size group (the farm with more than 50 hectares in the central region), the gross family income averaged above the official annual minimum wage for an urban worker in 1983 (28,500 sucres, or about US$315). While this level of income is hardly adequate to provide all the basic necessities for a family of five or six members, it may very well be more than many rural families could expect to receive initially by moving to a city.

It appears from the data that families must have a minimum of about 5 hectares of land before they can generate, from all sources, the equivalent of two minimum salaries for an urban worker, which was roughly the amount that would bring them into range of the "poverty line" in 1982. With 10 or more hectares, it appears that rural families in Chimborazo can compete quite favorably with the income earning capacity of unskilled urban workers.

Using net family income as a rough approximation of the savings potential for families, it appears that most of Chimborazo's rural families are living at or near the "break even point" or "zero level" of savings. In some years they may come out ahead; in other years, they probably dissave. Here again, 5 hectares of land seems to represent a threshold level below which family expenditures tend to be subminimal and the savings potential drops precipitously. In the north, 39 families (21 percent) registered a negative net income. The comparable numbers for the central and southern regions were 15 (15 percent) and 88 (39 percent), respectively.

The number of families earning 10,000 sucres (about US$110) or less of net income in the north, central and south, respectively, were: 96 (52 percent), 42 (44 percent) and 122 (54 percent). These negative and low positive net family income figures confirm the precarious nature of many rural families who walk a tight rope between mere survival and sheer existence. On the other hand, it is noteworthy that 20 (11 percent), 8 (8 percent) and 48 (21 percent) sample families in the north, central and south, respectively, earned at least 50,000 sucres (about US$550) of net income. This shows that some rural families-- those with access to reasonable amounts of productive resources--fare quite well in what is generally perceived as a very difficult environment. In the south where about one-fifth of the sample families earned 50,000 sucres or more of net income, one-tenth earned 100,000 sucres (about US$1,100) or more.

3. Income Comparison Between Reform and Non-Reform Sectors

Although the number of respondents in the reform sector in the north was quite small (2 former huasipungeros who had been given some land from the estate on which they had previously worked) and the sample size for the central region was only about two-thirds the expected number, the data suggest that rural families in the reform sector compare favorably with those from the non-reform sector on various income measures. (See Table II-43.) In the central region, average gross farm income for agrarian reform beneficiaries in the sample was more than twice that of the sample families in the non-reform sector. The difference was particularly noticeable in livestock production from which average gross receipts of beneficiaries was more than five times those of non-beneficiaries. While the difference in average gross farm income between the reform and non-reform sectors in the south was not as great as in the central region, the agrarian reform beneficiaries of the south still showed an advantage over the non-beneficiaries.

Average farm expenditures for beneficiaries in the central region was nearly three times that of the non-beneficiaries. The non-reform sector had higher average farm expenses in the south, but this difference was accentuated by high interest payments and livestock costs among three or four large non-beneficiaries. The secondary spending impact of agrarian reform programs is often overlooked. Yet, the available evidence from several countries suggests that once freed from the bondage of exploitative tenure relationships and given greater access to land and other productive means, agrarian reform beneficiaries become active and important participants in both factor and product markets. Unlike their previous landlords, who drained monetary resources away from the areas in which the former haciendas were located, the new beneficiaries tend to spend their increased income streams in the communities where they live and thus strengthen the backward and forward agricultural linkages in rural areas. A landlord based rural economy works against the creation of such linkages.

Average net farm income was considerably higher for the reform properties in both the central and southern regions. In the central region, agrarian reform beneficiaries on the average had more than twice as much net farm income as non-beneficiaries. Naturally, this higher level of net farm income in the reform sector means that the beneficiaries and their families do not have to sell their labor outside their production unit to the same degree that non-beneficiaries do. On the average, beneficiaries in the central region had only one-half as much salary income as non-beneficiaries. The corresponding portion of salary income for beneficiaries in the south was even less. On the other hand, the beneficiaries earned significantly more income than the non-beneficiaries from other sources, which included distributions from cooperatives. In both the central and southern regions, the average total family income and average family expenditures of beneficiaries exceeded that of the non-beneficiaries.

