

Preliminary Report

ANALYSIS OF AGRICULTURAL INPUT PRICES AND  
FARM GATE PRICES FOR SELECTED AGRICULTURAL PRODUCTS

to

USAID Mission

to

Costa Rica

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University of Florida  
Institute of Food and Agricultural Sciences  
Food and Resource Economics Department  
and  
International Programs  
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## SUMMARY

This report analyzes agricultural product and input prices in Costa Rica for the 1972-1980 period. Products included are cocoa, sugar cane, beef, rice, beans, corn, sorghum, onions, potatoes, plantains, tomatoes and cassava.

Prices for the following inputs were analyzed: fertilizers-urea, 10-30-10, 15-15-15; herbicides - 2-4, D, Gramoxone; a fungicide, Manzate; and an insecticide, Dipterex. Hourly costs for agricultural labor were also examined.

Product prices generally increased from 1972 to 1980, but real prices, measured in 1975 colones, were below those for 1972 in most cases. Wages increased substantially over the period.

Fertilizer and agricultural chemicals generally increased in price from 1972 to 1975, then dropped till 1978. Input prices increased again in 1980. Inflation, as measured by the wholesale price index, accounted for most of the increase in input prices. Exchange rate changes beginning in late 1980 and continuing through 1981 contributed to input price increases, also.

Production costs for the four basic grains, rice, beans, corn and sorghum, and for sugar cane were also analyzed. The costs were taken from enterprise budgets published by the Central Bank.

Crop production costs reported in these budgets generally increased from 1975 levels, but patterns were not uniform across products. Costs reported did not increase as rapidly as did the wholesale price index.

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ANALYSIS OF AGRICULTURAL INPUT PRICES AND  
FARM GATE PRICES FOR SELECTED AGRICULTURAL PRODUCTS

Kary Mathis

INTRODUCTION

This report provides the analyses specified in Work Order Number 1 of the Technical Support to Mission, established between USAID/Costa Rica and the University of Florida. Specific directives for that work order were:

"The Contractor shall analyze price trends since 1972 for major agricultural inputs such as fertilizer, herbicides, fungicides, pesticides, farm implements, agricultural machinery, hired labor (peones), custom land preparation/harvesting costs, etc.

Price indices for these inputs shall be developed.

The Contractor shall also analyze trends in support prices for basic grains and other selected agricultural products. In addition, the Contractor will prepare farm-gate price indices for a variety of fruits and vegetables (based on the availability of such data).

The Contractor will also analyze trends in costs of production data found in the avios (budgets) prepared by the Central Bank for crops/livestock operations as well as the overall amount per hectare in these avios which can be credit-financed.

All these analyses shall contain supporting data tables."

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Kary Mathis is professor of food and resource economics at the University of Florida.

The report is organized into six sections: the introduction, a discussion of economic measures such as wholesale price indices, analysis of product prices, relations of input prices and farm production costs, and finally a summary with conclusions.

AID personnel specified the years 1972 through 1980 as the appropriate period for this study. The products selected were:

cocoa	sorghum
sugar cane	onions
beef	potatoes
rice	plantains
beans	tomatoes
corn	cassava

Prices for nearly all the products for most years of the period were collected and production costs were gathered from available published sources. Costs were not available for all products for all years. Prices for certain purchased inputs and for hired labor were also available for some products in some years in some regions of the country. Prices and costs are discussed in more details in the following sections.

As indicated just above, published reports were used for much of the data needed, as well as other material prepared by Costa Rican and U.S. agencies (see reference list). Complete series for all products, inputs or costs for all years were not available during the initial collection effort in Costa Rica. However, analyses were conducted with the information at hand and a number of findings and conclusions are reported here.

#### GENERAL ECONOMIC MEASURES

Indices of both wholesale and consumer prices are published by the Central Bank of Costa Rica. These measures were used in analyzing and describing agri-

cultural product and input price trends and behavior. Exchange rates between the colon and the U.S. dollar and between the colone and other currencies changed considerably beginning in 1980 and affected the agricultural sector, just as many other sectors of the Costa Rican economy were affected. Therefore, some information concerning exchange rates and their effects on agricultural prices and costs is included.

#### Wholesale and Consumer Prices

The Central Bank calculates and publishes a general wholesale price index and indices for several groups of commodities. Four of these groups, foods of animal and of plant origin, fuels and energy, and chemicals, are shown in Table 1 along with the general wholesale price index. These indices are published with 1966 as the base year, and a new series uses 1978 as a base.

Consumer price indices used 1964 and then 1975 as base years. All indices in this report were transformed to a 1975 base, for ease of comparison. Since 1975 is also the mid-point of the 1972-1980 period of analysis, 1975 is a convenient base year.

The general wholesale price index almost doubled from 1972 to 1975, then showed an increase of 73 percent from 1975 to 1980 (Table 1 and Figure 1). Average annual rate of increase in wholesale prices was 14.7 percent over the 1972-1980 period. The index for fuels and energy increased the most, as would be expected, reaching a 1980 level almost five times the 1972 figure (Figure 1). Foods of plant origin showed the next highest growth, followed by chemicals and then foods of animal origin (Table 1 and Figure 1).

Average annual rates of increase for the product groups shown were: foods of animal origin, 12.4 percent; foods of plant origin, 17.6 percent; fuels and energy, 20.5 percent; and chemicals, 14.0 percent. These indices will be used in comparing price trends for both products and inputs in later sections of the report.

Table 1. Wholesale price indices: general, foods, energy and chemicals, Costa Rica, 1972-1980

Year <sup>a</sup>	Wholesale price index <sup>b</sup>				
	General	Animal origin	Foods Plant origin	Fuels, water and electricity	Chemicals, pharmaceuticals.
				1975=100	
1972	50.2	58.9	42.3	40.7	52.3
1973	63.5	70.3	54.1	48.8	62.9
1974	87.7	86.2	77.8	91.9	93.7
1975	100.0	100.0	100.0	100.0	100.0
1976	107.2	103.3	100.8	110.9	107.3
1977	115.2	112.5	115.4	114.3	109.5
1978	126.0	128.3	132.8	115.8	119.1
1979	156.2	150.5	175.0	190.5	143.3
1980	173.1	168.9	182.3	217.3	170.1

<sup>a</sup> Index for December for each year is used because annual averages are not available for all years.

<sup>b</sup> Indices transformed to 1975 base from 1966 base.

Source: Central Bank of Costa Rica, Statistical Bulletins 313 and 336 and unpublished data.

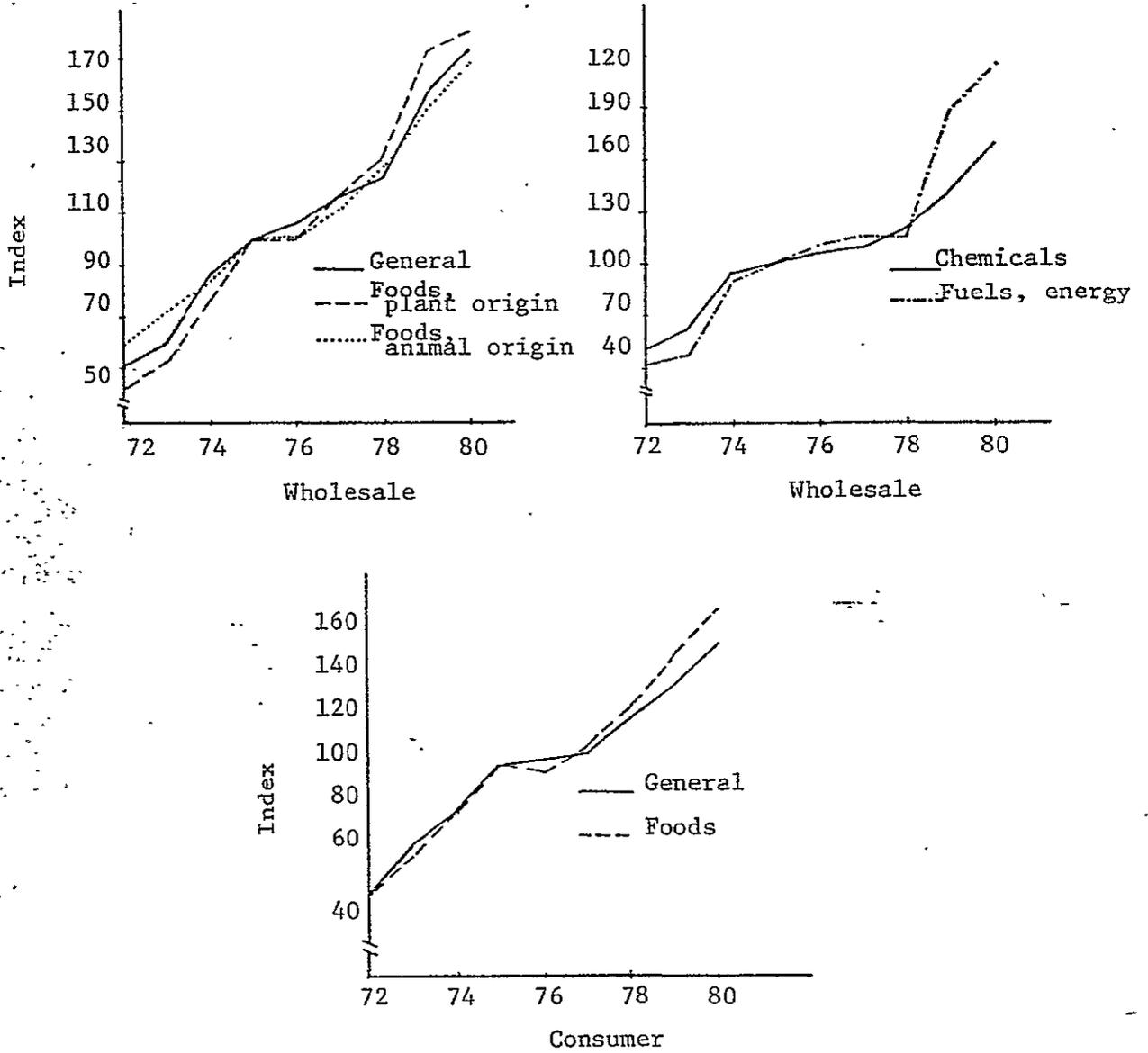


Figure 1.--Wholesale and consumer price indices (1975=100), Costa Rica, 1972-1980.

