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A RESEARCH PAPER

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A CASE STUDY OF THE LOWER COCHABAMBA VALLEY: EX-HACIENDAS PAROTANI AND CARAMARCA

by
JOSEPH F. DORSEY

LAND TENURE CENTER

AN INSTITUTE FOR RESEARCH AND EDUCATI(ON SOCIAL STRUCTURE, RURAL INSTITUTION RESOURCE USE AND DEVELOPMENT

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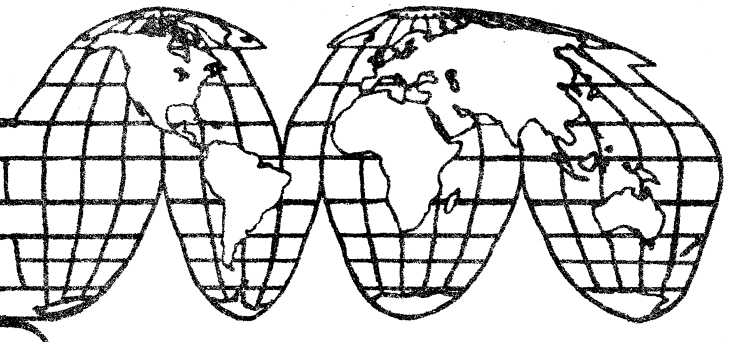
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PREFACE

My first response was skepticism when Drs. Thomas Carroll and Shlomo Eckstein proposed case studies as one of the main tools of investigation for a comparative study of land reform.* However, availability of trustworthy base data and background material and analysis of the LTC-CIDA team, particularly a case study by Carlos Camacho Saa, permitted confirmation of economic and social trends at two separate moments in time during the post-reform period. Furthermore, similar findings from the Toralapa case study** in an area 80 kilometers distant, field interviews on the Altiplano, and macro-level data confirming many of the trends found in the case study observed here have convinced me of the effectiveness of the case study approach when base data are available.

Methodology and the availability of base data were suggested by Katherine Barnes von Marschall, who had worked in the original LTC-CIDA study. With the help of Luis Calderon S., Director of the Sección de Investigaciones Sociales, and staff research worker Juan Torrico A., original questionnaires from the 1967 study of Parotani and Caramarca were retrieved from the archives of the Consejo Nacional de Reforma Agraria and copied (by hand!) by Paz Soto Dorsey. An identical questionnaire was duplicated with the help of Roxana Castillo D. and Pedro Guachalla from CNRA. With the approval and support of Coronel Amadeo Saldias C., President of the Consejo, Juan Torrico and I went to Cochabamba, where we were fortunate to secure the cooperation of Hernán Torres Quiroz, who had done the interviewing on the original questionnaires. His help was crucial because 1) the two months allotted for field work left no time for training field workers, 2) Torres was best able to duplicate the way questions had been asked in 1967, and 3) the campesinos would be more willing to respond to an interviewer with whom they had had contact before than to a stranger, particularly a foreigner. Interviews were conducted in Quechua in July and early August

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*R.P.O. 280, "Comparative Experiences in Land Reform in Latin America," funded by the International Bank for Reconstruction and Development.

**"A Case Study of Ex-Hacienda Toralapa in the Tiraque Region of the Upper Cochabamba Valley" (Madison, Wis., 1974). This study is part of the same research project. Data were gathered immediately after completion of interviews in the Lower Valley.

1973. Wherever possible, the original respondents from the 1967 interview were located and reinterviewed; otherwise, those currently controlling the land they had worked were interviewed. Some of the analysis is conducted in purely panel terms, that is, including only the original respondents reinterviewed in 1973. The regression analysis includes all individuals in the two groups.

Field work and computer analysis were supported by the World Bank and writing sponsored by the Land Tenure Center. Dr. William Thiesenhusen gave generously of his time in reading, criticizing, and helping revise the manuscript. Stephen M. Smith, Research Associate in the Agricultural Economics Department (University of Wisconsin-Madison), also read and criticized sections of the manuscript. Jane Dennis organized and typed the paper and John Padgett did the mimeographing in record time.

I would like to thank everybody who helped make this study possible, particularly William Thiesenhusen and Jane Dennis, who did all they could to improve the manuscript. What errors remain are mine--and I have found one or two which will be corrected when the study is rerun. In the meantime, I would like to extend my appreciation to the cooperating institutions, the Sindicatos of Parotani and Caramarca, the Consejo Nacional de la Reforma Agraria, the Comparative Experiences in Land Reform project of the World Bank, directed by Shlomo Eckstein, and the Land Tenure Center of the University of Wisconsin.

TABLE OF CONTENTS

		Page
I.	Natural, Historical, and Economic Setting	I.1.
	A. The Natural Setting and Principal Markets	
	B. Ecology and Natural Resources	I.1.
	C. Demographic, Economic, and Social Makeup of the Area and Ex-Haciendas	I.3.
II.	Pre-Reform Tenure Situation	II.7.
	A. Pre-Reform Tenure Structure	II.7.
	B. Pre-Reform Economic Structure	II.8.
	C. Pre-Reform Land Availability and Use	II.10.
	D. Pre-Reform Labor Availability and Use	II.11.
	E. Pre-Reform Income Levels and Distribution	II.13.
	F. Pre-Reform Social Infrastructure	II.14.
III.	The Land Reform Process	III.17.
	A. Sindicato Formation and the Initiation of Land Reform	III.17.
	B. Production and Distribution in the Period of Campesino Supremacy: The Failure of Coooerative Production	III.18.
	C. Consolidation and the Reassertion of the Rights of Landlords	III.21.
	D. Changes in the Sindicato Structure in the Post-Reform Period	III.22.
IV.	Economic Situation in the Port-Reform Period	IV.26.
	A. Land Tenure in the Post-Reform Period	IV.26.
	Land Tenure in the Reformed Sector	IV.26.
	Land Tenure in the Ex-Hacienda Estates	IV.29.
	B. Changes in Crops and Intensity of Land Use in the Post-Reform Period	IV.33.
	Changes in Cropping Patterns	IV.33.
	Changes in the Intensity of Land Use	IV.39.
	Changes in the Value of Per Hectare Farm Output	IV.45.
	C. Technological Change in the Post-Reform Period	IV.48.

		Page
IV.	D. Levels of Income and Standard of Living in the Post-Reform Period	IV.53.
	Determinants of Gross Farm Income	IV.53.
	Degree of Market Integration (Supply Side)	IV.66.
	Degree of Market Participation (Demand Side)	IV.68.
	Investment in the Post-Reform Period	IV.71.
	Standard of Living in the Post-Reform Period	IV.73.
V.	Social Infrastructure, Government Services, and Political Changes	V.78.
	A. Health Care Programs	V.78.
	B. Education in the Post-Reform Period	V.79.
	C. Governmental Programs Supporting the Reformed Sector	V.84.
	D. Taxes	V.86.
	E. Political Changes in the Post-Reform Period	V.87.
	F. Changes in Traditional Practicss	V.89.
VI.	Conclusions	VI.93.
Appendix 1		
Bibliography		

		Page
Table 1.	Compañía on Caramarca and Parotani (1967)	IV.28.
Table 2.	Percent of Land in Various Forms of Land Tenure, by Pre-Reform Occupation	IV.29.
Table 3.	Value of Gross Farm Production/Hectare	IV.32.
Table 4.	Land Holdings and Land Use for Traditional and Non-Traditional Products: Paired Comparisons Between 1967 and 1973	IV.36.
Table 5.	Hiring of Wage Labor by Ex-Colonos and Ex-Miners on Parotani, 1967 and 1973	IV.41.
Table 6.	Work as Day Laborer by Farm Size on Parotani	IV.42.
Table 7.	Migration Related to Amount of Land Owned in 1973	IV.43.
Table 8.	Migration Related to Total Family Income in 1973	IV.44.
Table 9.	Percent of Available Land Cropped: Caramarca	IV.47.
Table 10.	Comparison of 1967 and 1973 Average Production and Product Nominal Prices	IV.47.
Table 11.	Percentage of Farmers Using and Cash Value of Chemical Fertilizer	IV.50.
Table 12.	Hiring of Oxen	IV.52.
Table 13.	Consumer Price Index, La Paz	IV.63.
Table 14.	Mean Income Levels of 1967 and 1973	IV.63.
Table 15.	Components of Gross Farm Income	IV.67.
Table 16.	Marketed Production as a Percent of Total Production	IV.69.
Table 17.	Market Participation	IV.69.
Table 18.	Consumption Purchases as a Percent of Total Consumption Related to Farm Size	IV.70.
Table 19.	Acquisition of Consumer Durable Goods in the Pre-Reform and Post-Reform Periods	IV.75.
Table 20.	Average Family Holdings of Various Household Durable Goods	IV.76.
Table 21.	Value of Household Durable Goods	IV.76.
Table 22.	Education Levels by Age and Sex	V.81.
Table 23.	Farm Income by Education of Head of Household, 1973	V.82.
Table 24.	Commercial Income by Education of Head of Household (Parotani)	V.83.
Table 25.	Mean Consumption of Coca in Pounds	V.91.

AREA: LOWER COCHABAMBA VALLEY EX-HACIENDAS:
PAROTANI, CARAMARCA

I. Natural, Historical, and Economic Setting

A. The Natural Setting and Principal Markets

The Lower Valley is located southwest of Cochabamba at an altitude of about 2,500 meters. The Valley floor is broad and extremely flat between Cochabamba and Quillacollo; its downward slope becomes more noticeable and the space between the surrounding hills narrows south and west of Quillacollo where the two ex-haciendas of the case study are located. The Lower Valley is traversed by the main road and railroad from Cochabamba to Oruro and La Paz. Until a few years ago, the Department of Transportation maintained a toll station at Parotani, which made possible direct sales of farm products to consumers stopped there. The trains still stop at the station located in Parotani. Caramarca is somewhat more isolated, lying off the main road and across a river which in the past has been impassable for two to three weeks a year; the degree of isolation has declined somewhat in recent years with the construction of a bridge connecting the farm with the main road.

Since before the Revolution, marketing has been carried out at twice weekly fairs at Quillacollo, Vinto, and Cochabamba. The Quillacollo market for the most part handles traditional products such as potatoes, corn, wheat, etc., while vegetables and truck garden crops which have gained in importance since the Revolution (carrots, onions, sweet corn, etc.) are marketed at the fairs at Vinto. The Cochabamba market handles products of all kinds. These were also the principal markets in the pre-reform period.

B. Ecology and Natural Resources

The relatively higher income levels achieved by campesinos in the Lower Valley are made possible by the combination of fertile soil, replenished periodically by alluvion, and the plentiful supply of water for irrigation in most of the region. Parotani, for example, is bounded on two sides by rivers, and enjoys virtually unrestricted irrigation. The same is true of Caramarca and the vast majority of the irrigated farms in the Lower Valley. During those times of the year when the rivers are carrying a heavy load of

silt, campesinos on both case study farms as elsewhere in the Valley divert the silt-ladened water into sections of their fields in a centuries-old process of alluvion which in some places has raised the fields up to two meters above the level of the river. There is some trade-off between the benefits provided by irrigation and alluvial renewal of topsoil and the loss of fertility of the soil through the increasing mineralization and salinity, which in Itapaya (located across the river from Parotani) has already led to the loss of 40 hectares which can no longer be farmed because of the high level of salinity.*

Winter flooding is also a serious problem in the irrigated land of the Lower Valley. Considerable labor and expense is required to build and maintain levees to protect the fields from destruction. Some enterprising individuals have increased their landholdings considerably by building levees further out into the river bed and filling in behind them with topsoil. However, in years of heavy flooding, such as this past year, none of these precautions may be sufficient to protect the fields from the ravages of the rivers.

Cropping patterns have changed considerably since 1953 and at present are largely dictated by the quality of the land and amount of water available. Because of the latitude and relatively low altitude of the Valley, year-round production of most vegetable crops is possible. On campesino-owned land, two crops a year of onions, carrots, or other garden vegetables is the rule, and some more enterprising individuals are able to produce three crops on irrigated land. Some irrigated land has been put into orchards, especially by landlords who have succeeded in retaining part of their original haciendas, apparently because of the lower intensity of labor usage on these crops. Seasonally irrigated land is frequently used for alfalfa for dairy farming or for the production of sweet corn, while dry land is used in the production of traditional products such as dry corn, wheat, and other grain crops.

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*A partial solution to this problem in less serious cases is liming, which is not done because of its high cost.

C. Demographic, Economic, and Social Makeup of the Area and Ex-Haciendas

Just over 70 percent of the 490,000 people that the 1950 census* showed to be living in the Department of Cochabamba were listed as rural. Of these 344,000, perhaps a little more than one-third lived in the Lower Valley. Since 1950 the population has approximately doubled, although exact figures are impossible to ascertain until a new census is taken; in any case, there are probably 250,000 people in rural areas of the Lower Valley. The breakdown of the population by tenure type can only be estimated roughly. Landlords and their families constituted probably less than 5 percent of the population in 1950, based on the number of farms in the department operated under the colonato system (all haciendas used that system), times five, divided by the rural population; the actual figure arrived at was 3.5 percent, with the assumption that there were no major differences between the Upper and Lower Valleys in terms of the proportion of landlords in the total population. Piqueros,** or small holders, constituted about 30 percent of the population[1] (assuming that their numbers were approximately proportional to the amount of land they are estimated to control), while colonos and jornaleros constituted the remaining 65 percent. There were virtually no arrimantes, landless farm workers common elsewhere in Bolivia, who lived with a colono and helped fulfill his labor obligations to the hacienda in exchange for food, shelter, and a small part of the colono's sayaña or pegujal.

In addition to the owner, 41 colonos and an undetermined number of jornaleros or day laborers in the alcohol factory (probably equal in number to the colonos) were permanent residents of Parotani. Following the reform, there were about 75 ex-colonos and jornaleros, 47 ex-miners, and about 50*** individuals who supported themselves either by day labor or by rental or sharecropping of land.

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*The only census since 1900.

**Described in greater detail in Section II-A, p. 7.

1. Camacho Saa, Estudio de caso en el Valle Bajo de Cochabamba (Caramarca, Parotani, Itapaya) (La Paz: SNRA, January 1971).

***This figure is my own very rough estimate since no census was taken.

On the part of Caramarca still in the hands of the landowner in 1953, 33 ex-colonos and 7 ex-miners resided. On other parts of what had originally been part of Hacienda Caramarca, 350 piqueros lived on small plots of land which they had purchased at one time or another from the hacienda.

At the present time, piqueros probably still constitute about 30 percent of the population. Landlords and their families probably represent about half their former percentage. Although most farms were declared "medium-sized farms" or "agricultural enterprises," classifications which under the Agrarian Reform Law permitted landlords to retain part or most of the land worked by the hacienda, in many cases, such as that of Parotani, the campesinos refused to allow them to return to their land and instead made arrangements to buy it from them. The proportion of piqueros has probably declined to a little less than 30 percent of the population. There is a growing number of landless campesinos, who probably constitute about 10 percent of the population of the region; members of this group work up and down the Valley as day laborers both for landlords (who have kept part of their land) and for campesinos (who periodically require additional labor, beyond what their families can supply, to plant and harvest crops in as short a time as possible). Miners came into the Lower Valley as leaders of the sindicato movement and settled on ex-hacienda land received through the Agrarian Reform or purchased land from landlords. On the two ex-haciendas there are 57 miners out of a total of 513 heads of family, or just over 10 percent. However, the figure for the Lower Valley as a whole is probably closer to five percent. It should be emphasized that during the reform period and to a lesser extent even now, they exercise and influence power far in excess of their numbers. The remaining 55 percent of the population is constituted by campesinos who have received land through the Agrarian Reform, or are children of those who have received land.

Campesinos of the region are among those receiving the highest levels of rural income in the country, although still lagging behind urban workers in average earnings. Per capita incomes measured at 1973 prices exceed US$100. Laborers receive wages which average $b. 15 (US$.75) a day, which is as high or higher than any other region of the country, with the possible exception of colonization regions. As would be expected, the standard of living of campesinos in the Lower Valley reflects their relatively high

income. Two-story houses, some of which are stuccoed, most of which have zinc or tiled rather than thatched roofs, reflect the economic status of their inhabitants. Campesinos in the area are purchasing an increasing number of consumer semi-durable goods, such as household furniture, bicycles, metal beds, radios, sewing machines, and so forth. Piqueros, who before the Revolution constituted the highest social level of those who were personally engaged in the physical work of farming, are finding it increasingly difficult to maintain their status as a group differentiated from campesinos now that they too own land. The economic position of the farmer-miner is generally somewhat better than that of campesinos in the same community, which if anything has heightened the resentment campesinos still feel toward ex-miners as a group. Where they have been able to retain part or most of the land worked by the hacienda, ex-landlords have succeeded in re-establishing their influence over most of the piqueros, who, as they did before the reform, still look to the patrón for leadership. To a lesser extent, they have been able to maintain continued influence over their ex-colonos, as in Caramarca, where labor relations of a kind which the land reform pretended to abolish have reasserted themselves, though on a lesser scale.* Although not part of the community in the two farms on which attention will be concentrated, the group whose status was lowest in the pre-reform period, ex-colonos of haciendas in the upper reaches of the Valley, who are referred to disparagingly as "laris" (which can be approximately rendered as "hillbillies"), remain at the bottom of the social pyramid in the Lower Valley, occupying a position even lower than that of most landless laborers, another group with low status in the region. Thus, in addition to income, geographical factors, control over land, pre-reform status, and the manner by which an individual gained title to his land are all factors in determining his present status in the society of the Lower Valley.

Differentiation of social status on the basis of racial distinction ("indios, mestizos, blancos") which is physiologically without foundation in rural Bolivia, has virtually disappeared. Since the reform, the

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*The exchange of labor for the use of alfalfa pasture.

disparaging term "indio" has been replaced by the more neutral one of "campesino." However, vecinos (piqueros and residents of small rural towns not engaged in agriculture) still differentiate between themselves and campesinos, either on the basis of their residence in urban hamlets or on their adquisition of land by paying for it or inheriting it rather than receiving it through decree of the National Agrarian Reform Service (SNRA); however, even these differences are being eroded as campesinos build new houses, vecino style, by the main road in an urban-type arrangement, and as they acquire all or part of their land from the former patrón by purchase, just as piqueros had done. The erosion of these differences, which the campesinos by their own actions attempt to speed up, makes it very difficult for vecinos to maintain their former superior status. The highest position on the social pyramid is still retained by those landlords who have retained and continued to work part of their land, although some of the most galling manifestations of their position (kissing of hands of "whites," corporal punishment, unpaid personal service) have been abolished by the reform.

No mention is made of community Indians, since their importance in the entire Department of Cochabamba is negligible (unlike the Altiplano), and in the Lower Valley their communities had been absorbed by the haciendas long before the Revolution of 1952.

II. Pre-Reform Tenure Situation

A. Pre-Reform Tenure Structure

The hacienda which had been the dominant feature of the land tenure system in the Lower Valley during the nineteenth century had already begun to disintegrate by the second decade of the twentieth century. The haciendas there were smaller than elsewhere in Bolivia, and a higher percentage of the landlords resided on their haciendas than in the rest of the country where the pattern was one of absentee ownership. In the rest of the country, land sales were virtually limited to transfers between landlords of the same social class and usually involved the sale of a piece of property as a unit or at least did not involve its division into many small units. However, in the Cochabamba Valley, this had ceased to be the case by the middle of the 1920s, and landlords were increasingly finding that division of land into small units for sale to their own colonos or to other neighboring small farmers provided returns significantly higher than those attainable from the sale of the same amount of land as a unit to another patrón. (In the case of a sale of this type on Caramarca, one motive was to decrease the number of colonos on the estate to permit the change to a dairy and fruit orchard type of operation, which required less manpower.) This erosion of the hacienda system resulted in the formation of piquerías, or areas of small holders, which probably constituted about 30 percent of the area of the Lower Valley by 1952.

On the haciendas, the organization of land tenure and labor relations was unified under the colonato system. Under this system, in exchange for a small plot of land (1/3 hectare on Caramarca and one hectare on Parotani), colonos were obliged to provide a set number of days of unpaid labor each week to the hacienda. These amounts of land were small enough that the colonos and their families were able to till them under the prevailing system of traditional crop production without the need for additional labor. Division of the land between that farmed for the benefit of the hacendado and that farmed for the benefit of the colonos was highly unequal. According to information gathered by the LTC-CIDA team from ex-colonos and from the former landlords and hacienda records, the hacienda had control over

88 percent of the land on both Caramarca and Parotani with the remaining 12 percent divided into the pegujales (usufruct plots) of the colonos.[2] Perhaps the average amount of land campesinos had access to on the haciendas was slightly higher than the 12 percent, since the same report gives a figure of 21 percent for another nearby hacienda (Otavi). While no exact measure of the degree of inequality of land distribution in the Lower Valley, these figures should suffice to show that the high degree of inequality of land distribution at the national level (the Gini coefficient for the country as a whole was .95, denoting extreme inequality*) was also evident in the Lower Cochabamba Valley.

B. Pre-Reform Economic Structure

Before the 1952 Revolution, as now, the Lower Cochabamba Valley was one of the most progressive regions of the country. Traditional crops of corn, wheat, barley, and oats had already begun to give way before the reform to a variety of new crops and agricultural and livestock activities, although this process was considerably heightened and accelerated by the reform. Parotani had for years been engaged in corn production to supply the basic input of an alcohol distillery that the patrón had set up on the farm. The normal crop rotation consisted of several years during which a single planting of alfalfa was cut and grazed, followed by a year each of potatoes, corn, and wheat, after which the cycle was repeated. Some sheep manure was used, but on the whole the rotation which was practiced was insufficient for maintaining soil fertility. In the years before the reform, an attempt was made to turn to dairy production. For this purpose Holstein cattle were introduced, as was higher yielding, imported alfalfa seed. There were also some improvements in soil management techniques with some liming and increased use of sheep manure, although these procedures still were not sufficient for maintaining soil productivity. The changeover to dairy farming was not complete when it was interrupted by the Agrarian Reform.

