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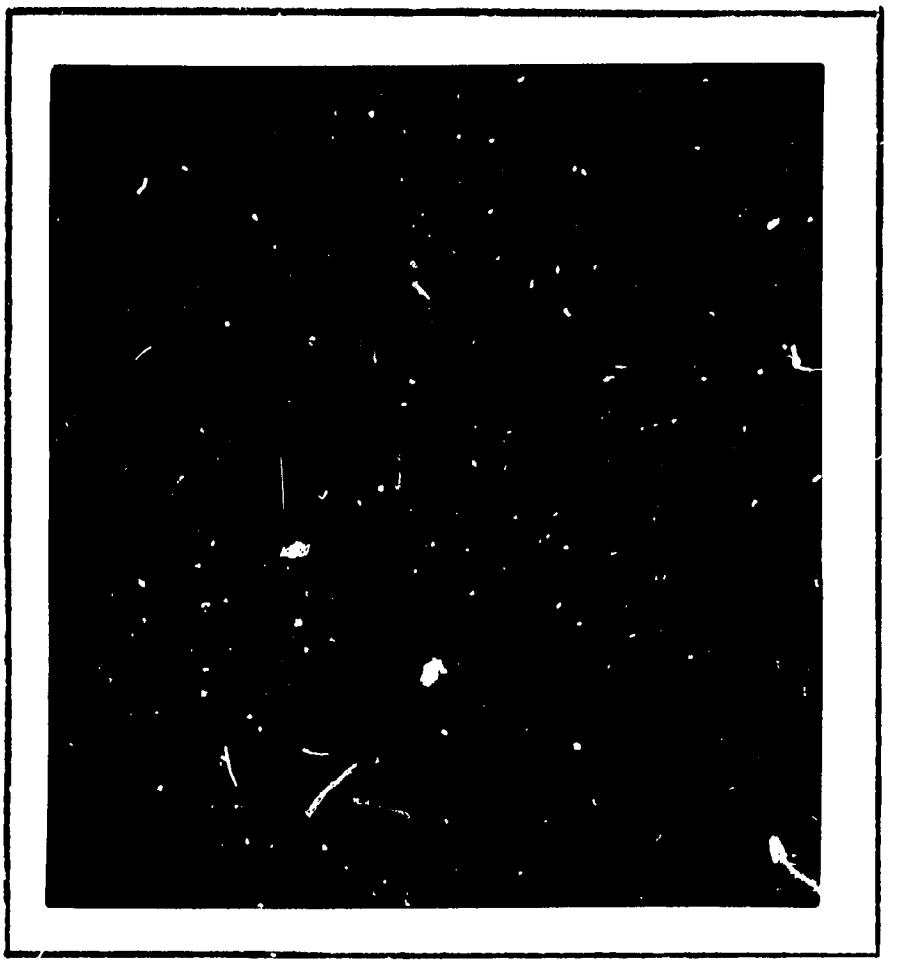

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A SURVEY OF CROP AND LIVESTOCK-MARKETING IN BOLIVIA

Clarence Zuvekas, Jr.

Sector Analysis Internalization Group
Foreign Development Division
Economic Research Service
U.S. Department of Agriculture

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Judith H. Cromwell

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4112 Auditors Building
14th & Independence Avenue, S.W.
Washington, D.C. 20250

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INTRODUCTION

This paper reviews the literature on Bolivian crop and livestock marketing, broadly defined to include such topics as transportation, food processing, and price policy. Significant changes in marketing have occurred since the 1952 revolution and subsequent agrarian reform, and these changes seem to have played a major role in raising campesino incomes in many parts of the country. For this reason alone, serious government attention to marketing is justified. 1/

There are other reasons, too, for being concerned with marketing. Export surpluses of sugar, rice, cotton, and beef have sometimes been difficult to sell. In late 1976, for example, Bolivia's rice stocks were equivalent to 3 years' domestic consumption. Bolivian beef has a poor reputation for quality. High transportation costs limit overseas markets for the above commodities and for potential future exports such as corn and soybeans. Failure to market export surpluses has obvious depressing effects on farm prices and incomes.

The low rate of capacity utilization of oilcrop processing plants is an indication of another set of marketing problems which includes inattention to the use of by-products for balanced livestock feed. Other issues with which the government should be concerned are weights and measures, grades and standards, storage and handling, and the promotion of marketing cooperatives.

1/ I wish to thank Elizabeth Erickson for helpful comments on an earlier draft of this paper. For a review of trends in rural income and income distribution, see Zuvekas (1977a).

CHANGES IN MARKETING SINCE 1952

The breakup of the hacienda system after 1952 resulted in significant changes in marketing patterns, particularly in the Northern Altiplano, the Yungas, and the Cochabamba Valleys, where the redistribution of land and power was most sweeping. While there is much controversy concerning the extent to which agricultural production declined (if at all) in the years immediately after 1952, all observers agree that agricultural marketings fell as campesinos increased their own food consumption. The extent to which shipments to market declined, however, is difficult to judge. Already weak marketing data were made even more suspect by the disruption of traditional marketing channels and the routing of commodity flows through new but not well-organized channels. By the late 1950s, though, marketings apparently had begun to increase in all parts of the country. (See Clark 1968 for a discussion of these trends.)

As former hacienda owners were driven from their lands, campesinos were no longer forced to surrender part of their crops under monopsonistic conditions which had discouraged increased productivity. [2/] They became free not only to consume more food themselves, but also to choose among competing buyers coming into the fields with trucks or purchasing farm

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2/ Some food had to be surrendered directly to the landowner, while in other cases the landowner obliged the peasants to deliver produce to urban buyers whose contracts were with the landowner, not the peasants. In other words, the landowner was the only effective "buyer" of the peasants' "surplus," except for small quantities of milk, eggs, cheese, fruits, or vegetables marketed by peasants in local fairs.

products in newly established ferias. [3/] Moreover, campesinos sometimes chose to sell a significant proportion of their surpluses directly in the cities.

These new marketing channels did not develop overnight. Some campesinos needed time to become accustomed to cash transactions. Trucks were in short supply because some were owned by ex-hacendados who were unwelcome in the countryside. [4/] The ex-hacendados also left a vacuum in the provision of other marketing services, which existing intermediaries could not completely fill. Nevertheless, the swiftness and effectiveness of the land redistribution measures facilitated the development of new marketing channels in a fairly short period of time.

At first, the number of buyers in the newly-established fairs was small. In the Northern and North Central Altiplano, for example, only 1-2 trucks initially came on a regular weekly basis. By 1966, however, most fairs were visited by an average of 5-9 trucks; 10-14 trucks were not uncommon, and a few large fairs saw 75-150 trucks weekly (Clark 1968: 166-168). [5/] In the Yungas of La Paz Department, Barnes de Marschall (1970: 96-110) reports a drastic change from a marketing system dominated by a

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3/ New communities associated with these fairs sprang up in the Northern Altiplano, Yungas, and Cochabamba Valleys, and some existing villages assumed greater importance. While some were little more than truck stops, others, often through efforts by the local sindicato, became the seats of newly-created cantones; this provided a few administrative jobs and brought other benefits to these communities. For more details on the new towns, see Barnes de Marschall and Torrico (1971); Clark (1968: 166-168); Léons (1966); Preston (1970); and Preston (1969).

4/ This was not true in all areas. In the Yungas, for example, Heath (1973: 82, 87-88, 92-93) reports that a number of ex-hacendados remained in the area and were active as intermediaries.

5/ Between 1963 and 1966 the number of trucks registered in La Paz Department increased from 1,172 to 2,372 (Slater et al. 1969: 113).

few landlords to one involving hundreds of intermediaries. Slater et al. (1969: Ch. 6-7) report increased buyer competition not just in the Altiplano and Yungas but also in Cochabamba and Santa Cruz. Their survey of 115 truckers concluded, interestingly, that trucking was an unprofitable enterprise; 40 percent of the truckers specifically pointed to excessive competition and lack of cargo as their major problem (Slater et al. 1969: 127-130). 6/

There is little information on marketing changes in the Central and Southern Altiplano and Valley regions, but they appear to have been less far-reaching than those in the northern regions. Many of the central and southern communities are distant from major urban centers and are not well served by transportation facilities. Though land there was expropriated and redistributed to campesinos, the social structure has changed less and campesino incomes do not appear to have increased as much as in the north or in the Oriente. 7/ Nevertheless, substantially increased market activity has been reported for some central and southern areas (Barnes de

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6/ Because the supply of trucks expanded rapidly in the mid-1960s relative to demand, cargo rates in 1967 had fallen to levels below those prevailing in 1956 (Slater et al. 1969: 130). If profits were in fact negative, this was probably a temporary phenomenon. Alternatively, there could be problems with the quality of the revenue and cost data. On the other hand, truckers may well have failed to take depreciation into account as a cost; the fact that only 16 percent claimed to be aware of commodity prices in the cities they serviced is further evidence of faulty business judgment (p. 130). An additional reason for believing that the trucking industry may have overexpanded in the early- and mid-1960s is the modest rate of increase of truck registrations (4.5 percent annually) between 1966 and 1972 (USAID/Bolivia 1974: 153). South (1972: 50), relying on data from a major transport survey (Daniel, Mann, Johnson, and Mendenhall 1968), supports the view that trucking is a competitive industry, pointing out that no organization or group dominates any particular route or serves the entire country.

7/ For citations of the literature on which these comments are based, see Zuvekas (1977a: 24).

Marschall 1974: 100-108; Clark 1970). (To a large extent, however, this may simply reflect a recovery to pre-1952 levels following a sharp decline in marketings after 1952. This resurgence in market activity was accompanied by a shift to, and diversification in, vegetable production [Erasmus, in Heath, Erasmus, and Buechler 1969: 144].)

The hacienda system was not nearly so widespread in the labor-scarce Oriente as in the Altiplano and Valles. Marketing changes in the Oriente since 1952 are due much less to the agrarian reform and more to improvements in transportation, which have stimulated colonization and the rapid development of lands well-suited to the commercial production of domestic food crops and export commodities. A 1971 survey of 10 relatively low-income colonies near the city of Santa Cruz found that 68 percent of the 470 farmers interviewed sold most of their production off the farm, with 56 percent marketing directly in Santa Cruz (Methodist Church in Bolivia 1972: 8, 54).

