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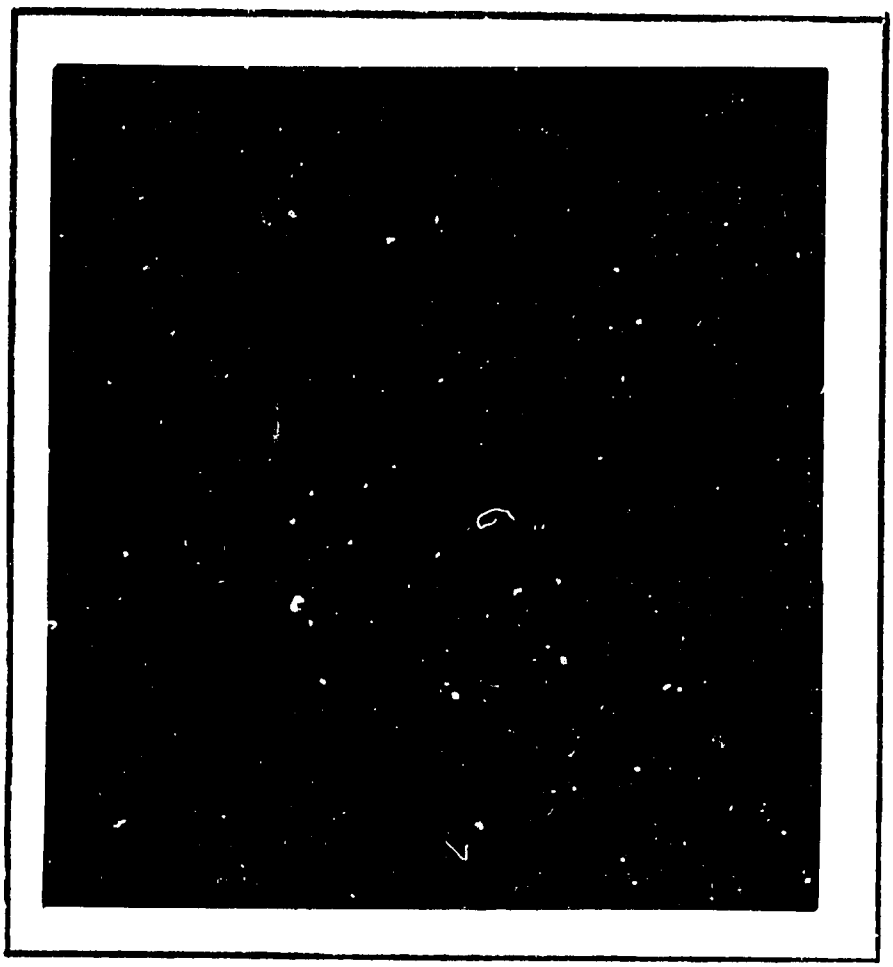

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GENERAL WORKING DOCUMENT #3

UNEMPLOYMENT AND UNDEREMPLOYMENT IN BOLIVIAN AGRICULTURE: A CRITICAL SURVEY OF THE LITERATURE

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One of the most widely discussed issues in development economics during the 1970s has been that of unemployment and underemployment. Although open unemployment has generally been quite low in agriculture, considerable rural underemployment (including what is sometimes called "disguised" or "hidden" unemployment) has been reported for many countries, including Bolivia. When rural underemployment data are converted to "unemployment equivalent" rates, the resulting figures are often startlingly high. 1/

This paper will critically review data on the labor force, employment, unemployment, and underemployment in rural Bolivia. In addition, it will examine the related subjects of internal and external migration, wage rates, and government employment policy. Finally, suggestions will be made for future research on these subjects. But first it is useful to consider in some detail the appropriateness of unemployment and underemployment as welfare indicators.

UNEMPLOYMENT AND UNDEREMPLOYMENT AS WELFARE INDICATORS

From the outset, this writer would like to express his reservations about the use of unemployment and underemployment rates as indicators of well-being. As is well known, employment data for less developed countries (LDCs), if available at all, are generally poor or incomplete

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1/ Rural unemployment-equivalent rates of 18-36 percent have been calculated for six Latin American countries by the International Labour Organisation (ILO) and its Programa Regional del Empleo para América Latina y el Caribe (PREALC) (Bouvier and Maturana 1973).

even at the highly-aggregated level. But the problems are not just statistical; they are also conceptual.

These statistical and conceptual problems have been ably summarized by David Turnham (1971). 2/ In reviewing the evidence on various aspects of the employment problem (labor force growth, employment prospects, income distribution, unemployment, and urbanization), Turnham concludes that "very much empirical work remains to be done before anything like settled conclusions or even systematic appraisal can be hoped for" (p. 7). He takes pains to emphasize the poor quality of the data and uses specific cases to demonstrate how different conceptual and methodological bases make it difficult to carry out cross-sectional comparisons among countries. Even time series data for a single country or cross-section data for different economic sectors within a country can lead to unwarranted conclusions if taken only at face value.

Turnham also warns against uncritical use of statistics like the underemployment rate; statements such as "30 percent of the labor force is underemployed," for example, are "very misleading without reference to the amount of extra work which is wanted and to the circumstances in which it is wanted" (p. 59). Where attempts have been made to express this "visible underemployment" as a percentage equivalent of full-time employment, the result has often been an increase in unemployment

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2/ Some of the following paragraphs are taken, with some adaptations, from the present writer's review of Turnham's study in the Journal of Developing Areas 6 (July 1972): 603-605.

rates of only 2-3 percentage points. Even here methodological problems abound: What is a "normal" work week? How does one account for the apparent lack of correlation between average hours worked and desire for additional work? Attempts to measure other types of underemployment--"disguised unemployment" in agriculture, street vending and shoe shining, M.A.'s selling apples, etc.--are fraught with even more difficulties. Turnham does not directly discuss this last type of "invisible underemployment"--people working full-time but at less productive tasks than they are capable of performing--suggesting that no attempts had yet been made to measure it.

Open unemployment is likewise difficult to quantify. Problems arise, for example, in defining such basic concepts as "labor force" and "participation rates." Technical and financial resource limitations make accurate data collection difficult, especially on a regular basis. Turnham believes that published unemployment rates understate the true extent of the problem; but he found no good evidence to support the view that unemployment rates in urban areas rose during the 1960s, though it was clear that the numbers of unemployed persons had increased. Data on open unemployment in rural areas were scarce (especially on a time-series basis), but generally and not surprisingly they indicated lower rates than in urban areas. This means that national unemployment rates may have been rising, since population grew faster in urban than in rural areas.

Measures of rural underemployment are particularly troublesome, especially if it is implied that vast numbers of people could leave

the countryside without affecting agricultural production. If technology is held constant, the physical removal of people might indeed cause production to decline, since all available hands may be needed for planting, harvesting, and certain other activities. True, these hands may appear to be idle much of the year, or the available work may be divided among all those present (leaving each one underemployed in a very real sense). 3/ But it is not at all clear just how much underemployment exists under these circumstances. Many estimates of rural underemployment fail to take fully into account such activities as time spent on general farm management, small livestock operations, garden plots, marketing, 4/ acquisition of credit, community public works projects, food processing (both for market and for home consumption), maintenance and repairs, and production of clothing and other items which cannot be bought in the marketplace for lack of cash.

3/ I.e., in the sense that slack-time tasks could be performed by fewer people.

4/ A study by a Michigan State University team (Slater et al. 1971) found that more than half of Altiplano farmers and more than 90 percent of those in the Cochabamba Valley spent at least one day a week at local markets. In commenting on these findings, the recent ILO-PREALC employment and manpower survey (1975: III-11) notes: "To the extent that reasonably productive alternative employment opportunities do not exist --and taking into account social incentives--the sale of small quantities of (agricultural) products, and a relatively low remuneration for a great expenditure of time, would be justified" (translation). Preston (1970) found that the new towns established in the highlands after 1952 gave farmers part-time employment opportunities in marketing and municipal administration.

Another issue concerns the definition of a "normal" work year (in terms of days), particularly when only single cropping is possible--either for climatic reasons (as on the Bolivian Altiplano) or for technological reasons (e.g., the absence of irrigation water)--and no alternative employment opportunities are available. In the United States, we do not consider as "unemployed" a Minnesota farmer who spends 3 months of the year in Florida because there is little he can do on his farm during the winter. Instead, we say in effect that his normal vacation time is long. A comparable view might be taken in research on LDC employment, though this should not be siezed upon as an excuse to brush rural unemployment problems under the carpet.

Available labor time in LDCs may also be overestimated by failing to take into account the fact that some rural residents considered as potential workers may not want to work on a full-time basis or may not even be in the labor force. In addition, malnutrition and illness probably limit significantly the ability of workers to do sustained work for long periods (Turnham 1971: Ch. 4; Yudelman, Butler, and Banerji 1971: 19-21). On the basis of survey evidence in Bolivia, it seems likely that 5-10% of potential labor time might be lost because of health problems.

Emphasis on unemployment and underemployment indicators fails to take into account the fact that many people counted as fully employed are working at such low-productivity tasks that they are no better off (in terms of nutrition, health, housing, etc.) than the openly unemployed or visibly underemployed. Indeed, they may be worse off.

Bolivia before 1952 provides an excellent illustration of this point: under the colonato, there was not only no visible unemployment or underemployment, but one could even speak of "over-employment"! 5/

Because of productivity considerations, as well as measurement problems relating to unemployment and underemployment, Turnham advocates an "income" or "poverty" approach to the employment problem. "Sample inquiries could, for example, focus on the economic circumstances of potential or actual full-time workers with earnings below some reference level" (p. 19). "A practical yardstick of employment situation [sic.] is then the percentage of the low paid workers in the total and a worsening [or] improvement in the situation would be judged by reference to increases or falls in the proportion over time" (p. 69). Turnham argues that the technical difficulties of such surveys are no greater than those of endeavors to measure unemployment and underemployment. What convinces him that such an approach is needed is his belief that a continuation of present trends will result in an even more skewed distribution of income, thus increasing social and political tensions. Such tensions, of course, could have adverse effects on economic growth and development. At the same time, recent research (summarized in Zuvekas 1975) has discredited the "old conventional wisdom" that a more equal distribution of income would have negative effects on rates of productive investment or income growth.

5/ On the other hand, it can be argued that "invisible underemployment" exists under such circumstances because of the "abnormally low" productivity and/or income received; the same could be said for smallholders owning their own land or for agricultural laborers receiving similarly low incomes (Bouvier and Maturana 1973). But this begs the question of what constitutes an "adequate" level of income, and in effect shifts the focus of the problem from employment to productivity and income.

Hollis Chenery and his collaborators at the World Bank and the University of Sussex share Turnham's view that the employment problem in LDCs is more appropriately viewed as an income problem: "The recognition that 80 percent or more of the low-end poverty group are employed in some fashion has shifted the focus of policy from increasing the quantity to improving the quality of employment" (Chenery et al. 1974: xvii). L.S. Jarvis, in a Ford Foundation symposium on employment problems in LDCs (1974: 166) argues that

> employment, although an important subsidiary issue, is not the proper focus of policy concern in the less developed countries. . . . If . . . the primary issue is one of income distribution or, more broadly stated, equality of opportunity, it seems better to focus attention explicitly on this objective rather than on an issue which is only indirectly related, such as employment and which may not result in the desired solution.