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2. Camacho Saa, Estudio de caso, pp. 78, 79.

*See my "Bolivia Country Report," part of IBRD project R.P.O. 280, "Comparative Experiences in Land Reform in Latin America," p. 42.

Caramarca had been owned until 1948 by the wealthiest family in Bolivia and was used mainly for the fattening of livestock. When the present owner took over in 1948, he brought in improved strains of Holstein cattle for dairy production and began planting imported fruit trees. The patrón also reportedly introduced improved varieties of alfalfa, potato, and onion seeds. The campesinos of Caramarca, however, insist that improved onion seed was brought back from Chile and Peru, not by the patron but by campesinos who had been working temporarily in these countries. Caramarca was one of the most highly mechanized farms in the area, having available a TD-7 tractor and implements, a six-ton truck and a pickup truck, well drilling equipment, and a mechanical butter churn.* Machinery on Parotani was limited to one tractor and implements. Small amounts of chemical fertilizer were already being used on a few haciendas in the Lower Valley, although Caramarca and Parotani were not among them.

In Caramarca, production on the one-third hectare peguales of the colonos employed about the same techniques as were employed on hacienda land, except for soil preparation which was done manually or with the assistance of oxen rather than with tractors. Tools were rudimentary; even such improvements in small farmer technology as the steel-tipped plow still had not displaced the wood plow used in pre-Christian Egypt. Manure from the colonos' sheep was used when planting potatoes, which usually were planted on about a third of their land (the equivalent of 1/9 hectare). A similar amount of land was dedicated to the production of corn, the other main staple in the campesinos' diet, with small amounts going to the production of onions and other garden vegetables. The remainder was planted for several years in alfalfa for the colonos' animals. The rotation cycle employed by campesinos consisted of a year each of potatoes and corn followed by alfalfa for several years and a repetition of the cycle. Agricultural production was almost exclusively for subsistence, with the sale of livestock, especially criollo cattle, the main source of the colonos' very limited cash income. Potato seed, which campesinos fully recognized must be brought

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*The sale of 43 hectares of hacienda land to piqueros may have been partially motivated by the need for capital for mechanization as well as by the desire to decrease the number of colonos.

in from other areas to minimize the likelihood of disease, was acquired from the patrón.

In Parotani colonos used their one-half hectare pegujales in approximately the same way as did the colonos of Caramarca and other haciendas in the Lower Valley. The basic aim of production was the fulfillment of the subsistence needs of the colono's family, with most of the pegujal dedicated to the production of the two staples, potatoes and corn, and small areas dedicated to vegetable production, including carrots, some of which were sometimes sold to passers-by at the railroad station or along the road. As in Caramarca, technology of production was approximately the same as that of the hacienda, with the exception that land preparation was not mechanized. Most tools used were produced by the farmer himself. What animal manure was available was used for potato production.

C. Pre-Reform Land Availability and Use

From the 1920s, the beginnings of a land market which included campesinos came to take shape. Land transactions in the Cochabamba Valley no longer were specifically limited to upper-class whites, as it continued to be in the rest of Bolivia until the eve of the Revolution.* Even before the Revolution, because of the high fertility of their irrigated usufruct plots, better access to markets (Caramarca and Parotani were both within 30 kms. of Quillacollo and 40 kms. of Cochabamba), and the proximity of rail and road communication, campesinos in the Lower Valley were able to market enough livestock, handicrafts, and agricultural products to develop a sufficiently large economic surplus to be able to purchase small plots of land when they were offered for sale. Furthermore, the prices they were willing to pay for land located near where they lived exceeded those that members of the rural elite were willing to pay; these potential buyers were much less limited to one geographical area for their land purchases. Campesinos achieved some additional access to small plots of land through sharecropping or rental arrangements, although it does not appear that a

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*Elsewhere sale of land to a campesino was the surest way for a landowner to bring social opprobrium on himself.

significant proportion of hacienda land in the Lower Valley was worked in this way.

Excluding piqueros, access to land in the case study region was limited to that which was obtained through the system of colonato. In the case of irrigated land, the size of these plots was quite small indeed: a hectare in Parotani and about a third of a hectare in Caramarca. The colonato system also permitted them access to an even tinier lot around their shacks.

On Itapaya, across the river from Parotani, the amount of land to which campesinos had access was also small. This small-holder community was formed at the turn of the century following the completion of the railroad when the post office turned over the land it owned around way stations to the contratistas who until then had the responsibility of riding the mail from La Paz to Cochabamba. Through inheritance and resale of land among members of the community, parcel size was reduced until the sizes ranged from just under 2,000 square meters to a little over 20,000; the size of plots under the original distribution is not known. Land was used in a similar fashion to that on the haciendas and the pegujales of colonos, although a higher percentage of what was produced was marketed than was the case with colonos. The types of crops produced and the levels of technology employed were on a par with those of the haciendas. As was the case on the pegujales, production was completely unmechanized.

D. Pre-Reform Labor Availability and Use

Until a few years before the Revolution, labor availability to the hacienda was codetermined with land availability to the colonos by the colonato system. The colonato system made three or four days of colono labor available to the hacienda in exchange for the pegujal which the colono could use as he pleased. While three or four days had been the norm for many years, by 1950 the legally prescribed maximum of four days* was generally observed throughout the Lower Valley, although there were instances of as few as two days and as many as five still being required in some haciendas. In many other parts of Bolivia, however, up to 1952 the four day limit was

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*Established by President Villaroel in 1945.

frequently ignored since local authorities were disinclined to interfere in hacienda affairs. On Caramarca, in addition to their plot of land, colonos received a wage of eight bolivianos a day (the equivalent of US$.05); on Parotani no wage at all was paid, and the practice of paying wages does not appear to have been generalized in the Valley during the pre-reform period. In both Caramarca and Parotani, colonos were required to serve as pongos, servants or houseboys, in the landlord's manor house on the hacienda. Colonato appears to have been generally less onerous in the Lower Valley than elsewhere in the country, which may in part explain why there was less violence in the land reform process in this region than in other parts of the country. Nonetheless, physical punishment and beatings, such as those administered to campesinos in Parotani, were not unknown even in the more enlightened Cochabamba Valley on the eve of the 1952 Revolution.

In addition to colono labor, in the years just before the Revolution day laborers were hired for short periods of time during the year to assist with planting and harvesting. Such laborers generally came from the smallholding communities, or piquerias, and from the unmarried sons of colonos. There were virtually no landless laborers called arrimantes, who in other parts of the country made a living by helping colonos farm their pegujales in exchange for a small plot of land within the pegujal.

From the middle forties on, there was notable increase in labor discontent throughout Bolivia, but most accentuated in the Cochabamba Valley and in the Altiplano around La Paz. This discontent may have been one of the factors which influenced landowners in their decisions to mechanize, which resulted in a much higher level of mechanization in the Lower Valley than the average for rural Bolivia. Labor problems or the fear of them may have also been an important consideration in the selection of the types of agricultural activities in which to engage; before 1952, landowners were increasingly turning to less labor-intensive activities and easily mechanized operations such as fruit orchards and dairy farming, which did not require large populations of resident farm labor. This may also have been a factor in the decisions leading to the division of parts of the hacienda's land and its sale to colonos.

Before the reform, campesinos worked their usufruct plots solely with the help of family members and occasionally through arrangements which

permitted exchanging labor with members of the extended family or neighbors. Hired labor was not used. A colono who owned one ox would team up with another campesino with one ox to make a yoke, being required to return the favor when the time came. Planting and harvesting were frequently accomplished with help from friends and extended family members through a system of labor swapping called "ayni." The person whose land was being planted or harvested would be responsible for supplying food and drink for those cooperating and would himself be responsible for repaying the others with equal number of days of work when they needed help. These and other systems of labor-sharing have persisted since the reform and have been supplemented by some hired labor.

E. Pre-Reform Income Levels and Distribution

The distribution of pre-reform monetary income was extremely skewed, with the percent of net cash income produced on any estate going in a proportion of more than 90 percent to the landowner. As has been noted, because of the high fertility of the soil, favorable climate, and access to transportation facilities and market channels, campesinos in the Lower Valley were much better able to achieve cash incomes than were their counterparts in the Upper Valley and the Altiplano. Even so, an examination of the record of the kinds of household items now commonly found in campesino homes (bicycles, radios, sewing machines, etc.) reveals that practically all of them have been purchased since 1952, which would indicate a low level of cash incomes for campesinos in the pre-reform period. Piqueros were somewhat better off than were colonos during the pre-reform period, with a higher percentage of the household semi-durable consumer goods which they now own having been purchased before 1952; however, they too have made considerable progress in terms of the absolute level of their incomes since 1952 (as a result of changes in cropping patterns and an increased integration into the market). On the top were and remain the large landowners.

Under the conservative assumption that land was divided in general in similar proportions to those of the ex-hacienda (Otavi) where it was most equitably distributed (79 percent for the landlord and 21 percent for the campesinos) it would appear that landlords whom we have estimated constituted as a group no more than 5 percent of the population and probably

closer to 2 percent received 79 percent of the income, while the remaining 95 or 98 percent of the population received 21 percent of the income.* In fact, income distribution was probably more skewed since the hacienda generally controlled 85 percent or more of the land and the colonos 15 percent or less. Taking into account the superior marketing facilities available to many landlords, who had aljerías or farm market stores on the first floors of their urban homes in Cochabamba, it is likely that income, in fact, was even more unequally distributed than the above estimate.

The only factor which to a small extent undercuts this finding is the non-linearity of the relationship between land and yield per unit area. Colonos, piqueros, and community Indians throughout the country consistently out-produced the haciendas on the basis of yield per unit area. This was as true in the Cochabamba Valley as in the rest of the country, and as true before the reform as afterward. Data from the 1950 agricultural census on yields in crops of all kinds (tabulated in the text of the main report) consistently show that per hectare yields decline monotonically as farm size increases, excepting the largest, most highly capitalized farms exceeding 10,000 hectares which achieve somewhat better yields. However, despite the operation of this factor, distribution of income was nonetheless extremely unequal.

F. Pre-Reform Social Infrastructure

1. Housing

Vestiges of pre-reform housing still remain on some ex-haciendas in the Lower Valley, although most of the dwellings campesinos inhabited when they were colonos on the hacienda have fallen into ruin and have been replaced by improved structures. Typically, colonos lived in one-room shacks or chozas with hardened dirt floors, wattle or adobe walls, and a thatched roof covered with mud. Windows were uncommon, with the only light coming through the open door during the day; little artificial light was used at night, and even now kerosene lamps are uncommon. Pots and pans were almost

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*This, of course, assumes that income is directly proportional to the amount of land, which, with a few reservations that will be explained in a later section, was and still is approximately true.

exclusively of earthenware. Cooking was done on a mud and stone hearth on the floor against one of the walls inside the house. Table utensils consisted of wooden spoons carved by the colonos themselves. Beds purchased commercially were virtually unknown. The whole family and barnyard animals slept on the floor or on low adobe pallets and straw ticks.

There was little incentive for making household improvements since the house in which a colono lived belonged not to him but to the hacienda. While expulsion of a colono from the hacienda was infrequent, it happened often enough to deter major investments in housing improvements.

2. Education

As with other matters, the attitude of patrones in the Cochabamba Valley toward education appears to have been considerably more enlightened than in other parts of the country. In most of the country, the education of colonos was generally thought to be dangerous, at least partly because it broke down one of the major points of differentiation between landlords and peasants: the ability to read and write. It should be remembered that many landlords and their families had only a primary school education themselves. On both Parotani and Caramarca, however, some kind of a school existed. On Caramarca there was a one-room school in which a teacher paid by the landowner conducted a first grade class for the children of the colonos, who were obliged to send them by the patrón. On Parotani, however, there was only an ill-attended class taught in the evenings by a railroad worker and paid for by the patrón. Since the landlord did not show much interest in the classes, few colonos bothered to send their children. Until 1952, education was not perceived by the campesinos as a way to achieve social mobility, which was almost completely unattainable in any case.

3. Health Care

Preventive medicine did not reach the rural masses before 1952. Attention for minor injuries and illnesses was dispensed by the landlord. Occasionally, for more serious problems, he would take the injured person to the city for bandaging, paying for these treatments out of his own pocket. The kind of medical attention a colono would receive or whether he would receive any attention at all was entirely dependent on a decision of the landowner.

4. Clothing

Before 1952 the only form of footwear used by colonos and their wives was the abarca, a sandle made from the sidewalls of truck or automobile tires. Clothing was almost exclusively of bayeta (homespun) and woven from the wool of the colono's sheep. What little commerically purchased clothes colonos had were reserved for use on Sundays or feast days. Both the quantity and variety of a colono's wardrobe was severely limited in the period before 1952.

III. The Land Reform Process

A. Sindicato Formation and the Initiation of Land Reform

The beginnings of the peasant movement in the Cochabamba Valley considerably antedate the Revolution of 1952 which brought the Movimiento Nacional Revolucionario to power and culminated in the promulgation on 2 August 1953 of the Agrarian Reform Law. Campesino veterans of the disasterous Chaco War began organizing, with some small success in the Upper Valley, shortly after their return home. The modest reforms sponsored by President Villaroel before he was overthrown and lynched in 1946 had raised hopes among campesinos for eventual ownership of land and elimination of unpaid personal services and other manifestations of their inferior status in Bolivian society. Despite the reaction which followed Villaroel's death, unrest was evidenced in the Bolivian countryside by sit-down strikes (huelgas de brazos caídos) and by the clandestine organization of campesinos into sindicatos and pre-syndical groups.

Even before the Revolution, campesinos from Parotani had affiliated themselves with the sindicato which already existed in Sipesipe, a few kilometers north on the road to Quillacollo and Cochabamba. As in most other haciendas in the Lower Valley, sindicatos were formed in Parotani (September-October 1952) and Caramarca (February-May 1953) during the time the Agrarian Reform legislation was being discussed but before it was actually signed into law. As was generally true elsewhere in the Valley and in the country as a whole, the campesinos of the two haciendas did not act to form sindicatos until being visited by leaders of the sindicato movement, in this case those of the Quillacollo and Ucureña federations, José Rojas and Sinforo Rivas. (It is worth noting that no sindicato was ever formed on the nearby piquería of Itapaya where small farmers saw and to some extent continue to see the land reform process as a threat to their relatively favored position in rural society.)

On Caramarca, unlike most other regions of the country, there was less fervor for the establishment of a sindicato. As a result, ten former miners who came into the community soon succeeded in occupying most of the posts within the sindicato. Furthermore, the decision to set up a

Sub-Central Campesino for the surrounding farms and a campesino militia garrison in the landlord's house in Caramarca robbed the local sindicato of a large degree of its autonomy. For these reasons, real participation in the affairs of the union by ex-colonos and to an even greater extent by the 350 piqueros who had acquired hacienda land was extremely restricted. By the middle of 1953, the hacienda land had been taken over by the sindicato and the patrón and his family were first imprisoned on the hacienda and then forced into exile in Chile.

With help from the Central Sindical of Quillacollo, the sindicato of Parotani was organized in October of 1952. However, not until the signing of the Agrarian Reform Law at the beginning of August of the following year did the formation of the sindicato result in the disruption of normal relations between the landlord and the campesinos. At that time, the sindicato took over the hacienda and all its animals and equipment; because the landlord left, the take-over was able to proceed non-violently. Although the reform was more thorough in the Lower Cochabamba Valley than perhaps anywhere else in the country, it was also less violent than in a number of other regions. There are several possible explanations for the small amount of violence associated with the take-over in this region. First, pre-reform obligations were fewer and in general less onerous than in the more backward regions of the country. Second, haciendas in the Cochabamba Valley were smaller in size than on the Altiplano or in some of the other valleys in the central part of the country. Third, campesinos of this region appeared more willing to compromise and accept partial solutions than were those of the Altiplano around La Paz. Finally, the agrarian union movement was sapped of much of its energy by the struggle for leadership of the Cochabamba Federation by José Rojas and Sinforoso Rivas and by the bloody confrontations of their followers which grew out of this struggle for power.

B. Production and Distribution in the Period of Campesino Supremacy: The Failure of Cooperative Production

In both Parotani and Caramarca after taking over the land, sindicato leaders retained that portion of the hacienda which had been worked for the benefit of the patrón in the pre-reform period--more than 80 percent of the land in most cases--for the use of a production cooperative made

up of the members of the sindicato. Campesinos were allowed to retain their pegujales, which in any case had been transferred to them by the provisions of the Agrarian Reform Law, and were required to work for three days a week on the land of the cooperative. Thus, following the reform, there was no immediate increase in campesino access to land.

On Caramarca, the manager of the cooperative ran it as if it were his personal fief. The miniscule remuneration that campesinos had received in the pre-reform period for work on the hacienda was discontinued; furthermore, breaches of his orders and of sindicato decrees were greeted with severe corporal punishment--something which had been unknown on that hacienda under the previous regime. As a result of the government decree of 2 September 1953 in favor of the miners, seven former miners moved to Caramarca and were granted land; other outsiders had also been granted land. Apparently, there was little involvement of the resident farm population in the taking of these decisions. During the entire period of cooperative production on Caramarca, the campesinos received no palpable benefits from the operation of the cooperative. Furthermore, they were virtually excluded from the workings of the sindicato whose directorate was increasingly manned by ex-miners. The result was a thorough disaffection on the part of the campesinos with the sindicato, which eventually led them to direct conversations with the landlord, opening the way for his return.

On Parotani, management of the cooperative was turned over to a farm technician. As in Caramarca, the campesinos achieved no immediate increase in land as a result of the reform, being limited to the free use of their pegujales. They were also required to provide the cooperative with three days of unremunerated work a week, which they did over a two-year period, with no more return than 100 kilos of potatoes per family. The 2 September decree led to the arrival of 47 miners in Parotani which created such resentment that the campesinos locked up the manager of the cooperative and took over the hacienda themselves. This did not, however, prevent the control of the sindicato from passing into the hands of the miners, with an ex-miner becoming head of the sindicato and representation in the directorate divided 50-50, despite the majority constituted by ex-colonos and ex-jornaleros in the sindicato. This state of affairs continued until 1962, at which time the sindicato divided, leading to the formation of two

sindicatos, one for ex-miners and the other for campesinos, loyal to the Central of Quillacollo.

The cooperative phase of operation was short-lived, lasting only two years in Parotani. By 1955-56 there was general agreement to divide the land among the ex-miners and campesinos for use as individual family plots. The failure of the cooperative can be attributed to many causes, but was principally the result of "the lack of honesty in the management of funds since . . . profits produced . . . exceeded the amount distributed to the members of the cooperative."[3] There can be no question that the economic surplus was invested rather than misappropriated, since during this period the ex-hacienda was decapitalized by the sale of purebred livestock, the cutting of orchards, and the sale of machinery. This failure of cooperatives to produce positive results for more than one or a few members of the directorate was the main reason for their dissolution and the individualization of land which has been almost complete. Other criticisms, made by Camacho and others, are that: 1) cooperatives were imposed from above rather than an outgrowth of the desires of the community; 2) farm management and maintenance of capital was deficient; 3) yields were lower than on the individual plots since cooperatives tended to retain the production of traditional crops while campesinos rapidly changed over to the production of high value garden vegetables; and 4) what little distribution there was of the earnings of the cooperative was done in a way that took no account of the amount or quality of work contributed to the cooperative by individual members. Whatever the reasons, the failure of the cooperatives of Parotani and Caramarca and of many others like them has given the word "cooperative" an unseemly connotation in rural Bolivia and reinforced the campesino's already strong penchant for individual family farm production.

The fact that Parotani, unlike Caramarca, was not chosen as the site of a Sub-Central Sindical permitted the local sindicato to maintain a far greater degree of autonomy. As a result, when it came time to distribute the land among ex-miners, ex-colonos, and ex-jornaleros, the Central Sindical Campesino of Quillacollo was much less able to enforce its will, which favored an as equal as possible distribution of land, on the Parotani local union. The division which actually took place gave each miner two hectares, each ex-colono one hectare plus his pegujal (for a total of more or less

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3. Camacho Saa, Estudio de caso, p. 52.

one and one-half hectares), and each ex-jornalero of the alcohol factory one and a quarter hectares.

C. Consolidation and the Reassertion of the Rights of Landlords

Because of the abuses of the manager of the cooperative and the leadership of the sindicato, campesinos began direct talks with the patrón which eventually led to the consolidation of his control over virtually all land worked for the hacienda in the pre-reform period, while the campesinos and ex-miners received merely the 1/3 hectare plot that they had been allowed to work since the sindicato had taken over the land. In absolute area, there was a slight increase in total land that campesinos and miners had available over what campesinos had the use of before the reform, but this was offset by the addition of seven miners and their families, so on a per capita basis there was no improvement whatsoever due to the reform. The major difference, then, was the removal of labor obligations and unpaid personal service. The decision to call for the return of the patrón which produced the mutually agreed upon declaration of the ex-hacienda as an "agricultural enterprise" by the SNRA and the return of nearly all hacienda land to the former owner is directly attributable to the failure to dissolve what was obviously a bankrupt cooperative benefiting no one but its director. Had the land merely been divided among the individual campesinos, there is no question that they would have been perfectly content to work it themselves and to have fought any effort to reassert whatever rights the former owner may have had under the terms of the Agrarian Reform Law. The end result of the consolidation of Caramarca as an "agricultural enterprise" was that the patrón received 83.4 percent of the land, virtually everything he had actually farmed before the reform, while the campesinos and miners received a mere 1/3 hectare apiece for a total of 15.8 hectares or 16.6 percent of the ex-hacienda's total area.