The consumer price index for all items nearly tripled from 1972 to 1980, and the index for foods was somewhat higher (Table 2 and Figure 1). The general consumer price index increased at an average annual rate of 12.0 percent over the period, while the index of food prices increased at 13.1 percent per year.

#### Exchange Rates

Costa Rican exchange rates have received a great deal of attention over the past year. The only aspect of concern in this report is the effect of exchange rate fluctuations on exports and imports of agricultural products and inputs. Cocoa, sugar and beef are important export products as well as being important domestic food items. Many essential inputs - fertilizers, agricultural chemicals and fuels - are imported. Thus, prevailing exchange rates and fluctuations in those rates affect Costa Rican export earnings and competitive position in world markets, domestic food consumption and productivity and financial health of agricultural producers and input supply firms.

The official exchange rate for the colon with the U.S. dollar was fixed at 8.57 from 1975 through 1980, after rising slightly from 1972 to 1975 (Table 3). The official rate averaged 17.037 for the first half of 1981. Effects of exchange rates on product prices and inputs costs will be discussed in those later sections.

Table 2. Consumer price index: general and foods, Costa Rica, 1972-1980

Year <sup>a</sup>	Consumer price index <sup>b</sup>	
	General	Foods
1972	53.1	53.1
1973	63.8	64.4
1974	83.3	83.4
1975	100.0	100.0
1976	104.4	98.7
1977	109.8	107.2
1978	118.7	124.2
1979	134.4	142.5
1980	147.8	160.7

<sup>a</sup> Index for December for each year is used because annual averages are not available for all years.

<sup>b</sup> Indices transformed to 1975 base for 1972 through 1974.

Source: Central Bank of Costa Rica, Statistical Bulletins 313 and 336 and unpublished data.

Table 3. Costa Rica, exchange rate with U.S. dollar,  
1972-1980

Year <sup>a</sup>	Colones per dollar	Dollars per colon
1972	6.635	0.151
1973	6.647	0.150
1974	7.930	0.126
1975	8.570	0.117
1976	8.570	0.117
1977	8.570	0.117
1978	8.570	0.117
1979	8.570	0.117
1980	8.570	0.117

<sup>a</sup>Rate for first half of 1981, ₡17.037 per \$; \$.60 per ₡.

Source: International Monetary Fund, International Financial Statistics.

## PRODUCT PRICES

The twelve agricultural products discussed in this report can be divided into three groups: products both exported and consumed domestically, made of cocoa, sugar and rice; the "basic grains", rice, beans, corn and sorghum, which are important domestic food crops and the vegetable crops of onions, potatoes, plantains, tomatoes and cassava. Price trends in both current and constant colones are discussed for each one of those three groups and effects of exchange rates are included in the discussion of the first group.

### Export and Domestic Products

#### Cocoa

Export prices for cocoa increased sharply from ¢3,262 per metric ton in 1972 to a high of ¢25,993 in 1977, then declined to ¢17,426 by 1980 (Table 4). Domestic prices were comparable, rising from ¢3,128 in 1972 to ¢27,352 by 1977, then declining to ¢20,609 by 1980.

Changes in export and domestic prices for cocoa are shown in Figure 2, for both current and 1975 colones. The figures for prices in 1975 colones are calculated by dividing current prices by the general wholesale price index (Table 1). The comparisons are shown in Figure 2 and Appendix Table 1.

Cocoa export prices in 1975 colones were somewhat above nominal prices from 1972 through 1974. From 1976 on, nominal cocoa prices rose more rapidly than the general level of wholesale prices, as reflected in 1976-1980 prices in 1975 terms (Figure 2 and Appendix Table 1).

#### Sugar cane

Prices paid to Costa Rican producers for sugar cane were reported in the publications and sources available. Sugar cane prices almost tripled from 1972 to 1975, then dropped and rose again to a higher level yet by 1980 (Table 4 and Figure 2).

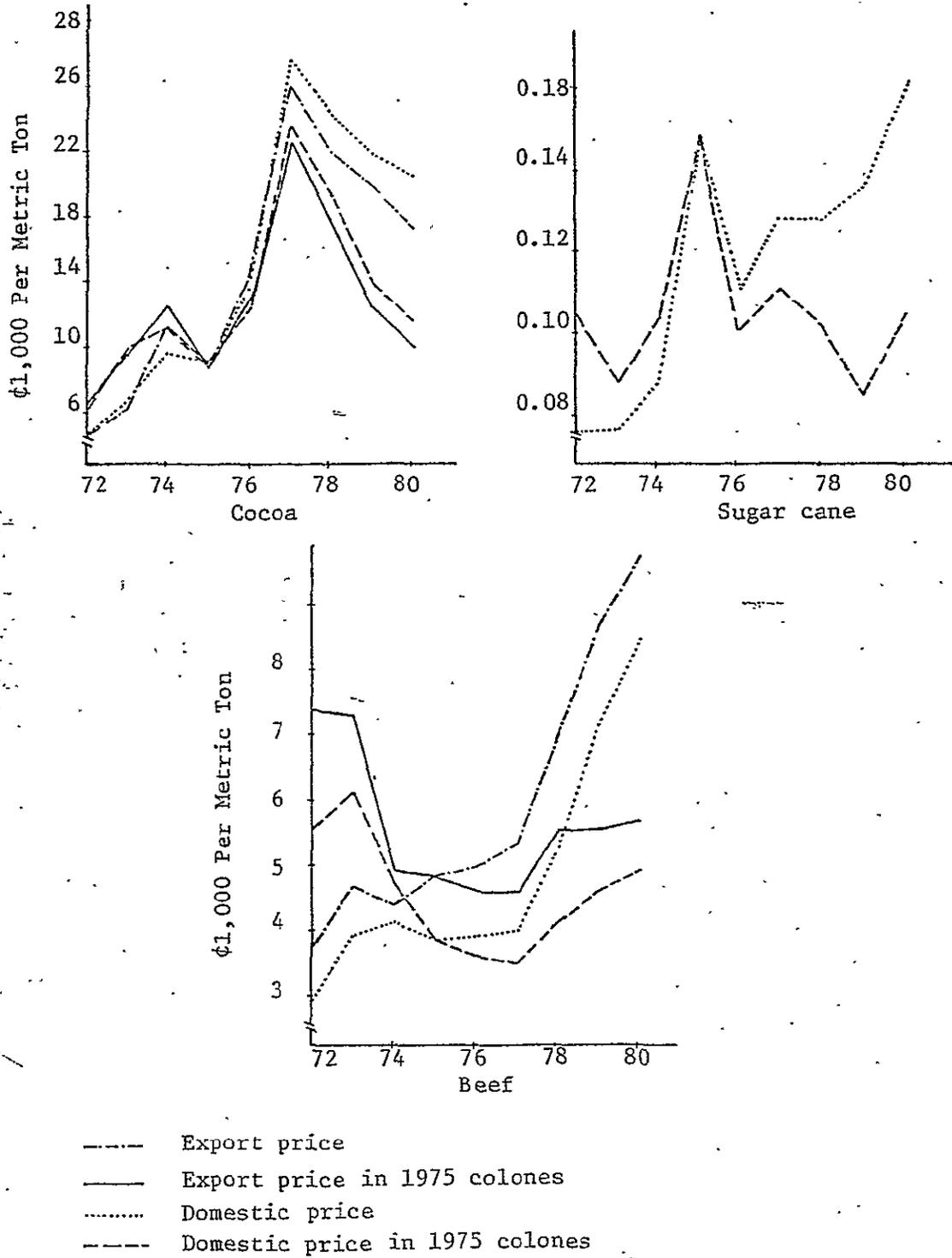


Figure 2.---Cocoa, sugar cane and beef: nominal prices and prices in 1975 colones, Costa Rica, 1972-1980.

Table 4. Cocoa, sugar cane and beef: Annual average producer prices for export and domestic markets, 1972-1980

Year	Cocoa		Sugar cane	Beef	
	Export	Domestic	Domestic	Export	Domestic
- colones per metric ton -					
1972	3,262	3,128	53	3,733	2,850
1973	6,080	6,274	56	4,688	3,910
1974	11,035	9,947	92	4,330	4,190
1975	8,923	9,321	148	4,785	3,806
1976	14,200	13,623	110	4,984	3,869
1977	25,993	27,352	127	5,327	4,043
1978	22,038	24,118	129	7,046	5,270
1979	19,598	21,963	134	8,741	7,190
1980 <sup>a</sup>	17,426	20,669	182	9,774	8,520

<sup>a</sup>Preliminary.

Source: Cifras Sobre Producción Agropecuaria, 1957-1974,  
Central Bank of Costa Rica. San Jose, Costa Rica, 1975,  
Cifras Sobre Producción Agropecuaria, 1975-1980,  
Central Bank of Costa Rica. San Jose, Costa Rica, 1981.