The importance of the income aspect of the employment problem is also amphasized by Yudelman, Butler, and Banerji (1971), who question the fruitfulness of research for better measures of agricultural unemployment:

> Our consideration of employment has been of the factors limiting agricultural incomes and the provision of more opportunities for productive, remunerative employment in the agricultural sectors of developing countries. The question of how much involuntary unemployment there may be in traditional agriculture has been set aside, largely because when involuntary agricultural unemployment is properly defined (and defined in such a way as to be comparable with involuntary industrial unemployment) it becomes almost impossible to measure.

A number of other economists have recommended that employment, per-capita GNP, and income inequality coefficients be de-emphasized if we want to obtain a better idea of changes in living standards among

the poorest elements of society in LDCs. John Adler (1972: 366), for example, suggests that international agencies

> collect, analyze and publish data which measure and compare for a number of countries the rate of growth of income of the lower half (or the lowest third, or 40%) of the population. Information of this sort would constitute a salutary beginning in the move away from the preoccupation with aggregate growth--the international pastime of growthmanship--and substitute for it the more meaningful idea of growth with social justice.

Montek Ahluwalia (1974: 5) has calculated, for 44 countries, the percentage of the population with incomes below a "poverty line," which is defined rather crudely in terms of a per capita dollar income figure ($50, or alternately $75) applied to all 44 countries. Another proposal, by Ahluwalia and Chenery, is that

> the income growth of different groups in society be given weights either in proportion to their numbers ("one man, one vote") or inversely proportional to their initial income levels ("poverty weights"). The equal weights imply that an increase of $10 in a family having an income of $1000 would be valued equally with an increase of $1 to a family with an income of $100, since each produces a one-percent advance. The methodology is politically neutral, since the weights can be chosen to fit the preferences of a given society (Chenery et al. 1974: xvi; see also pp. 38-42).

Our own proposal for the development of poverty indicators in Bolivia (Zuvekas 1977) calls for an abandonment of the income measure in favor of a multi-dimentional level-of-living indicator. In spirit, this approach follows a suggestion made by Rainer Schickele (1972), who reminds us that "the Lorenz method reveals nothing about income levels, and hence cannot measure the extent of poverty" (emphasis added). Schickele proposes a "necessities of life" concept, with quantity and quality dimensions that would vary from country to country.

The precise nature of a level-of-living indicator for Bolivia need not concern us here. What is important is that such an indicator can be more useful than employment indicators--however improved--in measuring changes in welfare.

At the same time, employment data cannot be ignored. From the standpoint of the individual, as we are frequently reminded now in the United States, open unemployment can be a very demeaning experience. In addition, it probably causes more social and political unrest than an equivalent amount of disguised unemployment. Furthermore, employment data can provide valuable information on macroeconomic behavior and on resource allocation between and within sectors (or geographic regions). There is still a case, then, for improving the employment data base.

LABOR FORCE, EMPLOYMENT, UNEMPLOYMENT, AND UNDEREMPLOYMENT: ESTIMATES AT THE NATIONAL LEVEL

Table 1 shows various estimates of the Bolivian labor force made in recent years by the Ministry of Planning and the Ministry of Labor. Although the 4 sets of data presented do not agree with each other, they all show labor force participation rates significantly higher than the Latin American average. The main reason for this is that up to 60 percent of women in the relevant age groups are counted (realistically) in the labor force, compared with some 20-25 percent for Latin America generally (ILO-PREALC: I-8). The discrepancy in the estimates of the two Ministries is due mainly to the fact that the Ministry of Planning includes in the labor force those capable of working but not actually seeking work; the Ministry of Labor considers these people to be in the "economically active population" (ages 15-64) but not in the labor force.

TABLE 1

LABOR FORCE PARTICIPATION RATES, VARIOUS ESTIMATES, 1965-1975

	(1)	MINPLAN-1		MINPLAN-2		MINTRAB-1		MINTRAB-2	
		(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Estimated Population[a]	Labor Force	Participation Rate	Labor Force	Participation Rate	Labor Force	Participation Rate	Labor Force	Participation Rate
1965	4,334.0					1,816.0	41.9		
1966	4,446.0	2,107.3[b]	46.8[b]			1,863.2	41.9		
1967	4,561.0					1,911.6	41.9		
1968	4,680.7			2,345.1	50.1	1,961.2	41.9		
1969	4,803.9			2,406.6	50.1	2,012.8	41.9		
1970	4,931.2			2,479.4	50.3	2,066.2	41.9	2,071.1	42.0
1971	5,062.5	2,403.4[b]	46.9[b]	2,545.4	50.3	2,121.2	41.9	2,126.3	42.0
1972	5,194.9			2,612.0	50.3	2,176.7	41.9	2,181.9	42.0
1973	5,330.7			2,680.2	50.3	2,233.6	41.9	2,238.9	42.0
1974	5,470.1			2,750.2	50.3	2,292.0	41.9	2,297.4	42.0
1975	5,633.8			2,829.1	50.2	2,360.3	41.9	2,366.2	42.0

Sources: (1) Bolivia, Ministerio de Planeamiento y Coordinación (MINPLAN); (2)-(3) Bolivia, CONEPLAN (1973), and Bolivia, MINPLAN, unpublished data, as reported in USAID/Bolivia (1974): 30; (4)-(5) Bolivia, MINPLAN, Plan Operativo 1975, as reported in ILO-PREALC (1975): Table I-4; (6)-(7) Bolivia, Ministerio de Trabajo y Desarrollo Laboral (MINTRAB), unpublished data; (8)-(9) Bolivia, MINTRAB (1976).

[a] Pre-1976 census.

[b] Average for 1966-67 or 1971-72.

Data from the Ministry of Labor show that 62 percent of the employed labor force in 1975 was in the agricultural sector, down from 66 percent in 1965. 6/ The Ministry of Planning's estimate for 1975 is 60 percent. The September 1976 population census, however, calls these figures into question. Only 4,644,228 inhabitants were counted, 1,145,000 fewer than had been projected, and preliminary data suggest that virtually the entire discrepancy results from previous overestimates of the rural population. 7/ On the basis of the new census data, it would appear that agriculture's share of the employed labor force in 1975 was actually about 51 percent.

Estimates of open unemployment in Bolivia vary considerably. According to a survey conducted by the Dirección General de Estadística y Censos in 1963, the national open unemployment rate was a modest 5 percent. A Ministry of Labor survey in 1966 showed the open unemployment rate in urban areas to be 13.2 percent, a figure not incompatible with the national estimate for 1963, given that open unemployment rates in rural areas were probably well under 5 percent (ILO-PREALC 1975: I-7, fn. 1). A manpower study conducted by Ohio State University estimated on the basis of field surveys and secondary data that open unemployment in 1967 was about 100,000, or less than 5 percent of the labor force (Chirikos et al. 1971, as reported in Wennergren and Whitaker 1975: 176).

6/ The percentage of the total labor force in agriculture would be slightly lower, since open unemployment rates are higher in urban than in rural areas.

7/ For a more detailed discussion of the implications of the 1976 census results, see Zuvekas (1977).

Additional estimates of open unemployment are presented in Table 2, which shows the Ministry of Planning's estimates to be roughly three times higher than those of the Ministry of Labor. The figures for 1975 are 10.1 percent and 3.5-3.7 percent, respectively. Both Ministries show a significant decline in unemployment rates since the early 1970s, though according to the Ministry of Planning the decline began as early as 1968. One major reason for the large discrepancy in the estimates of the two organizations is that the Ministry of Planning's figures include estimates of rural underemployment (ILO-PREALC 1975: I-7, fn. 2). In addition, the Ministry of Planning's unemployment figures include members of the economically active population who are capable of working but not actually seeking work.

Finally, we may consider several estimates of underemployment and of the unemployment-equivalent of unutilized labor time. For the early 1960s, FAO advisor Casto Ferragut (1963: 124-125) estimated the unemployment-equivalent rate in rural Bolivia to be an extremely high 58 percent. To obtain this figure, Ferragut calculated the total number of work-days 8/ available by assuming that all men and women between the ages of 15 and 60 living in rural areas were available for 300 work-days annually; this resulted in a figure of more than 360 million available work-days. Next, work-days per hectare for individual crops were estimated and applied to land under cultivation, yielding a labor requirement of about 42 million work-days, or just 12 percent of the estimated labor time available. To this were added estimated labor time required for livestock operations, other farm activities, and household work.

8/ This term will be used in place of what in the old days was called "man-days".

TABLE 2

OPEN UNEMPLOYMENT RATES, VARIOUS ESTIMATES, 1965-70
(percent)

	MINPLAN-1[a]	MINPLAN-2[a]	MINTRAB-1	MINTRAB-2
1965			3.4	
1966	15.0[b]		3.6	
1967			3.9	
1968		20.9	4.0	
1969		19.4	4.2	
1970		18.2	5.6	5.9
1971	16.3[b]	16.6	5.8	6.0
1972		14.9	5.4	5.6
1973		13.3	4.1	4.3
1974		11.6	3.5	3.7
1975		10.1	3.5	3.7

Sources: Same as for Table 1.

a These figures actually include estimates of rural underemployment.

b Average for 1966-67 or 1971-72.

There are a number of problems with this method of calculating underemployment equivalents: (1) no account is taken of the seasonality of labor requirements, and it is thus not possible to determine how many individuals could be considered surplus laborers in the sense that they could be transferred to other economic activities without affecting agricultural production under prevailing levels of technology; (2) all workers in the 15-60 age groups are assumed to have the same capacity for work; (3) part of the economically active population in rural areas is not in the labor force--i.e., not actively seeking work; (4) about 10 percent of the rural labor force in Bolivia works in non-agricultural activities; (5) no allowance is made for potential labor time not available because of poor health; (6) even if the economically active population were in perfect health, a "normal" work year of 300 days would be too high; (7) there seems to be no allowance for time spent in off-farm employment (and perhaps in farm-related activities such as marketing); (8) the estimated labor requirements for some major crops are low in comparison with other available data; (9) the estimated number of hectares under cultivation (727,200) may be too low; and (10) the 1976 census suggests that the economically active population in the early 1960s was lower than the figure Ferragut used. In summary, it is clear that Ferragut's rough estimate of rural underemployment is much too high.

Also too high are preliminary and tentative estimates made by an FAO-IDB survey team for 1971 (IDB 1973: 7-8, 228). The unemployment equivalent was calculated to be 57 percent on the basis of available labor time unutilized and 49 percent on the basis of potential national income not received under the assumption that labor in each of 10 geographic regions was paid the average regional daily wage for 275

days 9/ (see Table 3). The study itself warns that "this does not indicate that 57 percent of the available labor supply could be permanently removed from the agricultural sector; given the existing organization of production, this would cause a decline in yields" (IDB 1973: 7, translation).

