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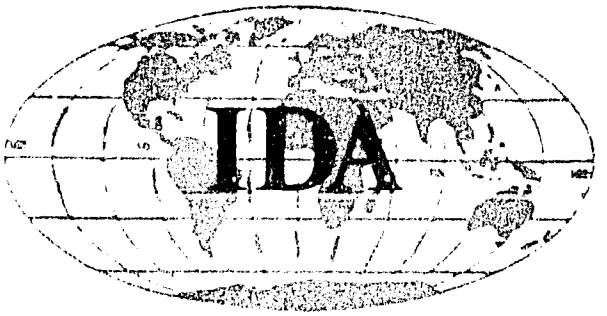

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MIGRATION AND THE BREAKDOWN OF A PEASANT ECONOMY IN CENTRAL BOLIVIA

by

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Introduction[1]

Ecological anthropologists have reconceptualized adaptive strategies in alpine environments. The comparative analytical approach of recent years is a radical shift from most of the research on cultural adaptation carried out in the first half of this century, which analyzed single specific cultures and ecosystems synchronically and without comparison (Brush 1976a). The earlier thinking, as Guillet pointed out, showed a bias toward functionalism and geographical determinism. Because it emphasized the natural resource base rather than the human capacity to respond to its constraints (Guillet 1983:562), the bulk of the studies were homeostatic and reductionist. Today we investigate the ways different populations devise solutions to similar environmental problems (cf. Moran 1979), concentrating on processes—the mechanisms of change—and on positioning the units of analysis within a larger sociopolitical context. We see cultural practices as strategies that populations use to adapt to their environment at a particular time (cf. Harris 1980). We also perceive cultural adaptation, as Orlove has aptly described it, as "the outcome of decision making, or repeated allocation of scarce resources to a hierarchy of goals under conditions of constraint." Thus we must examine the patterns of resource distribution and the nature of the goals and the constraints (Orlove 1980:252).

This paper examines the adaptive strategies of mountain small farmers facing differential resource distribution in the Mizque and Campero provinces of the Department of Cochabamba. Its starting point is the recognition that like farmers in other equally severe environments (cf. Abruzzi 1989; Downs and Ekvall 1965; Goldstein 1976; Hagen et al. 1963; Hoffpauir 1978; Zurick 1989), farmers in Campero and Mizque counteract a harsh environment by tapping into a network of several independent yet overlapping resource channels.

These farmers operate in alpine environments. In reference to the Andes, the ecosystem has been described according to two characteristics, *Alpwirtschaft* and verticality. *Alpwirtschaft*, or mixed mountain agriculture, consists of agropastoral transhumance, productive only during a short cultivation and grazing period, in which fields at different elevations are used. Cattle and sheep, tended in high levels of a community, provide milk, wool, hide, and other products, as well as dung for fertilizing the lower-level home agricultural fields. Communal ownership of pasture lands is combined with individual ownership of agricultural fields. This system is also present in the Swiss Alps and the Himalayas (Rhoades and Thompson 1975:537-539).

Verticality consists of "the vertical control of a maximum number of ecological zones" (Murra 1972). According to Murra, who first described this system in detail, in pre-Hispanic times several sociopolitical units had access to intermediate elevation potato and grain fields, and

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[1] I thank Elaine C. Brown and Michael Painter for comments on earlier versions of this essay. The data in this paper originate partially from research conducted by the Centro de Formación e Investigación (CEFOIN), of San Simón University, in Cochabamba. I largely directed the project as the social science adviser of the Alternative Development Program (PDAR) of the Bolivian government. USAID/Bolivia provided the funds for the investigation, through PDAR, for which I express my appreciation. The paper also draws on additional field research in which I engaged until recently.

high elevation grazing lands, near their principal area of settlement, but they also had colonies in other areas either close to the Pacific Ocean or in the Amazon. The territory of all of these colonies was shared by several politically independent sociopolitical units. The goal was self-reliance through having access to products from different ecological niches at different elevations (Orlove and Guillet 1985:8-9).

A great deal of literature on the Andes has applied the concept of verticality (cf. Brush 1976b; Flores 1977; Fonseca and Mayer 1978; Mayer 1979). While the approach has moved away from functionalist and ahistorical analysis, there is still little examination of the evolution of resource strategies in relation to political and economic power (Zurick 1989). Most of the studies imply that ecological constraints can override many possible social and political organizations, and in only a few of them can one see tensions in human populations trying to decide what course to follow. As adaptive strategies continue to be reified *a posteriori*, the bulk of the studies deals with adaptive elements only from the perspective of the relationship between individuals and nature. Considerations of the social contest for power are conspicuously absent. Verticality in the Andes, however, cannot be understood independently of the social and political organization imposed by Inca and pre-Inca societies (Bradby 1982).

Verticality and *alpwirtschaft* adapt not only to environmental but also to socioeconomic and political conditions. A number of external factors militate against the resiliency of these systems over time—not only environmental change and population pressure, but the development of capitalism, social differentiation, land reforms and other land policies, the emergence of towns, and the progressive integration of the countryside into the spheres of the world system (cf. Bradby 1982; Fonseca 1976; Forman 1978; Montoya 1980). Verticality and *Alpwirtschaft* are models that may have had full representation in the past, but they are currently somewhat blurred, and in some cases completely eliminated.

A somewhat altered version of *alpwirtschaft* prevails in Campero and Mizque. The "Laws of Expropriation," enforced in 1874, began the change. Until then, most peasant lands were inalienable. The laws imposed property taxes on these lands and allowed the state to auction off lands of peasants who were unable to pay the taxes. This led to the breakdown of communally owned landholdings and to the proliferation of haciendas. Haciendas, operated with indentured sharecroppers, became the holders of most of the land, coexisting with peasant communities and a vast number of free small-scale peasants who purchased small and large plots from them. This dynamic mosaic of land tenure arrangements was frozen with the agrarian reform of 1953, which institutionalized extreme inequality in land tenure among farmers, created fixed boundaries for the land holdings of individuals and communities, and hence delivered a mortal blow to verticality.

The farmers accommodate to the constraints of alpine environments with a reorientation of verticality and *alpwirtschaft* through five practices: creating and maintaining irrigation networks; developing cropping patterns suited to the environment; establishing linkages between crop production and animal husbandry; engaging in exchange networks and nonagricultural activities; and participating in seasonal migration. While these adaptive practices are not

mutually exclusive but coexist and complement each other, not all of the farmers can equally adopt any or all of them. In Campero and Mizque, depending on the quality of soil and availability of labor and irrigation for individual fields, farmer families may adopt only one strategy to the exclusion of the others. Farmers with plenty of irrigated, fertile fields tend to specialize in agricultural production. Those with rainfed plots tend to be more agropastoralists than agriculturalists, while those with marginal lands tend to join the ranks of hired rural or urban laborers.

But it is largely as a result of social differentiation that farmers embrace certain adaptive practices instead of others. Because farming communities are highly polarized and socially divided groups rather than homogeneous, well adapted, solidary groups, a pattern of several adaptive strategies according to social class emerges, instead of only one strategy valid for all.

The discussion that follows will define the actions likely to encourage or limit environmental breakdown, according to social classes. It will also explain why some farmers migrate while others remain at home, why some patterns of migration seem to reoccur, and what migration entails for the farmer households and for the regional economy. Such comprehension will enable us to point out the type of development activities that would improve the farmers' subsistence, so that they will not be forced to migrate against their will.

The Ecological Setting

The provinces of Mizque and Campero, in southeastern Cochabamba,[2] together occupy 8,280 square km (Campero 5,550 and Mizque 2,730) which amounts to 14.9 percent of the area of the Department of Cochabamba. The provinces can be divided into two zones: mountains (with elevations from 2,500 meters to 3,600 meters) and valleys (with elevations of 1,500 meters to 2,499 meters).[3] The mountain zone is rugged terrain often with steep slopes, considerable intrazone variation in humidity, some supplementary irrigation, agricultural production in microclimates, and pervasive soil erosion. The valleys have gentle terrain and rolling hills. They encompass roughly 63 percent of the agricultural land in Campero and 44 percent in Mizque. The valleys can be subdivided into those with and those without permanent irrigation. Mizque valley is the largest of those permanently irrigated, but some smaller valleys are also, such as Tin Tin, Quebrada de Mataral, and Omereque valley. Tipajara valley, a large valley

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[2] The provinces share a common border with the Cochabamba provinces of Carrasco, Arani and Esteban Arze, and the Departments of Chuquisaca, Potosí, and Santa Cruz.

[3] Following the Holdridge life-zone classification system, the Development Alternatives, Inc. team identified five zones within the two provinces. These zones are: Sub-Tropical Thorn Steppe at Omereque (1,503 meters above sea level), Temperate Thorn Steppe at Cercado-Marquilla (2,225 m.a.s.l.), Temperate Dry Forest at Rumi Cancha (2,100 m.a.s.l.), Temperate Montane Forest at K'uri (2,700 m.a.s.l.) and Temperate Steppe at Raqaypampa-Laguna (3,540 m.a.s.l.) (DAI 1990:19).

between Mizque and Aiquile, is without permanent irrigation. Other nonirrigated valleys in the area are Wara Wara, Negropujio, Oloy, Mesa Rancho, Marquilla, and Pampas, in Cercado province.

The provinces occupy a semiarid area with a highly variable climate. The average temperature is 18.9°C, with peaks in November (22.4°C) and lows in June and July (14.5°C). The annual average rainfall is 507 mm (1959-79), with high variation from year to year. Eighty percent of the precipitation occurs during 20 weeks in the summer planting months, November through February. Rainfall is negligible between May and October. The area's ratio of rainfall to evapotranspiration (its hydric balance) is negative for 8 months a year. The yearly average evapotranspiration rate is 1,100 mm.

Maintaining viable agricultural communities in this harsh environment is extremely difficult. Agricultural lands encompass 25,000 ha, 3 percent of the total area (828,000 ha divided between Mizque, 273,000 ha, and Campero, 555,000 ha). Most soils are loamy, deficient in organic matter and assimilable phosphorous, and have low natural fertility levels. They are mostly alfisols, with a neutral Ph, and medium-to-high contents of interchangeable calcium, magnesium, and potassium. They are very susceptible to hydric erosion and degradation. Only 25 percent of the agricultural lands have high quality soils (Type I and II).[4] The rest have soils type III through VII, and thus are in need of extensive soil conservation practices (Table 1).