The sindicato of Parotani was considerably stronger than that of Caramarca and as a result was able to make a deal with the former owner which did not involve his return. (The fact that campesinos in Caramarca were willing to tolerate the return of a patrón whom they had been involved in exiling from the hacienda and later from the country only shows the degree of their frustration with the failure of the cooperative to produce

positive results and with their arbitrary treatment at the hands of its manager.) After 1958, it became more difficult for campesinos throughout Bolivia to maintain de facto control over land to which they had no legal title, and as a result all groups in Parotani pushed for some kind of amicable settlement with the landlord. As in the day-to-day operations of the sindicato, the negotiations with the patrón were almost exclusively the responsibility of the miners. Under the agreement finally arrived at, both parties would request that Parotani be declared an agricultural enterprise (uncontested cases moved considerably faster through the SNRA bureaucracy) and the patrón would agree to sell almost all of the land to the campesinos and to abstain from returning to the hacienda. In exchange for the land consolidated in the possession of the landowner, the ex-miners and campesinos would pay for it at the rate of $b. 2,000/hectare for a total of $b. 400,000--far less than campesinos in Caramarca paid for subsequent purchases of land from the patrón there in transactions which were not tied to the mutually agreed upon consolidation. The final result was that miners were allowed to purchase two hectares at that price; ex-colonos were allowed to purchase one hectare and received their pegujales of about half a hectare free under the provisions of the Agrarian Reform Law; in addition, both ex-miners and campesinos paid 500 pesos for their house lots. The landlord finally was allowed to keep just three hectares comprising the park around his former house, and did not return to the ex-hacienda. By 1967, less than four years after the deal had been consumated, the ex-miners had paid off the entire amount owed and the campesinos owed only $b. 8,000, the payment of which was held up by red tape involved with the documentation of the transaction, which by 1973 still had not been clarified.

D. Changes in the Sindicato Structure in the Post-Reform Period

Following the settlement which allowed the patrón of Caramarca to return and confirmed the rights of ex-miners and ex-colonos to the 1/3 hectare plots which they had been working, the influence of the local sindicato declined sharply. Leadership of the sindicato remained in the hands of former miners despite their relatively small number in the community which, in addition to the 10 miners, included 31 ex-colonos and 350

piqueros. The patrón was soon able to reassert some degree of authority over the piqueros; this group, which had not benefited at all as a result of its actions, was induced to abandon the sindicato within a short time after the patrón's return, to be followed shortly thereafter by most of the ex-colonos, leaving a rump sindicato composed almost entirely of miners. The result was a grave decline in the sindicato's importance because most of the objectives for which it had been organized were either accomplished or no longer under its control. Its main function throughout most of the sixties was to see to the completion of the school, with minor functions including the coordination of part of the work of protecting the land of its members from incursions of the river and the supervision of the maintenance of a section of the irrigation canal. At the time of the 1973 field study, the secretary-general of the sindicato was still an ex-miner. Although the influence of the sindicato is much reduced, it is still one community organization capable of responding to challenges to the local community coming from the outside world. The 1973 field study itself provides an example to support this point: the secretary-general* who headed the Caramarca sindicato would not agree to the interviews and collection of data without first satisfying himself that the author and field worker had gained approval for the study from the leaders of both the Cochabamba Federation and the Central Sindical Campesino of Quillacollo. Without approval of the secretary-general of the ex-hacienda (and this is true throughout the country), it would not have been possible to gain much information about the land reform and its effects from other members of the community.

Subsequent to his return, the patrón began selling off small plots of hacienda land (units of 570 square meters) for the fantastically high price of $b. 5,000 for each lot to campesinos and piqueros.** Just what role, if any, the sindicato had in this process is not known.

The two sindicatos of Parotani, one for the ex-miners and another for the ex-colonos, have both declined in importance since the purchase of the

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*This is the title used throughout the country for the head of each local sindicato; he is elected by the members of the local union.

**By way of comparison, the campesinos of Parotani paid $b. 2,000 per hectare (1 hectare = 10,000 square meters).

land from the patrón, although the miner's sindicato remains the stronger of the two. Relations between the two sindicatos are limited to the yearly operation of cleaning the irrigation canal, with the work being divided in half and each group doing the cleaning of its half separately and exchanging sections the following year. The degree of decline in importance of the sindicatos is exemplified by the difficulty of getting members to pay their dues. Before the transaction with the landlord was completed, these kinds of problems did not exist for the sindicatos.

A number of reasons have been suggested for the declining influence of sindicatos in the area. In those cases like Caramarca, where the patrón has been able to reassert his right to ownership of part of the hacienda's land and to return to the hacienda, the effect had clearly been to undermine the influence of the sindicato and to encourage the return to old forms of patron-client relationships between the landlord and his former colonos.[4] Even where the landlord has been prevented from returning, the decline of the sindicato has nonetheless occurred after the campesinos have established clear title to their land, since this step removes the major motivation for campesinos to support the syndical structure. Furthermore, there has been no attempt to use the sindicato apparatus to channel government assistance to the campesinos, but rather an attempt has been made to set up parallel and separate organizations to act as bridges between the government organizations and the community, with the effect, if not the intent, of further subverting the authority of the sindicato. Despite their relative decline in importance, however, the sindicatos still constitute the most viable community organizations in the Lower Valley.

Finally, it is worth noting that with few exceptions sindicatos are composed exclusively of small farmers who own land, and most often include only those who have received their land through the operation of the land reform process. In their 1967 study, the LTC-CIDA team discovered only one sindicato (that of Balconcillos) which grouped together both the 40 ex-colonos who had received land as a result of the reform and 70 landless

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4. This problem is discussed at length in a forthcoming LTC Paper by Peter Graeff (expected publication date 1975).

workers.[5] In general, as has been observed on both Parotani and Caramarca, sindicato membership is limited to landowners; on Caramarca, even the piqueros who had initially belonged to the sindicato abandoned it during the consolidation phase of the reform process. If the numbers of landless workers increase and if these workers still are not able to find representation within the sindicato structure, the authority of the sindicatos is likely to suffer even greater erosion in the future.

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5. Camacho Saa, Estudio de caso, p. 139.

IV. Economic Situation in the Post-Reform Period

A. Land Tenure in the Post-Reform Period

1. Land Tenure in the Reformed Sector

The pattern of landholding which developed in the Lower Valley as a result of the land reform process considerably increased the access of campesinos to land and produced a major redistribution of income in favor of ex-colonos, who, as a group, had been at the bottom of the social and economic pyramid before 1952. The distribution of land into individual family parcels did not result in the creation of units of precisely the same size or potential value for producing income. On Parotani, as has been the case in most areas of rural Bolivia, landholdings in the post-reform period have tended to reflect the stratification which had existed before the Revolution. Ex-jornaleros for the alcohol factory received just over 1 hectare while the action of the SNRA and the pacted purchase* of land from the patrón gave ex-colonos 1 1/2 hectares and ex-miners 2 hectares apiece.[6] On Caramarca, because the hacienda was declared an "agricultural enterprise," the campesinos (and ex-miners) received only their pegujales, thus perpetuating the pre-revolutionary distribution of land; however, since all pegujales were of virtually the same size--one-third hectare--this provision of the Agrarian Reform Law did not result in the continuation of appreciable inequalities in land distribution as it did in the Altiplano and in other parts of Bolivia. Land purchases subsequent to the reform have provided small increases in landholdings for some campesinos, but to the present time they have not resulted in major reductions of

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*In exchange for the rapid termination of the land reform process and the acceptance of the "agricultural enterprise" classification by the campesinos and ex-miners, the landlord agreed to sell virtually all the land he received title to under the settlement for a fixed price per hectare.

6. This less than equitable distribution of land occurred in the face of opposition from the Central Campesino Sindical of Quillacollo. See Camacho Saa, Estudio de caso, p. 59.

the degree of equality of land distribution following the reform or in displacement of beneficiaries from the land they received.

Following the failure of cooperative production in the early post-reform period, the individual parcel of land worked largely with family labor has become the predominant form of land tenure in the Lower Valley. Other forms of tenure, such as compañía (sharecropping), rental, and antícresis* (pawning of land), which are continuations or adaptations of pre-reform tenure arrangements, show no signs of disappearing in the post-reform period, although together it is doubtful that they account for much more than 10 percent of agricultural land in the region. The most common of these is compañía, a form of sharecropping under which the owner of land provides the land (and the seed and chemical and organic fertilizer as well), and the other party to the (verbal) agreement provides his labor, tools, and animals in exchange for half of the harvest.** Compañía is more common in potato production than in other crops and is frequently practiced when the landowner leaves his land and emigrates to the city or to Argentina, returning only to collect his share. In the 1967 LTC-CIDA case study of the Lower Valley, compañía was found to be practiced by nearly a third of the ex-miners of Parotani compared to less than a tenth of the campesinos, ex-colonos and ex-jornaleros; none of the ex-colonos of Caramarca gave out their land in compañía, whereas three ex-miners who had moved elsewhere left their land to campesinos to be worked in this way. In return for a fixed cash payment over the term of the contract, the renter has virtually complete control over the agricultural production process. In general, because of the scarcity of land in the Lower Valley, the landowner is at an advantage over the party providing the other inputs, allowing the landowner considerable latitude in setting the terms of the agreement.[7]

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*Use of land is given up until the loan is repaid; like pawning in developed countries, antícresis is used as a last resort by low-income groups unable to obtain credit by any other means. Described more fully on the following page.

**The division of the harvest may or may not include a discount for the seed provided by the companero.

7. Camacho Saa, Estudio de caso, p. 66.

Table 1. Compañía on Caramarca and Parotani (1967)

	Number	Total Amount of Land
Parotani Ex-Miners	15	8.44 has.
Ex-Colonos	5	0.93
Caramarca Ex-Miners	3	6.00
Ex-Colonos	0	0.00

Source: Camacho Saa, Estudio de caso, p. 66.

Rental of land is another form used by widows or others who, because of their absence from the community, are not able to be actively involved in the management and work on their land but wish to maintain an income from it. In 1973 only four cases of compañía were observed (all on Parotani); in each case the sharecropper providing labor was an ex-jornalero or an individual who had received no land at all as a result of the reform. On the two ex-haciendas studied, only six cases of this type of tenure arrangement were observed in 1967; the 1973 sample produced no observation of land rental on either farm, although, based on other information, it is certain that the practice of land rental has not disappeared completely, at least from Parotani.

Antícresis is the method of last resort used by campesinos when no other source of cash can be found to meet extraordinary and unavoidable expenses. Under antícresis, in exchange for a set amount of money, a landowner transfers control over all or part of his land for an agreed upon minimum period. The maximum period is set by the length of time it takes the debtor to repay the loan; no interest is charged since use of the land constitutes a sort of interest payment. Obviously, this procedure is limited to dire necessities since by reducing an individual's command over land it decreases the income he can expect to have available for repayment of the debt and thus can lead to permanent loss of land. Three cases of antícresis were found in the 1967 sample; in 1973 only one case was found, but the individual involved was apparently unable to redeem the debt, implying the permanent loss of land.

The amount of land in Parotani involved in these types of tenure arrangements was small, with the total for all three types constituting less

than two percent of the total area surveyed in 1967. Land rental constituted about one percent of the area, with compañía and antícresis constituting equal amounts of land, though together they totaled less than one percent. Compañía was the most common form of indirect tenure employed by ex-miners, with the total proportion of land not worked directly by this group being about 10 percent. The amount of land ex-colonos' families did not work directly was about three percent and divided almost equally between rental and compañía. The group working the highest percent of their land directly was that of the ex-jornaleros, with only two percnnt of their land in antícresis and none rented or sharecropped; the fact that ex-jornaleros are forced to resort to antícresis in times of need in a proportion eight times higher than that of the next highest group is an indication of their relative poverty compared to other groups in the community.[8]

Table 2. Percent of Land in Various Forms of Land Tenure, by Pre-Reform Occupation

Tenure Type	Ex-Miners	Ex-Colonos	Ex-Jornaleros
Rental	0.85	1.58	0.00
Compañía	9.10	1.43	0.00
Antícresis	0.09	0.26	2.18
Sold	5.43	0.63	1.50
Worked by Owner	84.53	96.10	96.32
TOTAL	100.00	100.00	100.00

2. Land Tenure in the Ex-Hacienda Estates

Following the consolidation period beginning in 1958 many landlords were able to regain possession of those parts of their estates which had been worked directly for the benefit of the hacienda, that is, hacienda land as opposed to usufruct plots. Because of the small size of most haciendas in the Lower Valley and the relatively high level of machinery and

8. Ibid., p. 73.

other capital improvements, landlords were frequently able to have their haciendas declared "agricultural enterprises" by the National Agrarian Reform Service. This was the case in both Caramarca and Parotani and allowed their former owners to "consolidate" their title* to nearly all of the hacienda land which had not been divided up into pegujales before 1952. Elsewhere, hacendados whose capital investment had been smaller were frequently able to have their farms declared "medium-sized properties," which in general meant that campesinos achieved some increase in their access to land through the land reform process while the landlords were still able to retain part of most of hacienda land. Whether pacted,** as in Parotani, or through sales not directly connected with the land reform process, as was the case in Caramarca, even those landlords who were able to return to their ex-haciendas frequently found it necessary to sell part of their land to ex-colonos and former miners as well as to other neighboring small holders. The major reason for these sales as well as the change-over of landlords to less labor-intensive and more easily mechanized types of farm operations was the difficulty landlords had in finding an adequate supply of labor at the levels of wages they were willing to pay. In general, campesinos preferred not to work for their former patrón or for other landlords, other things being equal, even when the equivalent of an equilibrium wage was being offered. On Caramarca, for example, the amount of land the ex-hacendado controlled in 1967 was considerably less than the 79 hectares confirmed in his possession by the agrarian reform decree in 1958 as the result of subdivision of land into 570 square meter plots for sale to piqueros, ex-colonos, and ex-miners.[9] All campesinos reported increases in their holdings of land between the 1967 and 1973 surveys; however, the

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*Consolidación de título.

**In order to bring the agrarian reform process to a quick conclusion, campesinos often agreed to accept an "agricultural enterprise" classification rather than the "latifundia" or "medium-sized property" classification they had been suing for in exchange for an agreement to sell to the campesinos whatever land was consolidated by the landlord, at a pre-established price.

9. Camacho Saa, Estudio de caso, p. 73.

source of the additional land is unclear, since sales from hacienda land were not reported.

The patrón of Caramarca employed various systems for increasing the supply of labor which the hacienda could depend on after 1958. By agreeing to pay land taxes for the entire estate, including the part sold to campesinos (for which they are in theory obligated to pay taxes), he was able to secure the services of the campesinos for one day a week at a wage rate about one-third below the prevailing rate for the region. A second system used was the provision of 570 square meter plots to campesinos in exchange for a fixed number of day's work a week for the hacienda. A final method was allowing campesinos to cut alfalfa from 25 square meter plots in exchange for one day's work for each cutting of alfalfa.[10] A variety of land tenure arrangements similar to those described above developed wherever landlords were able to retain significant portions of their pre-reform holdings. In spite of specific language in the Agrarian Reform Law requiring the payment of wage labor for work performed in the agricultural sector, land tenure arrangements between landlords and their former colonos, taken virtually without change from the colonato system, have effectively displaced part or all of the wage that would otherwise have been due.

Campesinos in the Lower Valley have abandoned traditional agricultural products to take advantage of profitable opportunities in non-traditional crops which absorb more labor. As a result, ex-hacendados who still run parts of their former haciendas have been forced to respond to the relative scarcity of labor by adopting new lines of production requiring relatively lower inputs of labor. As in Caramarca, ex-haciendas throughout the Lower Valley have tailored their operations to profitable and more easily mechanized fruit orchards, dairy farming, and production of dry corn. The substantial initial capital outlays required have not constituted a barrier to the adoption of these types of operations because of lucrative land sales to campesinos (such as those made by the landlord of Caramarca described in Section III) and lines of credit easily obtainable at concessionary rates

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10. Ibid., pp. 69-70.

of interest from the Banco Agrícola and from private banks through the Fondo de Refinaciamiento Agrícola.* A net income of approximately US$85 per hectare in 1968 was sufficient to provide the owner with a comfortable standard of living while serving as collateral for Banco Agrícola loans and as a store of wealth in view of future capital gains from increases in the value of the land.[11]

The value of per hectare production on campesinos' land in 1967 was between four and five times that of the haciendas in the pre-reform period; despite unfavorable prices and weather conditions in 1973, which will be analyzed more fully in a later section, campesinos' per hectare production was still two to three times that of the haciendas in the pre-reform period. (See Table 3.) In spite of large capital investments and mechanized production, the ex-landlord of Caramarca produced output per hectare on the land he retained valued at only 17 percent of that of campesinos. Not only that, per hectare production on Caramarca apparently was 35 percent lower in 1967 than in the pre-reform period. Although changes in relative prices make percentage comparisons of dubious value, it is surprising that the hacienda can show no real improvement in per hectare production levels over those observed 15 years before.

Table 3. Value of Gross Farm Production/Hectare
(1973 Prices)

	Haciendas		Campesinos	
	1952	1967	1967	1973
Caramarca	5,754	4,228	24,530	19,426
Parotani	2,859	--	14,233	6,217

Source: Survey data and Camacho Saa, Estudio de caso, pp. 105 and 110.

*Agricultural Refinancing Fund, based on loans from the United States Agency for International Development.

11. Camacho Saa, Estudio de caso, p. 113.

B. Changes in Crops and Intensity of Land Use in the Post-Reform Period

1. Changes in Cropping Patterns

Colonos' production on their pegujales in the pre-reform period was of necessity restricted almost exclusively to the two dietary staples, corn and potatoes. The small size of the usufruct plots and the limited amount of time colonos had to tend them after fulfilling their obligations to the hacienda made virtually impossible large-scale production of the kinds of high-value vegetables which came to occupy a position of preeminence in the Lower Valley within a few years after the Revolution. Both of the crops which predominated on the two ex-haciendas studied--onions and carrots--were cultivated by campesinos before 1952, although on a very small scale and only after subsistence needs for the two staples had been met; small surpluses of these non-traditional crops provided colonos with a small and uncertain source of cash income. Especially for colonos living in Caramarca, marketing problems must have been formidable. Furthermore, with two-thirds of the country's population living at similar levels of subsistence and almost completely outside the market economy, demand for these products must have been both small and geographically concentrated in a few urban areas of the country.

Even before the dissolution of the cooperatives established by the sindicatos of Parotani and Caramarca, campesinos on both farms had begun to specialize in carrots and onions, respectively, on the plots which they had formerly held only in usufruct. Indeed the failure of the cooperatives to move out of the production of the traditional crops of potatoes and corn into crops of greater value may have been partially responsible for their short life. The opening of a free market in agricultural products and the redistribution of income associated with this during the first years of MNR rule are probably the most important factors in the creation of sufficient demand to allow campesinos to specialize in the production of one or at most two or three types of vegetables. A sharp decline in the availability of imported vegetables in the 1952-1956 period may also have been a major factor in increasing the demand for domestic produce.[12] Market

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12. Ibid., p. 87.

institutions rapidly adapted to the needs of the new producers, as markets oriented to the new crops, especially the vegetable market at Vinto, expanded to meet the needs of campesinos of the Lower Valley.* Piqueros also participated in the massive expansion of production of truck gardens in the Lower Valley, although the change is relatively less impressive since the degree of integration of piqueros with the market was initially considerably higher. Small holders from Itapaya, for example, had been selling watermelon in addition to traditional products for a number of years before 1952.

In any case, the transition to market-oriented agricultural production was well on its way within three years after the Revolution. In spite of sketchy and internally inconsistent estimates of production, the increases in both total production and production per hectare of non-traditional crops are so massive as to leave no doubt as to the direction of the change. FAO estimates for the production of onions show national output doubling by 1968 from pre-revolutionary levels. Yields per hectare for carrots nearly doubled in the same period while those of sweet corn and onions (both grown on Caramarca) rose more than 25 percent nationally and probably even more in the Lower Valley.** By 1973 approximately three-quarters of all agricultural production from Parotani was being sold at market. Similar high levels of market participation are typical of what is happening in the region as a whole. Barter constituted less than one percent of all transactions.

The trend to ever higher levels of market integration has not, however, meant a complete abandonment of traditional products which retain an important though declining role in the diet of campesinos in the Lower Valley.

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*The process of change in rural markets and the growth of campesino towns is documented for the Upper Valley in Katherine Barnes von Marschall and Juan Torrico Angulo, "Cambios socio-económicos en el Valle Alto de Cochabamba desde 1952," Estudios Andinos, Año 2, II, 1 (1971). (Also published as Land Tenure Center Reprint No. 109S [Madison: University of Wisconsin (November 1973)].)

**Available data from FAO and other sources are compiled in several tables in the main report.

Calculations based solely on the expected value of income favor the complete abandonment of traditional crops such as corn, wheat, and barley, and in fact area sown to these crops has continued to decline. No grain of any kind is now grown on either Parotani or Caramarca. Potatoes and corn, however, still are planted despite the generally lower expected return, as a kind of self-insurance. In developed countries, diversification has long been an established principle for stabilizing farm income by spreading the risk of adverse price movement and crop failure among several crops. Price movements of agricultural commodities in general and particularly for the highly perishable products grown in the Lower Valley are extremely volative, both seasonally and from one year to the next. In 1965, for example, campesinos of Caramarca found that the price of their major crop, onions, had dropped so low that it did not compensate the cost of harvesting.[13] Faced with this kind of uncertainty, campesinos in a country in which welfare programs in rural areas are virtually unknown find it essential to grow at least enough of the traditional crops in their diets to cover minimum subsistence needs, even though this means sacrificing some income which might be expected from increasing the area planted to the higher value crops of carrots, onions, or the like, in which they have specialized. Nonetheless, by 1973 considerable numbers of campesinos were reporting purchases of these traditional products, and an examination of land use by the eight campesinos of Caramarca for whom data are available for both 1967 and 1973 shows that this trend is continuing, as proportionately more land is being used for non-traditional crops such as fresh onions and sweet corn and proportionately less for traditional products such as dry corn and potatoes. All campesinos surveyed in Caramarca in 1967 and 1973 reported purchases of potatoes; this indicates a willingness to sacrifice some degree of security for an expected increase in income. In Parotani, 9 of the 18 campesinos for whom information is available for both time periods* reported purchases of traditional products, mostly potatoes, in 1967; by

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13. Camacho Saa, Estudio de caso, p. 89.