Sugar cane prices in 1975 colones were considerably above nominal prices in 1972 and 1973, and substantially below nominal prices from 1978 on (Figure 2 and Appendix Table 1). Nominal sugar cane prices increased more rapidly than the general level of wholesale prices prior to 1975, but rose much less rapidly after that year.

### Beef

Both export and domestic prices for beef rose from 1972 to 1974, then were relatively stable through 1977 before increasing substantially to 1980 levels. Export prices were above domestic prices throughout the period (Table 4 and Figure 2).

Beef prices in 1975 colones showed the same pattern as cocoa prices - rising less rapidly from 1972 to 1975 than the wholesale price index and more rapidly than wholesale prices after 1975 (Figure 2 and Appendix Table 1). This pattern was true for both export and domestic beef prices, with domestic prices rising at a higher rate than export prices.

### Exchange Rate Effects

The rate of exchange between the colon and the U.S. dollar changed some from 1972 to 1975, was fixed until 1980, and then moved upward substantially (Table 3). An exchange rate index was calculated by dividing the rate for each year of the 1972-1980 period by 8.57, the rate prevailing for 1975 through 1980. This index was then multiplied times current product prices in each year to calculate an "indexed" export price. This "indexed" price simply expresses the product value in relation to the prevailing exchange rate.

Thus, for 1972 and 1973 export quantities of cocoa, beef and sugar were worth 29 percent more than nominal prices, and eight percent more in 1974

than for the fixed-rate period 1975-1980 (Table 5). Though the analysis in this report does not include 1981, the change in exchange rates during that year affected the "value" or international purchasing power of export products. For example, the average exchange rate during the first six months of 1981 was ₡17.037 per dollar (Table 3) or an index of .503 (Table 5). If cocoa price in that period were ₡20,000 per metric ton, the indexed price would be only ₡10,060, or just over half the value at the 1975-1980 exchange rate.

#### Basic Grains

Four major domestic food crops, rice, beans, corn and sorghum, are classified as "basic grains" by Costa Rican government agencies, and producer prices for those products are established by support programs. The National Production Council (Consejo Nacional de Producción, CNP) administers these programs. Support prices are established for the fiscal year, July 1-June 30, and published at the beginning of that year for producers to use in planning. In recent years, prices for some of the products have been adjusted during the year to reflect rising production costs or market conditions. Support prices for 1971-72 through 1980-81 are shown in Table 6.

The CNP increased prices during the year for beans and sorghum in 1973-74 and 1974-75, for white corn and sorghum in 1977-78 and rice in 1978-79. Prices for beans, white corn and sorghum were increased during 1979-80, and were increased twice or more for all products during 1980-81.

Average annual producer prices for calendar years are shown in Table 7. General patterns for each commodity are the same as for support prices. Support prices also have schedules of discounts for quality, grade and foreign material so that actual producer prices over a year will generally average below support prices.

Table 5. Exchange rate index, and current and indexed prices for cocoa, sugar cane and beef exported from Costa Rica, 1972-1980

Year <sup>a</sup>	Exchange rate index <sup>b</sup>	Export prices					
		Cocoa		Sugar cane		Beef	
		Current <sup>c</sup>	Indexed <sup>d</sup>	Current <sup>c</sup>	Indexed <sup>d</sup>	Current <sup>c</sup>	Indexed <sup>d</sup>
- colones per metric ton -							
1972	1.292	3,262	4,215	53	68	3,733	4,823
1973	1.289	6,080	7,837	56	72	4,688	6,043
1974	1.081	11,035	11,929	92	99	4,330	4,681
1975	1.000	8,923	8,923	148	148	4,785	4,785
1976	1.000	14,200	14,200	110	110	4,984	4,984
1977	1.000	25,993	25,993	127	127	5,327	5,327
1978	1.000	22,038	22,038	129	129	7,046	7,046
1979	1.000	19,589	19,589	134	134	8,741	8,741
1980	1.000	17,426	17,426	182	182	9,774	9,774

<sup>a</sup> Index for the first six months of 1981 was 0.503 (see Table 3, note a).

<sup>b</sup> Calculated by dividing exchange rate for each year by 8.57; see Table 3.

<sup>c</sup> From Table 4.

<sup>d</sup> Calculated by multiplying index times current price; for example  $3,262 \times 129.2 = 4,215$ .

Table 6. Support prices for basic grains, 1971-72 - 1980-81

Year <sup>a</sup>	Rice colones <sup>b</sup> per bag	Beans	Corn		Sorghum
			White	Yellow	
----- colones per quintal <sup>b</sup> -----					
1971-72	68	75	30	30	25
1972-73	68	75	33	33	25
1973-74	73	85-100	38	38	36
1974-75	110	190-225	75	75	45-60
1975-76	142	225	75	75	60
1976-77	125	225	70	75	60
1977-78	132	225	70-75	75	60-65
1978-79	136-139	225	82	82	65
1979-80	149	225-285	89-98	98	74-84
1980-81 <sup>c</sup>	160-177	285-306	98-112	98-120	84-91
	186-192	430-529	130-172	161	101-107
	216-312				
	324				

<sup>a</sup>July 1-June 30.

<sup>b</sup>Bag = 73.6 kilograms or 160 pounds.  
Quintal = 46 kilograms or 100 pounds.

<sup>c</sup>More frequent increases were made during 1980-81 than in earlier years.

Source: CNP, Annual Statistical Report.

Table 7. Rice, beans, corn and sorghum: Annual average producer prices, 1972-1980

Year	Rice		Bean		Corn <sup>a</sup>		Sorghum	
	M.T.	Bg.	M.T.	Qq.	colones <sup>b</sup> M.T.	Qq.	M.T.	Qq.
1972	1,120	82	1,465	67	595	27	-	-
1973	1,313	97	2,624	121	672	31	-	-
1974	1,977	146	3,511	162	1,071	49	-	-
1975	2,385	176	4,505	207	1,482	68	1,133	52
1976	2,211	163	4,542	209	1,340	62	1,069	49
1977	2,333	172	4,529	208	1,225	56	1,055	49
1978	2,432	179	4,541	209	1,301	60	1,107	51
1979	2,454	181	4,467	206	1,436	66	1,203	55
1980 <sup>c</sup>	2,711	200	5,820	268	1,755	81	1,526	70

<sup>a</sup>Includes white and yellow corn.

<sup>b</sup>Prices are colones per metric ton and per bag for rice, and per quintal for other products.

<sup>c</sup>Preliminary.

Source: Cifras Sobre Producción Agropecuaria, 1957-1974,  
Central Bank of Costa Rica, San Jose, Costa Rica, 1975,  
Cifras Sobre Producción Agropecuaria, 1975-1980,  
Central Bank of Costa Rica, San Jose, Costa Rica, 1981.

### Rice

Rice prices increased from an average of ¢82 per bag in 1972 to ¢176 in 1975, then dropped in 1976. Rice prices increased to ¢172 in 1977 and reached ¢200 per bag in 1980 (Table 7). The same pattern can be seen in support prices, allowing for the July-June year (Table 6).

The increase from 1972 to 1975 was considerably more than the general wholesale price index so that rice prices in 1975 colones were above nominal prices (Figure 3 and Appendix Table 1). Producer prices for rice, while rising in current terms, showed substantial declines in 1975 colones, as the wholesale price index increased more rapidly (Figure 3).

### Beans

Producer prices for beans showed the same general pattern as did rice prices. Prices for beans increased more sharply even than rice from 1972 to 1975, rising from ¢67 per quintal in 1972 to ¢207 by 1975 (Table 7).

Bean prices were very stable within a range of ¢206 to ¢209 from 1975 through 1979 then jumped to ¢268 by 1980.

Bean prices in 1975 colones reflect the sharp increases from 1972 to 1975, when nominal prices for beans rose more rapidly than the general level of wholesale prices. The wholesale price index rose more rapidly than did bean prices from 1975 to 1980 (Figure 3 and Appendix Table 1). Thus, bean producers were receiving less in real terms, as measured by 1975 colones, in 1980 than they received in 1973.

### Corn

Average producer prices for corn showed a pattern very similar to those for rice and beans, with even sharper increases from 1972 to 1975, and from