Villages and small nuclei of households are all established in the vicinity of rivers, brooks, or at least gullies. In the 53 communities studied by the CEFOIN[5] team, water for domestic consumption is gathered from rivers or streams (31 percent), small-scale irrigation canals (21 percent), springs (13 percent), wells (10 percent), human-made water catchments (7 percent), and ravines (7 percent). Although water is distributed through pipes in some towns (7 percent), most often farmers (especially women and children) have to walk several kilometers daily to water sources (Mercado et al. 1991). Because of the continuous desertification the area is experiencing, it is not uncommon for farmers to be forced to relocate their hamlets into areas where water is more accessible.

Irrigation in All Possible Plots

Given the fact of drought (most of the last five years have been drought years), not having access to water means not being able to harvest at all. Because water availability is the key to survival in this area, access to permanent or even supplementary irrigation determines the extent to which agricultural production is feasible, stable, diversified, and economically profitable. Where irrigation exists, farmers are able to produce a larger variety of crops than

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[4] The U.S. Soil Conservation Service classification of soil types can be found in Brady 1974:347-351.

[5] See footnote 1, page 1.

in rainfed farming zones, even in years with plenty of rainfall.[6] Irrigation also determines the possibility of producing during the dry season. Both rainfed and irrigated farmers have the regular crop that begins in November (*jatun tarpuy*), but only the irrigated farmers have an additional cropping season (called *mishka*), which begins in April. Finally, farmers with irrigation can harvest earlier than those with dry land, and realize good prices for their products at times of limited supply (CIDRE 1987; Gray 1991:7).

Table 1. Soil Potential of Agricultural Lands in Mizque and Campero Provinces, by Ecological Zone

Ecological Zone	Mizque	Campero	Total
Valleys	4,919 ha (43.7%)	8,771 ha (62.9%)	13,690 ha (54.3%)
Types I and II	1,882 ha	3,810 ha	5,692 ha
Types III to V	3,037 ha	4,961 ha	7,998 ha
Mountains and High Plateaus	6,341 ha (56.3%)	5,167 ha (37.1%)	11,508 ha (45.7%)
Types I and II	726 ha	0	726 ha
Types III to VII	5,615 ha	5,167 ha	10,782 ha
Total Cultivated Land	11,260 ha	13,938 ha	25,198 ha
Total Land Requiring Conservation (Types III through VII)	8,652 ha (76.8%)	10,128 ha (72.7%)	18,780 ha (74.5%)

Source: McDowell and Macias 1990:7.

Not only is irrigation essential for sustained food self-reliability, but with it, people can produce a surplus above the food grown for domestic consumption, which they can sell and use to supplement their daily nutrient intake. Irrigation also increases the possibility of capital accumulation. In irrigated fields, farmers can produce for the market in relatively large

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[6] In Mizque, where irrigation is plentiful and constant throughout the year, corn, wheat, potatoes, peanuts, tomatoes, carrots, green peas, sweet potato, garlic, avocado, grapes, *chirimoy*, guava, citrus fruits, and *pacay* are produced. The irrigated Tin Tin valley produces corn, potato, onion, and garlic, in addition to wheat, barley, and vegetables. Quebrada de Mataral produces corn, potatoes, peanuts, sugarcane, onion, *chirimoya*, and citrus fruits. The valley of Omereque produces corn, tomatoes, peanuts, onion, sugarcane, garlic, cumin, chili, citrus fruits, *chirimoyas*, and *pacay*. Omereque has a plentiful supply of water from the Mizque river. Meanwhile, in the mostly nonirrigated mountains, farmers produce mainly potato (also their primary cash crop), corn, and wheat.

quantities and throughout the year. They can specialize in highly marketable crops, whereas farmers in nonirrigated areas must produce mostly for domestic consumption and local markets.[7] Irrigation, thus, determines farmers' access to large and profitable urban markets. As a rule, those farmers who have irrigation are economically better off.

Two types of irrigation works, both operated and maintained by the users themselves without assistance from the government or private agencies, can be differentiated. The first, year-long, draws on permanent rivers. Most plots irrigated in this way are in the valleys of Mizque, Tin Tin, Higueral, Chaguarani, Mataral, and Omereque. These areas have relatively high water flows and permanent irrigation throughout the year. They have canals and irrigation networks that are tapped into permanent rivers with relatively stable and plentiful flow, via diversion dams (*tomas*). Frequently water is diverted for kilometers before it reaches the field to be irrigated, having to cross the fields of many families who sometimes belong to different communities. The management and operation of these waterworks therefore requires elaborate cooperation arrangements involving many individuals and farmer groups. Farmers who have access to year-long irrigation are locally perceived as "rich." Many of them have trucks and tractors.

Second, supplementary irrigation networks that operate only during a short period of the rainy season divert water from rivers that are dry most of the year, using sunken dams that cut across the river beds (*tajamares* and *galerías filtrantes*). Since the amount of surface water available depends largely on rainfall, the volume of water flowing through streams from which irrigation is tapped fluctuates sharply. The fields irrigated through *tajamares* and *galerías filtrantes* lack water from June to September when most stream beds are dry. These networks benefit more than one community and require large labor investments. Throughout the area, other small irrigation facilities derive water from springs (*ojos*). These sources tend to dry up over time, or to reduce considerably during the dry season, most likely as a result of deforestation (cf. Edwards et al. 1990). When the water suffices it is used to irrigate rainfed fields, and when it does not it is reserved for human and animal consumption.

Through either of these methods, irrigation is not confined to clearly demarcated areas. Its ubiquitous presence and the differential importance according to crops and environmental conditions can be appreciated in the arrangement of a CEFOIN nonrandom sample of 1,097 plots (Table 2). In these plots corn, potato, wheat, and peanuts are produced in different ecological zones. The amount of irrigation plots in the rainfed valley is moderate to low in this sample,

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[7] In the generally rainfed Tipajara valley, those zones with irrigation produce for the Santa Cruz market. In Mizque and Tin Tin valleys, irrigation enables farmers to produce two crops a year of corn, potato, and onion. Mizque farmers produce vegetables and fruits for the Cochabamba and Santa Cruz markets, and there is relatively large capital investment in the area in the form of small-scale agribusinesses (vegetable production, vineyards, and milk processing). Mataral's production is sold in the Sucre and Aiquile markets. The commercial production of tomatoes for the city of Cochabamba is particularly important in Omereque.

depending on the crop. One-third of the land where corn is produced is under irrigation. The most important concentration of corn production on irrigated plots is in the Mizque, Tin Tin, Mataral and Omereque valleys. Except for Mizque, potato and especially wheat are produced mostly on rainfed plots. The opposite situation is found in relation to peanuts, which are mostly produced under irrigation.

Table 2. Distribution of Sampled Irrigated Plots, by Crop and Agroecological Zone

Crop	Overall Area	Mountain[1]	Irrigated Valley[2]	Rainfed Valley[3]	Closed Valley[4]	Warm Valley[5]
Corn	33.7*	21.4	60.2	25.6	60.5	51.1
	(525)**	(135)	(88)	(199)	(43)	(45)
Potato	37.8	25.9	78.6	38.1	34.6	25.0
	(320)	(135)	(42)	(113)	(26)	(41)
Wheat	15.0	20.2	100.0	11.5	100.0	100.0
	(167)	(94)	(8)	(52)	(12)	(4)
Peanuts	75.3	-	81.4	66.7	73.3	60.0
	(85)	-	(43)	(24)	(15)	(3)

[1] K'uri, Raqaypampa, Lagunitas, Panamá Rodeo
[2] Mizque
[3] Tipajara, Wara Wara, Villa Granado, Negro Pujio, Oloy, Mesa Rancho, Marquilla and Pampas
[4] Tin Tin, Higueral, Chaguarani, Quebrada de Mataral
[5] Omereque

* Percentage ** Sample size (number of plots)

Source: Adapted from Mercado et al. 1991.

Irrigation is the exception rather than the rule, however. First, its distribution is patchy. Some plots in the "irrigated valleys" do not have access to irrigation, while some in the dryland valleys and mountains do have access to supplementary irrigation during at least part of the year. This contributes to social differentiation regionally and within the communities. Second, and more importantly, the majority of farmers do not have access to either year-long or supplementary irrigation.

Despite the importance of water for agricultural production, only 15 percent of the cultivated land in the two provinces is irrigated (DAI 1990:23).[8] Few communities have enough irrigation water,[9] and even in communities with irrigation physical access to water sources is unavailable for all farmers. The existing irrigation networks are inadequate for a rural population of close to 77,000.[10] Programa de Desarrollo Alternativo Regional (PDAR) worked in 1990 with 20 irrigation and multiple use systems in Campero and 22 units in Mizque (PDAR, Unidad de Riego 1990). The CEFOIN team, for its part, identified 14 water systems in the Campero province and 21 in Mizque province (Mercado et al. 1991). Some of the irrigation works overlapped in both lists. The lists register inter- and intravillage medium-size water works, and thus, several mini-irrigation works operating in the area should also be included. Even after we take these factors into account, however, the shortage of irrigation sources is evident.

For most farmers the flow is generally so reduced that water is insufficient for human and animal consumption, even if carefully rationed, let alone for irrigation. The water availability is concentrated in a few days in a year, and often a few hours of such days. More than two-thirds of the rain falls in events of 11-60 mm/day, and intense (over 30 mm/day) downpours of one hour or less are frequent in the rainy season. Hence, paradoxically, there are times when there is too much water to be gainfully used. Flooding and especially sheet erosion normally result from the downpours.

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[8] The total area of the two provinces is 828,000 ha, of which some 25,000 ha (3 percent) are cultivated. Of those cultivated areas, 3,700 ha (15 percent) have permanent or temporary irrigation (CUMAT 1987, reported in DAI 1990:23). MACA and CORDECO official sources quote an inflated 20 percent for the irrigated areas in the provinces (cf. Mercado et al. 1991).