Information is also available on market participation in other regions. Unfortunately, however, the data in the most comprehensive marketing study (Slater et al. 1969) are not clearly presented. For example, we see in Table 1 that 24 percent of 263 farmers in the Yungas, Río Abajo, Northern Altiplano, Cochabamba, and Santa Cruz areas [8/] sold their products directly in La Paz; but how many of them directly sold in Cochabamba, Santa Cruz, or other cities is not indicated. Moreover, the percentage

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8/ The number of interviews by area were as follows (Slater et al. 1969: 133):

Yungas and Alto Beni	63
Río Abajo and Altiplano	75
Cochabamba	42
Santa Cruz	83
TOTAL	263

TABLE 1

USE OF MARKETING CHANNELS BY FARMERS IN 4 AREAS, 1967

	4 Areas Combined	Yungas	Río Abajo-Altiplano	Cocha-bamba	Santa Cruz
Percentage of Farmers Selling through Various Channels					
Selling in La Paz	24				
Consignment to La Paz	10				
Selling in fair or mill	65				
Selling on farm	22	26	7	24	32
Percentage Range of Production Marketed by Farmers in La Paz					
0%		57	49	49	98
1-80%		5	33	51	2
81% or more		38	18	0	0
Percentage Range of Production Marketed at Fair or Mill					
0%		74	31	8	36
1-67%		6	69	68	18
68% or more		20	0	24	46

Source: Slater et al. (1969: 141-142. 145, 148).

of total output marketed through these various channels is not indicated with great precision. Elsewhere we are told that 20 percent of production (for the various regions combined, but not individually) was marketed directly in La Paz (p. 140) and an additional 12 percent was sold on the farm (p. 141). The percentage of output sold at fairs (or in rice mills in Santa Cruz) is not indicated but apparently was much higher, leading us to wonder if the percentage figures refer to total marketings rather than total output.

Fortunately, other information on marketing participation is available for some communities or areas. Camacho Saa's study (1967) of Ucureña, in the Upper Cochabamba Valley, found that 31.5 percent of the major crops in that community (corn, potatoes, and wheat) were marketed. In Toralapa, another Upper Valley community, Dorsey's farm survey determined that 70 percent of output was marketed in 1965/66, compared with only 10 percent sold and 25 percent bartered in 1952 (Dorsey 1975a: 39). Most marketing in the Upper Valley since 1952, Dorsey reports (1975a: 2) was in newly-established fairs. 9/ Simmons (1974: 89) reported that farmers in the Upper Valley community of Palca greatly increased their market participation after 1952, but no figures were provided. In the Lower Cochabamba Valley communities of Parotani and Caramarca, Dorsey (1975b: 66-68) found another example of a dramatic increase in marketings, from less than 25 percent of output in 1952 to 86 and 64 percent, respectively, in 1967 and 82 and 75 percent in 1973.

9/ Before 1952 campesinos in the Upper Valley had to absorb high transport costs in bringing to Cochabamba or Punata products belonging to the hacendados.

Market participation in the Northern Altiplano is less than in Cochabamba, though it still is significantly higher than it was before 1952. In surveying the literature on this area, Wiggins (1976: 44) concluded that most farmers consumed about 80 percent of their output, though one-fourth marketed up to 60 percent. Burke's study of 4 ex-haciendas near Lake Titicaca found that 34 percent of these communities' output was marketed in the mid-1960s (1971: 313-314).

The increase in marketings by campesinos often reflected a shift away from basic food crops like potatoes and corn to vegetables. This was particularly true in the Lower Cochabamba Valley, where the shift to new crops seems to have been quite profitable.[10/] A similar shift occurred in some parts of the Altiplano, particularly near Lake Titicaca.[11/] On the other hand, potatoes, corn, and wheat continued to predominate in the Upper Cochabamba Valley, where very little irrigation water was available.

MARKETING MARGINS

In Bolivia, as in other developing countries, one encounters assertions that campesinos are exploited by middlemen (or should we now say middlepersons?). Ossío S. (1975), for example, reports that potato producers are being exploited. Exploitation is implied in the "conventional wisdom" about intermediaries summarized by Slater et al. (1969: 142).

10/ See Zuvekas (1977a: 31-40).

11/ For example, the community of Compi, where potatoes were the main crop before 1952, came to specialize in onions (Buechler and Buechler 1971).

Cattle ranchers believe that intermediaries have too much control over prices.[12/] There are also reports of farmers receiving less than the minimum price for certain commodities (Jacobs and Allen 1974, for wheat; Methodist Church in Bolivia 1972: 8, for rice); but in these cases it is not clear if the reason is exploitation or simply a normal absorption of transport costs by the producer. It is also not clear to what extent campesinos might be exploited by forward sales of their products to intermediaries, though some data are available for rice (see footnote 47).

On the whole, however, complaints about exploitation in Bolivia seem to be fewer than in other Latin American countries. The one detailed study of marketing processes, conducted in 1967 and limited to marketing in La Paz, found that almost all intermediaries were small operators with modest gross margins. Country assemblers (rescatadores), who handled more than half the food moving into La Paz, usually added 10-15 percent to the price paid to the farmer. For rice and bananas the figures were much higher, but this was necessary to absorb high transport costs (rice) or spoilage losses (bananas). Profit or net income data were not obtained, but it appeared that the operations of assemblers were not very profitable (Slater et al. 1969: 201).

Farmers marketing directly in La Paz generally received 60-70 percent of the retail value of their crops, while those selling to intermediaries in rural fairs received 50-60 percent (Slater et al. 1969: 199). Table 2 shows the percentage of the retail price absorbed at each level in the marketing process. An earlier study (Bartkowiak 1964) reported the following percentages of the retail price received by farmers:

12/ Interview with Sr. Luís E. Dorado Vásquez, Gerente General, Federación de Ganaderos de Santa Cruz (FEGASACRUZ), Santa Cruz, 16 November 1976.

TABLE 2

PERCENTAGE OF THE RETAIL PRICE IN LA PAZ ABSORBED AT VARIOUS LEVELS IN THE MARKETING PROCESS, 7 CROPS, 1967

A. Direct Marketing by Farmers in La Paz

	Producer	Rural Assembler	Wholesaler	Retailer	Total
Onions	52	0	28	20	100
Tomatoes	59	0	21	20	100
Carrots	60	0	18	22	100
Cabbage	62	0	17	21	100
Bananas	77	0	0	23	100
Rice	-	-	-	-	-
Potatoes (from Cochabamba)	69	0	15	16	100
Potatoes (from Altiplano)	69	0	15	16	100

B. Sales to Intermediaries at Rural Fairs or to Millers (Rice)

	Producer	Rural Assembler	Wholesaler	Retailer	Total
Onions	34	18	28	20	100
Tomatoes	45	14	21	20	100
Carrots	48	12	18	22	100
Cabbage	51	11	17	21	100
Bananas	52	25	0	23	100
Rice	56	22[a]	5	17	100
Potatoes (from Cochabamba)	61	8	15	16	100
Potatoes (from Altiplano)	54	15	15	16	100

Source: Slater et al. (1969: 198-203).

[a] Absorbed by miller.

bananas	20
cooking plantains	3%
oranges	47-50

More recently, Quintero Culbero (1974: 93-94) reported that US$ 9 million of the US$ 19 million retail value of rice was absorbed by taxes and by administrative costs.

In those cases where marketing costs are high, the explanation usually can be attributed simply to inadequate transportation, storage, and other parts of the marketing infrastructure (Bolivia, CONEPLAN, 1960: 57-58; Slater et al., passim; and Wiggins 1976: 44-50). This is not to say that no exploitation exists, 13/ but rather to suggest that farmers stand to gain much more from better roads, adequate storage facilities, and market price information than from attempts to control intermediaries' profits.

Possibilities exist for reducing retail marketing margins of dry goods, grocery items, beef, and potatoes, but only if retailers are consolidated into larger units. At present, the relatively high margins for staples (bread, 17 percent; rice, 16 percent; beef, 16-20 percent; and potatoes, 20 percent) 14/ could not be significantly reduced because sales volume of individual units is very low. With larger retail units, Slater et al. (1969: 207) suggest that economies of scale would permit the gross margin to fall to 10 percent without affecting profitability. Larger retailers, it was believed, might also be able to obtain quantity discounts of 2-

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13/ See the example of coffee marketing in the Weights and Measures/Grades and Standards section below. Also, considerable potential for exploitation exists where marketing deficiencies force farmers to sell their crops to intermediaries at low prices before the harvest.

14/ Slater et al. (1969: 73, 76). The weighted average gross margin for dry and processed goods was 15 percent.

5 percent for some products, further benefiting consumers (p. 205). Prospects for reducing costs of fruit and vegetable marketing were less promising (pp. 214-216).

TRANSPORTATION

There is widespread agreement that improved transportation facilities--particularly the construction or upgrading of roads--have played a major role in increasing agricultural production and income in Bolivia in the last two decades. This is particularly true for the Oriente, where the agrarian reform played only a minor role in increasing campesinos' opportunities to raise their incomes. The completion of the Santa Cruz-Cochabamba highway in 1954 was an especially important event, since this provided the first modern land link between the agriculturally productive lowlands and the much more populous highlands which constituted the major market for agricultural products. For the first time, many lowland products could be transported to the highlands and sold for less than imports. The "minimal" internal rate of return for this highway, and the associated infrastructure, was estimated to be 8-9 percent, excluding colonization and other difficult-to-measure benefits and based on conservative assumptions about future increases in the stream of benefits (Bergmann 1966).

Within the colonization areas in the lowlands, farmers' net returns per hectare were significantly related to transportation costs, which in turn depended on distance from all-weather roads (Henkel 1971; Royden 1972; Royden and Wennergren 1973; and Wennergren and Whitaker 1976). [15/] Galleguillos

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15/ Henkel's data are for the Chapare area in Cochabamba; the other studies were in Santa Cruz.

(1974) reports that poor transportation is the main reason for abandonment of land by colonists. Data from the Wennergren and Whitaker study are shown in Table 3. The authors calculated an ex post internal rate of return of 117 percent on investment in the access road and associated infrastructure in the Chane-Piray area north of Santa Cruz. Although one key assumption in this analysis may be questioned,[16/] there seems little doubt that the internal rate of return was in fact high. The spontaneous colonization in this area, moreover, was clearly more productive than directed colonization projects in Bolivia and elsewhere in Latin America (Nelson 1973).

In the Altiplano, Valles, and Yungas, campesinos' incomes would not likely have risen much without the agrarian reform, which--after some initial disruptions--gave them more control over production and marketing decisions. But in these regions, too, new road construction and other transportation improvements have been cited as important factors explaining the rise of new market towns and the greater opportunities for campesinos to increase their incomes (Barnes de Marschall 1970: 104; Buechler, in Heath, Erasmus, and Buechler, 1969: 223-224; Clark 1970; and Peinado Sotomayor 1971). Campesino incomes seem to be higher, and to have increased faster since 1952, in areas where existing roads to major markets were already adequate or where new roads were built--i.e., in the Northern Altiplano and Northern Valleys. [17/]

16/ Benefits were measured in 1972 and were assumed to be equal on a per capita basis in 1967-71. It is quite likely, however, that benefits were lower in these earlier years. On the other hand, income of the limited number of initial settlers in 1965-66 is not counted, and the definition of benefits was restricted to net direct benefits from increased agricultural production.