For purposes of calculating labor time available, it was assumed that 2.5 work-years of labor could be supplied by each family in all regions but the tropical and subtropical regions, where the figure used was 1.8 work-years. Although specific account is taken of seasonal non-agricultural employment and marketing, the estimated labor time unutilized is still high because (1) no allowance seems to be made for those in the economically active population not seeking work; (2) all workers are assumed to have the same capacity for work;, (3) permanent employment in non-agricultural activities does not seem to be considered; (4) time lost because of health problems is not taken into account; (5) a "normal" work year of 275 days is too high; and (6) the rural population was lower than the figure used.

Another high estimate of the unemployment equivalent in rural areas is the 49 percent figure reported by the Ministry of Agriculture for 1970 (see Table 4). Available labor time was determined by assuming that the labor supply per family averaged from 1.8 to 2.6 workers, depending on the Department. It is not clear, though, how the unemployment equivalent was determined. It is said simply that there is

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9/ More specifically, potential incomes were calculated for each of the 10 regions assuming that all potential workers were fully employed (for 275 days) at prevailing wage rates; subtracted from these figures were the incomes that would have been received in each region if all labor actually employed had been paid at the regional daily wage rates.

TABLE 3

LABOR SUPPLY, WAGES, AND RURAL INCOMES, BY GEOGRAPHIC REGION, 1971

Region	Labor Supply (Work Years) Available	Employed (%)	Unemployed (%)	Wages (Sb.) Daily	Annual	Rural Income (millions of $b.) Full Utilization of Labor Supply[c]	Actual Utilization[d]
Tropical South	68,800	79.9	20.1	10	2,750	189.2	151.2
Central Valleys	196,000	15.0	85.0	5	1,350	534.6	80.2
Southern Altiplano	50,500	30.0	70.0	4	1,100	55.5	16.7
Southern Valleys	311,000	63.0	37.0	7	1,925	606.2	255.9
Northern Altiplano	276,000	35.0	65.0	5	1,350	372.6	130.4
Central Altiplano	203,500	25.0	75.0	4	1,100	223.8	55.9
Tropical North	85,320	80.0	20.0	12	3,300	281.6	225.4
Northern Valleys	319,960	53.0	47.0	10	2,750	604.8	320.8
Sub-Tropical South	101,160	80.0	20.0	10	2,750	278.2	222.2
Sub-Tropical North	49,920	80.0	20.0	12	3,300	162.7	130.2
TOTAL	1,661,560	43.0	57.0			3,109.3	1,538.7[e]

Source: IDB 1973, 228.

a Assumes that 2.5 work-years are available in each family in all regions but the tropics and sub-tropics, where the assumed supply is 1.8 work-years.

b Based on 275 days of work per year.

c Assumes that all available labor is paid at the average prevailing wage.

d Actual work-years times the annual wage figure.

e Should be 1,375.

BEST AVAILABLE DOCUMENT

TABLE 4

LABOR SUPPLY AND EMPLOYMENT AND UNEMPLOYMENT EQUIVALENTS IN AGRICULTURE, BY DEPARTMENT, 1970

Department	Population	Workers per Family	Agricultural Labor			Unemployment Equivalent (%)
			Available	Employed	Unemployed	
Chuquisaca	359,667	2.6	155,000	62,000	93,000	60.0
La Paz	865,481	2.5	433,000	240,000	193,000	44.6
Cochabamba	547,810	2.5	228,000	125,000	103,000	45.2
Oruro	196,156	2.5	98,000	30,000	68,000	69.4
Potosí	681,561	2.2	250,000	100,000	150,000	60.0
Tarija	146,725	2.0	49,000	30,000	19,000	38.8
Santa Cruz	283,115	2.0	94,000	75,000	19,000	20.2
Beni	135,056	1.8	40,200	24,000	16,200	40.3
Pando	29,440	1.8	8,800	5,000	3,800	43.2
TOTAL	3,245,011		1,356,000	691,000	665,000	49.0

Source: Bolivia, MACA, 1974: 185.

"an equivalent theoretical manpower surplus of 665,000 persons because of more or less long periods without actual employment" (Bolivia, MACA, 1974: 185). 10/

The Ministry of Labor estimates that the underemployment rate for all sectors of the economy was 30.0 [sic.] percent for each of the years 1970 through 1975. Presumably this figure is an unemployment-equivalent, though this is not made clear. If most of the underemployment were presumed to be in agriculture, the implied unemployment-equivalent rate for the agricultural sector would be nearly as high as the other estimates reported above.

The highest implied agricultural underemployment estimate for Bolivia is found in a brief statement by Caton, Nelson, and Sleeper (1970: 1), who report: "It has been estimated that without change of technology the same [gross agricultural] output [for 1968/69] could have been achieved by 20-30 percent of the labor force." It is possible that this statement refers to the value of output, not to its actual physical composition in 1968/69; but no explanation is provided. In any event, the implied underemployment seems much too high.

The most realistic estimate of rural underemployment, in this writer's judgment, is that made by the Programa Regional del Empleo para América Latina y el Caribe (PREALC), a unit of the International Labour Organization (ILO). To determine labor requirements, hectares devoted to specific crops were multiplied by the number of work-days required

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10/ In a subsequent table showing "surplus labor" percentages by geographic region (MACA 1974: 191), surplus labor is defined as that percentage of the population without employment or employed for less than 180 days. But this does not seem to be the definition used in Table 4.

per hectare, and similar procedures were used for annual and permanent pastures and for various types of livestock. For crops, two figures were used, one based on the average number of work-days per month, and one based on the maximum number. 11/ Estimates were then made for labor time devoted to general administration and other farm activities. The required number of full-time workers was calculated by assuming a normal work-year of 250 days, a figure this writer regards as reasonable. This procedure yielded a labor requirement of 832,000 work-years for 1972; with an estimated 1,305,000 persons actually working (full- or part-time), the unemployment-equivalent rate was 36 percent (see Table 5). If the labor requirement for crops is based on the maximum figure, rather than the average, total labor requirements increase to 1,017,000 work-years and the unemployment-equivalent rate falls to 22 percent. The narrative discussion of these data suggests that only about 10 percent of the rural labor force should be considered "surplus" since a reduction of more than 10 percent at harvest time would cause production to fall unless there were a change in technology.

If the results of the 1976 population survey are accepted, the 10 percent figure could actually be converted into a negative figure--i.e., a labor shortage (!) It is doubtful, however, that a national labor shortage could be said to exist, and reports of regional shortages--especially in Santa Cruz--can be explained adequately by labor-market imperfections (see below).

11/ The maximum was 1.53 times the average, a figure based on a PREALC survey in Paraguay.

TABLE 5

LABOR REQUIREMENTS, LABOR AVAILABILITY, AND AGRICULTURAL UNEMPLOYMENT, BY GEOGRAPHIC REGION, 1975

(thousands of persons)[a]

	National	Altiplano	Valles	Oriente
Average Requirements	832	355	282	195
Crops	349	116	146	87
Pastures	25	8	5	12
Livestock	292	160	75	57
Other	33	14	11	8
General and administrative activities	133	57	45	31
Maximum Requirements	1,017	417	359	241
Crops (average x 1.53)[b]	534	178	223	133
Other	483	239	136	108
Employed Economically Active Population	1,305	722	408	175
Surplus or Deficit (-)				
Average Requirements	473	367	126	-20
Maximum Requirements	288	305	49	-66
Unemployment Equivalents (%)				
Average Requirements	36	51	31	-11
Maximum Requirements	22	42	18	-38

Source: ILO-PREALC 1975: Table III-2.

a The normal work-year is assumed to be 250 days.

b The 1.53 coefficient was obtained in a survey of Paraguay by the same organization.

The above paragraph points to perhaps the greatest problem in computing rural unemployment equivalents in Bolivia, namely, the lack of accurate population and labor force data. Rural unemployment estimates have not been based on periodic sample surveys, but rather on the basis of population projections the accuracy of which has been cast in doubt by the 1976 population census. This census itself, however, contains errors of an unknown but possibly significant magnitude. In the absence of separate labor-market surveys, estimates of rural unemployment and underemployment will continue to be subject to wide margins of error; and these errors will continue to be compounded unless more refined measures of underemployment are used.

UNEMPLOYMENT AND UNDEREMPLOYMENT IN SPECIFIC REGIONS

The data in Tables 3-5 show underemployment in Bolivia to be greatest in the Altiplano, lower but still substantial in the Valles, and lowest in the Oriente and the sub-tropical Yungas. Table 5 actually shows that the Oriente has a labor shortage, and much of the surplus labor for that region reported in Tables 3 and 4 would disappear with more realistic definitions of underemployment.

The 1976 population census, however, tells us that the labor-market differences among the 3 regions are considerably less than Tables 3-5 suggest. Labor availability in the Altiplano and Valles is less than indicated by pre-census estimates, while in the Oriente it is greater. To provide a rough indication of the adjustments required, we may obtain

Departmental population figures for 1970 by extrapolation 12/ and calculate revised labor supply data on the assumption that labor force participation rates are unchanged. If we use the same labor demand figures found in Table 4, the overall unemployment-equivalent rate falls from 49.0 percent to 36.3 percent (see Table 6).

The above exercise reduces considerably the unemployment-equivalent estimates for the Altiplano and Valleys, while raising the estimate for Santa Cruz. The figures are suggestive only, and in this writer's view they are still generally too high. But it would be useful to see if, in relative terms, they can be corroborated by qualitative information for the major geographic regions.

On the Altiplano, the degree of labor utilization is shown to be greater in the northern region (La Paz Department) than in the central and southern regions (Oruro and Potosí). 13/ This is plausible given the northern region's better access to the country's major urban market (La Paz), better soil and climatic conditions, greater opportunities for off-farm employment, and higher income levels in comparison with the rest of the Altiplano. The evidence on income levels and off-farm employment opportunities has been reviewed elsewhere (Zuvekas 1977) and will not be repeated here.

12/ On the basis of preliminary census results for 1976 showing rural and urban population by Department.

13/ This is also the case in Table 3, though the reported degree of underemployment in that table is very high in all 3 Altiplano zones. The central Altiplano includes the southern part of the Department of La Paz.

TABLE 6

UNEMPLOYMENT-EQUIVALENT RATES UNDER ALTERNATIVE LABOR SUPPLY ASUUMPTIONS, BY DEPARTMENT, 1970

(percent)

Department	Unemployment-Equivalent Rates	
	Pre-Census Rural Labor Supply Estimate	Post-Census Rural Labor Supply Estimate
Chuquisaca	60.0	45.6
La Paz	44.6	31.7
Cochabamba	45.2	29.5
Oruro	69.4	57.6
Potosí	60.0	39.7
Tarija	38.8	17.8
Santa Cruz	20.2	22.2
Beni	40.3	0.8
Pando	43.2	38.3
TOTAL	49.0	36.3

Source: Table 4 and author's adjustments to the labor supply data on the basis of preliminary 1976 census results. Labor demand estimates in Table 4 were unchanged.