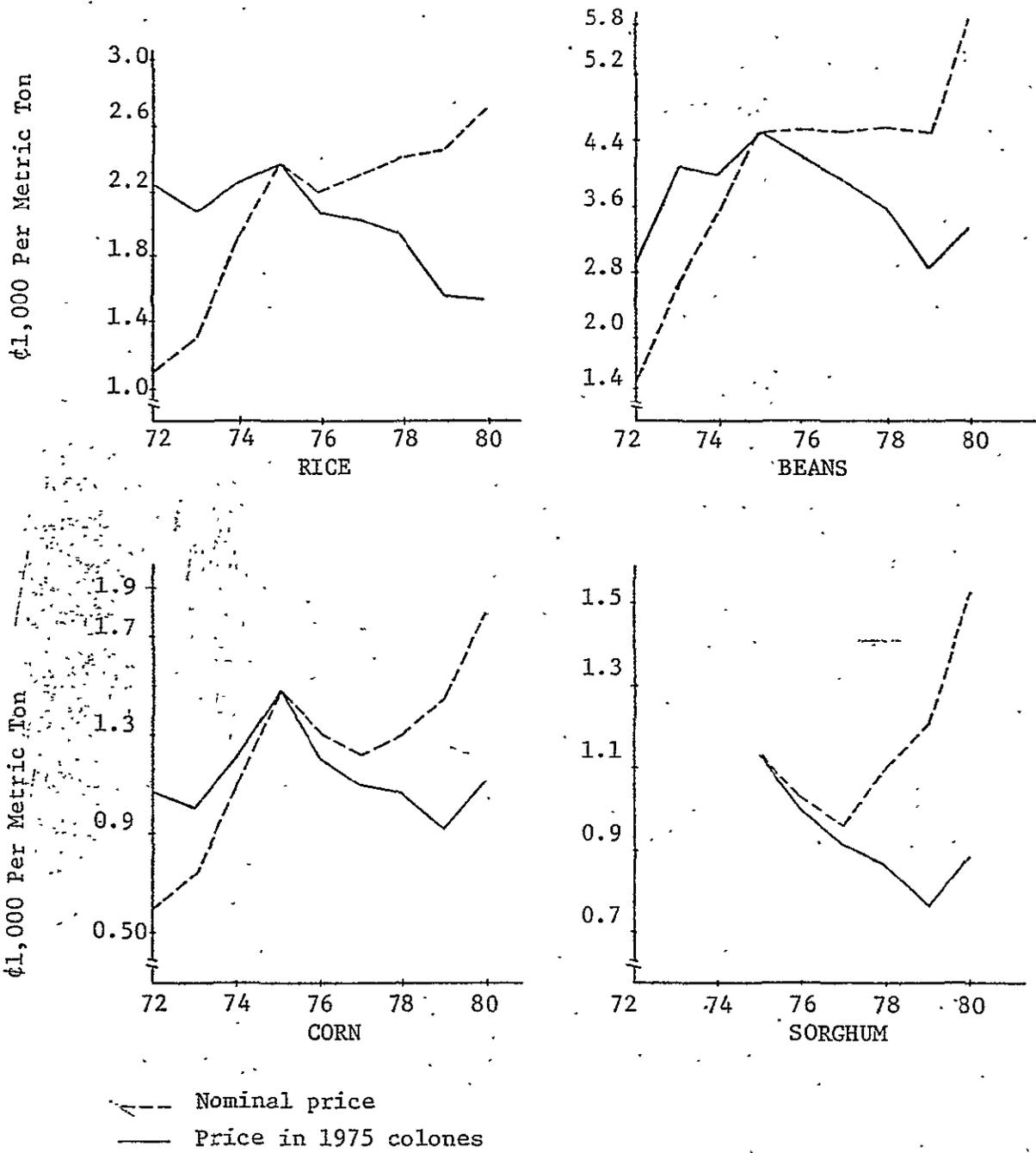


Figure 3.--Rice, beans, corn, and sorghum: Nominal prices and prices in 1975 colones, Costa Rica, 1972-1980.

1977 to 1980. Corn prices rose from ¢27 per quintal in 1972 to ¢68 by 1975. Corn prices dropped to ¢56 by 1977, then jumped to ¢81 in 1980 (Table 4).

Corn prices, expressed in 1975 colones, also showed the same pattern as for rice and beans. Real producer prices in 1980, in 1975 terms, were below real prices for all earlier years, 1972 through 1979 (Figure 3 and Appendix Table 1).

#### Sorghum

Prices received by producers for sorghum were not available for 1972, 1973, or 1974. Patterns for the 1975-1980 period were similar to those for the other basic grains. Sorghum prices declined slightly from ¢52 in 1975 to ¢49 in 1976 and 1977, then rose to ¢70 by 1980 (Table 7). Again, 1980 prices in 1975 colones were below those for all earlier years shown except 1979 (Figure 3 and Appendix Table 1).

#### Vegetables

##### Onions

Producer prices for onions climbed from ¢1,037 per metric ton in 1972 to ¢1,859 by 1975. Onion prices dropped in 1976, then began increasing again, reaching ¢3,462 by 1979. Prices in 1980 were down to ¢2,372 per metric ton (Table 8). Onion prices in 1975 colones reflect the increase in the wholesale price index after 1975. Those prices, expressed in 1975 colones, showed 1972 and 1973 levels above prices for all other years in the period except 1979 (Figure 4 and Appendix Table 1).

##### Potatoes

Potato prices showed a pattern similar to that for onions, rising from ¢1,423 per metric ton in 1972 to ¢2,794 in 1975 and ¢2,809 in 1976. However,

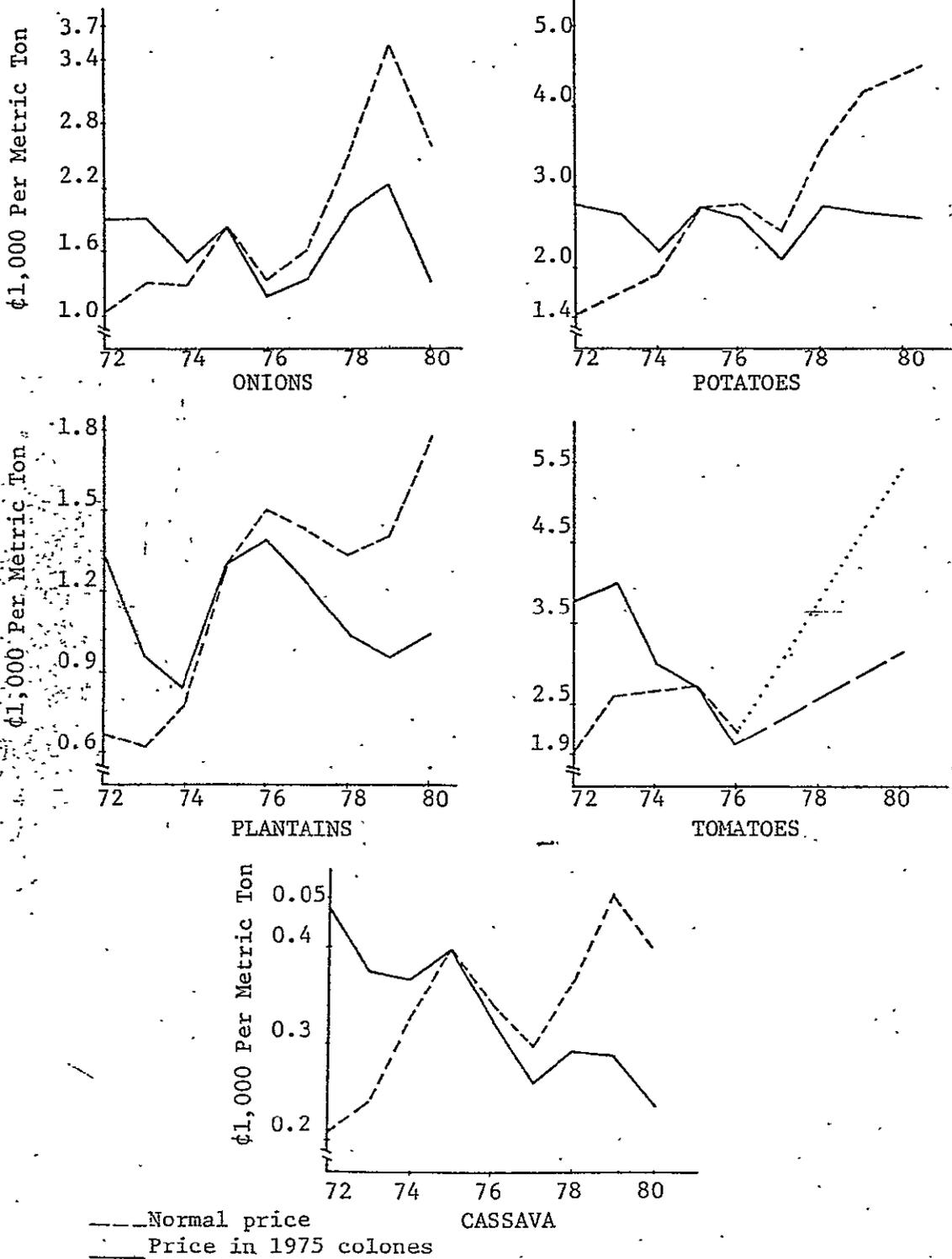


Figure 4.—Onions, potatoes, plantains, tomatoes, and cassava: Normal prices in 1975 colones, Costa Rica, 1972-1980.

potato prices dropped only a small amount in 1977, then rose sharply each year to the 1980 level of ¢4,509 per metric ton (Table 8). Measured in 1975 colones, however, prices for this important food crop have varied within a fairly narrow range (Figure 4 and Appendix Table 1).

#### Plantains

Also an important food crop, plantains exhibited price behavior similar to that for potatoes. Plantain prices increased from ¢614 in 1973 to ¢1,499 by 1976 then reached ¢1,771 per metric ton in 1980 (Table 2). Again, prices in 1975 colones showed that only in 1976 did plantain prices in real terms exceed those in 1972 (Figure 4 and Appendix Table 1).

#### Tomatoes

Tomato prices for each year of the period were not available. Published data for 1972-1976, and for 1980 were included. Tomato prices did not follow the same general pattern as the other vegetables during 1972 through 1976. Tomato prices rose from ¢1,934 per metric ton in 1972 to ¢2,735 by 1975 then dropped to ¢2,170 in 1976. By 1980, tomato prices reached ¢5,453 per metric ton (Table 8). In real terms, as measured by 1975 colones, tomato prices were higher in 1972 and 1973 than in any later year for which data were available (Figure 4 and Appendix Table 1).

#### Cassava

Cassava prices, while at lower levels than prices for the other vegetables, showed much the same pattern as prices for onions, potatoes and plantains. Cassava increased in price from ¢222 per metric ton to ¢399 by 1975, then dropped to ¢299 in 1977. Prices climbed from that level to ¢452 by 1979 then dropped slightly in 1980 (Table 8).