17/ See the data on rural income summarized in Zuvekas (1977a).

TABLE 3

NET RETURNS TO FAMILY LABOR AND LAND,
VARIOUS SECTORS, CHANE-PIRAY AREA, 1972

(pesos per hectare)

	Kilometers from Paved Road	Net Returns per Hectare			
		Sugarcane	Bananas	Rice	Average for All Crops
Chane	0- 6	1,332	363	333	936
Aguais	7-14	832	363	333	472
Sagrado Corazón	15-26	-	230	323	310
San Pedro	27-34	-	142	311	301
Calama	35-65	-	142	283	277
El Carmen	66-85	-	-	243	243
All Sectors	-	-	-	-	481

Source: Wennergren and Whitaker (1976: 92).

Despite recent road construction, the Bolivian road network is still poor. Of an estimated 37,313 kilometers in 1974, only 7,706 kilometers were classified as all-weather roads (see Table 4). [18/] The 5-Year Plan for 1976-1980 (Bolivia, MINPLAN, 1976) calls for the construction of an additional 470 kilometers of paved roads and 2,500 kilometers of gravel raods; 830 kilometers of existing roads are to be improved. Most of these are primary and secondary roads, with little attention apparently having been given to access roads. In view of the evidence on access roads cited above, their apparent neglect in the current plan may be questioned.

The current plan also calls for the construction of 650 kilometers of railways to add to the existing total of about 3,500 kilometers. Rail transport is now considerably less important than highway transport in moving agricultural products, but the two projects now being considered might increase the share moving by rail. One is a 442-kilometer line joining Bolivia's western system (which links the mining areas with the Pacific coast) and eastern system (linking Santa Cruz to Argentina and Brazil). The other is a 208-kilometer line to connect Santa Cruz with Trinidad, capital of the Beni. At present, most of the cattle grazed in the Beni are slaughtered there, and the meat is air-shipped to La Paz. Expansion of cattle-raising is largely limited to the growth of the domestic market, since exporting is made difficult by high transport costs and the poor quality of the beef. Completion of the two railway projects could facilitate the export of beef to markets in northern Chile, southern Peru, and

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18/ Unpublished data for 1976 showed a total of 37,560 kilometers, of which only 1,170 were paved and 6,500 gravel-surfaced. For additional details on the road network, see USAID/Bolivia (1974: 147-156).

TABLE 4

THE BOLIVIAN ROAD SYSTEM, 1974

Type of Road	All Weather	Passable During Rainy Season with Difficulty	Not Passable During Rainy Season	Total
Primary	4,875	2,832	-	7,707
Secondary	1,543	1,363	2,203	5,109
Local Access	1,288	3,444	19,765	24,497
TOTAL	7,706	7,639	21,968	37,313

Source: USAID/Bolivia (1974: 151).

Brazil. Exportation of other agricultural products (see below) might also be encouraged.

A few caveats on rail transport, however, are in order. The railroads have had a history of operating at a deficit, and after 1957 they began to lose traffic to trucks. A major transport study conducted a decade ago concluded that most of the rail system should be abandoned (Daniel, Mann, Johnson, and Mendenhall 1968, as cited in South 1972: 48). The Bolivian government chose instead to follow a strategy of rehabilitation and modernization, for which financing was obtained from the World Bank. Whether this ultimately will make rail transport competitive with road transport--including planned roads connecting the Beni with La Paz and Santa Cruz--remains to be seen.

Another aspect of the Bolivian transportation system, as it relates to agricultural marketing, is the distribution of food from truckers to wholesalers. The Michigan State University team studying agricultural marketing in La Paz investigated the desirability of constructing a market terminal to replace the existing facilities dispersed throughout the city (Slater et al. 1969: 233-234). They found that both truckers and wholesalers were satisfied with the existing system, and concluded that a terminal facility was not justified until both wholesaling and retailing activities became more consolidated.

> It should be noted that existing market areas at present get double use. Wholesaling transactions take place at night or in the early morning hours. The public, on the other hand, utilizes the market areas during the day. The present system, while lacking in aesthetic appeal, is relatively efficient for the present retail market structure (p. 233).

Data on transport costs are considered weak by grain marketing specialists Pfost and Niernberger (1973). The Ministry of Agriculture published data on truck transport rates per quintal from 81 major rural communities to their respective Departmental capitals; but the quality of these data is not known and should be checked. 19/ Data for transport rates between major cities are presented in Table 5. Given the reported high degree of competition among truckers, transport rates may not vary much for a given route, so even if the reported figures are based on small samples they might be fairly accurate. What they do not tell us, however, is the cost of transporting products from the farm to the 81 rural centers.

WEIGHTS AND MEASURES; GRADES AND STANDARDS

The metric system was adopted by law in 1930, but numerous other systems of weights and measures continue to be used in local areas. In Santa Cruz, for example, rice production is calculated in fanegas with a standard weight of 384 pounds. But in Chuquisaca, a fanega of wheat varies from 160 to 185 pounds (Erasmus in Heath, Erasmus, and Buechler 1969: 153). Weights for potatoes are reported in cargas, but this unit varies regionally from 46 kilos to 115 kilos, making it difficult to compare unit prices among regions (USAID/Bolivia 1974: 144-145). 20/ In Chuquisaca, a carga

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19/ Considerable variations are reported for rates per kilometer, but this is probably due primarily to differences in road conditions.

20/ Even within the same provinces, weights may vary considerably. In Pacajas (La Paz), for example, a carga is 71 kilos for potatoes but 59 kilos for chuño (dried potatoes). It is quite likely that weights in a specific locale also vary for the same commodity.

TABLE 5

TRUCK TRANSPORT RATES BETWEEN MAJOR CITIES, 1974
(U.S.. dollars)

	Per qq.	Kilometers
La Paz-Santa Cruz	1.35	903
La Paz-Cochabamba	0.60	403
La Paz-Oruro	0.38	230
La Paz-Potosí	0.95	574
La Paz-Sucre	1.10	740
La Paz-Tarija	1.65	952
La Paz-Camiri	2.20	1,211
Cochabamba-Santa Cruz	0.85	500
Cochabamba-Oruro	0.45	228
Cochabamba-Matarani	1.90	1,048
Santa Cruz-Sucre	0.90	608
Santa Cruz-Tarija	2.00	1,120
Santa Cruz-Potosí	1.30	774
La Paz-Matarani	0.76	665
Matarani-Santa Cruz	2.45	1,584

Source: USAID/Bolivia (1974: 154), based on data from the Sindicato de Transportistas.

of potatoes weighs 130-165 pounds, but for corn the range is 110-140 pounds. Corn in Chuquisaca is also sold by the tercio, whose weight ranges from 125 to 150 pounds.

Differences in weight for any particular unit, of course, provide the buyer an indirect means of paying lower prices for farm produce. While lower prices (i.e., "heavy" units of weight) can sometimes be explained by transport costs absorbed by the farmer, variable-weight units permit intermediaries to exploit the farmer. 21/ An example is provided by Heath (1966) for coffee marketing in Nor Yungas province (La Paz): intermediaries purchased coffee from farmers in arrobas of 32 pounds and resold it in La Paz in arrobas of 29 pounds. Largely through the efforts of the local campesino unions, a uniform arroba of 25 pounds was eventually established for coffee. 22/

Effective systems of grades and standards have been established for only a few commodities. There is no grading of fruits and vegetables. The grading of beef is only partial; in 1967, for example, the municipality of La Paz permitted a differential of only US$ 0.08 between the cheapest and most expensive cuts (Slater et al. 1969: 109). Accordingly, ranchers had little incentive to fatten cattle to obtain higher-quality

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21/ An interesting thesis project for a Bolivian economics student would be a study to determine the extent to which variable weights can be explained by differences in transportation and other marketing costs, and the extent to which they are accounted for by intermediaries' profits.

22/ The arroba is widely used throughout Bolivia for a variety of farm commodities. Although it has a standard weight (25 pounds) which usually seems to be adhered to, marketing abuses such as that reported for coffee sometimes occur.

cuts or to slaughter carefully (Slater et al. 1969: 109). [23] There is some inspection of beef in urban markets, but slaughterhouses are largely unregulated.

A wool grading system, with 7 grades, was introduced in 1965 and is being used by most buyers. Grading systems are also employed for several grains. Rice mills pay variable prices in accordance with broken grains, humidity, and foreign matter; there is also a premium for long-grain rice. Wheat is graded for moisture, foreign material, and test weight. [24] The brewery in La Paz grades barley according to moisture content, foreign material, and kernel diameter; but controls for moldy or insect-damaged grain are inadequate. The milk plant pays differential prices according to butterfat content at 0.1 percent intervals. In addition, all milk is tested for acid, dirt, and foreign matter before entering the plant (Pfost and Niernberger 1973: 63-64; USAID/Bolivia 1974: 144-146).

STORAGE, PACKAGING, AND HANDLING FACILITIES

Grain storage consultants Pfost and Niernberger (1973) found that the government had not compiled a list of on- and off-farm grain storage facili-

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[23] Toward the end of 1976, the Federación de Ganaderos de Santa Cruz (FEGASACRUZ) was attempting to negotiate a contract with the largest municipal-owned slaughterhouse in Santa Cruz to institute a system of grades and to regulate supply in order to eliminate sharp seasonal fluctuations in prices (Interview with Sr. Luís E. Dorado Vásquez, Gerente General, FEGASACRUZ, Santa Cruz, 16 November 1976). The proposed arrangement also calls for inspection of cattle to maintain sanitary conditions.

[24] Pfost and Niernberger (1973) have suggested that wheat be marketed throug a network of small country buying stations. As they point out (pp. 62-63), this would not permit the use of more sophisticated quality standard (e.g., gluten and protein measurements) because the equipment would be to costly for such small operations.

ties. Their own estimates for 1973, obtained from private industry sources, were as follows (pp. 40-41):

Wheat	37,500 MT (30,000 warehouse; 7,500 bulk)
Corn	1,300 MT
Barley	7,500 MT (warehouse facilities at breweries)
Rice	7,500 MT 25/ (warehouse facilities at mills)
Soybeans	1,000 MT

All of the above facilities were privately owned. The government, however, was then completing construction of silo storage and drying facilities for rice, with a capacity of 26,700 MT, in Santa Cruz.