Support for the view that the Altiplano is a labor-surplus region is provided by evidence on seasonal migration to the nearby Yungas (Buechler 1966; Burke 1971: 320; Heyduk 1974: 4; and Léons 1967: 39-43) 14/ and on the lack of use of hired labor by Altiplano campesinos (USAID/Bolivia 1974: 113). Although most respondents in one study of 4 Altiplano communities (2 in the northern Altiplano and 2 in Potosí) reported that their family members were fully employed, it was suspected that the work being done could have been performed in less time (Leonard 1966: 30-31).

Tables 3 and 5 show that rural underemployment is generally lower in the Valles than in the Altiplano, though there appear to be significant differences among the 3 major valley areas. Underemployment in the central valleys (Chuquisaca and Potosí) seems to be as great as in the central and southern Altiplano, while in the southern valleys (most of Tarija and parts of Chuquisaca and Potosí) the underemployment rate is fairly low. The northern valley (Cochabamba) occupies an intermediate position. The same pattern is evident in Tables 4 and 6, where the data are presented by Department.

14/ The Yungas are the steeply-sloped, mainly sub-tropical regions on the eastern slopes of the Cordillera Real in La Paz and Cochabamba Departments. Underemployment there does not seem to be a problem:

> The year-round nature of Yungas agriculture demands constant work in weeding, clearing jungle, planting and harvesting--activities so time consuming that the Yungas peasant is left with virtually no free time. To meet these demands all participate in reciprocal work arrangements such as ayne and mink'a where they help harvest another's coca and in turn are assisted when their own harvest comes in (Barnes de Marschall 1970: 75).

Table 3, as noted above, shows these sub-tropical areas to have underemployment-equivalent rates as low as those in the Tropical Oriente.

Unfortunately, few studies have been made of the central and southern valleys, so it is difficult to compare quantitative estimates of underemployment with qualitative impressions of the local labor markets. The below-average population growth rates for Chuquisaca and Potosí, though, suggest a labor surplus environment. 15/ Tarija's population growth rate is also below average, but less so; and the relatively low underemployment rate there may be due in large part to seasonal employment opportunities close at hand in northwest Argentina. Migration from the central and southern valleys will be discussed in a separate section below.

Cochabamba's underemployment figures are lower than might be expected given its below average population growth rate (1.5 percent). Other evidence on underemployment in that Department is mixed. The Regional Director of the Center for Forestry Development in Cochabamba recently stated that farmers in that Department spend less than half their time in agricultural pursuits (CODEX 1976: 365-366); and the Corporación de Desarrollo de Cochabamba has argued that "appreciable disguised unemployment" exists in local agriculture (CORDECO 1975: 166-167). These unsupported statements should be viewed with caution, since the documents in which they appear seem to have been designed as bargaining chips for use in dealings with the national government.

A different type of support for the existence of considerable rural underemployment in Cochabamba comes from a study by Camacho Saa (1967: 53) whose linear programming model for the community of Ucureña in the Upper Cochabamba Valley upheld the hypothesis that the marginal productivity

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15/ Population grew by 0.9 percent and 0.8 percent annually in Chuquisaca and Potosí, respectively, between 1950 and 1976; the national average was 1.7 percent. (These growth rates are based on the preliminary 1976 census results.)

of labor was approximately zero. 16/ It was also reported in this study that migration to Santa Cruz and to Argentina was increasing (p. 30). On the other hand, Dorsey's (1975a: 41, 54-63) production function for Toralapa, another community in the Upper Valley, showed that labor was the major constraint to increased production, and relatively little migration from the area was reported. Simmons (1974: 78) also reports that labor "appears as the most immediate short-run factor limiting production."

In the Lower Cochabamba Valley, a study of three communities by Camacho Saa (1970: 189, 194-197) found that many individual farm families faced seasonal labor shortages. The labor market was active 17/ and wages were relatively high (see the section below on wage rates). Although a subsequent study by Dorsey (1975b) in two of the same communities concluded (as did Camacho Saa) that land was more of a constraint to increased production than labor, there were a number of indications that the available supply of labor was more fully utilized than on the Altiplano. Even before the 1952 revolution, the colonato was less onerous in the Lower Valley than elsewhere: required labor for the hacendado was generally 4 days a week, compared with up to 6 elsewhere. On one ex-hacienda a small daily wage was even paid to the

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16/ Marginal productivity calculations of this type can be misleading if the implication is made that the number of workers could be reduced without affecting production. Yudelman, Butler, and Banerji (1971: 22) argue that "[the] criterion of zero marginal productivity of labour should apply to labour effort during the most critical operations."

17/ An agricultural sector assessment by USAID/Bolivia (1974: 113) states that campesinos in the Valles use little hired labor; but the Lower Cochabamba Valley, at least, seems to be an exception. Erasmus (in Heath, Erasmus, and Buechler 1969: 122-125) reports that use of wage labor is also widespread in the Chuquisaca and Tarija valleys, but this may well be confined to medium- and large-scale farm operations.

colonos. Day laborers were hired by the hacendados from independent communities (piquerías) or from among the unmarried sons of the colonos; there were virtually no landless laborers (Dorsey 1975b: 11-13).

Dorsey confirmed Camacho Saa's findings of an active labor market and relatively high wages after 1952. He also reports (pp. 31, 41) that hacendados remaining in the area often found it difficult to hire labor, as campesinos were devoting more time to their own landholdings, which many had managed to increase. This induced large landholders to shift to less labor-intensive activities such as orchards, dairy farming, and dry corn production. Finally, Dorsey notes (pp. 42-45) that there had been little recent migration from the Lower Valley, though he expected migration to increase unless campesinos were given more access to land, credit, and extension services and were confronted with more favorable prices for their products. 18/

There is general agreement that no serious problems of unemployment or underemployment exist in the Oriente, notwithstanding some of the figures that appear in Tables 3, 4, and 6. Table 5, which in this writer's opinion has the most realistic figures, shows a labor deficit, particularly during the peak agricultural months. 19/ Hired labor is

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18/ Given the shortage of available agricultural land, Camacho Saa (1970: 197) also expected increased migration, or, in the absence of employment opportunities elsewhere, the creation of more minifundios (and, by implication, increased underemployment).

19/ Even if labor-supply figures were adjusted upwards to reflect the 1976 census results, there would still be a shortage in the peak months.

widely used, even by small farmers. 20/ Seasonal migration to the Oriente from elsewhere in Bolivia (discussed in the following section) supports the view that it is a labor shortage region.

Labor supply problems are most serious in cotton farming. Although wages in cotton production are high by national standards, they are low by regional standards because of a labor market imperfection, 21/ and 6,000 army conscripts had to be imported for the 1972 crop (IDB 1973: 7-8). Even so, approximately 28 percent of that year's cotton crop was lost (USAID/Bolivia 1974: 115). In 1973 the problem was similar:

> Of the estimated 40,000 workers needed for the harvest, only about one-half this number could be assembled. Subsequently, a large share of these workers, especially those from the Altiplano, returned home after only a few weeks, disillusioned by poor working conditions, low earnings, and health problems. This labor difficulty was further compounded by competition from cane producers who began harvesting in late April (USAID/Bolivia 1974: 115).

The army was again brought in, as were students; but serious losses--at least 20 percent of the crop--again occurred.

20/ A study of 10 agricultural colonies in Santa Cruz, consisting mainly of small farmers (by Oriente standards), found that 64 percent of the 470 farmers interviewed used hired labor. The average amount of labor hired by an individual family was 1.05 work-years (Methodist Church in Bolivia 1972: 51, 76. (See Zuvekas 1977 for additional comments on this study.)

21/ Wage rates of cotton workers in the Santa Cruz area were 33-50 percent lower than those of sugar harvesters (Wennergren and Whitaker 1975: 130).

Given these losses, it is difficult to understand why the cotton growers' association fixes wage rates at a level well below the market-determined wages in the cane harvest, which overlaps the cotton harvest from mid-April to mid-June. Some cotton producers have turned to mechanized harvesting, but this lowers quality and risks loss of markets (USAID/Bolivia 1974: 115-117). Others have simply shifted to other activities. 22/

Mechanization is likely to be significant not just for cotton but also for other major crops in Santa Cruz. Mechanized farming of soybeans and corn has been recommended on cost-reduction/economies-of-scale grounds (Bolivia, MACA, 1976c). Two other major crops, rice and sugarcane, are now widely grown by small farmers but lend themselves to mechanization, which would threaten small farmers' status as landholders. It has been estimated that mechanized rice cultivation would lower labor requirements from 105 work-days per hectare to 5 (Cordero V. 1963), and mechanized sugarcane operations would also reduce labor requirements (Díez de Medina 1975). While widespread mechanization of farm operations may seem appropriate given present factor proportions in Santa Cruz, heavy labor migration into the region suggests that the employment implications of increased mechanization--and greater emphasis on livestock production--should be a major concern of public policy. We shall return to this subject below.

22/ Land devoted to cotton in Santa Cruz fell from 60,000 hectares in 1974/75 to only 28,000 in 1975/76. Though lower prices and accumulated debts were largely responsible, continued labor shortages were also a factor (Bolivia, MACA, 1976b: 1).

INTERNAL MIGRATION

Internal migration data from the 1976 census are not yet available, but some indication of migration trends can be obtained from Table 7, which shows Departmental population growth rates from 1950 to 1976 on the basis of preliminary census results. 23/ Below-average growth was registered in the central and southern Altiplano and Valles (Chuquisaca, Oruro, Potosí, and Tarija), in Cochabamba, and in the Beni, a Department dominated by a cattle ranching sector in which little technological change has occurred (R. Clark 1974). Population growth in La Paz was right at the national average, while Santa Cruz and sparsely-populated Pando experienced greater-than-average growth.

The pattern clearly indicated by these data is that of a shift in population from the southern and central Altiplano and Valles regions to the lowlands in the Department of Santa Cruz. There is also considerable migration from the northern Altiplano and Valles, but La Paz has been able to maintain its share of the national population and the decline in Cochabamba's share has been modest because land has been available in the Yungas and lowland regions within their borders. 24/ Table 8 shows that 35 percent of the estimated 188,032 settlers in identifiable colonization zones are in La Paz, and an additional 17 percent are in Cochabamba.

23/ External migration probably is also an important phenomenon and will be discussed in a separate section below.

24/ Northern Altiplano residents have also had employment opportunities in the capital city of La Paz (Leonard 1966).

TABLE 7

POPULATION AND POPULATION GROWTH RATES, BY DEPARTMENT, 1950-1976

(thousands of inhabitants; percent)

	1950 Population (Adjusted)	1976 Population (Preliminary)	Compounded Annual Rate of Growth
Chuquisaca	283.0	357.0	0.9
La Paz	948.4	1,484.2	1.7
Cochabamba	490.5	730.1	1.5
Oruro	210.3	311.2	1.5
Potosí	534.4	660.1	0.8
Tarija	126.7	188.6	1.5
Santa Cruz	286.1	715.1	3.6
Beni	119.8	163.5	1.2
Pando	19.8	34.4	2.1
TOTAL	3,019.0	4,644.2	1.7

Source: Population censuses of 1950 (adjusted) and 1976 (preliminary unpublished data).

