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**INDICES OF THE EFFECTS OF POLICIES ON THE AGRICULTURAL
SECTOR OF COSTA RICA**

Rigoberto Stewart

**STEWART ASSOCIATES
Heredia, Costa Rica
February 1992**

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**STEWART ASSOCIATES
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February 1992**

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Rigoberto Stewart

EXECUTIVE SUMMARY

A wealth of historic evidence worldwide indicate that trade and sectoral policies in developing countries have had very significant effects on the welfare of producers and consumers and on the development of their agricultural sectors. The welfare of producers and consumers have been affected by the levels of protection and income transfers fostered by the policies. And the development of the agricultural sectors has been conditioned by the levels of investment in research and extension and by the allocation of resources stimulated by the government's trade and sectoral policies.

This evidence has induced the World Bank to monitor the effects of a number policies on the agricultural sector of various developing countries, over time and across different types of activities. This is being done through the estimation of several indices.

The purpose of this study was twofold. One, to develop historic indices of the effects of various policies on Costa Rica's agricultural sector, using seven crops as example; and two, to simultaneously develop and refine the methodology, so that it can be used to continuously update the indices and monitor the effects of policy changes on the various types of activities that conform the sector.

The indices are: the Nominal Protection Coefficient (NPC), which measures the effect of policies that affect the price of the product; the Effective Protection Coefficient (EPC), which measure the effects of policies in both the product and traded inputs markets; the Producer Subsidy Equivalent (PSE), which attempts to quantify all the subsidies going to producers, including investment in research, extension and infrastructure; and the Consumer Subsidy Equivalent (CSE), which attempts to

account for all the subsidies going to consumers as a result of different policies, including measures such as subsidized transportation.

For this study, seven crops, representing import substituting, traditional and non-traditional exports activities were selected. The crops are: rice, white maize, beans, coffee, banana, sugarcane and melon.

This effort was not free of difficulties. Certain types of information is relatively scarce and difficult to obtain in Costa Rica. Detailed cost of production, necessary for estimating the EPCs were not available for some crops in some years. Data on direct subsidies to melon producers through the Tax Credit Certificate (CAT) was only available for one year. In many cases we were forced to choose indirect routes in order to arrive at key numbers. Nonetheless, we feel that, under the circumstances, the indices obtained reflect closely the effects of the various policies.

The estimated nominal protection coefficients (NPC) reveal a preference by the government to protect the production of basic grains, sugar and melon and to tax the production of coffee and banana. Protection was strongest during the first half of the decade, owing to the Monge Administration's policy of stimulating agriculture via prices and trade measures. Beginning in 1987/88 there was a tendency to reduce the levels of protection and to have greater correspondence between domestic and international grain prices. As called for in the SAL II agreement, protection was to not exceed 40 percent, based on a five year moving average of world prices. The negative protection of rice and beans during this period was due mainly to unmatched, sharp increases in world prices. During this period (1987/88-1990/91) sugar protection also fell, and the NPC remained between 1.25 and 1.44, as opposed to more than 2 of previous years.

The tax on coffee was relatively stable during the entire period, except for 1986/87 and 1989/90, with NPCs of 0.71 to 0.81. The tax rose in 1986/87 because of the increase in world prices, which allowed the government to charge a higher export tax rate. The opposite occurred in 1989/90, the year in which the drop in world prices triggered the virtual removal of all taxes.

The estimated effective protection coefficients (EPCs) indicate that the interventionist policies of the past decade subsidized the domestic resources used in the production of rice (some years), white maize, sugarcane and melon, and taxed those used in the production of coffee, banana and beans. Had it not been for the policies, much less domestic resources would have been devoted to the production of rice, sugarcane, white maize and melon. On the other hand, domestic resources were used to produce coffee, banana and beans despite the heavy tax burden that undermined the returns to these resources.

The producer subsidy equivalents (PSE) were quite revealing. Coffee producers, and bean producers after 1986/87, were very highly taxed by the combination of policies (PSE for coffee were -3 to -65%, and for beans of -26 to -84%), whereas the producers of sugarcane, white maize and melon were very highly subsidized. The PSEs were 21.7-58.6, 3.1-60 and 29 percent, respectively. Rice producers were mostly subsidized (although they were taxed in some years), but at lower levels.

The consumer subsidy equivalent (CSEs) reveal that coffee (and bean during the latter part of the period) consumers were highly subsidized. The CSEs for coffee ranged between 119 and 538 percent, and for beans between 30 and 103 percent. Consumers of sugar and white maize were highly taxed; the CSEs for sugar ranged between -12 and -57 percent, and for white maize between -2 and -46.5 percent. Rice consumers were mainly taxed, albeit at low rates, but were also subsidized in some years.

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1. THE ECONOMY AND ECONOMIC POLICIES

Costa Rica is one of the first developing countries to face the international crisis of the 80s. Because of its openness, the level of its external debts and the structure of its economy the crisis was strongly felt.

During 1980-83 the growth in national production fell 12 percent and the output per-capita dropped in more than 35 percent. The country's external debt grew rapidly, and in 1982 it represented 235 percent of exports. Inflation reached unprecedented levels in 1982 (up to 90 percent), and the levels of unemployment experienced during the 80s were also unusual (CORECA).

Between September of 1980 and September of 1982 the exchange rate in the free market went from $\text{¢}8.6/\text{US\$}$ to about $\text{¢}60/\text{US\$}$, a 600 percent devaluation. At the same time real wages fell by 45 percent, consumption was reduced, and extreme poverty increased sensibly. Private and public investment fell also (CORECA).

But, by 1983 there were clear indications that the economy had initiated its recovery. The government brought the foreign exchange market and its own finances under control. It regained access to sources of international finance and renegotiated its foreign debts. As a consequence, in 1984 gross investment increased by more than 25 percent, production grew 6 percent, and both imports and exports also increased. Inflation decreased to 11.9 percent, unemployment decreased and real wages appreciated.

During the second half of the decade, the government initiated an important structural adjustment program, including financial reforms, trade liberalization and privatization of state enterprises. Macroeconomic stability was reached with relatively low inflation rates and a real exchange rate that permitted

external balance and competitiveness in the export markets. This important process of reform and adjustment was backed by the Stand-by agreements with the IMF in 1987 and 1989, and by the World Bank and USAID through two Structural Adjustment Programs and bilateral donations.

A very important tariff reform was initiated in 1986, which rationalized the system and significantly reduced the levels of protection. It established higher nominal tariff levels for final goods than for intermediates and raw materials, and abolished a significant amount of tax exemptions. According to this program, by 1990, nominal tariffs were to remain within the 5-40 percent range of CIF value, except for textiles, clothing and leather products, which were to attain the same levels only in 1992.

Following are brief discussions of the principal instruments use to provide protection and subsidies to the various sectors between 1986 and 1989.

The Real Exchange Rate

During 1986-89 a system of mini-devaluations was instituted and operated on the basis of the purchasing power parity principle. Corrales and Monge estimated the overvaluation of the exchange rate at the beginning of the eighties to be between 18 and 30 percent; it was less than 5 percent during 1983-85, and was about zero during 1988-89.

Tariff Barriers

Starting in 1986 there were only three types of ad-valorem taxes: the Central American Common Tariff, the imports surcharge and one percent tax fixed by law No.6946. In 1990 the Common Tariff in Costa Rica had a range of 0 to 100 percent, the lower rates being applicable to raw materials and the higher to automotives and parts. The surcharges, which were temporal, and used for balance of payments purposes, were significantly reduced during the latter part of the decade, and were only between 2 and 6 percent in 1990.

Non-Tariff Barriers

The principal non-tariff barrier was import permits for agricultural products (grains and sugar), which were seldom given to private concerns. Only the National Grain Board was allowed to import grains and other agricultural products. But an agreement between the World Bank and the Government permitted the private sector to import some products during times of scarcity.

The anticipated deposits were another non-tariff barrier, since the importer was required to deposit at the Central Bank up to 100 percent of the value of imports for several months without earning interest.

Incentives to Non-Traditional Exports

Costa Rica began stimulating non-traditional exports to third markets in 1972 when the Law of Export Promotion was passed. The Export Contract, which is the principal legal instrument used for export promotion, was created in 1984. This instrument provided total tariff exemption on imports of all materials used in producing the exported products. It also provided total exemption from corporate taxes, and provided a subsidy in the form of a Tax Credit Certificate (TCC), which averaged about 15 percent of the FOB value. At the end of the 80s the TCC was provided according to the following schedule:

Domestic Value Added	Tax Credit Certificate
35 to 50 percent	15 percent
51 to 65 percent	20 percent
66 to percent and above	25 percent

2. THE AGRICULTURAL SECTOR

The agricultural sector has traditionally played a very important role in the Costa Rican economy. In 1984 it generated about 20 percent of GDP, employed about 30 percent of the labor force, and accounted for about 75 percent of total exports. During 1980-84, this sector's output grew at the rate of 3 percent per annum, and 8 percent in 1984. During the same period agricultural employment grew at a rate of only 1.4 percent per annum, and 2.1 percent in 1984.

Costa Rica's agricultural production is dominated by five export crops: coffee, banana, sugarcane, cocoa and beef; and four basic grains: rice, beans and white maize. The export crops account for about 60 percent of agricultural GDP, whereas basic grains account for only 7 percent; rice accounts for about 3 percent and maize and beans for about 2 percent each.

Public Investments

Public investments in this sector were significantly reduced during the 80s. Between 1981 and 1982 investments fell by 69 percent, going from ₡2,118 million to ₡656 million. In 1983, public investments grew 15 percent, but fell by 6.4 percent in 1984.

Credit

The credit policy, which is directed by the Central Bank, switched in favor of agriculture in 1980. The participation of this sector went from 42.2 percent (of total credit) in 1980 to 58.8 percent in 1984. This increase in credit favored mostly export crops, especially coffee.

Structure of Agricultural Production

According to the Agricultural Census of 1984, the 96,542 farms can be classified in three groups according to size: Class I, Class II and Class III. Class I comprises farms of 100 hectares or more; Class II of 5 to 100 hectares, and Class III of less than 5 hectares.

Class I, which includes high income farmers, represents about 6 percent of all producers, but 61 percent of total area in agriculture. This group generates most of the exports, except for coffee. In 1984 it generated 47 percent of agricultural GDP, mostly by producing export crops and rice. When all the other crops are included the participation increases to 54 percent. This implies that 5,792 producers generated ₱5,674 million of 1980, of a total agricultural production of ₱10,508 million. Thus, the average revenue per farmer was ₱979,927 of 1980 (US\$114,344).

Class II contains 47 percent (45,197) of all producers and 36.4 percent of total agricultural land. This group is the major producer of coffee, beans, white maize, potato and milk, and is also an important producer of beef, sugarcane and rice. In 1984

it accounted for 34,6 percent of agricultural production, and generated ₱3,573 million; that is, an average value per farmer of ₱79,056 of 1980 (US\$9,225).

Class III, which also embodies 47 percent of producers, generated ₱1,261 million; that is, 12 percent of the total value of production in 1984. This represented an average revenue per farmer of ₱27,838 of 1980 (US\$3,248). This group produces 25 percent of coffee (50% of all farms grow coffee and 58% of total revenue is from this crop), and about 60 percent of onion, lettuce, carrots, and tomatoes.

The Minimum Price Policy

This policy, which has been used to protect basic grain producers, was very costly during the 80s, and favored mainly large rice producers in the Class I category. The Agricultural Census of 1984 indicated that 76 percent of total rice sales was generated by farmers of this group; whereas farmers of Class III generated only 3 percent. The implication is that, by fixing the minimum price on the basis of production costs of farmers in Class II and Class III groups, the farmers in Class I were highly subsidized and were able to modernize, expand and integrate vertically with the rice industrialization process. This framework favored a high degree of concentration of rice production, and led to surpluses that had to be exported by the government at a loss.

Commercial Policy

The commercial policy in the agricultural sector during the 1980s was dominated by quantitative restrictions in the case of grains and other products, like sugar; export taxes, in the case of traditional exports; and subsidies, in the case of non-traditional exports, like melon. Imports of basic grains were allowed only in the case of deficits. Sugar imports are totally banned. Banana and coffee pay significant export taxes, and coffee producers are required to allocate part of their production to the domestic market, at a price far below world levels.

3. METHODOLOGY

This chapter provides a very brief explanation of the methodology used in this study to estimate the four indices of interest: nominal protection coefficients (NPC), effective protection coefficients (EPC), producer subsidy equivalents (PSE) and consumer subsidy equivalents (CSE). A very lengthy and detailed description is provided in the Appendix.

Nominal Protection Coefficient

The NPC is the ratio of domestic to border¹ prices (Pd/Pb). In order to determine the border price (import case) the appropriate international market, price and grade of the product must be identified, and the appropriate freight, insurance and local charges must be assessed, as well as any storage cost. The appropriate exchange rates must also be used.

In the case of grains we used the following international prices: US No.5, 20 percent broken at Gulf Ports, USA for rice; US No.2 white, Kansas City adjusted to Gulf Ports, for white maize; and FOB, Valparaíso, Chile for red or black beans. For grains from the U.S a freight and insurance rate of US\$ 25/t was used. Freight rates from Chile were provided by grain traders.

For local import costs (local charges) we obtained quotes for port charges, custom agent's fee, financing, grain loss,

¹ In the case of an importing country, the border price is the world price adjusted by freight, insurance, local charges and an appropriate exchange rate to a given point within the importing country.

administrative costs and loading and unloading plus transport costs to San Jose (details are provided in the appendix). And in order to convert dollar amounts to colons, we used the average market exchange rate for importing months.

The actual storage costs reported for 1989/90 and 1990/91, were converted to dollar amounts, and applied invariably to each year (US\$4.2/t/month). Thus, the adjustment was via the exchange rate applicable to each year.

In order to obtain the border farm price we subtracted the actually observed wholesale-farmgate margin from the border wholesale price. For the domestic farm price we used the price actually paid to farmers for grain placed in San José.

In the case of coffee the producer price is determined as follows. The producer delivers his coffee in consignment to the mill for processing and selling according to the miller's best judgement. The miller markets the coffee throughout the coffee year, and at the end presents a report to ICAFE (a government agency) containing the following information: total coffee received and milled, average yield of golden coffee per double hectoliter (DHL), total revenue from sales to export and domestic markets, and the sum of all costs allowed by law (not all costs are deducted). ICAFE uses this information to fix the final liquidation (to the producer) price the mill must pay for cherry coffee delivered by farmers. It deducts from total revenue, the milling costs, the ad-valorem production tax and a 9% return to the mill (this is 9% of total revenue, after deducting milling costs), to obtain the amount to be distributed among producers. This total is divided by the total amount of cherry coffee delivered to obtain the average producer price per DHL.

The border prices of coffee was determined as follows. Coffee produced in any given year is either consumed domestically (11-

14%) or exported to OIC members (under a quota system) or non-members (non-quota world market). Since the amount exported to OIC member market is regulated by the quota system (when the agreement is in effect), in order to obtain an average border price, we valued the amount exported to OIC market at the prevailing agreement prices and the rest (domestic consumption plus export to non-member markets, see Table C.17 of the Appendix) was valued at the prices prevailing in the non-quota market. We thus obtained a weighted average FOB, port price (border), which differed from the actual (domestic) average price in the sense that the latter valued 11 to 14% of the coffee at domestic auction prices, which were much lower than the non-member export price.

In the case of sugarcane the domestic price was determined as follows. Under the current marketing arrangement, producers (integrated with mills and independent) deliver their sugarcane to the mills for processing. The mills process the cane and deliver the sugar to LAICA (a government entity with monopoly power in sugar marketing), for which they receive an advance (partial payment). The mills, in turn, periodically pay the farmers advances on the cane delivered. At the end of the sugar year, LAICA determines the zafra's (harvest) total value, according to the different products sold in each market (white sugar, raw sugar, alcohol and melaza, in the domestic, U.S. preferential and world markets). From this they deduct a number of taxes to different institutions and payments to LAICA, to obtain the value of the zafra at the sugar mill level. The value of the melaza is then added to obtain the total revenue to be distributed among the mills and cane producers. By law, the mills receive 37.5 percent of this total, and farmers 62.5 percent. This implies that the cost of industrializing the cane is 37.5 percent of total revenues. This can be construed as a distortion, but was not addressed in our calculations. We took 37.5 percent as the valid processing cost. The remaining 62.5 percent is then

divided by the total tonnage of sugarcane delivered to obtain the farmer's price per ton of cane.

We estimated the total border value of the zafra by assuming that there are two international markets: the U.S. preferential and the world; and that in the absence of domestic distortions, Costa Rica would meet the quota in the U.S. preferential market and have the opportunity to sell the rest on the open world market. We thus valued the quota amount at the preferential prices and the rest at world prices. The sum of these two quantities provided the border value of the zafra (see Table S.19 of the Appendix).

In the case of banana, border prices were estimated in two ways. First, we took the FOB, port fixed by the government and added the export tax paid by the marketing firm. The rationale is that farmers could receive a price higher in the amount of the tax paid to the government. Second, we took international prices, FOB, ports in USA, and deducted a US\$ 2.5 per box freight and insurance (as estimated by CORBANA) and a 2.5 percent return to the marketing firm, to arrive at FOB, Limón border price (details are in the Appendix). To obtain the border farm price, we deducted total export costs borne by producers (including transport to the port) from the border FOB.

The domestic farm price was determined as follows. From the FOB, port fixed by the government, we deducted export costs and the different taxes paid by farmers, and added total incentives received by farmers, in US\$/box. For the latter, we divided total incentives by total boxes exported.

In the case of melon, we deducted export costs from the FOB price at port to obtain the actual price received at the farm level (this is the border price). We then obtained the total amount of CATS (tax credit certificates) for 1991, adjusted it to its

present value (since it matured in 12 months), and converted it to a per ton and per kilo basis, as follows. Exports were 389,745 tons and CATS were ₡274.2 million. Thus, CATS were equivalent to ₡7.03 per kg exported, or ₡5.27 per kg exported in present value terms (we took 75% of the face value). We then added this amount to the border farm price to obtain the actual or total domestic price received. The NPC is the ratio of the domestic and border prices.

Effective Protection Coefficients

The effective protection coefficient is the ratio of domestic and border value added. Value added is the difference between the price of the product and the cost of traded inputs incurred to produce that unit. Therefore, the EPC measures the increase in return to domestic, non-traded inputs (labor, land) that occurs as a consequence of policies in both the product and traded inputs markets.

In order to estimate the EPCs for **grains** we used detailed cost of production figures reported by the Banco Nacional de Costa Rica. Prices of traded inputs were adjusted according to the tariff levels prevailing in each year (see the Appendix).

In order to estimate the EPCs for **coffee** we used detailed cost of production figures for maintenance and partial renovation of coffee plantations, under the only production system that exist.

In the case of **sugarcane** we took the traded inputs listed in the detailed cost of production used for loans to growers for operating the plantation, and adjusted their costs for tariffs and other taxes, in order to obtain their domestic and border

values. We then subtracted the value of inputs (costs) per ton of sugarcane from the value of the sugarcane itself to obtain domestic and border value added at the farm level.

We were able to obtain payments of CATS and detailed production costs for export class melon only for 1991. The Central Bank does not have the yearly amounts of CATS by crops, and we were not allowed to do the disaggregation ourselves. They separated the 1991 figures as a favor. This is why NPC and EPC for the rest of the period were not estimated.

Producer Subsidy Equivalent

The producer subsidy equivalent (PSE) is an index that accounts for all policies (and disbursement) that implies an increase in farmers income or welfare. It thus includes, besides income transfers from marketing and pricing policies, the subsidies from credit at lower interest rates, and the implicit subsidies from investment in research, extension and infrastructure.

In the case of Costa Rica this index includes three types of subsidies: from the marketing system or pricing policy, from subsidized interest rates and from government expenditures on research, extension and infrastructure. For the first category we multiplied the quantities produced by the difference between the domestic and border prices. In order to obtain the credit subsidy, we multiplied the difference between the interest rates for commercial activities and those paid by each type of farmer times the total amount of credit provided per year. Since the data was reported as cumulative amounts lent throughout the year, we used one year as the duration of the loan. In reality it might

have been a loan for four months repeated several times throughout the year. The effect is the same.

Consumer Subsidy Equivalent

The consumer subsidy equivalent (CSE) is an index that measures the effects on consumers of various policies. In the cases studied it included only the pricing policy effects and its estimation consisted in multiplying the difference between domestic prices paid by consumers and border equivalent times total yearly consumption.

In the case of **sugar**, this subsidy (or rather tax) had two components: the subsidy from the marketing policy of the government and the subsidy that resulted from exemption of the sales tax. In the case of **coffee** this index included only the market effect of requiring a minimum quota for the domestic market. We multiplied the difference between domestic prices paid at the auction (wholesale level) and border equivalent times total yearly consumption.

4. INDICES OF THE EFFECTS OF POLICIES

Nominal Protection

Table 1 presents a summary of the nominal protection coefficients (NPC) estimated for each of the seven crops over the period 1980/81 - 1990/91.

Table 1. Summary of nominal protection coefficients (NPCs)

Year	Rice	Beans	W. Maize	Coffee	Sugarcane	Banana	Melon
1980/81	0.51	0.37	0.78	n.a.	n.a.	0.94	n.a.
1981/82	0.49	0.55	1.54	0.71	n.a.	0.79	n.a.
1982/83	1.09	1.40	2.39	0.75	1.82	0.61	n.a.
1983/84	1.18	1.45	1.39	0.81	1.96	0.86	n.a.
1984/85	1.03	1.34	1.64	0.81	2.32	0.79	n.a.
1985/86	1.06	1.74	2.34	0.77	2.01	0.89	n.a.
1986/87	1.33	1.85	2.48	0.60	2.06	0.97	n.a.
1987/88	0.74	0.79	1.72	0.75	1.44	0.67	n.a.
1988/89	0.68	0.63	1.03	0.77	1.25	0.62	n.a.
1989/90	1.27	0.54	1.53	0.97	1.43	0.65	n.a.
1990/91	1.28	1.31	1.36	n.a.	1.41	n.a.	1.15

n.a. = not available

Source: Appendix

Rice. The figures of the Table 1 show that rice producers, contrary to popular belief, did not, in general, receive high levels of protection via fixed prices, except during 1986/87 and 1989/91, years in which the nominal protection ranged between 27 and 33 percent. The negative protection of 1980/81-1981/82 is related to the turmoil in the foreign exchange market. The large and sudden devaluation increased the border price much faster than its domestic counterpart managed by the government. The negative protection of 1987/88 and 1988/89 was not due to a change in the government's protectionist policy. It was rather due to the fact that the international price increased 51 percent between 1986/87 and 1987/88, from US\$296 to US\$448/t; and remained at US\$ 415/t in 1988/89. This increase was not matched by similar increases in the domestic fixed price.

Beans. Bean producers have traditionally received low levels of protection from the policy of fixing domestic prices. The figures in Table 1 show, however, that these producers enjoyed high levels of nominal protection during 1982/83-1986/87 and in 1990/91. As pointed out in the case of rice, those levels of protection do not reflect a change in government policies, but are rather the outcome of a strong decline in international prices (from US\$ 890/t in 1980/81 to US\$ 289 in 1986/87) that was not matched in the domestic market. In other words, changes in the level of protection are due to the rigidity of domestic prices, which are fixed on the basis of production costs, and which do not adjust according to movements in international prices.

White Maize. Maize producers are traditionally protected by the government's pricing policies. The figures of Table 1 show that this did not change during 1981/82-1990/91; the nominal protection, which was very high during the first half of the decade (NPCs of up to 2.48), ranged only between 3 and 72 percent during the latter half.

Coffee. Nominal protection of coffee producers was always negative, because they were always required to pay several taxes (export tax, production tax and a tax to support ICAFE) that varied with the level of international prices; the higher the price, the higher the tax rate. This is reflected in the NPCs for coffee, in Table 1, which, for the most part, remained between 0.71 and 0.81, indicating a total tax on producers of 19 to 29 percent. The highest NPC (0.95) was observed in 1989/90, when, because of the collapse of the OIC agreement and the sudden fall in price, the government suspended almost all taxes.

Sugarcane. The whole activity is regulated by a government monopoly called Liga Agrícola e Industrial de la Caña de Azúcar (LAICA). This is the only institution or entity that can market sugar and sugarcane products. It sells to wholesalers, retailers and consumers, at prices fixed by the Ministry of Economy, Industry and Commerce (MEIC). The farmer gets a pooled price, which is calculated according to a formula, based on sale prices in three markets: the domestic, U.S. preferential and the international or world market. The border price was determined by valuing the quota (to the US) at the US preferential prices and all the rest of the sugar produced, at world prices.

The high levels of nominal protection shown in Table 1, indicate that LAICA and the MEIC fixed domestic prices far above the consolidated border price. This was more notorious during 1982/83-1986/87 when the NPC ranged between 1.82 and 2.32. During this period world prices plummeted while domestic prices continued to increase. The world price went from US\$0.169/lb in 1981 to US\$0.084/lb in 1982 and to US\$0.048/lb in 1985. It was not until 1988 before world prices rebounded to US\$0.10/lb And the NPC fell to only 1.44. During this period the domestic price to consumers went from ₡6.8/Kg in 1981 to ₡26.8 in 1986. These results indicate that sugar consumers were highly taxed by the marketing system and pricing policy.

Banana. In 1974, the government began fixing minimum FOB (at port) producer prices. It also instituted a series of producer incentives during the 1980s to stimulate the activity and thus reverse the negative trends of plantation abandonment. For area rehabilitation producers received US\$0.30 per box exported, over and above the fixed FOB price, as long as the yields were of at least 2.200 boxes/ha.

On the other hand, producers and multinational marketing firms together are required to pay a number of taxes that, at times, significantly lowers the net producer price. The **bunch tax** is a US\$0.02 per bunch or US\$0.0167 per box, paid by farmers, and deducted from the FOB price set by the government. The **ad-valorem tax** is 1 percent of the FOB price, and is paid by the producer. The **export tax** is a direct tax paid by the multinational marketing firm, that does not affect the fixed FOB producer price. In 1990 it went from US\$0.15/box to US\$0.50/box. It was still US\$0.50 in November 1991.

The NPCs of Table 1 indicate that the different taxes paid by producers, directly and indirectly, were proportionately larger than the sum of the pecuniary incentives received by farmers. The NPC indicate that producers were taxed nominally by 6-38 percent over the period of study, and that, because of the increase in the export tax, the overall tax was heaviest during the latter part of the period. The export tax was lowest during 1987-89 (US\$0.15-0.22/box). This in combination with a low border price, explain the NPC of 0.97 in 1986-87.