More recent data were not obtained, but additional facilities have been constructed in the last few years, and in percentage terms the increases may have been substantial for some grains. Nevertheless, grain storage capacity still seems to be generally quite low.

Most existing facilities take few precautions against humidity, disease, insects, and rodents (USAID/Bolivia 1974: 143). While these are not serious problems in the highlands, the high humidity in the lowland areas around the city of Santa Cruz makes it difficult to store grain for longer than a few months without serious damage. 26/ In addition to these storage deficiencies for grains, handling problems are also reported (USAID/Bolivia 1974: 143).

25/ Later in their report, however, the authors stated that the Empresa Nacional del Arroz had leased warehouse space for 1974 with a total capacity of 23,680 MT (p. 57).

26/ Hargreaves (1971) had reported average humidity in Santa Cruz to be 71-75 percent, implying an equilibrium moisture content in wheat of 14 percent. But Pfost and Niernberger (1973: 6) determined that the humidity figures (the only ones available) refer to daytime hours only. They suggest that the average humidity may in fact be about 85 percent, implying an equilibrium moisture content of 17 percent.

Niernberger and Pfost (1971: 16-20) recommend that wheat storage and marketing be improved through the construction of small buying stations in the traditional wheat areas, where most wheat is produced by small farmers. [27/] Given the small sales volume of the individual farmers, and the favorable environment for storage, facilities for wheat need not be elaborate: construction, they say, should be "of native materials wherever possible, utilizing cooperative labor, and of bagged warehouse design.. . . . The only bulk storage recommended . . . within the next 10 years would be at flour mills where classifying and comingling of purchases is possible" (p. 2).

Given the small volume that local buying stations would handle, and the desirability of spreading overhead costs, Niernberger and Pfost (1971) recommended that these stations assume other functions such as (1) buying and storing other locally produced grains, as well as potatoes and wool; (2) selling farm supplies; and (3) reselling grains to the local community. Before these and higher-level storage facilities are constructed, however, more needs to be known about production, distribution, and consumption at the local level. Existing data, according to Pfost and Niernberger (1973: 85) are "too limited to reasonably establish location and size of purchasing centers, secondary storages and final distribution systems." Accordingly, they argue (pp. 86-87), construction of local purchasing and storage stations should be only on a pilot basis.

27/ If farmers have to travel more than 30 kilometers to market their wheat, it is argued, they will be tempted to dispose of their surplus production by converting it to eggs and meat. For additional comments on local buying stations, and a Bolivian government proposal to establish 6 such centers, see Pfost and Niernberger (1973).

Attention must also be given to price policy. The policy of maintaining the same wheat price throughout the year discourages private investment in storage facilities at all levels. Incentives could be provided by progressively raising the price guaranty during the course of the crop season, starting with the harvest. Without this change, producers will still lobby for government-owned facilities, which might operate at a loss: mills and intermediaries will purchase easily assembled wheat early in the season from larger producers, leaving the government with high-assembly-cost, low-volume operations throughout the crop season. Turnover could be low under these circumstances, increasing the risk of storage losses (Niernberger and Pfost 1971: 21-24).

Partial information on use of storage facilities by farmers is available from the 1967 study by the Michigan State University team (Slater et al. 1969: 145). The percentage of farmers in the 4 areas studied who stored some of their output was as follows: 28/

Yungas	26
Río Abajo-Altiplano	53
Cochabamba	33
Santa Cruz	70

The figures for three of these areas are not difficult to explain: most of the Yungas farmers produced bananas, a highly perishable crop; most of those in Santa Cruz grew rice, which even with high humidity could be stored for a few months. Río Abajo-Altiplano farmers produced perishable vegetables but also potatoes, which on the Altiplano can be stored in rather simple facilities. The low figure for Cochabamba is more surprising; although

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28/ Note that the proportion of marketed crops stored is not indicated.

many farmers there find production of perishables highly profitable, there is also considerable production of potatoes and grains. Since only one-third of the Cochabamba farmers sampled said they would sell at low harvest-time prices in a saturated market, it is possible that their low utilization of storage facilities reflects the existence of alternative market outlets outside the immediate area. 29/

The nature of the storage facilities used by the farmers interviewed in this study is not indicated. Presumably these are primitive on-farm facilities where prolonged storage can result in significant losses. Wiggins (1976: 46) reports potato and oca losses to fungi and dehydration of up to 20 percent in the northern Altiplano, and perhaps 5 percent of the quinua crop was lost to insects and rodents.

Spoilage rates for perishables are not as high as might be expected, though there is room for improvement through better packaging and handling. The Michigan State study found that 15 percent of the bananas and tomatoes suffered complete spoilage loss at the wholesale level, while an additional 15-20 percent sold at a discount because of deterioration. Given the small scale of both assembly and wholesale operations, the prospects for invest-

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29/ Insufficient information was available on this subject. Moreover, the 1967 sutdy did not provide enough data on crop mix by area to determine to what extent use of storage facilities could be related to crop perishability. A study of shipments of agricultural products from Cochabamba, conducted by the Corporación de Desarollo de Cochabamba (CORDECO, in process), shows that more than 70 percent consists of perishable fruits and vegatables. Data on rail shipments, however, seem incomplete, and the relative importance of perishables in local marketings is not known.

ment in handling and packaging equipment were not encouraging. 30/

Little information was found on recent developments in storage, packaging, and handling for the commodities discussed above. A marketing survey of 21 commodities by Jacobs (1974) suggests that few changes had occurred in the marketing of bananas since the Mighigan State study was conducted in 1967. The information on grain storage was basically the same as that provided by Pfost and Niernberger (1973). It seems appropriate to recommend that a survey of storage, packaging, and handling be undertaken in the near future as part of a general study of agricultural marketing.

FOOD PROCESSING

Many of Bolivia's food products go through some form of industrial transformation before reaching ultimate consumers. For example, rice and wheat are milled; both domestic and imported wheat flour are used to make bread and pasta; milk is pasteurized and some is made into butter, cheese, and other dairy products; meat and meat by-products are processed in slaughterhouses; and several plants have recently been established to produce soybean oil. Still, food processing plays only a modest role in the country's economy: though it accounted for 18 percent of manufacturing output in

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30/ Bananas were being transported to La Paz from the Yungas in rawhide nets lined with banana leaves and containing 1,000-1,200 banana fingers. They were then ripened in an uncontrolled atmosphere. To reduce spoilage, they could be packaged in smaller lots in nesting baskets locally woven from reeds. Ripening could take place in special rooms with controlled atmospheres. Investment in these improvements, however, is not feasible for small wholesalers (Slater et al. 1969: 232).

1965, this represented only 2.5 percent of the GDP in that year.

Some food processing industries are plagued by excess capacity. A high proportion of wheat milling capacity has long been unutilized, due in part to government policies that encouraged the importation of wheat already milled into flour (see below). This had adverse effects on the unit costs of domestically produced flour (Boomkamp 1966). The country's 12 flour mills had a capacity of 119,620 MT/year in 1973, but only about half that amount was being utilized (Pfost and Niernberger 1973: 41). It was reported to this writer that a pineapple canning factory and a pork processing plant near Santa Cruz were idle; the reasons, however, were not known.

There is also considerable unused capacity in oilcrop processing. As of October 1976 Bolivia had 6 oilcrop processing plants with a capacity of 137,920 MT/year (soybeans or cottonseed); 2 additional plants with a capacity of 111,420 MT were under construction. Although there is considerable scope for import substitution in vegetable oils, soybean processing has been limited by the small local demand for the major by-products, soybean meal and soybean cake. 31/ Exports of by-products are limited by high transport costs, but successful exports of cottonseed cake to Brazil and Argentina (Jacobs 1974: 71) suggest that the transport-cost barrier is not prohibitively high.

Other food processing industries have likewise paid little attention to by-products. Potentially valuable by-products of meat processing, it

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31/ Little has been done to exploit the potential for selling these by-products to the rapidly growing poultry industry. Another market possibility is the use of soybean meal (6 percent) as an additive to wheat flour (Bolivia, MACA, 1976c: 26-31).

is said, are lost because slaughterhouses lack the facilities for processing them (USAID/Bolivia 1974: 143). While wastage might be a rational economic response to an absence of markets, it can also result from ignorance of economic opportunities, lack of know-how in exploiting known opportunities, or lack of credit to do so. The absence of markets for wheat by-products has been cited as one factor contributing to high flour milling costs, but again the real problem might be failure to exploit potential markets.

Processing of fruits and vegetables is still a very modest activity. For example, only 0.5 percent of the orange crop in 1972 was destined for industrial transformation, and for other tropical fruits the percentage was even less (Jacobs 1974: 30). Factors limiting the development of this branch of food processing include a small domestic demand (and therefore high unit cost) because of low incomes, high transportation costs restricting entry to export markets, and poor product quality. A 1965 study found that local canned goods had a difficult time competing against imports, even though the latter were almost twice as expensive as local products. Part of the problem with local products was the poor quality of the locally hand-made cans (Landes 1965).

MARKETING COOPERATIVES AND PRODUCERS' ASSOCIATIONS

As this writer has noted elsewhere, [32/] the cooperative movement in Bolivia has had a notable lack of success. Recent anthropological studies suggest that cooperative traditions in Bolivia are weaker and more limited

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32/ See Zuvekas (1977b: 97-98).

in scope than has usually been assumed. Government efforts to organize production cooperatives generally failed during the 1950s, and this experience might cause direct government promotion of marketing cooperatives to be met with resistance.

Marketing cooperatives have been recommended by some writers (Chueca Sotomayor 1974; Fehmerling 1961; Gandarillas and Bustillo 1970; and Valencia Vega 1972); but production cooperatives, interestingly, have received even more attention (see the references cited in Zuvekas 1977b: 97). It would seem, however, that marketing cooperatives pose less of a threat to the individualistic tradition of campesinos than production cooperatives. At present, marketing cooperatives are considerably less important than production cooperatives, which themselves are quite weak. 33/

Medium- and large-size farmers have sometimes formed producers' associations with more limited objectives than marketing cooperatives. These groups seek to increase incomes for their members by lobbying for changes in government policies affecting credit, prices, taxes, tariffs, etc. The most effective producer associations are reported to be the Asociación de Productores Algodoneros (ADEPA), the Asociación Nacional de Avicultores (ANA), the Asociación de Productores Lecheros (APL), the Federación de Cañeros de Santa Cruz (FECASAC), and the Federación de Ganaderos del Beni (FEGABE) (USAID/Bolivia 1974: 69-70). The Federación de Ganaderos de Santa Cruz

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33/ As of March 1974, the number of cooperatives and their membership were as follows:

	Number of Cooperatives	Number of Members
Production Cooperatives	565	22,870
Marketing Cooperatives	122	4,850

No consideration appears to have been given to the formation of Canadian- or Australian-type marketing boards as an alternative to cooperatives.