TABLE 8

POPULATION OF COLONIZATION ZONES, TYPES OF COLONIES, AND ORIGIN OF COLONISTS, JANUARY 1975

Department	Number of Colonies	Type	Number of Families	Estimated Population	Origin of Colonists
La Paz	377		16,710	65,840	
Caranavi-Asunta Sud Yungas	298	Spontaneous	12,862	50,448	Altiplano
Alto Beni	20	Oriented	2,169	8,676	Altiplano
Alto Beni	59	Spontaneous	1,679	6,716	Altiplano
Cochabamba	82		8,163	32,652	
Chapare	78	Spontaneous	6,732	26,926	Valles
Chimoré	3	Oriented	1,344	5,376	Valles
Yungas de Vandiola	1	Spontaneous	87	348	Valles
Santa Cruz	132		20,359	36,236	
Yapacaní-Puerto Grether	16	Oriented	1,779	7,116	Altiplano-Valles
Buen Retiro	3	Oriented	733	2,932	Altiplano-Valles
Yapacaní	26	Spontaneous	2,316	9,204	Altiplano-Valles
Norte Montero-Chane-Piray	41	Spontaneous	8,783	35,132	Altiplano-Valles
Cotoca	1	Directed	53	212	Altiplano-Valles
Riboré	42	Spontaneous	2,269	10,516	Valles-Oriente
Cordillera	46	Spontaneous	2,619	10,476	Valles-Oriente
San Julián	2	Oriented	383	1,532	Valles-Oriente
Mennonitas	3	Private	339	2,951	Overseas
Okinawenses y San Juan	2	Private	1,085	6,165	Overseas
Beni	2		420	1,680	
Casarabe	2	Spontaneous	420	1,680	-
Tarija	5		406	1,624	
Bermejo-San Telmo	5	Spontaneous	406	1,624	Valles-Oriente
Uncontrolled Settlements	-	Spontaneous	11,000	44,000	All Regions
TOTAL	648		57,058	232,032	

Sources: Bolivia, INC, 1976 and Galleguillos F. 1974.

Table 9 provides more detailed information on the origin of settlers in "oriented", or semi-directed colonization areas, and intradepartmental migration is more clearly evident. The figures for Cochabamba are particularly interesting because they show significant movement both into and out of the Department. 25/ Unfortunately, the data in Table 9 cover only 5,341 families, or just 9 percent of the total listed in Table 8. Most colonization is spontaneous, and it is not clear if the migration patterns of spontaneous settlers closely parallel those of settlers in directed or semi-directed projects.

In addition to permanent migration, there is a great deal of seasonal movement of labor from one region to another. Settlers in the Yungas draw on seasonally unemployed workers in the northern Altiplano, who frequently are relatives and friends from their home communities (Buechler 1966; Heyduk 1974; Léons 1967). There is seasonal as well as permanent migration from Cochabamba to Santa Cruz, particularly for the sugar harvest. 26/ Santa Cruz also receives seasonal migrants from Chuquisaca, Potosí, and Tarija (E. Clark 1970: 33; Erasmus, Heath and Buechler 149-150, 339-340). Workers on cattle ranches in the Beni, Santa Cruz, and Tarija find seasonal work on the sugar, cotton, rubber, and brazil nut plantations elsewhere in the Oriente (R. Clark 1974: 27-31).

25/ Migration from Cochabamba in the late 1950s and 1960s is reported in Camacho Saa 1967: 30; E. Clark 1970: 33-35; and Sariola 1960. While some migrants went to Santa Cruz, others moved permanently to Argentina. Studies of several communities in the early 1970s, however, found relatively little migration from Cochabamba (Dorsey 1975; 1975b).

26/ See the references in the previous footnote.

TABLE 9

ORIGIN OF SETTLERS IN SEMI-DIRECTED COLONIZATION AREAS
(percentage distribution)

Department of Origin	Colonization Area		
	Alto Beni (La Paz)	Chimoré (Cochabamba)	Yapacaní (Santa Cruz)
Chuquisaca	0.4	2.8	13.4
La Paz	77.2	5.1	2.4
Cochabamba	1.3	47.0	39.1
Oruro	12.9	3.5	6.0
Potosí	5.7	40.3	30.4
Tarija	0.1	0.0	1.7
Santa Cruz	0.1	0.9	6.4
Beni	2.1	0.3	0.6
Pando	0.1	0.3	0.0
TOTAL	100.0	100.0	100.0
N =	1,547	1,308	2,486

Source: Galleguillos 1974.

EXTERNAL MIGRATION

The ILO-PREALC employment and manpower survey (1975: I-11-12 and Table I-8) reports that estimates of Bolivians living in neighboring countries range from 115,000 to 675,000 (see Table 10). The lower figure is based on census data in neighboring countries, and at least one long-time observer of the Bolivian scene accepts the view that emigration from Bolivia is not particularly great (Patch 1971).

The Bolivian government recorded a net outflow to Argentina of 110,743 during 1952-66 (official departures of 279,831 less returns of 169,088), suggesting that the 1970 Argentine census figure of 92,000 is too low (Weil 1973: 68). 27/ The IDB estimated that Bolivians accounted for 20 percent of the population of the Argentine provinces of Salta and Jujuy in 1967, or about 150,000 (Weil 1973: 68). An Argentine source reported 160,000 Bolivians in Argentina in 1970 (ILO-PREALC 1975: Table I-8). The authors of the ILO-PREALC study believed that the actual figure was close to the higher estimate in Table 10. More recent ILO estimates show 715,000 Bolivians residing in other Latin American countries, excluding frontier workers and family members; addition of the latter would bring the total to about 1,045,000 (Breton 1976: 341).

A high number of Bolivians residing in Argentina was reported for the mid-1960s by Fernando Antezana (1969), in a study published by the World Council of Churches. Antezana, who headed a counselling center for seasonal migrants to Argentina (braceros), maintained that 490,000 Bolivians were living in the squatter settlements surrounding Argentina's cities, while an additional 98,000 were golondrinas migrating seasonally within Argentina. The braceros, employed

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27/ Of those departing in 1965, 26.4 percent had visas for Argentina, 21.5 percent for Chile, 13.9 percent for Perú, 13.3 percent for the United States, and 11.4 percent for other countries.

TABLE 10

ESTIMATES OF EMIGRATION FROM BOLIVIA, 1970s

Country of Destination	1970 Census Estimates[a]	1974 ILO Estimates
Argentina	92,000	500,000
Brazil	10,712	45,000
Chile	7,694	70,000
Peru	4,115	60,000
TOTAL	114,521	675,000

Source: ILO-PREALC 1975: Table 1-8.

[a] Censuses of neighboring countries. The Peruvian figure is for 1972.

chiefly in the cultivation and harvesting of sugar, tobacco, and timber, were estimated to number 196,000.

Unfortunately, it is not clear how the above estimates, or the ILO's high figures, were obtained. Both temporary and permanent migration to Argentina are reported in several studies of specific regions in Bolivia (Camacho Saa 1967: 30, E. Clark 1970: 33; and Sanchez and Wessel 1966: 76-81), but no figures are provided to provide a check on the global estimates. The 1976 population census lends credence to the higher estimates, but it is simply not possible to make a definitive statement about the volume of external migration.

The percentage of professionals who emigrate seems to be quite high. The Organization of American States reported that 162 professionals left Bolivia annually during 1959-67; this was an average of 14.1 percent of the university graduates during this period, the sixth highest figure among 17 Latin American countries surveyed (Weil 1973: 69). International agency reports and informal discussions with Bolivians also point to a serious "brain drain," which seems to be due in large part to the huge gap between professional fees and salaries in Bolivia and those prevailing in other countries.

WAGE RATES

Data on wage rates provide a check on the labor-market conditions described above. Table 11 presents estimates for 1971 obtained by an FAO-IDB survey team. Unfortunately, the limited information provided makes it difficult to judge the quality of these data. As might be expected, daily wages are reported to be highest ($b.10-12, or $US 0.85-1.00 at the 1971 exchange rate) in the Oriente, the Yungas, and

TABLE 11

DAILY WAGES IN RURAL AREAS, BY GEOGRAPHIC REGION, 1971
(pesos per day)

Region	Daily wages	
	current pesos	1976 pesos[a]
Low-Income Regions		
Tropical South	10	25
Central Valleys	5	13
Southern Altiplano	4	10
Medium-Income Regions		
Southern Valleys	7	18
Northern Altiplano	5	13
Central Altiplano	4	10
High-Income Regions		
Tropical North	12	30
Northern Valleys	10	25
Sub-Tropical North	10	25
Sub-Tropical South	12	30

Source: IDB 1973: 228, based on regional sampling and data from the Ministerio de Planificación y Coordinación. The sampling procedure is not explained.

[a]Based on the consumer price index for La Paz during the first six months of 1976.

the northern (Cochabamba) valleys. The intermediate position of the southern valleys may seem puzzling given below-average incomes in Tarija, Chuquisaca, and Potosí; 28/ but this result is plausible in view of the relatively low underemployment reported in Table 3 and the region's proximity to northwest Argentina, where wages are high by Bolivian standards. Not surprisingly, wage rates are lowest in the Altiplano, and within the Altiplano they are higher in the north than in the central and southern regions.

Rural wage data for the first half of 1976, published by the Ministry of Agriculture, are presented in Table 12. Unfortunately, they are based on Departments rather than geographic regions and thus are not directly comparable with the figures in Table 11. The methodology for obtaining these data is not explained, but the quality of the estimates is probably poor. Except for the Beni, regional wage differentials are reported to be less than 2:1, compared with a 3:1 spread in Table 11 (which excludes the Beni). The figures for Oruro and Potosí are higher, and that for La Paz lower, than might have been expected. Curiously, the implied cost of a meal is greater for women than for men in Cochabamba, Santa Cruz, and Tarija, while the opposite is reported for Chuquisaca and Oruro. It is not known to what extent male-female wage

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28/ GDP per capita in 1973 was estimated to be US$ 187 in Tarija, US$ 144 in Chuquisaca, and US$ 138 in Potosí, compared with US$ 201 nationally. Even after adjustment to reflect the 1976 census results, the respective Departmental figures of US$ 232, US$ 207, and US$ 194 are still below the adjusted national average of US$ 239 (Zuvekas 1977: 15).

TABLE 12

DAILY WAGES IN RURAL AREAS, BY DEPARTMENT, FIRST HALF OF 1976

(pesos per day)

Department	With Meal		Without Meal	
	Men	Women	Men	Women
Chuquisaca	20	15	30	20
La Paz	23	17	30	24
Cochabamba	30	20	35	30
Oruro	25	20	33	25
Potosí	25	20	30	25
Tarija	35	28	40	32
Santa Cruz	38	25	50	40
Beni	60	- [a]	80	n.a.
Pando	n.a.	n.a.	n.a.	n.a.

Source: Bolivia, MACA, 1976a: 22.

[a] $b.600 per month.

n.a. Not available.

differentials reflect sexual discrimination as opposed to different assignments of tasks on the basis of physical exertion required. 29/

If the data in Table 11 are converted to 1976 prices, significant real wage increases are implied for 1971-76. It is doubtful that such increases in fact occurred, since agricultural productivity gains were not spectacular during this period. The data in either Table 11 or Table 12 (or both) may be deficient, but part of the problem can be attributed to the consumer price index, which covers only the city of La Paz and is known to have other serious weaknesses (Whitehead 1969: 220-222).