[9] The communities of Buena Vista, Taqo Taqo, Uyuchama, Tabacal and Tipamonte in Mizque's central valley, concentrate 30 percent of the irrigated crops in the sample of the two provinces. In the mountains, only Kuri Alto, and to a lesser extent Kuri Bajo, have enough irrigation. South of Aiquile, Zamora benefits from the water of Molinero river. La Viña and Peña Colorada also have plenty of water. In the nonirrigated zone, only Tipa Tipa has a relatively efficient water system (Mercado et al. 1991).

[10] According to the 1976 population census, Mizque province had a total population of 35,001 inhabitants, and Campero had 41,428 people. Eighty-seven percent of the population in the provinces was rural. The rural population amounted to 32,775 people in Mizque, and 34,127 people in Campero. Population density was 12.8 inhabitants per square kilometer in Mizque, and 7.5 in Campero. Compared to the average figures of the Department of Cochabamba, Mizque and Campero were considerably more rural and less densely populated. Cochabamba's rural population encompasses 57 percent of the population. It averages 17.6 inhabitants per square kilometer.

The challenge for most farmers is, then, to catch and store scarce water that is available only for such short periods of time. The adaptive strategy that they use to meet this challenge is to excavate craters (*qochas*, *atajados*) in the subsoil. These craters can be as small as 7 meters in diameter by 1.5 meters deep, when only one family will benefit from it. More frequently, though, they are larger (10 meters by 2.5 meters) and serve three-to-five families. Farmers who make as little as US$500 a year are willing to share expenses to pay US$200 to rent a tractor to make larger craters. Tractors excavate 20 meter by 2.5 meter craters in two hours. All craters are used as reservoirs of water runoff, and as such they are tapped into gullies and furrows. Frequently they are drained by a tube that cuts across the crater wall, but recently farmers have started using wide plastic hoses to siphon off the water.

The crater strategy serves "rich" farmers with irrigated fields differently than poor farmers with rainfed plots. The "rich" peasants use craters mainly to store irrigation water during the night when they have nocturnal water distribution turns. Instead of wasting or underusing water, they are thus able to use it efficiently the following day (cf. Knapp 1991:71), mainly for producing crops for the market. Poor farmers, on the other hand, depend on craters chiefly for human and animal consumption. Only to a limited extent can they also use them for irrigation of small vegetable gardens for household consumption.

Summing up, the more a farmer depends on rain for agricultural production, the more precarious and risky is his or her economy. Absolute land scarcity is not the most important factor for social differentiation and outmigration among farmers in Mizque and Campero. More common, and more damaging, than absolute land scarcity is the dearth of fertile land. Land fertility and productivity largely depend on irrigation. If farmers are unable to obtain irrigation, whether permanent or supplementary, they must use other adaptive strategies.

Cropping Patterns for a Harsh Environment

Multiple cropping (called *jala jala*) with several cultivars in the same field has been another major adaptive strategy among farmers in Mizque and Campero. *Jala jala* is generally organized as strip intercropping. A typical combination includes 4 rows of potato, 2 rows of faba beans, 4 rows of potato, 2 rows of green peas, 4 rows of potato, and 4 rows of corn. Often, several varieties of the same cultivar are grown in the same field.

Multiple cropping has allowed farmers to tackle problems that result from the deterioration of soil structure and fertility. It has been a particularly valuable strategy for those who produce under conditions of limited irrigation, since scarce water can be used more efficiently to satisfy the growth needs of a wide range of cultivars. Multiple cropping is environmentally efficient because it generally uses domesticated varieties highly adapted to the conditions of the area. It also incorporates practices that enhance soil humidity retention and improve soil structure of eroded soils. Among these practices, manuring and making furrows that retain water longer but prevent waterlogging are the most important (cf. Brady 1974; Orlove 1977; Winterhalder et al. 1974). As a result, under normal circumstances peasant households can have access to a variety of food crops with which they are able to diversify their diet.

In recent decades, however, multiple cropping is being de-emphasized, for several reasons. Farmers are more dependent on purchased urban goods and services, as CEFOIN's survey of 360 households shows (Tables 3 and 4). Farm households spend an average of US$330 a year to purchase consumable goods.[11] In order to obtain money to buy these goods and services, farmers have increasingly specialized in cash crop production. Market-oriented cropping takes place in specialized fields. Today, the trend toward monocultural cropping is so pronounced that it has been generally assumed that rotational cropping is the only farming pattern in the area.

Multiple cropping is being downplayed particularly among farmers who have plentiful access to water resources, and whose economic goals are more dominated by market forces. In comparison with rainfed agriculturalists, those with year-long or supplementary irrigation produce larger absolute volumes, sell larger proportions of their crops, and generally consume more purchased products. Most farmers in the irrigated valleys therefore engage in monocropping, monovariety cropping, and agronomic specialization in higher price crops such as onion. The relatively high pay-off that ensues from these practices offsets the reduction in crop diversity and domestic food self-reliance. Farmers of this type buy the agricultural products that they need but no longer produce. The longer water is available during the year, the more market oriented is the farmer.

Alpwirtschaft simply ceases to work in these market-oriented farms. Multiple cropping in irrigated fields means land use intensification. Given the current high demand and prices for vegetables produced in these fields, few farmers are willing to put land in fallow. Large amounts of chemical fertilizers are used in these fields instead of manure. Livestock in general is dispensed with since manure is no longer important and the untended animals may harm commercial crops. Furthermore, the opportunity cost of domestic labor is higher in irrigated agriculture than in pastoralism. Neither the agropastoral transhumance with fields at different elevations, nor the symbiotic dependency of livestock rearing and agriculture, is practiced any longer. Irrigated fields are owned by fiercely individualistic farmers concerned mainly with the

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[11] Farmers own a limited array of durable goods, and even fewer capital goods (trucks, tractors, and rototillers), which are clearly restricted to "wealthy" households. Farmers' consumption of consumable goods is as modest as is their use of durable consumer and capital goods. Our reference to the consumption of "average" farmers, however, should not be misleading. Social differentiation is present in the area. While there are farmers in CEFOIN's sample who reported owning very few manufactured goods, some others are considerably better off. Thus, for instance, many households are destitute, but one has three tractors, another has four bicycles, another owns ten beds, and another has three sewing machines. Also, two households have two gas stoves, and another two have four radios. Finally, three households have two gas lamps.

private ownership of agricultural fields. Pasture lands, meanwhile, have been practically obliterated.

Table 3. Articles Owned by Households Surveyed

Article	No. articles owned	Maximum number owned by any given household	Percentage of 360 households interviewed who own article
Radio	331	4	82
Bed	443	10	65
Bicycle	175	4	45
Gas Lamp	130	2	35
Sewing Machine	123	3	33
Gas Stove	114	2	31
Motorcycle	14	1	4
Truck	7	1	2
Tractor	7	3	1
Rototiller	1	1	.3

Source: CEFOIN's household survey data.

Instead of *alpwirtschaft*, a system of intensified production arises. What counts most in this system is the productivity of specific fields; hence, the pervasive use of chemical pesticides and hired labor. Poor farmers from nonirrigated areas are recruited, especially for harvesting. This system represents an adaptation to opportunities created by the participation of farmers in vegetable trading, but it is probably unsustainable in the medium-to-long term, as witness the many cases of pest resistance to pesticides, of chemical poisoning of farmers, and decreasing yields despite ever increasing fertilization doses.

The second set of causes for undermining multiple cropping lies in the prevailing land tenure arrangements and the decreasing rate of return on labor investments. Multiple cropping has generally been combined with production in as many separate fields as possible. As elsewhere in the Andes (Brush 1977; Mayer 1985; Rhoades and Thompson 1975), and in other mountainous regions of the world (Brush 1976a), farmers cultivate separate plots that are usually located in different life zones or microenvironments. These zones vary in irrigation availability, altitude, contour, slope, moisture, temperature, exposure to wind and sunlight, and susceptibility to pests and diseases. Bilateral inheritance and exogamous marriage arrangements, which are common in the Andes, encourage this type of environmental complementarity. By having

multiple plots farmers reduce the likelihood of crop failure and ensure that food supplies are relatively constant throughout the year. Additionally, since ecological complementarity entails overlapping agricultural calendars, the system requires a more even distribution of labor (cf. Sanabria n.d.:4).

Table 4. Consumer Goods Purchased on a Weekly Basis

Item	Average weekly consumption	% Households (sample = 360)	Avg. Bs. spent per household per week	% Weekly expenses
Matches	.69 bx	69.4	.83	3.53
Pasta	1.47 kg	68.6	2.65	11.26
Coca	.32 kg	68.1	.44	1.87
Oil	3.71 lt	68.3	8.98	38.16
Sugar	1.36 kg	64.7	2.32	9.86
Rice	1.60 kg	60.0	1.64	6.96
Batteries	1 unit	57.2	1.23	5.23
Candles	4.09 un	43.3	.59	2.51
Kerosene	.55 lt	28.9	.32	1.36
Gas	.14 bot	25.8	1.26	5.35
Lard	.28 kg	20.3	.64	2.72
Meat	.21 kg	10.0	.64	2.72
Vegetables	1.06 kg	1.1	1.99	8.46

Source: CEFOIN's household survey data.

As Collins (1986) has pointed out, however, the system of environmental complementarity works provided that the distances between plots are not excessive, labor to tend the plots is not scarce, and returns on resources invested are not low in all plots at the same time. The system, then, requires a delicate balance among zones regarding labor and other input investment, and returns to these investments. If these conditions are not met, the demand on labor resources may be too great for the family to bear satisfactorily. In that case, access to different ecological zones and activities becomes a liability. In the attempt to take care of responsibilities in one zone, some agricultural practices in another zone may be neglected. This could result in lower productivity and degraded productive resources, especially soil fertility and structure. As a consequence, increased dependency on production in separate ecological zones could be created, which could fuel the spiral of overlooking important agricultural practices elsewhere, and further deteriorating productive resources. Under these conditions, the need for seasonal or permanent migration may be intensified (Collins 1986).

