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COCHABAMBA, BOLIVIA

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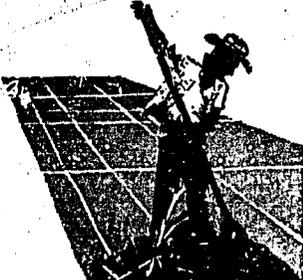
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*The author is presently Assistant Professor
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A Research Paper

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OF COCHABAMBA, BOLIVIA

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All views, interpretations, recommendations, and conclusions are those of the author and not necessarily those of supporting or cooperating organizations.

I. INTRODUCTION

The 1967 case study reported here attempts to determine the consequences and accomplishments of the Bolivian agrarian reform in three rural communities in the department of Cochabamba. The principal reasons for selecting this area for the case study were:

1. The area, in the canton of Tiraque, is an important agricultural area with well defined ecological characteristics. The northern part represents the desert-like mountainous area of the Andes and the southern portion represents the beginnings of the valleys. The elevation of the area, which ranges from about 12,500 feet in the northern section to about 8,800 feet in the southern part, is an important determinant of the ecological characteristics of the area, and has an important bearing on the particular type and intensity of crop and livestock production.

An estimated 60 per cent of the area is mountainous, with the southern part presenting almost level lands where more intensive farming takes place. The natural vegetation is very sparse.

The area has marked rainy and dry seasons, the former occurring in the months of December through March, while the rest of the year is fairly dry. The rainy

season provides an estimated annual average of less than 400 mm. (about 16 inches) of precipitation, slightly less in the northern part and slightly more in the southern part.

Records at the nearby research station show an annual average temperature of about 50° F., with a great deal of diurnal variation; also, the northern part is considerably colder than the southern part.

Frost occurs frequently in the higher parts and the flat pampas of the area. Although frosts are restricted mostly to the midwinter months of July and August, they are not unusual throughout the year. Additional hazards to crops are the almost constant high winds and hail storms, common to the entire area but predominant in the northern part and at an elevation of over 10,000 feet.

The soils conform in a general way to the lithosolic minimal paramo soils and shallow podzols. They are of loose consistency and have good moisture holding capacity, which is an important characteristic for the production of potatoes and for range pastures.

The rivers are of the seasonal type, torrential during the rainy season and almost dry washes the rest of the year. Numerous small water flows are found throughout the area, providing an additional source of water for irrigation.

2. The rural population of the Tiraque area has a rather homogeneous set of social and cultural characteristics. The Quechua ethnic group predominates in the area. The distinctive Quechua culture has been greatly influenced by Spanish culture, although to a considerably lesser degree than in the lower and upper valleys of the department.

3. The area produces a significant share of the department's potatoes, and can be considered specialized in potato production as opposed to other areas which specialize in other crops.

Objectives of the Case Study

The principal objectives of the study were the following:

1. Investigation of the present living and working conditions of the campesinos in the area.

2. Analysis of economic, social, and political changes after the reform period and the extent of their connection with the implementation of the agrarian reform law enacted August 1953.

3. A comparison of these changes between ex-haciendas, and between the ex-haciendas and rural communities known as piquerias--farm communities formed by small independent farmers who bought or inherited their land before the reform.

Of the three communities studied, two were large

haciendas where land was expropriated and turned over to the peasants during the land reform program, and the other was a piqueria. Both ex-haciendas and the piqueria are directly east of the city of Cochabamba, the capital of the department of the same name. The distance is approximately 42 miles, most of which can be traveled on the Cochabamba-Santa Cruz highway, the single most important surfaced road in the country.

The first ex-hacienda, Toralapa, was before the reform probably the biggest and most important farm of the entire province in terms of number of rural families, area, and volume of potato production. The pre-reform hacienda was subdivided for administrative purposes into five smaller sub-units, one of which--the lower part called Toralapa, located at an average elevation of 9,700 feet--was chosen for the study.

The second ex-hacienda, Kaspicancha, located at an elevation of about 12,200 feet, was before the reform one large hacienda; after the reform it was divided into an upper part called Kaspicancha Alto, and a lower part called Kaspicancha Bajo. This decision was made because campesinos of the upper and lower parts had been subject to differing work obligations and land allotments.

Piqueria Palca, the third community studied, is located in the southern part of the area at the beginning of the valleys, at an elevation of 8,900 feet. The small, independent farmers form a community of the line

village type.

According to the 1950 census, the population of the canton Tiraque was about 8,000 persons, of which 17 per cent were classified as urban and 83 per cent as rural. Estimates of the population growth, at an annual average rate of population increase for the period 1950-67, show an increase of about 3,500 people for the area. The total population of the three communities studied was 811, or about 7 per cent of the total population of the area.

Methodology

In each community the method of investigation was similar to the methods used in the study of the agrarian structure in Bolivia, a joint project of the Land Tenure Center of the University of Wisconsin and the Inter-American Committee for Agricultural Development (LTC-CIDA).

A series of formal and informal interviews with selected farmers tried to obtain the following information: nature of the physical environment, historical background, population, land use, local agrarian reform proceedings, and kind of political, economic, and social changes since the land reform. Finally, general information was sought in the surrounding communities on subjects such as the nature of marketing alternatives and market outlets and town-community social and economic relationships.

The field investigations took nine weeks in ex-hacienda Toralapa, and four and six weeks in ex-hacienda Kaspicancha and piqueria Palca, respectively. The length of the study in each community was related to the size of the sample, which in turn reflects the size of the population and the degree of cooperation encountered in each particular case.

A random sample was designed for the distribution of the economic and social questionnaires. After a population census in each of the communities, the size of the sample was determined by considering the high degree of illiteracy (estimated at about 95 per cent of the adult population), the lack of comparative studies for reference purposes, and the size of the population. It was decided to draw a random sample that would include about 25 per cent of the population (see Table 1).

Table 1. Number of Families Included in the Sample.

	Ex-hacienda T	Ex-hacienda K	Piqueria P
Number of families ^a	88	27	60
Number of sample families	20	8	13
Per cent of families sampled	22.7	29.6	21.7

^aIn each community there exist some additional families who are not included in the respective sindicatos' lists of established families.

The social questionnaire was also applied to some additional families, so that the number of families sampled by the social questionnaire was 26 in ex-hacienda Toralapa; 15 in ex-hacienda Kaspicancha, and 18 in piqueria Palca.

Before proceeding to description and analysis of the three communities, it will be helpful to outline the characteristics of the Bolivian agricultural sector.

II. THE BOLIVIAN AGRICULTURAL SECTOR

Although Bolivia is usually known as a mining country, the importance of the agricultural sector to the economic system is greater. The contribution of the agricultural sector to the gross domestic product for the past 17 years is from two to three times higher than the contribution of the mining sector.¹

Moreover, the agricultural labor force forms a majority of Bolivia's active labor force, although this majority has consistently declined over the past 10 years --from 62 per cent in 1958 to 57 per cent in 1967.² Nevertheless, the importance of the sector to the national economy is obvious.

Within the sector, agricultural and livestock production represented more than four-fifths of the total value of agricultural and forestry production in 1955, as indicated in Table 2.

¹Data for 1950-59 are from Planning Magazine (La Paz: National Planning Commission, 1961), p. 41, Table 1. For 1960-66, they are from Economic and Program Statistics (La Paz: USAID-Bolivia, March 1968), p. 6, Table 3.

²Bolivia en Cifras (La Paz: National Planning and Coordinating Ministry, August 1967), p. 1, Table 1.

Table 2. Value of Agricultural and Forestry Production, 1955.

	Percentage
Agricultural production	42.0
Livestock production	42.1
Fruit production	9.2
Forestry production	5.1
Other	1.6
Total	100.0

Source: Bolivian Report E/CN.12/430 (La Paz: Economic Council for Latin America (ECLA), April 1957), Vol. 2, p. 393, Table IV-2.

Another indicator of the importance of the agricultural sector in Bolivia's economy is the participation of the sector in the balance of payments. Total imports, and also imports of agricultural products, show an upward trend in terms of dollars spent annually, but the relative importance of agricultural imports is decreasing considerably as demonstrated in Table 3.

Exports of agricultural products have always been relatively small in comparison to total exports, which consist mainly of minerals (see Table 4).

Table 3. Bolivia: Total Value of Imports and Value of Agricultural Imports, Selected Years.

(Thousands of Dollars)

Year	Total imports	Total agricultural imports	Agricultural imports, per cent of total
1945	40,517	18,193	44.9
1950	55,843	21,467	38.4
1955	81,438	31,344	38.5
1960	71,477	15,805	22.2
1965	133,847	23,422	17.5
1966	138,433	22,610	16.4

Source: For 1945, 1950, and 1955, Bolivian Report E/CN.12/430 (La Paz: Economic Council for Latin America (ECLA), April 1957), Vol. 2, p. 235, Table IV-12. For 1960, 1965, and 1966, Bolivian Statistics (La Paz: Ministry of Planning, August 1967), p. 9, Table 5.

Table 4. Bolivia: Total Value of Exports and Value of Agricultural Exports, Selected Years.

(Thousands of Dollars)

Year	Total exports	Total agricultural exports	Agricultural exports as per cent of total
1945	79,233	4,429	5.6
1950	93,258	2,964	3.2
1955	99,790	2,039	2.0
1960	67,800	2,400	3.5
1965	131,800	2,800	2.1

Source: For 1945, 1950, and 1955, Bolivian Report E/CN.12/430 (La Paz: Economic Council for Latin America (ECLA), April 1957), Vol. 1, p. 155, Table 3. For 1960 and 1965, Economic and Program Statistics No. 8 (La Paz: USAID-Bolivia, December 1966), p. 16, Table XIII.

Agricultural exports have consisted mainly of rubber, coca leaves, Brazil nuts, and hides. In recent years, sugar, coffee, and alpaca and vicuna wool have acquired some importance. Agricultural exports have experienced large variations, even between consecutive years. Rubber exports, for example, in 1945 amounted to \$3.7 million or about 83 per cent of the total agricultural exports. In 1948, rubber exports came to only \$15,000, or less than 1.3 per cent of the total. They increased again to \$1.8 million in 1949, about 48 per cent of the total. Most agricultural exports do not come under any international agreement and suffer greatly from the lack of stable markets.

Import substitution for some agricultural imports is one of the principal objectives of the agricultural policy of the country. For instance, wheat and wheat flour imports amounted to about half of the total agricultural imports (about \$12.2 million in 1965 and \$11.6 in 1966).

The inability of the agricultural sector to meet the food requirements of the population, as exemplified by the need to allocate limited capital resources to importation of foodstuffs and agricultural raw materials, and by the low per capita comparative consumption levels of agricultural products, can be considered the consequence of a number of problems of the agricultural sector. The

most commonly cited problems of the agricultural sector are:

1. The land tenure structure which lasted until August 1953.
2. The unequal population distribution, with concentrations in certain areas of the high plateau and some valleys, where the proportion of cultivable land is limited.
3. The rugged topographic characteristics of certain areas of the country, which limit transport and agricultural activities.
4. The limited involvement of farmers in market activities.
5. The maintenance of a traditional technology because of the above points.
6. The high proportion of illiteracy or low educational levels among the rural population.
7. The lack of an adequate market organization.
8. The institutional problems, mainly the lack of public agencies geared toward development of the sector and especially the absence of an appropriate organization capable of coordinating an effective agricultural development policy.

The lack of investment and working capital is one cause of the underdevelopment of the sector, before 1953 because of the basic characteristics of the land tenure

structure until the agrarian reform, and later because of the low income level of farmers in some areas of the country.

Bolivia, prior to the agrarian reform of August 1953, exhibited a high degree of land concentration among a few owners, who in most cases lacked the initiative and capital to undertake a more rational and intensive type of agricultural production. According to the agricultural census of 1950, about 6 per cent of the landholders owned about 92 per cent of the farmland, all in units of 1,000 hectares or more; at the other extreme, almost two-thirds of the landholders owned a total of less than one-quarter of 1 per cent of the farmland, all in units of less than 5 hectares.