*Paired observations exclude families where the original reform beneficiary has died and left his land to his children or widow.

Table 4. Land Holdings and Land Use for Traditional and Non-Traditional Products: Paired Comparisons Between 1967 and 1973

Id. No.	1967 Alfalfa (1)	1967 Traditional Products (sq. meters) (2)	1967 Non-Traditional Products (sq. meters) (3)	1967 Ratio (2)/(3)	1967 Total Land (4)	1973 Alfalfa (5)	1973 Traditional Products (sq. meters) (6)	1973 Non-Traditional Products (sq. meters) (7)	1973 Ratio (6)/(7)	1973 Total Land (8)	Purchases of Traditional Products 67 (9)	Purchases of Traditional Products 73 (9)
					Caramarca							
72	3,400	2,840	3,980	0.71	5,114	925	2,025	5,025	0.40	5,350	P*	P
80	1,200	4,470	2,270	1.97	3,970	1,100	3,925	6,625	0.59	6,375	P	P
76	1,300	5,640	1,500	3.77	4,242	600	1,820	5,620	0.32	4,320	P	P
66	200	1,300	1,700	0.76	3,230	500	2,420	7,260	0.33	5,340	P	P
74	400	5,670	1,070	5.30	3,632	500	4,700	11,760	0.40	9,420	P	P
70	540	5,570	1,300	4.28	3,975	800	2,025	4,550	0.44	5,350	P	P
68	868	4,640	1,500	3.09	3,494	400	1,200	2,620	0.46	4,320	P	P
78	600	2,900	1,800	1.61	4,141	800	3,800	9,350	0.41	7,625	P	P
Col. Means	1,064	4,129	1,890	2.69	3,975	703	2,739	6,601	0.42	6,012		

*P = potatoes.

(Table 4. Land Holdings and Land Use cont.)

Id. No.	1967 Alfalfa (1)	1967 Traditional Products (sq. meters) (2)	1967 Non-Traditional Products (sq. meters) (3)	1967 Ratio (2)/(3)	1967 Total Land (4)	1973 Alfalfa (5)	1973 Traditional Products (sq. meters) (6)	1973 Non-Traditional Products (sq. meters) (7)	1973 Ratio (6)/(7)	1973 Total Land (8)	Purchases of Traditional Products 67 (9)	Purchases of Traditional Products 73 (9)
					Parotani							
06	0	4,042	4,042	1.00	4,042	0	6,000	14,000	0.43	20,000	P	P
50	0	0	0	0.00	0	0	1,250	0	0.00	1,250	P	P
44	2,280	3,362	4,848	0.69	6,598	0	4,000	7,500	0.53	12,500	0	P
20	3,884	17,024	9,664	1.76	11,086	0	6,000	9,000	0.67	15,000	0	P
30	0	1,957	3,497	0.55	10,427	0	5,500	7,500	0.73	15,000	P	P
22	0	7,441	12,917	0.58	10,179	0	7,000	20,000	0.36	27,500	P	P
24	0	4,171	4,171	1.00	4,171	0	2,100	4,900	0.43	7,000	0	P
26	5,838	12,861	16,941	0.76	19,896	0	6,800	12,700	0.54	19,600	0	P
28	0	1,020	2,940	0.35	1,980	0	3,500	5,250	0.66	8,750	C*	P
32	1,260	6,309	8,199	0.77	10,053	0	2,500	6,200	0.40	8,700	0	P
02	0	3,344	14,522	0.23	8,933	0	6,000	9,000	0.67	15,800	0	P
36	860	13,541	26,411	0.51	20,406		5,500	8,960	0.61	10,500	0	P
46	5,590	16,302	16,662	0.98	19,457		6,300	13,100	0.48	19,420	0	P
48	481	5,604	7,850	0.71	10,574	2,000	5,300	12,450	0.43	19,750	P	P
42**	0	3,200	10,000	0.33	15,000		16,010	2,512	6,37	14,804	P	P
38	0	0	0	0.00	0		0	0	0.00	0	PC	P
52	0	2,500	4,500	0.56	7,000	4,298	5,442	2,632	2.07	12,005	0	P
34	0	0	0	0.00	0		0	0	0.00	0	PC	P
Col. Means	1,122	5,704	8,176	0.70	8,878	350	4,956	7,539	0.66	12,643		

*C = corn.

**Outside sources and internal inconsistencies in the data provided by this respondent indicate that information may be erroneous.

1973 that number had risen to 17 and purchases were exclusively of potatoes, apparently reflecting a change from domestic production of chicha (a sort of fermented beer made from malted corn) to its purchase.

A further indication of increasingly intensive land use is the declining amount of land used for animal forage. In the Lower Valley of Cochabamba on irrigated land, plantations of alfalfa are cut and fed to oxen rather than being left for grazing. The small percentage of the land dedicated to this grazing use suggests a relatively higher intensity of land use than previously. In 1967 seven campesinos stated that part of their land was used for growing alfalfa; by 1973 that figure had dropped to only two of the 18 paired observations.* In only two cases was the proportion of land in alfalfa to total land greater than one-third.

Another indicator of increasingly intensive land use is given by the ratio of the amounts of land devoted to traditional compared to non-traditional products, with declines over time in this ratio revealing movement to more intessive land use. Whereas in 1967 six of the eight respondents from Caramarca reported dedicating proportionately more land to traditional** as opposed to non-traditional*** products, by 1973 all eight reported higher absolute amounts of land planted in non-traditional products and in all cases the ratio itself declined from one period to the next. Of the 16 campesinos and ex-miners of Parotani reporting ownership of land in both periods,**** in 1967 only one planted his land in a ratio of traditional to non-traditional products greater than one, two devoted equal amounts to traditional and non-traditional products, and the remainder planted a higher proportion in non-traditional products. By 1973 the ratio was less than 0.75 for all but two of the 16 landowners surveyed, indicating greater concentration on non-traditional products.

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*Field visits by the author also confirmed that surprisingly little land was in this use at the time data were gathered (June and July of 1973).

**Potatoes and dry (or shelled) corn.

***Fresh onions, dry onions, sweet corn, broad beans, and carrots.

****The remaining two had no land in either period.

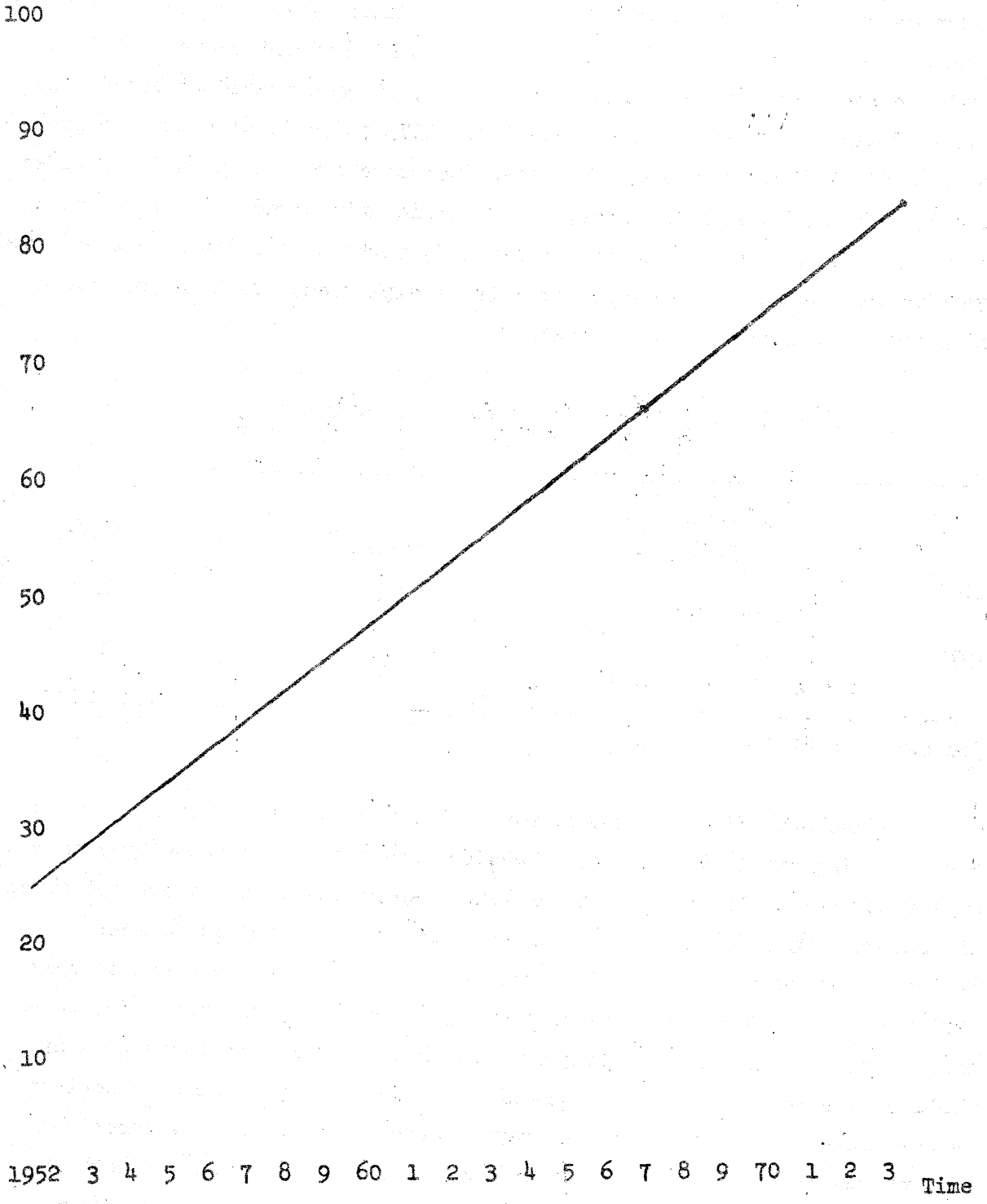
2. Changes in the Intensity of Land Use

The higher intensity of labor usage associated with the new crops being adopted in the Lower Valley was a major factor impeding their adoption by landlords both before and after the Revolution. Crops such as carrots (Parotani), fresh onions (Caramarca), and watermelon (Itapaya) neither are very susceptible to mechanization nor offer significant economies of scale for other reasons, and therefore have not been attractive to the landlords remaining after the reform. The landlords also turned away from the production of traditional crops which require large inputs of labor at certain times of the year.

The high demands for labor of the new crops constituted no obstacle to campesinos, however, since the family labor supply was generally ample, especially in the first years following the Revolution. At that time, the average size of campesinos' plots was lower than it was to become by 1973 and demands for labor not as severe since market integration was also lower. (Figure 1 is the result of taking observations from Caramarca in 1967 and 1973 and plotting them as a linear function of time. Under this assumption, the percent of output marketed at the time of the Revolution would have been just under 25 percent; if the real percentage of marketed output could be found, I expect that it would in fact be somewhat lower.) Labor, then, probably was not a binding constraint on production of non-traditional crops in the early years after the Revolution, although it appears to be becoming increasingly binding as time goes on and proportionately more land is devoted to marketed, non-traditional crops.

The average family living on Caramarca in 1967 has three and one-half adults and one and one-half children available for farm work, with the proportion of children declining to 1.0 in 1973. On Parotani, where families tended to be younger than on Caramarca, the available family labor force averaged 2.5 adults over the period with the proporiion of children rising from two and one-half to nearly three in 1973. In the post-reform period landlords were faced with some of the highest wage rates for agricultural labor in the entire country ($b. 10 in 1967 and $b. 15 in 1973, at nominal prices of both years); campesinos also were frequently forced to hire labor during part of the year to complete certain agricultural operations within the short periods allowed by the need to get one crop out so that

Output Sold as a Percent of Total Output
(Caramarca)



another could be planted. In both 1967 and 1973 more than half the campesinos surveyed reported wage bills exceeding the equivalent of 10 days hired labor despite their relatively large average family size. By 1973 all former miners in the Parotani sample reported hiring significant amounts of labor while in both periods less than half the campesinos surveyed reported wage bills of more than 175 pesos (at constant 1973 prices), although the proportion of campesinos hiring labor also increased over the period. Besides having more land than campesinos, the significantly higher proportion of ex-miners hiring labor, observed in Table 5, might be explained by ex-miners' greater ability to find well-paying outside employment, such as work on the railroad which passes through Parotani.

Table 5. Hiring of Wage Labor by Ex-Colonos and Ex-Miners on Parotani, 1967 and 1973

	Wage Bill (constant $b. of 1973)	Ex-Colonos	Ex-Miners
1967	0-175	14	1
	More than 175	8	5
1973	0-175	11	0
	More than 175	7	7

Source: Questionnaire data.

Besides providing employment for the growing number of landless workers by hiring off-farm workers, campesinos and their sons themselves sought employment off their own parcels of land, especially in the years following the reform. By 1967, 80 percent of the families surveyed on Caramarca had at least some income from wage labor; that proportion had dropped to only 12.5 percent in 1973. Besides reflecting a dislike on the part of campesinos toward working for landlords, this change is also an indication of the increase in landholding which all those surveyed were able to achieve in the interim between the two surveys. Campesinos apparently perceived that the marginal return to labor on their own land exceeded the wage being paid by the hacienda. Similarly, families with larger landholdings on Parotani were generally less inclined to work for wages off their own land than were those owning smaller plots of land. As in Caramarca, slightly

under half the families reported wage incomes in 1973 as opposed to more than 90 percent in 1967. During the intervening years, the average size of landholding increased by more than one-third of the original average of landholding on Caramarca of 4,410 square meters and by more than one-fourth on the Parotani average of just over one hectare.

Table 6. Work as Day Laborer by Farm Size on Parotani

	0 - 1 ha.	1+ ha. - 2 has.	More than 2 has.	Total
		1967		
Day Labor	10	15	1	26
No Day Labor	1	1	0	2
	11	16	1	28
		1973		
Day Labor	8	4	0	12
No Day Labor	1	11	1	13
	9	15	1	25

3. Population Retention as a Result of the Reform

A major result of the increasingly intense use of land by campesinos and ex-miners has been the retention on the farm of an entire generation of rural Bolivians who might otherwise have been forced to move elsewhere. Since job opportunities in urban areas have been slow to develop, even since the Revolution, the nation clearly benefited by the slower movement of rural people to the country's three major cities* than would have been expected in the absence of the reform. Quantification of this phenomenon must await the completion of a new census since available population estimates are basically extrapolations based on a series of assumptions from 1950 census figures. Information from the case studies does, however, permit some general comments.

The percentage of respondents reporting that one or more members of their families had migrated from Caramarca or Parotani to some other area

*La Paz, Cochabamba, and Santa Cruz are the cities attracting most rural migrants; these are all growing at rapid rates while the population of most other cities grows only slowly or remains constant and that of many smaller provincial capitals and towns is actually declining.

(excluding moves to other rural areas within the Lower Valley) was, respectively, 37.5 percent and 20 percent. On Parotani all families reporting migration fell into the category of landownership of more than one hectare, implying average or above average landownership; data from Caramarca is not clear on this matter, possibly because of the way it was broken down (see Table 7). There appears to be a positive relationship between total

Table 7. Migration Related to Amount of Land Owned in 1973

	Parotani		Caramarca	
Amount of Land	0 - 1 ha.	More than 1 ha.	0-4,500	4,501-9,500
Migration	0	5	1	2
No Migration	9	11	1	4
	Chi square = 3.91. Probability of chi square (> 3.91) is less than .005.		Chi square = .177. Not significant.	

family income and migration, with four out of the five families from Parotani who reported migration having incomes of more than $b. 10,000 in 1973, a level which included all families above the median for income. Results from Caramarca are similar, with two of the three families reporting migration being the same two with the highest total income. These results add support to the often repeated thesis that the agricultural sector subsidizes the rest of the economy by providing it with young men and women raised and educated at the expense of the agricultural sector.* It is also frequently assumed (though it was not possible to examine this question on the basis of the available case study data) that these migrants are often the best educated and most progressive members of the community.

Unfortunately for Bolivia, this subsidy is going mostly to Argentina rather than to other sectors of the Bolivian economy. All migrants from

*One exposition of this thesis is to be found in William L. Flinn, "Rural to Urban Migration: A Colombian Case," LTC Research Paper no. 19 (July 1966).

Table 8. Migration Related to Total Family Income in 1973

	Parotani		Caramarca	
Income Levels	5,000-10,000	Over 10,000	5,000-15,000	Over 15,000
Migration	1	4	1	2
No Migration	12	8	5	0
	Chi square with Yates correction = 2.56. Probability of chi square (> 2.56) $< .15$.		Chi square with later correction = 4.44. Probability of chi square (> 4.44) $< .05$.	

Source: Questionnaire data.

Caramarca were reported to have gone to Argentina, and three of the five families of Parotani reporting migration said that migrants had also gone to Argentina. In several cases migration seemed to be a chain occurence, with first one member of the family leaving to be followed by another later once the first was reasonably well established. No case was found in which after one family member had migrated to one place did younger members of the family choose to migrate to a different area.* Two families from Parotani reported that family members had moved to mining areas and a number of others reported children studying in Cochabamba or in various mining towns without indicating that their absence from the farm constituted a permanent move.

Considerable efforts are made each year by planters from Santa Cruz to recruit migrant labor from the Cochabamba Valley for work in the harvest of cotton and sugar cane. These efforts do not appear to be particularly successful on either Caramarca or Parotani since the differential in wages offered in the Santa Cruz area are apparently insufficient to offset the higher cost of living for which Eastern Bolivia is noted.

As long as the opportunity exists for earning an adequate living within the family parcel of land and for the probable eventual ownership of part or all of the land, children of campesinos are generally content to continue

*Similar findings are reported by William L. Flinn and James W. Converse in "Eight Assumptions Concerning Rural-Urban Migration in Colombia: A Three-Shantytown Test," Land Economics 46 (November 1970), pp. 84-104.

living in Parotani. (This appears to be less true of miners' children who more frequently seek outside employment.) Even after marrying, couples frequently continue living with the husband's parents until able to afford their own house. Often marriage will bring the gift of some part of parent's land (either the parents of the bridegroom or the bride, or both).

Death of a land reform beneficiary seldom results in the sale of his land. If a widow is left with young children, part or all of the land may be rented out or worked in compañía by a relative or kinsman. In the case where children are full-grown, a number of solutions have been found in Parotani to the problems associated with inheritance. In some cases, the land has been divided up with some children receiving as little as half a hectare, with women also claiming a right to the inheritance of land. In one case, land was not divided but worked as a unit, just as it had been before, by the remaining members of the family. The highly intensive methods of production adopted by campesinos since 1952 have until now allowed maintenance of most of the increase in population which has occurred in the generation on the farm since the Agrarian Reform Law went into effect. Without some increase in the amount of land available to campesinos and the implementation of programs to make land use even more intensive while maintaining or correcting the apparent adverse movement in agricultural prices (which was evident between 1967 and 1973), it will not be possible to assure rising per capita incomes in the Lower Valley or even to be sure of being able to maintain them at the level they have attained over the past seven years. Although increases in employment and income from raising the intensity of cultivation have by no means been completely exhausted yet, it is doubtful whether the respite from excessive rural-urban migration provided by the land reform will be able to continue for much longer without a more concerted effort being made in extension, credit, and agricultural price policy.

3. Changes in the Value of Per Hectare Farm Output

As may be observed from Table 3 (see page IV.32.), by 1967 the increased intensity of land use on the two ex-haciendas had produced four-fold increases in the value of production per hectare over pre-reform levels. The increase on ex-hacienda Otavi,* reported by Camacho Saa, was even more spectacular. As has been noted in previous sections, these changes were due to the

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*Camacho found the increase on this nearby hacienda to be 7.6.

changeover to higher valued crops and to the more labor-intensive methods used by campesinos. Furthermore, a comparison between the peso value of production on the part of Caramarca retained by the former patrón and that achieved on the land of campesinos reveals that this differential is not merely due to improved production techniques affecting agriculture in the Lower Valley without distinction as to tenure type. While campesinos surveyed in 1967 were reporting production per hectare averaging more than 23,000 pesos, the hacienda showed just over 4,000 for each hectare it controlled (data presented in Table 3).

Thus, the value of per hectare production by campesinos is significantly higher whether compared with pre-reform hacienda production or with that achieved by landlords on the parts of their estates that they were able to retain through the land reform process.

However, the right-hand side of Table 3 is both disappointing and surprising. With the ratio of land planted to non-traditional rather than traditional crops showing a significant increase between 1967 and 1973, one might have expected a rather dramatic increase in the value of per hectare production instead of the decline of over one-third on Caramarca and one-half on Parotani. With the increase in land that occurred on both Caramarca and Parotani, one might assume that intensity of land use might have dropped, thus explaining the drop in value of production per hectare. In fact, that has not happened, as may be observed from Table 9. Table 9 is obtained by dividing crop land (columns 2 and 3, 7 and 8 of Table 4) by total land (columns 5 and 10, respectively, of Table 4). The difference between the two periods in the intensity of land use is not significant. Data on this question from Parotani are unfortunately unavailable, although the author is convinced that the conclusion would be substantially the same, that is, that the decline in the value of per hectare productinn is not attributable to less intensive agricultural practices.