(FEGASACRUZ) is also beginning to show signs of acquiring some influence over policy.

PRICE POLICY [34/]

Since the late 1950s, the Bolivian government, through the Ministry of Industry, Commerce, and Tourism, has regulated the retail prices of food products by imposing ceilings on prices paid by urban consumers. These controls were applied to imported food items such as wheat flour, lard, edible oils, and dairy products, as well as to domestic products including rice, coffee, sugar, beef, and vegetables. The price of cotton has also been controlled.

Between 1957 and 1964 food prices did in fact rise more slowly in La Paz (36 percent) than the general index of consumer prices (72 percent). It is not clear, though, whether this was due mainly to the effectiveness of price controls or to a recovery in agricultural production and marketings. Interpretation of the data is further complicated by serious deficiencies in the construction of the price indices (Whitehead 1969).

Bearing in mind the limitations of the data, it is interesting to note the sharp reversal in relative food price trends reported after 1964. Despite the existence of price controls, food prices between 1964 and 1972 rose by 66 percent, compared with an increase in the general level of consumer prices of 51 percent. The next two years constituted a period of rapid inflation, brought about by rising world market prices and by the devaluation of the peso from 12 to 20 to the dollar in 1972. Food price

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34/ Part of this section is drawn from Zuvekas (1977b: 67-69).

increases between 1972 and 1974 (145 percent) again outpaced the rise in the general index (114 percent), due both to the specific effects of the devaluation, which encouraged a shift into export crops, and to a relaxation of price controls for domestic foodstuffs in January 1974. 35/

In 1975 and 1976 inflation slowed considerably to an annual rate of 6.2 percent. Food prices reversed their relative upward trend, rising at an annual rate of less than 4 percent. 36/

Table 6 presents data on agricultural prices at various stages in the marketing process, as reported by the Ministry of Agriculture. The quality of these data is questionable, but at the retail level the price increases reported for 1970-75 are not too different, on the whole, from those reported in the consumer price index. 37/ A comparison of the wholesale and retail price trends in Table 6 shows a mixed picture, suggesting that retailers' marketing margins, on the whole, changed relatively little. Farm-gate prices, however, generally rose more rapidly than either wholesale or retail prices, suggesting that wholesalers' margins might have been squeezed. Since the data are open to question, these conclusions must be regarded as tentative.

35/ The relaxation of price controls benefited producers of lowland products more than producers in the Altiplano and Valles. There was strong opposition in Cochabamba to the pattern of price increases, and the government resorted to force to contain the protests there (Whitehead 1976: 64).

36/ Based on data through the first 9 months of 1976.

37/ On an unweighted basis, the average increase for the 13 commodities in Table 6 for which retail price data are provided was 199 percent between 1970 and 1975. For the longer list of 55 commodities in the original source, the unweighted average increase was 207 percent. The increase in the food component of the consumer price index was 186 percent.

TABLE 6

PRICE INDICES OF SELECTED AGRICULTURAL PRODUCTS AT THE FARM-GATE, WHOLESALE, AND RETAIL LEVELS, 1975

(1970 = 100)

Commodity	Marketing Level[a]		
	Farm Gate	Wholesale	Retail
Rice	786	366	369
Corn (yellow, Cuban)	571	343	340
Wheat	348	403	351
Barley	368	n.a.	n.a.
Potatoes (top grade)	280	245	222
Coffee	163	n.a.	n.a.
Sugarcane/sugar	419	315[d]	n.a.
Cotton fiber	236[b]	n.a.	n.a.
Onions	250	265	208
Broad beans	210	330	300
Tomatoes	300	243	320
Oranges	280	221	240
Bananas	333	278	300
Beef	320[c]	n.a.	286
Mutton and lamb	460[c]	n.a.	285
Pork	667[c]	n.a.	322
Chicken	347[c]	n.a.	340

Source: Bolivia, MACA (1976a).

a Farm-gate prices are nationwide averages. The wholesale and retail price data refer only to the city of La Paz.

b 1974.

c Price per animal.

d 1974; based on 1971 = 100.

n.a. Not available.

A few comments and speculations may be made about the effects of price controls on individual products. The establishment of price ceilings on beef at levels well below world-market prices, combined with a temporary ban on beef exports in the early 1970s, encouraged contraband exports to neighboring countries where higher prices could be obtained (Asociación de Consultores 1975: Vol. III, pp. 61, 76). Rice has also been exported illegally, but since 1974 this has been due to surplus domestic production stimulated by a sharp rise in prices paid by the Empresa Nacional del Arroz, which purchases most of the rice milled in Bolivia. Contraband (or even legal) export opportunities, however, will be limited if prices are again allowed to lag behind world market levels. As the current agricultural development plan points out, low producer prices discourage the improvements in productivity and quality necessary for Bolivia to participate significantly in world markets (Bolivia, MACA, 1976d: 21).

Prices of cotton and coffee have also been controlled, and only after domestic demand is met have exports at the world market price been permitted (Wennergren and Whitaker 1975: 94). Control of the prices of imported foodstuffs (see above), through various subsidy arrangements, probably has discouraged import substitution in these commodities. 38/ Price controls on potatoes and garden vegetables do not seem to have been very effective (Gardner 1974; Wennergren and Whitaker 1975: 95).

Just how much could agricultural production be expected to increase if all price controls, import subsidies, and quantitative restrictions were

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38/ After 1972, though, food subsidies were lowered because of budgetary problems arising from the 1972 devaluation (Herrman 1974: 3).

removed? Herrman (1974: 1) argues that "the rate of growth of agricultural output would increase appreciably"; but statistical investigations of the supply response capability of Bolivian agriculture (using admittedly poor data) suggest that the aggregate supply response would be rather modest, in large part because most farmers have access only to traditional technology (Whitaker 1975: 16). Higher prices paid to farmers might be considered as a means of increasing output of specific crops whose supply elasticity seems fairly high (e.g., rice, sugarcane, and cotton), but this might be accomplished only at the expense of other crops. In Whitaker's view, the most promising approach to increasing aggregate supply is not price manipulation but rather "investments in improving factor and product markets and research and extension services" (1975: 19).

While government price policy until 1974 attempted, with varying degrees of success, to favor urban consumers, price support schemes benefiting producers have also been used from time to time (see the sections on wheat and rice below). Nevertheless, price supports have been used sparingly, and the government has been aware of their limitations. For example, though the Planning Board's socio-economic strategy document for 1971-1991 criticized past government policy favoring food imports, it was concluded that Bolivia lacked the market and storage infrastructure necessary to make price supports effective, especially in an environment where production was dispersed among thousands of minifundistas (Bolivia, MINPLAN, 1970: 175-184). The same conclusion was expressed 3 years later (Bolivia, CONEPLAN, 1973: Agricultural Sector section, p. 5).

The current national development plan indicates that the government intends to continue its post-1974 policy of relatively free agricultural prices. Price policy, it is stated, will be based on production costs and

productivity levels and will not subsidize inefficiency (Bolivia, MINPLAN, 1976: 146).

OTHER GOVERNMENT POLICIES

Apart from price controls, government policy can influence agricultural production and marketing in many other ways. During the 1950s an overvalued exchange rate favored food imports and acted as a disincentive to domestic production and export marketing (UN/ECLA 1957). This situation was remedied by the monetary stabilization program undertaken in the late 1950s, but the exchange rate again became overvalued during the 1960s and remained so until the devaluation of 1972.

The government can also influence agricultural marketing by attempting to reduce the complexity of the food distribution system. A Ministry of Agriculture document published several years ago argued that "improvements in marketing should be based on the elimination of ferias and the strengthening of producer associations, [in order to] establish direct contact between consumers and wholesalers in urban centers" (Bolivia, MACA, 1974b: 42). While producer associations have in fact been encouraged, overt actions to eliminate ferias would be politically risky and appear not to have been attempted. The 1976-80 development plan lists as one of the 4 agricultural sector objectives, increased efficiency in production and marketing to lower costs and increase producers' profit margins. The role of middlemen, it is said, will be reduced; but how this is to be done is not specified (Bolivia, MINPLAN, 1976: 144-146).

Finally, the government could establish a marketing price information system, which can help farmers make more rational decisions regarding the

timing of sales and the desirability of on-farm or community-level storage facilities. To the extent that price information stimulates the construction of storage facilities, seasonal price fluctuations would be narrowed.

SPECIFIC CROPS AND TYPES OF LIVESTOCK

Specific commodities have been mentioned above from time to time for purposes of illustration. The focus, however, was on one or another aspect of the marketing process. It is useful to supplement these discussions by focusing also on specific crops and types of livestock. Some duplication is inevitable, but additional information will be provided.

Wheat

Wheat has long been one of Bolivia's principal food imports. Government policies toward increasing domestic production have been equivocal, and the results until the late 1960s were quite disappointing. 39/ Even with recent gains, however, domestic production supplies only about one-fourth of consumption. Self-sufficiency in wheat is an unrealistic goal

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39/ There are several competing time series for wheat production in the 1950s and 1960s, with large discrepancies regarding not only levels of production but also direction of year-to-year changes. It would appear, though, that the long-run trend from the early 1950s through the mid-1960s was a horizontal line, though annual deviations from this trend were considerable. Notable among the short-term movements was a sharp decline in production from the early 1960s to the mid-1960s. Production and productivity gains since then, however, have been encouraging (Zuvekas 1977b).

given the prevailing technology [40/] and the higher profitability of corn and potatoes; but there is still some scope for increasing domestic production, both through higher productivity and by expanding the land area devoted to wheat.

There is considerable controversy concerning the reasons for the stagnation of wheat production in the 1950s and 1960s. Lack of progress has been attributed to the agrarian reform, the stimulus to imports provided by an overvalued exchange rate, the disincentive effects of PL 480 programs, government price policies, marketing problems, and various combinations of these alleged obstacles. For example, Rasberger (1965) sees PL 480 aid as a major deterrent to increased wheat production, while Roberts (1967) disagrees and places the blame instead on agrarian-reform and price-control policies which preceded PL 480 imports. A review of Bolivian economic policies by ECLA ("Economic Policy" 1967) agrees with Roberts that price (and exchange) policies discouraged wheat production, but argues that agrarian reform was not a negative force.