These large inequalities in farm size, plus the fact that about three-quarters of the country's farm population had no property rights, or occupied the poorer steeper land, or existed in virtual serfdom, enabled a great deal of economic, social, and political power to accrue to a minority of the Bolivian population. One of the basic aims of post-1953 Bolivian agricultural policy was the elimination of extremes in the size of landholdings--the elimination of latifundios and minifundios. The elimination of latifundios is certainly a reality, but the continued existence of minifundios in some areas of the country is still a major problem facing agriculture.

The capital per employed person in the agricultural sector was estimated to be about \$277 for the year 1950.³ This figure was the lowest amount of capital per active person of any economic sector in the country. The total capital in the agricultural sector was only about 20 per cent of the total capital stock of the country, and about three-quarters of it was livestock; the balance included agricultural machinery, crops, and general improvements in the sector.

The capital-output ratio--the relation between the existing capital in a given sector and the gross product of the sector--was estimated for 1950 at 0.45. This ratio is relatively high compared to the ratios of other sectors such as manufacturing or transport.

The government has taken an active role in increasing investment levels in agriculture during the past decade through the Bolivian Development Corporation and the Ministry of Agriculture. Various other projects have been undertaken by the government with the cooperation of international aid agencies.

Estimates of the annual public investment prior to the agrarian reform indicate that they averaged about \$1 million yearly for the period 1945-52. After the reform,

³Bolivian Report, E/CN.12/430 (La Paz: Economic Commission for Latin America, April 1957), Vol. 1, P. 62, Table II-19.

the level of investment in the agricultural sector increased substantially, and by 1955, the amount invested was on the order of \$10 million, including imported agricultural machinery. This investment represented 14 per cent of the gross product of the agricultural sector for that year. During the period 1961-65, the government invested about \$17 million, chiefly in colonization and irrigation projects made possible through development loans.

Even though a large proportion of the investment required in the sector must eventually come from private sources, credit first must be supplied by the government through an agricultural credit system of large scope. The private sector is currently without the necessary financial resources to undertake an investment capable of impact on the efficiency of agriculture for two major reasons: 1) part of the agricultural activities are of the subsistence type--these farmers have rather little in which to invest; and 2) the bigger agricultural enterprises that might be able to use additional capital have been virtually eliminated, with the exception of some in the departments of Santa Cruz and Beni. It should not be concluded, however, that investment demand is lacking among farmers.

Besides colonization programs and irrigation projects in some areas of the country, some technical and

administrative adjustments are also part of the government effort for the expansion of the agricultural sector. For the decade 1954-64, the principal effort of the government was to expand the agricultural frontier in the area north of the city of Santa Cruz. At the same time, international aid created or expanded various agricultural services-- extension, credit, and research--in an attempt to improve the level of technology among Bolivian farmers.

A large proportion of farmers, however, especially in the traditional areas of settlement, have been unable to participate in the benefits derived from these efforts. This situation is exemplified in the three agricultural communities studied here, and constitutes the subject of the following sections.

III. PRE-REFORM LAND TENURE IN THE CASE STUDY COMMUNITIES

The three communities studied were two ex-haciendas, Toralapa and Kaspicancha Alto, plus Palca, a community of independent farmers. Hacienda Toralapa⁴ probably came into existence only about a hundred years ago, when some whites succeeded in getting ownership of the land previously in legal possession of an Indian community. Kaspicancha Alto was a hacienda as long as the informants could recall until the land reform of 1953.

Piqueria Palca originated from sales of small parcels of land to rural workers of several small haciendas. If haciendas were considered small--in comparison to the other haciendas or latifundios of the area--owners sometimes sold parcels of the property to farm workers who wished to increase their own holdings. The process of land sales in small parcels continued until 1953.

At the time of the reform, a small part of piqueria P still remained as a hacienda named Cabreria, which had only three colonos who had to perform fewer

⁴Hereafter called hacienda T or ex-hacienda T in reference to the pre-reform or post-reform periods. Similarly, the other communities will be referred to as ex-hacienda K and piqueria P.

obligations than workers on other haciendas in the area. The land was largely worked by 12 piquero families which had sharecropping arrangements with the owner of this small hacienda.

Social Structure of the Haciendas and the Piguera

In general, the Bolivian hacienda had a very rigid, autocratic organization. The owner, and to a lesser degree the family of the owner, had a large degree of control in most decisions that dealt with the production process and the participation of each member of the community in such production processes.

Authority was delegated by the owner to the administrator, who represented the owner in managing the production process, labor obligations, and reward-punishment decisions. In large haciendas such as hacienda T, under the administrator five mayordomos (overseers) had direct control of specific activities on the hacienda.

In general, there was a close relationship between the hierarchy of authority and the social class of the holders of authority. The owners were, by and large, members of the upper class or the mestizo class. Administrators almost invariably were members of the mestizo class, but with some schooling, as compared to mayordomos who also were mostly mestizos but had very

little schooling and less experience.

Under the mayordomos were the curacas, selected by either the owner or the administrator from among the most reliable persons of the hacienda on the basis of their allegiance to the established order and their social and economic status in the community. Curacas commanded a great deal of control over the workers of a community and were the link between the superior authorities and the Indians. At the bottom of the social ladder were the colonos, or rural workers, who received use of a small parcel of land in exchange for their labor and associated free services.

The local political authorities appointed by the central government almost always served the interests of the privileged few who had acquired great power through ownership of the farmland in the area. However, the degree and type of influence that the landed class exerted upon the higher levels of government is subject to controversy. No agrarian party ever developed in the country, although the agrarian or rural societies were strong enough at the department level to influence certain aspects of government policy. Moreover, the landed class was composed, in some proportion, of professional people who slowly but steadily were branching into other important economic activities--industry, transport and construction--which added to their economic and social

powers in another fashion.

The exercise of political rights by the lower class was virtually nonexistent. Up to 1953 not a member of the indigenous class was elected to office in the country. The campesinos of both ex-haciendas had never participated in any election, since such participation was subject to literacy requirements which could not be met by any of them. Political participation among the piqueros was limited although a small proportion were qualified to vote; by and large they lacked the necessary incentives and motivation for such participation.

Economic Organization of the Haciendas--Production

The hacienda usually pursued a very simple and routine set of principles in agricultural production. The colonato system provided labor and other services by the Indians in return for their use of a parcel of land. Working obligations for the colonos varied a great deal throughout the country. In hacienda T work obligations were mandatory and rigidly enforced for each head of an Indian household.

Agricultural production was dual, composed of commercial production for the hacienda, and of subsistence production for the colonos. The types of crops grown, rotation cycles, and techniques of hacienda and colonos were similar because the prevalent agricultural technology

was approximately the same with both groups. This system had marked advantages for the hacienda owner because of his absolute control over the selection of choice cultivable land, the use of water for irrigation, and the discretionary use of the labor force.

The owners of ex-haciendas T and K relied entirely upon the resources within the hacienda and did not make cash outlays, with the exception of the administrator's salary and a few minor expenditures.

Production efficiency was low because the existing situation provided just enough profits to the owners to limit their interest in improved agricultural production practices. There was not even much awareness among owners that certain changes might have led to considerable increases in production.

In hacienda T the attempt to introduce improvements was limited to the procurement of superior potato seed varieties, and to the introduction of selected stocks of sheep. The accepted tradition that potato seed should come from another area in order to produce higher yields and to resist disease provided the owner with added control over the colonos, who were not able to procure outside potato seed by themselves. The colonos had to use the owner's supply of potato seed and consequently had to give about half of their personal potato production back to the owner.

This type of sharecropping arrangement (commonly known in the area as compania) between the owner and a high percentage of the colonos (estimated roughly at two-thirds) was for hacienda T a significant source of additional profit as well as a means of increased control over the colonos. The rest of the colonos somehow managed to obtain their own supply of potato seed from other areas, through relatives and members of the family who could take time to travel without interfering with working obligations.

In hacienda K the traditional technology was never modified, nor was modification even attempted. All agricultural production was done by oxen and the colonos. In this hacienda seed requirements were entirely satisfied from its own production.

Piqueria P exchanged crop production with the community of Colomi, located about eight miles away. Traditionally this community obtained potato seed from another area every four to five years, rather than every one to two years as at hacienda T.

Land Allotments to Colonos

Each head of a household was granted nominal land rights in exchange for his labor contribution to the hacienda. The amount of land accorded each colono was usually related to the customary land allotments in the area and to the availability of hacienda land.

Hacienda T granted to each head of a household an average of about two hectares, of which about half was under cultivation; the remainder was left idle for periods of three to six years. The labor available for use on family land was limited because of the working obligations for the hacienda, so the colonos were able to work only part of their land parcel. Hacienda K granted to each colono an average of about five hectares, more than at hacienda T because of the lower productivity of the soil and because sheep grazing was the most important activity of the colonos.

The quantity of land allotted to colonos was closely related to labor supply; locally, labor was rather abundant so only small parcels needed to be granted to attract labor.

The quality of land granted was also related to the supply of labor and the overall quality of the land of the hacienda. In hacienda T the interest of the owner in utilizing land already assigned to colonos caused much conflict, finally leading to the ejection of about 35 families who refused to leave their landholdings in exchange for some new holdings of lower quality. In ex-hacienda K colono land was of lower quality than the land under cultivation by the hacienda.

Land allotments were set by verbal agreement between the owner, or his administrator, and the colono.

The right to use the parcel was inherited by a family member who continued the labor obligations of the former colono. Land leases were not customary at either of the ex-haciendas, and whenever a member of the family married he was given a parcel of land if he so requested, thus forming an additional colono family for the hacienda.

Labor Obligations

Work obligations for the hacienda varied a great deal throughout the country according to labor supply, degree of backwardness of the area, and prevalent customs.

At hacienda T all the campesinos stated that they had to work six days each week for the benefit of the hacienda.

An average working day consisted of a minimum of eight hours, with no remuneration expected or offered except at planting and harvesting times, when the hacienda provided its workers some alcoholic beverage to comply with the ancient tradition of thanking Mother Earth for the bounty of the land.

The colono and his wife were commonly responsible for serving one week of pongueaje duty in the hacienda house. The services performed were mostly household chores--cleaning, cooking, and taking care of the house, barns, and yards. A family on house duties had to supply its own food. Sometimes part of this work obligation was performed at another farm that the owner had in another

province, to which the colono had to travel by his own means.

The marketing of hacienda production was largely accomplished with the assistance of the colonos, who were required to transport the marketable production to the market of Punata, about 14 miles away, or to the city of Cochabamba, about 40 miles distant. The colonos had to deliver the production with their own animals, and for this reason were paid a nominal wage.

There were other duties too--a payment to the hacienda for the right to utilize pasturelands, the surrender to the hacienda of one sheep from every 10 born to a colono's flock, and the surrender of 50 per cent of the animal manure that the colonos were able to gather in their corrals. This last obligation was greatly resented by the colonos, since chemical fertilizers were then unknown in the area and increases in soil productivity depended on application of manure.

The weaving of bags for crop storage and transport was the principal labor obligation of a colono's wife. It is reported that weaving quotas were high and rigidly enforced. In cases where delivery was impossible, payment to other women for the fulfillment of quotas was common.

From the information gathered during the investigation, it appears that the degree of dissatisfaction among the colonos about their obligations was high, but the great majority complied with these requirements.

In a few instances, a dissatisfied farmer, especially if he had relatives living at another hacienda, might leave his original community. These cases were, however, very uncommon.

Defiance of any obligation was in all cases severely punishable--sometimes by doubling the obligation. In the case of lost sheep or cattle, the penalty was the replacement of the animal by the shepherd or the person responsible for livestock grazing.

The most drastic form of discipline was the expulsion of the colono from his land, and this extreme measure was the most feared of all the disciplinary methods employed in ex-hacienda T. Reportedly, the owner resorted to this action whenever he had an interest in utilizing some of the colono's land.

Working obligations on hacienda K were somewhat different. In the lower part of the farm the colono had to work four days each week, and six days during the harvesting period. The wives of the colonos also worked six days a week during harvest time. The rest of the year the women had to prepare a daily light meal for the working colonos, with foodstuffs supplied by the hacienda.