In Campero and Mizque, the 1953 agrarian reform locked farmers into clearly defined and generally contiguous plots. In former haciendas, farmers distributed all the territory among themselves, but left a large share of it as a fallow and pasture reserve. In landholdings that had been bought, inhabited, and cropped by free farmers, the land tenure pattern after the reform was exactly the same as it had been before it. The individual ownership of lots was recognized, but no reserve for fallowing or grazing was established. In either case, verticality, i.e., access to different ecological zones, has become extremely restricted. In former freeholding lands it has probably been completely eliminated. Among former hacienda lands, on the other hand, ecological complementarity is perhaps restricted to microenvironments at short distance from their main plots, generally within their home community.[12] The agrarian reform has made it impossible for a farmer to have access to several microniches at the same time.

The consequences of the agrarian reform are also felt in the decreasing returns on labor per hectare cropped. For older farmers, the agrarian reform was the main way to gain access to land. Those farmers' lands are today made available to young farmers through inheritance, which generally favors all offsprings equally. Landholdings are thus fragmented and their productive capacity deteriorated. In addition to land passed through generations, in those communities that are former haciendas young adults are being given land from a communally owned reserve. More and more communal grazing land has to be cleared so that young adults each have a plot to support their families.

The result is that agricultural fields are minuscule, and declining in fertility. CEFOIN's study shows that the average size of holding per family is 3.5 ha in the dry valleys; 3.3 ha in the mountains; 2.6 ha in the irrigated valley; 2.4 ha in the warm valley; and 1.7 ha in the closed valley. If these averages are disaggregated, then the pattern of land scarcity is even more pronounced: 14.2 percent of the 360 respondents have 1 ha or less, 40 percent have less than 2 ha, 68 percent have less than 3 ha, 85 percent have less than 4 ha, and 92 percent have less than 5 ha. The wealthiest farmers in the provinces own 6 to 8 ha![13] In CEFOIN's sample only 6 farmers (1.7 percent) are completely landless, but this low representation is probably a reflection of a sample bias. It is likely that a larger proportion of farmers is landless or quasi-

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[12] The CEFOIN team reports that in a sample of 360 families, each family has an average of 2.26 plots, each plot measuring an average of 1.29 ha (Mercado et al. 1991). These data provide support that farmers have more than one field. However, to the extent that men and women bring into marriage their own plots, the data may only be a reflection of bilateral inheritance patterns, rather than an evidence of ecological complementarity. Unfortunately, CEFOIN does not provide information as to where the fields are located in relation to each other.

[13] The proportion of families that own less than 5 ha is as follows: 86 percent in the K'uri, Raqaypampa, Lagunitas mountains; 88 percent in Mizque valley; 80 percent in the Tipajara, Wara Wara, Villa Granado, Oloy, Mesa Rancho rainfed valley; 91 percent in the closed valleys of Tin Tin, Higueral, Chaguarani, and Mataral; and 94 percent in the Omereque warm valley (Mercado et al. 1991).

landless. Certainly, one must add the number of sharecroppers in the sample (seven). In Mizque, many mature households do not have enough land, and thus, in some cases several farmers sharecrop one ha (Paulson 1991).

In addition, the fallow period has been reduced to 1 to 3 years in fields larger than 3 ha, which are the minority, while fallowing has practically been eradicated on smaller plots (Pérez-Crespo 1991b:13). Given that the agrarian reform in the highlands and lowlands was not accompanied by credit, technical assistance, or price incentives (Pérez-Crespo 1991a), land fertility has declined, as the bulk of farmers claim.[14]

To summarize this section, multiple cropping is being rapidly downplayed in Campero and Mizque. For this to occur, several intervening phenomena had to take place. On the one hand, there was the expansion of vegetable commercial production and the dependence of farmers on urban produced goods, which particularly affected higher income peasants with irrigated lands. On the other hand, there was the implementation of the agrarian reform law which consolidated and exacerbated a process of social differentiation in peasant communities. The agrarian reform affected negatively mostly rainfed agriculturalists, and especially the holders of smaller plots, among them.

Alpwirtschaft has become antagonistic with, and hence has been replaced by irrigated, commercial agriculture. In rainfed production, however, it is being reformulated and adapted. Hence, a single common multiple cropping strategy, as part of the *alpwirtschaft*, is being replaced by several class-specific strategies. The strategy practiced by "rich" farmers is commercial monocropping of vegetables. Poorer farmers have two other options. First, they may engage in commercial growing of food crops to the extent that it is feasible, but they may also participate in exchange networks and seasonal migration. Second, they may adopt livestock rearing as the main economic activity, which can then be complemented with agriculture, trade, and seasonal migration.

Linkages between Crop Production and Animal Husbandry

Although the essential elements of *alpwirtschaft* have been obliterated in irrigated farms, they are still present in the rainfed farms. Communities in Campero and Mizque divide their land into cultivated land and forest (*monte*). *Monte* is the generic name for the scrub and thorn forest characteristic of the area. It encompasses *Prosopis laevigata*, *Tipecana tipa*, *Acacia visto*, *Shinopsis hankeania*, *Alnus acununata*, and *Podocarpus parlotarer*. *Montes* are generally located on hills, ravines, and river banks. From the forest farmers obtain firewood; green

[14] If divided by regions, the percentage of farmers who think land fertility has decreased is as follows: Tin Tin, Higueral, Chaguarani valley area (84 percent); K'uri, Raqaypampa, Lagunitas area in the mountains (83.6 percent); Mizque valley (81.6 percent); Omereque (75 percent); and the Tipajara, Wara Wara, Mesa Rancho, Villa Granado area (77.1 percent) (Mercado et al. 1991).

manure; thorny branches for fencing animals in corrals or fencing them out of cropped fields; and wood for furniture, house construction, and agricultural tool making.

Farmers are particularly aware of the need to make the most efficient use of micro-environments. Because of the severe ecological conditions, they maintain collective control over land resources (cf. Fricke 1989; Netting 1976; Messerschmidt 1976). Their corporate control over permanent grazing lands prevails throughout the year, whereas for agricultural lands it is limited to the period after harvest and before planting. Farmers cultivate crops in relatively moister areas, while they rear animals in drier microenvironments. The use of forest resources is regulated and protected by farmers' local political organizations (*sindicatos*), which may penalize infractors with heavy fines.[15] Farmers are entitled to collect as firewood only dried or fallen branches and bark. Trees for building material are generally protected.

Alpwirtschaft is practiced in Campero and Mizque's rainfed plots. Farmers draw on *montes* for energy for animal growth. At the same time, they rely on animals for agricultural production. From June to November (after harvest and before planting the new cycle) sheep and goats eat stubble on harvested fields, and thorny brushes on the *monte* and fallow lands. Only oxen eat from dried corn chaff siloed on the branches of trees. Therefore, with the exception of young animals, which remain in corrals, sheep, goats, and cows must walk long distances to their grazing areas in the *monte*. Frequently, these journeys are dangerous because the terrain is rugged (especially hard for cows), there is not water to drink, and mountain lions and foxes are constantly present. The number of casualties is relatively high. Children and shepherd dogs are responsible for the animals during grazing.

Once the rainy season starts around November, and until the first crop is harvested around June, there is more feed available. Pastures are green and shrubs have buds. By January, after fields have been harvested, cows and oxen are driven to the *monte*, where they remain till harvest time, around June or July. Meanwhile, sheep and goats graze not too far away from the agricultural fields, controlled by adolescent and adult farmers, and shepherd dogs. Thorny fences made out of *khiñi* and *thaqo* must be set up and repaired to prevent these animals from entering into the cropped fields. Commonly animals give birth during this period of relative food abundance, and there are many sucklings. Children take care of sucklings in corrals. Donkeys, mules, horses, pigs, ducks, and chickens stay around the households throughout the year.

If the energy flow so far described goes from land to livestock, it also goes the other way around. Animals are invaluable for agricultural viability. Tractors are relatively uncommon in the area, so farmers depend on oxen for plowing fields. Oxen are so indispensable for

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[15] In a sample of 41 communities that had access to forest, 31 of them (75.6 percent) had community control of forest resources, and in 71 percent of these cases the control was mediated by the peasant union (*sindicato*). In all 31 cases, the communities levied specific sanctions against cutting and burning trees (Mercado et al. 1991)

agricultural production that those farmers who do not have them are forced to rent them in exchange for labor or cash; and those farmers who have only one ox join other farmers in order to form a yoke. They establish reciprocal help obligations (*ayni*), or rent the other ox in cash or kind.[16]

Goats are as important for agricultural production as oxen, albeit for different reasons. Farmers hold goats in high esteem not primarily for their meat or hide. Goats, as well as other farm animals, are worth more alive than dead. Farmers are generally disinclined to butcher their livestock. They like milk and cheese, but their diet is only minimally dependent on meat. With the exceptions of festivities, they generally eat meat only when an animal has died of disease or an accident. Goat leather is used to make vests that protect farmers from thorns.

Goat is important above all for its milk and very especially for its dung.[17] Chemical fertilization is mostly concentrated among irrigated farmers who use it exclusively for highly commercial crops such as potatoes, peanuts, onions, and tomatoes. Animal manure continues to be the most important source of fertilization. Among the potato producers in CEFOIN's sample, 25 percent use chemical fertilizers, 36 percent mix chemical fertilizers and manure, and 21 percent use solely dung. Also, roughly 30 percent of the farmers who produce corn and wheat use fertilizers, and all of them use exclusively manure (Mercado et al. 1991).

Seventy-seven percent (276) of the 360 farmers interviewed in the CEFOIN study owned goats. Among them, 44.5 percent justified having them primarily for their manure. Farmers in the Tipajara valley reckoned that each goat can produce 50 kg (one *tupo*) of dung a year (Mercado et al. 1991). Farmers in the sample had an average of 8.5 goats per family. This would mean that farmers would have roughly 430 kg of goat manure a year. It is perfectly possible that an average family could have an equivalent amount of sheep manure each year. Cow dung is also collected and used in the fields. All this manure condenses energy that was dispersed in the meager vegetation of the area. Dung increases organic matter in the fields, and improves soil moisture and water-holding capacity. It is an important source of microorganisms and micro- and macronutrients (Brady 1974; Winterhalder et al. 1974).