Table 10 was calculated on the basis of physical production units and prices the respondents actually reported having received, that is, nominal prices for both years. Data for Caramarca show increases in production for all major crops, with the increase in the production of fresh onions a phenomenal 300 percent. Production data for Parotani are less unequivocal, possibly because of heavy flooding in 1973 before the survey was

Table 9: Percent of Available Land Cropped: Caramarca

Identification Number	1967	1973
72	1.33	1.32
80	1.70	1.65
76	1.68	1.72
66	.93	1.81
74	1.86	1.74
70	1.73	1.23
68	1.76	.88
78	1.13	1.72
	1.52	1.51

Table 10. Comparison of 1967 and 1973 Average Production and Product Nominal Prices (1967 base = 100)

Crop	Production 1973/1967	Nominal Price 1973/1967
	Parotani	
Corn	113.0	108.1
Potatoes	97.4	97.4
Carrots	78.8	100.9
Fresh Onions	108.5	111.1
	Caramarca	
Corn	115.0	118.8
Potatoes	127.1	86.9
Fresh Onions	300.5	70.2

Average change in CPI January 1967 - July 1973 = 163.3.

conducted; production of carrots is down by just over 20 percent while other crops have either held their own or risen in production. Production on the two farms shows a generally rising trend over time.

Agricultural production constitutes 90 percent of the income for family farms in both Caramarca and Parotani, and in nominal terms farm prices have changed little over the interim between the two surveys. In the face of an increase in the general price level of 63 percent over the period, prices of the carrots produced on Parotani are virtually unchanged while fresh onions produced on Caramarca have dropped 30 percent in nominal terms.

This severe decline in real purchasing power can in large measure be attributed to the effects of the devaluation of 50 percent at the end of 1972 and a continuing policy of maintaining agricultural prices low as a way of subsidizing the incomes of the urban population of the country.* In January of this year (1974), as a result of government measures which further reduced rural income, open opposition between the government and the campesinos developed throughout the country. In the Lower Valley, this opposition produced violent clashes between the campesinos and government troops and ended with the death of a number of campesinos.

C. Technological Change in the Post-Reform Period

More intensive agricultural production in the Lower Valley has necessarily been accompanied by considerable technological change, especially in recent years. Crop rotation and soil conservation practices which may have been acceptable under the dominant form of agricultural production in the years before 1952 were totally inadequate for maintaining soil fertility under increasingly intensive irrigation and land use. Until the Revolution, virtually no chemical fertilizer was used in the Lower Valley (none on either Caramarca or Parotani) and the amount of organic fertilizer available depended largely on the number of animals on a given hacienda, although small purchases of sheep manure were made from haciendas in the highlands and the upper reaches of the valleys.[14] However, with the increasingly heavy irrigation to which the land was submitted (especially in the case of carrots), heavy applications of organic fertilizer were required to maintain the fertility of the soil due to high levels of salinity in the irrigation water and to retard mineralization. Since the reform, campesinos from the Lower Valley have become extremely dependent on the purchase of truckloads of organic fertilizer from the Altiplano and high valley regions, to such an extent that its price has risen at a rate exceeding that of the consumer price index. In the six years between the two surveys, the consumer price

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*The large number of purchases of household semidurable goods is limited mostly to the period before the devaluation.

14. Camacho Saa, Estudio de caso, pp. 23, 35, 36.

index for La Paz rose 63 percent, while the average price reported by farmers on Caramarca and Parotani for fertilizer more than doubled; this change in relative prices apparently indicates that demand for organic fertilizer has increased relative to demand for other products.

The relatively high price of sheep manure has induced a limited substitution into chemical fertilizer at retail. By 1967, 30 percent of the farmers of Parotani were using some chemical fertilizer as a result of a successful program of demonstration plots run by the Servicio de Extensión Agrícola (the Agricultural Extension Service). The failure of plots set up on Caramarca to yield any demonstrable difference between fertilized and unfertilized plots left farmers unconvinced of the merits of fertilizer, and as a result none of those surveyed in 1967 reported using it. However, by 1973 there had been a dramatic increase in fertilizer purchases on both farms, with all 23 landowners in the Parotani sample and 7 of the 8 respondents from Caramarca reporting the purchase of chemical fertilizer.

Although the amounts involved are small, in most cases to just a few kilograms and seldom more than a few fifty-pound sacks, considerable increases in fertilizer use can be expected in the next few years even if no significant extension effort is made to increase demand for this product.* More than anything else, this change demonstrates how receptive small farmers in the Lower Valley are to technological improvements, since the high retail price of fertilizer in Bolivia (35¢ to 49¢ per kilogram of nitrogen compared to 29¢ in Mexico) makes the cost-benefit ratio for fertilizer use less favorable than in many other developing countries.** Nationally it

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*In fact, extension and credit programs in this area are likely to develop since the International Development Bank is already considering an 11.2 million dollar loan for the construction of a fertilizer and explosives plant and an United Nations Development Programme mission is in the country doing a feasibility study for the construction af a 1,000 MT/day nitrogen plant, according to an Inter-American Committee for the Alliance for Progress report and a letter to the author dated 17 May 1974 from T. Triscuzzi of UNDP in Vienna.

**One of the respondents in the Parotani survey paid 75¢/kg. in 1973. A more complete discussion of the problems and possibilities of fertilizer production and sales in Bolivia can be found in the author's unpublished discussion paper, "The Bolivian Fertilizer Market and the Goal of Domestic Production" (1974).

Table 11. Percentage of Farmers Using and Cash Value of Chemical Fertilizer

	Mean	Maximum	Percent of Farmers Using Fertilizer	Mean	Maximum	Percent of Farmers Using Fertilizer
	1967			1973		
Caramarca	0	0	0	$b. 48*	$b. 180	87.5
Parotani	(No data)		30	$b. 103	$b. 360	100.0

*All prices 1973.

Source: Camacho Saa, Estudio de caso, p. 135, and survey data.

is estimated that 90 percent of the chemical fertilizer is used on potatoes; this would appear to be true of the Lower Valley as well. Campesinos use only minimal amounts of chemical fertilizer (not more than 100 lbs. of 16-40-0* per hectare in most cases) when planting potatoes but believe that the residual effects from this application carry over to the next crop in the rotation cycle; this may well be true since levels of soil fertility might otherwise have been even further depleted. Levels of application and numbers of crops to which it is applied can be expected to increase in the future, especially if the price of organic fertilizer remains high. While the value of purchases of organic fertilizer increased about one-fourth on Parotani, it declined by nearly half on Caramarca (perhaps in response to a shortage of cash for purchases because of low prices in 1973). Even on Parotani, where the value of fertilizer of all kinds rose, the increase was not proportionate to the amount of additional land acquired during the intervening years. Thus, per hectare use of fertilizer has actually declined among farmers in the survey, although there is reason to believe that this is because 1973 was atypical in that agricultural prices dropped in real terms, reducing the availability of cash for purchasing farm inputs.

The type of tools used by campesinos in the Lower Valley is little different from that used before the reform, although there is reason to

*Soil in the Lower Valley is generally not deficient in potash, although testings might show spot deficiencies on some farms. See the discussion paper cited above.

believe that part of the increase in income since the Revolution may have gone to the purchase of better quality tools. A considerable variety of imported hand tools was observed in every market visited by the author, both in the Lower Valley and elsewhere. In any case, increases in labor productivity from this source are not likely to be significant. Similarly, more than 85 percent of those surveyed reported ownership of steel plows by 1967*; this figure is probably somewhat higher than the national average.

One major technological change, however, did take place between 1967 and 1973, which has already been noted tangentially in Table 4 where it was observed that on Parotani there has been a significant drop in the amount of land in alfalfa which is cut for feeding livestock, principally oxen. Some farmers of Parotani appear to be finding alternatives to the ownership of oxen for soil preparation. As may be observed in Table 12, in 1967 only six farmers spent more than 100 pesos ($b. 20 = US$1) on the rental of oxen and none of the former miners, who as a group were better endowed than the rest, had to rent oxen. By 1973 four of the ex-miners and seven campesinos were renting them; furthermore, others were making arrangements to pair their one ox with another campesino's one ox to make a yoke and thus decrease capital costs for both parties. This would probably explain at least much of the decline in value of animals which reached an average of nearly 1,700 pesos, or only slightly more than the price on one ox, per family between the two periods.

Similarly, there has been a complete reversal in the percentages of farmers using and not using the services of rental tractors, which neighbors from small rural towns have been offering to campesinos and ex-landlords. Whereas only 10 percent of the farmers on Caramarca used rented tractor services in 1967, by 1973 the figure has risen to 75 percent. In like fashion, in the most recent survey, 32 percent of the respondents from Parotani reported tractor rentals while none had reported rentals in the previous survey. On the surface, it would appear that Parotani should have shown greater interest than Caramarca since in other matters Parotani has

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*A similar percentage was observed in 1973.

Table 12. Hiring of Oxen

Value of Rental (in 1973 pesos)	Campesinos	Ex-Miners
	1967	
0-100	16	6
101 up	6	0
	1973	
0-100	11	3
101 up	7	4

appeared as an early rather than a late adopter of new techniques compared to more isolated ex-haciendas, such as Caramarca. Since the ex-landlord of Caramarca has a considerable amount of machinery available, he has offered it to campesinos in exchange for commitments to work for set periods of time for the hacienda. Furthermore, because Caramarca is closer to Vinto and Quillacollo, there may also be competition from tractor owners from these towns. On the other hand, Parotani is farther from the sources of machinery. In any case, the replacement of oxen by machinery for soil preparation will allow some saving in land that would otherwise have to go to forage crops and permit campesino savings to be used for direct improvements to welfare. As a major exporter of petroleum products and an importer of a number of agricultural products, Bolivia should perhaps be more concerned with saving land than saving fuel. Some problems have been reported with getting tractor operators to leave the small fields they are preparing for planting flat enough to facilitate irrigation since high spots receive no water while depressions flood, killing the crops. I feel, however, that most of these complaints will disappear as operators' experience increases. One unfavorable note: it will involve a transfer of income from campesinos to vecinos from rural towns and in some cases to landlords since campesinos do not own this machinery.*

*For a description of an attempt at setting up a cooperative to supply farmers in a small-holder community in the Lower Valley with tractor service, see Appendix 1 to the case study.

D. Levels of Income and Standard of Living in the Post-Reform Period

In this section an attempt will be made to discover which are the most important determinants of income, especially of farm-generated income, and how these factors vary between the two farms studied. Subsequent sections will focus on the disposition of farm income. Of particular interest will be the way in which increases of income since the reform have furthered farmer participation in the market on both the supply and demand sides and how this increased participation can be seen as a rise in the standards of living enjoyed by campesinos in the Lower Valley.

1. Determinants of Gross Farm Income

From the available data, any number of measures of the well-being of farmers in the sample might have been chosen, among them gross farm income, net farm income, total family income, including income from handicrafts, small business, and wage labor. Since the family still constitutes the basic production unit in rural Bolivia the analysis was conducted in terms of gross family farm income. Gross rather than net income was used because an accurate measure of net farm income could not be developed. Respondents generally failed to impute value to many of their own inputs which were contributed to the production process, the prime case of this being the value of organic fertilizer saved from their own animals. However, based on the information that is available on sales, consumption, and production costs, the correlation between computed gross and net income is so high (greater than .99 in the 1973 data from Parotani, for example) that I expect that the correlatinn between the "real" values of the two measures of income and the observed values would be high enough that no significant changes in the results of the regression analysis would appear if "real" values could be determined. Put another way, the value of self-produced inputs used in the production process is small by comparison to the value of total income, either net or gross.

Another possible choice of a proxy for welfare, per capita income, was not tried because in the author's opinion it would not constitute an accurate measure of welfare unless a set of weights were attached to the members of the family by age, occupational status, and the like. In rural areas there is good reason to believe that an increase in the number of children in the family does not imply a proportionate decrease in its

well-being, with income fixed. With no a priori or theoretically valid system for assigning weights, it was felt that to measure income on a per capita basis would only serve to confuse the question.

In the pages that follow, note that: 1) Gross Farm Income is measured in pesos bolivianos of 1973 (July); 2) all monetary variables are in 1973 pesos as well; 3) land is measured in square meters and is more or less homogeneous in quality; all land which is divided individually on both farms is irrigated; collective title to the hillside is not included.

Starting with the simple regression, FARM INCOME = $b_0 + b_1$ (LAND), we can derive the following results for the two farms in the two time periods.

PAROTANI (1967)

FARM INCOME = 5,197.5 + .91 LAND

s_b	(2,224.3)	(.19)
t-value	2.34	4.90
significance level	.03	.00

F-ratio (regression) with 1.26 d.f. = 24.0

significance level = (0.00)

R^2 (coefficient of determination) = .48

partial F (b_1/b_0) = 24.0

PAROTANI (1973)

FARM INCOME = -154.3 + .63 LAND

s_b	(1,182.7)	(.19)
t-value	-.13	7.90
significance level	.89	.00

F-ratio with 1.23 d.f. = 62.4

significance level = (0.00)

R^2 = .73

partial F (b_1/b_0) = 62.4

It is something of a surprise to find that the coefficient on land is considerably lower in 1973 than in 1967, although its level of signific-nace increases. What this reflects is the depressed state of agricultural prices in the face of massive inflation in other sectors. In fact, correction for this aberration (by inflating agricultural income by the 63 percent that everything else had risen by) yields the following equation.

PARTOANI (1973, corrected)

FARM INCOME = -251.57 + 1.03 LAND

s_b	(1,927.57)	(1.13)
t-value	-.13	7.90

F-ratio with 1.23 d.f. = 62.38

significance level = (0.00)

R^2 = .73

partial F (b_1/b_0) = 62.38

The corrected value for the coefficient on land in the 1973 equation (1.03) is not significantly different from the 1967 coefficient (.91) at the 10 percent significance level. Another way of saying the same thing is that, after correction is made for the unusually low level of farm prices, land remains at least as important a determinant of farm income in 1973 as it had been in 1967. The significance of the regression as a whole (measured by R^2 increases from .48 in 1967 to .73 in 1973) shows that the importance of land as the explanatory variable for farm income increases from 1967 to 1973. In the discussion of more complex models which follows, it will be argued that disparities in technology, marketing, and occupational factors decreased in the interim, leaving land as the principal explanatory variable.

For Caramarca, the following results were obtained for the simple regression of income on land.

(1967)

FARM INCOME = 11,448.6 - .14 LAND		F-ratio with 1,8 d.f. = 0.08
s_b	(2,244.5) (.48)	significance level = (.78)
t-value	5.10 -.28	R^2 = .01
significance level	.00 .78	partial F (b_1/b_0) = (.08)

(1973)

FARM INCOME = 2,763.5 + 1.48 LAND		F-ratio with 1,6 d.f. = 23.2
s_b	(1,916.9) (.31)	significance level = (0.00)
t-value	1.44 4.82	R^2 = .79
significance level	.20 .00	partial F (b_1/b_0) = 23.2

Land is not significant in the 1967 regression. Most campesinos still had only their pegujales, which were of nearly equal size. Subsequent purchases increased the dispersion of land, making estimation of its value in production easier. Wider diffusion of knowledge about marketing and modern inputs left land as the most significant single factor determining income. In the interval, as has been noted in the previous section, the degree of integration of Caramarca with the market increased greatly, including a 200 percent increase in physical output of fresh onions, which are grown purely for market. Furthermore, land is now used in a much higher proportion for

directly productive purposes, as may be noted from the declining proportion of land employed in the production of alfalfa. (It is worth noting again that, because of a lack of information on the subject, no imputation was made for the value of alfalfa production.) Only two of those surveyed in Parotani in 1967 reported planting alfalfa and on Caramarca the proportion of land going to this use was both small and declining. In any case, the importance of the amount of land in determining farm income is indicated by the fact that all respondents from Caramarca surveyed in both periods showed increases in their landholdnngs. These purchases were primarily from the ex-landlord of hacienda land which he continued to sell in small plots in the period between the two surveys. Similarly, referring back to Table 3, ten respondents from Parotani reported increases in their landholdings while only two showed decreases of more than 10 percent in the size of holdings.

A multiple regression model was developed in an attempt to include other factors which economists concerned with development traditionally have considered to be important determinants of farm income. Some of these factors are marketing skill, farm capital, and the use of modern inputs. No clear theoretical definition existed for the way in which these variables should be defined in the case of the Lower Valley. As a result, various specifications of the variables were tried before arriving at the following model. Some variables which conceivably might have improved the "explanatory" power of the model were excluded (such as the value of household semi-durables) since the author was attempting to develop a model which might be of some usefulness to policy-makers concerned with the Bolivian agrarian reform and agricultural development in the Lower Valley of Cochabamba. While other variables might be chosen to create a model which fits the data better, the model described here does provide some insight into factors determining farm income and the impact which changes in those factors have had on farm income in recent years. In general, the variables chosen were those over which the National Agrarian Reform Service or other agency of the Bolivian government could exercise some control for the purpose of raising farm income. One non-policy variable was included at the

suggestion of a former resident of Parotani,* that is, a "dummy" variable for former occupation which takes the value of 1 for ex-miners and 0 for former colonos and workers in the alcohol factory, who have been grouped together under the title of "campesinos." Based on what has been said about the differences between former miners and campesinos in previous sections, this variable really could not be excluded from the model.

No information was available for Caramarca on previous occupation of the respondents (with one exception). Furthermore, the small sample size (n = 10 in 1967 and 8 in 1973) makes fitting any regression with more than one variable at best a tenuous proposition. Results are given (with the dummy variable for occupation excluded from the equation), although very little can be said about them because of the lack of degrees of freedom.

The following variables were included in the equation:

1) LAND = irrigated land measured in square meters.
2) PERCENT MARKETS is the percent of total number of sales transacted in off-farm markets. Much of the qualitative literature on the development of new market channels after 1952 makes much of sales to rescatadores, or itinerant truck owner-merchants, who are alleged to exploit the peasantry by buying crops before harvest time and paying considerably less than the expected market price. Although there is an element of hedging against adverse price movement at harvest in this scheme, which one of the ex-miners from Parotani pointed out to the author, it is felt that campesinos are generally the losers in such deals. However, the percentage of off-farm sales is only a very indirect measure of acumen in dealing with purchasers of farm products, the variable of interest.
3) FARM CAPITAL is defined to be the average value of livestock (the total value of livestock at the time of the survey and the total value of livestock one year before the survey divided by two) plus the value of all farm implements. Generally, livestock is at least four times the value of tools. In addition, the variable for farm

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*Stephen Smith, currently a Research Associate in Agricultural Economics at the University of Wisconsin-Madison.

capital represents not only productive capital (oxen, plows, etc.) but also saving since animals are also a major form in which wealth is stored.*

4) MODERN INPUTS is defined as the total value of purchased seed (generally accepted as superior to seed saved from last year's harvest), organic fertilizer purchases, and chemical fertilizer purchases.

5) The final variable is a dummy variable for previous occupation, defined above as 0 for campesinos and 1 for miners. The sign on this variable was expected to be positive. The following results were obtained for Parotani:

(1967)

$$\underset{\text{INCOME}}{\text{FARM}} = 2{,}638.6 + .23\ \text{LAND} + 7{,}454.8\ \underset{\text{MARKETS}}{\%} - .26\ \underset{\text{CAPITAL}}{\text{FARM}} + 6.46\ \underset{\text{INPUTS}}{\text{MODERN}} + 6{,}834\ \underset{\text{DUMMY}}{\text{OCCUP.}}$$

s_b	(1,833.8)	(+19)	(2,674.2)	(.30)	(1.68)	(2,098.1)
t-value	1.44	1.24	2.79	-.85	3.84	3.25
sig. level	.16	.22	.01	.40	.00	.00

F-ratio with 5 and 22 d.f. = 19.0 significance level = (0.00)

$R^2 = .81$

(1973)

$$\underset{\text{INCOME}}{\text{FARM}} = -756.4 + .42\ \text{LAND} + 1{,}330.6\ \underset{\text{MARKETS}}{\%} + .50\ \underset{\text{CAPITAL}}{\text{FARM}} + 1.28\ \underset{\text{INPUTS}}{\text{MODERN}} + 1{,}387.8\ \underset{\text{DUMMY}}{\text{OCCUP.}}$$

s_b	(1,156.5)	(.12)	(1,759.4)	(.26)	(1.28)	(1,387.8)
t-value	-.65	3.66	.75	1.94	1.05	1.00
sig. level	.52	.00	.46	.07	.31	.33

F-ratio with 5 and 19 d.f. = 16.07 significance level = (0.00)

$R^2 = .81$

The relatively low value of the coefficient on land in the 1967 model is somewhat surprising, although in view of the results obtained from the simple regression model for Caramarca for the same year, in which no particular correlation was found between land and farm income, it should not have been completely unexpected. By 1973, size of landholdings became by

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*The other major store of wealth is cash kept at home.

far the most significant factor in income determination. Both the value of the coefficient and its significance level increases in the 1973 sample. This may indicate that other factors which had been important in 1967 no longer were particularly useful in explaining variation in income within the survey group.

Fairly impressive changes were occurring in market patterns which show up as changes in the percent of off-farm sales (compared with total sales). Over the 1967-1973 period the average number of off-farm sales transactions dropped from nearly 8 to just over 5 while the total number of transactions of all types dropped from 16 to 8, resulting in a non-significant* increase in the mean value of percent markets from .342 to .378. Large quantities of products appear to have been sold in each transaction, permitting the number of sales to drop without affecting total volume very much.