For the colonos of the lower part, the pongueaje was performed in the house of the owner in the city of Cochabamba. The colono had to travel on his own to the city about once a year. His family was not required to travel.

In the upper part, working obligations were less severe than in the lower part. Agricultural possibilities in the upper part of hacienda K were, and certainly still are, very much restricted by a short growing season lasting only from November through March. Therefore obligations were limited to two days each week, increasing to four days a week during the plowing and harvesting seasons. Other members of the family were not required to do any kind of work for the hacienda, nor were the men compelled to do any pongueaje.

Other common obligations for all colonos of the hacienda included delivering 10 bags of manure each year for the right to graze their livestock without regard to the size of their flocks. They also had to deliver one sheep annually for the same right.

The transportation of this hacienda's potato production was likewise a duty, each colono transporting about 20 quintals (2,000 pounds) from the farm to the main market--the city of Cochabamba. Whenever the amount of production was considered large by the standards of the farm, the colonos had to make *chuno*, a dehydrated potato that can be kept for years without any spoilage. Moreover, all the colonos had to furnish their own team of oxen and agricultural tools for all the work done in the fields of the hacienda.

In general, the working obligations described above for haciendas T and K represent the standard working

conditions and responsibilities of the colonos in the haciendas of the Tiraque area. The minor differences stemmed from ecological characteristics of a farm, and not from any preference of landowners for reducing the heavy burden of the colonos.

At piqueria P, working obligations were non-existent. At the time of the land reform, a small part of piqueria P still remained organized as a hacienda, with only three colonos with some colono obligations. These colonos had to work the land of the hacienda under a sharecropping arrangement. The owner provided the land and the necessary seed, and the colonos supplied the labor and their own agricultural tools. The additional labor force required, especially for harvesting of potatoes, was drawn from the piqueros who received daily wages for their work.

Crop production was divided in equal parts between the owner and the three colonos after deductions for the payment of property taxes and for the compensation of the curaca. The curaca received roughly 10 per cent of the production and was selected by the owner from among the piqueros of piqueria P.

Other principal colono obligations were caring for the hacienda's livestock and transporting the hacienda's crop production to the markets of Punata or Cochabamba.

Marketing of Agricultural Products

The production of both haciendas T and K was sold

directly, either wholesale or retail, in the market fair of Cochabamba. Once the crop was delivered to Cochabamba by the colonos, the owner participated in the sale in order to collect the returns.

The crop production from the parcels of colonos was mostly consumed by them, and the rest was bartered and sold on the farm to retailers who later resold it in Punata or Cochabamba. The proportion of output sold was in general not over 10 per cent of total colono production, and it consisted mainly of potatoes. Bartering disposed of another quarter of their production, and all the rest was consumed at the farm.

Though colonos did not have to sell their own production to the hacienda, or to any person in particular, the marketing possibilities of the colonos on both haciendas were highly limited because of the relatively small amounts they had available for sale. The colonos had access to only small parcels of land and had little time to devote to their own crops.

Comparison Between Piquerias and Haciendas--Production

As small independent farm operators, the piqueros were entirely on their own in the organization of their agricultural production. The type of crops and the prevalent technology were the same for piqueria P as for the two haciendas studied. Heavy reliance on inputs generated within the farm was common for all three.

In general, differences in the organization of production and type of crops existed only because of the physical characteristics of a farm or a piqueria.

Piqueros had no restrictions on the marketing of their agricultural production. The principal market for potatoes was the town of Punata; corn was sold in the area for the manufacturing of an alcoholic beverage called chicha. Other products were usually bartered. Piqueros participated more in marketing activities than did the colonos, and on the average sold about one-quarter of their production.

Profits generated from sales of agricultural products were mostly devoted to land purchases among the piqueros. Piqueros had the opportunity of buying parcels of land, a possibility that was nonexistent for the colonos on haciendas T and K. The existence of this opportunity might lead to the assumption that there existed strong incentives to seek an improved technology, to increase levels of production, and thus to buy additional land. This assumption, however, cannot be supported, because the types of crops cultivated and the process of cultivation of the piqueros and hacienda colonos differed not at all.

The lack of an institutional set-up capable of providing small independent farm operators with the needed assistance to improve their production practices also limited the improvement of their level of living.

The required motivations for a more rational utilization of their available resources were absent and small farmers did not achieve the social and economic gains which would have moved the development process along.

In short, the pre-reform land structure in the area could not have generated agricultural development of the area nor improvement of the rural workers' condition. The slow but continuous replacement of the hacienda by the piquerias might have had an important influence in generating some development conditions--ownership of resources and freedom of resource allocation--but only in the very long run. Although piqueros have had control over the land and freedom of resource allocation, it is clear by their performance vis-a-vis the colonos that these conditions per se could not promote the substantial development needed for achieving a real improvement in their level of living. Perhaps when the influence of the substitution in some way threatened the existing hacienda structure, the process might have been stopped. In general, the existing land tenure structure required a drastic change which materialized in the agrarian reform law of August 1953.

IV. THE AGRARIAN REFORM IN THE AREA OF THE CASE STUDY

In the first formal attempt to improve the plight of rural workers, President Gualberto Villaroel took power in December 1943, and in 1945 passed a law aimed at eliminating all forms of colono labor and associated free services in the rural areas of the country. This law, however, was largely ignored by the landed class and did little to ameliorate the hardships of the Indians.

Also in 1945, an Indian congress was held for the first time in Bolivia. These two actions were the only attempts by any government before 1952 to improve the working conditions of the Indian class. Even these attempts were mostly isolated efforts by some leaders of the government, rather than a coordinated policy for dealing with the agrarian situation.

The idea of reforming the agrarian structure became increasingly accepted by some political organizations, but only limited efforts to that end were made until the 1952 revolution.

Decree law No. 3464 dealing with the agrarian reform was promulgated on August 2, 1953, and passed by the new legislature on October 29, 1956. This agrarian reform represented the social liberation of more than two

million persons, and an attempt to incorporate them into the economic mainstream of the country. In addition, the peasant was integrated into the socio-legal structure of the nation and now enjoys all the rights prescribed by law. The motto of the reform was: "The land belongs to those who work it." The fundamental objectives of the land reform program were as follows:

1. Distribute agricultural land to those who do not possess it or who possess only a very small parcel--if they will promise to work the land--by expropriating land from owners who possess excess amounts or who do not personally engage in agricultural work.

2. Restore usurped land to the Indian communities and cooperate in the modernization of their agricultural methods, always respecting and using wherever possible their traditions of collectivism.

3. Liberate peasant workers from their serf-like conditions of life, absolutely prohibiting gratuitous personal services.

4. Stimulate greater production and commercialization of the agricultural sector by facilitating new capital investment, respecting the efforts of the small and medium farmers, developing agricultural cooperatives, extending technical aid, and facilitating credit.

5. Conserve land resources by adopting technical and scientific methods.

6. Promote internal migration of rural people from the inter-Andean zone where the population is excessively dense, with the object of obtaining a rational distribution of the population, and by doing so reaffirm national unity and economically strengthen the eastern and western portions of the nation.

Changes in the Land Tenure Structure
--The Reform Process

The agrarian reform law did away with the large landowner and created other forms of private property in the rural areas. The criteria for classifying different property sizes were the ecological characteristics of an area, the type of exploitation, and the existing capital investment. A basic principle of the agrarian law consisted of the recognition of private property rights within the limitations and dispositions of the same law. To this end a substantial amount of legislation was passed circumscribing the new rights.

The law prohibits the existence of latifundios, which are defined as large agricultural properties characterized by under-utilization of the available land and labor resources, and which generate profits only from the difference between the average productivity of the labor force and the wages paid to labor.

A medium size property is a farm unit of a size which requires the assistance of an external labor force

and/or utilizes an improved level of technology in such a way that it is mainly market oriented.

Indian communities are specifically acknowledged by the law, and their ancestral land rights are upheld. The agricultural cooperative property is also recognized by the law.

The law also recognizes the agricultural enterprise distinguished by large capital investments, paid labor force, and improved technology, excluding those places where topographic conditions prohibit the use of agricultural machinery and other technical advantages. The livestock ranch property is included under this classification.

In the Tiraque area the new land tenure established by the reform corresponds to a small property category, in most cases a small parcel of land worked by a campesino and his family with occasional hired help. The change in tenure status here was from a landless colono to a farm worker with property rights over the land worked by him. All the former large owners in the Tiraque area have been dispossessed of their land.

Both ex-haciendas studied were classified as latifundios during the legal proceedings of the reform. The former owner of ex-hacienda T contested all the sindicato's (rural labor union's) legal documents, trying to have the farm classified as an agricultural enterprise rather than a latifundio. The owner contended that

ex-hacienda T at the time of the land reform had some improved livestock and some agricultural machinery. The sindicato claimed that the improved livestock and the agricultural machinery were brought to the farm in June 1952 in an attempt to have the farm classified as an agricultural enterprise. Finally, after more than six years of lawsuits and countersuits the farm was declared a latifundio and the owner lost his claim.

In spite of the farm's latifundio status, the former owner was granted 200 hectares of land, but was never allowed to start farming again due to the strong opposition of the farm's sindicato. There is no legal basis for this grant, which was part of the final verdict of the agrarian judge who resolved this case.

Ex-hacienda K was formerly divided into an upper and a lower part. Before the reform many differences in labor requirements and obligations existed between these subdivisions of the hacienda. When the legal procedure started, the situation was complicated by the existence of two sindicato organizations, each trying to obtain additional advantages to the detriment of the other. Most conflicts started over the assigned limits between the lower and upper parts, and were complicated by the fact that some parcels of land were not in the place of residence of a given farmer. The reform process lasted from August 1954 to February 1963, when the existence of two haciendas was recognized.

At piqueria P the land rights that farmers obtained before the reform were recognized anew by the agrarian judges. At the time of the reform, 12 piqueros worked in a sharecropping arrangement with the owner of the remnant hacienda Cabreria. This hacienda was classified as small property because it had only 35 hectares and only three colonos. These colonos and the sharecropping piqueros, through the sindicato of piqueria P, petitioned the agrarian reform service to give them the land worked by them. The process lasted from August 1953 to October 1961, and was never contested by the former owner, who was awarded four hectares of land.

The decision to grant land to the 12 piqueros constituted a very liberal interpretation of the agrarian reform law, which does not provide any legal basis for this action. Each piquero received an average of about one hectare, and the three colonos received about 1.5 hectares each. The rest of the land of the ex-hacienda Cabreria, mostly mountainous, is used by the piqueros as grazing land.

The Distribution of the Land

In nearly all cases, landless farmers acquired land rights over the parcels they farmed before as colonos. The size of these parcels was not standard, so the land allotment is different for each ex-colono, although this difference is relatively small among campesinos of the

same farm. Ex-hacienda T has approximately 2,700 hectares, two-thirds of which are considered noncultivable land. About 700 hectares are classed as pastureland and are used collectively by campesino families without any restriction on size of flocks.

Seventy campesino families received land titles with the reform, each farmer averaging about four hectares of land, of which two hectares have some irrigation facilities. Nine campesino families have not received land titles, mainly because they had no interest in contributing to the sindicato's effort in obtaining the titles, but these families keep on working the parcels of land that each was utilizing before the reform. Furthermore, the 200 hectares of land granted to the former owner have been distributed among these 79 campesino families, allowing each family an additional one and a half to two hectares. Some land was set aside for the school and a sports field. Part of the rest of the land granted to the owner is covered with eucalyptus trees, but undoubtedly there exists an important amount of tillable land not being utilized.

The sindicato has control over the rest of the land of ex-hacienda T, although it has no legal right to do so. Actually, any campesino can work a parcel of land provided that the parcel does not belong to someone else, if this is approved by the officials of the sindicato. The nine untitled families are in this situation.

Ex-hacienda K has an area of 2,286 hectares, of which only 145 hectares are classified as tillable land; this amount indicates the natural disadvantages of this farm. Fourteen campesino families were granted land titles to parcels of land that correspond roughly with what they farmed as colonos before the reform. The size of these parcels is as follows: five received 16 hectares each, half cultivable and half pastureland; six received 12 hectares each, seven cultivable and five pastureland; three received 10 hectares each, half cultivable and half pastureland. Thirteen older sons of the ex-colonos were also granted land rights which average seven hectares-- three hectares for cultivation and four hectares for pasture--making a total of 27 farm families on this ex-hacienda.