Melon. As part of the incentives to non-traditional exports, melon producers owning an export contract² do not pay any taxes;

²The export contract is a document whereby the government agrees to provide a number of incentives to exporters of non-traditional crops.

they rather receive a subsidy from the government in the form of a Tax Credit Certificate (CAT). The effects of these certificates which are paid according to the domestic valued added contained in the exported product, are reflected in the NPC of 1.15 reported in Table 1.

The nominal protection coefficients reveal a preference by the government to protect basic grains, sugar and melon producers and to tax coffee and banana growers. Protection was strongest during the first half of the decade, owing to the Monge Administration's policy of stimulating agriculture. Beginning in 1987/88 there was a tendency to reduce the levels of protection and to have greater correspondence between domestic and international grain prices. As called for in the SAL II agreement, protection was to not exceed 40 percent, based on a five-year moving average of world prices. The negative protection of rice and beans during this period was due mainly to unmatched, sharp increases in world prices.

During this period (1987/88-1990/91) sugar protection also fell, and the NPC remained between 1.25 and 1.44, as opposed to more than 2 of previous years.

The tax on coffee was relatively stable during the entire period, except for 1986/87 and 1989/90, with NPCs of 0.71 to 0.81. The tax rose in 1986/87 because of the increase in world prices, which allowed the government to charge a higher export tax rate. The opposite occurred in 1989/90, the year in which the drop in world prices triggered the virtual removal of all taxes.

Effective Protection

Effective protection indicates how much non-tradable (domestic) resources are protected, or in what proportion the returns to these resources are incremented because of policies in the product and traded inputs markets. If the prices of the product and traded inputs are increased by the same proportion because of policies in both markets, effective and nominal protection will be the same. But if the domestic prices of traded inputs are increased by less (or decreased) than the price of the product, effective protection will be greater than nominal protection. The opposite will be true if they are increased by more than the increase in the price of the product. Table 2 presents a summary of the EPCs estimated for each product during the eighties.

Table 2. Summary of effective protection coefficients (EPCs)

Year	Rice	Beans	W. Maize	Coffee	Sugarcane	Banana	Melon
1980/81	0.25	0.20	0.55	n.a.	n.a.	n.a.	n.a.
1981/82	0.11	0.46	2.14	n.a.	n.a.	n.a.	n.a.
1982/83	1.09	1.60	17.33	n.a.	2.00	n.a.	n.a.
1983/84	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1984/85	0.95	n.a.	5.27	n.a.	2.90	n.a.	n.a.
1985/86	1.01	n.a.	-35.05‡	n.a.	2.30	n.a.	n.a.
1986/87	1.56	2.39	12.75	0.39	2.40	n.a.	n.a.
1987/88	0.57	0.70	2.25	0.62	1.50	n.a.	n.a.
1988/89	0.73	0.63	0.95	0.57	1.30	n.a.	n.a.
1989/90	1.45	0.42	1.84	0.70	1.50	0.44	n.a.
1990/91	1.57	1.53	1.81	n.a.	1.50	n.a.	1.16

n.a. = not available.

‡ Value added at border prices was negative.

Rice. The figures of Table 2 show that effective protection was negative during 1987/88-1988/89. This is because during this period, world prices soared above domestic prices and traded inputs were taxed. The higher levels of protection reported for the latter two years are a reflection of tariff rates on traded inputs that were lower than the equivalent tariff on rice imports.

Beans. The effective protection coefficients correspond closely to the NPCs reported in Table 1, and reflect the average tariff in traded inputs. The coefficients lead to the conclusion that domestic resources used in bean production during 1980/81 and 1987/90 received returns that were lower than should have been by 30 to 80 percent. This is because bean producers not only received a price lower than the border equivalent, but they also had to pay tariffs on imported inputs used to produce beans.

White Maize. The very high levels of effective protection shown in Table 2 resulted from the fact that, in many years, the border value of traded inputs was very close to the border value of the product itself. This implies that the domestic value added (in border terms) was very low. This explains the coefficients for 1982/83 and 1986/87. In 1985/86 the border value added was negative, indicating that the effective protection was enormous, since the traded inputs used to produce maize cost more than the maize itself. This means that had the country imported maize instead of produced it, it would have saved not only foreign exchange (the excess of the cost of traded inputs over the cost of product), but also all of the cost of domestic resources used to produce maize. The use of these resources added zero value to the production process and, therefore, should have received zero returns.

Coffee. The EPCs of 0.39 - 0.70 for the years in which production cost figures were available were lower than the NPCs, indicating

that coffee producers did not only pay export and production taxes, but also import tariffs on traded inputs used in coffee production. As a consequence, the domestic resources used in coffee production earned returns that were 30 to 60 percent lower than would have been without the distortions.

Sugarcane. The small difference between the NPCs of Table 1 and the EPCs of Table 2 for sugarcane is due to the fact that traded inputs account for only a small proportion of production costs at the farm level; namely, 15 to 28 percent. Nonetheless, the domestic resources used in sugarcane production obtained returns that were 50 to 190 percent above what they would have been without distortions in both the product and traded inputs markets.

Banana. The EPC of 0.44 for 1989/90 indicate that producers not only paid high level of taxes at the product level, but were also forced to pay tariffs on traded inputs. Consequently, the domestic resources used to produce banana (land, labor) received returns that were about 56 percent lower than would have been without distortions in both markets.

Melon. The EPC of 1.16 similar to the NPC of 1.15 indicate that tariffs paid on traded inputs were roughly equivalent to the subsidy received from the government. Therefore, the domestic resources used to produce melon received returns that were about 16 percent above what they would have been without distortions in both the product and inputs markets.

In sum, the EPCs of Table 2 indicate that during the past decade the interventionist policies favored the use of domestic resources in the production of rice (some years), white maize, sugarcane and melon, and penalized their use in the production of coffee, banana and beans. Had it not been for these policies, much less domestic resources would have been devoted to the

production of rice, white maize, sugarcane and melon. On the other hand, domestic resources were allocated to the production of coffee, banana and beans despite the heavy tax burden that lessened the returns to these resources.

Producer Subsidy

The overall subsidy to producers was measured in terms of the producer subsidy equivalent (PSE), which takes into account the subsidies to producers from market intervention and pricing policies, credit subsidies, and direct government subsidies in the form of investment in agricultural research and extension and infrastructure. The PSE expresses the sum of these subsidies as a percentage of the value of production at domestic prices. The results are presented in Table 3.

Rice. The figures of Table 3 show that the total subsidy to rice producers, which was dominated by the effects of market intervention, was quite variable during 1984/85-1990/91. The subsidy was negative in 1987/88 and 1988/89 because of the negative nominal protection reported above; it was relatively small (6.6 and 8.5%) during 1984/85-1985/86, and reached a maximum of 26.5 percent in 1986/87, the last year of the Monge Administration.

Beans. The subsidy equivalent to bean producers was significantly positive during 1984/85-1986/87, a period in which the government stimulated production via prices and in which world prices were relatively low. The PSE was significantly negative throughout the rest of the period, except in 1990/91. The maximum tax (-84.8%) occurred in 1989/90, a year of very high world prices.

Table 3. Summary of producer subsidy equivalents (PSEs)

Year	Rice	Beans	W. Maize	Coffee	Sugarcane	Banana	Melon
1984/85	6.6	26.3	39.8	-23.2	58.6	n.a.	n.a.
1985/86	8.5	42.9	57.7	-28.9	51.9	n.a.	n.a.
1986/87	26.5	46.4	60.0	-65.3	52.9	n.a.	n.a.
1987/88	-34.1	-25.9	42.5	-32.4	32.7	n.a.	n.a.
1988/89	-12.4	-57.1	3.1	-29.1	21.7	n.a.	n.a.
1989/90	21.8	-84.8	35.4	-3.2	31.2	n.a.	n.a.
1990/91	22.9	5.0	27.1	n.a.	29.1	n.a.	29.0

n.a. = not available

White Maize. Table 3 shows that white maize producers received significant subsidies throughout the period 1984/85-1990/91, except in 1988/89, when the subsidy was small. The PSE ranged between 27 and 60 percent of the value of production at domestic prices; very significant, indeed.

Coffee. It is very clear from the figures of Table 3 that coffee producers were heavily taxed during 1984/85-1988/89, with PSEs of -23 to -65 percent of the value of production at domestic prices. It was only in 1989/90 (and 1990/91, although we were not able to estimate the PSE) that the burden on producers was lessened through the removal of most of the taxes.

Sugarcane. The situation of sugarcane growers was quite the opposite of their colleagues in the coffee sector. They received very heavy subsidies throughout the period of study, with PSEs of 29 to 58 percent of the value of production at domestic prices. Consistent with the policy of the Arias government, the subsidy, although important, was lower after 1986/87.

Banana. Because of the lack of appropriate data, the PSE was not estimated for banana growers.

Melon. Producers of melon received overall subsidy in 1990/91 equivalent to about 29 percent of the value of production at border farm prices. This is significant.

The figures of Table 3 are quite revealing. Coffee producers, and bean producers after 1986/87, were heavily taxed by the combination of policies, whereas the producers of sugarcane, white maize and melon were highly subsidized. Rice producers were mostly subsidized (they were taxed in some years), but at lower rates.

Consumer Subsidy

The index of subsidy to consumers measures exclusively the effect of market intervention and price policies on the expenditures of consumers. It is the difference between domestic and border consumer prices multiplied by the quantity consumed, and expressed as a percentage of the value of the quantity consumed, at domestic prices. Table 4 present the indices.

Rice. The figures of Table 4 show that consumers were taxed through most of the period, but at relatively low levels: CSEs of -2.8 to -18.2 percent. In 1987/88 and 1988/89 they were subsidized at rates of 34 and 15 percent of the value of consumption at domestic prices, respectively.

Beans. The figures of Table 4 shows that the subsidy during 1988/89-1989/90 (of more than 100 percent) more than compensated bean consumers for the tax paid during 1984/85-1986/87.

Table 4. Summary of consumer subsidy equivalents (CSEs)

Year	Rice	Beans	W. Maize	Coffee	Sugarcane	Banana	Melon
1984/85	0.6	-5.2	-21.8	325.0	-57.0	n.a.	n.a.
1985/86	-2.8	-13.3	-36.6	538.0	-50.1	n.a.	n.a.
1986/87	-18.2	-36.7	-46.5	476.0	-47.5	n.a.	n.a.
1987/88	34.0	30.3	-31.6	324.0	-24.2	n.a.	n.a.
1988/89	15.0	101.7	-2.9	200.0	-12.0	n.a.	n.a.
1989/90	-15.1	103.2	-29.2	119.0	-19.1	n.a.	n.a.
1990/91	-15.4	1.1	-20.4	n.a.	-23.1	n.a.	n.a.

n.a. = not available

White Maize. Users of this product paid significant taxes (more than 20% of the value of consumption at domestic prices) throughout most of the period. The implication of these results (Table 4) is a significant reduction in the welfare of consumers of white maize products, such a tortillas and chips.

Coffee. Owing mainly to the policy of allocating a certain proportion of production to the domestic market, the subsidy to consumers have been enormous (Table 4). The CSE ranged between 119 and 538 percent of the value of consumption at domestic prices.

Sugarcane. Consumers were significantly taxed throughout the period, although at levels not comparable to the subsidy to coffee consumers. The tax ranged between 12 and 57 percent of the value of consumption (at domestic prices), and was lowest during the latter part of the period.

This index (CSE) was not applicable to banana and melon, since production of these crops is for exports only, and only the rejects are commercialized domestically.

The main conclusion from the CSEs in Table 4 is that coffee (and bean consumers during the latter part of the period) consumers were highly subsidized, with the subsidy to coffee consumers being up to 5 times as large as that to bean consumers, while sugar and white maize consumers were highly taxed. Rice consumers were mainly taxed (albeit at lower rates) but were also subsidized in some years.

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**INDICES OF THE EFFECTS OF POLICIES ON THE AGRICULTURAL
SECTOR OF COSTA RICA**

Rigoberto Stewart

APPENDIX

**STEWART ASSOCIATES
Heredia, Costa Rica
February 1992**

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SECTOR OF COSTA RICA

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STEWART ASSOCIATES
Heredia, Costa Rica
February 1992

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RICE

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I. PRODUCTION

a. Area, Production, Yields

Table R.1 presents the evolution of rice area, production and yields during the period 1979/80-1990/91, and shows that the country has been essentially self sufficient during that period, with exports and imports of quantities no larger than 30% of production.

Table R.1. Costa Rica: Production and consumption of rice, 1979/80 - 1989/90

Crop Year	Area (000 ha)	Yields (t/ha)	Product. paddy (t)	Product. milled (t)	Imports (t)	Exports (t)	Stock Changes (t)	Apparent Cons. a/ (t)
1979/80	81,216	2.916	236,843	154,730	0	43,706	n.a.	111,024
1980/81	84,629	2.878	243,590	159,137	0	40,726	n.a.	118,411
1981/82	72,294	2.795	202,037	131,991	0	13,989	n.a.	118,002
1982/83	76,598	1.937	148,378	96,935	13,868	202	n.a.	110,601
1983/84	88,351	3.185	281,388	183,831	11,289	15,500	n.a.	179,620
1984/85	72,335	3.079	222,740	145,516	0	43,855	n.a.	101,661
1985/86	72,319	3.375	244,050	159,438	0	20,515	22,752	116,170
1986/87	60,323	3.064	184,811	120,737	0	0	6,570	114,167
1987/88	50,770	3.028	153,747	100,443	19,601	0	0	120,884
1988/89	58,352	3.521	205,464	134,230	38,667	0	36,895	136,002
1989/90	63,398	3.900	244,317	137,428	3	289	n.a.	137,717
1990/91	51,930	3.800	195,685	122,303	38	0	n.a.	122,341

n.a. = not available

a/ Equivalent to production + imports - exports - stock changes.

Source: CNP

b. Production by Regions

Table R.2 shows, by means of the contribution of each region in 1988/89, the general importance of each in terms of rice production. The principal producers, in order of importance, are the North, Central and South Pacific regions, with a clear predominance of the North Pacific (47% of total).

Table R.2. Costa Rica: Regional situation of rice in 1988/89

Region	Production (paddy) (t)	Production (milled) (t)	Imports & invent changes (t)	Total Consump- tion (t)	Percent- age on farm consump. (%)	On Farm consump- tion (t)	Deficit (t)
Central	1,007	658	1,715	72,469	33.3	335	70,096
Ctl Pac.	47,047	30,736	0	10,311	5.5	2,588	0
N. Pac.	97,031	63,390	0	13,905	2.8	2,717	0
S. Pac.	42,230	27,589	0	17,614	8.7	3,674	0
Northern	8,689	5,677	0	8,501	25.7	2,233	2,824
Atlantic	9,548	6,238	0	13,202	5.2	496	6,964
Total	205,552	134,287	1,715	136,002	8.9	12,043	0

Source: CNF, DGEC and Ministry of Health.

c. Seasonality

Table R.3, which also presents the distribution of production by regions in 1986/87, shows the seasonality of production for that crop year. It shows that December is the principal harvest month (with 37.4%), and that 83.7% of all rice is produced during September-December. Thus, in this case, it is clear that the harvest months are September, October, November and December.

d. Type of Producers (Farm Size)

In 1984, 77% of all the rice was produced on farms of 100 hectares or more; farms of less than 10 hectares contributed only 4% (Table R.4). It is thus clear that in Costa Rica, rice is produced on very large farms, and, according to Salazar (1988), production is increasingly concentrating on these farms.

Table R.3. Production of paddy rice by months and regions, 1986/87 (t)

Month	Central	Central Pacific	Northern Pacific	South Pacific	Northern	Atlantic	Costa Rica	(%)
AUG	0	0	0	8,166	0	0	8,166	4.4
SEP	0	19,160	0	7,205	651	5,236	32,252	17.5
OCT	0	11,788	2,232	9,020	344	3,330	26,714	14.5
NOV	0	6,460	14,062	2,233	0	3,597	26,372	14.3
DEC	0	2,285	63,320	3,095	0	137	68,837	37.4
JAN	0	1,637	578	4,104	0	0	6,319	3.4
FEB	0	287	50	0	0	156	493	0.3
MAR	0	25	312	0	0	3,078	3,415	1.9
APR	0	227	678	0	0	2,687	3,592	2.0
MAY	0	0	5,657	0	0	21	5,678	3.1
JUN	0	0	812	0	0	0	812	0.4
JUL	0	800	611	0	0	0	1,411	0.8
Total	0	42,669	86,332	33,823	995	18,242	184,061	100

Source: Department of Economic Studies, CNF.

e. Production Systems or Technological Levels

Because of its predominance and the difficulty to clearly define the others, it is often said (Salazar, 1988) that rice is produced in Costa Rica under only one technological level: the mechanized. There are, however, two others, the semi-mechanized and the "artesanal" or traditional. Table R.5, which illustrates the relative importance of each technological level, shows that more than 70% of production occurs under the mechanized technology.

Table R.4 Costa Rica: Rice production by farm size group in 1984

Farm size group	Production (t)	Prod. (%)	% of total area	% of farms	% of marketed surplus
Total	221,444	100.00			
Small			4	21.5	1
1 - < 5 ha	3,845	1.74			
5 - < 10 ha	5,209	2.35			
Medium			30	70.0	18
10 - < 50 ha	23,154	10.46			
50 - < 100 ha	17,814	8.04			
Large			66	8.5	81
100 - < 500 ha	64,275	29.03			
500 & above	107,147	48.39			

Source: DGEC, 1984 Agricultural Census.

Table R.5 Relative importance of each technological level in rice production in 1984

Technological level	Farm Size (ha)	Area devoted to rice (ha)	% of farmers using	Average yields of paddy (t/ha)
Mechanized	>200	>5.0	4	3.0
Semi-mech.	50-200	5-10	17	2.2
Artesanal	0-50	0.5-2.0	79	Not available

Source: Salazar, 1988.

II. PRODUCTION INCENTIVES

f. Guaranteed Price

Table R.6 presents the guaranteed producer price fixed by the government during the period 1979/80-1990/91, and Table R.7 presents the prices actually received by farmers and the marketing margins between the farm and wholesale levels. Differences between the price actually received by the producer and the guaranteed price are due, on occasions, to the moisture content and other quality characteristics of the product, and on other occasions (1987-89), to supply and demand pressures in a closed market without government purchases and sales¹.

g. Credit

Rice production was financed with between 18 and 37% of total agricultural credit and about 70% of all the credit provided to basic grains during 1982-87 (Salazar). He pointed out that about 72% of the total area planted was financed with credit from the national banks during 1982-85. He also pointed out that the amount per hectare increased considerably during the eighties. Table R.8 presents total credit to rice production and subsidy equivalent to producers for the period 1984/84-1990/91.

h. Traded Inputs

See Appendix A.

i. Income Tax

Rice producers are not exempt from income taxes.

j. Public Expenditures

Table R.9 presents public expenditures on rice research. These are the expenditures of the Ministry of Agriculture only. Data on the research expenditures of other institutions, like CIAT, and on extension expenditures of the Ministry of Agriculture were not available.

¹In 1985, after the creation of the Rice Office, the government ceased to buy and sell rice.

Table R.6. Dates of effect of guaranteed rice prices, 1979-1991

Producer (Paddy Rice)		Wholesaler (Milled Rice)	
Date	Price	Date	Price
8/80-10/80	2,405	8/80-10/80	4,262
11/80-12/80	2,527	11/80-1/82	4,360
1/81-2/81	2,609	2/82-7/82	Free
3/81-7/81	2,935	8/82	12,891
8/81-10/81	4,400	9/82-4/83	19,922
11/81-12/81	4,750	5/83-7/84	21,407
1/82-2/82	5,080	8/84-2/86	21,985
3/82-6/82	5,760	3/86-5/86	24,257
7/82	10,940	6/86-10/87	26,573
8/82-12/82	10,270	11/87-12/87	28,259
1/83-6/83	11,223	1/88-8/88	29,760
7/83-6/84	12,182	9/88-7/89	33,518
7/84	11,573	8/89-7/90	37,150
8/84	11,862	8/90-3/91	49,080
9/84-7/85	11,877	4/91-6/91	51,067
8/85-10/87	14,130	7/91	70,103
11/87-12/87	14,978		
1/88-7/88	15,876		
8/88-6/89	17,697		
7/89-6/90	19,626		
7/90-3/91	24,185		
4/91-6/91	32,405		

Table R.7. Domestic prices and marketing margins for rice

Crop Year	Wholesale in S.J. C/t	Farm pr. in S.J. C/t	Margin C/t
1979/80	3,642	3,021	622
1980/81	4,252	4,196	56
1981/82	4,350	7,760	1,319
1982/83	18,410	16,587	1,823
1983/84	21,893	19,500	2,393
1984/85	21,980	18,522	3,458
1985/86	22,913	22,609	305
1986/87	26,573	22,609	3,964
1987/88	28,713	24,708	4,005
1988/89	33,518	28,573	4,945
1989/90	37,151	32,011	5,140
1990/91	51,948	43,080	8,868

Wholesale weighted by length of period during which they prevailed (see listings). Prices for 1987/88, 88/89 and 89/90 taken from Stewart. Prices for 1979/80-1985/86 are from Ahmed et al. Farm price are prices quoted as clean and dry, San José of adjusted accordingly. The same sources were used as for wholesale prices. For 1981/82 margin, the average 17% for the rest of the period was applied. Conversion factor is 0.625.

Table R.8. Credit to rice producers, 1985-91

Year	Total credit (Mill Col)	Interest rate b/ (%)	Commercial rate c/ (%)	Difference	Subsidy Equiv. d/ (Mill Col)
1985	1,467	23.0	30.0	7.0	103
a/ 1986	1,205	20.5	28.0	7.5	90
a/ 1987	1,205	25.5	29.0	3.5	42
1988	654	26.0	31.5	5.5	36
1989	1,450	27.0	31.0	4.0	58
1990	1,083	34.0	36.9	2.9	31
1991	1,369	37.0	39.8	2.8	38

a/ For 1986 and 1987 we took averages of the others.

b/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (large producer case).

c/ We used the rate quoted by the BNCR for "other activities".

d/ We assumed that loans were for twelve months.

Source: National Bank of Costa Rica

Table R.9. Public expenditures on rice production, 1985-91

Year	Research only (Colons)
a/ 1985	1,442,645
a/ 1986	1,586,909
1987	1,745,600
1988	2,130,000
1989	2,499,650
1990	3,391,000
1991	4,522,000

a/ For 1985 and 1986 we took 10% less than following year.

Source: Ministry of Agriculture

III. MARKETING

A. DOMESTIC

k. Production and Consumption Centers

Table R.2 showed that the main producing centers are the three regions along the Pacific Coast line, while the main consuming center is the Central Region, which embodies about 70% of total population. It is the region with the largest supply deficit.

l. Marketing Agents and Parastatal

Table R.10 shows that after 1980/81 and until 1984/85 CNP purchased only negligible amounts of all rice produced in the country, and beginning in 1985/86, when the Rice Office (Oficina del Arroz) was created, its participation came to a halt. Today there is a high level of vertical integration of rice production and milling. In general the mills buy paddy rice from farmers, mill and stores it and sell to wholesalers and retailers. Figure 1 depicts the marketing channels.

Table R.10. CNP's participation in the rice market,

1980-91

Year	Domestic production tons	Purchases a/ tons	Purchas/ Prod. (%)
1980/81	152,244	28,241	18.5
1981/82	126,273	10,072	8.0
1982/83	92,733	4,852	5.2
1983/84	175,868	10,568	6.0
1984/85	139,213	3,989	2.9
1985/86	152,531	0	0.0
1986/87	115,507	0	0.0
1987/88	96,066	0	0.0
1988/89	128,415	0	0.0
1989/90	137,428	0	0.0
1990/91	122,303	0	0.0

Source: CNP

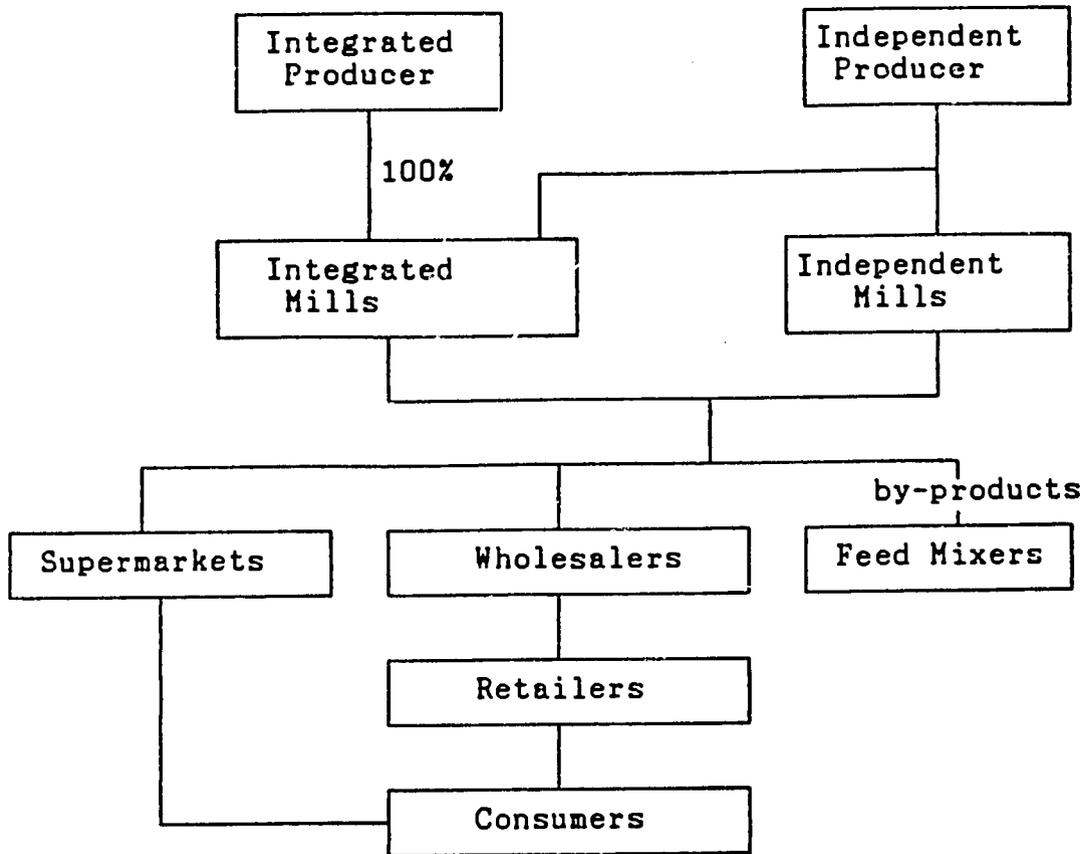


Figure 1. Marketing Channel for rice

n. Transport

Although a large number of mills are located in producing regions, a large proportion of domestic production is processed in the Central Region (non-producing but principal consuming center). Thus, a large proportion of rice is transported to the Central Region before or after milling.

n. Storage

This cost is borne mainly by the mills.

o. Price Controls (Wholesale)

The Ministry of Economy, in consultation with CNP at first (until 1985) and later with the Rice Office, sets the official wholesale and retail prices (or margins). Tables R.6 and R.7 provided details of the wholesale prices fixed during 1979/80-1990/91.

p. Marketing Margins and Costs

The history of the margin fixed between the farm and wholesale levels was presented in Table R.7 for 1979/80-1990/91. Table R.11 presents the makeup of the margin in 1991 (provided by the mills).