Table 8. Onions, potatoes, plantains, tomatoes and cassava:  
Annual average producer prices, 1972-1980

Year	Onions	Potatoes	Plantains	Tomatoes	Cassava
- colones per metric ton -					
1972	1,037	1,423	666	1,934	222
1973	1,315	1,717	614	2,613	239
1974	1,299	1,967	785	2,672	325
1975	1,859	2,794	1290	2,735	399
1976	1,317	2,809	1499	2,170	341
1977	1,611	2,503	1421	-	299
1978	2,552	3,509	1334	-	370
1979	3,462	4,208	1406	-	452
1980 <sup>a</sup>	2,372	4,509	1771	5,453	405

<sup>a</sup>Preliminary

Source: Cifras Sobre Producción Agropecuaria, 1957-1974,  
Central Bank of Costa Rica, San Jose, Costa Rica, 1975,  
Cifras Sobre Producción Agropecuaria, 1975-1980,  
Central Bank of Costa Rica, San Jose, Costa Rica, 1981.

The difference in nominal and constant (1975) prices is more marked for cassava than even for the other vegetables. Cassava prices for 1972 through 1975, in 1975 colones, were substantially above those for 1976-1980 (Figure 4 and Appendix Table 1).

## INPUT PRICES AND PRODUCTION COSTS

### Input Prices

Average annual prices paid by agricultural producers for fertilizers, chemicals and hired labor are published by the Ministry of Agriculture and Livestock (MAG). As with product prices, data on input prices were not available for a large number of inputs applied to all products in all regions. However, prices for certain widely used fertilizers or mixes and chemicals were published and are discussed here. Also, a wholesale price index for fertilizers, chemicals and pharmaceuticals is published by the Central Bank (BC).

This wholesale index almost doubled from 1972 to 1975, then increased another 70 percent by 1980 (Table 1). This index followed the same pattern at very similar levels throughout the period as the general wholesale price index.

### Fertilizers

Annual or monthly average prices for urea, 10-30-10 and 15-15-15 are published by the MAG. Prices for urea and 10-30-10 jumped sharply from 1973 to 1975 then dropped substantially by 1977. Fertilizer prices started up in 1978 and exceeded \$170 per quintal during 1980 (Table 9). The balanced mix, 15-15-15, rose considerably from 1973 to 1975, remained stable and then increased from 1978, averaging nearly \$150 per quintal in 1980 (Figure 5).

Table 9. Fertilizers: Annual average prices, Costa Rica, 1973-1980

Year <sup>a</sup>	Urea	10-30-10	15-15-15
		colones per quintal	
1973	41.40	43.25	36.65
1974	95.45	68.15	67.50
1975	117.70	100.90	77.80
1976	76.60	87.25	77.80
1977	77.50	85.90	77.75
1978 <sup>b</sup>	86.50	84.65	84.20
1979 <sup>c</sup>	108.15	108.95	102.35
1980 <sup>d</sup>	170.50	173.00	149.65

<sup>a</sup>Data for 1972 not available.

<sup>b</sup>Average for six months - March-June, September, December.

<sup>c</sup>Average for eight months - April, June-September, November-December.

<sup>d</sup>Average for eight months - February, April-June, September-December.

Source: Ministry of Agriculture and Livestock,  
Economics and Agricultural Statistics Department,  
Information Leaflets 1978-81.

### Agricultural Chemicals

Only a few of the wide array of agricultural chemicals used in Costa Rica had data on prices for 1973-1980 period. Two herbicides, 2-4,D and Gramoxone, a fungicide, Manzate, and Dipterex, an insecticide, are discussed here.<sup>1</sup>

The herbicides both increased sharply in price from 1973-1975, then declined, with Gramoxone showing a larger drop than 2-4,D. Both herbicide prices increased in 1980, with 2-4,D being higher, at ¢24.80 per liter than the 1975 price of ¢22.75 (Table 10 and Figure 6).

The fungicide showed a relatively slow rate of increase, from ¢23.60 per kilogram in 1973 to ¢33.15 in 1979, then jumped to ¢38.80 in 1980. The insecticide increased fairly sharply from ¢29.90 per kilogram in 1973 to ¢56.00 by 1975 then gradually until 1980, when the price jumped to ¢86.15 per kilogram (Table 10 and Figure 6).

### Effects of Exchange Rates

Since the fertilizers and chemicals discussed here are imported, either in final or ingredient form, exchange rates have definite effects on domestic prices for these items. Figure 7 shows the effects of the 1980-81 change in exchange rates (from Table 3) and the effects of inflation since 1975 on Costa Rican prices for the fertilizers and chemicals discussed. It is clear that inflation since 1975 has contributed greatly to the price increases for these inputs. Devaluation of the colon during 1981 also contributed, but not so greatly as the six years of inflation.

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<sup>1</sup>Use of trade names does not imply endorsement of a product. These names are published in MAG data series and are included in this report for that reason.

Table 10. Agricultural chemicals: Annual average prices,  
Costa Rica, 1973-1980

Year <sup>a</sup>	Herbicides		Fungicide	Insecticide
	2-4,D colones per liter	Gramoxone	Manzate colones per kilogram	Dipterex
1973	8.70	65.65	23.60	29.90
1974	17.15	74.50	23.05	37.60
1975	22.75	99.40	27.90	56.00
1976	22.70	90.75	29.65	68.80
1977	21.75	80.05	30.75	70.35
1978 <sup>b</sup>	14.65	51.30	32.10	72.00
1979 <sup>c</sup>	16.95	43.90	33.15	72.00
1980 <sup>d</sup>	24.80	56.00	38.80	86.15

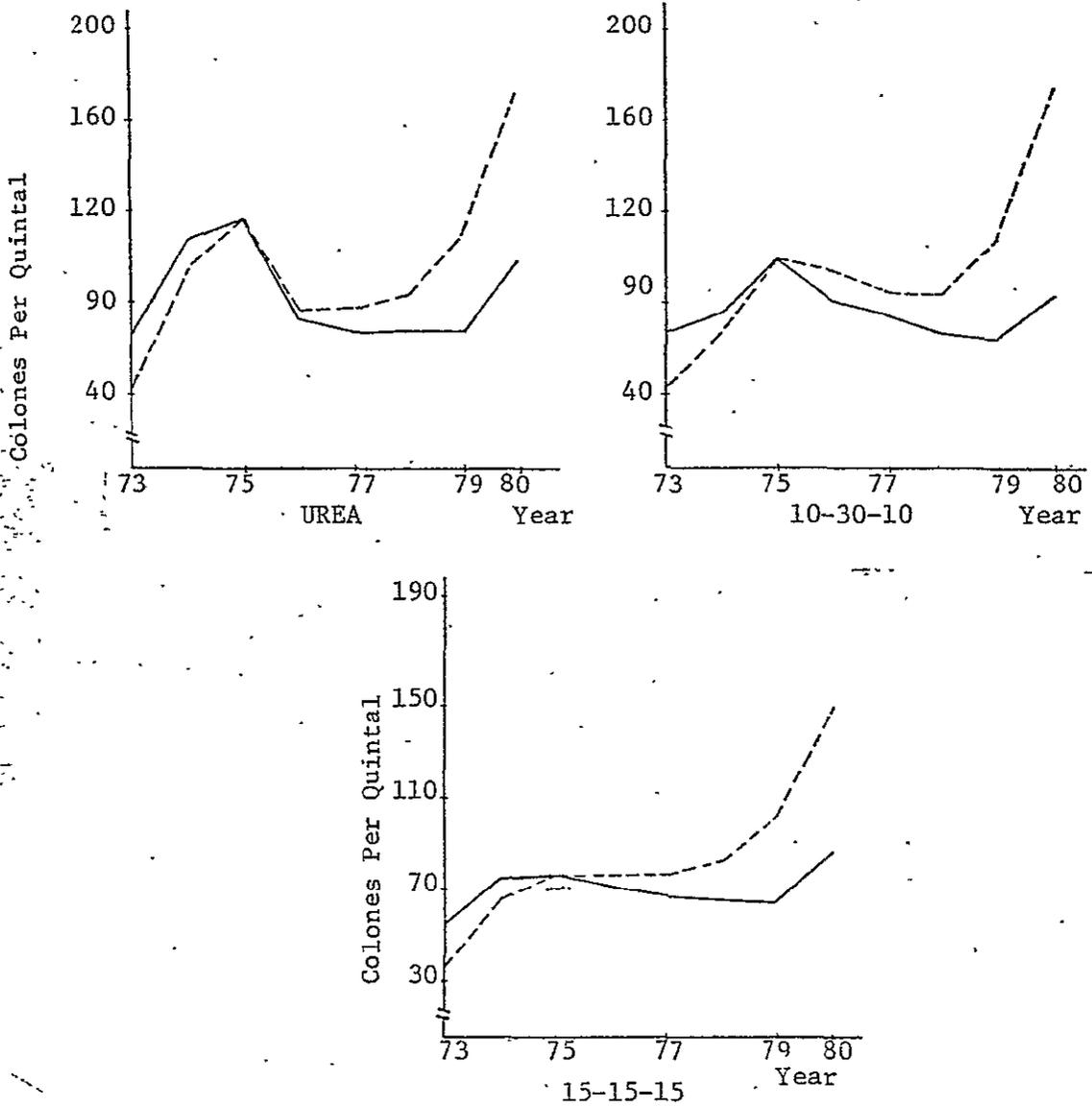
<sup>a</sup>Data for 1972 not available.

<sup>b</sup>Average for six months - March-June, September, December.

<sup>c</sup>Average for eight months - June, September, November-December.

<sup>d</sup>Average for eight months - February, April-June, September-December.

Source: Ministry of Agriculture and Livestock, Economics and Agricultural  
Statistics Department, Information Leaflets, 1978-1981.