Aldunate Guillen (1971), Boomkamp (1966), and Burke (1968 and 1971) stress the price advantage to millers of using imported wheat and, especially, flour. Boomkamp describes Bolivia's wheat problem as basically one of marketing, not production, and recommends a tax on imported flour, the proceeds of which would be used to lower the costs of wheat imported by the mills and to increase prices paid for domestic wheat. Millers, he argues, should be required to sell 1 qq. of domestic flour for each 4 qq.

40/ Low-cost production of wheat requires large amounts of both capital and relatively flat land relative to labor. Few areas in the Valles have large expanses of suitable land. There is considerable potential in the Oriente, but only if more productive subtropical varieties can be developed to overcome the disadvantages of high irrigation costs and greater profitability of competing crops.

imported. Burke (1968), who notes that only 10 percent of Bolivia's wheat production was milled into flour, argues that the opportunity cost of increasing domestic wheat and flour production would be low because of the existence of underemployment in wheat growing areas and excess capacity in the milling industry.

Other marketing problems such as poor roads, a shortage of trucks, lack of storage facilities, and lack of campesino organization have been cited by Gardner (1970), Hall (1968), Jacobs and Allen (1974), Niernberger and Pfost (1973), Torrico Arze, Terrazas, and Salas Duran (1962), and USAID/Bolivia (1976). Jacobs and Allen, who surveyed 100 farmers in Cochabamba, Sucre, and Tarija, found that only 16 of the 71 who marketed their wheat received the official price. The remainder presumably had to absorb transport costs in one fashion or another; 45 farmers, for example, sold their crop to intermediaries.

Another obstacle to wheat production, cited by Boomkamp (1966) and by USAID/Bolivia (1963), is the lack of a market for wheat-milling by-products. There is considerable potential for using these by-products in animal feeding programs, but little has been done to develop this market.

Wheat production increases since the late 1960s have been made possible to a large degree by increased extension efforts and the introduction of new varieties. In 1973 the government also sought to encourage increased production through higher prices in the form of a subsidy channeled through millers to sellers (farmers or intermediaries). [41/] When initially established in May 1973 for that year's wheat crop, the wheat support price

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41/ Subsidies were necessary because of the decision to hold down prices of flour and bread.

reflected world market conditions. But by mid-July world market prices had roughly doubled, making it profitable for producers, intermediaries, and millers to smuggle grain (or flour produced from U.S. wheat) out of the country (Pfost and Niernberger 1973: 17, 81-84).

A different kind of problem occurred in 1974. Prices were set at US$ 209 per MT at a time when world market prices were in the US$ 200-240 range. Subsequently, however, world prices fell to US$ 135-165 and millers found it unattractive to purchase locally produced wheat when imports could be obtained for about US$ 150 CIF. The government apparently feels that it does not have the power to force millers to buy from local sources, and it lacks the storage capacity needed to make direct purchases. As a result, the wheat price support policy has been ineffective (USAID/Bolivia 1976: 12). Another problem, discussed by Niernberger and Pfost (1971: 3), is that a fixed support price throughout the crop year discourages storage.

The 1976-80 agricultural development plan (MACA 1976d: 43), interestingly, has concluded that further efforts to rapidly increase domestic wheat production should have low priority: "Wheat does not have a clear comparative advantage, either among cereals or other similar crops. It is probably cheaper to import wheat to meet Bolivia's needs than to produce it locally." This suggests not only that little attention will be given to wheat production technology, but also that little effort will be made to introduce the kind of marketing and storage improvements recommended by Niernberger and Pfost (see above).

Rice

Production of rice was stimulated during the 1950s by the opening of the Cochabamba-Santa Cruz highway in 1954, by the colonization of the east-

ern lowlands which this road and other government programs encouraged, and by technical assistance provided by U.S. advisors. Subsequently, the knowledge brought to Bolivia by Okinawan and Japanese colonists, and their on-site adaptive research, further stimulated production and productivity increases.

Still, the average production of 38,600 MT of rough rice during 1961-63 was insufficient to satisfy domestic demand. Not until the late 1960s, when production had reached an average of 76,500 MT, was domestic demand met and an export surplus a very real possibility. Production and cost difficulties, however, limited export prospects, and output during 1971-74 increased only modestly to an average of 83,400 MT. In 1975 production jumped sharply to 126,000 MT, and while some exports (both legal and contraband) were made, domestic stocks began to accumulate. 42/ By mid-1976, according to figures supplied by the Empresa Nacional del Arroz, domestic stocks were equivalent to about 3 years' consumption. 43/ Concerned about the mounting surplus, the government decided not to make any credit available for rice during the 1976-77 crop year.

Marketing improvements in the form of improved road transport have clearly played a major role in the expansion of rice production. The Cochabamba-Santa Cruz highway, penetration roads connecting Santa Cruz with nearby colonization areas, and access roads enabled colonists to supply cash crops to urban populations in both the lowlands and the highlands. Rice

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42/ Quintero Culbero (1974: 95-97) argues that there is considerable scope for expanding the domestic market, since per capita consumption is relatively low. But this ignores effective demand at government-regulated prices.

43/ Stocks as of 10 July 1976 amounted to 1,200,000 qq. (Empresa Nacional del Arroz, unpublished data).

was particularly attractive because it was a relatively easily established, low-risk crop providing quick returns.

Government rice marketing programs also have stimulated production, though the first such effort was only temporarily and partially successful. 44/ In 1959 a guaranteed floor price was established for rice, and credit was made available to growers. But government purchases began too late (after the harvest), and the credit program benefited only a handful of farmers. Still, the announcement of the price guaranty apparently induced farmers to increase their plantings in 1960. In that year, the government created the Comité Nacional de Comercialización del Arroz (CONCA), a quasi-governmental entity that ultimately was to be controlled by rice growers. CONCA was to (1) provide technical assistance in fertilizer and pesticide use, harvesting, and handling; (2) provide administrative guidance to cooperatives; (3) establish a rice grading system; (4) set minimum producer prices for each grade; (5) help processing plants acquire better equipment; (6) provide storage facilities for rough and processed rice; and (7) establish a marketing system with equitable prices for consumers. Purchases of rice would be made at relatively low harvest-time prices, but farmers were still expected to benefit from the price guaranty. Consumers would also gain, both from a lower average price and from the fact that storage facilities would dampen price fluctuations and assure a reasonably constant supply throughout the year.

44/ This discussion of government efforts is based mainly on Slater et al. (1969: 218-223). For additional details on rice production and marketing in the early and mid-1960s, see Moran (1968) and Tailby (1966).

Rice production did increase, [45/] but CONCA was only a short-lived entity. It suffered a financial collapse in 1963 after its support price proved to be higher than the market price. Other problems included illegal speculation, questionable loans, and generally poor management. In addition, CONCA lacked adequate storage facilities and funds to make timely purchases. In its peak year of operation, it handled only 6 percent of the crop. After CONCA's collapse, production was reported to have declined in 1964 and 1965; though revised data now show a steady increase during the early and mid-1960s, the earlier data are very likely more accurate.

In 1965 the government re-entered the rice marketing picture by providing assistance for the establishment of a Federación Nacional de Cooperativistas Arroceros (FENCA). The marketing, credit, and cooperative-organization programs planned for FENCA, however, were never fully developed. FENCA continues to exist as a modest-size entity representing 110 cooperatives with 4,000 members. Its members are believed to have an average of 5 hectares of rice land; large growers generally are not members. According to FENCA sources, about 40 percent of the credit for the 1975-76 crop went to its members. The absence of credit for rice production during the 1976-77 crop year is bound to hurt FENCA's membership. Intervention of FENCA's management by the Instituto Nacional de Cooperativas, in early 1976, indicates that it has other problems as well.

The marketing system in 1971 as described by Niernberger and Pfost (1971) imposed numerous burdens on producers bringing their rice to the mills for processing and sale. During the height of the harvest season,

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45/ Statistics on the extent of the increase vary. Recently revised data show production rising from 34,285 MT in 1961 to 42,855 MT in 1963. Earlier data show a more modest increase, from 59,000 MT in 1960 to 63,000 MT in 1963.

producers sometimes had to wait in line at the mill for two weeks until their turn came for milling. Drying space was scarce and fees were sometimes charged. Growers thus incurred transport, drying, and milling costs. They also risked theft or quality loss until sale to the Banco Agrícola, the sole buyer. 46/ Moreover, storage charges were passed on to sellers by the mills, who were not paid for on-site storage by the Banco Agrícola. Growers who sold to intermediaries, of course, also had to absorb these costs as well as the fees charged by the intermediaries.

In 1973 the government revived a CONCA-type program by establishing the Empresa Nacional del Arroz (ENA). Under this program, rice is purchased at a fixed price by the 250 or so mills, acting in effect as ENA's agents. The mills are required to sell all their hulled rice to ENA, though exceptions are sometimes made. ENA then sells to distributors at a fixed price, and it has a monopoly on the (legal) exporting of rice. Not all producers receive the guaranteed price, since some sell through intermediaries who absorb transport costs and discount a fee for their services. 47/ Nevertheless, farmers have a reasonable amount of price security. Storage problems were alleviated by the construction of government silos in Santa Cruz in 1973 (see above), though makeshift arrangements have also been required. As already noted, rice farmers have continued to have access to modest amounts of credit, at least until the 1976-77 crop year

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46/ The mills did not take title to the rice. Banco Agrícola buyers discounted for broken kernels.

47/ A survey of 10 colonies near Santa Cruz found that 54 percent of the farmers selling rice received less than $b. 120 per fanega (384 pounds) at a time when the official price was set at $b. 150 (Methodist Church in Bolivia 1972: 8). A 1967 study found that 59 percent of farmers surveyed sold their crop prior to harvest at 64-72 percent of prevailing prices (Osborn 1967).

when all credit for rice was suspended in view of the huge surplus that has accumulated.

Exporting of rice is made difficult by relatively high production and transport costs and by quality problems. [48/] Most of the rice grown is short-grain and thus has difficulty entering world markets. ENA has begun to deal with this problem by authorizing the importation of sufficient seed (Bluebonnet) to raise the share of long-grain rice from 7 percent of total production in 1975-76 to 20 percent in 1976-77. The success of this effort is not clear at this time. It may well be that production and transport costs are still too high for significant exports to be made.

In summary, farmers have clearly responded to government efforts to increase rice production by offering marketing incentives. But government programs have generally been too ambitious, poorly planned, and ultimately costly to the Bolivian taxpayer. The solution to the present dilemma is not yet clear.