B. INTERNATIONAL TRADE

q. Trade Generalities

Costa Rica went from being a net rice exporter in the 1970s to a net importer in the 1980s; exports occurred only in 1979/80 and 1981/82 (Table R.12). Rice was exported because, during the 1980-82 period, when the freed exchange rate was greatly influenced by speculative forces and remained far from equilibrium, exporters received prices, in colones, well above the domestic wholesale price. When the price of the Colón was normalized in 1982/83, the country went back to importing rice. In 1983/84 Costa Rica exported 15,000 tons of rice at U.S.\$260/t and imported 11,000 tons at U.S.\$423/t, while the domestic wholesale price stood at U.S.\$502/t. During 1984/85 and 1985/86 rice was exported at U.S.\$222 and U.S.\$204/t, respectively, while the domestic wholesale remained at U.S.\$451 and U.S.\$427/t, respectively (Table R.13). During 1986/87-1989/90 no rice was exported, and imports occurred in two crop years. This leads to the conclusion that for the purposes of measuring protection, Costa Rica should be considered an exporter during 1979/80-1981/82 and a net importer of rice during the rest of the period, since under border pricing farmers would have supplied considerably less rice during 1984/85-1985/86, the years in which some rice was exported.

Table R.11. Rice: Composition of the margin between farm and wholesale (ex-mill price)	
Item	Colones
Cost of raw product	2,482.00
Value of by products	114.03
Net cost of input	2,367.97
Labor	56.92
Manufacturing expense	115.52
Drying	0.00
Milling	11.88
Bagging	44.86
Fumigation	1.98
Insurance	10.54
Sub-total	241.70
Administrative expense	76.94
Sales expense	37.84
Financial expenses *	345.52
Sub-total	460.30
Total Cost	3,069.97
Profits	163.47
Cost + Profits	3,233.44
Price Difference **	8.67
* Using a 36.7% annual interest rate.	
** With respect to the prevailing ex-mill price of ₱3,224.77/qq	

Table A.12. Costa Rica: Imports and exports of rice.
period Jan/67 - Dec/69

Date	Destination	Origin	Volume (tons)	Price (\$/ton)
1/60	Nicaragua	-	10,401	358
2/60	Cuba	-	9,826	343
2/60	Rep. Dominicana	-	10	430
4/60	Nicaragua	-	4,185	318
4/60	Guatemala	-	1,840	318
5/60	Cuba	-	3,168	343
6/60	Mexico	-	10,276	499
6/60	Nicaragua	-	4,000	540
9/60	Nicaragua	-	1,660	502
10/60	Nicaragua	-	1,552	502
11/60	Nicaragua	-	1,788	502
2/61	Ecuador	-	9,994	469
4/61	Nicaragua	-	10,444	500
6/61	Mexico	-	10,276	499
7/61	Mexico	-	5,013	499
8/61	Nicaragua	-	3,229	415
8/61	El Salvador	-	300	500
12/61	Mexico	-	4,460	499
1/62	Mexico	-	6,000	499
11/62	Panama	-	92	455
12/62	Panama	-	92	455
1/63	-	Italy	4,052	0
2/63	Panama	-	18	455
2/63	-	U.S.A.	9,816	361
10/63	-	U.S.A.	11,289	423
5/64	Mexico	-	15,500	260
8/64	Mexico	-	20,914	221
8/64	Santa Lucia	-	190	241
8/64	Trinidad & Tobago	-	208	242
9/64	Trinidad & Tobago	-	451	241
10/64	Trinidad & Tobago	-	903	241
10/64	Mexico	-	10,472	221
11/64	Trinidad & Tobago	-	243	241
11/64	Mexico	-	10,473	221
3/66	Rep. Dominicana	-	10,023	229
4/66	Peru	-	10,493	179
5/68	-	U.S.A.	10,496	376
6/68	-	U.S.A.	9,105	345
10/68	-	U.S.A.	3,921	340
3/69	-	U.S.A.	16,772	21
4/69	-	U.S.A.	17,471	212
5/69	-	U.S.A.	17,276	212

Source: Dept. of Economic Studies - C.N.F.

During the period 1984/85-1985/86 the international price of US No.2, 4% broken was U.S.\$365/t, 60 percent higher than the price received by Costa Rica. The grain was exported to Mexico, Trinidad and Tobago, Dominican Republic and Peru, which implies that the freight rates between the U.S. and all of these points, except Mexico, must be similar or less than from Costa Rica, in which case the export price received by Costa Rica should be similar to the FOB, Gulf price unless the products in question are not good substitutes. According to local experts, Costa Rican rice is comparable to grades US No.3 up to US No.5 with 15 to 20 percent broken and, thus, is a very imperfect substitute for US No.2, 4% broken. The implication is that the domestic price should be compared to the international price of US No.5, 20% broken or similar products for border pricing.

Table R.13. Domestic and trade rice prices, 1979/80-1989/90

Period	Direction of trade	Volume traded Tm	Trade Price \$/Tm	Domestic wholesale price \$/Tm
79/80	Exp	43,706	407	447
80/81	Exp	40,726	496	202
81/82	Exp	3,989	480	n.a.
82/83	Imp	9,816	361	475
83/84	Exp	15,500	260	502
83/84	Imp	11,289	423	502
84/85	Exp	43,855	222	451
85/86	Exp	20,515	204	427
86/87	none	0	n.a.	n.a.
87/88	Imp	19,601	362	416
88/89	Imp	38,668	225	438
89/90	none	0	n.a.	n.a.

n.a. = not applicable
Source: CNF

r. Ports of Origin and Entry

Table R.12 showed that the port of origin is US Gulf Ports. The port of entry is Caldera on the Pacific Coast.

s. Tariff and Other Barriers

Although tariffs on grain imports have existed at least since the Protocol of San Jose went into effect in 1967, grain trade has been influenced primarily by quantitative restrictions. The CNP has a monopoly on grain trade, and it imports and exports only in times of deficits and surpluses, and being state owned, it is exempt from import or export duties. Thus, tariffs have existed only in theory, and quantitative restrictions have prevailed. In fact, the tariff regulation states that white maize and bean imports pays a 30% duty, but if there is a shortage the duty falls to only 1%. This regulation has also been valid for rice.

t. Storage Requirements

Storage is estimated at about three months.

u. Local Charges

These include port charges, custom agents fees, financing, grain loss, transport and administrative costs. Details of these costs and the adjustments performed will be presented in the methodology section.

IV. METHODOLOGY

Nominal Protection

International Price. The price used was US N05, 20% broken at Gulf Ports. For 1979/80-1981/82, the export years, we used the FOB, Caldera actually received by CNP. For 1982/83-1986/87 we used prices from IMF, IFS tapes for rice, US Gulf. The quality was not specified (Table R.14).

Freight and Insurance. We used \$25/t for all years.

Table R.14. Monthly international rice prices,
US No.5, 20% broken at Gulf Ports
(Jan.80 - Dec.91; \$/Tm)

Month	1980	1983	1986	1989
Jan	441	375	384	399
Feb	485	364	386	399
Mar	518	364	366	397
Apr	529	364	351	403
May	529	375	349	414
Jun	485	386	351	419
Jul	483	386	322	423
Aug	452	386	340	425
Sep	452	386	328	349
Oct	463	386	317	364
Nov	540	386	311	353
Dec	584	386	311	346
Month	1981	1984	1987	1990
Jan	595	386	306	342
Feb	595	386	295	358
Mar	606	386	295	358
Apr	606	386	295	358
May	617	386	295	290
Jun	617	386	298	290
Jul	617	386	295	280
Aug	584	381	300	271
Sep	551	377	313	260
Oct	496	366	388	260
Nov	470	366	395	0
Dec	430	366	406	283
Month	1982	1985	1988	1991
Jan	408	368	408	248
Feb	386	375	439	272
Mar	353	384	450	289
Apr	348	381	445	306
May	364	386	461	310
Jun	359	386	448	315
Jul	353	384	439	309
Aug	364	381	439	294
Sep	364	379	428	281
Oct	364	381	408	311
Nov	342	399	414	340
Dec	397	386	399	ERR

Rice prices from Oct.89 to Apr.90, are monthly prices of Huston milled rice prices which are comparable to U.S. Gulf prices. Conversion factor, 22.04. Prices for 11 & 12 1990 and 1991 are USDA's Weekly Guide to Prices.

Sources: IMF, IFS Tapes.

Local Import Costs. Port Charges. About 90% of the charges assessed by the port authorities (INCOP) are expressed in US\$/t; thus, we used current charges (US\$3/t) as a base to estimate the charges in previous years (Table R.15). Custom Agent. This fee was assessed at US\$0.10/t for all years. Financing. We used the commercial rate prevailing in each year, as reported by IMF, and applied it to three months financing of the total CIF cost. Grain Loss. Following grain importers estimates of loss per shipment, we used 0.5% of the CIF cost in each year. Administrative. This cost is estimated at US\$0.50/t, as reported by CNP and one other importer. Transport from Port. This is the transport cost from Port Caldera to San Jose. For 1987-91, we used the actual rates quoted by transport companies; and estimated the others using the consumer price index to adjust the 1987/88 rate backwards to 1979/80. The numbers are within expected ranges.

Exchange Rate. We used the average rate for the importing months (April-July). See Appendix table.

Storage Costs. Actual storage costs are reported for 1989/90 and 1990/91. These were then converted to dollar amounts, and applied invariably to each year (US\$4.2/t/month). Thus, the adjustment was via the exchange rate applicable to each year.

Wholesale-Farmgate Margin. Wholesale prices correspond to those reported by Ahmed et. al. for 1979/80-1985/86, and to the ones reported by CNP for 1986/87, and by Stewart for 1987/88-1989/90. For 1990/91 we estimated a weighted average of the prices set during the entire crop year. The weights were the number of days in which each price was in effect. For 1981/82, a year in which the margin was negative, we used a margin of 17% of the farm price (estimated from the rest of the data).

Domestic Farm Price. In principle we used the actual domestic price paid to farmers placed in San José. For the period 1979/80-1985/86 we used the prices reported by Ahmed, et al. These prices were adjusted by a factor reported by CNP to go from wet and dirty to dry and clean grain. In the other years we used the actual prices paid in San José for dry and clean grain, and, thus, made no adjustment. The price reported for dry and clean paddy rice was adjusted by a factor of 0.625 to obtain a equivalent farm price for milled rice.

Table K.15. Local charges applicable to grain imports, 1980-91

Year	Port Charges (¢/t) (1)	Brokerage fee (2)	Financing (3)	Grain loss (4)	Administrative (5)	Sub total (6)	Transport to S.J. (7)	Total (8)
1980	25.80	0.86	70.00	1.75	4.30	102.71	93.65	196.36
1981	54.32	1.81	179.60	4.49	9.05	249.27	128.20	377.47
1982	114.58	3.82	366.65	9.17	19.10	513.31	243.49	756.80
1983	121.55	4.05	326.17	8.15	20.26	480.18	322.99	803.17
1984	131.67	4.39	360.60	9.02	21.95	527.62	361.70	889.32
1985	150.23	5.01	409.77	10.24	25.04	600.28	416.22	1,016.50
1986	167.63	5.59	411.11	10.28	27.94	622.55	465.33	1,087.88
1987	186.26	6.21	398.55	9.96	31.04	632.02	544.00	1,176.02
1988	227.08	7.57	716.18	17.90	37.85	1,006.58	652.00	1,658.58
1989	244.36	8.15	716.80	17.92	40.73	1,027.95	652.00	1,679.95
1990	266.82	8.85	577.29	14.43	44.47	911.90	870.00	1,781.90
1991	476.21	12.22	806.47	20.16	61.11	1,376.17	883.61	2,259.78

1/ Includes all services from INCOP at port; 96% of these are in \$ amounts per ton.

This amount (US\$3/t) was used for 1980-90.

2/ Custom agency's fee, US\$0.10/t

3/ Based on 8% annual rate on CIF costs for three months

4/ Estimated at 0.5% of grain or 0.5% of CIF.

5/ Flat US\$0.50 per ton

7/ From 1980-86 adjusted by consumer price index, using 1987 as a base. Indexes from IMF.

Effective Protection

In order to estimate the EPCs we used detailed cost of production figures reported by the Banco Nacional for the mechanized production system only. Prices of traded inputs were adjusted according to the tariff levels prevailing in each year (see Appendix A). The prices of machinery services were adjusted as follows:

Unit Value*13,000 = total domestic value (TDV)

TDV*(1/1+MM) = CIF + tariff

Remove tariff by multiplying by (1/1+t)

Add marketing costs by multiplying by (1+MM)

Then divide by 13,000 to obtain border value per hour.

In sum, $BUV = (U.V*(1/1+MM)*(1/1+t)*(1+MM) = U|V*(1/1+t)$

Where BUV = Border Unit Value

Table R.16 presents a summary of the costs of traded inputs, at domestic and border prices, for 1981-1991.

Producer Subsidy Equivalent

This index includes three types of subsidy: from the marketing system or pricing policy, from subsidized interest rates and from government expenditures on research and extension. For the first category we multiplied the quantities produced by the difference between the domestic and border prices. In order to obtain the credit subsidy, we multiplied the difference between the interest rates for commercial activities and those paid by large farmers times the total amount of credit provided per year. Since the data was reported as cumulative amounts lent throughout the year, we used one year as the duration of the loan. In reality it might have been loan for four months repeated several times throughout the year. The effect is the same.

Consumer Subsidy Equivalent

In this index we included only the pricing policy effect. We multiplied the difference between domestic prices paid at the wholesale level and border equivalent times total yearly consumption.

Table R.16. Summary of cost of traded inputs at domestic and border prices, 1981-91 (\$/t)

Year	At	
	domestic	border
1981	2,779	2,557
1982	6,690	6,141
1983	6,395	5,916
1984	n.a.	n.a.
1985	11,340	10,488
1986	11,496	10,234
1987	10,390	9,177
1988	11,534	10,461
1989	13,575	12,010
1990	16,370	14,522
1991	23,146	20,876

n.a. = not available

V. INDICES

Nominal protection coefficients are presented in Table R.17. Effective protection coefficients are presented in Table R.18; Producer Subsidy Equivalent in Table R.19; and the Consumer Subsidy Equivalent in Table R.20.

Table R.17. Nominal Protection Coefficients for rice

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	
FOB price for US\$5,20% broken at Gulf Ports	-	-	-	378	386	384	343	296	448	415	305	310	a
Freight rate to Port Caldera, Costa Rica	25	25	25	25	25	25	25	25	25	25	20	20	b
CIF Port of Caldera in dollars per ton	407	496	480	403	411	409	368	321	473	440	325	330	c=a+b
Average market exchange rate import months	9	18	38	41	44	50	56	62	76	81	89	122	d
CIF Port of Caldera in colones per ton	3,500	8,980	18,332	16,309	18,030	20,488	20,556	19,927	35,809	35,840	28,864	40,323	e=c*d
Local charges other than transport cost	103	249	513	480	528	600	623	632	1,007	1,028	912	1,376	f
Transport cost to San Jose	196	377	757	803	889	1,017	1,088	1,176	1,659	1,680	1,782	2,260	g
Border price San Jose at wholesale level	3,201	8,353	17,062	17,592	19,447	22,105	22,266	21,735	38,474	38,548	31,558	43,959	h=e+f+g
Storage costs for three months (at \$3/month)	108	228	481	510	553	631	704	782	954	1,026	1,121	1,540	i
Estimated marketing margin in domestic market	622	56	1,319	1,823	2,393	3,458	305	3,964	4,005	4,945	5,140	8,868	j
Border price in San Jose at farm level (C/t)	2,580	8,297	15,743	15,259	16,501	18,016	21,257	16,989	33,515	32,577	25,298	33,551	k=h-i-j
Domestic farm price in San Jose (C/t)	3,021	4,196	7,760	16,587	19,500	18,522	22,609	22,609	24,708	28,573	32,011	43,080	l
NPC equivalent to (domestic farm/border farm)	1.17	0.51	0.49	1.09	1.18	1.03	1.06	1.33	0.74	0.88	1.27	1.28	1/k

Costa Rica was considered an exporter during 1979/80-1981/82, owing to the circumstances of those years.

Table R.18. Effective Protection Coefficients for rice

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose (C/t)	3,021	4,196	7,760	16,587	19,500	18,522	22,609	22,609	24,708	28,573	32,011	43,080
Traded inputs at domestic prices		2,779	6,690	6,395	ERR	11,340	11,496	10,390	11,534	13,575	16,370	23,146
Value added at domestic prices		1,416	1,070	10,192	19,500	7,182	11,112	12,219	13,174	14,998	15,641	19,934
Border price in San Jose at farm level (C/t)	2,580	8,297	15,743	15,259	16,501	18,016	21,257	16,989	33,515	32,577	25,298	33,551
Traded inputs at border prices		2,557	6,141	5,916	ERR	10,488	10,234	9,177	10,461	12,010	14,522	20,876
Value added at border prices		5,740	9,602	9,343	16,501	7,527	11,023	7,812	23,054	20,567	10,775	12,675
EPC (domestic value added over border value added)		0.25	0.11	1.09	ERR	0.95	1.01	1.56	0.57	0.73	1.45	1.57

Table K.19. Rice: Producer Subsidy Equivalent, 1984/85-1990/91

Crop Year	Market interv. Mill C	Credit policy Mill C	Public Expend. Mill C	Total subsidy Mill C	Percent subsidy (%)
1984/85	73.59	102.67	1.44	177.70	6.59
1985/86	215.46	90.35	1.59	307.39	8.53
1986/87	678.52	42.16	1.75	722.43	26.47
1987/88	-884.64	35.97	2.13	-846.55	-34.11
1988/89	-537.42	58.02	2.50	-476.90	-12.43
1989/90	922.62	31.41	3.39	34.80	21.76
1990/91	1,165.37	37.65	4.52	1,207.55	22.92

Table R.20. Rice: Consumer Subsidy Equivalent, 1984/85-1990/91

Crop Year	Domest Wholesale price	Border Wholesale price	Consum tons	Subsidy equiv. Mill C	Percent subsidy (%)
1984/85	21,980	22,105	101,661	12.73	0.57
1985/86	22,913	22,266	116,170	-75.15	-2.82
1986/87	26,573	21,735	114,167	-552.29	-18.20
1987/88	26,713	38,474	120,884	1179.96	34.00
1988/89	33,518	38,548	136,002	684.09	15.01
1989/90	37,151	31,558	137,142	-776.04	-15.05
1990/91	51,948	43,959	122,341	-957.38	-15.38

BEANS

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I. PRODUCTION

a. Area, Production, Yields

Table B.1 presents area, production, yields of beans for the period 1979/80-1990/91.

Crop Year	Area (000 ha)	Yields (t/ha)	Production (t)	Imports (t)	Exports (t)	Stock Changes (t)	Apparent Cons.a/ (t)
1979/80	24,894	0.46	11,504	9,379	0	n.a.	20,883
1980/81	23,681	0.52	12,289	2,456	0	n.a.	14,745
1981/82	35,507	0.46	16,312	23,437	0	n.a.	39,749
1982/83	39,120	0.37	14,632	0	0	n.a.	14,632
1983/84	41,631	0.50	20,780	13,612	0	n.a.	34,392
1984/85	43,279	0.53	22,893	0	0	n.a.	22,893
1985/86	48,271	0.60	28,992	0	0	0	35,837
1986/87	56,489	0.57	32,186	0	11,177	980	20,029
1987/88	48,478	0.47	22,803	0	8,725	(15,922)	30,000
1988/89	48,701	0.56	27,265	7,571	0	4,836	30,000
1989/90	63,664	0.54	34,256	7,382	2,813	n.a.	38,827
1990/91	69,580	0.49	34,267	6,079	0	n.a.	40,346

a/ Equivalent to production + imports - exports - stock changes.
 b/ 1988/89 figures corrected by the authors.
 n.a. = not available.
 Note: Inventory changes refers only to CNP's, and is not accurate.

Source: CNP

b. Production by Regions

Table B.2, by means of the 1988/89 production pattern, illustrates the regional distribution of bean production in Costa Rica. It should be noted that this is the general pattern that prevailed during the period of interest. As shown by the table, the South Pacific and Northern are the main bean producing regions, together accounting for 68% of the total in 1988/89.

Table B.2. Costa Rica: Regional situation of beans in 1988/89

Region	Production & invent. changes t	Imports	Total consumption t	On farm consumption t	Deficit t
Central	2,818	2,735	15,454	1,437	9,901
Ctl Pacif	1,525	0	2,142	737	617
N. Pacif.	4,044	0	3,102	1,808	-942
S. Pacif.	10,948	0	4,040	3,208	-6,908
Northern	7,563	0	2,866	2,866	-4,697
Atlantic	367		2,396	229	2,029
Total	27,265	2,735	30,000	10,285	0

Since on-farm consumption was higher than total consumption in the Northern region, we made them equal by subtracting the difference from the Central Region's consumption.

Source: CNP.

c. Seasonality

Table B.3 shows, via the production pattern of 1986/87, that bean production is concentrated in the period January-April, and that these are the relevant harvesting months for the study, not September-February.

Table B.3. Production of beans, by months and regions, in 1986/87
(tons)

Months	Central	Central Pacific	North Pacific	South Pacific	Northern	Atlantic	Costa Rica	Proportion (%)
AUG	191	126	0	2,745	0	0	3,062	9.8
SEP	445	0	0	1,079	0	0	1,524	4.9
OCT	0	0	0	0	0	0	0	0.0
NOV	0	0	0	0	0	0	0	0.0
DEC	0	165	2,457	188	0	0	2,810	9.0
JAN	1,620	1,145	530	3,021	0	0	6,316	20.3
FEB	281	1,041	632	4,284	0	0	6,238	20.0
MAR	108	183	3,670	1,437	2,188	291	7,877	25.3
APR	151	56	2,173	110	803	49	3,342	10.7
MAY	0	0	0	0	0	0	0	0.0
JUN	0	0	0	0	0	0	0	0.0
JUL	0	0	0	0	0	0	0	0.0
Total	2,796	2,716	9,462	12,864	2,991	340	31,169	100

Note: Production figures for Upala, which is considered Northern, were included in the North Pacific.

Source: Department of Economic Studies, CNP.

d. Type of Producers

According to the 1984 Agricultural Census, 85% of the farms producing beans were of 50 hectares or less (up from 75% in 1973), and they contributed 69% of total production (Table B.4). Medium and large scale farms (15% of total) contributed only 30% of total production. In 1984, also, 50% of the farmers (12,735) planted, on average, less than 1 hectare (0.42 ha) of beans and sold very little of their product. It is clear that although large farms produced increasingly more beans during the 80s, the activity is concentrated on very small farms.

e. Production Systems or Technological Levels

Beans are produced under three levels of technology or production systems: semi-mechanized, espeque (using a planting stick) and "tapado", where seeds are only covered by cut shrubs. The semi-mechanized is employed on the larger farms (100 ha or more), while the "espeque", which is very labor intensive (labor is 65% of total cost), is utilized on farms of 5 hectares or less

(where 50% of production is consumed on the farms). "Frijol tapado" is a system in which farmers spread the seeds in a bushy field and later cut the bush, thus covering and leaving the seeds for germination. Almost no traded input is used (only snail killer). This system is employed on medium size farms where 1.5 to 2.6 hectares are planted to beans. Yields are about 0.4 t/ha, and about 40% of production is retained for on-farm consumption. About 65% of the total is produced under this technology, which is employed by about 69% of all bean producers production.

Table B.4. Costa Rica: Bean production by farm size in 1984

Farm size	Production Proportion	
	(t)	(%)
Total	17,003	100.00
1 to < 5 ha	3,292	19.36
5 to < 10 ha	1,843	10.84
10 to < 50 ha	6,719	39.52
50 to < 100 ha	2,498	14.69
100 to < 500 ha	2,142	12.60
More than 500	509	2.99

Source: 1984 Agricultural Census

II. PRODUCTION INCENTIVES

f. Guaranteed Price

A guaranteed minimum price, which is paid and enforced by the CNP (Tables B.5 and B.6) is announced by the government, usually before the planting season; Saenz (1990) points out, however, that this price is of little importance to most farmers, because of the small portion of total farm devoted to beans and the large proportion of beans consumed on the farm. He states that, in 1984, 50% of the farmers derived a yearly income of only ₡4,000 (US.\$84) from beans, and that for the producers, a 20% increase in the farm price triggered an increase in yearly income of only ₡592 (US.\$12).

Table B.5. Guaranteed producer and wholesale bean prices, 1980-1991

Producer		Wholesale	
Date	¢/t	Date	¢/t
1/80-11/80	6,196	2/80-2/82	6,334
12/80-2/81	6,696	3/82-4/82	16,000
3/81-7/81	9,348	5/82-9/82	21,000
8/81-10/81	11,500	10/82-4/84	24,697
11/81	13,000	5/84-12/84	29,571
12/81-2/82	15,000	1/85-5/86	31,760
3/82-7/82	20,000	6/86-1/87	42,220
8/82-11/82	24,697	2/87-12/88	38,000
12/82-6/83	28,740	1/89-10/90	42,185
7/83	33,435	11/90	63,003
8/83-8/85	33,445		
9/85-12/86	42,103		
1/87-6/87	37,893		
7/87-12/88	35,788		
1/89-2/89	37,211		
3/89-7/89	42,630		
8/89-12/90	50,000		
1/91-6/91	62,588		
7/91	70,327		

g. Credit

Table B.7 shows the amount of credit received by bean producer during 1985-91 and the implicit subsidy obtained through reduced interest rates. It should be noted that the public banks charges small farmers a rate well below those paid by large farmers and other users of credit, as shown in the table.