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[16] See Mercado et al. 1991, for a detailed discussion of the rental fees and forms of payment regarding oxen.

[17] These farmers' goals contrast with those of most animal husbandry programs which concentrate on weight increase and meat and leather quality. Farmers, however, are more concerned with producing live animal products than meat and leather. Animal husbandry programs, therefore, should help farmers enhance their production of dung, milk, and cheese. Also, farmers prefer lamb meat over goat meat. Since urban consumers seem to agree with this preference, there may not be an elastic demand for goat meat. Finally, commercial goat production for meat, regardless of its scale, will likely increase pressure on land because farmers will have to increase the size of their herds.

Although draft animals are essential to agricultural production throughout the area, they are concentrated especially in the nonirrigated and irrigated valleys, rather than the mountains. Meanwhile, there is a higher concentration of manure producing animals in the rainfed valleys and the mountains than in irrigated valleys. Although there are animals in all the life zones, their distribution is not even.[18]

In their attempt to compensate for the lack of water and other disadvantageous environmental conditions, nonirrigated farms combine crop and animal production more closely than irrigated farms. The rainfed Tipajara valley farmers integrate agriculture and livestock raising more tightly than the irrigated Mizque valley farmers. Goats and sheep constitute an integral part of the peasant economy of Tipajara: raising livestock allows for economic diversification, it provides inputs for agriculture, and works as an insurance against periodic droughts. A similar pattern of resource use is found in other nonirrigated valleys in the area of Wara Wara, Negropujio, Oloy, Mesa Rancho, Marquilla, and Pampas, in Campero province.

Alpwirtschaft is seriously threatened from the perspective of forest resource use. First, old land tenure patterns sanctioned by the agrarian reform have contributed to eliminate the concept of communally owned forest, in former freeholding communities. Although all communities reserve *monte* for pastoral production, and they often share it with several other communities, not all *monte* is communally owned. Second, the forest resources are being rapidly depleted, over the past several decades, as a result of natural population growth. Population expansion has manifested itself in higher levels of consumption of firewood, and in the need to expand the agricultural zone. More impoverished households depend on forest resources as a source of cash. Recent deforestation, however, is continuing a process that was already in force at the turn of the century. Liquor distilling, the development of railways, and corn beer making contributed very importantly to the deforestation of the area (Pérez-Crespo 1991b). Reforestation is rarely practiced, yet according to farmers, the *monte* areas have become more distant from their houses over time, as a result of deforestation.

The most important reason for current deforestation is a shortage of agricultural land and cash in peasant communities. Over 63 percent of the 360 heads of households in CEFOIN's sample had cleared forest in order to have access to arable land, and 7.5 percent of 1,307 plots analyzed in the same study were newly opened fields. When asked why farmers cleared new agricultural land from forest, the most common response was "because of declining land productivity." Most farmers (80 percent) perceive that land fertility has decreased in the last

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[18] In its sample of 360 households, CEFOIN registered 3,796 sheep; 3,093 goats; 1,832 chickens; 853 cows; 640 oxen; 538 pigs; 321 donkeys; and 52 horses. The area with the largest concentration of all animals, with the exception of horses, is the Tipajara, Wara Wara, Mesa Rancho, and Villa Granado area (39 percent). The next largest concentration of animals is divided between Mizque valley and the mountains. However, whereas Mizque valley has a larger concentration of oxen, cows, horses, and chickens than the mountains, the latter concentrate more sheep, goats, donkeys, and pigs than the former (Mercado et al. 1991).

ten years (Mercado et al. 1991). Farmers want to have access to fallow reserves. *Montes* are also being increasingly deforested as a result of a dearth of cash. Poor farmers cut trees to sell them as firewood for domestic consumption in Aiquile and Mizque, and for the operation of corn beer (*chicha*) and brick factories. Farmers sell firewood in bundles of 15 to 20 kg for a price of Bs2.50 in town, and Bs1.50 to 2.00 on farm. They also sell large quantities of firewood to truck owners. Approximately 1.5 cubic meters is sold for Bs60 to 80 (US$16 to $22). It takes two weeks for farmers to gather such amounts (Mercado et al. 1991). With pressing needs to meet, when crops fail and there are few income-generating opportunities, farmers often exploit forest resources.

In summary, *alpwirtschaft* is an adaptive strategy that continues to be used by rainfed farmers in Campero and Mizque. A carefully choreographed arrangement of practices in agricultural fields and grazing lands is applied. Agriculture depends on livestock rearing, and vice versa. The productive potential of both activities is enhanced by maintaining this dependency (cf. Orlove 1977). The *monte* is the first insurance against economic difficulties that ensue from agricultural instability. For *alpwirtschaft* to be viable the delicate complementarity of *monte* and crop fields must be maintained. The gain in one of these ecological niches must offset the losses in the other.

Several factors may transform *alpwirtschaft*. The pressure is increasing on the agricultural *and* the forest resource base. While the forest is decreasing in size and resources (with probably no climax vegetation left in it [Pérez-Crespo 1991b]), agriculture is faltering. From 1986 to 1989, crop production was so low that there has not been enough stubble as feed. Finally, farmers are experiencing a loss of complementary ecological niches. The *alpwirtschaft* system will change as these forces intensify.

Exchange Networks and Nonagricultural Activities

It is unlikely that *alpwirtschaft* was in the recent past a closed system based on agriculture and livestock rearing alone, with the exclusion of trading. Specialization and self-reliance is a matter of degree (cf. Forman 1978; Rhoades and Thompson 1975). In Campero and Mizque, however, the trend is to incorporate the resources from other environments through trade, as part of one new adaptive strategy. If the needs are too large for farmers to meet with agricultural and *monte* resources alone, then they obtain goods produced off-farm either through bartering or selling products or labor.

By exchanging goods, farmers can use the regional surplus production to offset local scarcity. This scarcity may be simply temporal: not all the products are available at the same time. Adaptive strategies require the coexistence of several agricultural calendars in accordance with the different growing seasons of the life zones in the area. Mountain potatoes, for instance, are harvested in January and February, whereas Mizque potatoes are harvested in March and

April.[19] Thus, vertical complementarity of ecological zones coincides with sequential availability of agricultural produce from distinct zones (Gray 1991:7).

The flow of energy and resources through exchanges creates enough surplus to offset environmental instability in the area, even when *alpwirtschaft* is weakened. Farmers trade for goods that are not available to them. The most important factor in the demand for trade goods is related to ecological zonation, since, other than specialization according to zones, there is not an important regional division of labor. Farmer households try to be as self-reliant as possible in the provisioning of manufactured products. They make the most efficient use of available animal products (sheep wool, cow and goat hide, even pig hair). Wool is spun and woven into blankets, ponchos, sweaters, pants, and large sacks for agricultural and domestic use.[20] Leather products are not too common because farmers are reluctant to kill their livestock, but leather is made into products used in house building and cloth making, and in agriculture (ropes to tie together the yoke, tie up bundles of agricultural products, and make whips).

Despite the farmers' goal of striving for self-reliance, trade relationships have spread over the area. Agricultural goods from diverse life zones can be obtained either through barter or purchase. Barter is still very common in villages that are relatively isolated and are situated away from main roads (e.g., Tin Tin, Pasorapa, Raqaypampa) (Conosur 1989). Farmers in these zones barter some agricultural produce for others (potatoes from the mountain for corn or onion from the valley); crops for manufactured goods (potatoes for locally made clay pots, salt bricks from afar, or manufactured shirts and skirts); livestock for manufactured goods (goats for clay pots or second-hand clothes); and livestock for livestock (a young ox for an old one). Bartering takes place among farmers, but also among farmers and truck owners, who then sell somewhere else the products they obtained through nonmonetary exchange of goods (Mercado et al. 1991).

Monetization is rapidly finding its way into the economy. Farmers need cash not only for purchasing urban produced goods, but buying land is increasingly becoming the most common way to get agricultural land, for young and old farmers alike. In CEFOIN's sample, although land inheritance is still the main way to get land, purchasing is the second most important method (Table 5).

The agricultural labor market is the farmers' main source of cash, and one very important avenue for them to supplement their food reserves. Family labor has traditionally been the main

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[19] Labor and agricultural calendars for the region can be found in Conosur 1989:10; CORDECO 1989:26; Mercado et al. 1991; and Paulson 1990:31-33.

[20] There are small weaver guilds of kin-related members. The technological knowledge is passed from one generation to another through apprenticeships involving extended families. Thus in Tipajara, artisans in Montecillo, Thajras and Qhuru Mayu Chico are consanguineously related. The weavers are mostly male, but females also weave (Mercado et al. 1991).

source of labor for all agricultural practices and all crops, and continues to be so, but farmers need extra-family labor, especially for planting and harvesting.[21]

Table 5. Sources of Land Rights by Zones

Life Zone	Number of households that reported having access to the ecozone	Of those households that have access to the ecozone, percentage that reported gaining it through:					
		Inheritance	Purchase	Land Reform	Sharecrop	Communal Land	No Answer
Mountains[1]	70	65.3	14.4	17.1	1.1	.5	1.6
Irrig Val.[2]	67	38.3	34.7	18.5	.9	5.0	2.7
Dry Val.[3]	130	53.2	21.2	13.6	2.1	9.7	.2
Closed Val.[4]	45	64.0	16.7	4.9	1.5	10.2	2.7
Warm Val.[5]	40	28.7	23.4	10.6	6.4	29.8	1.1
TOTAL	360	49.9	23.1	14.7	2.0	8.7	1.6

[1] K'uri, Raqaypampa, Lagunitas, Panamá Rodeo
[2] Mizque
[3] Tipajara, Wara Wara, Villa Granado, Negro Pujio, Oloy, Mesa Rancho, Marquilla and Pampas
[4] Tin Tin, Higueral, Chaguarani, Quebrada de Mataral
[5] Omereque

Source: Mercado et al. 1991.