--- Nominal price  
 — Price in 1975 colones

Figure 5.--Fertilizer: Nominal prices and prices in 1975 colones, Costa Rica, 1973-1980.

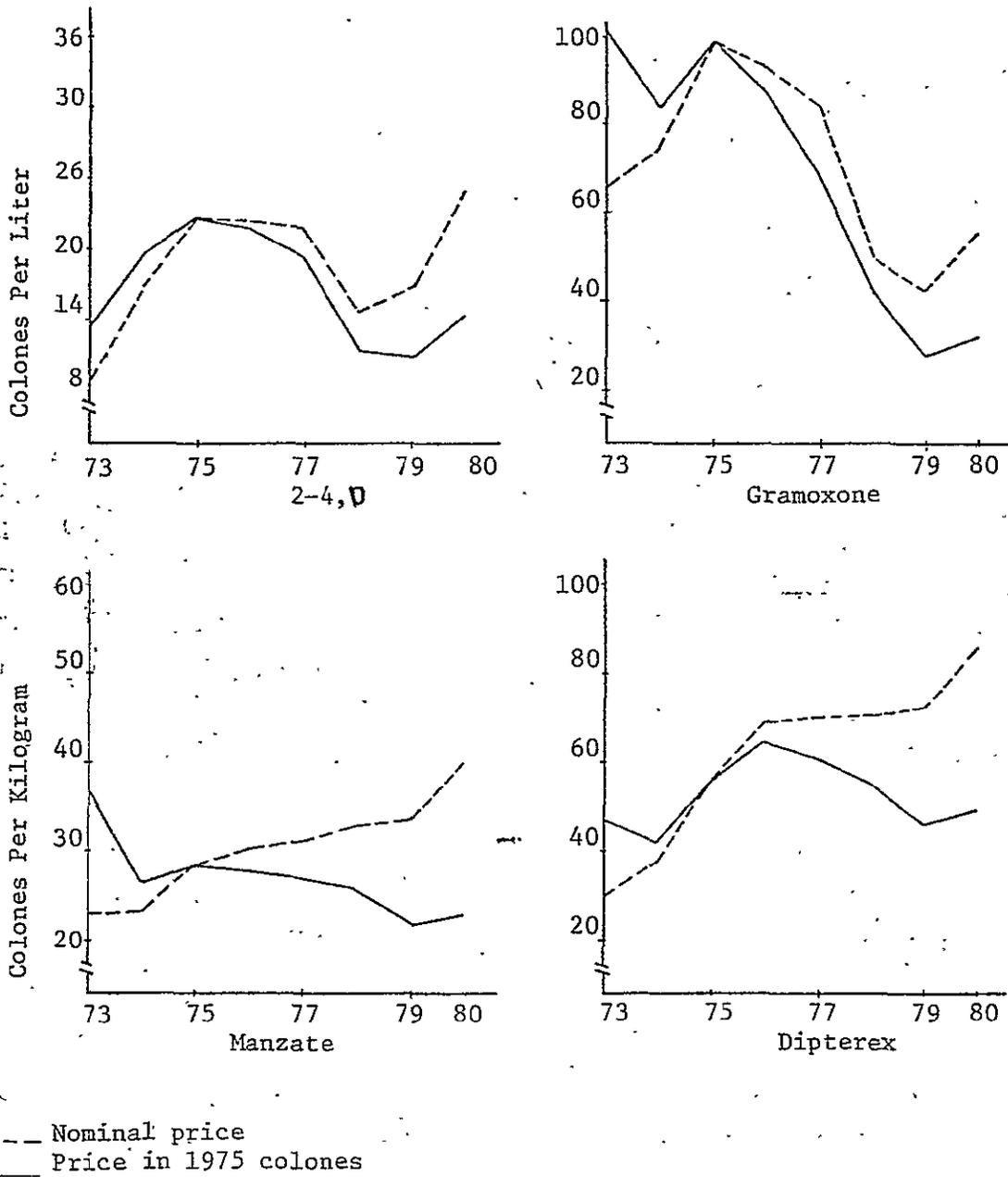


Figure 6.--Agricultural chemicals: Nominal prices and prices in 1975 colones, Costa Rica, 1973-1980

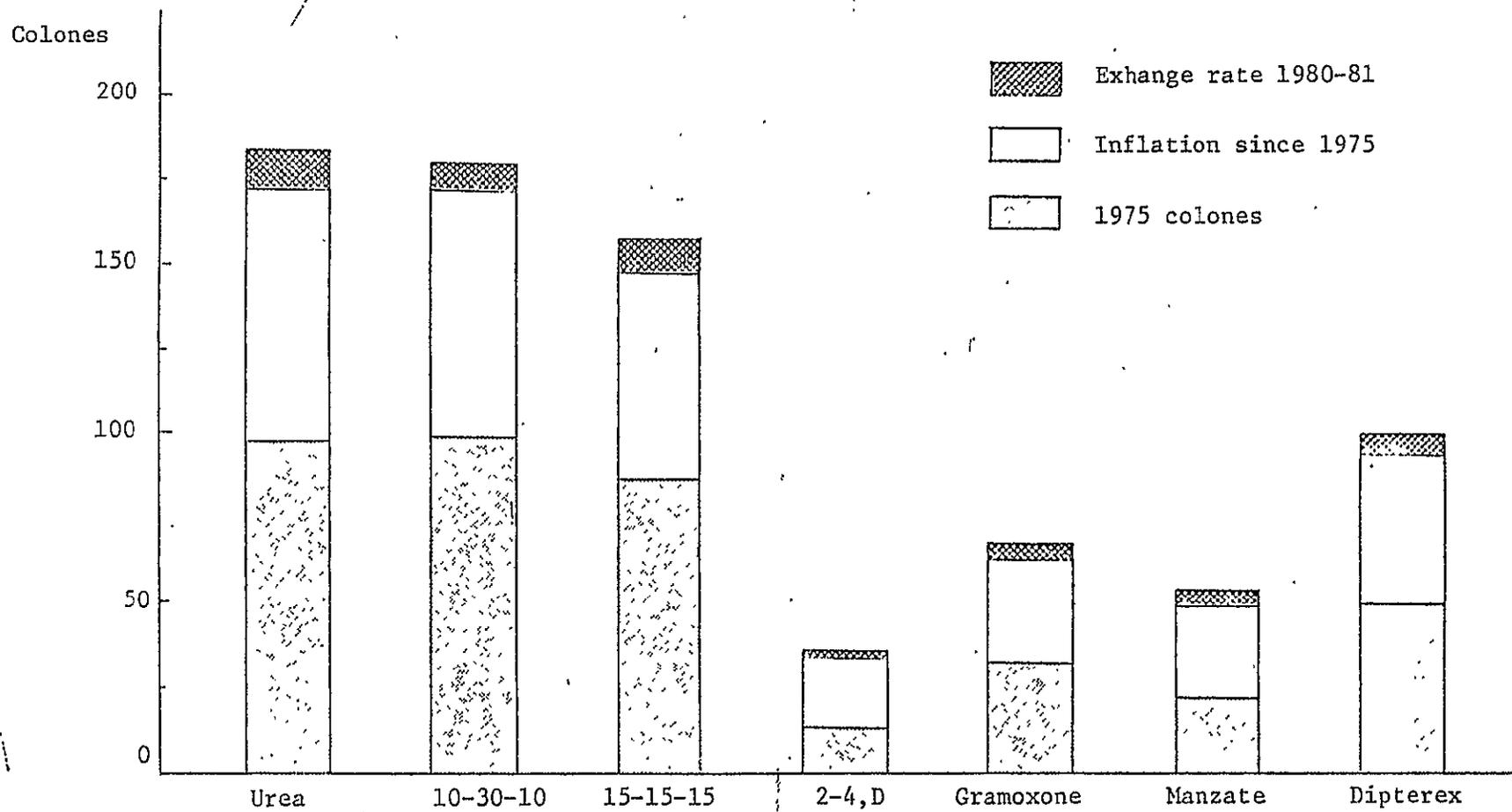


Figure 7.--Fertilizers and agricultural chemicals: 1980 prices and effects of inflation and exchange rate changes, Costa Rica.

### Agricultural Labor

Average labor costs per hour were available for one or more years during the 1972-1980 period for 11 of the 12 agricultural products considered. No information on labor costs for beef cattle production was found. Labor costs increased from less than two colones per hour in 1972 and 1973 to five to six colones by 1980 (Table 11). The data, while not complete, should be representative of most crops and most regions. The general trend has been upward (Figure 8), with an average annual rate of increase of nearly 18 percent from 1.5 colones per hour in 1972 to 5.5 colones in 1980.

### Production Costs

#### Major Regions

Production of the twelve products considered in this study is divided among several regions of Costa Rica (Table 12). Government agencies have delineated specific planning regions, and most of the production cost data are designated according to these planning divisions. For this study, costs and other relevant data for each product were selected for the one region of greatest importance for that product. In some products, enterprise budgets were published for the country as a whole. The regions used in study are identified by the boxes enclosing the percentages in Table 12.

Published data did not always identify these regions clearly and consistently. Also, the regional names were changed, apparently in 1981, and the complete list of new names was not available. The former names are used in this report.