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h. Traded Inputs

See Appendix A.

i. Income Tax

Producers are not exempted from income tax.

j. Public Expenditures

Table B.8 presents estimates of public expenditures on research and extension of beans.

Table B.6. Domestic bean prices and marketing margins (1979/80-1990/91)

Year	Wholesale Farm price		Margin C/t
	in S.J. C/t	in S.J. C/t	
1979/80	5,516	6,220	622
1980/81	6,330	8,580	858
1981/82	10,637	17,690	1,769
1982/83	23,846	28,540	2,854
1983/84	25,525	32,580	3,258
1984/85	30,580	33,480	3,348
1985/86	32,602	40,850	4,085
1986/87	40,462	38,808	3,881
1987/88	38,000	35,560	3,556
1988/89	40,441	48,068	4,807
1989/90	45,873	46,896	4,690
1990/91	53,756	50,002	5,000

Wholesale prices are weighted averages, in which the weights are the number of days during which they prevailed. See Table B.5.

Farm price are those paid for clean and dry in San Jose or adjusted accordingly.

Since most of the margins were negative, an average margin of 10% above farm price, obtained for the 4 years during which wholesale was higher, was applied to the rest of the years.

Table B.7. Credit to bean producers, 1985-91

Year	Total credit (000 Col)	Interest rate b/ (%)	Commercial rate c/ (%)	DifferenceEquivalent	Subsidy d/ (Colones)
1985	36,156	12.0	30.0	18.0	6,508,080
a/ 1986	16,737	15.0	28.0	13.0	2,435,810
a/ 1987	48,737	15.0	29.0	14.0	6,823,114
1988	10,998	15.0	31.5	16.5	1,814,637
1989	19,649	15.0	31.0	16.0	3,143,760
1990	88,207	15.0	36.9	21.9	19,317,224
1991	128,144	17.8	39.8	22.0	28,127,564

a/ For 1986 and 1987 we took averages of the other, excluding 1990.

b/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (the small producer case).

c/ We used the rate quoted by the BNCR for "other activities".

d/ We assumed that loans were for twelve months.

Source: Banco Nacional de Costa Rica

Table B.6. Public expenditures on beans production, 1985-91

Year	Research only (Colons)
a/ 1985	1,270,400
a/ 1986	1,270,400
1987	1,270,400
1988	2,620,950
1989	3,067,950
1990	2,644,700
1991	4,174,000

a/ Expenditure on research in 1985 and 1986 assumed to be equal to that of 1987.

Source: Ministry of Agriculture

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III. MARKETING

A. DOMESTIC

k. Production and Consumption Centers

Table B.2 clearly indicated that the main producing centers are the South Pacific and Northern regions and that the main consuming center is the Central Region because of its population concentration.

l. Marketing Agents and Parastatal

Table B.9 shows that CNP purchased between 21 and 92% of production (marketable surplus) during 1980/81-1990/91 and that in most years it purchased more than 50%. Given the high levels of on-farm consumption, it is fair to say that the private sector do not intervene in bean marketing between the farm and wholesale levels. It does, however, participate actively in bean wholesaling and retailing. Figure 1 depicts the marketing channels.

m. Transport

Since bean prices are normally set in reference to locations in San José, transport costs from farm to market is incurred by the farmer. When importing, the transport cost from the port is borne by the CNP.

n. Storage

Storage costs are incurred principally by CNP. These costs were estimated at about US\$5/t during 1988-90, and because of the accelerated devaluation of the colón, about US\$3/t in 1991.

Table B.9. Costa Rica: CNP's participation in the bean market, 1980-91

Crop year	Domestic Product. t	Purchases a/ t	Purchas/ Prod. (%)
1980/81	12,289	8,900	72.4
1981/82	16,312	3,419	21.0
1982/83	14,362	9,447	65.8
1983/84	20,780	17,034	82.0
1984/85	22,893	12,267	53.6
1985/86	28,992	26,825	92.5
1986/87	32,186	19,864	61.7
1987/88	22,803	14,100	61.8
1988/89	22,456	10,923	48.6
1989/90	34,108	n.a.	n.a.
1990/91	n.a.	n.a.	n.a.

n.a. = not available

Source: CNP

o. Price Controls

Prices are fixed also at the wholesale and retail levels, as shown in Table B.5, and are enforced through CNP's participation at all levels of the marketing chain.

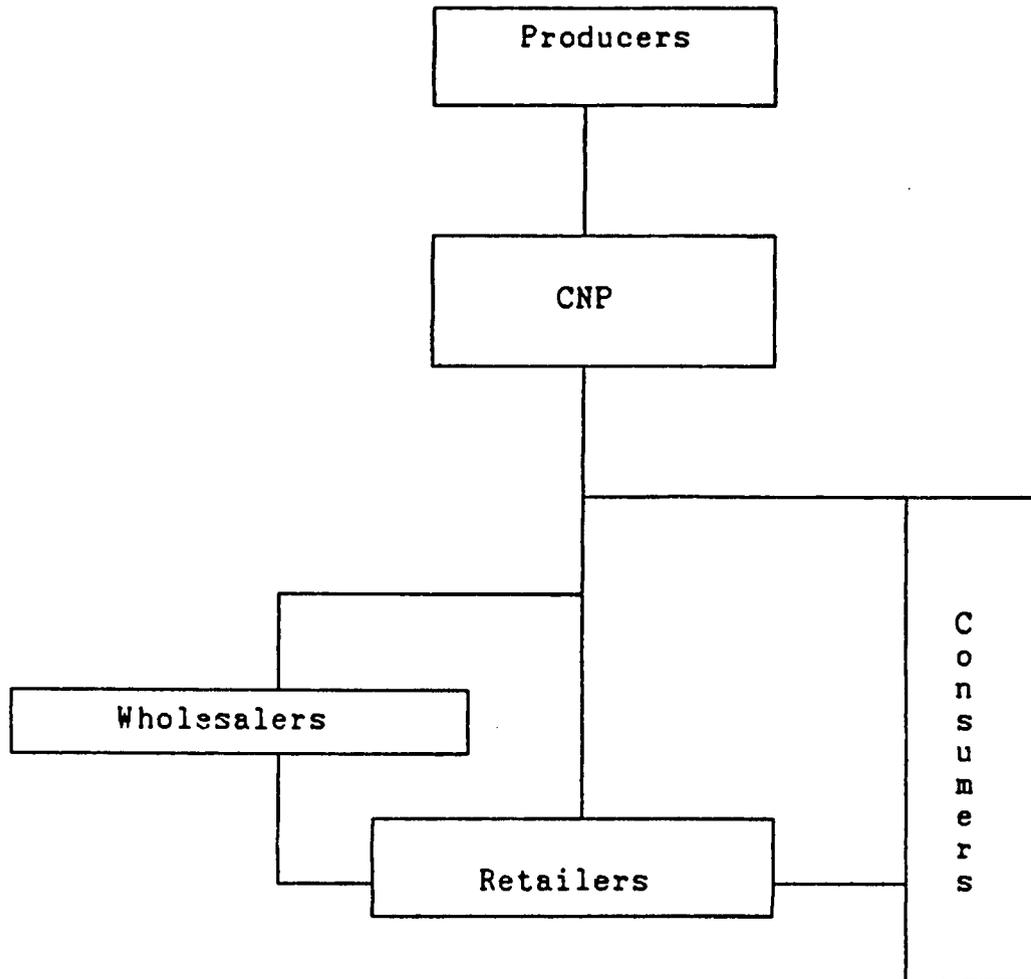


Figure B.1. Marketing channel for beans

p. Marketing Margins and Costs

Table B.6 presented the marketing margins fixed by the government and the margins actually used in the estimation of the protection coefficients.

B. INTERNATIONAL TRADE

q. Trade Generalities

Table B.10 shows that Costa Rica imported and exported beans during the period 1980-1991, and Table B.1 showed that the country was essentially a bean importer during the period 1979/80-1990/91; total imports amounted to 55,347 tons, while total exports were 20,398 tons.

r. Ports of Origin and Entry

Table B.10 shows that bean was imported from the rest of Central America, Mexico, Chile, Argentina and the USA, with a clear predominance of USA and Chile; while exports went predominantly to Central America. The port of entry to Costa Rica, for all grains, is Caldera, on the pacific coast.

s. Tariffs and Other Barriers

Although tariffs on grain imports have existed at least since the Protocol of San Jose went into effect in 1967, grain trade has been influenced primarily by quantitative restrictions. The CNP has a monopoly on grain trade, and it imports and exports only in times of deficits and surpluses, and being state owned, it is exempt from the import or export duties. Thus, tariffs have existed only in theory, and quantitative restrictions have prevailed. In fact, the tariff regulation states that white maize and bean imports pays a 30% duty, but if there is a shortage the duty falls to only 1%.

t. Storage Requirements

Imported beans are stored by CNP in a cool climate (Cartago), under essentially natural conditions. Average storage period is about 4 months.

IV. METHODOLOGY

Noninal Protection

International Price. Black beans is a staple in Costa Rica with annual consumption of 25 to 30 thousand tons. Unlike most of Central America, Costa Ricans prefer black over red beans, and dislike the red beans imported from the U.S., especially the pinto beans which swells more than the locally grown.

As pointed out earlier, Costa Rica is a net importer of beans, with the larger quantities being provided by the U.S. and Chile. Countries in Central America supply residual amounts when necessary. This is due in part to the fact that Guatemala is the only other country in the region that produces black beans (preferred by Costa Ricans) in significant quantities. Costa Rica also exported beans in 1986/87 and 1987/88, but at prices well below the domestic wholesale price.

Based on these considerations, the price of black beans in Argentina was chosen as the international reference price for border pricing of beans in Costa Rica (Table B.11). We used the price of black beans, Argentina, reported by the World Bank. For 1979/80-1982/83 we used the prices (CIF, Caldera) actually paid by the CNP, since there were no quotes on the World Bank list.

Table B.11. Monthly international bean prices, black, Argentina
(Jan.80 - Dec.91; \$/t)

Month	1984	1985	1986	1987	1988	1989	1990	1991
Jan	480	470	465	350	275	670	735	n.a.
Feb	480	470	465	350	275	670	735	n.a.
Mar	480	470	465	350	275	670	735	n.a.
Apr	480	470	465	350	275	670	725	n.a.
May	480	430	465	350	285	670	725	n.a.
Jun	458	430	440	310	315	700	725	n.a.
Jul	458	430	440	310	340	770	800	n.a.
Aug	458	450	400	310	420	880	990	n.a.
Sep	510	450	400	275	500	910	850	n.a.
Oct	490	465	350	275	670	910	750	n.a.
Nov	470	465	350	275	670	800	n.a.	310
Dec	470	465	350	275	670	750	n.a.	310

Sources: IMF, IFS Tapes

Freight and Insurance. Current freight rates are estimated by two import agencies in the country at US\$75/t. They claim that these rates are good for the past three to four years. Yet we chose to use US\$75/t as a benchmark figure and adjust it according to world inflation rate to obtain estimates for the previous years. The index of petroleum prices was tried, but the results were nonsensical.

Local Import Costs. Port Charges. About 90% of the charges assessed by the port authorities (INCOP) are expressed in US\$/t; thus, we used current charges (US\$3/t) as a base to estimate the charges in previous years (Table B.12). Custom Agent. This fee was assessed at US\$0.10/t for all years. Financing. We used the commercial rate prevailing in each year, as reported by IMF, and applied it to three months financing of the total CIF cost. Grain Loss. Following grain importers estimates of loss per shipment, we used 0.5% of the CIF cost in each year. Administrative. This cost is estimated at US\$0.50/t, as reported by CNP and one other importer. Transport from Port. This is the transport cost from Port Caldera to San Jose. For 1987-91, we used the actual rates quoted by transport companies; and estimated the others using the consumer price index to adjust the 1987/88 rate backwards to 1979/80. The numbers are within expected ranges.

Exchange Rate. The rates used for estimating protection coefficients are averages of the rates for the appropriate importing months. These were taken from the monthly exchange rates reported by the Central Bank (See Appendix tables).

Storage Costs. Actual storage costs are reported for 1989/90 and 1990/91. These were then converted to dollar amounts, and applied invariably to each year (US\$4.2/t/month). Thus, the adjustment was via the exchange rate applicable to each year.

Wholesale - Farmgate Margin. This margin was estimated on the basis of prices fixed or that prevailed at each level. In many instances the margin was negative, because the CNP fixed the wholesale price below farm prices. Because of this, we decided to average the positive margins and apply them to the other years (See Table B.6).

Table B.12. Local charges applicable to bean imports, 1980-91

Year	Port Charges (¢/t) 1/	Brokerage fee 2/	Financing 3/	Grain loss 4/	Administrative 5/	Sub total	Transport to S.J. 6/	Total (8)
1980	29.56	0.94	149.47	3.74	4.93	188.67	93.65	282.32
1981	74.63	2.49	465.69	11.64	12.44	566.90	128.20	695.09
1982	118.45	3.95	647.24	16.18	19.74	805.56	243.49	1,049.05
1983	124.25	4.14	445.16	11.13	20.71	605.39	322.99	928.38
1984	136.41	4.55	491.54	12.29	22.74	667.52	361.70	1,029.21
1985	156.24	5.21	542.02	13.55	26.04	743.05	416.22	1,159.27
1986	172.33	5.74	525.88	13.15	28.72	745.93	465.33	1,211.16
1987	194.87	6.50	472.89	11.82	32.48	718.57	544.00	1,262.57
1988	233.88	7.80	927.72	23.19	38.98	1,231.57	652.00	1,883.57
1989	249.19	6.31	1,543.33	38.58	41.53	1,880.94	652.00	2,532.94
1990	286.33	9.54	1,760.90	44.02	47.72	2,148.52	870.00	3,018.52
1991	476.21	13.05	1,004.74	25.12	65.24	1,584.36	943.41	2,527.78

1/ Includes all services from INCOF at port; 96% of these are in dollars per ton.

This cost (US\$3/t) was used for 1980-90.

2/ Custom agency's fee, US\$0.10/t

3/ Based on 6% annual rate on CIF costs for three months

4/ Estimated at 0.5% of grain or 0.5% of CIF.

5/ Flat US\$0.50 per ton

7/ From 1960-86 adjusted by consumer price index, using 1987 as a base. Indexes from IMF.

Domestic Farm Price. In principle we used the actual domestic price paid to farmers placed in San José. For the period 1979/80-1985/86 we used the prices reported by Ahmed, et al. These prices were adjusted by a factor reported by CNP to go from wet and dirty to dry and clean grain. In the other years we used the actual prices paid in San José for dry and clean grain, and, thus, made no adjustment.

Effective Protection

In order to estimate the EPCs we used detailed cost of production figures reported by the Banco Nacional for two production systems: semi-mechanized and beans planted with a stick (espeque). The prices of traded inputs were adjusted according to the tariff levels prevailing in each year (see Appendix A). The prices of machinery services were adjusted as follows:

Unit Value*13,000 = total domestic value (TDV)
 TDV*(1/1+MM) = CIF + tariff
 Remove tariff by multiplying by (1/1+t)
 Add marketing costs by multiplying by (1+MM)
 Then divide by 13,000 to obtain border value per hour.
 In sum, $BUV = (U.V*(1/1+MM)*(1/1+t)*(1+MM) = U|V*(1/1+t)$
 Where EUV = Border Unit Value

Table 13 presents a summary of the costs of traded inputs, at domestic and border prices, for 1981-1991.

Table 13. Summary of costs of traded inputs at domestic and border prices (C/t), 1981-91

Beans planted with espeque		== Semi-mechanized beans			
Year	At domestic	At border	==	At domestic	At border
1981	4,689	4,338	==	6,446	5,919
1982	5,419	5,022	==	13,082	12,066
1983	8,239	7,705	==	13,271	12,281
1984			==		
1985			==	17,902	16,615
1986			==	19,318	17,538
1987	9,614	8,737	==	15,101	13,337
1988	11,703	10,731	==	17,880	16,408
1989			==		
1990	16,640	15,064	==	19,679	17,932
1991	24,278	22,597	==	n.a.	n.a.

n.a. = not available

Producer Subsidy Equivalent

This index includes three types of subsidy: from the marketing system or pricing policy, from subsidized interest rates and from government expenditures on research and extension. For the first category we multiplied the quantities produced by the difference between the domestic and border prices. In order to obtain the credit subsidy, we multiplied the difference between the interest rates for commercial activities and those paid by small farmers times the total amount of credit provided per year. Since the data was reported as cumulative amounts lent throughout the year, we used one year as the duration of the loan. In reality it might have been loan for four months repeated several times throughout the year. The effect is the same.

Consumer Subsidy Equivalent

In this index we included only the pricing policy effect. We multiplied the difference between the domestic prices paid at the wholesale level and the border equivalent times the total amount consumed in each year.

V. INDICES

Nominal protection coefficients are presented in Table B.14. Effective protection coefficients are presented in Table B.15. The producer subsidy equivalent is presented in Table B.16; and the consumer subsidy equivalent is presented in Table B.17.

Table B.14. Costa Rica: Nominal Protection Coefficients for beans

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	
FOB price at Argentinian port	718	890	768	490	477	452	388	289	520	854	848	310	a preliminary est. of 11/
Freight rate to Port Caldera, Costa Rica	41	46	51	57	63	68	70	75	75	75	75	75	b
CIF Port of Caldera in dollars per ton	759	936	820	537	541	520	458	364	595	929	923	385	c=a+b
Average market exchange rate import months	10	25	39	41	45	52	57	65	78	83	95	130	d
CIF Port of Caldera in colones per ton	7,473	23,285	32,362	22,258	24,577	27,101	26,294	23,645	46,386	77,166	88,045	50,237	e=c*d
Local charges other than transport cost	189	367	806	605	668	743	746	719	1,232	1,881	2,149	1,584	f
Transport cost to San Jose	282	695	1,019	928	1,029	1,159	1,211	1,263	1,884	2,533	3,019	2,528	g
Border price San Jose at wholesale level	7,944	24,547	34,217	23,792	26,274	29,003	28,251	25,626	49,501	81,580	93,212	54,349	h=e+f+g
Storage costs for three months (at \$3/month)	124	313	497	522	573	656	724	818	982	1,047	1,203	1,644	i
Estimated marketing margin in domestic market	622	858	1,769	2,854	3,258	3,348	4,085	3,881	3,556	4,807	4,690	5,000	j
Border price in San Jose at farm level (C/t)	7,198	23,375	31,950	20,416	22,443	24,999	23,442	20,927	44,963	75,727	87,320	47,705	k=h-i-j
Domestic farm price in San Jose (C/t)	6,220	8,580	17,690	28,540	32,580	33,480	40,850	38,808	35,560	48,068	46,896	62,588	l
NPC equivalent to (domestic farm/border farm)	0.86	0.37	0.55	1.40	1.45	1.34	1.74	1.85	0.79	0.63	0.54	1.31	l/k

Table B.15. Costa Rica: Effective Protection Coefficients for beans

FOR BEANS PLANTED WITH ESPEQUE												
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose (C/t)	6,220	8,580	17,690	28,540	32,580	33,480	40,850	38,808	35,560	48,068	46,896	62,588
Value of traded inputs at domestic prices	ERR	4,689	5,419	8,239	ERR	ERR	ERR	9,614	11,703	0	16,640	24,278
Value added at domestic prices	ERR	3,891	12,271	20,301	32,580	33,480	40,850	29,193	23,857	48,068	30,257	38,310
Border farm price in San Jose	7,198	23,375	31,950	20,416	22,443	24,999	23,442	20,927	44,963	75,727	87,320	47,705
Value of traded inputs at border prices	ERR	4,338	5,022	7,705	ERR	ERR	ERR	8,737	10,731	0	15,064	22,597
Value added at border prices	ERR	19,037	26,928	12,711	22,443	24,999	23,442	12,190	34,232	75,727	72,256	25,108
EPC	ERR	0.20	0.46	1.60	ERR	ERR	ERR	2.39	0.70	0.63	0.42	1.53
FOR SEMI-MECHANIZED BEANS												
Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose	6,220	8,580	17,690	28,540	32,580	33,480	40,850	38,808	35,560	48,068	46,896	62,588
Value of traded inputs at domestic prices		6,446	13,082	13,271	ERR	17,902	19,318	15,101	17,880	ERR	19,679	ERR
Value added at domestic prices	ERR	2,134	4,608	15,269	32,580	15,578	21,532	23,707	17,680	48,068	27,217	ERR
Border farm price in San Jose	7,198	23,375	31,950	20,416	22,443	24,999	23,442	20,927	44,963	75,727	87,320	47,705
Value of traded inputs at border prices		5,919	12,066	12,281	ERR	16,615	17,538	13,337	16,408	ERR	17,932	ERR
Value added at border prices		17,456	19,884	8,135	22,443	8,384	5,904	7,589	28,555	75,727	69,388	47,705
EPC	ERR	0.12	0.23	1.88	ERR	1.86	3.65	3.12	0.62	ERR	0.39	ERR

Table B.16. Beans: Producer subsidy equivalent, 1985-91

Year	Subsidy from market policy (Mill C)	Subsidy from credit policy (Mill C)	Subsidy via research MAG (Mill C)	Total subsidy (Mill C)	Percent subsidy (%)
1985	194.2	6.5	1.3	201.9	26.3
1986	504.7	2.4	1.3	508.4	42.9
1987	575.5	2.6	1.3	579.4	46.4
1988	-214.4	1.8	2.6	-210.0	-25.9
1989	-754.1	3.1	3.1	-747.9	-57.1
1990	-1,384.8	19.3	2.6	-1,362.9	-84.6
1991	78.7	2.0	4.2	84.9	5.0

Research expenditures for 1985 and 1986 we assumed to be equal to that of 1987.

Table B.17. Beans: Consumer subsidy equivalent, 1985-91

Year	Consump tons	Domestic Wholesale tons	border wholesale C/t	Subsidy equiv. (Mill C)	Percent subsidy equiv. (%)
1985	22,893	30,580	29,003	-36.1	-5.2
1986	35,837	32,602	28,251	-155.9	-13.3
1987	20,029	40,462	25,626	-297.2	-36.7
1988	30,000	38,000	49,501	342.0	30.3
1989	30,000	40,441	81,580	1,234.2	101.7
1990	38,827	45,873	93,212	1,838.0	103.2
1991	40,346	53,756	54,349	23.9	1.1

Consumption of last two years projected at 34,000 tons.

MAIZE

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I. PRODUCTION

a. Area, Production, Yields

Yellow Maize. Table M.1 shows that the area devoted to yellow maize, which was about one third of that devoted to white maize in 1979/80, declined drastically after 1985/86 to the point where no yellow maize was produced in 1988/89 and only a negligible amount was produced in 1989/90.

Table M.1. Costa Rica: Production and consumption of yellow maize,
1979/80 - 1990/91

Year	Area (000 ha)	Yields (t/ha)	Production (t)	Imports (t)	Exp (t)	Stock Changes (t)	Apparent Consump. 1/ (t)
1979/80	10,086	1.68	16,905	21,944	0	n.a.	38,849
						n.a.	
1980/81	12,184	1.88	22,853	51,260	0	n.a.	74,113
						n.a.	
1981/82	9,860	1.69	16,668	39,226	0	n.a.	55,894
						n.a.	
1982/83	12,850	1.56	20,009	64,221	0	n.a.	84,230
						n.a.	
1983/84	10,663	1.70	18,099	26,222	0	n.a.	44,321
						n.a.	
1984/85	11,328	1.70	19,248	43,348	0	n.a.	62,596
						n.a.	
1985/86	11,754	1.85	21,690	0	0	10,403	11,287
1986/87	8,873	1.73	15,321	17,455	0	1,879	30,897
1987/88	2,127	1.56	3,317	121,885	0	0	146,805
1988/89	0	0.00	0	144,633	0	7,193	137,440
1989/90	1,516	1.89	2,866	127,146	0	n.a.	130,012
1990/91	0	0	0	198,144	0	n.a.	198,144

1/ Equivalent to production + imports - exports - stock changes.

n.a. = not available

Source: CNP

White Maize. The area devoted to white maize, on the other hand, increased steadily between 1979/80 and 1986/87 (Table M.2) and began a slow decline in 1987/88. During the 1980s producers received incentives, via price, to produce white instead of yellow maize, and the area devoted to the former increased at the expense of that devoted to the latter. Production of white maize increased sharply after 1984/85, rising from 83,621 tons 104,000 tons in 1985/86 and 1986/87; in 1987/88 it began a slow decline to an estimated 79,000 tons for 1989/90.

Table M.2. Production and consumption of white maize, 1979/80 - 1990/91

Year	Area (000 ha)	Yields (t/ha)	Produc. (t)	Imports (t)	Exports (t)	Stock changes (t)	Apparent Consump.1/ (t)
1979/80	28,757	1.68	48,197	4,508	0	n.a.	52,705
1980/81	34,736	1.88	65,154	0	0	n.a.	65,154
1981/82	39,240	1.69	66,199	3,429	0	n.a.	69,628
1982/83	43,462	1.56	67,673	0	0	n.a.	67,673
1983/84	51,420	1.70	87,278	0	230	n.a.	87,278
1984/85	49,694	1.68	83,621	0	0	0	83,621
1985/86	57,587	1.82	104,897	0	0	0	122,887
1986/87	66,662	1.56	104,012	5,000	0	0	109,012
1987/88	59,393	1.58	93,694	0	0	(3,531)	97,225
1988/89	58,760	1.45	84,932	614	0	(9,254)	94,800
1989/90	47,866	1.65	78,962	0	0	0	78,962
1990/91	40,170	1.71	62,239	0	0	0	62,239

1/ Equivalent to production + imports - exports - stock changes.

n.a. = not available

Source: CNF

White maize accounts for more than 95 percent of all the maize produced in the country and is grown exclusively for human consumption, in the form of tortillas, tamales and other uses of corn meal; yellow maize is imported for animal feed. However, because of high contamination with aflatoxin and the excess of production over demand for human consumption, about 40 percent of the white maize produced in the country is used as animal feed. Morales, 1990, indicated that CNP lost to aflatoxin 10.2, 15.6 and 10.3 percent of the white maize handled during 1985/86, 1988/89 and 1989/90, respectively.