Corn

Corn is a major food crop in Bolivia, occupying an estimated 230,000 hectares in 1975. Statistics for the 1950s show a sharp--and very likely exaggerated--production decline immediately after the revolution and agarian reform of 1952-53; but by 1957 production had returned to pre-1952 levels. Production since 1957 has shown only a very slight and erratic upward trend;

48/ Quintero Culbero (1974: 89) estimated that production costs (presumably for 1973-74) averaged $220 per MT, or more than twice the costs in other Latin American countries. This reported cost differential is probably exaggerated, but Bolivia does seem to be at a cost disadvantage.

on a per capita basis it has declined. Yields in the 1970s have been only marginally higher than those in the early 1960s.

A brief review of export prospects in the late 1960s (Sanz Guerrero 1968) concluded that Bolivia could export up to 200,000 MT of corn annually to Europe if marketing bottlenecks were removed. These were identified as high transport costs via the Paraná-Plata system, high bagging costs, lack of storage facilities, and low producer prices. There were also production cost bottlenecks which had to be overcome through yield-increasing innovations. Many small farmers reported that they were willing to double or even triple production if they had a guaranteed minimum price. However, without a reasonably assured export market a price support system would be financially unsustainable. Some contraband exports to Peru have been reported (Wales and Preston 1972), but the production and marketing obstacles to significant legal exporting seem to be essentially the same now as those identified a decade ago.

Corn in Bolivia is used as both human and animal food. Much of it is consumed on the farm, with a considerable portion transformed into chicha. Market sales are made to assemblers soon after harvest, [49/] and prices fluctuate widely (Pfost and Niernberger 1973: 49-52). There is no grading.

The 1976-80 Agricultural Development Plan assigns first priority to corn among the grain crops (Bolivia, MACA, 1976d: 43). The planned production of hard corn, for processing as animal feed, is 198,000 MT in 1976 and 350,000 MT in 1980. A less spectacular but still substantial increase

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49/ On-farm storage facilities apparently do not permit storage for long periods. Good off-farm storage facilities are limited (see above).

(8 percent annually) is planned for production of corn for human consumption. Since only modest exports of soft corn are projected toward the end of the plan period, the increased production of corn for human consumption seems much too high given any reasonable estimates of domestic demand. While the domestic demand for hard corn for use as animal feed is reportedly increasing rapidly (Bolivia, MACA, 1976c), it is questionable that the projected increases can be absorbed by the domestic market. Since no exports of hard corn are projected in the 1976-80 Plan, it is difficult to escape the conclusion that domestic marketing problems have again been underestimated. Under these circumstances, the recommendation to set a minimum price for corn (US$ 4.25 per qq), made by a working group sponsored by the Santa Cruz office of the Ministry of Agriculture (Bolivia, MACA, 1976c: 15) seems inappropriate.

Potatoes

Potatoes are not only Bolivia's major subsistence crop but also an important source of cash income in the Altiplano and Valles. According to one study, they were the second most profitable crop in 1972, with net income per hectare averaging US$ 118. 50/ However, income from potatoes varies considerably from year to year, as prices fluctuate widely in response to the effects of weather and climate on supply.

50/ Based on traditional methods of production. Of the 14 crops for which estimates were made, pineapples ranked first in profitability, with US$ 119 per hectare (Clement 1973: 5). A much higher profitability for potatoes (US$ 661 per hectare) was estimated by Wiggins (1976: 59); but this is based on a presumed price paid to farmers of $US 150 per MT. Ministry of Agriculture data show that prices during the period 1970-75 ranged from US$ 44 to US$ 132 per MT for the highest quality of potatoes (Bolivia, MACA, 1976a: 17).

The Michigan State University team (Slater et al. 1969: 237) concluded that

> the present distribution system does not provide incentives to the farmer to increase production. Larger volume only tends to depress harvest prices, since various government actions militate against storage. At the same time, little or no commercial credit is available to help the farmer hold output off the market during harvest periods. If the grower could finance storage of part of his production for a few months, he could obtain higher prices and, at the same time, stabilize the retail price of potatoes during non-harvest months.

The scope for increasing potato production seems limited: the 1976 census showed that population had been growing by only 1.7 percent annually since 1950, and the income elasticity of demand for potatoes is probably negative. Domestic demand is thus growing very slowly. The 1976-80 Agricultural Plan projects potato exports of US$28.8 million by 1980, but the existence of an export market of this size may be doubted. 51/ If this market does not exist, or is much smaller than presumed, the sharp increase in lending for potato production called for in the Plan would only lead to overproduction and declining prices.

Soybeans

Production of soybeans in Bolivia increased from only 300 MT a decade ago to 10,000 MT in 1975/76 and perhaps 17,500 MT in 1976/77 (Bolivia, MACA, 1976c: 1). Considerable land suitable for soybean production is available in the eastern lowlands not only to satisfy domestic demand for edible oils but also for Bolivia to become a soybean exporter.

51/ The location of this market is not identified.

At present, Bolivian soybeans would not be competitive in world markets. Yields average less than 1,500 kg./ha., and to overcome high transport costs it has been estimated that 2,500 kg./ha. would be necessary. [52/] In addition, storage and drying facilities would have to be improved, and the adoption of a grading system compatible with that in the U.S. would be desirable (Pfost and Niernberger 1973: 60).

Expansion of soybean production, as indicated earlier, is also limited by the market for soybean cake and soybean meal. Exports of cake and meal are currently not possible because of high transport costs. The domestic market has been growing rapidly, but it is still relatively small, and more could be done to promote the use of balanced feed mixes in poultry production. It has also been suggested that soybean meal be added to wheat flour. Potential demand for soybean cake and meal by the poultry industry in 1977 was estimated to be 17,250 MT, and a wheat flour mixture with 6 percent soybean meal would absorb an additional 15,000 MT. To obtain this total of 32,250 MT of cake and meal would require soybean production of 50,000 MT (Bolivia, MACA, 1976c: 27-29), roughly three times the estimated production in 1976/77.

Unless this potential demand is translated into effective demand, the growth of soybean production even for the domestic market will be limited. A round-table discussion group sponsored by the Ministry of Agriculture's Santa Cruz office has recommended that the government require the use of soybean meal in wheat flour and that it prohibit the importation of vegetable oils and their by-products (Bolivia, MACA, 1976c: 31). It is not clear if the government has the inclination to adopt such regulations or

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52/ Experimental yields of 4,000 kg. have been obtained.

the ability to enforce them. Given the promising potential of soybeans, however, some form of import restrictions could probably be justified on infant-industry grounds.

Sugar

Bolivia is self-sufficient in sugar, though drought conditions in 1971 resulted in imports for the first time since 1963. Export surpluses have been produced in some years. Bolivia's share of the old U.S. quota system, however, was modest, providing only about US$ 1 million annually in foreign exchange earnings. Exports to neighboring countries have been limited because these countries generally are exporters themselves. Occasionally, however, significant sugar exports have been made. In 1973, for example, export earnings from sugar amounted to US$ 7.8 million. 53/ But unless world market conditions are particularly favorable, the growth of the Bolivian sugar industry is likely to be restricted largely to the growth of domestic demand.

Sugar production in Bolivia has been very competitive with cotton, and favorable cotton prices in the early 1970s pushed sugar cultivation in Santa Cruz farther to the north, 54/ increasing transportation costs to the point where they may have accounted for as much as 50 percent of the cost of sugar delivered to the mills. Opportunities for lowering transport costs by relocating the mills or by other means seem limited,

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53/ Mainly on the basis of an increase in volume. The sharp rise in sugar prices had not yet occurred.

54/ Drought conditions also played a role in this shift to the north, where rainfall is higher (see Bolivian-USU/USAID Study Team 1972: 114-116).

and competitiveness of sugar with cotton depends primarily on the relative prices of the two commodities (Wennergren et al. 1973).

Sugar prices are negotiated annually by producers, the Comisión Nacional de Estudio de la Caña y del Azúcar (CNECA), the national government, and the sugar mills. Each mill is assigned a share of the national market. The mills in turn assign quotas to each producer in their respective areas in order to regulate the daily flow of cane into the mills. It has been argued that administration of the quota system has been poor and discriminatory; small producers charge that their quotas have remained the same while large new producers are added to the mills' rolls (Díez de Medina 1975: Chapter 12).

The Federación de Cañeros de Santa Cruz (FECASAC), representing the larger growers, has been an effective pressure group. But the Federación de Pequeños Cañeros de Santa Cruz and the Federación Departamental de Cañeros Campesinos y Productores Agrícolas, representing the numerous smaller growers, 55/ are weak organizations. So are the few cooperatives in the sugar area north of Santa Cruz, despite the fact that 77 percent of the growers there stated that organizing cooperatives would be the best way to improve their production and socio-economic position. 56/

55/ It was estimated that 89 percent of the sugar growers north of Santa Cruz had no more than 20 hectares. Nevertheless, they accounted for 51 percent of the land devoted to sugar production in that area.

56/ Díez de Medina (1975: Chapters 6 and 12) found that there was no true cooperative work in the area, despite evidence that attitudes toward cooperatives were more favorable than those found in the early 1960s by Patch, Marus, and Monje Rada (1962).

Cotton

Cotton production has increased rapidly since the early 1960s, when the annual harvest averaged just over 1,000 MT. Most cotton is now sold in international markets; cottonseed has been sold in Argentina and Brazil. The peak production year was 1973, when 37,600 MT were harvested from 68,200 hectares and exports were valued at US$ 18 million. Since 1973, world market trends have become less favorable for Bolivia, and this was a major reason for the decline in area planted to only 29,100 hectares during the 1975/76 crop year.

Much of the land near Santa Cruz is well suited to the growing of cotton, but cotton is a relatively profitable crop only when world market prices are high. Unless both production and transport costs can be substantially lowered, land area devoted to cotton is likely to fluctuate considerably from year to year.

Cotton producers are well organized as the Asociación de Productores Algodoneros (ADEPA), and they have been successful in obtaining credit from the Banco Agrícola and from private banks. Among the changes in marketing they would like to see are price supports, lower rail transport rates, and an elimination of marketing and export taxes (Bolivia, MACA, 1976b).

Fruits

The major tropical fruits produced in Bolivia are bananas, pineapples, and citrus fruits (especially oranges). Peaches are the most important temperate fruit. Pineapples and oranges are among the most profitable crops grown in Bolivia, while bananas and peaches seem to be of at least

average profitability. 57/

Fruit marketing, as we have already indicated, is very primitive. Transport and storage losses are high. 58/ Quality is poor, especially for oranges and peaches (MACA 1974a: 24; Hinojosa T. 1971), and until it is improved Bolivia will not be able to export significant amounts of fruit. In the case of peaches, and perhaps oranges, exporting would probably require the introduction of new varieties. This means that significant exports of these fruits must be viewed as a long-term objective. In addition to quality, attention will also have to be given to transport costs and to the appearance of intermediaries able to obtain credit and to handle relatively large quantities of fruit.