#### Central Bank Enterprise Budgets

The Central Bank (BC) and an interbank commission prepare and publish production cost estimates for a number of crops for which government agencies

Table 11. Average labor cost per hour from two sources, eleven agricultural products, Costa Rica, various years 1972-1980

Product	Years	Average labor cost per hour	
		M.A.G.	B.C.
		colones	
Cocoa	1977	5.09	
Sugar cane	1976		3.00
	1977	3.72	3.83
	1978	5.06	
	1979	6.08	
	1980		5.00
Rice	1972	1.58	
	1973	1.74	
	1977		3.39
	1978	4.25	3.86
	1979	5.02	4.50
	1980	6.66	5.00
Beans	1975		2.26
	1976		3.00
	1977		3.39
	1978		4.00
	1979		4.50
	1980		5.00
Corn	1972	1.36	
	1976		3.00
	1977		3.39
	1978		3.86
	1979		4.50
	1980		5.00
Sorghum	1976		3.00
	1978	7.27	4.00
Onions	1974	1.82	
	1977	3.49	
Potatoes	1972	1.50	
	1979	5.19	
Plantains	1976	3.01	
	1978	4.38	
Tomatoes	1977	3.33	
	1979	6.00	
Cassava	1973	1.67	
	1978	4.80	
	1979	6.00	

## Table 11. Continued

Sources: M.A.G. - Ministry of Agriculture and Livestock, Planning Directorate, "Analysis and Summary of Costs of Production of Agricultural Crops and Livestock Products 1971-1980", July 1981 (mimeo).

B.C. - Central Bank of Costa Rica, Department of Development Credit, crop enterprise budgets, 1975-1980.

Table 12. Twelve agricultural products: Shares of production in planning regions of Costa Rica

Product	Central Valley		North	Dry	Pacific Central	South	Atlantic	Total <sup>a</sup>
	East	West						
Percent								
Cocoa	- <sup>b</sup>	0	14	0	0	3	<u>83</u>	100
Sugar cane	<u>24</u>	<u>35</u>	14	22	2	2	- <sup>a</sup>	100
Beef	3	8	17	<u>50</u>	7	10	4	100
Rice	- <sup>b</sup>	2	6	<u>38</u>	28	26	- <sup>b</sup>	100
Beans	3	7	16	27	15	32	- <sup>b</sup>	100
Corn	5	6	9	27	12	29	11	100
Sorghum	- <sup>b</sup>	4	0	<u>58</u>	24	14	0	100
Vegetables <sup>c</sup>	<u>56</u>	<u>34</u>	3	3	3	1	- <sup>b</sup>	100

<sup>a</sup> Percentages may not sum to 100 due to rounding.

<sup>b</sup> Less than one percent.

<sup>c</sup> Potatoes and tomatoes.

Source: Basic Information on the Agricultural Sector of Costa Rica, Office of Agricultural Sector Planning, 1977.

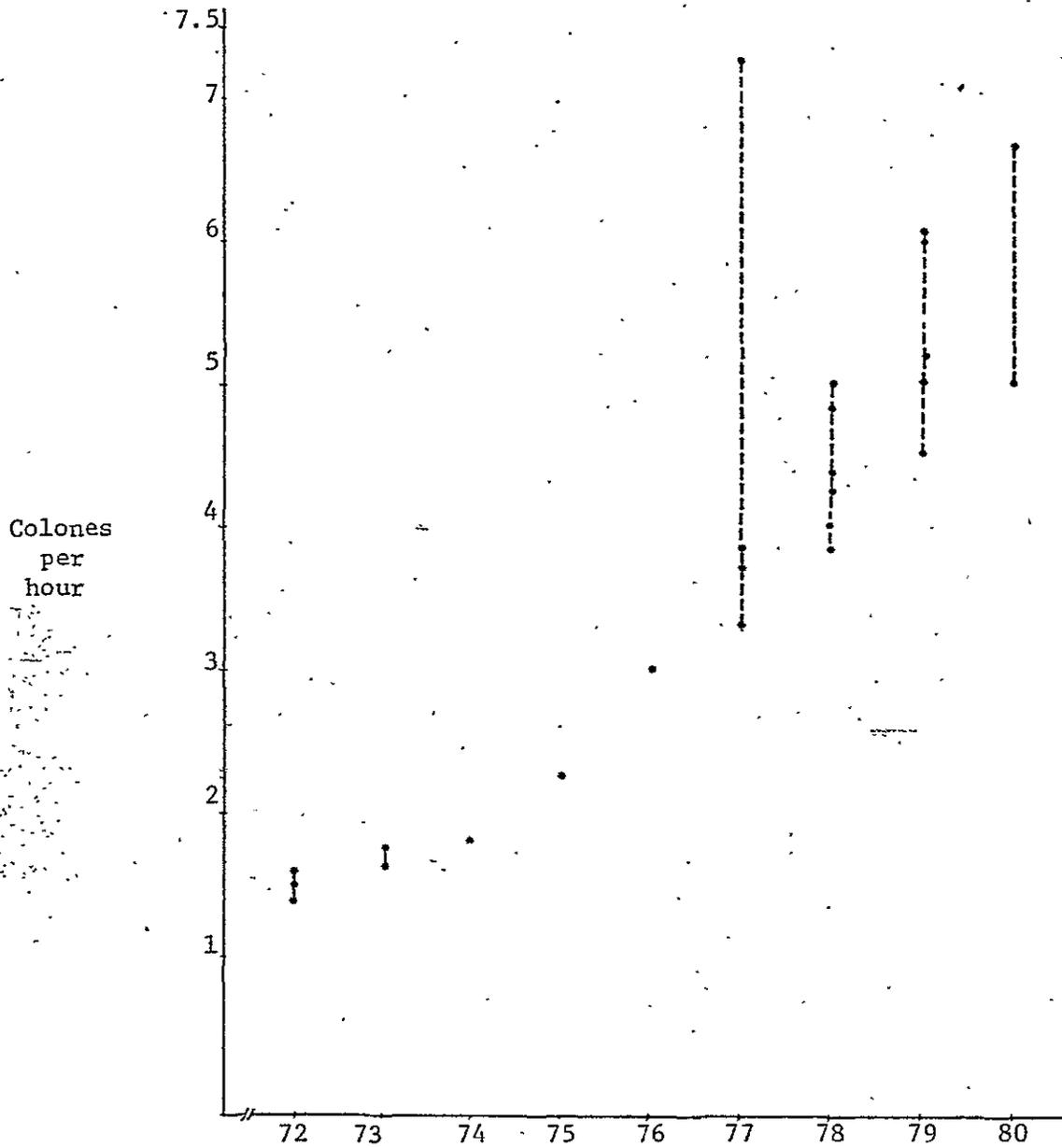


Figure 8.--Average agricultural labor cost per hour, Costa Rica, 1972-1980.

provide financing. For this study, budgets were collected for each of the four basic grains and for sugar for most of the years from 1975 to 1980 (Appendix Table 3). Budgets were available for one or more of the primary producing regions, for one or more production systems.

### Basic Grains

From the budgets selected for analysis, key items are used in Tables 13 and 14. Table 13 shows yields and prices that generated revenues for the grains in the years for which budgets were available. Prices are support prices established by CNP (Table 6) and yields were usually specified in the budgets or calculated from them.

The yields apparently were expected yields for the system and region. No data were available to compare these with historical yields.

In Table 14, revenues from Table 13 and costs from enterprise budgets are listed and used to calculate returns per hectare. These return figures are shown in both nominal and 1975 colones.

Production costs for each of the four basic grains followed different patterns in the short period shown. Costs for rice dropped from 1975 levels in 1972 and 1977, then increased in 1979 and 1980, but the 1980 figure was still considerably below that for 1975 (Table 14). Production costs for beans increased each of the years shown until 1980, when a slight decline was listed.

Corn production costs increased steadily but not too greatly, with increases of two to seven percent each year, and 1980 cost was only 17 percent above the 1975 level (Table 14). Sorghum costs were available for each year from 1975 to 1980. These costs dropped from 1975 to 1977, then increased by 1980. However, 1980 cost was only 4 percent above the 1975 figure.

Revenues in nominal terms fluctuated considerably. This is not surprising, since it is the nature of agricultural products to vary in both yield, total

Table 13. Yields, prices and revenues for rice, beans, corn and sorghum, selected regions, Costa Rica, 1975-1980

Crop, region and item	Unit	1975	1976	1977	1978	1979	1980
Rice, <sup>a</sup> Pacific Dry							
Yield	Qq.	57.2		63	63	63	63
Price <sup>b</sup>	¢ per qq.	88.75		78.12	82.50	86.90	93.12
Value	¢ per hectare	5,076		4,922	5,198	5,475	5,866
Beans, <sup>c</sup> all regions							
Yield	Qq.	25			30	25	25
Price <sup>b</sup>	¢ per qq.	225			210	225	225
Value	¢ per hectare	5,625			6,300	5,625	5,625
Corn, <sup>d</sup> Pacific South							
Yield	Qq.	55		55	60	60	55
Price <sup>b</sup>	¢ per qq.	75		70	70	82	89
Value	¢ per hectare	4,125		3,850	4,200	4,920	4,895
Sorghum, Pacific Dry							
Yield	Qq.	70	50	70	50	65	59
Price <sup>b</sup>	¢ per qq.	60	60	60	65	65	74
Value	¢ per hectare	4,200	3,000	4,200	3,250	4,225	4,366

<sup>a</sup>Mechanized.

<sup>b</sup>Support prices (see Table 6).

<sup>c</sup>Sembrado a espeque.

<sup>d</sup>Semi-mechanized.

Source: Central Bank of Costa Rica, Department of Development Credit, crop enterprise budgets.