But it is important to observe that while in the 1967 sample a positive and highly significant relationship existed between off-farm sales and farm income, by 1973 the value of the coefficient on this variable as well as the level of significance had dropped considerably. More than anything else, this change indicates an increase in the availability of trucks for moving produce to market. At the time of the first sample, the oligopoly of the truck-owners syndicate was a significant factor in making it difficult for farmers to move their products to outside markets, even when they knew the prices were better than those they were offered by the truck owners. Frequently, it was a question of selling to the rescatador truck owner or letting the crop be lost since truck owners usually would not accept hauling contracts but preferred to purchase the crop and market it themselves. The sindicato** still limits the number of trucks on a given route (although, because of the increased number of trucks, the degree of oligopoly would appear to be lower). Thus, if a campesino knew that the best price for his product could be obtained by bringing it to the market at Punata in the Upper Valley, he might still be unable to ship it there because truckers going through and originating from Parotani are mostly limited to the La Paz-Oruro-Quillacollo-Cochabamba route. The decline in the value and

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*Using the pooled variance, the t-value for the difference in the means is -.39 (S^2_{1967} = .314, n = 28; S^2_{1973} = .351, n = 25).

**The sindicato of truck owners limits competition on truck routes.

significance of the coefficient of this variable suggests that the oligopoly is breaking down somewhat; there are various steps that could be taken to speed up this process and to increase the diffusion of information about marketing, such as limiting the authority of the sindicatos in controlling routes and transmitting information on commodity prices in Quechua over the local radio stations.

The sign on the coefficient for farm capital in the 1967 equation is unexpectedly negative, however. The low level of significance suggests that capital is not a significant determinant of income in this period. The higher value and greater significance of the coefficient on farm capital in 1973 would seem to indicate that the level of farm capital being held by 1973 is more nearly optimal for the level of agricultural production. A rather significant drop has taken place in the value of livestock and other animals between the two periods; much less land is now in alfalfa, and there has been a 25 percent increase in the value of rental of oxen and an increase from zero in 1967 to eight in 1973 in the number of respondents using tractor services. These factors, then, tend to indicate that ways are being found to decrease the lumpiness of capital and permit a more nearly optimal holding of capital to be maintained.

Both the coefficient of the variable for modern inputs and the level of significance of the coefficient are lower in the 1973 than in the 1967 sample. Modern inputs is composed of the value of two basic factors: fertilizer (chemical and organic) and seed. Its makeup has changed considerably with the proportion represented by seed purchases declining from 51 percent in 1967 to 23 percent in 1973, probably reflecting more than anything else the change in relative prices, as agricultural products in general (including seed) have not risen as fast as other products, including organic and chemical fertilizer which have risen faster than the general price level.* There may also be a problem of multicollinearity (.65) between the land and modern inputs variables, which would explain the lack of significance of the coefficient on this variable. Another explanation is that now most farmers know the technology and are using it.

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*The author did not discover this problem until analysis had already been performed; perhaps it would be better to have used physical units rather than their cash equivalents.

The change in the dummy variable for occupation is interesting. In 1967 a considerable difference in expected income existed on the basis of the former occupation, with a large and highly significant differential existing in the favor of former miners. By 1973 not only had the level of that differential declined, but at the same time it changed from a highly significant to a non-significant explanatory variable. Whatever differences existed between former miners and campesinos in their ability to grow and market their products had been moderated as campesinos acquired many of the skills miners had developed before they started farming.

For Caramarca estimations of the same equations, less the variable for occupation, yielded the following results.

(1967)

	FARM INCOME	= 6,117.7	+ .53 LAND	+ -- PERCENT MARKETS*	- .33 FARM CAPITAL	+ 3.56 MODERN INPUTS
s_b		(3,803.8)	(.52)	--	(.24)	(1.62)
t-value		1.61	1.02	--	1.94	4.81
sig. level		.16	.34	--	.21	.07

F-ratio with 3 and 6 d.f. = 2.23 significance level = .18

R^2 = .53 n = 10

(1973)

	FARM INCOME	= 6,908.6	+ 1.20 LAND	- 4,926.1 PERCENT MARKETS	- .04 FARM CAPITAL	+ 2.31 MODERN INPUTS
s_b		(6,572.2)	(.58)	(7,119.6)	(.38)	(2.23)
t-value		1.05	2.06	-.69	-.10	1.03
sig. level		.37	.13	.54	.93	.38

F-ratio with 4 and 3 d.f. = 4.76 significance level = .12

R^2 = .86 n = 8

The information provided by the additional variables is severely limited due to the lack of degrees of freedom. As in the equations for Parotani, the significance level of land as well as the value of the coefficient

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*The pivot ratio was too small to permit accurate calculation of the coefficient for this variable; therefore, it was omitted from the equation.

is higher in 1973. Similarly, the coefficient for modern inputs drops from 1967 to 1973, although again this may reflect the imperfect design of this variable due to changes in relative prices. The low significance levels of the F-ratios indicate that the equations are not much of an improvement over the use of its mean value as an estimate of the dependent variable.

In a previous section the physical volume of production of several of the most important traditional and non-traditional crops was analyzed. Generally, production of traditional crops maintained its 1967 levels or increased slightly, although proportionately less land was dedicated to these crops. Production of the principal cash crop of Parotani, carrots, declined slightly, with most of this decline being attributed to flooding. On Caramarca, the main cash crop, fresh onions, increased by 200 percent from 1967 levels, while other cash crops, such as broad beans, also showed significant increases. Gross farm income, however, was severely affected by the failure of prices of agricultural commodities in general and vegetable prices in particular to rise in proportion to the general price level. In fact, what happened was that whatever measure of income one chooses to use, a decline occurred for Parotani while income of Caramarca rose, but nowhere near in proportion to the increase in the physical volume of output. Most of this relative and absolute unfavorable movement in income is traceable to the effects of the devaluation of 1972 and subsequent attempts to maintain agricultural prices low as a subsidy to the urban sector. Table 13 below shows the changes which have occurred in income between the two periods, while Table 14 shows the tremendous impact of the devaluation on the La Paz consumer price index which in general closely parallels price movements throughout the country.

As was noted in the introductory section, Parotani is one of the farms of the Lower Valley most exposed to the problems of flooding due to its location at the confluence of three rivers. Part of the decline in income between the two periods was due to the fact that the volume of output of the major cash crop was down about 20 percent in 1973. Most of the decline, however, is due to the fact that commodity prices have fallen in real terms due to the effect of the devaluation which took place late in 1972 and to the official policy of holding agricultural prices down. In Caramarca, the only reason why similar decreases were not observed within the different

Table 13. Consumer Price Index, La Paz
(base = 1963)

100	1963	161	Aug. 1972
110	1964	161	Sept.
113	1965	162	Oct.
121	1966	201	Nov.
135	1967	197	Dec.
142	1968	197	Jan. 1973
146	1969	197	Feb.
156	1970	201	March
157	1971	203	April
167	1972	205	May
159	April 1972	205	June
159	May	212	July
160	June	220	Aug.
161	July	228	Sept.

Source: Boletin Estadístico, Banco Central de Bolivia, Gerencia Técnica, no. 212 (La Paz: marzo de 1974).

Table 14. Mean Income Levels of 1967 and 1973
(expressed in constant prices of 1973)

Parotani

Type of Income	(1) 1967	(2) 1973	1973 Income as Percent of 1967 Income (2)/(1)
1. Gross Farm	14,478	8,126	56.1
2. Net Farm	13,070	6,760	51.7
3. Gross Farm and Wage	15,175	9,537	62.8
4. Gross Farm and Wage and Handicaaft	15,175	9,682	63.8
5. Total Income (= 4 + Business)	17,860	11,212	62.7
6. Per Capita Income (= 5/Family)	3,553	2,297	64.6
7. Gross Farm/Hectare	14,233	6,216	43.7

Caramarca

Type of Income	1967	1973	(2)/(1) x 100
1. Gross Farm	10,839	11,680	107.8
2. Net Farm	9,412	10,622	112.9
3. Gross Farm and Wage	11,647	12,355	106.1
4. Gross Farm and Wage and Handicraft	11,668	12,580	107.8
5. Total Income	11,742	12,580	107.1
6. Per Capita Income	2,844	2,964	102.8
7. Gross Farm/Hectare	2,453	1,941	79.1

The various types of income shown in Table 14 are defined as follows:

GROSS FARM INCOME is the sum of the value of seed saved, consumption of farm crops, sale of crops, crops bartered, consumption of farm animals, sale of farm animals (excluding off-setting sales and purchases),* consumption of animal products, and sale of animal products.

NET FARM INCMME = Gross Farm Income minus production costs (seed, fertilizer, sacks, and other puchased inputs such as hired labor and the rental of oxen and tractors). Purchases of livestock are not included as a production expense since they were not used up in one period.

WAGE = Income from labor of some family member.

HANDICRAFT = Income from the sale of handicrafts.

BUSINESS = Income from commercial sources including buying and selling of farm products as well as sale of non-agricultural products to passers-by.

PER CAPITA INCOME = Total Income/number of members of family.

GROSS FARM/HECTARE = Gross Farm Income divided by amount of land

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*The sale of livestock (liquidation of assets) may explain much of the residual variation in the regression equations on farm income.

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measures of income was due to a massive increase in the output of cash crops, especially fresh onions, which more than offset the unfavorable movement of prices in real terms and even in nominal terms.

Cash production costs (= gross farm - net farm income) remained about the same on Parotani and dropped slightly on Caramarca. However, they represented a greater fraction of gross farm income for Parotani in 1973 and a smaller one for Caramarca. In this case, Caramarca is probably more typical of other parts of the Lower Valley since it is unlikely that many other farms were as severely affected as Parotani by flooding.

On Parotani, the average amount of wage income has increased from 697 to 1,411 pesos from 1967 to 1973 while the percentage of those reporting having received wage income has dropped from over 90 percent to under 50 percent, with at least 3/4 of those reporting such income in the category of 9,000 square meters or less land, in other words, those with no land or less than average holdings of land. On Caramarca, where 80 percent of those surveyed in 1967 had reported income from wages, only one individual reported such income in 1973.

Income from handicrafts has increased in importance on both farms, although its contribution to total income in neither case reaches two percent. Income from commercial sources includes anything from selling sandwiches and cold drinks to passing travelers to the purchase of livestock and vegetables for resale in Cochabamba. It does not include sale of own farm products to passers-by. Naturally, because of its location, such income in considerable on Parotani, averaging 2,685 pesos in 1967 and 1,530 pesos in 1973, and negligible for Caramarca in both periods. On Parotani, the standard deviation of commercial income is between two and three times its mean, which is not surprising since a few individuals have high and one individual a very high income from this source, while most receive no income whatsoever from this source. The drop in commercial income is attributable in large measure to the removal of the toll station which formerly was located in Parotani.* The obligatory stop for all traffic provided an excellent opportunity for small-scale business to flourish.

Per capita income on Parotani has dropped sharply, reflecting both the large drop in total income, which has been discussed above, and a small increase in the average family size. On Caramarca, on the other hand, per capita income has risen slightly as a result of a small decline in the average size of families and a seven percent increase in income.

Gross farm income per hectare fell on both farms, falling by more than 50 percent on Parotani and by about 20 percent on Caramarca. While some decline in this ratio was to be expected under the assumption of a constant returns to scale production function, since other inputs were basically fixed, a decline of the order of that of Parotani is indeed surprising. Here again one must recall that at least 20 percent of the decline can be attributed to natural calamity, with another 63 percent explained by the failure of agricultural prices to follow the general inflationary trend. Correction for these factors would show a decline in income per hectare of less than 20 percent, not surprising in view of an increase of average landholding of nearly 30 percent.

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*The main reason for its removal was the bad feeling which developed in the community over relations between toll-collectors and women of Parotani as toll-collectors lived for extended periods in the community and away from their families.

2. Degree of Market Integration (Supply Side)

Table 15 breaks down gross farm income into its basic components, giving the mean values of the various components by year. The degree of market participation has traditionally been higher in the Lower Valley than in most other regions of the country, but it was still low by present standards in the pre-reform period. Assuming that the proportion of output sold is a linear function of time, a backward extrapolation of the 1967 and 1973 observations from Caramarca put this proportion in the neighborhood of 25 percent, although I suspect that the real value, if it could be determined, would be somewhat lower. Articles by Clark (referring to the Altiplano) and Marschall and Torrico (the Upper Valley) also support the thesis that market participation by campesinos in the pre-reform period was low, although neither article hazards a guess at the proportion of income constituted by such sales.[15] By 1967, however, more than 64 percent of gross farm production was marketed on Caramarca and over 86 percent on Parotani. In 1967 farmers from Caramarca were less able to take advantage of the possibilities offered by commercial agriculture because of its remote location and seasonal isolation by flooding. It will be recalled that the coefficient for the percentage of off-farm to total sales in the 1967 regression equation could not be calculated because all sales were made off-farm, i.e., the value of this variable was one for all cases; rescatadores simply did not come back into Caramarca to make purchases. Improvements in the access road and construction of a bridge have improved access to the point that rescatadores now do visit the area to buy onions.* By 1973 the degree of market integration of farmers from Caramarca came close to rivaling that of farmers from Parotani (see Table 15). The spread between the lowest indicator for market integration (agricultural product sales/gross farm production) and the highest (agricultural product sales/

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15. Ronald J. Clark, "Land Reform and Peasant Market Participation on the Northern Highlands of Bolivia," LTC Reprint no. 42; Katherine Barnes von Marschall and Juan Torrico Angulo, "Cambios socio-económicos en el Valle Alto de Cochabamba desde 1952," LTC Reprint no. 109-S (Madison, Wis., 1973).

*Campesinos took pains to point out to the author that there now was a bus which comes through the farm twice daily, allowing them to send some of the older children to school in the market town of Vinto.

Table 15. Components of Gross Farm Income
(value in $b. 1973)

	1967	1973
Caramarca		
1. Retained Seed	234.7	297.5
2. Agricultural Products Consumed on Farm	3,201.3	1,192.2
3. Agricultural Product Sales	6,629.2	8,042.5
4. Barter	0	180.0
5. Livestock and Poultry Consumed on Farm	403.3	525.0
6. Livestock and Poultry Sales	652.0	610.0
7. Livestock and Poultry Product Consumption	225.3 (includes wool)	676.9
8. Livestock and Poultry Product Sales	79.9	156.3
Total	11,425.7	11,680.4
Parotani		
1. Seed Retained from Harvest	0	106.0
2. Consumption of Agricultural Farm Products	1,622.6	973.1
3. Agricultural Product Sales	12,052.0	6,479.0
4. Barter of Agricultural Products	0	0
5. Consumption of Animals	242.8	305.2
6. Sale of Animals*	403.2	182.4
7. Consumption of Animal and Poultry Products	108.5	78.8
8. Sale of Animal and Poultry Products	137.7	1.6
Total	14,566.8	8,126.1

*Offsetting sales and purchases (replacement) of animals excluded.

total agricultural production) is larger for Caramarca than for Parotani. This can be explained by the fact that animal production and the consumption of animals and animal products is much more important on Caramarca than on Parotani. For both farms sale of agricultural products represents over 90 percent of the value of farm product sales. (See Table 16.)

Every indicator of degree of market integration for Parotani dropped, apparently due to the significant decline in income which has been noted in earlier sections. What is interesting, however, is that the decline

in the proportion of output which is sold was relatively small in the face of a massive drop in farm income. This evidence thus tends to undercut the much propounded thesis that peasants are able to divorce themselves from the market during hard times and return to a more subsistence-oriented mode of production.*

3. Degree of Market Participation (Demand Side)

Data from both farms show a substantial drop in the absolute value of on-farm consumption of agricultural products (see Table 14), which substantiates the assertion in the previous section that even in times of relatively unfavorable agricultural prices and other calamities, farmers in the Lower Valley do not return to subsistence production. The trend in the consumption of domestic animals, poultry, and products such as milk, eggs, wool, etc., is generally upward,** which is not surprising in view of the high income elasticity of demand for these products. (Within the detailed questionnaire on consumption, an increase was also noted in the average family consumption of purchased meat.) In the pre-reform period in Bolivia, as in most other countries in Latin America, products such as cheese, eggs, etc., were too valuable to be consumed by campesinos who either sold them or were required to bring them to the landlord as part of their obligations of pongueaje. Thus increased consumption of these products (see Table 15) reflects general improvements in standard of living and not any reversion to a non-market-oriented mode of production.

In the Lower Valley the degree of market participation (defined to be the ratio of purchased consumption goods to total consumption) has probably been higher than for most other regions of the country, with the possible exceptions of the Eastern Lowlands, especially since 1952. Table 17 shows the changes that have been observed in this ratio. As early as 1967 (and probably for several years before) consumption in the form of cash purchases constituted more than half of total consumption (farm

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*See Teodor Shanin, "Peasantry as a Political Force," in T. Shanin, ed., Peasants and Peasant Societies (Baltimore: Penguin Books, 1971), p. 254.

**The decline in consumption of "animal and poultry products" observed in the Parotani data is attributable to an epidemic which decimated the poultry flocks of the community a few months before the survey was made.

Table 16.* Marketed Production as a Percent of Total Production

	1967	1973
Caramarca		
1. $\frac{\text{Agricultural Product Sales}}{\text{Gross Farm Production}} \times 100$	58.0	68.9
2. $\frac{\text{Total Sales}}{\text{Gross Farm Production}} \times 100$	64.4	75.4
3. $\frac{\text{Agricultural Product Sales}}{\text{Total Agricultural Production}} \times 100$	65.9	82.8
Parotani		
1. $\frac{\text{Agricultural Product Sales}}{\text{Gross Farm Production}} \times 100$	82.7	79.7
2. $\frac{\text{Total Sales}}{\text{Gross Farm Production}} \times 100$	86.4	81.9
3. $\frac{\text{Agricultural Product Sales}}{\text{Total Agricultural Production}} \times 100$	88.1	85.7

*Calculated from Table 15.

Table 17. Market Participation
(= Consumption Purchases/Total Consumption)

Caramarca

	0 - .50	.50+ - .75	Over .75	Sample Size
1967	1	8	1	10
1973	0	7	1	8

Parotani

	0 - .50	.50+ - .75	.75+ - .85	.85+ - .95	Sample Size
1967	3	16	8	1	28
1973	0	2	12	11	25

consumption including bartering* plus consumption purchases) for nearly all respondents. At that time the great majority of respondents found themsleves in the .50+ to .75 range. As time went on, however, farm families in the Lower Valley purchased an even higher percentage of their total consumption requirements, with 100 percent of those surveyed in 1973 showing consumption purchases equal to more than half the value of total consumption. Ratios for Parotani tended, as was expected, to be higher than those for Caramarca. On Parotani, only two respondents showed ratios of market participation of .75 or less, with the remainder nearly equally divided between the .75+ to .85 and the .85+ to .95 ranges. Thus the degree of market participation of farmers in the Lower Valley is even higher on the demand side than on the supply side, and the trend of rising market participation is more clearly defined.

Table 18. Consumption Purchases as a Percent of Total Consumption Related to Farm Size (1967 and 1973)

	0 - 1 ha.	1+ ha. - 2 has.	More than 2 has.	Total
		1967		
0 - 50%	3	0	0	3
50+ - 75%	3	12	1	16
75+ - 85%	4	4	0	8
85+ - 95%	1	0	0	1
	11	16	1	28
		1973		
0 - 50%	0	0	0	0
50+ - 75%	0	2	0	2
75+ - 85%	3	9	0	12
85+ - 95%	6	4	1	11
	9	15	1	25

*Although the author suspects that barter is slightly more important than the data show, having observed cases of this type of transaction and having heard about others.

An attempt was made to discover if a relationship existed between the amount of land a family owned (and thus its income, because of the high correlation which has been observed between the two) and the degree of market participation. No such relationship was found in the data in either period. Results are presented above in Table 18.

4. Investment in the Post-Reform Period

In rural Bolivia there is much less of a dichotomy between saving and investment than in more developed countries since savings are only rarely invested outside the family economic system. Even in the case of antícresis, funds loaned are used to acquire control over additional land. The distinction between what constitutes consumption and investment in less clear in the family farming enterprises found in the Lower Valley. Most saving in this area takes the shape of investment in land, housing construction, the purchase of livestock, and retained cash earnings.

Land has been shown to be the major determinant of farm income, a fact of which farmers from the Lower Valley are well aware. Farmers in Caramarca have been able in the past to acquire land from the hacienda, albeit at prices that are often above what good farm land sells for in most developed countries. On Parotani, the supply of land, as was observed in Table 2, has been largely limited to sales of land by ex-miners; campesinos sell their land in only the rarest of circumstances. On both farms there is no variation whatsoever in the estimated per hectare value of land, which apparently indicates that the respondents could not estimate the value of their land and the field worker took it upon himself to put in a figure he thought estimated the average value of land on the case study ex-hacienda. By 1973, however, estimates vary widely, indicating that respondents had given some thought to what their land was worth. Since many respondents had purchased land in the interim, they had some basis for estimating its value. In any case, a land market of sorts does appear to be developing. When land does come up for sale, because of the imperfect market, a potential buyer must have the ready cash to purchase it before someone else does. This puts a premium on liquidity, which may explain the large cash balances campesinos are alleged to keep at home.*

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*An indirect measure of supposed liquidity might be derived from (cont.)

Housing is a second major form investment takes in the Lower Valley. Between 1967 and 1973 respondents from Caramarca increased their estimates of the value of their houses from just over 3,000 to over 26,000 pesos; over the same period on Parotani those figures increased from 5,500 to nearly 22,000 pesos. Only a small part of this increase can be accounted for by inflation or by a better appreciation of the value of housing. Several houses were under construction while data was being gathered in the months of June and July of 1973. In the majority of cases, new houses had two stories. Owning a two-story house in a status symbol in rural Bolivia, and this form of construction appears to be an imitation of the urban mode of living rather than representing any improvement in convenience or an attempt to save land. The percentage of respondents reporting purchases of galvanized steel plates for roofing rose from 75 to 84 percent on Parotani and 10 to 25 percent on Caramarca. Those houses not covered by metal roofs generally have red Spanish tile roofs, which require more maintenance and are usually more expensive to build. Thatched roofs are becoming even more of a rarity in the Lower Valley than they are elsewhere in the country. Piqueros already had reasonably decent housing by 1952; therefore, in many cases they are still living in the same houses with only slight modifications.