Today, the commonest way to recruit extra-family labor in the area is by hiring. Wage labor contracts are more important than traditional reciprocal labor exchanges between individu-

[21] In CEFOIN's sample, the average contribution of extra-family labor for the production of potatoes, corn, wheat, barley, and peanuts is 28 percent of total labor for land preparation, 44 percent for sowing and planting, 29 percent for weeding and making mounds, and 42 percent for harvesting. Among crops, the extra-domestic contribution varies considerably. Insofar as planting is concerned, its contribution ranges from 38 percent for corn to 50 percent for potatoes. Similarly, regarding harvesting it ranges from 35 percent for corn to 47 percent for peanuts. In the sample, barley and corn have the lowest share of extra-domestic labor (30 percent and 31 percent, respectively), peanuts and wheat have a larger share (37 percent and 39 percent, respectively), and potatoes have the largest proportion (42 percent) (Mercado et al. 1991).

als (*ayni*) or between one individual and a group of other farmers (*umaraka*), and much more relevant than sharecropping. CEFOIN's data on the labor exchange arrangements practiced by farmers for 1,172 plots show that almost 40 percent of the fields are cultivated with extra-family labor, and that an average of 23 percent of the labor exchanges for the most common crops in Campero and Mizque are mediated by cash flows (Table 6).

Table 6. Forms of Labor Exchange in Fields Planted to Selected Crops, in Campero and Mizque

Crops	Number of fields	Percentage of fields in which the following kind of labor is the most common:				
		Family Labor	Wage Labor	Ayni	Share-crop	Other
Corn	320	68.9	18.4	7.3	.9	4.5
Potato	525	58.6	21.[illegible]	11.2	2.3	6.8
Wheat	167	60.9	[illegible].2	10.4	.7	10.9
Barley	11	68.3	22.2	9.5	-	-
Peanuts	85	62.2	27.7	6.7	5.1	.4
Onion	23	62.4	21.1	9.0	7.5	-
Tomato	21	57.9	32.9	-	9.3	-

Source: Adopted from Mercado et al. 1991.

Thus, *alpwirtschaft* has been transformed to include monetization and wage labor in addition to agricultural intensification. The trend seems to be for cash to become the main vehicle for economic transactions. Commodities and wage labor opportunities have established their presence in the area. The introduction of more industrially produced commodities and labor opportunities will further reshape alpwirtschaft.

Monetization of the economy is moving at a rapid pace, but has by no means become the indisputable dominant mode. Suffice it to mention two cases. First, although cash labor exchanges are very important for recruiting extra-domestic labor, noncash labor exchanges are more frequent than cash arrangements in agricultural production as a whole. Noncash labor exchanges, including family labor, are four times more common than cash exchanges in the sample (Table 6). Therefore, neither labor exchanges nor exchanges of goods seem to be fully commercial in the area. Wage labor contracts are the trademark of the irrigated farms, which highly depend on cash networks external to the region. On most rainfed farms noncash labor exchanges are still the norm. By and large, it is only the lower economic strata of rainfed agriculturalists that work for cash as laborers in irrigated fields, which is virtually the only cash opportunity available.

Second, commercialization of crops and livestock is today generally reputed to be the most important form of exchange in the provinces. This notwithstanding, bartering is still more common than selling in the local markets (*ferias*), as Gray shows.[22] With the exception of crops raised mainly for domestic consumption (such as *tarwi* and *quinoa*, but also corn and wheat), at least a fraction of the agricultural produce is traded in the local markets. Trading does not always mean selling. Despite the existence of several small and intermediate market places, it is only in Aiquile that there is full commercial (cash) exchange (Gray 1991).

The incomplete monetization of the economy, however, does not mean that alpwirtschaft remains largely unchanged. Above all, the introduction of trade of any sort shows that the system is not self-contained. The present contribution of wage labor and market goods clearly do not strengthen the *alpwirtschaft* system to the point that farmers can derive their subsistence locally. Moreover, as Bradby (1982) shows, *strictu sensu* wage labor and exchange (whether bartering or selling) are expressions of the collapse of the mountain agricultural production system rather than manifestations of its well-being. The verticality model, and the *alpwirtschaft* model by implication, is a model of control of different ecological niches. Verticality is a social and political system designed to provide access to products from these varied environments without having to use exchange. Hence, "all forms of exchange are incompatible with the system of vertical control insofar as this was a system of direct control of distant lands" (Bradby 1982:118).

Farmers cannot make a living out of agropastoral transhumance, but, at the same time, local commoditization of labor exchanges and goods is imperfect, temporary, and selective. Farmers' participation in cash-generating activities has been discriminating. In a sample of 1,152 fields studied by CEFOIN, it was found that farmers sell or barter 23 percent to 45 percent of their staples, and 73 percent to 99 percent of their vegetables (Table 7).

According to CEFOIN data, at least one-fourth of the production of households could be considered to be surplus over and above the satisfaction of domestic needs. This assumption may be true under normal production conditions, and especially for staple goods, but under conditions of economic or ecological stress, farmers may reduce consumption of staples and vegetables, and forfeit for trade the volume reduced. Because ecological instability is rather the norm than the exception in the area, traded goods are not always agricultural surplus. Under conditions of duress, they may rather represent the degree of the producers' self-exploitation.

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[22] The marketing system in the area is weakly integrated at the local level, but also tightly integrated with markets outside the region. Structured as a branching, tree-like spatial configuration, all market places (*ferias*) are connected to one single price-setting location in Aiquile. This situation contrasts with high levels of articulation with extra-regional markets in Punata, Cliza and Cochabamba city, which are mediated by truck owners who act as wholesale (monopsonistic) buyers and (monopolistic) sellers of agricultural produce (Gray 1991).

Table 7. Use of Produce in 1,152 Fields of Selected Crops

Crops	Number of Fields	Percentage of fields in which most of the produce is used for the following:		
		Domestic Consumption	Seed	Trade
Corn	320	66.5	8.7	24.9
Wheat	167	61.1	15.7	23.2
Potato	525	32.6	22.7	44.7
Peanuts	85	14.1	13.1	72.8
Onion	23	4.3	.6	95.0
Tomato	21	.2	-	99.8
Barley	11	n.a.	n.a.	n.a.

Source: Adopted from Mercado et al. 1991.

Seasonal or Permanent Migration

People in Campero and Mizque migrate because their intraregional survival strategies—their cropping patterns, linkages between agriculture and livestock raising, and trade exchanges—do not generate enough surplus to counterbalance the effects of an extremely harsh and unstable environment. Simply stated, there is not enough land to cultivate, nor to distribute among young farmers; irrigation resources are very limited; there are no technological improvements available in the area to overcome land scarcity and reverse declining soil fertility; livestock raising does not generate enough cash to offset the meager contributions of crop production; and there are very few sources of wage labor employment available. Meanwhile, the farmers' involvement in market relations is growing, and especially young farmers desire consumer goods. Whatever farmers produce generally obtains poor prices, whereas urban manufactured goods are increasingly dear. The option, therefore, is temporary or permanent migration.

A farmer stated in straightforward terms the rationale for migration: "*Viajo porque hace falta arroz, coca, dinero para comprar ropa para mis hijos, terrenos para mis hijos.*" [I migrate because I do not have enough rice, coca, money to buy clothes for my children, farmland for my children.] Another farmer explained: "*No hay vida aquí. Tengo que salir todavía para ganarme todos los días. Tenemos que llorar de comida.*" [There is no life here. I must leave to earn my daily bread. We are forced to weep for food.]

CEFOIN interviewed 46 community leaders about issues that their communities may need help with. The main topics that they identified were related to a complete lack, or a deficiency of: drinking and irrigation water (40 percent), agropastoral technical assistance (23 percent), health facilities (16 percent), road infrastructure (8 percent), and educational facilities (4 per-

cent). (Twenty-eight of the leaders interviewed did not answer [Mercado et al. 1991].) Two-thirds of the leaders' answers are related to agricultural and livestock production. The rest of the needs reflect the leaders' awareness of the region's isolation (better health and education facilities and improved road linkages).

In 1990 Jones also interviewed farmers about their community needs. He conducted group interviews in six communities in the two provinces. In three communities, farmers said that water was their most critical need. They had lost all their crops to drought in 1990. In another community, women farmers added that there was a need for local employment, especially for young people, so they would not have to migrate. Three communities expressed needs for the seed of corn, potatoes, and wheat, and for credit, especially for rainfed farms and low-income farmers. Finally, technical assistance and human health improvement were identified as important community needs (Jones 1991:16). Again, the leitmotif in the farmers' answers was irrigation, agricultural improvement through technical assistance and credit, and local employment. The message is that farmers cannot subsist with their existing agricultural resources alone.

Agricultural underdevelopment, as expressed in CEFOIN's and Jones' lists of community needs, does influence the decision of individual farmers to migrate. CEFOIN interviewed 60 farmers (53 male and 7 female), who had migrated in recent years. The farmers were asked to state the reasons that led them to migrate. This issue was probed through two questions: first, what was lacking in their communities at home that led them to migrate, and second, why did migrants decide to go where they went. Insofar as things that were lacking at home are concerned, almost three-fourths of the answers emphasized money (28 percent), food (26 percent) and clothes (14 percent). Farmers are aware of the paucity of their landholdings, yet since there is nothing that they can do to resolve this problem, they take it for granted.[23] That is why when asked about their main community problems, few farmers mentioned land shortages. Rather, they concentrated on issues that they perceive as somehow more manageable and solvable, such as irrigation.

If coca is added to the food category, then food was the most important cause of migration in the opinion of the interviewed migrants. The second most important item, then, was money. The categories of work, irrigation, land, and animals can be collapsed into one

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[23] There are two possible reasons why farmers feel they cannot do anything to change the land tenure structure in Mizque and Campero. First, until recently, very few farmers questioned the ideology of the national revolution of 1952, and the land reform of 1953. This ideology states that farmers have been given land and have been liberated from indentured labor obligations. They should, therefore, feel eternally thankful to the state, and not make demands for the services (education, health, credit, technical assistance) to which they should be entitled as citizens. Secondly, they know farmers do not influence the ruling groups in Bolivian society. Asking for a "second land reform," may actually be asking for trouble: the potential losses may be perceived as larger than the potential gains.

single category that we could label agricultural work, and that occupies the third place. A fourth division would encompass general household resources (household goods and "everything"). Finally, education opportunities would rank fifth (Table 8).[24]

Table 8. What Is Lacking at Home That Encourages People to Migrate

Items	Number of responses	Percentage of the 87 interviewed
Money	24	27.6
Food	23	26.4
Clothes	12	13.8
Work	6	6.9
Irrigation	5	5.7
Land	5	5.7
Coca	4	4.6
Household Goods	3	3.4
Everything	3	3.4
Animals	1	1.1
School	1	1.1
	87	99.7

Source: CEFOIN's migration data.