These findings also appear to be quite important. Contrary to popular opinions advanced by anti-reform interests, agrarian reform programs apparently can increase income and employment opportunities in the rural areas over and above pre-reform levels. The permanent and temporary exodus of rural people to the cities, at least in the first generation of beneficiaries, appears to be taking place among those who still lack reasonable access to

TABLE II-43

Farm and Family Income Analysis of Reform and Non-Reform Properties by Region

Size of Production Unit by Region	NORTH[a] Reform (N = 2)	NORTH[a] Non-Reform (N = 150)	CENTRAL[a] Reform (N = 38)	CENTRAL[a] Non-Reform (N = 100)	SOUTH[a] Reform (N = 50)	SOUTH[a] Non-Reform (N = 138)
Value of Gross Farm Production						
Crops	39.750	34.461	20.055	17.794	99.040	72.427
Livestock	10.253	12.858	42.180	8.321	15.662	19.778
Total	50.003	47.319	62.235	26.115	114.702	92.204
Production Costs						
Crops	8.743	8.610	5.771	3.253	13.504	14.051
Livestock	14.680	2.417	7.128	902	749	5.552
Other	11.475	11.912	11.466	4.428	9.500	13.691
Total	34.898	22.939	24.581	8.582	23.753	33.294
Net Farm Income	15.105	24.380	37.654	17.533	90.949	58.910
Family Income Sources						
Net Farm Income	15.105	24.380	37.654	17.533	90.949	58.910
Salaries	-	17.476	8.153	17.166	5.914	16.167
Artesan Commercial Activities	-	15.955	2.608	3.325	3.188	1.028
Other	-	3.375	12.021	1.108	1.618	4.091
Total	15.105	61.186	60.436	39.132	101.669	80.197
Family Consumption	18.200	34.645	29.687	24.482	49.850	41.269
Net Family Income	-3.095	26.541	30.749	14.650	51.819	38.927

SOURCE: Survey EEAE.

a. Missing data: north, 9 cases; central 8 cases (all reform properties); and south, 14 cases.

land and other productive means of production. Small wonder then that rural communities in the reform sector with relatively more stable populations and higher levels of local spending often show more vitality than communities in which the bulk of the resources are in the hands of a few and much of the work force must seek outside employment opportunities.

Finally, the data for the central region show the average net family income of beneficiaries to be nearly two and one-half times that of the non-beneficiaries. In the south, the average net family income of beneficiaries was 20 percent less than that of the non-beneficiaries. However, the reform families in this region averaged almost 10,000 sucres more in expenditures.

If we consider the net family income figure as a proxy for the families' ability to save, then the evidence once again points favorably toward land redistribution. Even in the south, the data suggest that agrarian reform activities have certainly not reduced the overall savings potential in rural areas. Given the fact that most of the interventions in this region are relatively recent, one can only expect the savings of beneficiaries to increase over time. Furthermore, the higher average expenditures among beneficiaries in this region no doubt include some investment activities such as the education of children and farm improvements. As long as rural people remain the victims of exploitative tenure and credit systems, they are reluctant parties to a continuous transfer of surpluses out of their communities.

Whether successive generations of agrarian reform beneficiaries will continue to have an edge over their non-beneficiary counterparts in the rural areas, however, remains to be seen. Reform efforts in the south are still too young to answer this question. However, some evidence from the central region--primarily from case studies and observations--suggests a polarized effect among the offspring of agrarian reform beneficiaries, which is not unlike that found in the rural population generally. Those beneficiaries who received more land and better quality land tend to educate their children more and help them become better established in non-farm occupations (such as commerce), while the children of families who received fewer benefits are more likely to be totally or partially engaged in unskilled work in both rural and urban areas.

V. Trends in the Agrarian Structure of Chimborazo: Summary

Although the past two decades brought widespread changes in the agrarian structure of Chimborazo, these changes were not completely unanticipated. Indeed, the 1964 CIDA study and others identified with considerable accuracy the direction, if not the magnitude, of many of these changes. Despite its sluggish beginning, the Agrarian Reform Program proved to be an important factor in the transition of the province's agrarian structure. However, it was by no means the only catalyst in this transformation. Many of the changes were already underway when the Agrarian Reform Program started. To a considerable degree, these changes helped to justify the specific reforms attempted. The evolution of Chimborazo's agrarian structure during the past two decades and its apparent directions today closely parallel changes elsewhere in Ecuador and in other parts of the world.

Thus, it is not surprising that the study verified that the traditional hacienda and its associated forms of tied labor have all but disappeared in Chimborazo. Land, labor and capital markets in the rural areas have become increasingly activated and complex as the heirs of the traditional landed gentry abandoned the countryside in favor of urban-based professions and the burgeoning peasantry sought a rural hedge against the vagaries of urban life. Meanwhile, growing urban markets for agricultural products--along with the widespread availability of new agricultural technology and the penetration of the countryside by urban-based bureaucracies--have virtually eliminated rural self-sufficiency. Consequently, the land is being subdivided at unprecedented rates and cultivated ever more intensively.