The decline in value of livestock and poultry on Parotani has already been noted, and farmers putting any land at all into alfalfa for forage appear to be concentrating on agricultural production and devoting less attention to livestock production. Data from Caramarca, however, show a continuous increase in the value of animals and an increase in the number of oxen owned, to the point that all but one of those surveyed in 1973 had a yoke of oxen. This result, rather than the declining value of animals observed for Parotani, is more typical of one of the ways in which campesinos invested surplus cash after the reform. However, the author expects

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deducting total expenses for production and consumption from total income; in all four cases, the result is positive:

	1967	1973
Parotani	8,375	1,767
Caramarca	377	2,162

that as the tractorization of land preparation proceeds, within a decade investment in livestock will progressively decline in the Lower Valley. In the Caramarca sample, the increase in value of animals from an average of about 3,800 to over 6,600 pesos by 1973 is attributable almost exclusively to additional oxen; the number of smaller animals was virtually unchanged.

The investment of labor in increasing land resources by building low levees further out into the river bed and filling in behind them with topsoil is also observed in Parotani. This sort of investment is particularly risky for two reasons. First, the investment may be swept away by the river, which may account for the fact that several respondents showed marginal differences in their landholdings not explained by sales or purchases; land gained from the river this year may be lost next year. Secondly, property rights over this land are not clearly defined. The one individual in the sample who was reported to have increased his holdings in this manner was engaged in a dispute with one of the leaders of the sindicato over just who had ownership rights over that piece of land.

5. Standard of Living in the Post-Reform Period

Probably the most significant result of the land reform has been a massive improvement in the standard of living of the rural population of Bolivia, and of all regions, perhaps the most dramatic change has taken place in the Lower Valley. The most striking manifestation of this change in standard of living is the result of the massive investment in housing described above. The windowless hovels of the pre-reform period have been replaced with sturdy one- and two-story adobe structures, some of which are starting to be stuccoed or painted and most of which have brick or cement floors and windows to let in light. Because of the lack of property rights before 1953, such investment would not have been possible even if the necessary funds had been available since a colono had no assurance that he and his family would not be expelled from the hacienda at some future date.

Less obvious, perhaps, though no less important were changes taking place within the homes of campesinos in terms of diet, household furnishings, and other consumer semi-durables. It has been noted in the initial sections of this study that the campesino family in the pre-reform period was almost entirely self-sufficient in terms of food consumption, with the

exception of a few spices and salt, which was bartered for with traders (llameros) who packed it in on the backs of their llamas from the salt flats around Uyuni.* By 1967 food purchases constituted approximately 51 percent of food consumption on Caramarca and 64 percent on Parotani; by 1973 these figures had risen to 78 and 66 percent, respectively. In addition to a considerable diversification over the pre-revolutionary diet, which besides being low in nutritional value must have been rather boring, the present diet of campesinos and ex-miners in the Lower Valley is considerably higher in protein and necessary vitamins. In addition to consumption of farm animals, which in the Lower Valley are mainly kept for the meat and other products which they provide the farm family rather than for sale, purchases of meat now constitute a considerable part of food purchases, fully one-third by value on Parotani. Thus better nourishment for the population has been a direct result of improvement in incomes of campesinos in the post-revolutionary period. Meals are generally served on purchased plates and eaten with metal utensils rather than wooden spoons.

Table 19 shows changes over time in ownership of various types of household durable goods for the ex-haciendas Parotani and Caramarca and the piquería of Itapaya. It should be observed that the greatest change in the standard of living in the Lower Valley did not take place immediately following the reform, but in the years after 1960, several years after the initiation of the reform. Some idea of the bleakness of campesino existence in the pre-reform period is conveyed by the almost total absence of what farm families in more developed countries would consider the bare essentials of life. It is worth noting that while piqueros, like campesinos and ex-miners, have increased their ownership of the household goods shown in the table and may in fact still have, on the average, more of these goods than campesinos, as a group they have suffered a relative decline in standard of living when compared to campesinos, who started from virtually nothing

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*With the extension of the road system throughout the country and the increase in the number of trucks, llameros have all but disappeared by the present time.

Table 19. Acquisition of Consumer Durable Goods in the Pre-Reform and Post-Reform Periods

	Parotani					
	Ex-Miners (7)			Ex-Colonos (14)		
Article	Before 1953	1953-1959	1960-1967	Before 1953	1953-1959	1960-1967
Bicycle	--	2	4	--	3	6
Radio	--	--	2	--	--	6
Sewing Machine	--	--	3	1	3	2
Bed	--	--	13	--	4	20
Record Player	--	--	--	--	--	3

	Caramarca (10 Campesinos and Ex-Miners)		
	Before 1953	1953-1959	1960-1967
Bicycle	--	5	--
Radio	--	--	1
Sewing Machine	2	--	--
Bed	--	2	8
Record Player	--	--	1

	Itapaya (11 Piqueros)		
	Before 1953	1953-1959	1960-1967
Bicycle	1	3	3
Radio	2	2	8
Sewing Machine	1	3	2
Bed	4	9	13
Record Player	--	--	--

Source: Camacho Saa, Estudio de caso, p. 167, Table 24.

in 1952 and have achieved a standard of living which eventually may surpass that of piqueros.*

Since 1967, the average family holdings of each of these goods has risen in both Caramarca and Parotani, as may be observed in Table 20. For some items, such as radios, the changes are dramatic. For other items, such as sewing machines and lamps, changes are large in percent terms, though in absolute terms the average number of these items per family remains low.

*This fact may explain part of the failure of piqueros to participate in and their opposition to the land reform.

Table 20. Average Family Holdings of Various Household Durable Goods

Article	Parotani 1967	Parotani 1973	Caramarca 1967	Caramarca 1973
Bicycle	.64	.92	.70	.88
Radio	.46	.92	.20	.88
Sewing Machine	.43	.52	.20	.38
Bed	1.85	2.30	1.70	2.88
Kerosene Lamp	.14	.28	.20	.38

Analysis of changes in the value of household items including roofing materials also shows considerable improvement, including a sharp drop in the number of respondents in the 2,500 peso and below category. By 1973, no significant differences remain between household goods ownership, expressed in either physical or value terms, between ex-colonos and ex-miners. No quantitative data are available on small-holders communities, but interviews in piquería Charamoco lead the author to suspect that piqueros still retain a slight edge on ex-colonos in their standard of living.

Table 21. Value of Household Durable Goods (including roofing materials) 1967 and 1973

Value	Number of Families in Each Category Parotani 1967	1973
0-2,500	12	5
2,501-5,000	8	13
5,001-7,500	4	4
Over 7,500	4	3
Total	28	25

Another manifestation of improvement in the standard of living is the type of clothing worn by campesinos. Before the reform, very little clothing had been purchased, except for use on Sunday's, feast days, and other special occasions. Most clothing consisted of bayeta or "homespun" woven from the wool of colono's own sheep. Homespun has virtually disappeared from the Lower Valley by the present time, in part because of the amount

of time spinning and weaving requires.* In both surveys expenditures for clothing were found to be around 600 pesos and did not appear to be significantly influenced by changes in income. The use of abarcas, rubber-tired sandals, is generally limited to men, and even they wear them only for working. Women now use cheap domestically produced plastic shoes whether they are doing agricultural work or involved in other activities. School children are generally attired in uniforms, drab coveralls for the boys and blue skirts and white blouses for the girls.**

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*A shopkeeper from Capinota, a provincial capital near Parotani, reported that very few campesinos bought clothing from her before 1952; however, within a few years thereafter, they began coming in to buy in increasing numbers; business declined immediately after the devaluation but had picked up again by 1973.

**The mandatory use of uniforms is a democratic measure since it eliminates the obvious disparities in clothing which poor and rich families would be able to provide their children; it has the effect of slightly increasing access to education for children from poor families.

V. Social Infrastructure, Government Services, and Political Changes

A. Health Care Programs

One result of the various community development programs working in rural Bolivia has been the construction of postas, or first aid stations and clinics, throughout the countryside. As was the case in Parotani (and also Charamoco), these postas are constructed almost if not entirely with community labor. Where they are built on ex-haciendas, one can be certain that the sindicato played an important role in organizing the labor force; elsewhere Juntas de Vecinos may have a key role, as occurred in Charamoco. The posta of Parotani was staffed by a person with experience in first aid and in giving injections. The posta on Charamoco had no permanent staff, although the piqueros were actively engaged in attempting to get someone to fill the job. Even when a posta has no permanent staff, it still benefits the community by making it easier for medical and paramedical personnel from Cochabamba to vaccinate and perform other services for the community during their periodic visits. Some indication of the value of the posta to the residents of Parotani might conceivably be derived from the fact that while five families reported some expense for medical treatment in 1967 only one reported such expenses in 1973. There was also a small decline in the average value of such expenses in the Caramarca sample.

Infant mortality is still a major health problem, with about one child in three having died by the third year. Few families with more than one or two children have not had one or more children die.* In one case, all four children a family had had died in infancy. There appears to be a trend to lower rates of infant mortality in recent years, especially compared with the pre-reform period; however, the author has not performed the statistical analysis which probably would confirm this hypothesis.

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*One of the few families with several children and no child or infant deaths reported also had the highest farm and total income.

B. Education in the Post-Reform Period

Education of the children has been a unifying force in rural communities throughout Bolivia since the reform. In areas where schools did not exist before 1952 or where they consisted of a room somewhere on the hacienda donated by the patrón, construction of a school immediately followed possession of the land on the list of priorities of Bolivian campesinos and ex-miners, both individually and collectively. Indeed, as was the case on both Parotani and Caramarca, the sindicato played a major role in the construction of the local school and, once a school is built,* the sindicato continues to contribute to its maintenance and continual improvement. Sindicatos generally antedate the Juntas de Auxilio Escolar (Educational Assistance Committees) by about a decade in areas which have been affected by the reform, and the Juntas can generally count on full cooperation of the sindicato which in general is jointly involved with the Junta in planning of construction and maintenance programs. Often there is considerable communication with the sindicatos by the involvement of current or past sindicato officers on the directorate of the Junta, as is the case in Parotani.[16] Indeed one of the keys to the success of these organizations has been their ability to cooperate with the sindicatos instead of working at cross purposes with them as have many organizations which have been established by the Desarrollo de Comunidades and other private or religious community development agencies for the purpose of channeling funds to rural communities without reenforcing the authority of the sindicatos. On smallholders communities, such as Itapaya, where no sindicato organization exists, the Junta de Auxilio Escolar may be the only community-wide organization and as a result may come to occupy a position of importance such as that occupied by the sindicatos in areas affected by the reform.

Once a primary education of children has been assured, the next step is the addition of one grade at a time until education is established

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*"Built" is used in preference to "finished" since schools are never really finished in rural Bolivia, with the successful completion of one planned improvement leading almost immediately into the initiation of the next.

16. Camacho Saa, Estudio de caso, pp. 136, 142-144.

within the community up to the eighth grade. On Parotani, the refusal of the fiscal school, which caters to children of piqueros from Itapaya and of railroad workers, to admit children of campesinos sparked interest in the construction of a nucleo escolar, or regional high school, on land of the ex-hacienda (described by Camacho in his 1967 study[17]). However, by 1973, despite considerable improvements and additions to the physical plant of the school, "nucleo" status had not been achieved. It is worth noting that virtually all costs associated with construction and improvements of schools are at the expense of the local community, although occasionally various agencies of government do make small donations, usually in the form of materials not available in the local community. General René Barrientos, then president of Bolivia, visited the school at a point when one of the improvement projects was near completion and, upon the request of the community, made an out-of-pocket donation of several thousand pesos for galvanized steel roofing materials. However, in the initial years after the Revolution, contributions from the state for the construction of schools were limited and both the cost of the materials and the labor was supplied locally; in addition, in the early years after the Revolution burden of payment of the salaries of teachers also frequently fell on the community.

It is not difficult to understand the zeal for education which developed after the reform. Parents became convinced that their children were not automatically doomed to occupy the same low station in life as they themselves had. Furthermore, there appeared to be some opportunities developing outside of agriculture for people who spoke Spanish and had a reasonable amount of education. Whether in fact these perceptions and aspirations are being achieved will be discussed below; there is no denying, however, that they strongly influenced the decision of campesinos to dedicate massive collective efforts at school construction and improvement.

Table 22 is constructed in a way that effectively breaks down the population by educational and age groups into those educated before the Revolution and those educated after. Persons more than 35 years old in 1973 would have been 16 or older in 1953, and thus past the age where they could be

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17. Ibid., p. 142.

Table 22. Education Levels by Age and Sex
(mean education in years)

	Males Employed in Agriculture		Females Employed in Agriculture and Domestic Labor	
		Caramarca		
35 and younger	(6)	5.17	(6)	2.33
Over 35	(8)	0.50	(8)	0.00
		Parotani		
0 - 25	(12)	5.25	(8)	1.25
25+ - 35	(1)	2.00	(7)	0.86
Over 35	(22)	1.73	(18)	0.33*

*One woman had six years of education; the rest had received no education at all.

expected to still be in school. Because of the larger sample size in Parotani, it is possible to break down the population into three groups, including young people 25 and younger who have received their entire education since the reform. The population for the table includes only those individuals who showed occupations either in agriculture or in domestic labor, that is, rural dwellers not currently going to school.

Notwithstanding its small number of cells, this table contains a wealth of information. First, it shows a considerable improvement in the level of education achieved by rural families since 1953. Second, the Parotani sample shows that improvement has been cumulative, with higher levels of education being associated with younger members of the population. (The author was tempted to include individuals over ten years old, even if they were still in school, because average levels of education clearly increase over time; this was not done because it would have produced a downwardly biased estimate of final educational achievement.) Third, education levels before the reform were considerably lower in more isolated areas such as Caramarca than on ex-haciendas such as Parotani which are on main rail and road links between major cities; it is in these more isolated regions that progress has been most dramatic. Fourth, education of women is still behind that of men, although the educational gap between the sexes appears

to be closing; nonetheless, it will be more than a generation before any semblance of equality will be achieved in the average terminal level of education of men and women. Finally, the unexpectedly small number of males between 25 and 35 years old may be explained by migration to Argentina and the mines. If so, it is likely that the real average for this group, including those who have emigrated, would be somewhat above 2.0 years of schooling.

In trying to develop equations for the estimation of farm income, two measures of education were tried: number of years of education of head of household, and average number of years of education of head of household and his wife. Neither measure of education was significant in the regression equations as an explanatory variable of farm income. (Also see Table 22.) This does not mean, however, that there is no relation between an individual's expected income and level of education, especially if non-farm income is included. Table 23 tabulates three levels of commercial income by four levels of education. Individuals having none or only one year of education were grouped together because it has been determined, based on discussion with teachers, that functional literacy is not achieved before the end of the second year of primary school education. (Classes are in Quechua for the first year and in Spanish for all succeeding years.) There appears to be a positive relationship between level of education and commercial income (chi square is significant at the .11 significance level).

Table 23. Farm Income by Education of Head of Household, 1973 ($b.)

Years of School	0-4,500	4,501-9,000	9,001-13,500	13,501+
0, 1	3	3	3	1
2, 3	4	2	2	2
4, 5	0	1	2	0
6 or more	0	2	0	0

No central tendency.

Table 24. Commercial Income by Education of Head of Household (Parotani)

Years of School	$b. 0-750	751-3,000	3,001 or more
0, 1	10	0	0
2, 3	8	0	2
4, 5	3	0	0
6 or more	0	0	2

Chi square = 6.08. Probable chi square 6.08 = .11.

In recent years the cut-off point for rural eudcation has become the highest grade offered in the local school, which has been true to a greater or lesser extent of most countries in Latin America.* Some children are able to obtain some secondary education if they have relatives in cities or mining areas with whom they can live. A small number of families in better financial positions than the rest are able to send their children to school in Cochabamba; however, the cost of room and board in town was reported to be approximately $b. 1,600 per year for each child in 1973, which would be prohibitively expensive for most families.** Children from Caramarca are able to continue their education beyond the number of years offered at the local school because of the availability of twice daily bus service to the market town of Vinto. In general, however, unless some form of government-funded scholarships are instituted, rural children will be largely excluded from any benefits accruing to individuals with a secondary education.

The interest campesinos and ex-miners in the Lower Valley have shown in education apparently, then, is not focused on probable increases in income from farm sources but on higher incomes that can be expected from commercial sources or from non-farm occupations entered into by those who leave

*The major exception to this statement being Cuba.

**Perhaps it is worth noting that the only respondent reporting payment of room and board so that his children could study in town also had the highest farm income and by far the highest total income, much of it derived from ownership of a truck.

the farm to seek employment in the mines or cities, or in Argentina. Just how useful secondary education is may be open to question, since the expansion of employment opportunities in the rest of the economy has been sluggish while the value of education beyond primary school is small in terms of its marginal contribution to farm income, given present technology. Nothing said here should be interpreted to belittle other than non-economic contributions of education to society; what needs stressing is that within the existing technological and social framework education's contribution to increasing farm income is negligible.

C. Governmental Programs Supporting the Reformed Sector

Extension programs have been severely limited in their application to the reformed sector in the Lower Valley. To be effective, technical assistance programs have to be tied to agricultural credit, from which the reformed sector has been virtually excluded. According to the agricultural extension agent based in Quillacollo, virtually nothing has been done with extension in vegetable crops. Efforts have gone into improved varieties and practices for wheat and potato production, although these crops have declined steadily in importance in the Lower Valley. Some attention has also gone to fruit orchards, which are largely grown on the remnants of haciendas retained by former landlords. Attention has been concentrated on these crops in part, at least, because lines of credit were available from the Banco Agrícola for those farmers able to qualify, permitting the adoption of recommendations to improve production practices. Camacho Saa reported that the Servicio de Extensión Agrícola (SEA) had run some chemical fertilizer demonstration plots which had been successful in Parotani and failed in Caramarca, prompting more rapid adoption of such fertilizer on the former than on the latter.[18] (As was noted in Section III, a high percentage of farmers on both farms were using such fertilizer by 1973.) Perhaps, since supplying domestic demand for vegetable products does not appear to have been a problem since the reform and possibilities for export are limited, greater efforts at providing extension information to campesinos

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18. Camacho Saa, Estudio de caso, p. 135.

and other small farmers may not have been called for in these crops. However, with the development of a domestic fertilizer industry, a combination extension, soil testing, and credit program may be required to raise domestic demand for the industry's output.

In the past, farm credit programs in the Lower Valley as elsewhere in the country have concentrated on the "commercial" agricultural sector to the virtual exclusion of small farmers. Because campesinos generally lack legally valid titles to their land (deeds not registered, land transfers and inheritance not recorded, etc.), campesinos are generally discouraged from applying for loans by the legal requirements of the Banco Agrícola even before processing of the loan application begins.* The cost of having titles validated are high and generally unwarranted when compared to the amount of loan usually requested by campesinos. To minimize administrative costs of such loans, the Banco Agrícola favors the organization of groups of ten individuals to make a loan request collectively. The Banco Agrícola had no lines of credit available for vegetable production, though funds were available for wheat and potato production. The manager (agente) of the Cochabamba branch of the bank estimated the number of campesinos who had received loans in 1973 at about 300; repayment of these loans averaged above 90 percent, partly as a result of strong peer pressure brought to bear by the community on any individual in default. At the present time, virtually no credit is available to small farmers in the Lower Valley from official sources; some credit is available from private sources, rescatadores in most cases and vecino storekeepers in the small rural towns. However, the number of farmers making use of such credit is small. In the survey data, only one farmer each from Parotani and Caramarca showed

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*Camacho Saa reported that only one individual from Parotani had received a small loan from the Banco Agrícola; it cost the individual involved more than one-third the value of the loan and considerable loss of time; the loan (for seed) did not arrive until after planting had been finished and was applied to another use. In the month that he spent gathering the survey data for Parotani in 1973, Hernan Torres was unable to turn up a single case of a campesino having been successful in getting a bank loan. One individual did admit to the author that he had talked with bank employees about applying for a loan but had become discouraged when informed about the documents and steps involved in processing a loan application.

interest payments in 1967; by 1973, only one from Parotani and none from Caramarca reported such payments.

Desarrollo de Comunidades is the other government agency which is involved in rural areas of the Lower Cochabamba Valley. Experience with the agency on Parotani has not been favorable. Before 1967, the community requested a small amount of money from this agency for the completion of the current school improvement project, an amount equivalent to about one-sixth of what the community already had invested in the project. Instead, the agency decided that a more appropriate project would be the creation of a safe source of drinking water for the community. A pump was ordered and a well dug which produced only brackish unpotable water; the pump was transferred by Desarrollo de Comunidades to another community and the residents of Parotani sought no further contact with the agency.* (As has been noted above, funds for the roofing materials finally were supplied in part by a cash donation from General René Barrientos.)

A bridge was constructed over a river which separated Caramarca from the main Cochabamba-La Paz road, thus ending the community's periodic isolation due to floods. This has made year-round bus service between the community and Quillacollo possible, which in turn has facilitated higher education for the children of Caramarca and improved marketing. What agency was involved in the construction of the bridge and how important community pressure was in seeing to its construction is not clear. This type of project, however, frequently does receive support from Desarrollo de Comunidades in terms of materials and engineering work.