As animal feed, white maize is an almost perfect substitute for yellow maize; the only difference is in the levels of carotene. On the supply side, however, white maize is less productive, and, for the same price, farmers would probably prefer to grow yellow maize. In terms of human consumption, white and yellow maize are less than perfect substitutes, since Costa Ricans will use yellow maize for tortillas and meal only if white maize was totally unavailable. Total demand for white maize is thus composed of the demands for animal feed (mostly on-farm) and human consumption.

b. Regions

Table M.3, which presents one instance of the contribution of each region to total production, shows that the Atlantic and South Pacific are the two main producers of white maize (64%), followed by the North Pacific and Northern regions (22.3%). The Central region, which is the main consuming center, produces the least (5.6%). The distribution presented is typical for all years, and was similar for yellow maize during the years of significant production.

c. Seasonality

Table M.4, which presents average monthly production of white and yellow maize for the crop years¹ 1986/87 and 1987/88, show that the distribution is multi-modal for white maize, with large proportions being produced in September, October, January and June (total 61%); the other 39% is very evenly distributed among the other months. The months of least production are March, April and May (1.7 to 4.3% per month). This seasonal distribution of production indicate that the period September-February do not constitute the harvest months in the case of white maize. We chose to use the whole year as import months, with no adjustment for storage back to production months.

¹ In Costa Rica crop year for grains covers the period August 1-July 31.

In the case of yellow maize, because 94% of production occurred between August and January, the period Aug-Jan was taken as production months, while April-July was considered import months. After 1987/88 all months were considered import months, due to the insignificance of domestic production.

Table M.3. Regional situation of white maize in 1988/89 (tons)

Region	Production	Imports & invent changes	Human Consumption	Livestock Feed	Total Consumption	Net [‡] Production
Central	4,841	9,469	22,014	22,736	44,750	-17,895
Ctrl Pac.	6,709	0	3,054	1,392	4,446	5,317
N. Pac.	11,636	0	7,832	3,248	11,080	8,388
S. Pac.	23,526	0	7,098	10,208	17,306	13,318
Northern	7,305	0	3,454	6,496	9,950	809
Atlantic	30,915	0	4,948	2,320	7,268	28,595
Total	84,932	9,469	48,400	46,400	94,800	38,532

[‡] Production minus on farm livestock feed.

Source: CNP

d. Type of producers

Table M.5 shows that maize is produced mainly on small farms, since, according to the Agricultural Census, farms of 50 hectares or less produced about 73% of the total in 1984, and contributed 74% of total area; farms larger than 100 hectares produced only 13%. Salazar (1988) pointed out that between 1973 and 1984 the share of area and production by the group of 1-50 ha increased by more than 4%, indicating a move to more concentration of maize production in the hands of small farmers.

According to the Agricultural Census, in 1984 each producer grew on average 1.7 ha of maize; 46% of the producers (of 29,687) planted only 0.45 ha each, and produced only 6.8% of the total, while 2% of the farmers (the larger) averaged 17.2 ha and produced 26.4% of the total (Table M.6).

Table M.4 Production of white and yellow maize by months,
1986/87 and 1987/88

Months	W H I T E			Y E L L O W		
	1986/87	1987/88	Average percentage	1986/87	1987/88	Average percentage
AUG	6,250	8,405	7.1	2,586	54	14.8
SEP	18,974	33,430	25.6	3,515	356	21.6
OCT	9,585	14,958	11.9	2,476	698	17.7
NOV	6,209	5,527	5.7	597	480	6.0
DEC	6,241	7,593	6.7	392	949	7.5
JAN	15,524	5,749	10.4	2,447	780	18.0
FEB	6,912	5,395	6.0	316	0	1.8
MAR	3,702	5,154	4.3	24	0	0.1
APR	2,276	1,276	1.7	11	0	0.1
MAY	4,297	3,899	4.0	358	0	2.0
JUN	15,770	7,744	11.4	1,373	0	7.7
JUL	5,463	4,852	5.0	475	9	2.7
Total	101,103	104,384	100	14,570	3,317	100

Source: Department of Economic Studies, CNP.

Farm Size	(t)	(%)
Total	48,858	100.00
1 to <5 ha	7,369	15.08
5 to <10 ha	6,737	13.79
10 to <50 ha	21,742	44.50
50 to <100 ha	6,525	13.36
100 to <200 ha	5,159	10.56
More than 500	1,326	2.71

Source: 1984 Agricultural Census of the Dirección General de Estadística y Censos

Table M.6. Average area and percent of total production produced by different proportions of farmers in 1984		
% of farmers	Average area (ha)	% of total production
46	0.45	6.8
39	1.50	27.0
13	4.50	39.8
2	17.20	26.4
100	1.69	100.0
Farmers = 29,687		Area = 50,230 ha

e. Production Systems

Maize is grown under three levels of technology: mechanized, semi-mechanized and traditional (or by "espeque"). In the mechanized, which is used on farms over 200 hectares, about 40% of total costs is devoted to machinery services, 46% to other inputs and 9% to labor. The yields of 1.6 t/ha are above the national average and 80% is marketed. Only 1.9% of the farmers used this technology in 1984, contributing 8% of total production.

In the semi-mechanized level, which is employed on farms of 50-200 ha, labor accounts for about 41% of total costs, tradable inputs 36%, and machinery services (exclusively for land preparation) 13%. Reported yields are below the national average². Only 11.5% of the farmers used this technology in 1984, contributing 17.7% of total production (Salazar and 1984 Agricultural Census).

Under the traditional technology, which is employed by 86.5% of the farmers on farms of 0.7-1.9 hectares to produce 75% of total output, labor accounts for 57% of total cost; traded inputs 34%. The smaller farmers consume up to 45% of their production on the farm.

² Salazar (1988) points out that the cost of production model used by the banks for credit purposes include much more tradable inputs than those reported in the Agricultural Census.

II. PRODUCTION INCENTIVES

f. Guaranteed Price

Saenz points out that although the National Production Council (CNP) fixes a guaranteed price at the farm level (see Tables M.7, M.8 and M.9), this price has meant very little to farmers, from the stand point of being a mechanism that improves their income. He states that in 1984 a 20% increase in the price of maize, would have increased the income of 47% of the farmers by only ₡242/year or US\$5. He then pointed out that the price is relevant to only 15% of the farmers, and particularly to the 2% that sells 26% of all marketed maize.

Table M.7. Guaranteed prices to producers and wholesalers, 1979-1991 (₡/t)			
Producers		Wholesalers	
Date	Price	Date	Price
1/79-6/80	2,130	10/79-1/80	2,084
7/80-12/80	2,435	2/80-8/80	2,295
1/81-4/81	2,826	9/80-1/82	2,622
5/81-7/81	3,739	2/82-4/82	6,109
8/81-10/81	4,270	5/82-9/82	8,500
11/81	4,770	10/82-12/84	10,435
12/81-2/82	5,110	1/85-6/85	11,217
3/82-7/82	7,500	7/85-5/86	11,805
8/82-11/82	10,435	6/86-12/86	13,936
12/82-4/83	11,091	1/88-12/89	16,988
5/83-5/85	11,508	1/90-5/90	19,720
6/85-8/85	12,659	6/90	24,077
9/85-12/88	13,669		
1/89-9/89	15,205		
10/89-10/90	18,403		
11/90-8/91	21,318		
9/91	24,898		

The difference between the guaranteed price and the price actually received by the farmers is due largely to moisture content and other physical characteristics, since the guaranteed price is quoted on a dry and clean basis.

g. Credit

According to Salazar, during 1976-80 almost all of the area planted to maize was financed through the banking system; but starting in 1982 only 5% of the area planted received this type financing, but the amount per hectare increased considerably. Table M.10 shows the amount of credit received by maize producers during 1985-91 and the implicit subsidy obtained through reduced interest rates. It should be noted that the public banks charges small farmers a rate well below those paid by large farmers and other users of credit, as shown in the table.

h. Trade Inputs

See Appendix A.

i. Income Tax

Producers are not exempt from paying income taxes.

j. Public Expenditures

Table M.11 shows public expenditure on research and extension for 1985-91.

Table M.8. Domestic prices and marketing margins for yellow maize

Year	Wholesale in S.J. C/t	Farm price in S.J. C/t	Margin C/t
1979/80	2,132	1,980	297
1980/81	2,290	2,650	398
1981/82	3,094	5,830	875
1982/83	9,600	11,040	1,656
1983/84	10,020	11,590	1,739
1984/85	10,573	11,630	1,745
1985/86	11,965	13,630	2,045
1986/87	13,936	13,668	2,050
1987/88	13,936	n.a.	n.a.
1988/89	13,936	n.a.	n.a.
1989/90	13,936	n.a.	n.a.
1990/91	17,202	n.a.	n.a.

n.a. = not available.

Farm price: mainly from CNP; 1979/80 from Ahaed et al.

1990/91 according to dates when fixed and length in place.

Wholesale prices are those at which CNP sell to industrial users.

Table M.9. Domestic prices and marketing margins
for white maize, 1979/80-1990/91

Year	Wholesale price in S.J. C/t	Farm price in S.J. C/t	Margin used C/t	Actual Margin C/t
1979/80	2,255	1,982	297	272
1980/81	2,707	2,683	403	23
1981/82	7,043	6,320	948	723
1982/83	10,618	11,788	1,768	-1,170
1983/84	10,957	11,590	1,738	-633
1984/85	11,488	11,793	1,769	-305
1985/86	12,400	13,627	2,044	-1,227
1986/87	14,633	14,133	2,120	500
1987/88	14,633	13,669	2,050	964
1988/89	16,502	14,279	2,142	2,223
1989/90	20,073	17,701	2,655	2,372
1990/91	23,468	21,048	3,157	2,421

Farm prices are mostly from CNP; 1979/80 are from Ahmed et al. and 1990/91 prices are according to dates fixed and length in place.

Wholesale price is the price CNP sell to tortilla plants and other users, but those for 1987/88, 1988/89, 1989/90 are from Stewart, Central Region.

The margin was set at the average of 15% of the farm price that prevailed during the years of positive margins.

Table M.10. Credit to maize producers, 1985-91

Year	Total credit (000 Col)	Interest rate b/ (%)	Commer. rate c/ (%)	Differ- ence	Subsidy Equiv. d/ (Col)
1985	48,519	12.0	30.0	18.0	8,733,420
a/ 1986	27,908	15.0	28.0	13.0	3,628,063
a/ 1987	27,908	15.0	29.0	14.0	3,907,145
1988	32,677	15.0	31.5	16.5	5,391,705
1989	9,473	15.0	31.0	16.0	1,515,712
1990	26,648	15.0	36.9	21.9	5,836,000
1991	22,223	15.0	39.8	24.8	5,500,267

a/ For 1986 and 1987 we took averages of the other years.

b/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (the small producer case).

c/ We used the rate quoted by the BNCR for "other activities".

d/ We assumed that loans were for twelve months.

Source: National and Central Banks.

Table M.11. Public expenditures on maize production, 1985-91

Year	Research only (Colons)
a/ 1985	2,462,600
a/ 1986	2,462,600
1987	2,462,600
1988	2,620,950
1989	3,067,950
1990	2,940,800
1991	5,902,000

a/ Expenditure on research in 1985 and 1986 assumed to be equal to that of 1987.

Source: Ministry of Agriculture

III. MARKETING

A. DOMESTIC

k. Production and Consumption Centers

Table M.3 showed that the main consuming center is the densely populated Central Region, while the main producing centers are, in descending order, the Atlantic, South Pacific and North Pacific regions.

l. Marketing Agents and Parastatal

The principal buyer and seller of maize (marketing agent) has been CNP. Table M.12 shows that CNP bought between 26 and 75% of total production during 1980-91; and, given the high level of on-farm animal consumption, the participation of other agents has been negligible. The marketing channel for maize thus looks like the depiction in Figure 1.

m. Transport

A greater proportion of the marketable surplus is transported from the main producing regions to two or three sites in the Central region, where the CNP owns plants and warehouses.

n. Storage

Until 1991, the farmer sold white maize to CNP or to the few companies that makes corn meal immediately after harvest. Storage costs are borne by the CNP or these companies. In the past, when imported, these two types of actors (but mainly CNP) have absorbed the cost of storage to the moment of use. These costs will be presented in the methodology section.

In the case of yellow maize, the CNP used to incur the costs of storage of both the domestic and imported product. Today, most of the product is imported by private feed mixers that are integrated into poultry and pork production; they incur the costs of most of the imported product. CNP incurs the rest, given that it still imports some yellow maize. Average storage period is reported to be about three months.

o. Price Controls

The price of maize have always been controlled and fixed by the CNP and the Ministry of Economy. As shown in Table M.7, at times the wholesale price was fixed below the guaranteed farmer price, with the express purpose of subsidizing both producers and consumers.

p. Marketing Margins and Costs

Table M.8 showed that the fixed marketing margin between the farm and wholesale levels was negative for some crop years.

Table M.12. CNP's participation in the white maize market, 1980-91

Year	Domestic Prod. t	Purchases t	Purchas/Prod. (%)
1980/81	88,007	30,016	34.1
1981/82	82,867	22,304	26.9
1982/83	87,682	34,938	39.8
1983/84	105,377	57,118	54.2
1984/85	102,869	60,071	58.4
1985/86	126,587	94,838	74.9
1986/87	119,333	78,083	65.4
1987/88	97,011	61,634	63.5
1988/89	85,017	44,328	52.1
1989/90	n.a.	n.a.	n.a.
1990/91	n.a.	n.a.	n.a.

Source: CNP

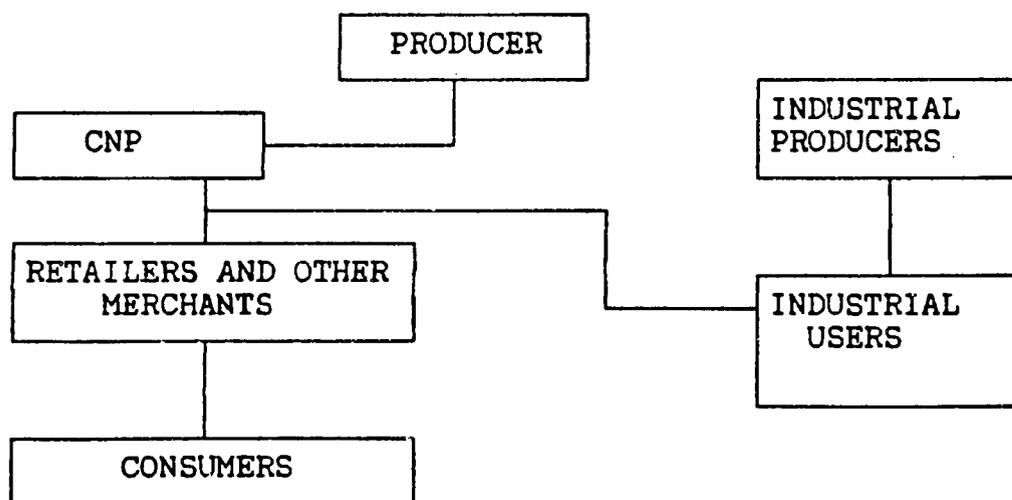


Figure 1. Marketing channel for white maize

B. INTERNATIONAL TRADE

q. Generality

Yellow Maize. The figures of Tables M.1 indicated that the country has been an importer of yellow maize, with imports providing increasing amounts (up to 100%) of total consumption.

White Maize. The figures of Table M.2 indicated that Costa Rica has basically been self sufficient in white maize, with very little trade during the decade of interest. World output of white maize, estimated at 50 million tons in 1984, was relatively small compared to that of yellow maize at 400 million tons. They have distinctly separate markets. White maize is mainly grown in developing countries (roughly 50 percent, and accounts for almost one third of total maize output) for human consumption while yellow maize is grown throughout the world largely, but not exclusively, for animal feed. The largest producers are China, Mexico and the Republic of South Africa, but white maize is of significance in total cereal production only in the two latter countries. The main exporting countries are South Africa, the United States and Zimbabwe (FAO, 1984).

r. Origin and Port of Entry

Yellow Maize. Table M.13 shows that during 1980-89 Costa Rica imported yellow maize from the United States only. Imported yellow maize originates at the Gulf ports of the U.S. and is unloaded at Port Caldera, on the Pacific Coast. This port is used because the port of Limón, on the Atlantic, is very expensive and lacks the necessary facilities to unload bulk grain; it is thus cheaper to go cross the canal of Panamá, than to unload in Limón. The port of entry then is Caldera and the first border price: CIF, Port Caldera.

White maize Although Costa Rica does not trade actively in white maize, the data in Table M.14 indicate that the country is a net importer of white maize; some was exported only in 1983/84. Imports occurred in 1979/80, 1981/82, 1986/87 and 1988/89; none of these greater than 5,000 tons. These imports came from Central America, a region that produces white maize for domestic consumption and exports its occasional surplus. It is not an international white maize market. Corn meal manufacturers have imported white maize from the U.S. in the past and have indicated that they can rely on this market for supplies in the future.

Table M.13 Costa Rica: Imports of yellow
maize, period 1/80 - 7/89

Date	Origin	Volume (tons)	CIF Price (\$/ton)
6/80	U.S.A.	10,394	154
7/80	U.S.A.	11,550	157
8/80	U.S.A.	12,100	175
9/80	U.S.A.	8,881	206
10/80	U.S.A.	10,362	167
12/80	U.S.A.	10,591	207
7/81	U.S.A.	9,326	184
6/82	U.S.A.	5,500	155
6/82	U.S.A.	14,089	174
7/82	U.S.A.	19,636	168
8/82	U.S.A.	14,437	173
9/82	U.S.A.	11,087	168
4/83	U.S.A.	15,656	136
5/83	U.S.A.	15,441	137
7/83	U.S.A.	7,600	150
10/83	U.S.A.	11,494	176
4/84	U.S.A.	14,729	141
9/84	U.S.A.	840	162
10/84	U.S.A.	10,786	161
10/84	U.S.A.	6,997	180
6/85	U.S.A.	18,304	138
7/85	U.S.A.	6,421	141
3/87	U.S.A.	10,955	n.a.
7/87	U.S.A.	6,500	123
8/87	U.S.A.	12,802	95
8/87	U.S.A.	2,597	19
10/87	U.S.A.	7,000	8,240
11/87	U.S.A.	7,177	8,243
12/87	U.S.A.	6,393	8,415
1/89	U.S.A.	7,047	n.a.
1/88	U.S.A.	7,699	9,155
2/88	U.S.A.	13,001	56
3/88	U.S.A.	11,993	n.a.
5/88	U.S.A.	11,830	120
5/88	U.S.A.	5,499	151
6/88	U.S.A.	8,400	121
7/88	U.S.A.	20,441	154
8/88	U.S.A.	16,647	146
10/88	U.S.A.	7,350	154
10/88	U.S.A.	2,023	155
11/88	U.S.A.	16,800	138
12/88	U.S.A.	20,515	139
1/89	U.S.A.	20,793	152
3/89	U.S.A.	19,512	144
5/89	U.S.A.	20,997	142
7/89	U.S.A.	19,997	138

Source: Dept. of Economic Studies - C.N.P.

Table M.14. Costa Rica: Imports of white maize, period
Jan.1980 - Jul.1989*

Date	Origin	Volume (t)	Price (\$/t)
1/80	El Salvador	460	366
7/80	El Salvador	4,048	29
5/82	United States	2,429	168
5/82	Belgium	1,000	n.a.
7/87	n.a.	5,000	n.a.
10/88	Nicaragua	614	181

* During this period only 230 t was exported (in 1983/84).
n.a. = not available.

Source: Department of Economic Studies, CNP.

s. Tariffs and Other Barriers

Although tariffs on grain imports have existed at least since the Protocol of San Jose went into effect in 1967, grain trade has been influenced primarily by quantitative restrictions. Until November, 1990, CNP had a monopoly on maize trade, and it imported and exported only in times of deficits and surpluses, and, being state owned, it was exempted from the import or export duties. Thus, tariffs have existed only in theory, and quantitative restrictions have prevailed. Furthermore, the tariff regulation states that white maize and bean imports pays a 30% duty, but if there is a shortage the duty falls to only 1%.

t. Storage Requirements

Currently estimated at 3 months.

u. Local Charges

These include port charges, custom agents fees, financing, grain loss, transport and administrative costs. Details of these costs and the adjustments performed will be presented in the methodology section.

IV. METHODOLOGY

Nominal Protection

International Price. For yellow maize, we used the price of US NQ3. When unavailable, US Yellow NQ2 was used as a proxy (Table M.15).

These facts presented with respect to the white maize markets led to the choice of the price of white maize in Kansas City as the appropriate reference price for estimating white maize border prices in Costa Rica. In order to obtain a price equivalent to white maize at US Gulf Ports, appropriate charges were added to the elevator price of US White No.2 in Kansas City. Because of the production pattern, all twelve months were taken as import months, and the FOB price for each crop year was the average of 12 months (August - July). For 1979/80, for example, we used the average for August 1979 - July 1980 (Table M.16).

Freight and Insurance. We used \$25/t for all years.

Local Import Costs. Port Charges. About 90% of the charges assessed by the port authorities (INCOP) are expressed in US\$/t; thus, we used current charges (US\$3/t) as a base to estimate the charges in previous years (Table M.17). Custom Agent. This fee was assessed at US\$0.10/t for all years. Financing. We used the commercial rate prevailing in each year, as reported by IMF, and applied it to three months financing of the total CIF cost. Grain Loss. Following grain importers estimates of loss per shipment, we used 0.5% of the CIF cost in each year. Administrative. This cost is estimated at US\$0.50/t, as reported by CNP and one other importer. Transport from Port. This is the transport cost from Port Caldera to San Jose. For 1987-91, we used the actual rates quoted by transport companies; and estimated the others using the consumer price index to adjust the 1987/88 rate backwards to 1979/80. The numbers are within expected ranges.

Exchange Rate. For the period 1979/80-1986/87 we used the average rate for the importing months (Feb.-Apr.), and for the rest of the period, we used a 12-month average (See Appendix table).

Storage Costs. Actual storage costs are reported for 1989/90 and 1990/91. These were then converted to dollar amounts, and applied invariably to each year (US\$4.2/t/month). Thus, the adjustment was via the exchange rate applicable to each year.

Table M.15. Monthly international yellow maize
prices, yellow, US No.3 at Gulf Port:
(Jan.80 - Dec.91; \$/Tm)

Month	1980	1983	1986	1989
Jan	105	108	107	118
Feb	114	117	104	117
Mar	110	125	101	118
Apr	108	133	101	115
May	110	134	105	117
Jun	113	135	105	113
Jul	130	140	83	107
Aug	143	152	75	101
Sep	141	147	66	103
Oct	140	148	65	106
Nov	147	147	69	108
Dec	145	143	70	108
Month	1981	1984	1987	1990
Jan	152	142	68	106
Feb	143	137	67	106
Mar	142	146	72	110
Apr	144	148	74	119
May	141	146	81	121
Jun	136	147	80	122
Jul	138	142	76	126
Aug	127	138	71	110
Sep	116	130	73	102
Oct	111	121	79	102
Nov	110	117	82	103
Dec	105	114	83	104
Month	1982	1985	1988	1991
Jan	113	119	86	106
Feb	112	119	87	107
Mar	114	120	90	110
Apr	116	120	90	111
May	116	117	90	107
Jun	115	116	120	104
Jul	111	115	127	105
Aug	101	105	119	111
Sep	97	102	121	110
Oct	91	97	121	109
Nov	103	106	113	109
Dec	105	108	117	ERR

Sources: IMF, IFS Tapes. Prices for 11 & 12
1990 & 91 are from USDA Weekly Guide to Prices.

Table 16. Monthly international white maize, prices, US No.2, Kansas adjusted to Gulf Ports (Jan.80 - Dec.91; \$/Tm)

Month	1980	1983	1986	1989
Jan	127	121	98	153
Feb	152	122	96	152
Mar	170	122	96	152
Apr	193	131	102	152
May	226	139	106	152
Jun	228	155	105	152
Jul	228	149	97	145
Aug	234	157	86	120
Sep	269	171	73	120
Oct	244	195	75	114
Nov	245	211	84	112
Dec	229	185	93	114

Month	1981	1984	1987	1990
Jan	220	181	98	118
Feb	219	185	95	118
Mar	213	191	84	118
Apr	210	191	83	116
May	205	191	83	114
Jun	159	177	83	125
Jul	155	179	86	123
Aug	126	167	86	123
Sep	112	161	86	117
Oct	104	158	86	112
Nov	95	155	86	112
Dec	101	154	88	114

Month	1982	1985	1988	1991
Jan	102	146	88	116
Feb	102	131	90	116
Mar	102	124	90	116
Apr	105	122	90	116
May	105	121	90	122
Jun	105	116	110	123
Jul	105	114	141	123
Aug	97	105	154	116
Sep	94	97	154	110
Oct	94	94	154	110
Nov	101	96	154	110
Dec	117	98	154	110

Sources: IMF, IFS Tapes.

In the case of white maize storage costs were not included in the calculations, since the user of white maize faces the possibility of buying domestic maize and storing it for continuous use (tortillas, meal) or import foreign maize and utilize it in the same way. This is different from the situation where there are definite production and import months.

Table M.17. Local charges applicable to maize imports, 1980-91

Year	Port Charges (¢/t) 1/	Brokerage fee 2/	Financing 3/	Grain loss 4/	Administrative 5/	Sub total 6/	Transport to S.J. 6/	Total (8)
1980	29.56	0.99	149.47	3.74	4.93	188.67	93.65	282.32
1981	74.63	2.49	465.69	11.64	12.44	566.90	128.20	695.09
1982	118.45	3.95	647.24	16.16	19.74	805.56	243.49	1,049.05
1983	124.25	4.14	445.16	11.13	20.71	605.39	322.99	928.38
1984	136.41	4.55	491.54	12.29	22.74	667.52	361.70	1,029.21
1985	156.24	5.21	542.02	13.55	26.04	743.05	416.22	1,159.27
1986	172.33	5.74	525.88	13.15	28.72	745.83	465.33	1,211.16
1987	194.67	6.50	472.89	11.82	32.46	718.57	544.00	1,262.57
1988	233.88	7.80	927.72	23.19	38.98	1,231.57	652.00	1,883.57
1989	249.19	8.31	1,543.33	38.58	41.53	1,880.94	652.00	2,532.94
1990	286.33	9.54	1,760.90	44.02	47.72	2,148.52	870.00	3,018.52
1991	476.21	13.05	1,004.74	25.12	65.24	1,564.36	943.41	2,527.76

1/ Includes all services from INCGP at port; 96% of these are in dollars per ton.

This cost (US\$3/t) was used for 1980-90.