The wage data discussed above may be checked with figures reported in studies of individual communities or regions. It should be noted, however, that errors of 20-30 percent or more may occur simply because some of these studies--as well as Table 11--do not specify whether meals are provided in addition to the cash wage reported.

In the lower Cochabamba Valley, Camacho Saa (1970: 91) found that the daily wage in 1967 was $b.10 in the 3 communities he studied. This, he noted, was one of the highest rates in the traditional areas of the country (i.e., the Altiplano and Valles). Dorsey (1975b: 39) revisited 2 of the 3 communities in 1973 and found that the nominal daily wage had risen to $b.15. In real terms, however, the consumer price index suggests a decline of 8 percent. The same daily wage in 1973 was reported for the Upper Cochabamba Valley (Dorsey 1975a: 40). These figures are consistent with Tables 11 and 12, and a lower real wage rate in

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29/ For the northern Altiplano, though, Wiggins (1976: 35) reports that there seem to be few differences in the tasks performed by men and women.

1973 is plausible in view of the difficulties experienced by farmers in the Lower Valley in 1973 (Dorsey 1975b). However, as we noted above, the price index used to obtain real wages is for the city of La Paz only and is so poor that one cannot be certain that real wages--especially in another part of the country--did in fact decline.

Additional daily wage figures for the Upper Cochabamba Valley are found in several cost-of-production estimates for specific crops. González Soria (1974: 56-59) uses $b.25 for the 1973 corn crop, while Crespo Vidal (1974) uses $b.30 for wheat, either for 1973 or 1974 (it is not clear to which year the data refer). Given the high rates of inflation reported for 1973 (32 percent) and 1974 (63 percent), and the much lower rates for 1975 and 1976, 30/ these relatively high figures can be considered consistent with the 1976 data in Table 12, especially if they refer to wages for men. It should also be remembered that the data in Table 12 are Departmental averages, and in the more remote parts of the province of Cochabamba wage rates are often lower. 31/

30/ The inflation rate was 8 percent in 1975 and 5 percent in 1976.

31/ A cost-of-production table for peanuts in the lower-elevation lands in southeastern Cochambamba uses a daily wage figure of $b.8 in 1969. (Daviu Gemio 1969: 33). In the sub-tropical colonization areas, a sample survey by Zeballos Hurtado (1975: 73) found that the average daily wage in the 1972-73 crop year was $b.16.0 in Chimoré and only $b.10.2 in the Chapare. The Chimoré and Chapare figures are lower than would be suggested for the sub-tropical south by the data in Table 11.

A survey of 22 communities in the central and southern valley areas of Chuquisaca (Erasmus, in Heath, Erasmus, and Buechler 1969: 124) found that daily wages in 1963 were equivalent to $b.2.5-3.5 with food and $b.4.0-5.0 without food. In 4 valley communities in Tarija, the range was $b.5.0-9.0. 32/ These figures may be converted to 1971 prices and compared with the nominal wages in 1971 shown in Table 12. Such a comparison indicates either stagnation or a decline in real wages in Chuquisaca and a decline in Tarija. 33/ Again, caution should be exercised in interpreting real wage trends. Apart from the price index problem, the data in Table 11 are on a regional basis and include those parts of the central and southern valleys outside the Departments of Chuquisaca and Tarija. Finally, it is not clear whether the data in Table 11 refer to wage rates with meals or without meals.

32/ The actual figures were expressed in bolivianos, which were replaced by pesos in 1963 at a conversion rate of 1 peso per 1,000 bolivianos. The exchange rate in 1963 was $b.12= US $1.

33/ The comparative figures, in 1971 pesos, are:

	1963	1971
Chuquisaca:		
With meals	3.9 - 5.5	5.0
Without meals	6.3 - 7.8	
Tarija	7.8 - 14.1	7.0

Wage data for the Altiplano were more difficult to find. Pou (1972: 122) reported that the prevailing daily wage in the Patacamaya development area in southern La Paz Department (central Altiplano) was $b.8 in early 1970. This is twice as high as the regional estimate for 1971 in Table 11, but it might be explained by the area's favorable geographic location midway on the highway between La Paz and Oruro.

Wiggins (1976: 52-76) reports a daily wage in the northern Altiplano of $b.20, presumably for 1975. This may seem lower than the 1975 figure suggested by Table 12, but the two figures are actually compatible since the data for La Paz Department in Table 12 also include the relatively high-wage sub-tropical North region. However, the $b.20 figure for 1975 suggests a significant increase over the real wage figure for 1971 indicated in Table 11, and this is questionable. It is difficult to determine which of the two figures is the more accurate. Both are probably based on a limited, non-systematic sample.

Elsewhere in La Paz Department, daily wages are probably higher than average in the valley areas close to the capital and below average in the more remote highland areas. In the Yungas, the picture is mixed. 34/

A number of wage estimates are available for individual crops or geographic zones in the Department of Santa Cruz. Heath (in Heath

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34/ Buechler (in Heath, Erasmus, and Buechler 1969: 216) reported daily wages in 1963 of $b.3.0-4.0 without food or lodging for area residents and $b.5.0 plus food and lodging for seasonal workers from outside the area. A sample survey in the colonization zones, conducted by Zeballos Hurtado (1973: 73), found that daily wages in the 1972-73 crop year averaged $b.10.0 in Caranavi, $b.11.5 in Alto Beni I and $b.15.4 in Alto Beni II. The equivalent figures in 1975 prices are $b.17.6, $b.20.2 and $b.27.0, respectively.

Erasmus, and Buechler 1969: 339-340) reported that seasonal laborers from the southern highlands could earn $b.20 daily harvesting sugar (2 tons daily at $b.10 per ton), though local laborers who worked more slowly earned only about half as much. A study by Zeballos Hurtado, Macías Villanueva, and Sejas Albornoz (1967: 55) found that daily wages in the Rio Grande-San Javier-Concepción area averaged $b.10.5 in 1966 (including $b.3 for food) 35/ A cost-of-production estimate for soybeans in 1969 used a figure of $b.12 for harvesting (Daviu Gemio 1969: 35). Clement's cost-of-production tables for wheat (1973) used a figure of $b.15 for the 1971-72 crop year, while during the same period the IDB (1973: 7-8) reported wages of $b.12-14 for cotton.

Estimates of daily wages in 1975 and 1976 range from $b.40 to $b.50. A Departmental sector survey (Asociación de Consultores 1975, Vol. II) used $b.50 in cost-of-production tables for sugarcane and cotton (for tasks other than harvesting, where payment was by volume harvested), as well as for corn. For tomatoes, potatoes, and peanuts, the wage assumed was $b.40. A figure of $b.50 was used for corn in 1976 cost-of production estimates by Graber (1976) and the Santa Cruz office of the Ministry of Agriculture (Bolivia, MACA, Santa Cruz, 1976b: 17-20).

After allowing for time differences, most of the above estimates seem to be higher than the figures in Tables 11 and 12. The reason could be that they are based mainly on wage rates prevailing in areas fairly close to the Departmental capital. In the more remote colonization zones, daily wages appear to be lower. Zeballos Hurtado's sample

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35/ The table on p. 54, however, suggests a figure of $b.12.5.

survey (1973: 73) found that the daily wage in the 1972-73 crop year averaged $b.32.1 in the Chane-Piray zone north of the city of Santa Cruz, while in the more remote Yapacaní zone to the west the average was only $b.16.2.

In summary, the evidence on regional differences in wage rates, though sketchy and sometimes not consistent, shows a fairly clear pattern. 36/ Wages are highest in the Oriente and above average in the Upper and Lower Cochabamba Valleys. The lowest wages are found in the central and southern Altiplano and in the central valleys. These wage differentials are consistent with the employment and migration patterns described above.

A crude comparison of agricultural wage earnings and productivity by Department is presented in Table 13. Annual wage earnings are calculated by assuming a normal work year for wage labor of 240 days. 37/ Average agricultural output per worker is based on labor supply figures adjusted downward to reflect the 1976 census findings. Productivity tends to be higher than wage earnings, though for 2 Departments the opposite is true. Nevertheless, there is a definite positive relationship ($R^2 = .78$), and the rank order of most Departments, if not the absolute differences in productivity, conforms roughly to expectations.

36/ One possible exception is the evidence for the Beni. While Table 12 shows it to have relatively high wages, Ronald Clark (1974: 25) maintains that salaries (which are often paid in lieu of daily wages in the lowland cattle regions) are low even by Bolivian standards.

37/ Actually, labor is frequently hired for considerably fewer days, and the marginal productivity of hired labor at certain times of the year is zero.

TABLE 13

PRODUCTIVITY PER RURAL WORKER, 1968-1970, AND WAGE RATES, 1971

	Labor Supply 1970[a]	Average Agricultural Product, 1968-70 (pesos)	Output per Available Work-Years (pesos)	Average Daily Wages, 1971[b]	Annual Wage Earnings[c]
Chuquisaca	113,900	197,657,000	1,735	5.6	1,344
La Paz	351,200	385,529,000	1,098	6.5	1,560
Cochabamba	177,400	475,551,000	2,681	10.4	2,496
Oruro	70,700	54,796,000	775	4.0	960
Potosí	165,800	225,055,000	1,357	5.2	1,248
Tarija	36,500	117,420,000	3,217	7.9	1,896
Santa Cruz	96,400	410,970,000	4,263	11.4	2,736
Beni-Pando	32,300	109,592,000	3,393	n.a.	n.a.

Source: IDB 1973: 221, 225, 234-237, and author's estimates of the 1970 rural labor force.

a Downward adjustments to the data in Table 4. These are the same figures used to calculate the revised unemployment-equivalent rates in Table 6.

b Weighted on the basis of the percentage of the rural Departmental population living in each geographic region (as defined in Table 3).

c Based on 240 days of work.

n.a. Not available.

For any given Department, differences between the wage income and productivity data in Table 13 can be attributed to (1) poor data; (2) the different relative importance of wage, as compared to nonwage, labor; and (3) imperfections and segmentations of product and factor markets. It is important to remember that imperfect and segmented markets exist not just for the country as a whole, but also within a given region. Thus there is no strong tendency toward equality of the basic agricultural wage rate within a region. 38/ The non-market determination of wage rates by the cotton growers' association in Santa Cruz has already been mentioned as one example of wage differentials for similar types of work.