D. Taxes

The fact that the Government of Bolivia has been unsuccessful in implementing the many proposals of Bolivian and foreign economists and tax consultants for instituting a land tax by no means implies that campesinos escape the burden of taxation. An important part of minicipal revenues, especially in rural towns, is derived from rental of sales space in the

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*In fairness to the agency, the lack of a safe supply of drinking water is a serious problem and may partially explain the high consumption of chicha on Parotani (chicha because it is boiled and is generally safe to drink).

markets and other designated sales areas (derecho de sentaje). Furthermore, the taxation of alcoholic beverages, especially chicha, is an important source of revenue for the national government. In Parotani, now that the toll station has been removed to Sipe-Sipe, the only official presence remaining in the collector of the chicha tax. The tax is assessed on the seller and depends on the quantity of chicha sold; in the estimation of the collector, there is very little evasion of this tax.

E. Political Changes in the Post-Reform Period*

One of the first acts of the MNR government was to enforce the progressive labor legislation, enacted by President Villaroel, which had been in abeyance since his death. During the first few months of the MNR administration, there was little definition in the agrarian policy that was to be followed; by early 1953, however, with the formation of campesino militias and sindicatos throughout the country, the balance of power clearly swung to campesinos, leading to a mass exodus of landlords from the countryside. The 15 April 1958 decree invalidating the expropriation of haciendas turned over to miners ended the period of revolutionary land reform and in some areas allowed landlords to return or achieve enough potential control over their land to force campesinos to make some payment for the land, even if the payment did not represent full market value (the case of Parotani).

Despite the fears of campesinos, Barrientos' overthrow of the MNR in 1964 did not result in the reversal of the land reform and the return of the land to its former owners. Once this became obvious, campesinos in the Lower Valley soon were taken into the official party of the MPC (Movimiento Popular Christiano) led by Quecha-speaking President Barrientos. Ex-miners, however, generally retained their loyalty to the Lechin wing of the MNR (known as PRIN),* and it is this division which was responsible

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*This section depends heavily on Section VIII of Camacho's case study, pp. 174-180.

**Juan Lechin has been the leader of Bolivia's miners since before 1952 and has frequently advocated more far-reaching programs than MNR leaders have been willing to go along with.

for the division of the Parotani sindicato into two separate organizations, one for former miners and the other for campesinos.

In 1952 the MNR eliminated the literacy requirement for voting and made suffrage universal and mandatory. Initiating a practice to be continued by subsequent governments, the MNR used its control over the sindicatos to bolster its support at election time and to offset the political strength of the miners by that of the campesinos who until recently have been the more conservative of the two groups.* It should not be assumed, however, that campesinos have gotten nothing out of the political system in exchange for their support of the various governments which have been in power. Their two main aims, retention of the land and rejection of the land tax, have been successfully maintained for a period of over twenty years, despite several changes in government. Even governments whose intention has been to better the economic condition of former landholding groups have not been able to achieve their goal at the expense of campesino beneficiaries of land reform living in traditional regions of the country; increases in the landholding and credit opportunities of the upper class have largely been restricted to the Eastern lowlands. Furthermore, there is evidence that in recent years peasants have been less solid in their backing of official parties. Indeed, the degree of their current disaffection with policies, which has been shown in previous sections to be detrimental to their interests, can be seen from the recent uprising in the Lower Valley which cut Cochabamba off from the rest of the country for several days and was only quelled by force of arms with casualties on both sides. Though campesinos have achieved their basic goals of land ownership and avoidance of direct taxation, increasingly they have come to realize that the benefits received from the government and economy are not proportionate either to their number in society or to their contribution to economic growth in terms of producing an adequate supply of food at prices which in recent years have declined in real and in some cases even in nominal prices. Traditional means can no longer control the campesino movement, especially in the face of policies detrimental to the maintenance of accustomed levels of farm income and standards of living.

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*Campesinos still view ex-miners with some suspicion and are not slow to charge them with being "communists." Indeed some former miners were jailed for awhile following the overthrow of the Torres government on precisely that charge.

F. Changes in Traditional Practices

With their increasing integration into the national culture, campesinos in the Lower Valley are rapidly abandoning many traditional forms of behavior which in the past have been considered typical of Bolivian campesinos. Because integration of campesinos is proceeding faster in the Lower Valley than in most other regions of the country, these changes are more easily discerned there than elsewhere; they are, however, indicative of the direction changes are taking in the country as a whole.

More bountiful agricultural production, a higher percentage of irrigated land, and fewer fears of drought, hail, and frost made conditions less propitious for the perpetuation of magical-religious practices which abounded in other traditional areas of the country where the vagaries of the weather made crop failure an ever-present danger down to the moment that the harvest had been stored in the hacienda's barn or the campesino's house. The only practice remaining since the reform is the offering to Pachamama (Mother Earth) which is still made at planting and harvest to assure a good crop. Considerable quantities of chicha are consumed by campesinos and their kinsmen helping in the ayni of planting and harvesting traditional crops. About a thimbleful of each cup of chicha is poured on the land (in Spanish, challando) as a libation to Pachamama before the cup is drunk. Coca is also available for those who chew accompanied by little hunks of limestone to improve its taste. In years gone by, the ceremony was officiated by a yatiri, or sorcerer, although in recent years his services have been dispensed with in areas like the Lower Valley where campesinos are more integrated into the national society.[19]

Presterío, or the sponsorship of a fiesta celebration, including paying for the mass, hiring a band, providing food, etc., entails considerable expense in exchange for increased prestige in the community which, in the long run, may be accompanied by some increase in income. To some degree the expense of being the preste, or sponsor, is offset by income from the sale of chicha during the celebration, a right which is reserved for the

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19. Camacho Saa, Estudio de caso, pp. 98, 99; also confirmed by Stephen Smith and by my own observations.

preste. Invariably, those chosen preste are members of the community who are economically able to afford the expenses involved; poorer members of the community are never asked to take on the obligation. Only two respondents, one in each survey and both from Caramarca, reported expenditures for presterío. In one case the expenditure involved did appear to constitute a significant fraction of the respondent's income for 1967 (about half); the case reported in 1973 was only about five percent of the respondent's yearly income. Net expenditures for these celebrations, taking account of income from the sale of chicha, is unavailable. While presterío, especially for a major fiesta, involves considerable expense for the preste in any given year, over time it is a way of spreading the cost of community recreation among the members of the community best able to bear such expenses. For the rest of the community not involved in presterío, fiesta expenses do not constitute much more than three percent of total family income.

One major change which can be observed from survey data from Parotani presented in Table 25 is a major decline in the use of coca by those who grew up since the reform. By concentrating on landowners and on respondents who were working in agriculture in 1967, the sample is biased toward the upper age groups.* Nonetheless, by dividing the Parotani sample up into two groups, consisting of households headed by men over 40 and men 40 and under, it is possible to analyze possible effects of the reform in terms of coca consumption: those over 40 in 1973 presumably already had their habits formed by the time of the Revolution and those under 40 were for the most part too young to have had the habit of chewing coca firmly ingrained by that time. This latter group was then sub-divided to establish a small sub-group of heads of households in 1973 who were under 30 and therefore were quite young at the time of the Revolution.

There is little doubt as to the direction change is taking: those who use coca are using less, proportionately fewer young men are using coca, and none of the new generation represented in the sample use coca at all.

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*The average age of respondents in the Caramarca sample was 60 (in 1973) and no respondent was under 40; in general coca consumption per family has increased for this group from about one-half pound in 1967 to a pound in 1973.

Table 25. Mean Consumption of Coca in Pounds (Parotani)

	1967		1973	
Group*	Lbs.	n of Group	Lbs.	n of Group
Over 40	.833	15	.615	12
40 or Under	.500	9	.364	11
Under 30	none	none	.000	3

*Female-headed households excluded.

What is responsible for this change? One of the theories of why coca was used refers to its ability to numb the senses to hunger and cold; better clothing and diet then might partly explain the decline in its use. More important, however, is the increase in the campesino's self-esteem resulting from land ownership, increased education, and increasing participation in the life of the nation. It is not surprising to find lower levels of consumption in areas like the Lower Valley where the degree of integration into the economy and the society are highest, although the author is convinced that the trend toward lower consumption, especially in the lower age groups, will be found in future studies elsewhere in the country.*

Like coca, the use of raw alcohol distilled from sugar or from corn, as was done on Parotani before the Revolution, is also declining. Only one individual reported purchases of alcohol in the 1967 sample and none in the 1973 sample. Consumption of other alcoholic beverages, however, is rising. The average consumption of chicha, fermented malted corn, rose from just over three liter jars a week to just over five in 1973. Furthermore, consumption of beer, a beverage traditionally more associated with urban than rural areas, also rose, although still lagging considerably behind chicha.** Thus in their drinking habits, as in other things, campesinos are adopting more urban values and rejecting traditional habits which tended to distinguish campesinos from other members of society.

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*In fact, a study by the Ministry of Public Health entitled Desarrollo Rural (La Paz, 1964?), p. 13, estimated that 10 percent of the campesino population no longer is using coca leaves.

**The total value of beverage purchases still averaged less than 3 percent of total income in 1973 for Parotani.

Another practice which continues to be common in rural areas including the Lower Valley and shows no sign of decline is the trial marriage in which young men and women live together for a few years before celebrating the marriage officially. During this time, the couple usually lives in the young man's parents' house and accumulates enough wealth to begin the construction of a house of their own and to help defray the costs of the wedding ceremony and celebration. When parents are no longer able to work their land, one of their children will take them into his own house and provide for them in their old age.

Traditional practices are generally of less importance in the Lower Valley than in other regions of the country which have been transformed by the land reform. To a far greater extent than perhaps any other major region except the Eastern Lowlands, campesinos of the Lower Valley have been integrated into the Spanish-speaking society and culture of the country. Certain traditional practices, such as presterío and the offering to Pachamama which provide opportunities for conviviality in the community without standing in the way of the campesino's assimilation of urban culture, have been retained. The use of coca, on the other hand, is being rejected by younger members of rural society because it lowers the individual campesino's self-esteem and acts as a barrier to upward mobility and is socially unacceptable in Spanish-speaking society.

VI. Conclusions

The case study of ex-haciendas Parotani and Caramarca in the Lower Cochabamba Valley is an example of the results that can be achieved by land reform beneficiaries where agricultural, climatic, and marketing conditions are propitious. Dramatic increases took place in family farm income and agricultural production, despite the almost total lack of credit, extension, and other services.

Starting from a relatively low level of agricultural development, land reform alone made possible the rapid adoption of a new set of crops and production techniques leading to significant increases in output. The importance of this result cannot be overemphasized since the conditions which frequently make land reform possible are precisely the ones which make it virtually impossible for the government to provide the credit, extension, and other services which are said to be essential for the success of an agrarian reform program.

The fear of a drastic decline in the production of food for urban areas led the government to institute forced labor by the campesinos on the hacienda land, under the guise of "cooperatives"; if anything, these "cooperatives" slowed down the changeover to high value, non-traditional crops. The failure of these institutions to provide tangible benefits to the communities led to the individualization of all the land and has made subsequent collective organization for agricultural services or production more difficult, particularly when the name "cooperative" is attached to it.

Under the terms of the 1953 Agrarian Reform Law or through purchase from landlords following the reform, most resident hacienda workers (colonos, jornaleros, etc.) and some ex-miners obtained varying amounts of land; at the very least, campesinos received the use plot they had been working before 1953, and generally obtained some additional land as well. Piqueros (free-holding peasants) have generally not received any additional land, although as a group they have experienced a substantial increase in income through the same process of changing crop patterns and increased market integration. However, this improvement is somewhat obscured by their loss

of social and economic position relative to campesinos, who before the 1953 reform constituted the lowest stratum of Bolivian society.

Market institutions quickly adapted to the needs of many individual small producers, with rapid expansion of markets such as Vinto to handle the increased volume of vegetable production. Rescatadores increased in numbers and extended their truck routes into the countryside as soon as possible after roads and bridges were built. Within a few years after the reform, campesinos had greatly increased their integration with the market in terms of both sales and purchases; data on both show a rising trend over the two periods.

The dominant pre-reform tenure structure was the hacienda, described most often as feudal and based on the unpaid labor of campesinos. Since the reform, intensively farmed individual family plots have become the predominant form of land tenure in the Lower Valley. Tenure arrangements of piqueros on the individual family plots which they had either inherited or purchased before 1952 were virtually untouched by the reform.

The pattern of huge latifundia and absentee landlordism which characterized most other areas of the country before 1953 was less prevalent in the Lower Cochabamba Valley. Partly because of this, the National Agrarian Reform Service more frequently declared haciendas in the Lower Valley to be "agricultural enterprises" or "medium-sized properties," legal categories which permitted the landlord to retain part or all of pre-reform hacienda lands. As in Parotani, however, former landlords have often not been allowed to return to their land, but rather have been forced to sell the land to the campesinos and former miners as a condition for settling the Agrarian Reform case. Where they have been able to return, as in Caramarca, they have been induced to change to less labor-intensive modes of production, to mechanize their operations, and to sell part of their land to campesinos at very high prices.

The Cochabamba Valley has always been one of the most progressive regions of the country, and technological change has been accelerated by the reform. In the post-reform period, heavy applications of purchased organic and chemical fertilizer have been accompanied, on campesino and piquero plots, by a massive expansion of the production of non-traditional, labor-intensive vegetable crops. In recent years mechanization of land

preparation has increased in the reformed sector. Unlike the post-reform hacienda sector, where mechanization has taken place largely because of its labor-saving potential, mechanization of land preparation is rapidly being adopted by piqueros and campesinos in the reformed sector as a means of increasing the intensity of land use through multiple-cropping and replacement of alfalfa with vegetable production on valuable irrigated land.

The land reform produced a major redistribution of income in favor of campesinos and resulted in a phenomenal improvement in their standard of living. Sturdy one- and two-story adobe homes with windows and galvanized steel roofs have almost completely replaced the dingy, thatched hovels campesinos working on haciendas occupied until 1953. Nearly all the consumer semi-durables commonly associated with rural development and now found in nearly every campesino home (bicycles, radios, beds, etc.) have been acquired since the reform. The 1952 Revolution marked the beginning of a continuous improvement in campesinos' diet, which now includes significant amounts of high protein foods and a high proportion of purchased rather than self-produced food items. In the Lower Valley, most campesinos' clothes are the product of the Bolivian textile industry rather than being spun at home. Hardly a trace of traditional dress remains in the clothing campesinos wear, although women have been more conservative in this respect. Other traditional practices (chewing coca, drinking "moonshine" alcohol, etc.) are rapidly disappearing as a result of campesinos' increasing integration into the economic, social, and political life of the nation.

Campesinos in the Lower Valley had greater opportunities for education than were available in most other parts of the country before 1953; even so, average levels of education of those who grew up in the pre-reform period are abominably low. Since then, collective effort of the community and pressure by campesinos on the government have resulted in substantial improvements in the rural education system, in the average number of years of schooling of young people, and in the ability of the younger generation to speak Spanish in addition to their native Quechua.

Sindicatos, or agrarian peasant unions, have been the driving force behind the land reform. Originally set up under the leadership of former miners, sindicatos were instrumental in securing effective control and eventual property rights over the land on ex-haciendas in the Lower Valley.

Where they have been strong and unified during the drawn-out legal processes established by the 1953 Agrarian Reform Lww, sindicatos generally have succeeded in increasing the campesinos' access to land and in preventing the return of the former hacienda owners. In most matters, sindicatos are the sole power in direct control over rural areas, settling disputes among their members and representing them in their contacts with government bureaucracies. Attempts have been made by the national government and its political parties since 1952 to undermine the authority of these organizations or to use them for their own ends. These efforts have only been partially successful. The failure of landlords to recoup more than a small part of their former haciendas and of the government to establish direct land taxes is largely attributable to the united opposition of the campesinos expressed through the national sindicato structure. However, the political power of campesinos in the Lower Cochabamba Valley, as elsewhere, has not been sufficient up to now to assure them equal access with urban groups and former landlords to necessary government services, institutional credit, or favorable commodity price policy.

The results observed in the Lower Cochabamba Valley represent the limiting "best" case of what can be expected from a land reform alone. Future increases in family farm income and agricultural production probably will require the provision of credit, soil-testing, and extension services which have so far been unavailable. Finally, campesinos can be expected to react unfavorably to the continued squeeze on their real income resulting from sharp increases in the cost of inputs and consumer goods in the face of stable or declining commodity prices.

APPENDIX 1 to Case Study of Lower Cochabamba Valley

CHARAMOCO: Attempt at organization of an agricultural service cooperative. One of the leaders of the ex-miners' sindicato of Parotani told the author and field worker of an attempt to organize a cooperative on a small-holder community near Parotani. Accompanied by the son of one of the farmers of Parotani, the author and field worker visited Charamoco and held an extended interview with the man most responsible for the formation of the cooperative.

Charamoco is located in the Lower Valley about seven kilometers southeast of Parotani on the road to Capinota. Distribution of land in this small-holder community is fairly equal and averages just over one hectare per family. Crops grown are similar to those of Parotani and Caramarca, mostly garden vegetables for sale at Vinto and other regional markets and some traditional products for on-farm consumption with surpluses being sold.

The leader of the pre-cooperative had worked in the mines in jobs which permitted him to acquire a basic knowledge of engine mechanics and accounting. He had also participated in several short courses in cooperativism given by the Federación de Cooperativas de Ahorro y Prestamo* of Cochabamba. His enthusiasm was apparently largely responsible for initial interest on the part of other small holders in the possibilities offered by the organization of a machine-service cooperative. On his initiative, the Cochabamba federation held a three-day short course in cooperativism in Charamoco, with an average daily attendance of about 30 campesinos. Within a short time after the course, there were about 50 individuals who had agreed to provide $b. 2,000 (= US$167, before the devaluation) for the purpose of purchasing a tractor, which at that time cost $b. 106,000, or just slightly more than would have been available from the initial contributions of potential members of the pre-cooperative. However, since many of those interested had little understanding of what was implied by a cooperative, the purchase was delayed until a higher level of consciousness could be

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*Federation of Savings and Loan Cooperatives, most active in urban areas as a repository for savings and a source of loans for lower- and middle-class workers.

achieved among the members. This delay had the effect of discouraging some potential members, but our informant insisted that there is a long history of failure of small cooperatives in Bolivia due to the attempt to advance too fast without achieving full participation of the membership.

In the meantime, a coup d'etat brought a change in government, which initially at least, was strongly opposed to cooperatives of the type that campesinos were attempting to set up in Charamoco. Those who attended meetings of the cooperative were labeled "communists," despite the obvious differences in the principles of communism and those of the type of cooperativism which were evident in Charamoco. Underlying the name-calling--which was extremely effective in dissipating support for the cooperative--there was apparently a pre-existing rivalry between campesinos and railroad workers, who had official support in making these charges. Erosion of support for the cooperative received a boost from the devaluation in October 1972 which overnight decreased the purchasing power of local currency by about one-third and perhaps more with respect to purchases of imported items like tractors.

Only five of the original 50 supporters remained, and by increasing their initial capital advance to the pre-cooperative, which they called a "society,"* from 2,000 to 5,000 or 6,000 pesos, they were able to purchase a small second-hand Massey-Ferguson tractor with basic implements for soil preparation. In spite of the considerable mechanical skills of the leader of the pre-cooperative, the society has had a series of problems with breakdowns and expensive repairs on the tractor. At the time of the interview it was not in working order, while the members attempted to get together $b. 1,400 to pay for a new water pump. Failing that, they have agreed to sell the tractor.

Initially, each member took a turn of a week deciding how the time of the tractor should be allocated. However, since only the leader of the cooperative was able to drive and maintain the machine, gradually this function was centralized in him for day-to-day operations. General policy on how the tractor was to be used, what jobs were to be done in what order,

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*Detractors in the community have enjoyed themselves by renaming the "sociedad" a "suciedad" to ridicule those who bought the used tractor.

etc., continues to be decided by the group as a whole and has not caused problems. The group has been able to charge only $b. 35 per hour while the going rate for tractor service in the Lower Valley is $b. 45, because due to its poor mechanical state land preparation must be done in a lower gear than used by most other operators and thus takes longer for a given area of land. This has decreased the profitability of the operation.

When asked by the author if the small size of fields constituted a problem for efficient operation of the tractor and adequate preparation of the soil, the informant denied that this was a problem when a tractor was operated by an experienced person. Land could be left as smooth as that prepared with a yoke of oxen, but with the advantage that the depth of plowing in normal soils would be between four to six inches deeper.

The leader of the cooperative underlined a number of reasons for its relative lack of success:

1. Cooperatives in Bolivia have a generally poor reputation, with numerous leaders of cooperatives having ended up in jail for embezzlement of funds. For this reason, he had favored a slow pace in the organization of the cooperative and had been careful to give frequent account of funds under his control.
2. Lack of support on the part of the Servicio de Extensión Agrícola* impeded the progress of the pre-cooperative. The individual who was the agent for the SEA at the time the pre-cooperative courses sponsored by the Federation of Cooperatives were going on and interest among the community was highest gave his enthusiastic support to the group. Unfortunately, he was transferred to the Upper Valley and the person replacing him has not shown interest in the pre-cooperative.
3. The accusations of "communism" leveled at members of the cooperative by railroad workers, who may have been jealous of the possible loss of their superior position in the hierarchy of the community had the cooperative succeeded, had a devastating effect on the development of the cooperative in view of apparent official sanctioning of this type of harassment.

The informant also showed us a bomba-espalda, a motor-driven dusting and spraying back-pack for insecticides and fungicides, which he has used on his own vegetable crops and fruit trees as well as providing service to other members of the community for which he is paid. He explained that there

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*Agricultural Extension Service, agency of the Bolivian government.

is considerable interest in these chemical products on the part of other members of the community.

Although it is considerably smaller than the neighboring small-holder community of Itapaya, Charamoco has its own First Aid and Health Care Station (posta), while Itapaya still does not. (Residents of Itapaya are thus forced to go out of the community to either Charamoco or Parotani for treatment, vaccinations, and the like.) The station was constructed as a community endeavor, with voluntary workers receiving incentive payments of food from CARITAS. This posta is, needless to say, a matter of considerable pride in the community.

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