2/ Custom agency's fee. US\$0.10/t

3/ Based on 8% annual rate on CIF costs for three months

4/ Estimated at 0.5% of grain or 0.5% of CIF.

5/ Flat US\$0.50 per ton

6/ From 1960-66 adjusted by consumer price index, using 1987 as a base. Indexes from IMF.

Wholesale-Farmgate Margin. For 1979/80-1985/86 we used the wholesale prices reported by Ahmed et. al.; and for 1986/87-1989/90 we used the ones reported by CNP. For 1990/91 we estimated a weighted average of the prices set during the entire crop year. The weights were the number of days in which each price was in effect (see Table M.8).

For the purpose of this exercise (in order to estimate a border farm price), the margin was estimated at 15% of the farm price, which is equivalent to the average of the positive margins prevailing throughout the period.

For wholesale price of white maize, we took the prices CNP charged the industrial users, such as Demasa and Alimentos Jacke. At times, these prices differed significantly from the official prices fixed by the Ministry of Economy and reported by the CNP. Table M.18 presents examples of prices at which the CNP sold white maize during selected months. It should be noted that some of the differences might be due to the fact that CNP charges some clients a wholesale price (private citizens) and others a retail price (industrial users).

Table M.18. Some wholesale white maize prices charged by CNP, Aug.1986-Mar.1990

Date	Prices charged (¢/t)	Average period price (¢/t)	Buyer
8/1986	14,632	13,936	DEMASA
12/1986	14,632	13,936	Private
8/1987	7,865	13,936	DEMASA
8/1987	14,632	13,936	Jack's
8/1987	11,203	13,936	Private
1/1988	13,817	13,936	DEMASA
3/1988	13,289	13,936	Private
8/1989	16,982	13,936	Private
3/1990	16,242	13,936	Private

Domestic Farm Price. Yellow maize. In principle we used the actual domestic price paid to farmers placed in San José. For the period 1979/80-1985/86 we used the prices reported by Ahmed, et al. These prices were adjusted by a factor reported by CNP to go from wet and dirty to dry and clean grain. In the other years we used the actual prices paid in San José for dry and clean grain, and, thus, made no adjustment. The farm price was used for comparison only until 1986/87; thereafter we only used the wholesale price.

White Maize. Prices for 1979/80 were taken from Ahmed et. al.; prices for 1980/81 - 1986/87 were taken from CNP's reports and adjusted by a specific conversion factor, which ranged between 0.839 and 0.913. Prices for 1987/88 -1989/90 were actual prices paid in San José for dried and cleaned grain, taken from Stewart, 1990. Prices for 1990/91 were prices fixed for dry and clean grain in San Jose at different dates during the period, and thus were weighted by the number of days in effect.

Effective Protection

In order to estimate the EPCs we used detailed cost of production figures reported by the Banco Nacional for two production systems: semi-mechanized and planted with a stick (espeque). The prices of traded inputs were adjusted according to the tariff levels prevailing in each year (see Appendix A). The prices of machinery services were adjusted as follows:

Unit Value*13,000 = total domestic value (TDV)
 $TDV*(1/1+MM) = CIF + tariff$
 Remove tariff by multiplying by $(1/1+t)$
 Add marketing costs by multiplying by $(1+MM)$
 Then divide by 13,000 to obtain border value per hour.
 In sum, $BUV = (U.V*(1/1+MM)*(1/1+t)*(1+MM) = U|V*(1/1+t)$
 Where BUV = Border Unit Value

Table 19 presents a summary of the costs of traded inputs, at domestic and border prices, for 1981-1991.

Table M.19. Summary of the value of traded inputs at domestic and border prices, 1981-91

Year	MAIZE WITH ESPEQUE			SEMI-MECHANIZED MAIZE		
	At domestic	At border	Nominal protection	At domestic	At border	Nominal protection
1981	n.a.	n.a.	n.a.	1,600	1,472	1.09
1982	n.a.	n.a.	n.a.	2,736	2,434	1.12
1983	2,637	2,595	1.09	4,974	4,539	1.10
1984	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
1985	4,836	4,428	1.09	6,856	6,274	1.09
1986	4,305	3,671	1.17	6,651	6,011	1.15
1987	3,075	2,724	1.13	5,936	5,066	1.17
1988	4,020	3,478	1.16	4,380	3,837	1.14
1989	4,196	3,541	1.18	6,035	5,228	1.15
1990	4,355	3,718	1.17	5,609	5,072	1.15
1991	n.a.	n.a.	n.a.	9,100	8,297	1.10

n.a. = not available

Producer Subsidy Equivalent

This index includes three types of subsidy: from the marketing system or pricing policy, from subsidized interest rates and from government expenditures on research and extension. For the first category we multiplied the quantities produced by the difference between the domestic and border prices. In order to obtain the credit subsidy, we multiplied the difference between the interest rates for commercial activities and those paid by small farmers times the total amount of credit provided per year. Since the data was reported as cumulative amounts lent throughout the year, we used one year as the duration of the loan. In reality, the loans might have been for four months, repeated several times throughout the year. The effect is the same.

Consumer Subsidy Equivalent

In this index we included only the pricing policy effect. We multiplied the difference between the domestic prices paid at the wholesale level and the border equivalent times the total amount consumed in each year.

V. INDICES

Nominal protection coefficients are presented in Table M.20. In the case of yellow maize, nominal protection was estimated at the farm level for the period 1979/80-1986/87, the period during which domestic production was significant. For the rest of the period of interest, nominal protection was estimated at the wholesale level (feed mixers) because domestic production was insignificant. The figures of the table show that during the last three crop years and until the price increase in July, 1990, consumers of yellow maize (the feed manufacturers) were subsidized by the CNP, through a price lower than full import cost. NPCs for white maize are presented in Table M.21.

Effective protection coefficients are presented in Tables M.22 and M.23. The producer subsidy equivalent is presented in Table M.24; and the consumer subsidy equivalent is presented in Table M.25.

Table M.20. Costa Rica: Nominal Protection Coefficients for yellow maize

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	
FOB price for US No.3 at Gulf Ports	115	140	115	135	146	117	99	78	90	116	111	106	a
Freight rate to Port Caldera, Costa Rica	25	25	25	25	25	25	25	25	25	25	25	25	b
CIF Port of Caldera in dollars per ton	140	165	140	160	171	142	124	103	115	141	136	131	c=a+b
Average market exchange rate import months	9	18	38	41	44	50	56	62	76	82	92	122	d
CIF Port of Caldera in colones per ton	1,207	2,979	5,329	6,500	7,486	7,077	6,907	6,381	8,753	11,606	12,495	16,032	e=c*d
Local charges other than transport cost	56	126	247	279	311	326	343	354	454	533	586	878	f
Transport cost to San Jose	149	254	490	602	673	742	808	898	1,106	1,185	1,456	1,764	g
Border price San Jose at wholesale level	1,412	3,360	6,065	7,381	8,470	8,167	8,058	7,634	10,313	13,325	14,537	18,674	h=e+f+g
Storage costs for three months (at \$3/month)	108	228	481	510	553	631	704	782	961	1,034	1,155	1,543	i
Estimated marketing margin in domestic market	297	398	875	1,656	1,739	1,745	2,045	2,050	NFP	NFP	NFP	NFP	j
Border price in San Jose at farm level (C/t)	1,006	2,734	4,710	5,215	6,179	5,792	5,309	4,802	11,275	14,359	15,691	20,218	k=h-i-j
Domestic farm price in San Jose (C/t)	1,980	2,650	5,830	11,040	11,590	11,630	13,630	13,668	13,936	13,936	13,936	17,202	l
NPC equivalent to (domestic farm/border farm)	1.97	0.97	1.24	2.12	1.88	2.01	2.57	2.85	1.24	0.97	0.89	0.85	l/k

Yellow maize production was significant only until 1986/87, the only periods for which import months were used for FOB and exchange rate.

Note protection is at farm level for 1979/80 - 1986/87, at wholesale level for the rest. Note that in the latter storage cost is added, not subtracted as before.

Starting in December 1990 imports are free except for a 2.25% tariff. The wholesale price for 1991 is only a reference price for CNP.

Importers actually pay the int'l price plus the tariff; thus the NPC is actually slightly lower than one for 1991 on.

Table M.21. Costa Rica: Nominal Protection Coefficients for white maize

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	
Kansas City White No.2 adjusted to FOB Buif	160	218	105	120	184	139	99	85	95	153	117	118	a
Freight rate to Port Caldera, Costa Rica	25	25	25	25	25	25	25	25	25	25	25	25	b
CIF Port of Caldera in dollars per ton	185	243	130	145	209	164	124	110	120	178	142	143	c=a+b
Average market exchange rate import months	9	14	34	40	43	48	54	60	71	80	86	109	d
CIF Port of Caldera in colones per ton	1,593	3,472	4,393	5,848	9,018	7,894	6,732	6,584	8,500	14,216	12,217	15,548	e=cfd
Local charges other than transport cost	64	123	211	265	340	335	333	350	430	579	559	860	f
Transport cost to San Jose	157	251	455	586	702	751	798	894	1,082	1,231	1,429	1,649	g
Border price San Jose at wholesale level	1,813	3,845	5,060	6,700	10,059	8,980	7,863	7,828	10,012	16,027	14,205	18,057	h=e+f+g
Storage costs for three months (at \$3/mo/mt)	108	180	425	507	543	606	682	753	896	1,008	1,081	1,375	i
Estimated marketing margin in domestic market	297	403	948	1,768	1,738	1,769	2,044	2,120	2,050	2,142	2,655	3,157	j
Border price in San Jose at farm level (C/t)	1,516	3,443	4,112	4,932	8,321	7,211	5,819	5,708	7,962	13,885	11,550	14,900	k=h-i-j
Domestic farm price in San Jose (C/t)	1,982	2,683	6,320	11,788	11,590	11,793	13,627	14,133	13,669	14,279	17,701	21,048	l
NPC equivalent to (domestic farm/border farm)	1.31	0.78	1.54	2.39	1.39	1.64	2.34	2.48	1.72	1.03	1.53	1.41	l/k

Border price or 1990/91 only include the 5 months of 1990.

The other 7 months need to be included in the average.

In this case storage cost is not deducted from border price in San Jose;
it is not included in the calculations.

Table M.22. Costa Rica: Effective Protection Coefficients for yellow maize

FOR MAIZE PLANTED WITH ESPEQUE												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose (C/t)	1,980	2,650	5,830	11,040	11,590	11,630	13,630	13,668	13,936	13,936	13,936	17,202
Value of traded inputs at domestic prices	ERR	0	0	0	ERR	2,837						
Value added at domestic prices	ERR	2,650	5,830	11,040	11,590	11,630	13,630	ERR	ERR	ERR	ERR	14,365
Border farm price in San Jose	1,006	2,734	4,710	5,215	6,179	5,792	5,309	4,802	11,275	14,359	15,691	20,218
Value of traded inputs at border prices	ERR	0	0	0	ERR	2,595						
Value added at border prices	ERR	2,734	4,710	5,215	6,179	5,792	5,309	ERR	ERR	ERR	ERR	17,623
EPC	ERR	0.97	1.24	2.12	ERR	0.82						
FOR SEMI-MECHANIZED MAIZE												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose	1,980	2,650	5,830	11,040	11,590	11,630	13,630	13,668	13,936	13,936	13,936	17,202
Value of traded inputs at domestic prices	ERR	1,600	2,736	4,974	ERR	6,856	6,891	5,936	4,380	6,035	5,809	9,100
Value added at domestic prices	ERR	1,050	3,094	6,066	ERR	4,774	6,739	7,732	9,556	7,901	8,127	ERR
Border farm price in San Jose	1,006	2,734	4,710	5,215	6,179	5,792	5,309	4,802	11,275	14,359	15,691	20,218
Value of traded inputs at border prices	ERR	1,472	2,434	4,539	ERR	6,274	6,011	5,066	3,837	5,228	5,072	8,297
Value added at border prices	ERR	1,263	2,276	676	ERR	-482	-702	-264	7,438	9,130	10,619	11,921
EPC	ERR	0.83	1.36	8.97	ERR	-9.90	-9.60	-29.29	1.28	0.87	0.77	ERR

NOTE: For yellow maize only semi-mechanized is relevant.

Table M.23. Costa Rica: Effective Protection Coefficients for white maize

FOR MAIZE PLANTED WITH ESPEQUE

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose (C/t)	1,982	2,683	6,320	11,788	11,590	11,793	13,627	14,133	13,669	14,279	17,701	21,048
Value of traded inputs at domestic prices	ERR	ERR	ERR	2,837	ERR	4,836	4,309	3,079	4,020	4,196	4,355	ERR
Value added at domestic prices	ERR	2,683	6,320	8,951	11,590	6,958	9,318	11,054	9,649	10,083	13,346	21,048
Border farm price in San Jose	1,516	3,443	4,112	4,932	8,321	7,211	5,819	5,708	7,962	13,885	11,550	14,900
Value of traded inputs at border prices	ERR	ERR	ERR	2,595	ERR	4,428	3,671	2,724	3,478	3,541	3,718	ERR
Value added at border prices	ERR	ERR	ERR	2,337	ERR	2,783	2,149	2,984	4,484	10,344	7,832	ERR
EPC	ERR	ERR	ERR	3.83	ERR	2.50	4.34	3.70	2.15	0.97	1.70	ERR

FOR SEMI-MECHANIZED MAIZE

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Domestic farm price in San Jose	1,982	2,683	6,320	11,788	11,590	11,793	13,627	14,133	13,669	14,279	17,701	21,048
Value of traded inputs at domestic prices	ERR	1,600	2,736	4,974	ERR	6,856	6,891	5,936	4,380	6,035	5,809	9,100
Value added at domestic prices	ERR	1,083	3,583	6,814	ERR	4,937	6,736	8,197	9,289	8,244	11,892	11,948
Border farm price in San Jose	1,516	3,443	4,112	4,932	8,321	7,211	5,819	5,708	7,962	13,885	11,550	14,900
Value of traded inputs at border prices	ERR	1,472	2,434	4,539	ERR	6,274	6,011	5,066	3,837	5,228	5,072	8,297
Value added at border prices	ERR	1,971	1,678	393	ERR	938	-192	643	4,125	8,657	6,478	6,603
EPC	ERR	0.55	2.14	17.33	ERR	5.27	-35.05	12.75	2.25	0.95	1.84	1.81

Table M.24. Maize: Producer subsidy equivalent, 1985-91

Year	Subsidy from market policy (Mill C)	Subsidy from credit policy (Mill C)	Subsidy via research MAG (Mill C)	Total subsidy (Mill C)	Percent subsidy (%)
1985	471.3	6.7	2.5	482.5	39.8
1986	988.4	3.6	2.5	994.5	57.7
1987	1,005.4	3.9	2.5	1,011.8	60.0
1988	556.6	5.4	2.6	564.6	42.5
1989	33.5	1.5	3.1	38.0	3.1
1990	503.3	5.8	2.9	512.1	35.4
1991	344.1	5.5	5.9	355.5	27.1

Expenditure on research in 1985 and 1986 assumed to be equal to that of 1987.

Table M.25. White maize: Consumer subsidy equivalent, 1985-91

Year	Consump tons	Domestic Wholesale tons	border wholesale C/t	Subsidy equiv. (Mill C)	Percent subsidy equiv. (%)
1985	83,621	11,488	8.980	-209.7	-21.6
1986	122,887	12,400	7,663	-557.5	-36.6
1987	109,012	14,633	7,826	-741.8	-46.5
1988	97,225	14,633	10.012	-449.3	-31.6
1989	94,800	16,502	16.027	-45.0	-2.9
1990	78,962	20,073	14,205	-463.3	-29.2
1991	62,239	23,468	16,676	-298.2	-20.4

Numbers in parentheses are negative.

COFFEE

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I. PRODUCTION

a. Area, Production, Yields

Table C.1 shows area, yields and production of cherry coffee and gold coffee (milled) for the period 1980/81-1990/91. It should be noted that cherry coffee is reported in terms of Double Hectoliters (DHL), which is the amount of coffee contained in a rectangular box, whose interior dimensions are 1m long, 0.5m wide and 0.4m high (ICAFFE). Each DHL of cherry yields between 22 and 23 Kg of gold coffee (Table C.1).

Table C.1. Coffee: Area, production and yield, 1980/81-1989/90

Year	Area a/ (ha) (1)	Yield (DHL/ha) (2)	Production cherry coffee (000 DHL) (3)	Yield Kilos of gold coffee per DHL	Produc. gold coffee b/ (t)
1980/81	95,674	0.00	5,291	23.00	121,678
1981/82	n.a.	n.a.	4,525	23.11	104,582
1982/83	n.a.	n.a.	5,463	23.00	125,649
1983/84	99,869	0.00	5,214	22.47	117,167
1984/85	112,877	0.00	6,720	22.71	152,605
1985/86	111,840	0.00 †	4,194	22.44	94,102
1986/87	96,950	0.00	6,449	22.32	143,913
1987/88	81,710	0.00	6,371	23.00	146,542
1988/89	n.a.	n.a.	7,350	22.75	167,222
1989/90	93,146	0.00	6,427	22.64	145,509

a/ (1)=(3)/(2).

b/ Gold coffee is the bean that result after complete milling (beneficio). This is the form in which coffee is exported.

† Very peculiar.

Source: ICAFFE.

b. Production by Regions

Table C.2, which presents average yearly production by province, for the period 1984/85-1988/89, shows that more than 75% of production takes place in three provinces: Alajuela, San Jose and Cartago; and since the high quality types, such as Hard Bean (HB), Good Hard Bean (GHB) and Strickly Hard Bean (SHB), is produced in the higher altitudes of these provinces, it is safe to state that most of the coffee is produced in the Central Valley (Table C.3).

c. Seasonality

The climatic diversity of the regions in which coffee is produced leads to various maturing patterns. All of the coffee producing areas belong officially to one of three ripening zones, which are defined by the period in which the bean ripens and is harvested. These are the Early, Medium and Late Ripening Zones. The Early Ripening Zone includes areas situated at low altitudes with heavy rain fall, that are considered marginal for coffee. Harvest in these areas begin as early as June and peaks during September-October. The Medium Ripening Zone includes areas that are usually found at medium altitudes with lower rainfall. The harvesting period, which is usually very short, begins in October and peaks in November-December. The Late Ripening Zone includes high areas (altitudes of 1200 -1600 m.a.s.l) with relatively low rainfall, which are considered best for coffee production. In these areas, harvest begins roughly in November and runs through April, with a peak in January-February. Table C.4 shows that most of the coffee is harvested during December-March (75%).

Table C.2. Coffee: Production by province

Province	Average 1984/89 (000 DHL)	Proportion (%)
San Jose	1,484	24.0
Alajuela	2,367	38.3
Cartago	1,044	16.9
Heredia	691	11.2
Guanacaste	68	1.1
Puntarenas	499	8.1
Limon	25	0.4
Total	6,178	100.0

Source: ICAFE.

Table C.3. Coffee: Production by type

Type	Altitude (masl)	Average Proportion 1984-87 (000 DHL)	(%)
SHB a/	1200-1700	2,461	39.83
BHB b/	1100-1200	648	10.49
HB c/	800-1200	1,105	17.88
MHB d/	400-1200	967	15.65
HGA e/	900-1200	283	4.57
MGA f/	600-900	413	6.69
LGA g/	200-600	208	3.36
P h/	300-1000	95	1.53
Total		6,179	100.00

a/ Strictly hard bean (north, central and south regions).

b/ Good hard bean (high regions).

c/ Hard bean (mesetas).

d/ Medium hard bean (Coto Brus, El General).

e/ High grown atlantic (high regions).

f/ Medium grown atlantic (Cimarron, Turrialba).

g/ Low grown atlantic (low regions).

h/ Pacific.

Source: ICAFE.

d. Type of Producers (Farm Size)

Coffee production in Costa Rica is very unconcentrated and latifundios are almost non-existent. The 1986/87 crop was produced on about 97,000 hectares of land (Table C.1) and was "delivered" to the mills by approximately 116,073 individuals¹.

¹ In Costa Rica a large proportion of the coffee is grown on family farms and farmers usually deliver their coffee to different mills and in the names of different family members and friends. This allows them to obtain the different prices that might prevail in the region and to show individual income not high enough to be taxed. This is why it is not certain how many coffee farmers there are. The 1984 Agricultural Census reported 34,464 coffee farms; this implies that there were at the most this number of farmers, since some farmers own more than one farm.

Table C.4. Coffee: Harvest by type and month, average 1984/85-1988/89 (thousands of DHL)

Ripening stage and type of coffee	Months									Total
	August	September	October	November	December	January	February	March	April	
EARLY										
Low Grown Atlantic	52	58	35	42	10	104	0	0	0	302
Medium Hard Bean							0	0	0	
Coto Brus	29	68	145	290	242	145	48	0	0	967
El General	242	290	174	164	68	19	10	0	0	967
Medium Grown Atlantic	78	99	83	50	74	21	8	0	0	413
MEDIUM										
Hard Bean	0	33	55	111	243	298	199	144	22	1,105
Pacific	0	1	2	11	24	31	16	10	0	95
High Grown Atlantic	0	14	20	23	42	85	51	34	14	283
LATE										
Good Hard Bean	0	0	0	13	117	194	259	65	0	648
Strictly Hard Bean										
Central	0	0	0	0	49	246	1,231	812	123	2,461
North	0	0	485	74	369	911	812	246	0	2,897
South	0	0	0	0	49	197	984	984	246	2,461
Total (000 DHL)	401	563	999	777	1,286	2,252	3,619	2,295	405	12,599
Percent (%)	3.2	4.5	7.9	6.2	10.2	17.9	28.7	18.2	3.2	100.0

Source: Informe Anual de Labores 1990, ICAFE.

Table C.5 shows that there has been a clear predominance of small farms, with about 70% of total number below 10 hectares, and with a trend towards a greater proportion of these.

Table C.5. Costa Rica: Distribution of coffee farms by size, 1973 and 1984.

Farm size	1973		1984	
	Number	Percent	Number	Percent
< 5 ha	18,930	58.5	22,690	65.8
5 to <10 ha	4,401	13.6	4,684	13.6
10 to <20 ha	3,485	10.8	3,180	9.2
20 to <50 ha	3,385	10.5	2,511	7.3
50 to <100 ha	1,283	4.0	871	2.5
100 to <200 ha	521	1.6	322	0.9
200 to <500 ha	265	0.8	138	0.4
More than 500 ha	83	0.3	68	0.2
Total	32,353	100.0	34,464	100.0

Source: ICAFE.

e. Production Systems

There is basically only one production system.

f. Processing

Table C.6 presents the actual milling cost legally accepted during 1980/81-1990/91.

II. PRODUCTION INCENTIVES

g. Guaranteed or Administered Prices

There are no guaranteed or administered prices. Producer prices are determined as follows. Each mill sells the coffee received from producers in both the export and domestic markets and the revenues are pooled; export, production, and other taxes as well as the cost of milling services, are deducted; the rest is divided by the total quantity milled in order to obtain a farmer price per DHL. The farmer receives advances during the coffee year and a final liquidation at the beginning of the following coffee year.

h. Credit

Table C.7 shows the amount of credit used by coffee producers during 1980-90, the interest rate and subsidy equivalent.

i. Traded Inputs

See Appendix A.

j. Income Tax and Other Taxes

Coffee cooperatives are exempt from paying income taxes; all other producers are not. All producers pay an ad-valorem production tax equivalent to 10% of the value of milled coffee (Law No1411 of January 1952). According to the law, this tax is assessed as 10% of the total revenue to the mills minus milling cost (excluding mills returns). This tax is paid by the mills each time they sell a batch of coffee, and is later deducted from total revenues going to producers. In August 1988 producers were exempt from paying the tax on the proportion allocated to domestic consumption. In October 1989, by means of law 7133, the tax schedule described in Table C.8 was set.

Table C.6. Coffee milling costs accepted by law, 1980/81-1990/91 a/

Year	Milling cost ¢/Kg	Milling cost ¢/t
1980/81	1.77	1,770
1981/82	2.80	2,800
1982/83	3.97	3,970
1983/84	5.31	5,310
1984/85	5.96	5,960
1985/86	7.37	7,370
1986/87	8.10	8,100
1987/88	9.15	9,150
1988/89	9.87	9,870
1989/90	10.65	10,646

a/ Data reported by ICAFE.

b/ Preliminary.

Source: ICAFE.

Tax on cherry coffee. Law 200 of October 5, 1948 established a tax of ¢0.10 per DHL of cherry coffee delivered to the mills. These funds went to ICAFE. This tax was removed by Law 6988 of June 26, 1985, in favor of a 1% export tax to finance ICAFE.

k. Public Expenditures

The principal public expenditures on coffee is undertaken by the Cooperative Program MAG-ICAFE for coffee research and extension (Table C.9).

Table C.7. Credit to coffee producers, from the national banks, 1985/91.

Year	Total credit (Mill Col)	Inter. rate b/ (%)	Commer. rate c/ (%)	Differ- ence	Subsidy Equiv.d/ (Mill Col)
1984/85	267	23.0	30.0	7.0	18.7
1985/86	284	20.5	28.0	7.5	21.3
1986/87	289	25.5	29.0	3.5	10.1
1987/88 a/	378	26.0	31.5	5.5	20.8
1988/89	466	27.0	31.0	4.0	18.6
1989/90	607	34.0	36.9	2.9	17.6
1990/91	892	37.0	39.8	2.8	24.5

a/ Taken as the average of 1986/87 and 1988/89.

b/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (large producer case).

c/ We used the rate quoted by the BNCR for "other activities".

d/ We assumed that loans were for twelve months.

Table C.8. Schedule of ad-valorem production tax, 1989

Specification	Percentage tax
If FOB rail is below \$100 per 46 Kg.	0
If FOB rail is between \$100 and \$110 per 46 Kg.	2.5
If FOB rail is between \$110 and \$120 per 46 Kg	5.0
If FOB rail is between \$120 and \$130 per 46 Kg	7.5
If FOB rails is greater than \$130 per 46 Kg	10.0

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III. MARKETING

A. EXPORTS

1. Exporters and Exports

In Costa Rica, by law, all coffee harvested between June of one year and April of the next, must be marketed between October first of the same year and September 30th of the next. Legal regulations determine that all coffee harvested between June of year t and April of year t+1 belong to the coffee year that begins on October 1st of year t and ends on September 30th of year t+1, and can only be sold during that coffee year, unless special dispensation is granted by ICAFE. Table C.10, which presents the quantities exported and exports as a

proportion of total production during 1980-90, shows that between 86 and 90 percent of production is exported each year.

m. Internal Transport

Cherry coffee is transported by farmers to various pick up points in the area of influence of each mill, and later by millers to the mills, where the coffee is processed. Gold coffee, for exports, is transported from the mills to the port. The first category of transport cost is borne by the mills as part of their operating cost; the second is borne by the exporters and is included in the fixed "internal costs" of \$1.65 per qq (100 lbs).

n. Port of Embarkation and Country of Destiny

Table C.11 shows that most of the coffee is exported through port Limón, on the Atlantic, and Table C.12 shows that the U.S. and Germany are the major buyers of Costa Rican coffee (17.4 and 16.5% each).