Other wage differentials in Santa Cruz for the same or similar tasks are caused by both demand and supply factors. On the demand side, product markets are segmented by transport costs, which affect the net returns to farmers for products that are sold in reasonably competitive markets. Specifically, if we hold constant the marginal physical productivity of labor in a given region, the value of the marginal product of labor (and thus the wage rate that can be paid) is related inversely to transport costs that reduce farmers' net returns. On the supply side, labor is not perfectly mobile nationally, even though it may be reasonably mobile within the commercial farming areas linked to the city of Santa Cruz. Because insufficient labor migrates into the region, either permanently or seasonally, to more than offset the growth of

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38/ The significance of this point for relating reported regional wage rates to productivity will be explained below.

labor demand and depress wage rates, relatively high wages are the rule. If the regional labor market were perfect, one would expect wage labor in the more remote areas to be hired only when its marginal physical productivity is above average, so that the value of the marginal product to the producer equals the regional wage rate. But there are probably few instances where productivity in those areas is that high. The existence of hired labor in the remote areas at lower wage rates can probably be explained by the following set of circumstances: To begin with, hired labor is not used as much, and it can be supplied largely from within the local area. 39/ In other words, there may be enough local labor available for a few days at a time, or for a few hours daily over a longer period of time, to meet the modest demand for hired workers and establish an equilibrium between local supply and demand at a relatively low wage rate. (It is assumed that seasonal unemployment in these areas is of too short duration to justify migration to other areas for seasonal work.) Alternatively, relatives from highland communities can be induced to provide low-wage seasonal labor which for sociocultural reasons they might be unwilling to supply to others in distant locations, even at high wages, for relatively short periods of time.

39/ Often, settlers may actually farm only 1-2 hectares, even though they hold 20-30. Presumably, given the relatively low net prices they receive for commercial crops, farmers do not find it profitable to clear additional land and bring it into production unless they can clear the land themselves or hire labor at relatively low wages.

This partial explanation of wage differentials is largely conjectural, and more research would have to be undertaken to improve the analysis. In the Altiplano and Valles, labor markets are even more imperfect than in the Oriente: often they are local in nature and very thin. Greater intra-regional differences would be expected under these circumstances.

Intra-Departmental wage differentials are stressed here because it appears that most estimates of regional wage rates are based on a limited number of observations which do not constitute an adequate sample survey. 40/ For this reason alone, the data in Tables 11 and 12, as well as the other data reviewed above, may be subject to large margins of error. When other data problems are also considered, the potential for error increases. Still, it is unlikely that more accurate wage data would show any major changes in the rank order of Bolivia's major geographic regions.

Given the weakness of price data in Bolivia, it would be difficult to determine real wage trends even if nominal wage data were reasonably accurate. Under actual circumstances, the situation is practically hopeless. Tables 11 and 12 are not directly comparable on a regional basis, but on a national basis a sharp rise in real wages is indicated from 1971 to 1976. There is very little reason to think that this in fact happened. Also, some of the implied regional changes (which can be inferred despite the direct incomparability of the regional classifications) are puzzling: relatively high increases for the southern

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40/ Even when adequate survey techniques have been used, the survey may be confined to a limited area or areas: the study by Zeballos Hurtado (1975), for example, looks at 7 selected colonization zones in La Paz, Cochabamba, and Santa Cruz Departments.

and central Altiplano and modest increases for Santa Cruz. The relatively low increase implied for the Cochabamba valleys, though, is plausible in view of what appears to have been agricultural stagnation in that region in recent years. In fact, it is possible that real wages there have actually been stagnant or have declined since the late 1960s, after having increased in the first 15 years after the 1952 revolution. Elsewhere in Bolivia, one may guess that real wage changes have varied from significant increases to modest declines, with the national average probably having increased modestly. But this is just a hypothesis, and extensive field work--including an examination of farm records, where available--would be required to support or reject it.

GOVERNMENT POLICY

Government policy in Bolivia has paid relatively little attention to rural unemployment and underemployment problems. Colonization of the Yungas and the eastern lowlands, it is true, has been promoted in large part to provide productive employment for "surplus labor" in the "overpopulated" highlands; and given Bolivia's level of development, investment in colonization projects since the early 1950s has been considerable. But the employment implications of policies affecting agricultural technology have often been ignored. In the mid- and late 1950s, for example, the government, with U.S. assistance, encouraged the adoption of highly mechanized methods of production by establishing a machinery pool in Santa Cruz which offered farmers highly subsidized rental rates. This and related projects suffered from mismanagement and lack of attention not only to employment but also to the harmful effects

of uncontrolled machinery use on sub-tropical soils. 41/ When the machinery subsidy was terminated, the inappropriateness of advanced mechanization--even in what appeared to be a labor-shortage area--became obvious, and the use of machinery for land clearing and other operations declined sharply.

Development plans in Bolivia have given only pro forma consideration to rural employment or have altogether ignored the issue. The 10-year plan for 1962-71 (Bolivia, JUNAPLAN, 1961) does little more than mention, as the last of 4 agricultural sector objectives, an increase in campesinos' employment and real incomes to enable them to particpate more fully in national economic life. Rural employment is not even considered in the 20-year socio-economic strategy document for 1971-1991 (Bolivia, MINPLAN, 1970). The current (1976-80) plan (Bolivia, MINPLAN, 1976) does not list employment generation as a specific development objective, though a liberal interpretation might consider it to be subsumed under the objective of increased campesino participation in socio-economic activity. Even so, no specific measures for increasing employment are discussed. The agricultural sector plan for 1976-80 (Bolivia, MACA, 1976d) lists a reduction of rural underemployment as the last of 6 sector objectives; but the chapters on strategy, policy, and implementation do not directly focus on this objective.

Given the difficulty some farmers have had in securing seasonal labor, particularly for the cotton harvest, there is an increasing possibility

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41/ For strong criticisms of the mechanization program, see U.S. Congress (1960) and Menjívar (1969).

that mechanization--particularly of harvest operations--will become attractive for large-scale farmers in the eastern lowlands. If significant mechanization does occur, it could contribute to rising unemployment and underemployment in the Oriente and reduce seasonal employment prospects for underemployed laborers in the highlands.

Mechanization, however, should not be blindly opposed on employment grounds, any more than it should be blindly accepted on production grounds. The literature on the effects of mechanization on production, employment, and income distribution (reviewed in Cline [1973: 148-152] and in Yudelman, Butler, and Banerji [1971: 78-100]) shows that the technological and institutional environment in which it is contemplated must be carefully studied. Although mechanization may sometimes increase both production and employment, the effect is often simply to replace labor with capital while increasing production negligibly if at all. Machinery may appear attractive only because overvalued exchange rates, subsidized credit, or tax policy make its price to the purchaser lower than its scarcity value.

Cotton farmers, as noted above, have already begun to turn to mechanized harvesting, and there is little doubt that this will result in job losses among the 60,000 or so seasonal migrants from the highlands. As of 1975, none of the sugarcane producers north of Santa Cruz had mechanical harvesters, and few even had tractors; but if mechanization did occur the jobs of many of the 10,000 hired workers in that area would be threatened, as would be the status of the more than 3,000 small cane growers (20 hectares or less) who constitute almost 90 percent of the area's cane producers (Díez de Medina 1975). Mechanization of rice

production would have similar results. Just how far mechanization of cotton, rice, and sugar is likely to proceed is difficult to predict in view of the price and export-volume uncertainties faced by producers. But it is important to realize that government policy can be the deciding factor.

It is not clear how much labor might be displaced by mechanization in the lowlands, 42/ and careful analysis would be necessary to make such a determination since the results of studies in other countries (which are by no means clear) 43/ cannot be assumed to apply to Bolivia. It is important to consider the effects of mechanization on output, and to compare the production gains (if any) with the losses of employment and of foreign exchange.

If employment and income distribution objectives are considered important, some of the major implications for mechanization policy, as Cline (1973: 151) has suggested, are that (1) governments and international agencies should support mechanization only when it clearly increases output, (2) machinery should be made available on a rental basis to farmers of all sizes, (3) encouragement should be given to intermediate technologies such as improvement of implements, as opposed to the use of the use of tractors and combines, and (4) machinery prices should reflect their scarcity values.

42/ One study, as noted above, argued that mechanization of rice production would reduce labor requirements from 105 work-days per hectare to 5. It is doubtful, though, that a decline of this magnitude would occur.

43/ Cline (1973: 151) notes that estimates of the labor-displacing effect of machinery differ widely for some countries, indicating that the state of knowledge about this important issue is poor.

In the highlands, where rural underemployment is now much more serious than in the lowlands, government policy-makers might consider expanding programs which promote the adoption of what Yudelman, Butler, and Banerji (1971: 47-52) call "land-augmenting innovations"--i.e., innovations which increase output per unit of land. Evidence for several Asian countries reviewed by these writers (pp. 70-78) suggested that the introduction of high-yielding seed varieties, fertilizers, other chemical inputs, and irrigation increased labor use by perhaps 20-50 percent, ceteris paribus. It should not be assumed that the same kind of employment effects are necessarily achievable in Bolivia, where the technological and institutional environments may be quite different, particularly in the Altiplano and Valles. But the weight of the evidence from other countries, and bits and pieces of information for Bolivia itself, 44/ suggest that both employment and income could be increased via the adoption of land-augmenting innovations. Such changes might be directly promoted through supervised agricultural credit programs, or indirectly encouraged by road construction and other activities that improve farmers' access to markets.

Government policy might also seek to expand rural employment opportunities in non-agricultural activities. Some efforts have already been made to promote the expansion of artisan and handicraft industries, but the results have not been especially encouraging and this writer

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44/ In what seems to be an extreme case, one community in Cochabamba is reported to have increased labor utilization from 190 to 250 work-days annually (presumably per worker) simply by applying fertilizer to potato production (IDB 1973: 9).

doubts that there is much employment potential in these activities. The export market for their products is quite competitive, and a significant breakthrough would require a degree of marketing organization that Bolivia has found difficult to achieve. The domestic market may well be income-elastic (or at least potentially so), but it is too limited to be of great significance. Promotion of artisan and handicraft industries need not be abandoned, but this writer would suggest that it continue to be given low priority.

Little hope should likewise be held out for increasing rural employment opportunities through policies which promote a wide geographic dispersion of activity in Bolivia's modest manufacturing sector. This writer's experience in Ecuador indicates that even generous tax incentives in that country could not overcome the locational disadvantages of the smaller urban centers, particularly from the point of view of transport costs and supporting services. If anything, these disadvantages are greater in Bolivia. Even if a large enough subsidy could be provided, it is doubtful that such a cost could be justified even under liberal interpretations of social benefits. To be sure, there may be limited opportunities for processing agricultural products in some of the smaller urban centers in areas of high rural underemployment; but for many years to come manufacturing activity will probably be highly concentrated in the larger cities. Moreover, agricultural processing activities in the smaller cities are likely to be established only as a result of the prior expansion of local agricultural output, income, and employment.

Finally, we may consider the employment-generation possibilities of rural public works projects, which many writers believe have great

potential for absorbing seasonally idle labor. Bolivia has already experimented with such projects in the colonization zones, as well as in the highlands, but the resources made available have been limited. Project possibilities in Bolivia include secondary and tertiary road construction, irrigation works, storage facilities, school construction, and tree planting both to combat soil erosion and for income.

While this writer is optimistic about the potential of off-season employment opportunities of this kind, it should be remembered that experiences with rural public works projects in less developed countries have been mixed. Successful projects require not only money but also careful planning that takes into account what individual communities would most like to have. Care must also be taken to ensure that materials and other inputs not available in local areas can be obtained elsewhere on a timely basis. The amount of labor available, and precisely when it is available, must be carefully determined; workers who are idle during periods of heavy rainfall cannot be used for projects which can only be undertaken when rainfall is scant.