The differences in distribution of the land are explained by the varying quality of the land. Another reason for the distribution probably stems from differing sizes of sheep flocks before the reform. The larger the number of sheep each colono had, the greater the grazing rights allowed him.

Four new young families have presented land requests to the sindicato of ex-hacienda K, but these have not been granted because of the lack of suitable land.

Pasturelands in this ex-hacienda include all the lands beyond the limit of cultivation, which are collectively used by all the farm families of the community.

No limitations exist on the size of their flocks, and no special regulations govern the use of pasturelands.

Ex-hacienda Cabreria has an area of 35 hectares, of which about two-thirds are considered suitable for agriculture. The former owner received four hectares of land but he never returned to the hacienda, so his land allotment was worked collectively by the sindicato of piqueria P. For the last five years this work has stopped in view of the lack of interest of some piqueros in participating in any form of communal work, and the inability of the sindicato of piqueria P to enforce its decisions.

The possibilities of former owners returning to any of these farms is extremely small. The lack of mechanization on most farms in the traditional areas of settlement--due to absence of capital, insecurity of expectations, or in some cases uneconomical land units--forces reliance on the labor force for production. This labor requirement puts post-reform owners in a position of dependence on the former colonos, who because of lack of interest, lack of time, or sindicato orders, cannot supply the needed labor at current wages. Thus the landed class in the area of Tiraque has been virtually eliminated by expropriation of property and by the labor shortage.

The distribution of the land in the communities studied, through agrarian reform and de facto distribution,

would roughly provide an average land allotment per head of household in the amounts indicated in Table 5. The parcels of land now owned by the campesinos correspond approximately to what the campesino worked before the reform, plus the additional land granted by the agrarian reform, plus any de facto land. About half of the cultivable land is left fallow for periods of three to six years.

Table 5. Estimated Legal and De Facto Land Allotments (in hectares).*

	Ex-hacienda T	Ex-hacienda K	Ex-hacienda Cabreria
Total area	2,700	2,286	35
Cultivable area	900	145	24
Per cent of cultivable area	33%	6%	66%
Pastureland	700	131	10
Number of campesino families benefited	79	27	15 ^a
Estimated cultivable land received per head of household	4-6	9	1.3

*One hectare equals 2.47 acres.

^aFifteen farm families received land. Three were colonos of hacienda Cabreria and 12 were pre-reform piqueros of piqueria P who worked land in the hacienda under a sharecropping arrangement.

In piqueria P the small amount of cultivable land per head of household shortens the fallowing period by one or two years. Also, piqueros sometimes work on a sharecropping basis at surrounding farms, or engage in other activities such as commerce in agricultural products.

The law specifies that once property titles are distributed, the new owners should register them in the office of deeds. Not more than 5 per cent of all titles distributed in the studied communities have been registered, and the sindicatos of both ex-haciendas and the piqueria do not seem to have enough interest or power to enforce this regulation.

Usually some parcels of land granted to the campesinos surround the campesino's house, while some lie distant from their houses. At ex-hacienda T, the distance between the campesino's house and his land is sometimes 2 to 4 kilometers. In piqueria P, the relatively small size of the piqueria and the lineal residence pattern limits the distance; most plots of land are close to the village.

Political Change as a Consequence of
the Agrarian Reform Law--Organization
of Peasant Unions

The history of the labor movement in Bolivia, as elsewhere, consists of long and arduous attempts to establish labor unions capable of protecting the rights of their members. This movement was oftentimes ruthlessly suppressed or eliminated altogether.

In the case of the farmer's unions, or sindicatos, the unionization of nearly 100 per cent of all the campesinos in the country was achieved in a short period of time (two to three years) and by and large it was free of violence.

The farm level sindicato is the cornerstone of the unionization movement. Each canton has a subcentral campesina composed of all the sindicatos of the surrounding area. The subcentrales campesinas form the Central de Campesinos at the provincial level, and the many centrales form the Federacion Campesina at the departmental level, which in turn is part of the Confederacion de Campesinos at the national level.

The peasant unions of the three communities studied have well-defined authority and responsibility. At both ex-haciendas each sindicato has between eight and 14 secretaryships. Participation of most of these in direction of the sindicato is, however, purely nominal, since only one or two members of the ruling committee are performing their assigned roles. The secretaria general and secretaria de relaciones (loosely equivalent to president and vice-president) usually manage the affairs of the sindicato.

The rules governing the conduct of the members in accordance with the charter are rigidly enforced. At ex-hacienda T and piqueria P the dirigentes (leaders of the sindicato) are the dispensers of justice and the persons who settle most of the conflicts between the farmers of these communities. If a punishment is required it usually consists of working for the dirigente for a few days, depending on the type of offense. In some cases,

especially when the offense is theft, fines are collected in addition to the forced labor. When an offense is greater, or the defendant has already been convicted of the same fault, he is taken to the Central Campesina de Ucureña where he is further punished. In certain cases the dirigentes of the cantonal town, or provincial town, act as referees of local problems. Only in extreme cases are conflicts between farmers settled outside the sindicato's territory and under national laws.

The dirigentes of ex-hacienda K, on the other hand, command very little respect from the sindicato members, and have no power to settle problems between farmers. These are usually resolved in the town of Tiraque by the police authorities. The differences between ex-haciendas exist because the influence of the dirigentes of the upper valley (especially from Ucureña) is much greater at ex-hacienda T than it is at ex-hacienda K. The most important leaders of Ucureña lived occasionally in ex-hacienda T during the years 1956 to 1960, which helped to develop the more authoritative character of the dirigente of ex-hacienda T. His power increased as a result of his contact with the most important campesino leaders of the country.

The functional characteristic of sindicato objectives, together with the misuse of power by some dirigentes, is eroding the sindicato's former omnipotence. The basic objective of the sindicatos of both ex-haciendas

was to support the action of the government in the application of the agrarian reform law. This objective was accomplished and the sindicato's objectives shifted to the building of a school house and the improvement, maintenance, or construction of some access roads to the farms. Once the proposed goals are achieved, the sindicatos begin to lose momentum, and become less active organizations.

On both ex-haciendas these new goals are not quite obtained yet. Schools are being built but the interest of both sindicatos in these projects is very low already. At ex-hacienda T the school has been half finished for the last four years. In ex-hacienda K the half-built school is newer, but chances are that it will take many more years to complete. On the other hand, the sindicato of piqueria P has developed into a very dynamic element in the progress of the community. Plans for buying a tractor for collective use are being actively promoted, and a somewhat ambitious irrigation project is also considered a job that can be done through sindicato action.

The farmers of piqueria P, independent before the agrarian reform, had a higher level of education and more interest in political organizations. At one time the old traditional parties had some members among the piqueros of this community. After the first national indigenous congress, held in La Paz in 1945, these farmers attempted to organize a sindicato in 1946, but were blocked by some

owners of the farms of the surrounding area and some townspeople of Tiraque. Organization of this sindicato might have spurred surrounding communities to organize for protection of their rights.

Sindicatos were organized in September 1953, at ex-hacienda T, and in March 1954, at ex-hacienda K, whereas the sindicato of piqueria P was organized in October 1952 with much less outside help than the ex-haciendas received. The sindicato of piqueria P was organized not because its members had to fight for newly acquired land rights, since they were already owners of their parcels, but because sindicatos were being organized everywhere and the piqueros felt that it was their duty to do likewise.

The sindicato of piqueria P has become through the years less interested in party affairs. The dirigentes of this sindicato have a higher educational level than the dirigentes of other rural communities in the area, and are well aware that political parties have not fulfilled the many pre-election promises to help the community.

The Role of the Sindicato in the Legal Process of the Agrarian Reform

Throughout the country sindicatos had a very active role in implementing the agrarian reform law. The legal mechanism of the reform requires that a formal legal petition be presented to a lower court. Without exception in the known cases of the Tiraque area (the detailed

studies of ex-haciendas T and K and piqueria P, plus general observations of all the surrounding farms), the sindicato was the instrument through which the agrarian reform process became a reality. At the time of the reform, and even before the sindicatos were organized, farm owners in the area of Tiraque abandoned their haciendas. Sometimes the legal process initiated by the sindicato did not meet any legal opposition, as was the case in ex-haciendas K and Cabreria, but still each proceeding took more than six years to be completed.

At ex-hacienda T the sindicato collected dues to defray the expenses of the legal process. The average cost per campesino in this ex-hacienda for all the legal work carried out by the sindicato amounted to about \$20.

At ex-hacienda K the sindicato's role in the legal process consisted of carrying through the paper work in the town of Tiraque and the city of Cochabamba. To this end about two hectares of land were worked collectively under the sindicato's control in order to support the sindicato's expenses.

The sindicato of piqueria P was also active in obtaining property rights for some of its members. It initiated the legal procedures with an approximate total cost per campesino benefited of about \$18.

The role played by the three sindicatos was very commendable in view of the continuous requirements for legal documents, most of which were costly and difficult

to obtain. From the start the campesinos met many obstacles--they were ignorant of legal actions, and were sometimes unaware of how to search capital cities for public offices. All actions required money, which was usually difficult to collect. In the case of ex-hacienda K, money from the land worked collectively for this purpose was not forthcoming at the needed time, and returns were dependent on weather and crop factors not under the control of the sindicato.

Prospects of the Sindicato for Community Development

Before the revolution of 1952, the hacienda system limited leadership possibilities among the rural workers of the country, although this system indirectly developed some leadership within each community when certain selected colonos were given a small amount of authority. Throughout the years, these specially selected workers became suited for the task of organizing and conducting the sindicatos. At both ex-haciendas the first dirigentes were colonos who had had some authority within the hacienda system (such as curacas), or colonos who were relatively better off than the rest. Usually they were older and respected people within their communities.

Without this base of leadership it would have been difficult for the emerging sindicatos to carry out their part in the legal proceedings of the agrarian reform to become a political linkage with similar institutions

outside the community. The power vacuum left by the elimination of the hacienda has been occupied by the sindicato. This fact cannot be overlooked in any attempt to improve the existing conditions in any farm community of the area of Tiraque.

Motivation toward social action was not and still is not a common trait among the campesinos of the communities studied. Under this circumstance part of the effort of the sindicatos had to be channeled toward building a sense of unity and an understanding of the advantages of collective action. The organization of more functional groups within the sindicato, such as committees of community improvement and school boards, indicates this development is proceeding. Thus far, however, relatively small gains in the fulfillment of community goals are outweighed by inability to cope with problems that require collective action.

In the three communities studied, school houses standing half finished for more than four years support the contention that the power structure of these rural communities is strong enough to at least attempt community improvement programs, but it lacks the mechanisms by which these programs can be successfully implemented. There is a limited financial base for carrying on action programs and sometimes communities may try larger projects than they can handle.

This inability of the local sindicatos to generate active programs of community development is partly because sindicatos were organized for a well-defined and much announced reason--"That of protecting themselves by defending the revolution of 1952." To this end paramilitary units were organized throughout the countryside, some of them well armed and ready to quell political opposition outside their jurisdiction. Leadership consensus and development were not, at the time, the most important aspects of the sindicatos. Through the years this lack of definite purpose beyond the procurement of land rights and the enforcement of the newly won rights--an important task in itself--allowed in some cases the development of a very autocratic type of leadership, under which many abuses were and still are perpetrated against the campesino masses.

Yet there exists a great potential for community development through sindicato action. After all, sindicatos are the depositories of power in the community and are the only institution capable of inducing individual and community participation in any type of program. Examples from other areas are encouraging. In the community of Vacas, for instance, the sindicatos gave way to cooperatives which appear to have a sense of unity for collective action. The Vacas cooperative has undertaken the job of supplying potato fertilizer to its members, so that in this area sharecropping arrangements, common in

in the immediate area of the town of Tiraque, are no longer in existence. Campesinos can benefit more from their efforts since they have control over their entire production.