Table C.9. Public expenditures on coffee production, 1985-91

Year	Research only (Colons)
a/ 1984/85	20,274,026
a/ 1985/86	22,301,428
a/ 1986/87	24,531,571
1987/88	26,984,728
1988/89	35,748,118
1989/90	32,842,446
1990/91	28,271,095

a/ Figures for 1984/85, 1986/87 and 1987/88 were estimated as if the following year represented a 10% increment.

Source: Ministry of Agriculture

Table C.10. Coffee: Amount and proportion exported and consumed domestically, 1980-1990

Year	Production of gold coffee (t)	Beginning stocks (t)	Exports (t)	Exports/ Production (%)	Domestic Consumption (t)	Final stocks (t)	Dom. consump/ Production (%)
1980/81	121,678	0	105,765	86.9	15,913	0	
1981/82	104,582	1,123	90,932	86.9	14,773	0	14.1
1982/83	125,649	0	103,740	82.6	16,550	5,359	13.2
1983/84	117,167	5,359	106,860	91.2	13,730	1,936	11.7
1984/85	152,645	1,936	125,320	82.1	16,906	12,355	11.1
1985/86	94,102	12,355	89,187	94.8	12,167	5,104	12.9
1986/87	143,913	5,104	126,405	87.8	17,343	5,269	12.1
1987/88	146,542	5,269	117,795	80.4	17,011	17,004	11.6
1988/89	167,222	17,004	129,441	77.4	18,549	36,237	11.1
1989/90	145,479	36,237	142,618	98.0	16,021	23,077	11.0
1990/91							

Exports a/

	Total	Agree- ment	Non agree- ment
1980/81	105,765		
1981/82	90,932	73,290	17,643
1982/83	103,740	67,554	36,186
1983/84	106,860	72,677	34,182
1984/85	125,320	72,124	53,196
1985/86	89,187	76,719	12,467
1986/87	126,405	113,891	12,514
1987/88	117,795	72,143	45,652
1988/89	129,441	86,956	42,485
1989/90	142,618	132,536	10,082
1990/91			

a/ The OIC agreement was suspended in Feb. 1986, reinstated in October 1987, and suspended again in July 1989.

Source: ICAFE.

Table C.11. Coffee: Exports by port of embarkation (%), 1981/82-1988/89

Port of Embarkation	Year				
	1981/82	1984/85	1985/86	1986/87	1988/89
Port Limon	70.8	70.7	88.9	88.1	85.7
Port Caldera	5.7	29.3	11.1	11.9	13.9
Paso Canoas (southern border)	0.2	0	0	0	0.3
Peñas Blancas (northern border)	23.3	0	0	0	0
International Airport (San José)	0	0	0	0	0.1
Total	100.0	100.0	100.0	100.0	100.0

Source: ICAFE.

o. Export Taxes and Other Barriers

1. **Ad-valorem.** According to Law No. 5519 of April 24, 1974, all coffee exported to countries with which Costa Rica doesn't have a free trade treaty pay an ad-valorem export tax not to exceed 18% nor less than 1%, and to countries with which a free trade treaty exist, the maximum is 7% and minimum 1%. Law No 11007H of December, 1979 fixed the ad-valorem export tax at 13%, and Law 12445H of April 1981 fixed the scale presented in Table C.13, which was modified on 12/08/88. This tax was to be paid by the exporter upon canceling his obligations with the mill. The total tax revenue and average percentage is presented in Table C.14.

2. **Export tax (ICAFE).** Until Law 6988 of 6/26/1985 came into effect, Law 3062 of 11/12/1962 required:

. A tax of \$2.00 per each 46 Kg of coffee sold on the coffee exchange (Bolsa de Cafe), which went to ICAFE to defray its expenses. This law was to affect all coffee sold, for exports or domestic consumption beginning with the 1962/63 crop. Other parts of the law required other temporary taxes to finance ICAFE. In 1980 it was changed to 3/4 of 1% of FOB. Law 6988 of 6/26/1985 abolished the previous and set a tax of 1% of all exports to finance ICAFE.

3. **OIC tax.** Exporters must pay a certificate of origin tax of \$0.26 per bag of 60 Kg (\$4.33/t), which goes to OIC.

Table C.12. Costa Rica: Principal coffee buyers, 1981/82-1989/90 (tons)

Country	Average				Average	(%)
	of 1981/82- 1986/87	1987/88	1988/89	1989/90	of 1981/82- 1989/90	
MEMBERS a/						
U.S.A.	21,110	13,637	14,037	29,508	19,573	15.64
Finland	7,011	5,191	6,795	7,529	6,632	5.30
France	3,815	4,876	5,424	5,522	4,909	3.92
Italy	4,249	5,841	6,092	10,772	6,739	5.38
Netherlands	5,545	6,826	5,557	10,582	7,127	5.70
England	8,298	6,364	11,924	9,565	9,038	7.22
Germany b/	17,394	16,446	21,009	32,720	21,892	17.49
Sweden	3,498	3,777	4,674	5,243	4,298	3.43
Others	6,435	9,170	11,427	21,069	6,872	5.49
Sub-total	82,717	72,129	86,939	132,510	93,574	74.78
NON-MEMBERS						
Argentina	768	414	2,621	138	985	0.79
Czechoslov.	6,725	7,753	6,827	966	5,568	4.45
Poland	3,071	7,911	9,510	207	5,175	4.14
Germany c/	3,138	4,532	5,800	-	3,368	2.69
Others	8,614	25,033	17,718	8,769	8,591	6.86
Sub-total	28,060	45,643	42,476	10,080	31,565	25.22
TOTAL	66,466	117,772	129,415	142,590	125,139	100.00

a/ Members of the DIC agreement.

b/ Federal Republic of Germany.

c/ Democratic Republic of Germany.

Source: ICAFE.

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Table C.13. Ad-valorem export tax on FOB value; April 1981

FOB price \$/46 Kg	Tax Rate (04/1981)	Tax Rate (08/1988)
Up to 95	4%	1%
95.1 - 115	4%+0.3%(FOB-95)	1%+0.1%(FOB-115)
115.1 - 175	10%+0.1%(FOB-115)	10%+0.1%(FOB-115)
175.1 - 191	16%+0.125%(FOB-175)	16%+0.125%(FOB-175)
> 191	18%	18%

Source: ICAFE.

Table C.14. Coffee: Ad-valorem export tax, 1979/80-1990/91

Year	FOB value mill \$	Ad-valorem export tax mill \$	FOB raills mill \$	Ad-valorem tax/FOB value (%)	Average rate reported ICAPE (%)
1975/80	n.a.	n.a.	n.a.	n.a.	18.0
1980/81	267.4	19.6	241.1	7.3	10.4
1981/82	240.4	25.9	203.5	10.8	10.3
1982/83	223.4	21.8	195.8	9.8	4.0
1983/84	257.1	25.8	226.6	10.0	8.2
1984/85	296.0	23.5	276.6	7.9	10.1
1985/86	350.1	58.6	309.6	16.7	18.0
1986/87	406.4	38.6	288.3	9.5	10.5
1987/88	310.6	31.5	267.4	10.1	10.5
1988/89	317.4	27.1	266.2	8.5	53.0
1989/90	241.7	0.0	240.8	0.0	1.0
1990/91	n.a.	n.a.	n.a.	n.a.	1.0

n.a. = not available

Source: ICAFE.

p. Export Costs

These costs include transport from mills to port, port costs or charges, commissions of brokerage firms, and a return to the exporter. The law recognizes the following as legitimate export costs:

- a. Transport costs according to bill;
- b. 0.5% of ex-mill price for bank commissions;
- c. US\$0.30/qq (46 Kg) as general exporter expenses;
- d. Commissions paid to foreign agents, a maximum of 2% of the contract, when included in bank collections notes or receipts.

According to exporters, all of these costs (excluding returns to the exporter and commissions to foreign agents) are to be covered by the \$1.65/qq set by the authorities (they claim that this is not enough, that today about \$2.25/qq is required to cover all costs). The law also fixes the return to the exporter at 2.5% maximum.

B. DOMESTIC CONSUMPTION

q. Centers of Marketing and Consumption

Table C.9 showed that 11 to 14% of total production is allocated to the domestic market, under a set of rules that are totally different from those governing the export trade. The Board of Directors of ICAFE decides each year, on the basis of previous consumption and stocks, how much each mill must retain for the domestic market. Most of this coffee is produced, milled, toasted, packed and consumed in the Central Valley (the most populated area of the country).

r. Marketing Costs and Storage Requirements

Coffee retained for the domestic market is held by the mills until the moment of sale and the expenses are included in the allowable mills overhead. When ready to sell, they must deliver the batch to ICAFE, at the warehouse of the "Bolsa de Café de Comercio Nacional". The coffee goes into auction (bi-weekly) at the "Bolsa", where the price is determined. Once a buyer accepts, he must pay the seller (mill) and pay ICAFE a fee of \$2.00/46 Kg to defray all costs associated with the process, including short time storage at the "Bolsa".

s. Price Controls, Taxes and Subsidies, Other Controls

Although the domestic price is determined at each auction, supposedly, by the interaction of the forces of supply and demand, it is a price that largely reflects government's supply control. Giving that ICAFE sets a minimum quantity that must be allocated to the domestic market each year, and giving that retail prices are also fixed by the government, the price paid for coffee in the domestic market is largely distorted. Domestic coffee toasters who buy coffee at these auctions must pay a \$2/46 Kg tax to ICAFE, for its expenses.

C. PRICING MECHANISM AND PRICES

Export Prices. When exporters receive an order from a foreign buyer and negotiate an FOB, price (at port), they estimate their costs and taxes and make an offer to the mills, quoting an FOB ex-mill (or rails) price. If accepted, the mill receives this price, and pays the government only the production tax (when required) out of the total received. Exporters cover internal costs to the port, other export costs, export tax, and their fee and profits with the difference between the ex-mill price paid the mill and the FOB, Port they receive from the foreign buyer (Table C.15).

Domestic Price. Each year ICAFE determines how much coffee each mill must reserve for the domestic market. This coffee is then auctioned off by-weekly at the coffee exchange, and a price is determined by this process.

Producer Price. The producer deliver his coffee in consignment to the mill for processing and selling according to the miller's best judgement. The mills market the coffee throughout the coffee year, and at the end presents a report to ICAFE containing the following information: total coffee received and milled, average yield of gold coffee per DHL, total revenue from sales to export and domestic markets, and costs allowed by law (not all costs are deducted). ICAFE uses this information to fix the final liquidation (to the producer) price the mill must pay for cherry coffee delivered by farmers. It deducts from total revenue, milling costs, the ad-valorem production tax and a 9% return to the mill (this is 9% of total revenue, after deducting milling costs), to obtain that amount to be distributed among producers. This total divided by the total amount of cherry coffee delivered yields the average producer price per DHL.

Table C.15. Coffee: Average FOB prices to preferential and world markets and domestic prices, 1980/81-1990/91

Year	FOB price			Domestic price a/ \$/t
	Average	Members	Non-members	
	\$/t	\$/t	\$/t	
1980/81	2,548	2,686	1,944	578
1981/82	2,644	2,887	1,627	473
1982/83	2,153	2,691	1,148	567
1983/84	2,405	2,965	1,217	575
1984/85	2,362	2,941	1,575	523
1985/86	3,925	4,084	2,947	584
1986/87	3,215 b/	3,244	2,979	532
1987/88	2,637	2,868	2,272	587
1988/89	2,452	2,729	1,885	771
1989/90	1,695	1,697	1,669	724

Year	FOB Rails	Exchange rate	FOB Rails	Domestic auction	Domestic/FOB rails
	\$/Kg	¢/\$	¢/Kg	¢/Kg	(%)
1980/81	2.3	18.2	41.4	10.5	25.3
1981/82	2.2	36.0	80.5	17.0	21.2
1982/83	1.9	40.0	75.6	22.7	30.0
1983/84	2.1	43.0	91.2	24.8	27.1
1984/85	2.2	48.7	107.4	25.4	23.7
1985/86	3.5	54.3	189.2	31.7	16.7
1986/87	2.3	59.0	134.6	31.4	23.3
1987/88	2.3	70.2	159.7	41.2	25.8
1988/89	2.1	78.6	163.7	60.7	37.1
1989/90	1.6	87.7	142.6	63.5	44.5

a/ At rates reported by ICAFE.

b/ Estimated by the authors from data reported by ICAFE. ICAFE, however, also reported an average price of \$2,731.8/t.

Source: ICAFE.

IV. METHODOLOGY

Nominal Protection

Milling Costs. We used the actual milling costs per ton reported by ICAFE. These are the costs accepted by law (Table C.6)

Export Costs. These costs are not reported separately, neither per unit (60 Kg bags) nor as a total disbursement. We thus tried two approaches. The first was to estimate these costs as the difference between export revenues and taxes. Given that the FOB, port price is reported to be equivalent to the FOB, rails plus export costs, ICAFE's export tax and the ad-valorem export tax. We subtracted both tax revenues and the total export revenue at the mills level (rails) from total export revenue at the port to obtain total export costs. As shown in Table C.16, this approach failed, since for 1984/85 and 1985/86 the resulting export costs were negative; also, the cost per ton varied much more than could be expected. Because of this we decided to use an alternate approach. We quantified the costs according to the law that regulates the industry. The costs were obtained as follows: we imputed \$36.36 /t for transport, 0.5% of FOB, rails for bank commissions, \$6.612/t for general export expenses and 3.5% of FOB, port to cover commissions to foreign agents and exporters returns (see Table C.16).

Border Prices. Coffee produced in any given year is either consumed domestically (11-14%) or reported to OIC members (under a quota system) or non-members (non-quota world market). Since the amount exported to OIC member market is regulated by the quota system, in order to obtain an average border price, we valued the amount exported to OIC market at the prevailing agreement prices and the rest (domestic consumption plus export to non-markets, see Table C.17) was valued at the prices prevailing in the non-quota market. We thus obtained a weighted average FOB, port price (border), which differ from the actual (domestic) average price in the sense that the latter valued 11 to 14% of the coffee at domestic auction prices which were much lower than the non-member export price.

Effective Protection

In order to estimate the EPCs we used detailed cost of production figures reported by the Banco Nacional for maintenance and partial renovation of coffee plantations, under the only production system that exist. Prices of traded inputs were adjusted according to the tariff levels prevailing in each year (see Appendix A). The prices of machinery services were adjusted as follows:

Table C.16. Coffee: Estimated export costs, 1980/81-1989/90

Year	Exports	Export prices		Export value		Export taxes			Export costs a/		Export costs estimated according to the law b/
		F0B port	F0B rails	F0B	Rails	ICAFE	Ad-valo-rem	Total	Per unit		
		\$/t	\$/t	mill \$	mill \$	mill \$	mill \$	mill \$	\$/t		
1980/81	105,765	2,548	2,280	269.4	241.1	2.0	19.6	6.7	63.6	143.5	
1981/82	90,932	2,644	2,238	240.4	203.5	1.9	25.9	9.1	100.4	146.7	
1982/83	103,740	2,153	1,887	223.4	195.8	1.8	21.8	4.0	39.0	127.8	
1983/84	106,860	2,406	2,121	257.1	226.6	1.9	25.8	2.8	26.2	137.8	
1984/85	125,320	2,362	2,207	296.0	276.6	2.3	23.5	-6.4	-51.4	136.7	
1985/86	89,187	3,925	3,471	350.1	309.6	3.5	58.6	-21.6	-241.9	197.7	
1986/87	126,405	2,732	2,281	345.3	288.3	3.5	38.6	15.0	118.7	150.0	
1987/88	117,795	2,637	2,270	310.6	267.4	3.1	31.5	8.7	73.9	146.6	
1988/89	129,441	2,452	2,072	317.4	268.2	3.2	27.1	19.0	146.6	139.2	
1989/90	142,616	1,695	1,688	241.7	240.7	2.4	0.0	-1.5	-10.3	110.7	

a/ Estimated as FOB value minus Rails value minus ICAFE tax minus the ad-valorem tax.

b/ Includes \$36.36/t for transport, 0.5% of FOB rails for bank commissions, \$6.612/t for general export expenses and 3.5% FOB price for commissions to foreign agents and exporters return.

Source: LATICA.

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Table C.17. Coffee: Amount and proportion exported to members and rest, 1980/81-1989/90

Year	Availability of coffee a/ (t)	Exports to members (t)	Final stocks (t)	Net availability b/ (rest)
1980/81	121,678	n.a.	0	n.a.
1981/82	105,705	73,290	0	32,415
1982/83	125,649	67,554	5,359	52,736
1983/84	122,526	72,677	1,936	47,913
1984/85	154,581	72,124	12,355	70,102
1985/86	106,457	76,719	5,104	24,635
1986/87	149,017	113,891	5,269	29,857
1987/88	151,811	72,143	17,004	62,663
1988/89	184,226	86,956	36,237	61,034
1989/90	181,716	132,536	23,077	26,103

a/ Availability is production plus beginning stocks.

b/ Net availability (rest) is equivalent to availability - exports to members - final stocks.

Source: ICAFE.

Unit Value*13,000 = total domestic value (TDV)
 TDV*(1/1+MM) = CIF + tariff
 Remove tariff by multiplying by (1/1+t)
 Add marketing costs by multiplying by (1+MM)
 Then divide by 13,000 to obtain border value per hour.
 In sum, $BUV = (U.V*(1/1+MM)*(1/1+t)*(1+MM) = U|V*(1/1+t)$

Where BUV = Border Unit Value

Table C.18 presents a summary of the costs of traded inputs, at domestic and border prices, for 1981-1991.

Producer Subsidy Equivalent

This index includes three types of subsidy: from the marketing system or pricing policy, from subsidized interest rates and from government expenditures on research and extension. For the first category we multiplied the quantities produced by the difference between the domestic and border farm prices. In order to obtain the credit subsidy, we multiplied the difference between the interest rates for commercial activities and those paid by commercial farmers times the total amount of credit provided per year. Since the data was reported as cumulative amounts lent throughout the year, we used one year as the duration of the loan. In reality it might have been loan for shorter periods repeated several times throughout the year. The effect is the same.

Consumer Subsidy Equivalent

In this index we included only the market effect of requiring a minimum quota for the domestic market. We multiplied the difference between domestic prices paid at the auction (wholesale level) and border equivalent times total yearly consumption.

Table C.18. Summary of value of traded inputs at domestic and border prices (C/DHL)

Year	At domestic	At border	Average protection
1981	n.a.	n.a.	n.a.
1982	n.a.	n.a.	n.a.
1983	n.a.	n.a.	n.a.
1984	n.a.	n.a.	n.a.
1985	n.a.	n.a.	n.a.
1986	n.a.	n.a.	n.a.
1987	1,142	993	1.15
1988	1,016	885	1.15
1989	1,370	1,183	1.16
1990	1,743	1,494	1.17
1991	1,883	1,702	1.11

Note: Only traded inputs use for maintenance and partial renovation of plantations.

V. INDICES

Nominal protection coefficients are presented in Table C.19. Effective protection coefficients are presented in Table C.20; producer subsidy equivalent in Table C.21; and the consumer subsidy equivalent in Table C.22.

Table C.19. Coffee: Border farm price and Nominal Protection Coefficient, 1981/82-1989/90

	Coffee year or crop								
	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Exports under OIC agreement (members)	73,290	67,554	72,677	72,124	76,717	113,891	72,143	86,956	132,536
Other exports plus domestic consumption	32,415	52,736	47,913	70,102	24,635	29,857	62,663	61,034	26,103
Export Prices to OIC members	2,887	2,691	2,965	2,941	4,084	3,244	2,868	2,729	1,697
Export prices to world markets	1,627	1,146	1,217	1,575	2,947	2,979	2,272	1,885	1,669
Average FOB border	2,501	2,015	2,270	2,268	3,807	3,189	2,591	2,381	1,692
Less Export Costs	147	128	138	137	198	150	147	139	111
Average FOB rails, dollars/ton	2,354	1,887	2,132	2,131	3,610	3,039	2,444	2,242	1,581
Exchange rates	36	40	43	49	54	59	70	79	88
Average FOB rails, colones/ton	84,720	75,481	91,755	103,718	195,857	179,370	171,642	176,302	138,670
Less milling costs per ton	2,800	3,970	5,310	5,960	7,370	8,100	9,150	9,870	10,646
Net revenue to mills	81,920	71,511	86,445	97,758	188,487	171,270	162,492	166,432	128,024
Less return to mills (9% of net) a/	7,373	6,436	7,780	8,798	16,964	15,414	14,624	14,979	11,522
Border farm price per ton of gold coffee	74,547	65,075	78,665	88,960	171,523	155,855	147,868	151,453	116,502
Number of DHL of cherry per ton of gold coffee	43	43	45	44	45	45	43	44	44
Border price per DHL of cherry	1,723	1,497	1,768	2,020	3,849	3,479	3,401	3,446	2,638
Domestic price per DHL of cherry	1,231	1,118	1,431	1,635	2,977	2,102	2,563	2,664	2,548
Nominal Protection Coefficient at farm level	0.71	0.75	0.81	0.81	0.77	0.60	0.75	0.77	0.97

a/ Returns allowed legally.

Table C.20. Coffee: Effective Protection Coefficients at farm level, 1981/82-1989/90

	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90
Domestic price per DHL of cherry	1,231	1,118	1,431	1,635	2,977	2,102	2,563	2,664	2,546
Value of traded inputs at domestic prices						1,142	1,016	1,370	1,743
Value added at domestic prices						960	1,547	1,294	805
Border price per DHL of cherry	1,723	1,497	1,768	2,020	3,849	3,479	3,401	3,446	2,638
Value of traded inputs at border prices						993	885	1,183	1,454
Value added at border prices						2,486	2,516	2,262	1,143
EPC Effective Protection Coefficient						0.39	0.62	0.57	0.70

Data on costs of production was not available for 1980/81-1985/86.
 Export and price data for 1990/91 not yet available.

Table C.21. Coffee: Producer Subsidy Equivalent, 1984/85-1989/90

Crop Year	Market interv. Mill C	Credit policy Mill C	Public Expend. Mill C	Total subsidy Mill C	Percent subsidy † (%)
1984/85	-2,587	18.66	20.27	-2,548	-23.2
1985/86	-3,657	21.29	22.30	-3,614	-28.9
1986/87	-8,860	10.12	24.53	-8,846	-65.3
1987/88	-5,339	20.76	26.98	-5,291	-32.4
1988/89	-5,748	18.64	35.75	-5,693	-29.1
1989/90	-578	17.60	32.84	-528	-3.2

† Percent of the value at domestic prices.

Table C.22. Coffee: Consumer Subsidy Equivalent, 1984/85-1989/90

Crop Year	Domest Consump t	Price differen US\$/t	Price differen Col/t	Subsidy equiv. Mill C	Percent subsidy † (%)
1984/85	16906	1,702	82,902	1401.54	325
1985/86	12167	3,143	170,661	2076.68	538
1986/87	17343	2,533	145,447	2591.86	476
1987/88	17011	1,903	133,619	2272.99	324
1988/89	16549	1,542	121,185	2247.67	200
1989/90	16021	660	75,448	1206.76	119

† Percent of the value at domestic prices.

SUGARCANE

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I. PRODUCTION

a. Area, Production, Yields

Area, production and yields are presented in Tables S.1 and S.2.

Table S.1. Costa Rica: Sugarcane and sugar production, zafra
1979/80-1990/91

Zafra a/	S. cane milled b/ (000 t)	Yield c/ Sugar 960Pol/t (kg)	Sugar prod.n 960Pol (000 t)	Prod.n raw sugar equiv. d/ (000 t)	Prod. sugar all types d/ (000 t)
1979/80	2,199	90.5	199.0	190.7	189.9
1980/81	2,204	91.6	201.8	193.4	189.7
1981/82	2,129	91.0	193.8	185.8	181.5
1982/83	2,226	95.8	213.3	204.4	199.9
1983/84	2,618	98.0	256.6	245.9	241.3
1984/85	2,343	107.0	250.8	240.3	236.4
1985/86	2,484	103.0	256.0	245.3	240.1
1986/87	2,357	98.1	231.2	221.6	216.6
1987/88	2,480	97.0	240.6	230.5	224.9
1988/89	2,193	102.4	224.5	215.1	209.7
1989/90	2,437	100.8	245.7	235.5	230.2
1990/91	2,630	102.4	269.3	258.0	258.8

a/ Zafra is total harvest during a cane year Oct.1 to Sep.30.

b/ Figures are reported as total cane milled, not as cane production.

c/ For 1979/80 - 1982/83 yields were estimated from reports of sugar production (960) and cane milled.

d/ Conversion factor is 1.04348. Column 4 is divided by this factor.

e/ Includes white sugar, Pol. 99.5 and 99.8; raw sugar, Pol. 98.0 and alcohol expressed in white sugar equivalent, Pol. 99.5.

as reported by LAICA.

Source: LAICA

b. Production by Regions

Table S.3 presents production of cane and sugar by region for the period 1979/80-1989/90.

Table 5.2. Costa Rica: Structure of sugar production

Zafra	White sugar a/		Raw sugar		Alcohol in w.s. equiv. b/		Total c/	
	(000 t)	%	(000 t)	%	(000 t)	%	(000 t)	%
1979/80	117	61.6	73	38.4	0	0.0	189	100.0
1980/81	117	61.5	73	38.5	0	0.0	190	100.0
1981/82	140	77.2	41	22.8	0	0.0	182	100.0
1982/83	150	74.9	50	25.1	0	0.0	200	100.0
1983/84	159	65.9	82	34.1	0	0.0	241	100.0
1984/85	140	59.0	79	33.3	18	7.7	236	100.0
1985/86	143	59.4	64	26.5	34	14.0	240	100.0
1986/87	165	76.4	49	22.7	2	0.9	217	100.0
1987/88	157	69.7	49	21.6	20	8.7	225	100.0
1988/89	172	82.2	37	17.8	0	0.0	210	100.0
1989/90	167	72.5	63	27.5	0	0.0	230	100.0

a/ Includes refined sugar.

b/ Alcohol converted to white sugar equivalent.

c/ Sum of both types of sugar.