Notwithstanding the many difficulties that rural public works projects might encounter, this writer recommends that government policy give them more consideration. Such projects are particularly attractive because they can be selected in such a way as to concentrate the direct and indirect benefits on particular target groups. Although much of the work thus provided would be of a one-time-only nature, some permanent maintenance jobs will have been created. Even more important are likely to be the income-induced jobs which would result from the higher farm incomes that rural infrastructure can make possible.

A major rural public works program would not be inexpensive. Heavy financial commitments, as well as commitments of scarce managerial resources, would be necessary. Even if the government's revenues are rising and foreign assistance is available, such a program would have to compete against other increasing claims on the budget. It would have to be clearly demonstrated that this approach has a potentially more favorable benefit-cost ratio than alternative programs aimed at decreasing rural underemployment. With data currently available, such a demonstration cannot be made.

DIRECTIONS FOR FUTURE RESEARCH

At the beginning of this paper, it was argued that unemployment and underemployment statistics are seriously deficient as welfare indicators, and the suggestion was made that research efforts give higher priority to the development of good time series data on rural income (or, preferably, consumption). 45/ Nevertheless, consideration should be given to a limited amount of research to improve employment indicators and make them more useful for policy purposes.

Especially significant would be research to clarify the concept of rural underemployment in Bolivia under prevailing technological condi-

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45/ For details of this proposal, see Zuvekas (1977).

tions. The amount of underemployment has generally been overestimated, mainly--but not only--because activities other than those directly associated with crop and livestock operations have not been fully taken into account. One way to obtain better data on the availability and allocation of labor resources in farm households would be to employ the services of anthropologists who would live in selected communities for 12 months and record in detail how residents of all ages and both sexes spend their time. (Naturally, these social scientists would also be collecting other information; otherwise their degree of underemployment would be quite high!) However, experienced anthropologists, or even foreign graduate students, would be expensive to support--notwithstanding their willingness to forego the comforts of urban life--and the number of communities that could be studied would be limited. 46/

More communities could be studied with a given budget by relying instead on Bolivian authropology students, who would submit the results of their research as theses. 47/ Although collection of data on the allocation of time would have to be based on a standardized format for all communities, students could be free to spend the rest of their research time in a variety of different ways, choosing from among such diverse topics such as kinship patterns, the social implications of

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46/ This would rule out the use of sampling techniques to select the communities to be studied.

47/ A similar suggestion was made for obtaining data on rural income or consumption, in which case economics students would be used. For a more detailed discussion of how this might be done, see Zuvekas (1977).

drinking, and community power structure. 48/ Technical and financial assistance for supervision and support would be necessary if such a program were to cover more than a handful of communities. Even with such support, it might be very difficult to study as many as 25-30 communities over a 3-4 year period.

Alternatively, consideration could be given to a special nationwide employment survey based on some kind of sample frame. This is likely to yield much better data than a comprehensive agricultural sector survey, which would be able to devote only a limited number of questions to the employment issue. Even if this approach were adopted, it would still be beneficial to conduct anthropological studies of several individual communities to provide a check on the results obtained from the employment survey.

Whichever approach is chosen, the following questions, among others, should be answered:

(1) What is a reasonable definition, in terms of days, of a "normal" work year? Should different definitions be used for areas where year-round activities are possible and areas where only one crop a year can be grown? (The answer to this last question really depends on the purpose for which the data are desired. If off-farm employment is considered necessary to attain some minimum level of income or consumption, a single definition based on year-round farming can be justified.)

48/ At least during the first year, student interest in the project could also be stimulated by including the design of the questionnaire as one of the activities to be undertaken during a project training period of perhaps 3 weeks.

(2) How many family members are actually available for farm work? How much potential time (in days) does each have available? During what months is each available? What age and sex weights should be employed to reflect differences in productivity as determined by physical characteristics and/or cultural patterns?

(3) Of those family members not available for farm work, or available only on a part-time or temporary basis, how many are employed or seeking employment in other activities (including household work), how many are in school, and how many simply are unable to work because of age or other limitations?

(4) How much potentially available labor time is lost because of poor health?

(5) Is all available labor needed during the harvest period, or at other times? Is non-family labor needed on these occasions? Is non-family labor paid a cash wage, and if so are meals also provided? If not, what other means of compensation (e.g., labor exchanges) are used?

(6) How much time is needed for marketing, obtaining credit, caring for livestock, maintenance and repairs, general farm administration, community public works projects, and other farm or community activities? How many family members can be absent from the farm for extended periods of off-farm owrk? For how long, and when? Are there times when certain family members must remain on the farm, even though the daily tasks required take only a few hours?

(7) How much time is devoted to each crop, and to each major activity for those crops? Could the work be done by fewer people, or in

less time? Can crop and task data be obtained on an hourly as well as a daily basis? How much time is spent on family garden plots?

If these questions are answered carefully, it should be possible to determine the extent to which "surplus labor" is present in Bolivian agriculture in the sense that loss of these workers would not affect agricultural production. More realistic underemployment estimates could also be made in the light of existing technological practices, and the potential in various parts of the country for rural public works projects could be more easily determined. If technological change occurs, labor requirements will be altered and so will the implied unemployment-equivalent rate. Separate research on the employment implications of alternative technologies would be needed if the employment survey, or a general agricultural sector survey, does not clearly indicate factor proportions under various well-defined levels of technology.

Apart from the adoption of new technology, the implied unemployment-equivalent rate in Bolivia would be affected by several other changes which government policy can bring about. Two of these will be mentioned simply to further illustrate the weakness of unemployment-equivalent rates as welfare indicators. Effective public health and nutrition programs would reduce labor time lost because of poor health. Other things equal, the unemployment-equivalent rate would rise, thus suggesting, paradoxically, a deterioration in welfare. Expanded educational opportunities in rural areas, particularly at the secondary level, would tend to reduce labor time available, but the unemployment equivalent rate

might be lowered if other family members become more fully employed by taking over tasks that otherwise would have been performed by those going to school. The effects of education on rural consumption and welfare, though, are uncertain both in the short run and in the long run. 49/

In suggesting earlier that the potential for rural works projects be explored, it was noted that research on the costs and benefits of such projects would have to be undertaken. This would require technical assistance from outside Bolivia, and grant financing would probably be necessary.

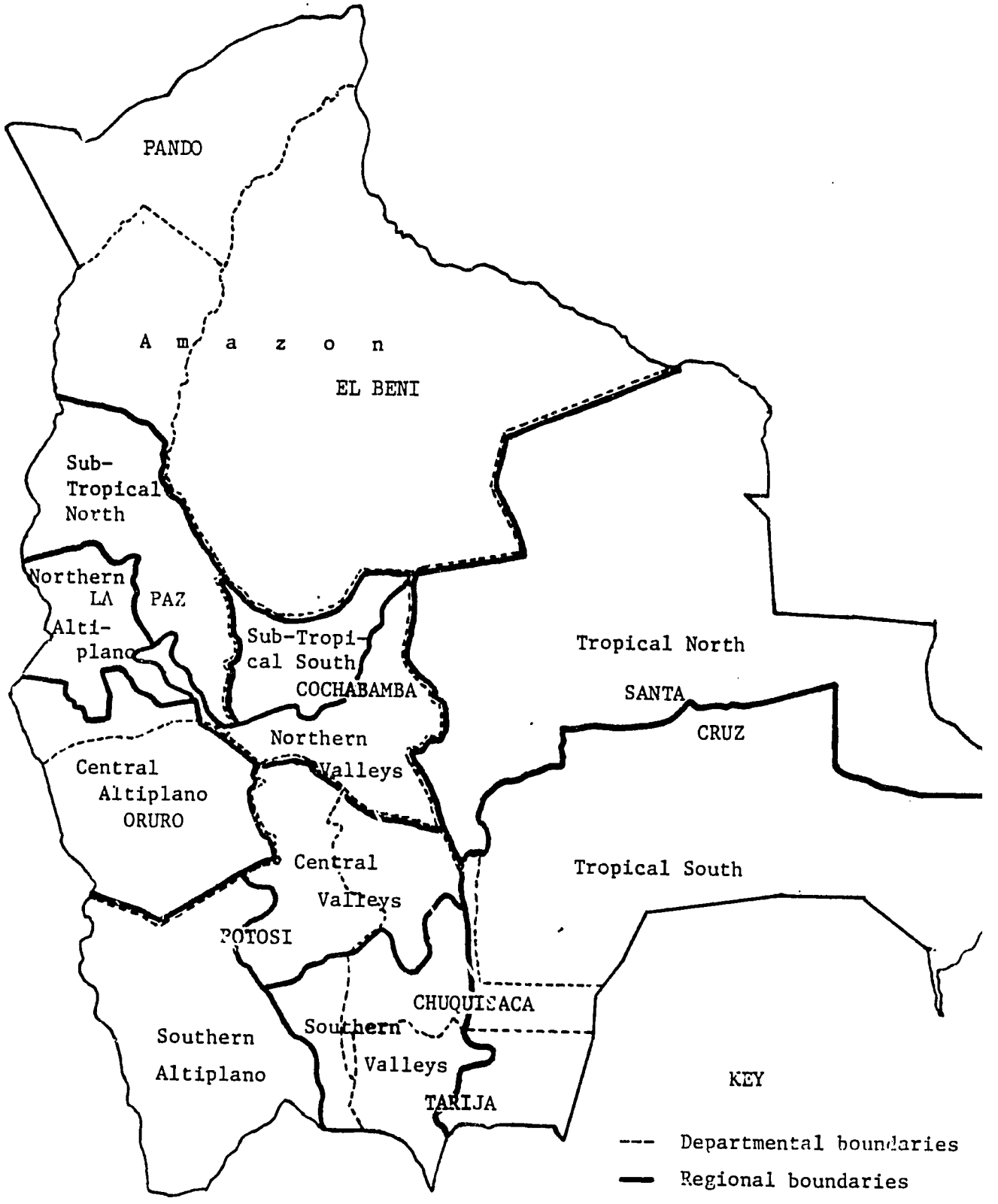
CONCLUDING REMARKS

In view of the criticisms that have been made of existing unemployment and underemployment estimates for Bolivia, and the critical comments on employment indicators generally, some readers may be left with the impression that this writer regards the employment problem in rural Bolivia to be a minor one. This is not so: an improved methodology for measuring rural underemployment can still be expected to generate a high unemployment-equivalent rate. And while consumption indicators can tell us more about rural welfare than unemployment-equivalent rates, the latter, together with supporting data on how idle labor time is distributed over time and among family members, can be most useful in devising income-generation and employment-creating strategies for specific rural areas.

49/ In the short run, students presumably receive direct consumption benefits. But even "free" public education in LDCs usually requires cash outlays, and agricultural production may be affected adversely unless the school year is designed to provide breaks during periods of peak labor demand. If the educational system encourages students to use their schooling as a ticket to an urban job, long-run benefits to rural communities might be limited to occasional "migrants' remittances."

MAP 1

Agricultural Regions of Bolivia



Source: IDB (1973: 234-238).

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