Perhaps the most salient features of the agrarian transition in Chimborazo over the past two decades are the increasing minifundization and proletariatization of the country side.

Minifundios and off-farm employment have become the norms throughout the province. According to our study, 88 percent of the farms in the northern region were under 5 hectares and only 40 percent of the gross family income came from farming. In the central region 70 percent of the farms were under 5 hectares and 52 percent of the gross family income came from farming. The comparable figures for the south regions were 52 percent and 78 percent, respectively.

Traditionally, artisan activities provided an important source of supplementary earnings--especially in the northern and central regions--but these products are being rapidly replaced by manufactured goods produced by urban-based, capital-intensive industries. Likewise, mechanization of the coastal agro-export industries and the emergence of surplus labor supplies in that region have virtually eliminated another traditional source of supplementary income for the Chimborazo peasantry.

Increasingly, rural families of Chimborazo depend on occasional service and construction jobs in Quito and Guayaquil along with agricultural day labor in the province. As artisan activities decline, women also work more outside the household as occasional farm laborers in the region and as domestic servants in the cities. And as husbands and older sons devote ever more time outside the household to sustaining their families, women and daughters have assumed a growing responsibility for maintaining the household farming operations. Of course large numbers of peasants and their families continue to abandon the Chimborazo countryside permanently as the land resources run out and the off-farm employment opportunities dry up.

If the agrarian transition has either expelled or kept most rural families at the margin of poverty, it has been quite benign to others. In particular, a significant group of rich campesinos and small to medium farmers who managed to acquire and hold on to at least 10 hectares of good land are now benefiting from public rural development projects in combination with cheap labor and a growing demand for food. While evidence of sustained individual accumulation at the lower end of this size spectrum is weaker, these families nevertheless are educating their children and investing in urban assets. These with larger farms -- whether modernized remnants of defunct haciendas or successful climbers -- are clearly the major beneficiaries of the new agrarian structure which still favors those who control the most productive resources.

Tragically, our study suggests that very little of the private accumulation generated by these successful adapters is being captured and retained in their rural communities.

To be sure, rural services such as health and education have improved immensely. Home conditions, clothing and diets have, on the whole, taken turns for the better. Rural electrification, together with improved communication and transportation systems, have brought new lifestyles to the once isolated countryside. Many of these improvements have been brought about through external infusions of public revenues. But like the modernization of agriculture, they ultimately mean greater dependency and need for family income. Short of massive public transfers to create jobs and to reverse environmental degradation in the rural areas of Chimborazo, the prospects for increased production and income do not look good.

So, while there are notable improvements in housing and social infrastructure, very little economic surplus is being returned to the land and to rural communities. The new farmers are investing liberally in the education of their children and improvements in levels of living, but few are sanguine about the future of the countryside. Rural villages reflect this prevailing attitude. They show a declining vitality as their citizens reach ever farther for their sustenance and as the terms of trade between countryside and city continue to deteriorate.

VI. Possible Policy Responses to Structural Problems

Many of the problems left over from the old agrarian order as well as those generated by the recent agrarian transition could only be solved through massive public commitments. These are simply out of the question in the present economic and political context. Nevertheless, we feel that some of the problems could be mitigated within the present institutional and financial constraints. The following policy suggestions are quite modest. They reflect regional differences within the province. We think that many of them could be implemented with provincial resources.

The Northern Region

There are still some medium sized private holdings in the northern part of the province which, under careful soil and water management practices, could be used more intensively than they presently are. However, most of these units already meet the spirit of the law in terms of present usage. Others could not sustain the intensive cropping practices characteristic of most of the smaller farms in this region without suffering irreversible soil deterioration. Above all, the amount of land suitable for intensive cultivation and potentially available for redistribution is far below the amount needed to counteract the extreme minifundization process in the region.

The northern cantones of Chimborazo are still important in the production of horticultural crops for the province and beyond, and to a lesser extent, in the production of milk and pork for the local market. However, the diminutive size of most of the holdings and the exaggerated land values in the region

mean that the majority of peasant families have few prospects for sustaining themselves with farm production. Off-farm employment is critical to most families. Since the traditional artisan activities of the region are threatened by urban-based manufacturing and since off-farm employment opportunities in agriculture can't begin to absorb the potential labor supply on the region's minifundios, the survival of most families hinges upon employment opportunities in Riobamba, Quito, and Guayaquil. The Integrated Rural Development (DRI) and FODERUMA programs in the region properly recognize the potential of building a sustainable small-scale farm economy in the region based on a combination of intensive on-farm enterprises and off-farm employment opportunities. From a policy standpoint, this seems highly preferable to having these families abandon the region altogether for urban slums.