The development of a sindicato into a more energetic organization, permeated with social objectives and capable of promoting community welfare, is probably difficult to achieve, but an important beginning has been made. The process of decision making now rests within the communities, and this certainly is a result of the reform. This represents an important social change even though potential community decisions have not been fully successful.

Agrarian Reform and the Social Organization and Social Mobility of the Communities Studied

The social organization of the farm people of the communities studied is determined largely by a common occupational activity. The social stratification in areas where the family farm is prevalent, such as the communities studied, can be described as follows:

Rich farmers and rich piqueros, farmers in command of functional or informal leadership.

Farm owners, piqueros, labor class.

Those who "do not count." Extremely poor farmers usually considered "lazy."

In each community studied a few well-to-do farmers command a great deal of prestige and influence. These wealthy farmers do not necessarily hold any formal post in

the communities or in the town of Tiraque.

Farm families in the middle strata are the most numerous and form the majority of the community. Political and sindicato activities are usually conducted by these farmers.

Farm families at the bottom are commonly unattached laborers and extremely poor families. In general, these families are said not to possess the good values attributed to those families in higher strata--hard work, thriftiness, and an ill-defined but nevertheless existent understanding that it is God's will to be either at the top or at the bottom of the social scale.

Although stratification does exist, there is considerable interaction between families and people of all levels, indicating a flexible class structure. In communities where large estates predominate, which was the case here prior to the agrarian reform, there existed a very rigid class system. The local class structure is still largely determined by the social and economic patterns which existed before the reform, but a new social stratification is developing at ex-hacienda T and piqueria P, where social mobility is emerging with an increase in the educational level of the younger generation, and with occupational and geographical adjustments of new farm families.

The social situation at ex-hacienda K is influenced by the extremely limited economic opportunities of these

farmers. Social change here is therefore taking place at a much slower pace than in the other two communities.

The broader social stratification in the area of Tiraque includes three groups distinguished by tenure status, place of residence, and educational background, while other rank factors like ethnic background, skin color, length of residence, and style of life are fairly homogeneous for all groups.

The largest group is the ex-colonos, currently called campesinos, who are small farm proprietors. They reside in scattered dwellings on or around their parcels of land.

Another group is the piqueros, or small independent farmers, who bought or inherited their farms before the reform. Although tenure status is similar, the sizes of holdings are rather dissimilar due to inheritance problems and the limited cultivable land supply for sale. The size of the holding is an important social ranking factor among piqueros.

The educational level and the degree of acculturation of the piqueros are significantly different than the campesinos'. About three-quarters of the piqueros are literate (heads of household), and almost two-thirds speak Spanish. Table 6 compares literacy and Spanish fluency for the three communities.

Table 6. Level of Literacy and Knowledge of Spanish
(Head of Household).^a

	Ex-hacienda T (N = 87) ^b		Ex-hacienda K (N = 27)		Piqueria P (N = 60)	
	<u>Literacy</u>					
Literate	21	(24)	4	(15)	43	(72)
Illiterate	68	(76)	23	(85)	17	(28)
	<u>Knowledge of Spanish</u>					
Good	2	(2)	0	(-)	24	(40)
Poor	27	(31)	4	(15)	21	(35)
Do not know	58	(67)	23	(85)	15	(25)

^aInformation from population census of each community. Parenthetical figures represent respective percentages.

^bEighty-seven responses out of 88 established families.

The last major group in the Tiraque area is the vecinos, or townspeople, some of whom own some surrounding land. Community services such as grammar and junior high schools, health services, a few stores, a church, and police are located in the town. The educational level of vecinos is higher than is the two previous groups', and their ethnic background is similar. A distinct difference between vecinos and the other two groups does exist so far as material possessions, sources of income, and style of life are concerned.

Interaction between campesinos of different ex-haciendas, or between campesinos and piqueros, is almost nonexistent; each farm community forms a very self-contained social unit. Interaction between town and farm

people takes place primarily on a commercial basis, since farmers buy and sell in these agricultural towns. Another source of interaction is compadrazgo, or godchild relation. This practice is largely based upon the interest of the townspeople in establishing a firm commercial tie between farmers and godfathers.

A marked difference in social mobility also exists between farm and townspeople. Both vertical mobility and migratory movement are most common among townspeople and least common among campesinos; piqueros occupy an intermediate position.

The major means of upward social mobility among the rural population of the communities studied are tenure status, decision making power, education, and increased level of aspiration.

Rural workers who have acquired ownership status have broadened their alternative possibilities in the production process and in the initiation of technological change, providing a foundation upon which their social and cultural characteristics can change to permit a substantial improvement in level of living.

The decision making power bestowed upon the farmers with the reform compares to a total absence of any such power before the reform. Self-determination of the types of production and distribution and of occupational alternatives within pragmatic bounds is obviously an extremely important means of upward social mobility for

the rural people of Bolivia. Values among the farmers of the three communities, however, are still largely determined by factors other than the freedom of self-determination. Their economic foundation remains limited, leaving little room for the adoption of new agricultural practices. Incentives for risk taking--for using the decision making power obtained through the reform--are greatly curtailed. Theoretical freedom to change occupations is seriously constrained by limited education and consequent lack of skill for any occupation other than traditional farming, and by lack of employment opportunities outside their communities.

A general improvement in the educational level of rural people is another important means of upward mobility, and to this end both ex-haciendas studied have built one-room schools, with a publicly supported teacher provided in each case. School attendance is not yet so high that all children benefit; nevertheless, 69 per cent of the interviewed farmers (one-third of all the farmers of the three communities) stated that the minimum education for males should be 12 years, the equivalent of a complete elementary and high school program. Only 5 per cent of all interviewed farmers favored three years or less of elementary education.

However, little effort is put forth at the community level for the fulfillment of these educational goals. Only the first two courses of elementary education are

offered now. School attendance conflicts with agricultural chores for children of school age, and girls for the most part are not enrolled.

The types of occupational activities desired for children are reported in Table 7. Importantly, farming is no longer considered the only occupational alternative.

These views document an increased level of aspiration among farmers. More than 65 per cent of interviewed farmers think it possible for their children to attain a higher social status through improvement in their occupational alternatives. Before the reform the rural class as a whole was perforce resigned to their position on the social scale.

Table 7. Occupations Desired for Male Children by Farmers of Studied Communities.

Type of occupation	Ex-hacienda T (N = 26)	Ex-hacienda K (N = 14)	Piqueria P (N = 18)
Farmer	10	7	3
Mechanic	4	-	1
Professional ^a	-	-	11
Other ^b	12	7	3
Total	26	14	18

^aNo specific profession was named in the answers. The term refers generally to engineer, lawyer, school professor, etc.

^bA number of answers were very vague. In general, the answers stated any type of occupation depending on the person's ability.

Some barriers to upward mobility were greatly reduced after the reform and its associated measures. The race factor, a serious deterrent to the improvement of social status in Bolivia, is at least ameliorated. The customary name "Indian" was replaced by the more neutral term campesino. Some educational opportunities, once absent for the majority of the campesinos, are presently available to all the campesino population. Public recognition of campesinos' potential role in national development has increased these farmers' awareness of national and social values, and has in turn facilitated upward mobility as education, for instance, becomes widely accepted and used as a means toward higher status for children.

V. PRESENT AGRICULTURAL SYSTEM

The communities studied utilize agricultural processes and enterprises mostly of the traditional type. Crops and methods of cultivation are practically the same as they have been for many generations, and the only generally accepted innovation during the past decade is the use of chemical fertilizer for potato growing. The campesinos of the area are aware of certain new tools, such as the steel plow, but are economically unable to acquire an improved plow and are without sufficient inducement to make the effort to change the traditional mediterranean-type plow.

The principal and in most cases the only equipment of the campesinos of these communities is the traditional plow, the double-head ox yoke, the iron blade hoe, sickle, and pickax, and various ropes and bags. All the campesino families in the sample owned cattle for plowing purposes. Oxen provide a very cheap source of power since they are raised by the farmers themselves; they also supply meat, manure, and hides.

Fertilizers

Animal manure, especially from sheep, is carefully gathered and widely used in the area. Animals are not taken to pasturelands until about noon, so that natural

fertilizer will accumulate in corrals. Most campesinos of the area, however, must buy additional organic fertilizer each year from some campesinos of the highland areas, who are devoted exclusively to the business of supplying animal fertilizer to certain areas of the department of Cochabamba.

Chemical fertilizers are used together with organic fertilizers. The amounts commonly used per hectare of potato crop are about 400 pounds of chemical fertilizer and 4,000 pounds of manure. This proportion is not necessarily the recommended one, but the higher cost of chemical fertilizers, about 25 times as much as manure, makes this mixture the adopted practice. Organic fertilizer is also used on most other crops but in smaller amounts than for potato production.

The proportion of campesino families using chemical fertilizer, on the potato crop in the agricultural year 1965-66 was very high, according to a sample survey of 59 campesino families. At ex-hacienda T (N = 26), the figure was 100 per cent, and at the piqueria (N = 18) it was 94 per cent. Ex-hacienda K (N = 15), because the sample families lacked money to purchase chemical fertilizers, had a figure of only 53 per cent.

Labor Use

All the work of preparing the ground for planting is done with oxen. Total labor requirements vary with

crops, a hectare of potatoes requires 165 man-days on the average, plus 34 team-days of oxen. A hectare of barley demands 84 man-days plus 17 team-days. A hectare of wheat needs 99 man-days and 17 team-days. The demands of other crops lie within these ranges.

These high labor requirements can be partly attributed to the deficient equipment and tools used in the production process, and to the limits of traditional technology in agricultural production. The mediterranean-type plow penetrates the soil only three to four inches, compared with an average 6 to 10 inches for an improved plow, and more than one plowing operation is therefore required. Also, the double-head yoke greatly impairs the physical strength of draft animals; the double-neck yoke or other harness is preferable.

As in other rural areas, new farming methods are continuously but slowly emerging in response to needs of the growing population and to new social and economic conditions. Manual labor is being replaced in some instances by animal power, and this source in turn is occasionally replaced by mechanical power. At ex-hacienda T some threshing operations are currently done with the help of a gasoline-powered mill.

Practices of Traditional Agriculture-- Crop Rotation and Fallowing

Soil fertility is protected in this region by the use of natural and chemical fertilizers, by a crop rotation

cycle, and by a well planned fallowing system. A common rotational cycle at both ex-haciendas and at piqueria P is shown in Table 8. The minor differences between communities in crop rotation and fallowing are closely related to pressure upon the land and to the quality of the soil. Other crops such as lima beans, peas, and papalisa, an edible tuber, are also planted instead of barley at ex-hacienda T and piqueria P.

Since the environmental conditions of the area limit the possibility of new crops, none have been introduced since the reform. Potatoes and barley appear to have a comparative growing advantage in the area, and no major changes in crop composition are expected in the near future.

New improved varieties of potatoes, barley, and oca have been developed in the experimental research station near ex-hacienda T, offering promising possibilities for a real improvement in agricultural production of the campesinos of the area. The existing rapport between the research station and the campesinos of the area is, however, rather weak. The research station has not actively promoted the introduction of these improved varieties, and only a very small proportion of area campesinos currently benefit from the accomplishments of the research station.

Table 8. Crop Rotation and Fallowing System.

Year	Ex-hacienda T ^a	Ex-hacienda K	Piqueria P ^a
1	Potatoes	Potatoes	Barley
2	Barley	Oca or barley	Wheat
3	Rest	Forage oats	Potatoes
4	Potatoes	Rest	Rest
5	Rest	Rest	Rest
6	Rest	Rest	
7	Rest	Rest	
8	Rest	Rest	
9		Rest	

^aAt ex-hacienda T and piqueria P there exists some level land that has irrigation facilities, in which case the campesinos plant corn and lima beans every year without any fallowing.

Livestock Exploitation

Every campesino family owns some livestock as a source of food, lard, tallow, wool, hides, feathers, draft animals, manure, and--a very important function--as a way to utilize surplus money in the form of savings. Despite their importance, livestock operations are only complementary to agricultural activities. No campesino farm in the area is devoted mostly to livestock.