CEFOIN's second question concerning the reason why farmers chose the area where they migrated elicited similar responses. Over two-thirds of the migrants had migrated in search of work and money. Seven people had migrated either because they did not have land, water, and other resources at home, or had land and plenty of water at their destination point (Chapare, in this case). Finally, a small group among the respondents had migrated to visit relatives. These relatives undoubtedly provided them with job opportunities (Table 9).

In the answer of the former migrants to the question whether it was good or bad to migrate we find further evidence that the general failure of the agricultural economy of the area is leading people to migrate. Eighty-one percent of the 52 responses were positive in their

[24] Farmers complained to Jones about the high price of coca in Aiquile. In mid-1990, when he conducted his research, a pound of coca cost Bs4 (US$1.1), whereas the same amount was being sold at Bs1 (US$0.27) in Chapare. Hence, it is possible to understand why people migrate to Chapare to buy coca, which is chewed as a traditional mild stimulant (Jones 1991:19).

evaluation of migration. Some farmers mentioned that migration meant work, money, and food for them. The remaining 19 percent of the responses were negative about migration. Migration to Chapare involved dealing with heat and frequently illness.[25] For some others, it presented opportunities for them to drink alcoholic beverages excessively. Finally, there was always the menace of encountering the police forces ("Leopardos"), who have the dubious fame of being arbitrary and arrogant.

Table 9. Why Migrants Chose Their Destination Point

Reasons	Number of Responses	Percentage of the 76 who responded
Work	42	55.3
Money	22	28.9
Land	4	5.3
Visit Relatives	3	3.9
Food	2	2.6
Water	2	2.6
No Resources at Home	1	1.3
	76	99.9

Source: CEFOIN's migration data.

As one farmer put it, "*[migrar] es malo, pero uno tiene que hacerlo.*" [Migrating is bad, but one is forced to do it.] Three other farmers expressed why migration is good for them:

> *Uno migra porque [allá] hay trabajo, y puede ganarse arroz y dinero.* [One migrates because there is work [there], and one can earn rice and money.]

> *Es bueno migrar [al Chapare] porque se tiene árboles frutales para traer frutas a casa. Se puede traer [también] arroz, yuca, coca para el trabajo.* [Migration (to Chapare) is good because one has fruit trees there so one can bring fruits home. One can (also) bring rice, cassava, coca for agricultural labor.]

[25] In the sample, half of the farmers who had migrated to Chapare and Santa Cruz (53) had become sick. The most frequent ailments were anemia, malaria, yellow fever, dermatitis, and insect and vermin bites.

Es bueno migrar al Chaparé pues ahí existe producción [para] la comida y la mantención de los hijos. [Migration to Chapare is good because it is possible to produce there for feeding and providing one's children.] (CEFOIN's migration data.)

That farmers identify the lack of food, clothing, money, and employment as their most important reasons for migrating means that they migrate because the productive conditions at home are failing. Their ability to produce crops and livestock is being undermined, and they are experiencing increasing difficulties in gaining access to land and other resources. They could compensate for the lack of homegrown food and homemade clothing by purchasing these goods if they had money, the availability of which depends on wage labor opportunities. Since there are very few sources of employment in Campero and Mizque (and presumably they are not that profitable), farmers do not have the means to buy the commodities they need in order to survive. Hence, they must migrate.

Campero and Mizque are zones where making a living is hard under normal circumstances. The more dependent farming is on rainfall, the more unstable and precarious is the farmers' economy, and the greater is their dependency on a multihabitat resource flow system. Agricultural production in several complementary life zones, integration of livestock and crop production, exchanges of goods from different areas, and migration to near and far away places are all survival strategies that farmers use to counterbalance their inclement environment.

Migration is not a temporary phenomenon, nor one that started with the droughts and economic crisis of the early 1980s. As a symptom of a structural malfunction in the rural economy of Mizque and Campero, it has become an almost permanent feature in peasant communities. Hence, although 44 percent of the migrants in CEFOIN's sample stated that they have been migrating for only 5 years or less, 31 percent have been migrating for over 10 years, and 20 percent have been migrants for 15 years or more. The sample's range included people who have migrated for 1 to 39 years (CEFOIN's migration data).

Migration is integrated in a complex web of household adaptive strategies. In the rainfed valley (Tipajara, Wara Wara, Negropujio, Oloy y Mesa Rancho, Marquilla, and Pampas), the long dry months force people to diversify. Families in this zone emphasize small livestock raising (especially goats, pigs, and chickens). Some families also engage in weaving and *charango* making. They also have a good command of masonry, a skill that they learned through migration. Most families sharecrop in faraway plots that are irrigated by the Chujillas river, in the general direction of Totora. In Villa Granado, itinerant raising of cows and goats often outweighs agriculture in importance: agriculture is unpredictable and there is plenty of shrub land. The Quebrada de Mataral area appeals to farmers from higher areas who sharecrop and provide help in sowing and harvesting activities. Finally, tomato production in Perereta and Robles lures migrants from within the province as well as from other provinces (Mercado et al. 1991).

Migration Patterns

Migration is particularly conspicuous when it involves large numbers of farmers traveling long distances and for relatively long periods of time, yet it is an essential and ubiquitous element in farmers' lives. The reason why migration frequently goes unchecked is that it is hard to detect it under rural labor exchange arrangements that seem to be geographically static.

Migration within the provinces of Campero and Mizque is much more common than frequently assumed. In the mountains, K'uri farmers who cultivate rainfed plots look for temporary jobs in the nearby zones, but also in tropical Chapare, during the slack months of the agricultural cycle. They are paid in cash or kind. In Lagunitas and Panamá Rodeo, dryland farmers regularly establish a second residence in more protected microenvironments, where they cultivate their own plots or sharecrop with farmers who have irrigated plots. Panamá Rodeo farmers exchange mountain agricultural goods with Omereque warm valley farmers, who lend them their draft animals. In the irrigated valley of Mizque, crop production goes on almost uninterrupted throughout the year. This renders the area particularly attractive to farmers from the mountains and rainfed valleys, who engage in seasonal labor there during planting and harvesting periods (Mercado et al. 1991).

The responses to CEFOIN's migration survey show a wide range of destination points. The places male migrants mention most frequently as destinations are Chapare, Santa Cruz, and Cochabamba city, but they also mention that they migrate within the Mizque and Campero provinces (Aiquile, Mizque, Omereque), to areas within the Department of Cochabamba (Lope Mendoza, Ayopaya, Arani), and to Sucre and Potosí. These data reflect the extent to which farmers do not qualitatively differentiate migration to zones of major migrant concentration (which are visible from the perspective of the cities) and to zones of subtle migratory flow (Table 10).[26] Female migrants also mentioned Santa Cruz (44 percent), Chapare (33 percent) and Cochabamba city (11 percent) as their most common destinations. In this sample, however, female returned migrants present a narrower range of migration target areas than males (Aiquile being the only other area mentioned by females). This may be explained by the extremely reduced sample size of the females (total 7).

How long do current migrants stay away from home? The responses to this question are extremely varied, but it is remarkable that 87 percent of the respondents stay away from their home communities for four months or less a year (Table 11). This information allows us to identify CEFOIN's migrant sample as composed mostly of seasonal migrants. CERES's most recent study on the Chapare population (Rivera 1990) concentrated on the permanently settled

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[26] The most commonly mentioned areas in Chapare are Eterazama—by far the most frequently mentioned—Chimoré, Shinaota and Bulo Bulo. Other places alluded to are Villa Tunari, San Juan, Villa Nueva, Villa Flore, Todos Santos, Ivirgarzama y Santa Bárbara. In Santa Cruz, the areas most referred to are Pulquina, Los Negros, San Julián, Brecha Casarabe, and San Isidro y Mairana.

population, and did not provide a description of the main features of the seasonal population. We can now use CEFOIN data to infer some attributes of the seasonal migrant population at large. This notwithstanding, the sample is not composed exclusively of migrants who were always seasonal migrants. Some of them mentioned having been away from home for long periods of time, ranging from 3 to 13 years, in the past.

Table 10. Migration Points Mentioned by Recent Male Returned Migrants, by Frequency of Reference

Destination Point	Number who responded	Percentage of the 93 respondents
Chapare	41	44.1
Santa Cruz	24	25.7
Cochabamba	10	10.7
Aiquile	7	7.5
Mizque	3	3.2
Sucre	2	2.2
Omereque	2	2.2
Potosí	1	1.1
Arani	1	1.1
Lope Mendoza	1	1.1
Ayopaya	1	1.1
	93	100.0

Source: CEFOIN migration survey.

The most common pattern among the migrants in the sample is to migrate for short periods of time, but several times a year, and usually with two or three destination points. Most farmers in the sample seem to have been migrating for several consecutive years. Although most farmers tend to travel during the slack agricultural period between June and October, migration occurs throughout the year precisely because of the short duration of the sojourns.

Some farmers migrate for one month at a time in three trips during the year. Some others stay one month in Chapare, and then migrate to Santa Cruz for ten days. Some others combine two weeks in Santa Cruz with three months in Chapare and two weeks in Cochabamba city. In general, farmers migrate any time that they need food, cash, or employment. In some cases there seems to be a pattern whereby farmers go to Cochabamba in February and March, to Mizque in June, and to Santa Cruz in September and October (Figure 1). In some other

instances, two members of a household migrate during the same year to different areas, in a relay fashion. One farmer said: "*[Viajo al Chapare porque] falta trabajo por falta de lluvia. Además mi esposa también está en Santa Cruz. Fue a ganar de alguna cosa, y volverá en dos semanas. Viajó hace una semana.*" ["(I go to Chapare because) there is no work due to the lack of rain. Besides, my wife is also in Santa Cruz. She went there to earn money doing anything she can, and she will come back in two weeks. She went away one week ago."]