Table 14. Basic grains, selected regions: Revenues, costs and returns, 1975-1980

Crop, region and item	1975	1976	1977	1978	1979	1980
			- colones per hectare -			
Rice, <sup>a</sup> Pacific Dry						
Revenue	5,076		4,922	5,198	5,475	5,866
Cost	4,836		4,013	3,511	3,692	4,427
Return-nominal	240		909	1,687	1,783	1,439
1975	240		789	1,339	1,141	832
Beans, <sup>b</sup> all regions						
Revenue	5,625			6,300	5,625	5,625
Cost	3,082			3,604	3,899	3,819
Return-nominal	2,543			2,696	1,726	1,806
1975	2,543			2,140	1,105	1,044
Corn, <sup>c</sup> Pacific South						
Revenue	4,125		3,850	4,200	4,920	4,895
Cost	3,241		3,309	3,440	3,689	3,801
Return-nominal	884		541	760	1,231	1,094
1975	884		470	603	788	632
Sorghum, Pacific Dry						
Revenue	4,200	3,000	4,200	3,250	4,225	4,366
Cost	3,036	2,589	2,557	2,602	2,677	3,151
Return-nominal	1,164	411	1,643	648	1,548	1,215
1975	1,164	383	1,427	514	991	702

<sup>a</sup>Mechanized.

<sup>b</sup>Sembrado a espeque.

<sup>c</sup>Semi-mechanized.

<sup>d</sup>Deflated by general wholesale price index, 1975=100 (Table 1).

Source: Table 13, and crop enterprise budgets, Central Bank of Costa Rica, Department of Development Credit.

output and price. However, the fact that the revenues shown were based on expected yields and support prices does not make them suitable for evaluating the financial strength of farmers growing these crops. Revenues expressed in 1975 colones showed the effects of inflation, particularly during 1979 and 1980 (Table 14).

Data from the Central Bank budgets on production costs for the basic grains present a confusing picture. The index of wholesale prices, one measure of the general trend in prices of goods purchased by producers, increased 73 percent from 1975 to 1980, 50 percent from 1977 to 1980 or 11 percent from 1978 to 1980 (Table 15). Costs reported in the budgets showed increases from 1975 to 1980 of 4 to 24 percent for sorghum, corn and beans, and a decline of 8 percent for rice. In the shorter period of 1977 to 1980, cost increases ranged from 10 percent for rice to 23 percent for sorghum, compared with 50 percent for the price index (Table 15).

#### Sugar cane

Central Bank budgets for establishment and operating costs for sugar cane were available for three years of the period. Establishment costs were reported as considerably higher in 1975 than in 1980 (Table 16). Operating costs increased from \$2,484 per hectare in 1976 to \$3,492 in 1980, an increase of 41 percent. Operating costs increased 25 percent from 1977 to 1980 (Table 15).

No data were reported for actual or expected yields so no revenue estimates could be made. The declining trend in establishment costs reported in the budgets is contrary to the increasing pattern of wholesale prices (Table 15). Operating costs did increase from 1976 or 1977 to 1980, through not as much as the increase in the wholesale price index.

Table 15. Changes in wholesale price index and in production costs from Central Bank budgets, basic grains and sugar cane, 1975-80

Period	Wholesale Price Index	Rice	Beans	Corn	Sorghum	Sugar cane <sup>a</sup>
		Percent				
1975-80	73	-8	24	17	4	--
1976-80	61	--	--	--	22	41
1977-80	50	10	--	15	23	25
1978-80	11	26	6	11	21	--

<sup>a</sup>Operating cost

Source: Calculated from Tables 1, 14 and 16.

Table 16. Sugar cane: Establishment and operating costs, Central region, 1975-1980

Year <sup>a</sup>	Cost	
	Establishment <sup>b</sup> colones per hectare	Operating
1975	5,848	- <sup>a</sup>
1976	- <sup>a</sup>	2,484
1977	5,502	2,789
1980	4,270	3,492 <sup>c</sup>

<sup>a</sup> Budgets for 1978, 1979, operating cost for 1975 and establishment cost for 1976 not available.

<sup>b</sup> All regions.

<sup>c</sup> Average of first and second cuttings.

Source: Central Bank of Costa Rica, Department of Development Credit, crop enterprise budgets.

## SUMMARY AND CONCLUSIONS

The Costa Rican economy has experienced substantial inflation since 1972. Price indices reflect average annual increases of nearly 15 percent in the general level of wholesale prices and 12 percent in consumer prices. Particular groups of goods such as fuels, have shown even greater rates of price increase.

Prices for the twelve agricultural products considered in this study have also increased since 1972, but not by as much as the general price level. Thus, farmers generally are realizing less in real terms for the products they sell now than they were in the early 1970's. Costs of purchased inputs such as fertilizers and chemicals, have also risen rapidly, so that many farmers are likely to be in a serious cost-price squeeze. This is certainly true in the United States now, as well as in Costa Rica.

Production costs used by the Central Bank and other development funding agencies are difficult to analyze. Trends in production costs for four of the five crops analyzed show substantially smaller increases than the general wholesale price index, and smaller increases than prices for individual purchased inputs studied.

Reported costs for producing rice, beans, corn and sugar cane increased less than did the wholesale price index. Production costs for sorghum rose at a much greater rate than did the other four crops listed, but still showed a smaller increase than the wholesale price index. Production costs were not available for enough years for the other seven products included to draw any conclusions. The Central Bank does not prepare budgets for those seven crops, and M.A.G. data on production costs did not provide enough detail for comparisons.

APPENDIX

Appendix Table 1. Twelve Costa Rican agricultural products: Annual average producer prices in 1975 colones<sup>a</sup>, 1972-1980

Product	1972	1973	1974	1975	1976	1977	1978	1979	1980
Cocoa									
Export	6,497	9,578	12,581	8,923	13,243	22,573	17,495	12,537	10,069
Domestic	6,229	9,883	11,341	9,321	12,704	23,753	19,146	14,056	11,943
Sugar cane	105.56	88.67	104.89	148.00	102.58	110.29	102.40	85.76	105.17
Beef									
Export	7,435	7,385	4,937	4,785	4,648	4,626	5,593	5,594	5,648
Domestic	5,676	6,159	4,777	3,806	3,608	3,511	4,183	4,602	4,923
Rice	2,231	2,068	2,254	2,385	2,062	2,026	1,931	1,570	1,567
Beans	2,918	4,134	4,003	4,505	4,236	3,933	3,605	2,859	3,363
Corn	1,185	1,059	1,241	1,482	1,250	1,064	1,033	919	1,014
Sorghum	-	-	-	1,133	997	916	879	770	882
Onions	2,065	2,071	1,481	1,859	1,228	1,399	2,026	2,217	1,375
Potatoes	2,834	2,705	2,243	2,794	2,620	2,174	2,786	2,693	2,601
Plantains	1,326	967	895	1,290	1,398	1,234	1,059	900	1,023
Tomatoes	3,852	4,116	3,046	2,735	2,024	-	-	-	3,151
Cassava	442	376	370	399	318	260	294	289	234

<sup>a</sup>Current prices deflated by general wholesale price index, 1975=100.

Source: Statistical Bulletin, No. 313, Central Bank of Costa Rica, San Jose, Costa Rica, Jan. 1976.  
 Statistical Bulletin, No. 336, Central Bank of Costa Rica, San Jose, Costa Rica, Jan. 1979.  
 Statistical Bulletin, No. 338, Central Bank of Costa Rica, San Jose, Costa Rica, May 1981.  
 Statistical Bulletin, No. 339, Central Bank of Costa Rica, San Jose, Costa Rica, June 1981.

Appendix Table 2. Fertilizers and agricultural chemicals: Prices in 1975 colones, Costa Rica, 1972-1980

Year	Fertilizers			Herbicides		Fungicide	Insecticide
	Urea	10-30-10	15-15-15	2-4,D	Gramoxone	Manzate	Dipterex
	colones per quintal			colones per liter		colones per kilogram	
1973	65.22	68.13	57.73	13.71	103.42	37.18	47.10
1974	108.82	77.70	76.96	19.55	84.94	26.28	42.18
1975	117.70	100.90	77.80	22.75	99.40	27.90	56.00
1976	71.43	81.37	72.55	21.17	84.63	27.65	64.16
1977	67.30	74.60	67.52	18.89	69.52	26.70	61.09
1978	68.65	67.19	66.82	11.63	40.71	25.48	57.14
1979	69.24	69.75	65.52	10.85	28.10	21.22	46.10
1980	98.50	99.94	86.45	14.33	32.35	22.42	49.77

Source: Calculated from Tables 1, 9 and 10.

Appendix Table 3. Central Bank crop enterprise budgets available

Crop and system	All	Regions <sup>a</sup> and years available			Atlantic
		Central	North	Pacific Dry South	
Sugar cane					
Establishment	1980			1977	1977
Operations				1975	1975
				1976	1976
				1977	1977
1st cutting		1980		1980	1980
2nd cutting		1980		1980	1980
Rice					
Mechanized	1975			1977	1977
				1978	1978
				1979	1979
				1980	
1st crop			1980	1980	
2nd crop			1980	1980	
A espeque	1975 1976 1977 1978				
Beans					
Mechanized				1975	
Semi mechanized	1976			1979	
	1977			1980	
Sembrado a espeque	1975	1979	1978		1979
		1980			1980
Con quia	1975				
	1976				
Tapado	1975				
	1976				
	1977				
	1978				
	1979				
	1980				

Appendix Table 3. Continued

	All	Central	North	Pacific Dry	South	Atlantic
<b>Corn</b>						
Mechanized		1975 1977	1977	1975 1976 1977 1978	1975 1977 1978	1975 1977
Semi mechanized	1980	1979		1979	1979	1979
Sembrado a espeque	1975 1976 1977					
<b>Sorghum</b>						
				1975 1978 1979 1980	1975 1978 1979 1980	
Mechanized planting				1976 1977	1976 1977	

<sup>a</sup> Names of regions were changed, apparently in 1981, but the new names were not available.

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