The ecological characteristics of the area determine the species and breeds of livestock that can prosper here. Almost all the livestock is of native type, and the few isolated attempts before the reform to introduce

improved breeds of dairy cattle, sheep, and horses have not continued; what little was achieved is totally lost.

Pasture management is unknown among the campesinos of the area, and the natural pastures are reputedly of poor quality. Some additional forage crops are usually fed to cattle, horses, and donkeys, especially forage barley and oats. In a few places under irrigation, some alfalfa is cultivated, especially at ex-hacienda T and piqueria P.

The livestock population in the studied communities is typical of that in the general area of Tiraque, as is livestock ownership per campesino family. A complete livestock census of these three communities produced the results shown in Table 9.

The lesser importance of sheep as part of the real livestock population at piqueria P is due to limited pastureland. At ex-hacienda K, the number and kinds of animals are fewer on account of elevation.

From an expansion of the random sample applied in each community (about 25 per cent of the campesino families), it appears that the complete census of the three communities underestimates the true total livestock population. Campesinos are very reluctant to report their possessions, especially livestock. The most radical differences between the expansion of the sample results and the "complete census" are found among sheep and rabbit counts.

Table 9. Livestock Numbers and Importance at Three Studied Communities, Per Family, 1967.

Animal unit equivalent ^a	Ex-hacienda T		Ex-hacienda K		Piqueria P		
	No.	Per cent	No.	Per cent	No.	Per cent	
Cattle	1.00	3.53	46.8	2.59	30.0	2.00	50.6
Horses	0.50	0.51	3.3	1.70	9.9	0.33	4.0
Donkeys	0.25	1.01	3.3	--	--	1.27	8.0
Llamas	0.25	--	--	7.41	21.5	--	--
Sheep	0.12	25.51	40.6	26.70	37.0	8.00	24.2
Pigs	0.12	0.72	1.2	0.26	0.4	0.20	0.3
Poultry	0.06	4.39	3.5	0.89	0.6	4.17	6.3
Ducks	0.06	0.43	0.3	--	--	0.21	0.3
Rabbits	0.03	2.86	1.0	1.78	0.6	8.37	6.3
Total per cent			100.0		100.0		100.0
Animal units per family		7.54		8.62		3.96	

^aAnimal unit equivalent was estimated by considering market price of each kind of livestock as an overall average for the three communities. Average prices of other animals are proportional to those of cattle, which command the highest prices. The percentage figures correspond to the importance of animal unit equivalents in each community, not to actual numbers of livestock.

No radical change in the ownership and distribution of livestock is foreseeable for the area. All local farmers are basically engaged in agricultural pursuits, with livestock merely complementary. The campesinos of ex-haciendas T and K stated that whenever they have some surplus money they will buy some livestock, mainly cattle and sheep. This is an accepted way of saving money. The livestock market in the town of Punata, held every Tuesday throughout the year, offers a ready market if there is need to transform livestock into cash.

Farmers of piqueria P, however, have the increase of their land resource as a basic goal; their surplus money is devoted to buying additional parcels of land.

Level of Self-sufficiency

Before the agrarian reform campesinos in the Tiraque area as a whole did not sell more than 10 per cent of their agricultural production. At ex-hacienda T the only crop sold in this proportion was potatoes, and practically no marketing of campesinos' agricultural products occurred at ex-hacienda K. In both cases the campesinos' lack of sufficient land and time prevented a higher level of production for the market.

At piqueria P the approximate percentage of crops sold has changed in the following way:

<u>Crop</u>	<u>Percentage Sold</u>	
	<u>Before the reform</u>	<u>After the reform</u>
Corn	10	57
Potatoes	0	62
Wheat	20	68
Barley	50	76

The principal reasons for this large increase in the proportion of production sold at piqueria P are the newer and expanded market outlets, the improved transportation facilities, and the larger market involvement of campesinos who now require cash in order to acquire commodities that were either unknown or unavailable before the reform, such as transistor radios, record players, sewing machines, and bicycles.

Currently, ex-hacienda T is the most market oriented of the three communities studied, while ex-hacienda K is still markedly a subsistence type of farming operation where less than 10 per cent of the production is sold and almost three-quarters is consumed on the farm. Piqueria P holds an intermediate position.

Barter Practices

Barter is relatively minor in importance at both ex-haciendas. At ex-hacienda T agricultural production is mostly market oriented, and bartering usually is carried out only for relatively minor crops like oca, papalisa, and corn.

Bartering occurs mainly between campesinos and merchants who travel from farm to farm bartering bread, salt, hot pepper, and other goods for potatoes. The isolation of ex-hacienda K keeps the number of merchants who go to this farm limited, and consequently the proportion of agricultural production bartered is small there.

At piqueria P the importance of bartering is comparatively high. Peas and corn are bartered for oca and papalisa, products which do not grow in piqueria P but are part of the regular diet of farmers of the area, and which can be kept for a long time without spoilage.

Level of Capital Investment

A low level of capital investment is characteristic of the Bolivian agricultural sector. The farmers of the ex-haciendas studied have as a rule limited their cash expenditures for land, agricultural equipment, and general farm improvements, and prefer to put most of their investment in the form of livestock. On the other hand, farmers of piqueria P invest the bulk of their capital in land, and again, relatively little in agricultural equipment and general farm improvements.

Yet material possessions in the communities studied have increased considerably since the agrarian reform, especially transistor radios and bicycles. A random sample applied in these communities is analyzed in Table 10. Wood and metal beds are owned by all the

families in the sample at ex-hacienda T and piqueria P, but by only about 30 per cent in ex-hacienda K, where others sleep on the floor.

Table 10. Percentage of Campesino Families Owning Selected Material Goods.

Good	(Percentages)		
	Ex-hacienda T (N = 22)	Ex-hacienda K (N = 10)	Piqueria P (N = 15)
Bicycle	64	10	27
Transistor / radio	32	20	27
Sewing machine	18	20	7
Record player	18	--	13

Land Fragmentation

In the area of Tiraque in general and in the communities studied in particular, a single farmer's land units are usually located far apart over an extensive area. The fragmentation of farm properties is more prevalent in the piquerias, where a piquero may inherit land from several sources as well as buy land that becomes available. At ex-haciendas T and K inheritance problems exist as a source of land fragmentation. Furthermore, before the reform a farmer could be given rights to work land which consisted of a parcel near his house and an additional plot somewhere else; the agrarian reform law provided legal rights to the same scattered plots. In the communities studied, no campesino has his farm property in

one single unit, and this appears to be the usual case in the area of Tiraque.

One possible solution to land fragmentation problems would consolidate different parcels by bartering compromises; this course has not been pursued and would be difficult to apply since farmers are very attached to their respective plots. Another possible approach, also difficult to put into practice, is to piece together various small plots of land and work it collectively. Experience indicates, as noted, that collective work is difficult to implement. Another solution may be to provide farmers with some credit facilities, enabling them to exchange their scattered plots with the necessary money to settle price differentials.

Still, land fragmentation in this area is not nearly so serious as it is in other areas of Bolivia. Also, at the present level of farm technology, economies of scale are not likely to take place.

Occupational Structure

Land and labor are the principal inputs of the agriculture practiced in the communities studied, and labor is the main factor in achieving increases in the level of agricultural production. Table 11 describes the occupational structure at both ex-haciendas and at the piqueria. About 94 per cent of heads of households report agriculture as their primary occupation. Household chores

occupy mostly widows who are too old to work in the fields. Not one male head of household reported agriculture as his secondary occupation, yet in ex-hacienda T a relatively significant 10 per cent reported they had a specialized trade such as musician, mason, chicha maker, or craftsman. This same situation is found in piqueria P, where the most important secondary occupation is commerce, whereas in ex-hacienda K practically everybody considers himself a farmer and nothing else.

Table 11. Occupational Structure, Heads of Household, at the Three Studied Communities.

Type of occupation	Ex-hacienda T (N = 88)		Ex-hacienda K (N = 27)		Piqueria P (N = 60)	
	Main	Second-ary	Main	Second-ary	Main	Second-ary
Agriculture	84	-	26	-	54	-
Household chores	3	2	1	-	4	-
Weaving	1	3	-	1	-	5
Others ^a	-	8	-	-	2	7
Total	88		27		60	

^aOther occupations include musicians, carpenters, tailors, craftsmen, masons, chicha makers, and merchants.

The occupational structure of the entire family provides a better understanding of the whole range of occupations of campesino families in the province of Arani, as indicated in Table 12.

Table 12. Main Occupations of Rural Families, Province of Arani.^a

(N = 119)

Occupation	Males		Females	
	Number	Per cent	Number	Per cent
Agriculture	167	62.5	1	0.4
Household chores	--	--	97	42.0
Students	70	26.2	36	15.8
Trades	10	3.7	47 ^b	20.3
Shepherd	5	1.9	46	19.9
Merchant	1	0.4	2	0.8
Others	14	5.3	2	0.8
Total	267	100.0	231	100.0

^aChildren under six years of age were not included in the sample. The province of Arani is the major political subdivision of the area of Tiraque. The sample was taken in eight communities, of which six are located in the area of Tiraque.

^bWeaving.

Source: H. Murillo and E. Jauregui, Socio-Economic Study of the Rural Area of the Province of Arani (Cochabamba, Bolivia: Agricultural Interamerican Service, 1963), p. 27.

Agriculture still rates as the most important activity for the men. Shepherds are young members of the family who have completed two or three years of school and cannot carry on heavier work at their age. Women are mostly engaged in household activities, weaving, and livestock care, yet are also very active in agricultural tasks; they participate in almost all the different

phases of work except plowing and similar heavy work.

Women do most of the planting, cultivating, and harvesting with the help of all children not already taking care of the livestock.

VI. ECONOMICS OF AGRICULTURAL PRODUCTION
IN THE COMMUNITIES STUDIED

The ecological conditions of the Tiraque area have determined a type of agricultural production classified as cold to temperate. The area is especially well suited to potato production. The relative importance of other crops is small, as can be seen from expansion of the sample in the three communities (see Table 13).

Table 13. Crop Production Per Family, Agricultural Year 1965-66.^a

(Pounds Per Family)			
Crop	Ex-hacienda T	Ex-hacienda K	Piqueria P
Potatoes	18,880	3,038	6,261
Barley	2,885	200	1,890
Wheat	1,904	-	1,366
Oca	1,400	750	-
Lima beans	928	38	39
Corn	323	-	1,985
Papalisa	120	12	-
Peas	75	-	523
Forage oats	-	56	-
Total production per family	26,515	4,094	12,064
Number of families	88	27	60
Estimated total crop production (U.S. tons)	1,167	51	362

^aExtrapolated from an approximate 25 per cent family sample.

In spite of similar socio-cultural characteristics and similar technical and economic constraints there is considerable variation between these communities in the level of crop production and apportionment.

At both ex-haciendas, potato production represented over two-thirds of the total crop volume during the agricultural year 1965-66; at piqueria P potato production was about one-half of total crop volume. Moreover, at both ex-haciendas, potato sales accounted for about 90 per cent of total crop sales, while at piqueria P, they accounted for 66 per cent of total crop sales.

The importance of potatoes in these communities leads to the assumption that production and marketing of other crops are determined by the production of potatoes. This assumption is supported by a comparison of the production, sales, and consumption of potatoes with those of all other products including livestock.

Table 14 shows the average production, consumption, sales, and barter of potatoes, of all other crops, and of livestock for small and large per capita potato producers. It also includes an estimated average for all families in each community for comparative purposes. Table 15 presents the same information in percentages.