It does not appear that IERAC has an important role to play in such areas. Aside from performing some continual "clean-up" activities to give peasants clear titles to their land and keeping pressure on the medium and larger producers to use the land to its agronomic capacity, the Institute probably ought to concentrate its human and financial resources elsewhere. In order to carry out these activities in an efficient and rational manner, specific studies of titling problems on the minifundios and production on the larger holdings will be needed.

Two commonly mentioned policy responses to the structural problems of this region do not appear to be very fruitful. These are consolidation of the minifundios and conversion of some private medium and larger holdings into production cooperatives. The minifundio problem is intricately related to reduced employment opportunities and other problems in the larger economy. To consolidate the highly fragmented parcels of the minifundios might very well enhance their efficiency. But as long as their creation is driven by external factors, the potential benefits are likely to be far less than the associated costs.

While many of the medium sized farms may very well be producing below socially optimal levels, the environmental constraints on these units are simply too severe to permit a wholesale conversion to intensive agriculture without employing strict soil and water conservation practices. Where that is feasible and where units are being substantially underutilized or poorly managed under absentee ownership, expropiation and redistribution ought to be seriously considered. At the same time, it would have to be made clear that those units being managed with good economic and technical practices by resident owners would be fully protected.

Given the problems associated with production cooperatives in this region, such an option may not be the best alternative for any new reform units. Evidence from case studies indicated that many of the cooperatives are plagued with management and production problems. In addition, extreme land pressures in the region invite a violation of the "commons principle" which, in turn, means more rapid environmental degradation. And finally, the promotion of common property resources for collective production activities in an economy overwhelmingly oriented toward a capitalistic mode of production creates contradictions which are difficult for campesinos to deal with. As a consequence, many production cooperatives throughout the country are undergoing de facto subdivision into individual parcels.

The Central Region

The central part of Chimborazo presents a somewhat different set of problems for IERAC. There, the reform activities were the dominant influence in changing the agrarian structure. While it is still early to assess the full impact of these reform actions, evidence from the study points to some very positive economic and social consequences. The reform was critical in opening up many heretofore closed communities and helping to integrate the largely indigenous population into the wider economy and society. At the same time, the replacement of the traditional hacienda system with a peasant market economy has seriously taxed the fragile natural resource base of the region. Vast areas have been irreversibly destroyed or are on the verge of complete destruction. Indeed, it seems doubtful whether the destructive processes can be arrested before they destroy the entire region. If the region is to be saved for productive farming purposes, IERAC must play a central role. The páramos and other fragile environments must be carefully managed with fairly limited agricultural use. The only two feasible immediate land use options for these areas are controlled grazing and forestry which, at the risk of interjecting new forms of paternalism, will initially require outside assistance and supervision. If these areas are destroyed, the lower areas, which are intricately connected to the high mountains and páramos, will also be threatened with destruction.

Fortunately, only a few areas in the central part of the province suffer the same demographic pressure affecting most of the northern region. Nevertheless, the study shows a strong tendency toward subdivision of the land on both private and collective reform properties. Perhaps to an even greater degree than in the northern region, the largely indigenous population of the central cantones cling tenaciously to the land in the face of precarious opportunities elsewhere in the economy. Until these opportunities are improved, it is doubtful whether IERAC can forestall the accelerated fragmentation of rural properties.

IERAC's efforts to "clean up" the agrarian reform process in the central region should be continued. A large number of families still do not have clear titles to their land and therefore do not qualify for institutional credit and other essential inputs. This effort should be combined with some serious rethinking and reorganization of the collective properties and other campesino organizations created by the reform process. The study shows that many of these organizations have virtually collapsed in the face of strong pressures for individually owned properties. The Institute needs to study these organizations carefully to see which ones are functioning well and what, if anything, can be done to strengthen those that aren't. The internal struggle which is taking place in many of these organizations has contributed to a deterioration of the Institute's image in this region.