Table 11. Length of Stay at Destination Point among Recent Migrants

Length of Stay	Number of Respondents	Percentage	Cumulative %
2 Weeks	6	10.5	10.5
3 Weeks	5	8.8	19.3
1 Month	14	24.6	43.6
1.5 Months	10	17.5	61.1
2 Months	5	8.8	69.9
3 Months	8	14.0	83.9
4 Months	2	3.5	87.4
5 Months	-	-	87.4
6 Months	1	1.8	89.2
7 Months	-	-	89.2
8 Months	2	3.5	92.7
9 Months	1	1.8	94.5
10 Months	-	-	94.5
11 Months	-	-	94.5
12 Months	3	5.3	99.8
	57	99.8	99.8

Source: CEFOIN migration survey.

In the sample, 92 percent of the migrants declared their home occupation as agriculturalists. The remaining listed occupations of housework (3 percent), tailor and mason (2 percent), driver (2 percent), and merchant (2 percent). Once at the destination point, the array of occupations expands, with the common denominator that most of these occupations are paid in cash. Most migrants continue to work in agriculture: 71 percent of the respondents claim to work as farmers, and 10 percent as farm laborers. The remaining migrants are petty merchants (5 percent), maid/cooks (3 percent), bricklayers/tailors (2 percent), drivers (2 percent), mechanics (2 percent), or do whatever work they can find (2 percent). Harvesting is the most

common occupation of migrants. Migrants harvest coca in Chapare, rice in Santa Cruz, peanuts in Mizque, and tomatoes in Omereque. Some farmers also go to Santa Cruz to sell vegetables. A few migrants acknowledge having worked stamping coca in Chapare, and in confidence, they admit having manufactured or smuggled coca paste. Coca related activities, whether legal or illegal, are undoubtedly the most profitable ones. There are some migrants whose main occupation is to cut down primary forest in search of forest species with high commercial value. Few of the farmers in the sample have stayed in Chapare for long enough periods to sharecrop.

Figure 1. Sample Distribution of Migration Throughout the Year

Case	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1					x	x	x	x	x			
2								x	x	x		
3					x							
4		x	x	x	x	x	x	x	x	x		
5										x		
6								x	x	x	x	
7			x	x							x	x
8											x	x
9			x	x	x							
10				x							x	
11			x									
12			x	x				x	x			
13			x					x	x			
14		x	x			x			x	x		
15									x			
16							x	x	x	x	x	
17							x	x	x			
18									x			
19							x	x	x	x	x	
20							x	x	x			
21						x	x	x	x	x	x	
22					x				x			x
23							x	x	x	x		
24									x	x	x	x
25						x						

Source: CEFOIN's migration data.

The fact that 10 percent of both male and female migrants declare that they migrate to Cochabamba city seems to contradict the declared occupations of farmers when they arrive at their destination points. It is possible that the migrants' list of occupations may be missing a category that would describe the role of some of them in the city of Cochabamba, since it seems unlikely that all of them would be farmers in the city. The city's most dynamic activities in the self-employed category are commerce and construction (Escobar and Ledo 1988). Since most migrants in CEFOIN's sample are seasonal migrants (the sample's average length of stay in the city is two weeks), it is unlikely that these migrants would work as construction workers. It is possible, however, that they would engage in petty commerce while in the city. Indeed, wherever the migrants go, they do not waste the chance to bring along corn, peanuts, and potatoes from home to exchange for cash or tropical goods.

Some farmers in CEFOIN's sample hinted at several patterns of migration depending on the type of work they intend to do in their destination points. Thus, they normally travel alone when they are going to work as agricultural laborers, but when their goal is to engage in commerce they frequently travel in groups, including parent and children teams. Farmers tend to travel to Santa Cruz in groups, whereas they go alone to Chapare. When the respondents are clustered according to whether they are single or married, their preferences about traveling alone or in groups are remarkably similar. In both cases half of the responses are for one choice and the other half are for the other one. Thus, the farmers' decision to migrate alone or in a group seems opportunistic, regardless of marital status.

The age of the migrants in the sample is distributed across a very wide spectrum. The most frequently mentioned ages are 30 years (9 cases), 23 years, and 19 years (5 cases each), but practically all ages between 16 and 60 years are represented with at least one case. This means that migration is not a phenomenon specifically related to any age group.

Migration has been an integral part of the network of adaptive strategies used by farmers of Campero and Mizque since the beginning of the century. In the past, it normally involved labor movement within the region, which may be a sign that *alpwirtschaft* has been in transition for quite a long time. Intraregional migration continues to be practiced, and it is perhaps more important than in the past insofar as it now has commercial agriculture as a relatively new addition to the pool of seasonal employment opportunities.

Over the last 40 years, however, extra-regional migration has become increasingly important, insofar as it importantly contributes to the monetary resources of farmer households. The external poles of attraction are the result of the national development dynamics. Santa Cruz, Chapare, and Cochabamba city—the migrants' more important destination points outside the region—were economically and demographically unimportant places before 1950. They gained their ability to lure migrants when they received infusions of capital investments between 1950 and 1980 in Santa Cruz, and 1980 and 1990 in Chapare and Cochabamba. The development of these areas could not have been possible without the influx of large contingents of underpaid migrants. At the same time, it could not have been possible if two historical phenomena had not have taken place: the national revolution of 1952, and the boom of cocaine

production of the 1980s. This is not the place to elaborate on the substantial connection between these phenomena. Suffice it to say, however, that it is warranted to relate migration in Campero and Mizque to the pattern of capitalist development adopted in the country (Pérez-Crespo 1991a).

Migration in the area, as all over the world, tends to nurture the informal economy of the host regions rather than the industrial labor markets. Its sphere of action is the primary and secondary sectors of the economy. The occupations that migrants engage in in Santa Cruz, Chapare, and Cochabamba city are mainly agricultural or service-related. Neither in Santa Cruz nor in Cochabamba city have migrants been incorporated into the process of industrialization. In the host areas, as in the sending communities, no substantial economic development has taken place, i.e., one that increasingly creates and supports opportunities for generating income and employment. Contrary to the prediction of Lewis, economic development has not taken place even when there have been unlimited supplies of labor (Lewis 1954).

The results of the involvement of farmers in migration must be taken into account in this light. Most remittances, by and large, are primarily used for consumption and the satisfaction of immediate needs, rather than for investment in agriculture. This statement should be qualified, however. Wealthier farmers migrate as well as poor ones, although in smaller numbers and for different reasons. "Rich" farmers frequently obtain land in Chapare, plant it with coca and then sell coca in highland communities. With the capital they are able to muster as a result, they frequently buy (mostly irrigated) land in their home communities, or trucks for commercial hauling of agricultural products. These farmers are, thus, able to accumulate capital through migration, and invest in income- and employment-generating activities. Poor farmers are less able to do so. They normally work in low-paid agricultural and service jobs. They frequently complain that they are as poor after migrating as they were before.

This is not to say that migration is a completely negative experience for farmers. Limited as the remittances are, generally farmers are able to derive enough money to supplement their domestic economy, and to pay for the education of their children. Furthermore, farmers learn skills in the host areas that are transferable, albeit with some modifications. Paradoxically, this transference is possible because, as stated above, the kind of jobs they have as migrants do not represent much of a technological upgrade.

Conclusion

Farmers who live in mountain ecosystems mesh several strategies to gain livelihood from their local environment and economy. One of the most common strategies combines carefully timed transhumant agropastoral production at different elevations, using cultivars adapted for each zone, fragmented household landholdings, and communal and private control of resources. Increasingly, however, mountain communities engage in economic activities that render them an integral part of the national and even international systems. Thus, to the list of strategies adopted by farmers stated above, it is necessary to add wage labor opportunities and access to markets.

Like the mountain production strategy, migration is an adaptive practice. It is a mechanism whereby farmers engage in activities in other economic sectors, as well as other social and ecological environments, in order for their domestic units to remain viable. It is a strategy for peasant families—not individuals—to spread risks, and ensure immediate and medium-term security.

Large numbers of farmers engage in permanent or, more frequently, temporary migration. While migrating they are reacting to conditions that jeopardize their livelihood. These conditions are ecological but are also economic and political. They are locally derived, but also informed by the way the region is incorporated in a larger economic order. Some of these conditions are transient and ensue from conjunctures such as crises or special events in the development of households. It is increasingly common, however, that the conditions are structurally based, and thus beyond the control of farmer households. Structural pressures on small-scale agriculturalists include the deterioration of the terms of trade with cities; a decline in soil fertility and, generally, in agricultural production; the stagnation of agricultural technology and credit; and increasing dependency on manufactured goods and cash exchanges.

Rural migration is thus related to the breakdown of the *alpwirtschaft* system, which is being replaced as a result of a constantly renewed interaction of several factors. Not the least important of these factors are the sociopolitical transformations that ensued from the national revolution, launched in 1952. The progressive reduction of the size of peasant plots, communal pasture lands, and forest reserves; the dearth of off-farm economic opportunities, credit, agricultural price incentives, and technical assistance; but also the opening of the lowlands for commercial agricultural production, which has attracted many farmers, are all the outcome of such revolution.

Is migration adaptive? Does it contribute to the sustained livelihood of the peasant community? A short answer is that migration in Campero and Mizque is not as dysfunctional as is often assumed, but at the same time it is not a long-term solution for the economy of the region. As in almost all cases around the world, the impact of migration—and especially circular migration—on the development of the home communities is at best neutral, but not positive. Migrant remittances simply "perpetuate status quo underdevelopment" (Kearney 1986:346; Cornelius 1976). Through migration, farmers can continue to practice a debilitated *alpwirtschaft*. Full food security, and income and employment opportunities are still missing, however. The need to migrate as an adaptive strategy is, hence, reproduced. Migration continues to be a reaction to the underlying inequalities of the national development.

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