Some bananas, pineapples, and oranges have been sold in Argentina and Chile (Jacobs 1974: 33-34, 47), and illegal exports of peaches are reportedly made to Peru (Wales and Preston 1972); but the quantities are very small. 59/ There is occasional talk about taking advantage of world market

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57/ Information on the profitability of peaches is qualitative (Rodríguez Iriarte 1975). Data for the other 3 fruits are included in a study of 14 crops by Clement (1973: 5). Profitability of these fruits, with traditional methods of production, was estimated to be as follows in 1972:

	Net Income per Ha. ($b.)	Rank (14 crops)
Pineapples	2382	1
Oranges	2279	3
Bananas	962	7

58/ The estimated marketing losses for oranges total 16 percent (Jacobs 1974: 32). As noted above, an estimated 15 percent of bananas are completely lost at the wholesale level, and an additional 15-20 percent are sold at a discount because of deterioration.

59/ Foreign trade data for 1974, published in the Instituto Nacional de Estadística's Boletín Estadístico, No. 13 (20 March 1976), show pineapple exports of US$ 24,000 and plantain exports of US$ 1,050. No exports of oranges or peaches are reported.

opportunities for canned fruits, preserves, and fruit juices (e.g., MACA 1974a: 24), but Bolivia's opportunities here are probably very limited by transport costs (if not also by production costs). 60/

Prospects for significantly increased domestic marketings likewise seem limited, particularly since small wholesalers and retailers are unlikely to find it profitable to make transportation and storage investments to reduce spoilage and thus lower prices to consumers. 61/

Beef Cattle

Bolivia achieved self-sufficiency in beef production in 1969 (Clyburn et al. 1970). But exports have been limited by poor quality, lack of grading, and the high cost and risk of airlifting cattle from the Beni to La Paz. In 1974 exports of live cattle were a modest US$ 323,000, and for beef and beef products the figure was less than US$ 100,000. Unless more attention is given to overcoming marketing problems, there will be little incentive to increase production faster than the growth of domestic demand. Even for the domestic market, production and quality improvements are discouraged by restrictions on the domestic retail spread between the cheapest and most expensive cuts of beef (see above).

The poor quality of Bolivian beef has been attributed to the slaughtering of cattle at light weights, with no sanitary controls, chilling, or grading (Clyburn et al. 1970). Disease problems have not been unusually

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60/ Exports of fruit juices, canned fruits, jellies, and marmalades amounted to US$ 120,300 in 1974.

61/ See the section of this paper on "Storage, Packaging, and Handling Facilities."

serious (Clyburn et al. 1970), but attention to this aspect of quality is still necessary. An IDB loan for $4.2 million, authorized in January 1976, will enable Bolivia to begin dealing effectively with the animal health problem.

Effective competition with Argentina in the northern Chilean and Southern Peruvian markets will require not only quality improvements, but also the ability to deliver sizeable quantities of beef on a regular basis. The private sector is prepared to play a major role in beef exporting; but some assistance from the government would be desirable, both to provide incentives for quality improvement and to develop potential markets. The government, in its turn, would probably have to go abroad to obtain the necessary expertise.

Sheep/Llamas/Alpacas

Bolivian farmers have had little success in expanding markets for meat and wool from the sheep, llamas, and alpacas which overgraze the Altiplano and Valles. The local market is limited, and poor production technology has made it difficult for Bolivia to compete in world markets in terms of both price and quality.

Estimates of Bolivia's wool export potential have varied. One study in the late 1950s (Shotwell 1959) concluded "optimistically" that export potential of sheep and alpaca wool was a modest $1.2 million. An additional $1.6 million could be earned by exporting llama wool, it was argued, but only if Bolivia could sell in large volume at lower prices. Later, Roberts et al. (1965) estimated the export potential to be $12 million but emphasized that the marketing system was not adequate for exporting.

To improve wool marketing, the government established the Comité Boliviano de Fomento Lanero (COMBOFLA) in 1962. COMBOFLA buys wool at a series of collection centers located throughout the Altiplano. It then grades, [62/] processes, and sells the wool. In addition, it operates an alpaca yarn plant and has sought export markets for wool and wool products. An evaluation of COMBOFLA's operations in early 1968 noted that the organization was having difficulty becoming financially viable because of the limited domestic market and the uncertain conditions in world markets for llama and alpaca wool. Financial viability was seen to be dependent on full use of the yarn plant and investment in new equipment (Wennergren 1968).

Three years later, COMBOFLA still faced financial difficulties. Although buying and selling of wool was profitable, and some 30,000 campesino families were said to have benefited, the yarn plant and the sale of alpaca yarn were still money-losing ventures since quality was too low and price too high to compete effectively in world markets. COMBOFLA continued to lack the financial resources necessary to modernize its operations (Christensen 1971). By 1973 COMBOFLA's purchases of wool had fallen to levels below those prevailing in the late 1960s, and sales of alpaca yarn had stopped rising (see Table 7). COMBOFLA's exporting operations remained unprofitable (Wennergren 1974).

Despite COMBOFLA's efforts to assist campesinos in wool marketing, most wool continued to be sold directly to textile firms or through intermediaries. Reported wool purchases by textile mills (including pur-

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62/ Previously, "wool was marketed by weight only. Wool collectors reportedly added sand and water to the raw wool as a common practice to increase the sale weights" (Wennergren 1974: 58).

TABLE 7

COMBOFLA: WOOL PURCHASES AND SALE OF ALPACA YARN, 1965-1973

(kilograms)

	Wool Purchases			Sale of Alpaca Yarn
	Sheep	Alpaca	Llama	
1965	-	112,931	80,675	-
1966	8,114	81,035	53,333	-
1967	202,980	127,978	21,604	4,506
1968	346,933	34,316	1,264	14,699
1969	208,466	62,962	2,000	17,057
1970	337,318	48,625	35	21,298
1971	264,749	40,146	-	27,096
1972	195,097	25,256	113	19,208
1973	239,582	44,474	12,730	26,784

Source: Wennergren (1974: 59-61).

[a]The value of wool purchases in 1973 was $199,000; sales of alpaca yarn in that year amounted to $137,000.

chases from COMBOFLA) are indicated in Table 8 for the period 1965-1973. These data, however, are considered biased because reported purchases by one of the two largest mills, especially in the 1960s, are believed to consist primarily of contraband wool coming from Peru and Argentina (Wennergren 1974: 24). Contraband wool purchases presumably have declined, but the sharp fall in both the volume and value of reported purchases since 1969 is cause for concern.

Little progress has also been made in the marketing of meat from sheep, llamas, and alpacas. Meat quality is reported to be low and it has been estimated that the same amount of (better quality) meat could be produced on the Altiplano with 30-40 percent fewer animals using more pasture and forage. 63/ An improved pasture and feeding program would also improve wool quality (Draper 1972).

DIRECTIONS FOR FUTURE RESEARCH

If, as some Bolivian case studies argue, improved access to markets can induce technological change even if institutional credit is unavailable, it would be useful to determine the scope for increasing marketing opportunities for small farmers through additional road construction and other means of linking farmers more closely to markets. 64/ Particular attention should be given to access roads, which as noted earlier in this paper receive relatively little attention in the current 5-Year Plan. One

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63/ For a discussion of possible processed meat products and by-products, see Draper (1973).

64/ This recommendation was also made in an earlier paper (Zuvekas 1977b). For a review of studies relating farm income to market access, see the "Transportation" section of the present paper.

TABLE 8

PURCHASES OF SHEEP WOOL BY TEXTILE FIRMS, 1965-1973

	Kilograms	Value (US$)
1965	703,876	484,147
1966	755,464	543,283
1967	1,008,728	786,282
1968	1,122,556	839,253
1969	1,292,309	904,311
1970	1,100,383	844,837
1971	981,575	755,944
1972	708,353	556,740
1973	788,291	556,564

Source: Wennergren (1974: 25).

issue that needs to be considered as part of this study is the effect of increased marketings on farm-gate prices, and thus on farm incomes: if the increase in marketings is large enough, the benefits of lower transport costs will be offset to some extent by the depressing effects on retail prices. Research on the relationship between market access and farm income should have high priority.

Related to the research just suggested is the need for better information on transport rates. Existing data are poor, and data on transport costs from the farm to local or regional centers are often lacking entirely. Research on transport costs can be conducted as a separate project, and it should precede benefit-cost studies of access-road and highway construction.

In recommending the establishment of small wheat buying centers in rural areas, Niernberger and Pfost noted that the optimum location for these buying centers could not be determined unless better data were available on production, consumption, and marketings by local geographic area. But if wheat is to have a relatively low priority, as the present agricultural plan indicates, collection of these data as a separate project should not rank high on the research and data collection agenda. Information of this kind would be collected in any event for those areas where the possibility of road or highway construction is being considered. This piecemeal approach would not provide complete geographic coverage; but unless wheat policy unequivocally favors increased domestic production, the wheat farmers's best hope for a higher income may lie in lower transport costs.

Since the Michigan State team's study in 1967, little information seems to have been collected on storage, packaging, and handling. If the scale of wholesaling and retailing operations has not changed significantly in the last decade, there still may be little scope for investment to improve these

aspects of marketing. One suspects that few changes have occurred in the marketing of highly perishable fruits and vegetables; but for other agricultural products there may have been a trend toward larger-scale operations. If so, investment in storage, packaging, and handling improvements might be justified, and this would have implications for credit policy. The importance of scale changes in marketing can probably be determined by a short "reconnaissance" survey with a relatively low budget. The Michigan State survey materials can be used to help determine the survey design. This is not a particularly high priority project. It might be contracted out to one of the branches of the national university, whose students could gain some valuable research experience.

One of the most important items on the marketing research agenda, in this writer's opinion, is a thorough and detailed study of export marketing prospects, and, more importantly, export marketing policy. The latter has been particularly neglected in Bolivia, and yet export policy is probably the real key to successful participation in world markets. Attention should be given to broad issues such as exchange-rate policy, credit, insurance, and government red tape, as well as to the nuts and bolts of overcoming obstacles to the entry of a specific product in a particular country. Specific products to examine include beef, cotton, sugar, rice, and soybeans. Bolivia is self-sufficient in the first four of these commodities, and production surpluses have often been difficult to market abroad, with costly consequences. Soybeans are a promising export for the future.

A detailed study of export policy will require substantial technical assistance from abroad. In recent years, the United Nations has been a major source of this kind of expertise. AID has also had experience in

this area. Designing and implementing an appropriate export policy requires a great deal of sophistication, and the committment to provide technical and financial assistance must be long-term.

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