While it would be naive--and perhaps even counterproductive -- to resist the strong trend toward individualization of collective properties (a trend certainly not unique to Ecuador), it would also be a mistake to abandon collective enterprises completely in favor of individual ownership and management. Evidence from the northern cantones of Chimborazo suggests that such a transition in the face of limited opportunities for the rural masses outside their communities of origin would invite an uncontrollable minifundization and intensified use of the region's fragile, deteriorating

land base as peasant families seek to maintain a security blanket in the countryside. In order to retain any economies of scale and foster the social benefits associated with collective enterprises, the Institute must bear the burden of providing both the carrot (economic incentives) and the stick (the legal framework) for collective action.

Of course this burden should and must be shared with other public and private agencies working in the region. Scarce resources simply do not permit a fragmentation and duplication of rural development efforts. The Institute faces an especially difficult challenge in working with the diverse religious groups which have already led to a strong social polarization of the region.

Another sensitive problem--and opportunity--is that of local taxation, which involves close cooperation between IERAC and DINA to seek an appropriate and just means of generating funds for local infrastructural development. The present system does not provide an effective means for capturing economic surpluses and channelling them into local development projects. Rural people remain primarily at the mercy of the national government for development funds which are constantly threatened by economic crises and political demands elsewhere. Those projects which are undertaken are typically administered in bureaucratic fashion with little or no involvement of local people in decision-making and implementation.

It also appears that the central region could benefit from some restructuring of properties within the former haciendas to ensure better land use and improve agricultural production. While most of the recent land redistribution efforts have been based on sound land use planning principles and complete land surveys, many of the earlier interventions were simply de facto titling operations in which property boundaries weren't always well delineated. Many of the huasipungos were located on very marginal land to which tenants had received usufruct rights from their former patrons. While there may not be any more haciendas available in the region for redistribution, there still appears to be some flexibility within the reform sector to "clean up" the reform process.

The Southern Region

The reform efforts in the southern part of the province are also too recent to permit a full assessment. However, as in the central region, the study suggests that these activities are producing positive economic and social benefits. Although the predominant property type in this region is the minifundio and land subdivision is proceeding at an accelerated rate, the region still has somewhat more flexibility than the northern and central regions. This means that IERAC has a greater opportunity to carry out land reform measures which mesh human needs with environmental constraints. Except for some of the areas in the temperate climate, the land in this region is quite fragile. As the region opens up to greater commerce and the economy shifts from predominantly livestock to more cropping activities, the soils are likely to be subjected to greater abuse. With good soil and water conservation measures and other essential support services, the region could support very productive systems of small and medium-scale agriculture oriented toward the Guayaquil market.

Many of the temperate areas in this region are still quite isolated. And some of the slopes connecting these areas with the sierra are far too steep to support any type of sustainable farming activities. Nevertheless, the intensive agriculture found in some of the more populated temperate areas demonstrates the enormous potential of these and similar areas for supporting a productive economy of small and medium farms. Obviously, IERAC has an important role to play in the future of these areas.

VII. Some General Conclusions

In general, the field study, observations and case studies reconfirm the findings from other post-reform studies in Latin America. In those areas where reform activities were significant, the first generation beneficiaries show a decided improvement in farm production, family income and general welfare. Their children also tend to fare better, but in direct relationship to the level and quality of benefits received.

Equally important, the study shows some positive benefits for the communities affected by agrarian reform programs. The increased income flows to beneficiaries result in greater local expenditures which, in turn, improve local economies. Many of these expenditures represent more education, better health and nutrition and improved shelter. Typically, the beneficiaries also demonstrate more pride in their work and a more optimistic outlook on life. Today, in places like Guamote, ex-huasipungeros and their families, many still dressed in traditional clothing and speaking predominately Quichua, turn out in large numbers to watch their children participate in school events. It is very doubtful whether these families would be participating in such mainstream activities had there not been an agrarian reform.

On the other hand, there can be no doubt that the agrarian reform could have done more, had there been more public support and less resistance. The reform certainly didn't eliminate the gross inequities in the agrarian structure of Chimborazo. If the semi-feudal estates and their tied labor force no longer exist, thousands of rural families still live on the brink of poverty, lacking sufficient resources to eke out a decent living. And even those families who have benefitted more from agrarian reform and rural development activities show little inclination to invest any economic surpluses in their communities.

Short of a very drastic agrarian reform coupled with massive rural development efforts to provide complementary inputs and protect the natural environment, the province probably does not presently have enough good land and other resources to ensure a reasonable level of living to all its rural citizens. This means that further agrarian reform efforts similar to those of the past can only reduce the misery, but certainly not do away with it. Above all, the present dilemma of limited public support for agrarian reform and a growing crisis in the countryside should not be an excuse for doing nothing.