Larger potato producers have consistently higher per capita average values of production, consumption, sales and barter, plus a higher value of livestock production and consumption. In all the communities,

Table 14. Per Capita Production, Consumption, Sales and Barter of Crops (in Pounds) and Livestock (in Dollars), Sample Families.^a

	Production			Consumption			Sales and Barter			Livestock	
	Pota- toes	Other crops	Total	Pota- toes	Other crops	Total	Pota- toes	Other crops	Total	Produc- tion	Consump- tion
Ex-hacienda K											
Small	250	66	316	141	45	186	43	-	43	\$ 7.72	\$ 5.64
Large	694	261	955	468	205	673	93	12	105	7.86	5.45
All families	472	163	635	304	125	429	68	6	74	7.79	5.54
Piqueria P											
Small	800	957	1,757	380	319	699	416	487	903	18.19	9.65
Large	1,984	1,706	3,690	615	487	1,102	1,263	611	1,874	23.66	12.72
All families	1,392	1,331	2,723	497	403	900	839	549	1,388	20.92	11.18
Ex-hacienda T											
Small	2,978	1,490	4,468	420	651	1,071	2,337	641	2,978	21.82	14.05
Large	5,970	2,139	8,109	675	975	1,650	4,977	221	5,198	28.95	19.34
All families	4,474	1,814	6,288	547	813	1,360	3,656	431	4,087	25.39	16.69

^aAt both ex-haciendas one-half of the farmers sampled are included in each group. In piqueria P the number of farmers sampled is uneven; thus the group consisting of large producers is slightly larger than the corresponding group of small producers.

Table 15. Production and Distribution of Potatoes and Per Cent Relation to Total Crop and Livestock Production and Distribution, By Value.^a

	(Percentage)					
	Potato production Total crop production	Potato barter & sales Total crop barter & sales	Potato consumption Total crop consumption	Total crop consumption Total crop production	Crop & livestock consumption Crop & livestock production	Livestock consumption Total consumption
<u>Ex-hacienda K</u>						
Small	79.1	100.0	75.8	59.1	65.8	41.3
Large	72.7	88.5	69.5	70.5	68.7	18.3
All families	75.9	94.2	72.6	64.8	67.3	24.8
<u>Pigueria P</u>						
Small	45.5	46.1	54.3	39.8	45.3	22.9
Large	53.8	67.4	55.8	29.9	33.5	19.8
All families	49.6	56.7	55.0	34.8	39.4	21.3
<u>Ex-hacienda T</u>						
Small	66.6	78.5	39.2	24.0	28.1	24.8
Large	73.6	95.7	40.2	20.3	25.2	22.5
All families	70.1	87.1	39.7	22.1	26.7	23.6

^aAt both ex-haciendas one-half of the farmers sampled are included in each group. In pigueria P the number of farmers sampled is uneven; thus the group consisting of large producers is slightly larger than the corresponding group of small producers.

large per capita potato producers also market more potatoes and other crops, and consume more potatoes but in a decreasing proportion.

From the information gathered during the field investigation, it appears that the importance of potato production in relation to total crop production is increasing in the area. Among apparently significant reasons are the following:

1. Technology of potato production has undergone considerable improvement. Chemical fertilizers, practically unknown before the reform, are now used by nearly all farmers. High yield and pest resistant potato varieties have been developed during the past 15-18 years, and the use of pesticides is gaining support among farmers.

2. Improvements in communication and transportation during the past 15 years have changed marketing opportunities and costs, creating incentives for expanded crop production. Average market prices are about 3.4 times higher now than in the years immediately after the reform while marketing costs have not increased nearly as much; the cost/price marketing ratio is now a relative advantage to farmers growing and selling potatoes in the area.

3. Potatoes constitute the single most important component of the diet of the farm families of the Tiraque

area, and as such have priority in the use of land resources.

It is reasonable to accept evidence that the volume of potato and other production has increased from pre-reform levels, except for certain farms, such as ex-hacienda K, where crop production is actually lower now. At ex-hacienda K natural hazards like frost, hail, high winds, and droughts now affect production more than before the reform, when the former owner had more resources to minimize these problems than each individual farmer presently has.

Distribution of the Crop Production

Crop production is allocated in four ways: sales, barter, seed, and household consumption. Disposition of the production varied a great deal among the respective crops as well as among the communities studied.

Ex-hacienda T is the most market-oriented, selling about 70 per cent of its crop. Ex-hacienda K is practically a self-subsistent community; sales do not even reach 10 per cent. Piqueria P is also market-oriented, selling about two-thirds of the total crop.

In general, the proportion of sales of each crop follows closely its proportion of total production. The four most important crops in each community amount to about 95 per cent of the total crop output, and account for 97 per cent of volume of production sold.

The most important commercial center for the sale of agricultural and livestock products of the three communities is the town of Punata, which holds a weekly fair every Tuesday. This is practically the only day when commercial transactions are made. Another part of the production is marketed directly in the community to merchants who go from house to house buying agricultural products at prices somewhat lower than in town. This practice, however, is not common in ex-hacienda K because of its relative isolation.

Farmers of ex-haciendas T and K engaged little in bartering transactions. The higher importance of bartering at piqueria P may be partly explained by the lack of transportation facilities to the community. At present, there exists a poor road which is not often traveled, and which is impossible to use during the rainy season (December through March). The lack of transportation could in turn be attributed to the lower marketable volume of production, which precludes the steady traveling of some trucks.

Potatoes account for the major proportion of agricultural production bartered in both ex-haciendas. For merchants, the dollar difference in goods given away and the amount of potatoes received is noticeably better than for any other area product. Potatoes account for over three-quarters of the total production, all harvested between April and May, and the campesinos do not have

adequate storage facilities; this situation helps make potatoes the most convenient sale product for both buyers and producers. Other crops are infrequently traded, and even this minor bartering seems to be gradually decreasing in importance because of the higher economic participation of campesinos in the area and their desire to purchase cash commodities.

The proportion of the potato crop saved for seed varies from one-fifth in ex-hacienda K to less than five per cent in ex-hacienda T. A lower proportion of other products is kept for seed because of the smaller acreage planted to those crops, and the lower seed requirements. For instance, a hectare requires 2,000 to 3,000 pounds of potato seed against 150 pounds of wheat or grain barley seed.

The percentage of agricultural production devoted to household consumption for the communities studied as a whole is close to one-quarter of total production. Potatoes are the most important consumption product of the campesinos of the area, followed by barley and wheat.

Part of the campesino's agricultural production is carried on under sharecropping arrangements. This sharecropping volume is included in the production figures. Sharecropped products go mainly to additional sales, and are included in the total volume sold. Sharecropping exists in ex-hacienda T only for potato production, and farmers in ex-hacienda K do not participate in any kind of

sharecropping system, but at piqueria P sharecropping arrangements for potatoes and other crops are relatively common for reasons enumerated earlier.

Livestock Distribution

Table 16 details the returns that farm families in each community got from their livestock during the agricultural year 1965-66. Sales include mostly poultry and sheep products.

Table 16. Average Gross Returns From Livestock and Livestock Products Per Family, Agricultural Year 1965-66.

Use	(Dollars)		
	Ex-hacienda T	Ex-hacienda K	Piqueria P
Consumption	\$73.64	\$33.04	\$47.51
Sales	51.55	20.83	40.59
Barter	1.25	.37	--
Total	\$126.44	\$54.24	\$88.10

Gross and Net Agricultural Income

Farm production in the area of Tiraque is heavily dependent upon the potato crop, so price risks involved in the production and marketing of potatoes are more severe. Moreover, storage difficulties make these farmers vulnerable to depressed market prices, since the great majority market their potato output as soon as it is harvested. Average gross crop returns per family for agricultural year 1965-66 are shown in Table 17. The differences

between ex-haciendas T and K and piqueria P are consistent with the overall situation of these communities.

Table 17. Gross Value of Crop Production Uses, Per Family, Agricultural Year 1965-66.

Use	Ex-hacienda T	Ex-hacienda K	Piqueria P
Consumption	\$215.87	\$102.17	\$183.59
Sales	726.43	14.27	353.91
Barter	42.32	5.83	--
Seed	52.73	31.14	--
Total	\$1,037.35	\$153.41	\$537.50

The relation between net and gross cash income is very close for ex-hacienda T and piqueria P--87 and 89 per cent, respectively--indicating the relatively small proportion of cash outlays made. At ex-hacienda K this proportion is only 8 per cent, demonstrating that almost all cash income is used to cover farm expenditures. Types of farm expenditures are shown in Table 18.

The high expenditure for seed at piqueria P occurs because one type of sharecropping arrangement calls for the provision of potato seed.

Even though family labor appears to be underutilized in the communities studied, especially at ex-hacienda K and piqueria P, the high labor demand in very specific short periods makes it necessary to depend on additional labor, the cost of which is roughly one-tenth of the total production cost in these communities.

Table 18. Average Farm Expenditures Per Family,
Agricultural Year 1965-66.

Type of expenditure	(Dollars)					
	Ex-hacienda T		Ex-hacienda K		Piqueria P	
	Value	Per cent	Value	Per cent	Value	Per cent
Seed	4.23	4.0	1.77	5.5	18.14	41.5
Chemical fertilizer	35.75	34.0	2.92	9.0	10.06	24.8
Livestock buying	35.23	33.6	21.21	65.5	1.08	2.5
Wages	14.81	14.1	2.50	7.6	3.94	9.2
Other ^a	14.90	14.2	4.04	12.4	9.39	22.0
Total	104.92	100.0	32.44	100.0	42.61	100.0

^aIncludes transportation costs, equipment, tools, and sindicato and community dues.

No land purchases were made in the agricultural year sampled.

About 75 per cent of the farmers sampled in each community had some off-farm cash income during the agricultural year 1965-66, but this source does not really provide much cash. Most farmers earned wages from work related to agriculture, although about half the farmers sampled on ex-hacienda T and piqueria P also engaged in commercial activities. Commerce is especially important on piqueria P where land resources are limited, and off-farm activities account for about one-fifth of net family annual income there. In the case of the two ex-haciendas,

however, off-farm income is much less important than agricultural income and is generally used only to meet immediate needs until crops can be sold.

Table 19 summarizes the sources of gross and net cash income per family together with the proportion of the crop and livestock production consumed, bartered, and saved for seed. All these figures are consistent with the higher resource availability in ex-hacienda T and the limiting physical characteristics of ex-hacienda K.

At ex-hacienda T and piqueria P the per capita net income values are higher than the corresponding value for the country as a whole, estimated at \$121 for 1967.⁵

Resource Productivity

Land and labor productivity depend upon technological developments, capital equipment, organization and management, and many other environmental and institutional factors. The relevant productivity variables in the Tiraque area are soil productivity and traditional technology. Soil productivity may be physical or economic; physical productivity is the yield from a given unit of land, while economic productivity is the difference between production costs and returns. Pounds of output per hectare furnish an accurate yardstick for rating physical productivity of farmers' crops and soil--given

⁵Economic and Program Statistics (La Paz: USAID Mission to Bolivia, March 1968), p. 11, Table VIII.

Table 19. Gross and Net Income in Cash and in Kind From All Sources, Per Family, Agricultural Year 1965-66.

	(Dollars)					
	Ex-hacienda T		Ex-hacienda K		Piqueria P	
	Value	Per cent	Value	Per cent	Value	Per cent
<u>Cash income</u>						
Crops	726.43	93.3	14.27	40.6	353.91	89.7
Livestock	51.55	6.7	20.83	59.4	40.59	10.3
Gross cash income from agriculture	777.98	100.0	35.10	100.0	394.50	100.0
Farm production costs	104.92		32.44		42.61	
Net cash income from agriculture	673.06	96.0	2.66	42.1	351.89	78.2
Net cash off-farm	27.66	4.0	3.65	57.9	97.53	21.8
Net cash income--all sources	700.72	100.0	6.31	100.0	449.42	100.0
<u>Income in kind</u>						
Crops	310.92		139.14		183.59	
Livestock	74.89		33.41		47.51	
Gross total	385.81		172.55		231.10	
Expenses in kind (seed saved)	52.73		31.14		--	
Net income in kind	333.08		141.41		231.10	
Net income--all sources	1,033.80		147.72		680.52	
Per cent in cash	68.5		4.2		64.7	

Table 19. (Continued)

	Ex-hacienda T		Ex-hacienda K		Piqueria P	
	Value	Per cent	Value	Per cent	Value	Per cent
Consumption						
Cash expenditures	289.48		33.41		259.55	
Crops	215.87		102.17		183.59	
Livestock	73.64		33.04		47.51	
Goods obtained in barter	43.57		6.20		--	
Total consumption	622.56		174.82		490.65	
Total savings	411.24		-27.10		189.87	
Total savings as per cent of net income	39.7		--		27.6	
Per capita values						
Family size	4.70		4.93		4.40	
Net cash income	149.1		1.28		102.14	
Net income in kind	70.9		28.68		52.52	
Total net income	220.0		29.96		154.66	
Total consumption	132.5		35.46		111.51	
Savings	87.5		--		43.15	

the similar technology utilized throughout the area. Comparative average crop yields for selected crops for the country as a whole in 1955, and for ex-hacienda T at the time of the field investigation are included in Table 20. Although the information comes from different time periods, it is nevertheless included for comparative purposes.

Table 20. Comparative Crop Yields for Selected Crops.

	(Pounds Per Hectare)	
	Bolivia 1955	Ex-hacienda T 1967
Potatoes	6,600	25,300
Barley	1,570	2,750
Wheat	1,125	2,200
Lima beans	4,425	2,125

Sources: For 1955, Bolivian Report E/CN.12/430 (La Paz: Economic Council for Latin America (ECLA), April 1957), Vol. 2, p. 408, Table IV-7, except for lima beans. That figure is from 1950 Agricultural Census (La Paz: Ministry of Finance, Bureau of Statistics, May 1955).

In the Tiraque area most crops are cultivated with a traditional technology; new varieties, chemical fertilizers, or insecticides are not used. On the other hand, potato production is carried on under a more advanced technology using some modern inputs. Gross and net returns for the potato crop compare very favorably to the other crops of the area, as indicated in Table 21.

Table 21. Gross and Net Returns, Selected Crops,
Ex-hacienda T, Agricultural Year 1965-66.

	(Dollars)			
	Potatoes	Barley	Wheat	Lima beans
Yield (pounds per hectare)	25,300	2,750	2,200	2,125
Gross income	843	147	110	106
Cash costs ^a	262	10	6	11
Net return to land and labor	581	137	104	95
Cost of labor ^b	166	113	101	80
Net return per hectare	415	24	3	15

^aCash costs include seed cost for all crops, and fertilizer and manure costs for potato crop only.

^bIncludes man days of labor, and ox and horse labor for threshing barley and wheat.

Labor productivity estimates for ex-hacienda T take into account the average number of man and oxen hours required to cultivate a hectare of selected crops and the average annual reported crop yields on the farm. The average number of effective daily hours of work was estimated at six.

Table 22. Labor Productivity Per Hectare, Ex-hacienda T, Agricultural Year 1965-66.

Crop	Average yield (pounds per hectare)	Hours of labor	Output per hour of work (in pounds)
Potatoes	25,300	990	25.5
Barley	2,750	504	5.46
Wheat	2,200	594	3.70
Lima beans	2,125	372	5.71

The estimated number of man-days of labor required to obtain the average volume of a family's crop production at ex-hacienda T is shown in Table 23.

Table 23. Estimated Number of Annual Days of Family Work Required--Ex-hacienda T.

	Average production per family		Output per hour of work	Man days required
	Pounds	Per cent	Pounds	
Potatoes	18,880	71.2	25.55	123
Barley	2,880	10.9	5.46	88
Wheat	1,905	7.2	3.70	86
Lima beans	930	3.5	5.71	27
Other	1,905	7.2	--	--
Total	26,500	100.0	--	324

In order to produce about 93 per cent of its total production, then, an average farm needs an estimated 324 days of work. The average family size in ex-hacienda T at the time of the study was 4.70 persons per family. About one-half of the family participates actively in the production process of these crops; thus the family labor available could work about 860 days, or a little over twice the days of labor required.

For comparative purposes it is assumed that crop yields per hectare under cultivation are similar in all three communities. On ex-hacienda K the average crop output per family during the agricultural year 1965-66 was about 4,100 pounds and the estimated number of labor days required about 27. At piqueria P the average crop output per family was about 12,000 pounds which demands about 161 man days of work. In all these communities, the estimated available family labor is more than enough to satisfy labor needs.

Since yields are estimated to be much lower at ex-hacienda K because of the higher elevation of the farm and limitations in the quantity and quality of productive inputs, and since the reported yields in piqueria P are also lower, the current total production per farm family in these communities is probably obtained with higher labor input.

VII. PRODUCTION CHANGES SINCE THE 1953 REFORM

Area production is better for the post-reform period than for the pre-reform period, and better for ex-hacienda T than for ex-hacienda K. The following discussion refers to ex-hacienda T, with comparisons with ex-hacienda K whenever possible.

1. The number of families in both ex-haciendas who own and use land is now considerably higher than before the reform. In ex-hacienda T the number expanded from 20 or 30 to 88 families. Part of this increase was due to the return of about 35 families that were evicted by the former owner. In ex-hacienda K the number of families expanded from 14 to 27.

2. Information about yields is not very accurate. Campesinos now use chemical fertilizer and animal manure, while before the reform they used only manure. Campesinos probably have yields at least as high as the owner's before the reform, and higher than they had as former colonos.

3. The information about cultivated land in ex-hacienda T is derived from estimates of production. The data show that cultivated hectares increased 3.4 times, while production increased only 2.1 times, implying that yields per hectare have dropped by about a third.

This decrease is probably due to a decrease in the proportion of land planted to potatoes, which yield about eight times as many metric tons per hectare as other crops do. This change in relative importance of potatoes since the reform is also responsible for the decrease in the average production per family. It is possible that this shift occurred because campesinos now are allowed to grow other crops.

Information from ex-hacienda K indicates that post-reform production is slightly lower, even though families almost doubled. The survey here followed five consecutive years of poor agricultural production. Whether this fully accounts for the decrease in production is not clear. No reliable information about change in yields exists for ex-hacienda K; thus estimates of land under cultivation are not attempted.

4. In ex-hacienda T marketing as a percentage of production is slightly lower. In ex-hacienda K, without an increase in total production, marketing has decreased as production was used to feed the expanded number of families.

A summary of employment, production, and marketing for the pre- and post-reform periods for both ex-haciendas is presented below.

Ex-hacienda T

		<u>Pre-reform</u> (1950-51)	<u>Post-reform</u> (1965-66)
<u>Production (metric tons)</u>			
Owner:	Potatoes ^a	467	
	Other crops	<u>25</u>	
	Total	492	
Campesinos:	Potatoes	33	831
	Other crops	<u>25</u>	<u>336</u>
	Total	58	1,167
Total Crop Production		550	1,167
<u>Land under cultivation</u> (hectares)			
Owner:	Potatoes	40	
	Other crops	<u>20</u>	
	Total	60	
Campesinos:	Potatoes	6	72
	Other crops	<u>20</u>	<u>224</u>
	Total	26	296
Total land under cultivation		86	296
Number of families ^b		20-30	88
Land under cultivation per family		4.2-2.9	3.4

^aTwo-thirds of the colonos had a sharecropping arrangement with the owner, and had to part with half of their potato production. Thus, the owner received an additional 17 metric tons of potatoes.

^bDuring the years 1948-51, about 35 families were evicted from the hacienda.

	<u>Pre-reform</u> (1950-51)	<u>Post-reform</u> (1965-66)
<u>Marketing^c</u> (metric tons)		
Owner:		
Potatoes	390	
Other crops	<u>22</u>	
Total	412	
Per cent marketed	89%	
Campesinos:		
Potatoes	3	658
Other crops	<u>3</u>	<u>171</u>
Total	6	829
Per cent marketed	10%	71%
Total production marketed	418	829
Overall per cent marketed	76%	71%
Estimate average production per family (metric tons)		
For the hacienda	24.6-16.4	
For themselves	<u>2.9- 1.9</u>	<u>13.3</u>
Total	27.5-18.3	13.3

Ex-hacienda K**Production (metric tons)**

Owner:		
Potatoes	16	
Other crops	<u>20</u>	
Total	36	
Campesinos:		
Potatoes	12	38
Other crops	<u>6</u>	<u>13</u>
Total	18	51
Total crop production	54	51

^cAbout 10 per cent allowance is made for seed.

	<u>Pre-reform</u> (1950-51)	<u>Post-reform</u> (1965-66)
Marketing (metric tons)		
Owner:		
Potatoes	14	
Other crops	<u>18</u>	
Total	32	
Per cent marketed	89%	
Campesinos:		
Potatoes	1	3.8
Other crops	<u>-</u>	<u>0.5</u>
Total	1	4.3
Per cent marketed	5.5%	8.5%
Total production marketed	33	4.3
Over-all per cent marketed	61%	8.5%
Number of families	14	27
Average production per family		
For the hacienda	2.6	-
For themselves	<u>1.3</u>	<u>1.9</u>
Total	3.9	1.9

In other areas of the department of Cochabamba, production changes since the reform are reflected in a level of living improvement greater than that among the campesinos of the communities studied. Aside from the physical characteristics of the area, it is possible to expect that economic gains of the reform have not been totally exhausted, and that the future gains are yet possible.

Finally, some changes are difficult to assess. Some writers feel that the most important results of the

reform are those which cannot be measured. This point is well expressed by Warriner:

. . . The important result is not how much production has increased, how much incomes of new farmers have risen, what farmers have paid and what landowners have received; these facts must be known and recorded. Yet they are not the true criteria of success . . . Governments which carry out reforms are not primarily concerned with economics or demography or even with history. They want to create a social order which is more just and more equal. They want to get rid of subservience and dependence.⁶

Development Possibilities

Peasant involvement in the Bolivian economy has been partly achieved, but further mechanisms are needed for releasing the potential economic growth resulting from the land reform. Present resource utilization must be maximized and changes made within the existing technical and financial constraints.

The major proportion of crop production is obtained using inputs at the farm level under conditions characterized by traditional technology. The equipment and tools used here are poorly suited for increasing either land or labor productivity, although such increases are possible.

A number of other crops which can complement potato returns have been under investigation with very positive results. Security of expectations can be greatly

⁶Doreen Warriner, Land Reform and Economic Development (Cairo: National Bank of Egypt, Fiftieth Anniversary Commemoration Lectures, 1955), p. 36.

increased if farmers of the area stop depending almost entirely on the returns of one crop. Thus far the interest of farmers in these improvements is limited, perhaps because the nearby research station does not actively promote its results.

In order to adopt improved technology farmers need some external help from extension services and agricultural credit agencies. Currently no agricultural extension services exist in the area. An agricultural credit agency is in operation in the town of Tiraque, but the credit policy for small farmers is such that during the agricultural year 1965-66, not a single farmer from any of the communities studied received credit, nor did anyone plan to request credit in the future. Collateral obligations for crop or livestock loans are too high and bureaucratic procedures too complicated.

Credit facilities are largely utilized by the vecinos, who are thus able to buy potato seed and chemical fertilizer which is later furnished to a campesino under a sharecropping arrangement. Credit facilities are also used by vecinos to buy the potato crop at very low prices. Some campesino families even sell their expected production long before it is harvested.

The crop culture, land use pattern, and fallow system in the area is largely determined by tradition. However, the introduction of new agricultural techniques is probably the most important step in increasing the

productivity levels of these farmers. For the most part, a relatively small capital investment would be necessary. The average cost of local potato seed per hectare is about \$175, while the improved seed average cost is \$360, or a little over twice as much. The average yield in kilograms per hectare for the local seed is anywhere between 5,000 to 25,000 pounds, whereas the improved seed yields on the average are about 32,000 pounds. Net gains from utilizing improved seed would be large compared with the costs and risks involved. The current type of community organization, in which the sindicato has a great deal of power, would make the task of introducing improved agricultural practices easier.

The responsibility for increasing productivity rests partly with the farmers and their sindicatos. The role of government would consist of adopting more flexible policies for the experimental station and the agricultural credit agency of the area. Moreover, the government, through its control of the sindicatos, should attempt to motivate sindicato leaders toward the promotion and acceptance of improved agricultural techniques. Currently, this is the only feasible approach, since the government is unable to pursue a more ambitious policy while lacking financial and other necessary resources.

A land reform is not a panacea and cannot by itself overcome all the many problems associated with

underdevelopment. However, in the case of the ex-haciendas studied, the reform has certainly provided a wider range of alternatives.

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