Source: LAICA.

Table S.3. Costa Rica: Sugar production by region, 1979/80-1990/91

Zafra	Guanacaste and Puntarenas		Central Pacific		Atlantic (Turrialba)		Northern (San Carlos)		Total	
	Cane a/ (000 t)	Sugar prod. b/ (000 t)	Cane a/ (000 t)	Sugar prod. b/ (000 t)	Cane a/ (000 t)	Sugar prod. b/ (000 t)	Cane a/ (000 t)	Sugar prod. b/ (000 t)	Cane a/ (000 t)	Sugar prod. b/ (000 t)
1979/80	784	62	793	74	419	39	203	15	2,199	190
1980/81	1,000	80	682	65	355	32	166	12	2,203	190
1981/82	986	76	666	64	295	27	182	14	2,129	182
1982/83	1,033	89	656	65	346	31	188	14	2,223	200
1983/84	1,213	110	760	74	397	37	249	20	2,619	241
1984/85	1,047	102	731	75	406	38	265	22	2,449	236
1985/86	1,216	117	649	66	367	35	253	22	2,485	240
1986/87	1,063	95	649	65	366	34	280	23	2,358	217
1987/88	1,258	111	617	61	321	31	282	22	2,478	225
1988/89	1,071	102	536	54	289	28	298	25	2,194	210
1989/90	1,341	127	520	52	284	27	292	24	2,437	230
1990/91	1,548	156	549	55	259	24	273	23	2,629	259
Average	1,130	102	651	64	342	32	244	20	2,367	218
Percent	47.7	46.8	27.5	29.5	14.4	14.7	10.3	9.0	100.0	100.0

a/ Amount of sugar cane processed.

b/ Of all types.

Source: LAICA

c. Seasonality

The production season or "zafra" goes from October 1 of each year to September 30 of the following. Because optimum levels of sucrose are obtained during the dry months, harvesting occurs as shown in Table S.4. Table S.5 presents production by months in the different regions.

Table S.4. Sugarcane: Harvesting months (zafra)

Region	Harvest month
Atlantic (Turrialba)	January - June (August)
North (San Carlos)	January - June
Central Pacific (Atenas)	January - June
North Pacific (Guanacaste)	January - April
South Pacific	January - May 15

Source: LAICA.

Table S.5. Costa Rica: Monthly sugar production, zafra 1989/90 a/

	Month					Total Production (t)
	January (t)	February (t)	March (t)	April (t)	From May on (t)	
Central Pacific Guanacaste and Puntarenas	6,532	12,652	16,365	11,063	5,611	52,222
Northern	227	3,974	6,515	4,698	8,069	23,503
Atlantic	1,056	5,150	6,680	5,560	8,953	27,399
Total	33,152	53,518	65,177	47,883	30,456	230,185
% of total	14.4	23.2	28.3	20.8	13.2	100.0

a/ Sugar of all types.

Source: LAICA.

d. Type of Producers

Table S.6 shows that sugarcane is mostly grown by large enterprises (haciendas). In 1984, for example, 60% of total area was planted on farms of more than 200 hectares.

Table S.6. Distribution of sugarcane farms by farm size groups, 1984

Farm Size (ha)	No. of farms	Total area planted	Area in each farm size group (%)
< 1 to 5	2,731	2,080	5.6
5 to 10	1,290	2,575	5.4
10 to 20	1,176	3,252	6.9
20 to 50	1,192	4,353	9.2
50 to 100	542	3,229	6.8
100 to 200	220	2,754	5.8
200 to 500	155	5,513	11.6
> 500	70	22,930	48.5
Total	7,376	47,285	99.8

Source: DGEC, Agricultural Census, 1984.

e. Production Systems and Technological Levels

There is basically one technological level, the one used to estimate the effective protection coefficients.

II. PRODUCTION INCENTIVES

f. Guaranteed or Administered Prices

The whole activity is regulated by a government monopoly called Liga Agrícola e Industrial de la Caña (LAICA). This is the only institution or entity that can market sugar and sugarcane products.

The farmer gets a pooled price, which is calculated according to a formula, based on three (consumer) sales prices: the domestic, U.S. preferential and the international or world price.

g. Credit

Table S.7 presents the evolution of credit to this activity and estimates of the subsidy equivalent.

Table S.7. Credit to sugarcane growers, 1985-91

Year	Total credit (000 Col)	Interest rate b/ (%)	Commercial rate c/ (%)	Differ- ence	Subsidy Equivalent d/ (Colones)
1985	352,345	23.0	30.0	7.0	23,264,430
1986	329,482	20.5	28.0	7.5	24,711,150
1987 a/	408,664	25.5	29.0	3.5	14,303,240
1988	487,847	26.0	31.5	5.5	26,831,563
1989	459,108	27.0	31.0	4.0	19,964,328
1990	608,033	34.0	36.9	2.9	17,632,954
1991	586,797	37.0	39.8	2.8	16,136,907

a/ Obtained by interpolating between figures for 1986 and 1988.

b/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (the large producer case).

c/ We used the rate quoted by the BNCR for "other activities".

d/ We assumed that loans were for twelve months.

Source: Dpto. Crédito Rural, Banco Nacional de Costa Rica.

h. Traded Inputs

See Appendix A.

i. Income Tax

LAICA is exempt from both sales and income tax, but producers and the mills are required to pay it.

j. Public Expenditures

Sugarcane research and extension is carried out by the Directorate of Sugarcane Research and Extension (DIECA). Table S.8 presents DIECA's annual expenditure for the period 1984/85-1990/91; as well as funds transferred to organizations of sugarcane producers.

Table S.8. Public expenditures in the sugarcane sector,
1985-91

Year	Research & exten- sion a/	Producer Organiz- ations b/	Total
..... Mill Colones			
1985	15.9	n.a.	15.9
1986	16.1	n.a.	16.1
1987	20.1	n.a.	20.1
1988	24.6	14.6	39.2
1989	26.2	9.7	35.9
1990	29.2	11.5	40.7
1991	41.6	19.4	61.0

a/ Budget of DIECA, the sugarcane research and extension directorate.

b/ Contributions to Federacion de Camaras and Camaras de Productores. These averaged 0.196% of domestic value of the zafra during 1987/88-1989/90. We used the same proportion for 1990/91.

n.a. = not available

Source: Epto. Crédito Rural, Banco Nacional de Costa Rica.

III. MARKETING

A. EXPORTS

k. Exporters and Exports

The country exports about 30% of total production through LAICA (Table S.9), which owns its own port facility at Punta Morales, on the Pacific Coast, through which almost all sugar and alcohol is exported. At this location, it owns a warehouse with capacity for 80,000 tons of sugar. Exports are to the U.S. (sugar and alcohol) and to the international markets:

United States: Costa Rica participates in the U.S quota system, by complying with USDA's allocation. In 1982, Costa Rica was awarded a quota equivalent to 1.5% of total U.S. imports; and in 1983, when Nicaragua's quota was reduced, Costa Rica was granted 32% of Nicaragua's. Between Jan/89 and Sept/90 USDA modified the quota 5 times, the last of which took away the proportion of Nicaragua's quota that was being filled by Costa Rica (Table S.10).

International: The rest of Costa Rica's exports goes to the international market. In 1989/90, for example, 83% of total exports went to this market (Table S.10).

l. Internal Transport

Sugarcane is transported from the farms to the sugar mills located in each of the regions. There is almost no transfer of sugarcane to mills in other regions (would be too costly). Once processed, at regional mills, the resulting sugar is transferred to LAICA's warehouses, which are also strategically located in each region. The mills in Guanacaste, which are closest to Punta Morales, are generally instructed to process sugar for exports. Thus exported sugar is mainly transported by LAICA from its warehouses in Guanacaste to Punta Morales, and the costs are considered part of LAICA's marketing cost.

m. Port of Embarkation and Country of Destiny

Almost all sugar is exported from LAICA's facilities at Punta Morales on the Pacific. Table S.11 shows the countries of destiny of Costa Rica's sugar export. The principal buyers are the United States and the former USSR.

Table S.9. Sugar: production, consumption and exports,
1979/80-1990/91 a/

Zafra	Production (000 t)	Domestic Consumption (000 t)	Exports Total (000 t)	Alcohol (000 t)	Exports as percent of prod. (%)
1979/80	190	127	80	0	42.1
1980/81	190	128	75	0	39.6
1981/82 c/	182	133	44	0	24.4
1982/83	200	130	64	0	32.2
1983/84	241	135	88	0	36.5
1984/85	236	142	46	18	19.7
1985/86	240	153	76	34	31.7
1986/87	217	155	76	2	35.0
1987/88	225	158	58	20	25.9
1988/89	210	158	45	0	21.6
1989/90	230	165	68	0	29.5
1990/91	259	167	98	10	37.8

a/ Differences between production and total use are
accounted for by changes in stocks.

b/ In white sugar equivalent.

c/ 10,000 t were imported in 1981/82.

Source: LAICA

Table S.10. Costa Rica: Sugar exports by markets
(1982/83-1990/91)

Zafra	Total exports (t)	U.S. Prefer. market (t)	World market (t)	U.S Pref. as prop. of total (%)
1982/83	64,408	38,102	26,306	59.2
1983/84	68,204	56,623	31,581	64.2
1984/85	46,498	40,670	5,828	87.5
1985/86	76,155	29,069	47,086	38.2
1986/87	76,000	15,951	60,049	21.0
1987/88 a/	58,367	17,761	40,606	30.4
1988/89 b/	45,302	38,469	6,833	84.9
1989/90	67,884	11,290	56,594	16.6
1990/91	88,222	25,383	62,839	28.8

a/ LAICA also reports 11,099

b/ LAICA also reports 11,193.

Source: LAICA

Table S.11. Countries of destiny of Costa Rica's sugar export, zafras 1987/88-1989/90

Country	1987/88 (t)	1988/89 (t)	1989/90 (t)
Preferential			
U.S.A. a/	32,864	23,802	47,534
World			
Russia	25,503	21,500	
Mexico			14,000
Trinidad and Tobago			3,000
Nicaragua			3,250
Switzerland b/			100
Total	58,367	45,302	67,884

a/ Includes in-bond sugar for next period.

b/ Raw sugar exported directly by Cooperativa Victoria.

Source: LAICA

n. Export Taxes and Other Barriers

Because of the monopoly, exports are quantitatively restricted, with the interest of satisfying domestic demand at fixed consumer prices. Sugar imports have also been restricted. Until 1986 a tax of 3% and an export right of 1% were fixed. The municipality of Puntarenas collects a small export tax.

o. Export Costs and Prices

According to LAICA's reports, export costs averaged US\$ 22/t in 1989/90 and US\$ 10.6/t in 1990/91 (Table S.12).

Table S.12. Fooled prices and costs of sugar exports,
1979/80-1990/91, in U.S.\$/t

Zafra	FOB price	Premium & polariz. bonus	FOB value	Export costs	Net price
1979/80	541.4	11.0	552.4	29.0	523.4
1980/81	624.6	12.8	637.4	31.6	605.8
1981/82	301.2	1.0	302.2	29.4	272.8
1982/83	464.0	5.0	469.0	28.0	441.0
1983/84	344.8	9.8	354.6	30.2	324.4
1984/85	257.8	8.6	266.4	21.4	245.0
1985/86	208.0	5.4	213.4	11.0	202.4
1986/87	247.6	5.2	252.8	13.0	239.8
1987/88	301.0	6.6	307.6	14.4	293.2
1988/89	347.0	7.6	354.6	15.6	339.0
1989/90	378.0	10.8	388.8	22.0	366.8
1990/91	282.0	8.2	290.2	10.6	279.6

Source: LAICA

B. Domestic Consumption

p. Proportion Consumed Domestically

Table S.13 presents total domestic consumption in terms of white and raw sugar, for the period 1979/80-1990-91; Table S.14 presents average yearly consumption of white sugar on a regional basis, for the period 1984/85-1989/90; and Table S.15 presents average yearly consumption, for 1988/89-1989/90, according to uses and users.

Table S.13. Costa Rica: Domestic consumption of sugar, 1979/80-1990/91

Zafra	White a/ sugar 99.5'Pol (t)	Raw b/ sugar 96'Pol (t)
1979/80	126,820	136,470
1980/81	128,362	138,129
1981/82	132,548	142,634
1982/83	129,777	139,652
1983/84	135,289	145,583
1984/85	142,253	153,077
1985/86	153,280	164,943
1986/87	154,665	166,433
1987/88	157,570	169,559
1988/89	157,625	169,619
1989/90	164,683	177,213
1990/91	167,116	179,832

a/ Mostly white or white equivalent.

b/ Obtained by multiplying white sugar times 1.07609.

Source: LAICA.

Table 5.14. Domestic consumption by warehouses and regions, average for 1984/85-1989/90

Warehouse and region	Average of 1984/85-1989/90 (t)	Percentage (2)
CENTRAL a/	115,174	74.3
Alajuela	11,147	
Cartago	9,747	
La Uruca	87,103	
Victoria	12	
San Gerardo	178	
Naranjo	6,986	
CENTRAL PACIFIC	6,432	4.1
Puntarenas	4,340	
Punta Morales	2,013	
San Ramon	77	
NORTH PACIFIC	8,234	5.3
Liberia	8,234	
SOUTH PACIFIC	11,944	7.7
San Isidro	11,944	
NORTHERN	3,804	2.5
Quebrada Azul	3,804	
ATLANTIC	9,426	6.1
Turrialba	4,715	
Limon	4,711	
Total	155,613	100.0

a/ Central includes all locations in Central Valley.

Source: LAICA.

Table S.15. Costa Rica: Domestic sugar consumption, by activity, average of zafras 1988/89 and 1989/90, in tons

Activity	Zafra				Total (t)
	White sugar (t)	Refined		Total (t)	
		Indus- trial (t)	Domes- tic (t)		
Direct consumption	113,958	151	2,275	2,426	116,385
Coffee toasters	6,000	1	0	1	6,001
Bakeries	2,364	65	4	69	2,433
Confectioneries	9,219	1,194	3	1,196	10,415
Pharmaceuticals	431	233	1	233	665
Beer and liquors	153	205	1	205	359
Sauces	521	20	1	20	541
Gelatin	1,069	28	0	28	1,096
Juices, Syrups	428	366	0	366	794
Soft drinks	14,080	383	0	383	14,464
Children food & Ice cream	3,867	639	0	639	4,506
Base for soft drinks	2,098	452	0	452	2,550
Hotels and restaurants	35	0	0	0	35
Animal feed	1	0	0	0	1
Other	21	0	0	0	21
Total	154,245	3,737	2,284	6,021	160,265

Source: LAICA.

q. Marketing and Consumption

Marketing is done by LAICA, who sells to wholesalers, retailers and consumers, at prices fixed by the Ministry of Economy, Industry and Commerce (MEIC). Consumption by region is presented in Table S.14.

r. Marketing Costs and Storage Requirements

In 1990 LAICA had the capacity to store 92,000 tons, which means that in a year it could store up to 165,600 tons. The warehouses are located in Alajuela, Naranjo, La Uruca (busiest), San Carlos, San Isidro, Turrialba, Liberia,

Cartago, Punta Morales (for export), Puntarenas and Limón. Storage costs at these warehouses are included in the marketing costs that are deducted from total receipts. Table S.16 shows the marketing costs incurred by LAICA during 1987/88-1989/90. These costs averaged 14% of the total value of the zafra during the period.

Table S.16. Sugar: Income, expenditures and farm price, zafras 1987/88-1989/90 (millions of colons)

	1987/88	1988/89	1989/90
Value of zafra	5,532.1	6,583.5	7,514.1
White sugar	3,882.7	5,172.5	5,830.8
Raw sugar	1,274.6	1,331.4	1,663.1
Alcohol	374.9	1.6	0.0
Forward sales	0.0	78.0	20.1
Less: Appropriations and Retentions (taxes) a/	82.5	69.9	70.2
Less: Marketing costs	851.7	912.9	983.4
Plus: Value of melaza	292.9	311.4	395.4
Plus: Value extra-quota b/	0.0	0.0	550.1
Total Value at Mills	4,890.8	5,912.2	7,406.2
Millers share (37.5%)	1,834.1	2,217.1	2,777.3
Farmers share (62.5%)	3,056.8	3,695.1	4,628.9
Tons of cane (thousands)	2,479.5	2,193.3	2,436.7
Farm price per ton cane	1,232.8	1,684.7	1,859.6

a/ Payments to Cámara de Azucareros, Federación de Cámaras and Cámaras de Productores, Plan Vial, and Capital to LAICA. These are all taxes.

b/ Value of sugar produced over and above the quota assigned to each sugar mill. This is produced and sold at their own risk.

Source: LAICA

s. Price Controls and Other Forms of Intervention

The MEIC fixes the prices LAICA sells to wholesalers, retailers and consumers, as well as the wholesale and retail margins. Table S.17 presents a history of the domestic prices fixed during 1979/80-1990/91.

Table S.17. Domestic sugar prices fixed
by the government, ¢/kg. 1979/80-1990/91

Year	Date	LAICA Price a/	Consumer Price b/
1979/80	25/02/80	3.44	4.00
1980/81	01/06/81	4.25	4.95
1981/82	05/10/81	5.84	6.80
1982/83	16/02/82	8.17	9.50
1983/84	20/08/82	14.30	16.50
1984/85	12/04/83	17.43	20.50
1985/86	15/01/85	20.08	23.50
1986/87	23/07/86	22.90	26.80
1987/88	19/01/88	26.06	30.50
1988/89	16/12/88	30.40	35.50
1988/89	07/08/89	33.03	38.65
1989/90	06/08/90	36.16	42.30
1990/91	18/01/91	44.00	51.25

a/ Sold only in 50 kg bags.

Source: LAICA

t. Taxes

LAICA pays municipal taxes, and producers are not exempt from income taxes. There is no sales tax on sugar.

C. PRICING MECHANISM AND PRODUCER PRICES

Under the current marketing arrangement, producers (integrated with mills and independent) deliver their sugarcane to the mills for processing. The mills process the cane and deliver the sugar to LAICA, for which they receive an advance (partial payment). The mills, in turn, periodically pay the farmers advances on the cane delivered. At the end of the sugar year, LAICA determines the zafra's total value, according to the different products sold in each market (white sugar, raw sugar, alcohol and melaza, in the domestic, U.S. preferential and world markets). From this they deduct a number of taxes to different institutions and payments to LAICA, to obtain the value of the zafra at the sugar mill level. The value of the melaza (Table S.18) is then added to obtain the total revenue to be distributed among the mills and cane producers. By law, the mills receive 37.5% of this total, and farmers 62.5%. This implies that the cost of industrializing the cane is 37.5% of the receipts. This can be construed as a distortion, but it will not be addressed in our calculations. We will take the 37.5% as the valid processing cost. The remaining 62.5% is then divided by the total tonnage of sugarcane delivered to obtain the farmer's price per ton of cane.

Table S.18. Costa Rica: Value of melaza, zafra of 1983/84-1990/91

Zafra	Sugar cane milled (000 t)	Yield of melaza kg /t cane	Total produc. of melaza (t)	Price of melaza	Total value of melaza mill
1983/84	2,618	35.8	93,632	n.a.	n.a.
1984/85	2,343	36.1	84,506	n.a.	n.a.
1985/86	2,484	28.3	70,266	n.a.	n.a.
1986/87	2,357	36.6	86,320	n.a.	n.a.
1987/88	2,480	43.3	107,397	2,727	292.9
1988/89	2,193	39.6	86,848	3,586	311.4
1989/90	2,437	40.6	99,029	3,750	371.4
1990/91	2,629	41.3	108,583	5,354	581.3

n.a. = not available

Source: LAICA

IV. METHODOLOGY

Nominal Protection

Value of the Zafra. Is the total value of all the products obtained from the sugarcane delivered to the mills by producers. Is the sum of the revenues from the different products in the various markets. We estimated the total value of the zafra by assuming that there are two international markets: the U.S. preferential and the world; and that in the absence of domestic distortions, Costa Rica would meet the quota in the U.S. preferential market and have the opportunity to sell the rest on the open world market. We thus valued the quota amount at the preferential prices and the rest at world prices. The sum of these two quantities provides the border value of the zafra (see Table S.19).

Marketing Costs. These are all the costs incurred by LAICA to market the whole zafra, both in the domestic and export markets. They include transport, storage, management, capital outlays, labor, etc. These can be considered wholesaling, retailing and exporting costs. Total marketing cost for each zafra of the period 1987/88-1989/90 is reported by LAICA. In this study we took the average percentage reported for the three zafras (14%) and applied it to the rest of the period, including 1990/91.

Value of Melaza. The total values of the melaza obtained from the 1987/88-1989/90 zafras were reported by LAICA. This represented roughly 5% of the value of the zafra without melaza. We thus used this 5% of the value of the zafra as the approximate value of the melaza for the rest of the period.

Effective Protection

We took the traded inputs listed in the "avíos" used for loans to sugarcane producers, for operating the plantation, and adjusted the costs for tariffs and other taxes, in order to obtain their domestic and border values (Table S.20). We then subtracted the value of inputs (costs) per ton of sugarcane from the value of the sugarcane itself to obtain domestic and border value added at the farm level. The effective protection coefficients are equivalent to the division of domestic and border value added.

Table S.19. Costa Rica: Border value of the zafra, in raw sugar equivalent, 1979/80-1990/91

Zafra	Prod. raw sugar equiv. (000 t)	Exports US Preferential 1/ (t)	Difference (t)	Avg. price US Preferential \$/t	Average price world market \$/t	Value of export US Pref. 000 \$	Value of rest at world prices 000 \$	Total value of zafra (border) 000 \$
1979/80	190.7	n.a.	n.a.	643.6	612.1	n.a.	n.a.	n.a.
1980/81	193.4	n.a.	n.a.	427.4	354.7	n.a.	n.a.	n.a.
1981/82	185.6	n.a.	n.a.	401.0	164.7	n.a.	n.a.	n.a.
1982/83	204.4	38,102	166,263	465.8	166.2	17,746	27,639	45,386
1983/84	245.9	56,623	189,301	459.1	94.8	25,998	17,951	43,950
1984/85	240.3	40,670	199,675	426.3	69.5	17,419	13,862	31,301
1985/86	245.3	29,069	216,218	441.7	113.3	12,841	24,507	37,347
1986/87	221.6	15,951	205,614	461.1	130.1	7,356	26,749	34,104
1987/88	230.5	17,761	212,775	467.5	204.6	8,304	43,531	51,835
1988/89	215.1	38,469	176,674	482.7	261.9	18,570	46,269	64,840
1989/90	235.5	11,290	224,171	492.9	256.6	5,565	57,523	63,087
1990/91	265.3	25,384	239,916	456.9	227.0	11,598	54,468	66,067

n.a. = not available

1/ U.S. preferential and world prices reported by OAS, Department of Economic and social affairs. We took the reported price for each calendar year as if for the zafra of that year; and deducted US\$20/t for freight to international markets.

Table 20. Summary of value of traded inputs at domestic and border prices (C/t), 1981/1991

Year	At domestic	At border protection	Average
1981	40	36	1.10
1982	86	61	1.09
1983	145	123	1.22
1984	ERR	ERR	ERR
1985	155	132	1.18
1986	168	135	1.24
1987	184	152	1.22
1988	210	181	1.16
1989	233	197	1.18
1990	224	199	1.12
1991	276	21	1.08

Producer Subsidy Equivalent

Credit. In order to estimate the subsidy equivalent from cheaper credit, we used the credit amounts reported by the Central Bank and the interest rate reported for agricultural loans. The rates were then compared to the rates reported for "other activities" in order to determine the subsidy. Since the total credit was reported as the cumulative amounts disbursed throughout the year, we used a loan period of one year.

Consumer Subsidy Equivalent

This subsidy (or rather tax) had two components: the subsidy from the marketing policy of the government and the subsidy that results from exemption of the sales tax. The first category was estimated by multiplying the difference between the domestic price of sugar (fixed by the government) and the border price estimated by us times the total amount of sugar consumed. The percentage CSE was obtained by dividing the sum of the effects by the total value of the sugar consumed, at domestic prices. Table S.21 illustrates the estimation of the first component.

V. INDICES

Table S.21 presents estimates of nominal protection for the zafras of 1979/80-1990/91. Table S.22 presents the effective protection coefficients. Table S.23 shows the estimates of producer subsidy equivalents, and Table S.24 the consumer subsidy equivalents.

Table S.21. Nominal protection coefficients for sugarcane

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Value of zafra (000 \$)	n.a.	n.a.	n.a.	45,386	43,950	31,301	37,347	34,104	51,835	64,840	63,087	66,067 a
Exchange rate	9.6	21.5	38.6	41.1	44.8	50.8	56.3	63.2	76.3	82.1	91.6	112.9 b
Value of zafra (mill ¢)	n.a.	n.a.	n.a.	1,868	1,969	1,589	2,104	2,155	3,955	5,320	5,781	7,458 c=(a*b)/1000
Less: Marketing Costs (mill Colones)	n.a.	n.a.	n.a.	261	276	222	295	302	852	913	983	1,044 d
Plus: Value of Melaza (mill Colones)	n.a.	n.a.	n.a.	93	98	79	105	108	293	311	395	581 e
Total Value at Mills (mill Colones)	n.a.	n.a.	n.a.	1,700	1,792	1,446	1,915	1,961	3,396	4,719	5,193	6,995 f = c-d+e
Farmers share (62.5%)	n.a.	n.a.	n.a.	1,062	1,120	904	1,197	1,226	2,122	2,949	3,246	4,372 g = .625*f
Tons of Cane (thousands)	2,199	2,204	2,129	2,226	2,618	2,343	2,484	2,357	2,480	2,193	2,437	2,629 h
Border farm price/t of cane	n.a.	n.a.	n.e.	477	428	386	482	520	856	1,345	1,332	1,663 i = (g/h)*1000
Domestic farm price/t of cane	182	296	498	868	840	894	968	1,073	1,233	1,685	1,901	2,341 j
NPC (domestic/border)	n.a.	n.a.	n.a.	1.82	1.96	2.32	2.01	2.06	1.44	1.25	1.43	1.41 k = j/i

n.a. = not available

Source: LAICA.

Table S.22. Effective protection coefficients for sugarcane, 1982/83-1990/91

	1979/80	1980/81	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
Domestic farm price/t of cane	182	296	498	868	840	714	968	1,073	1,233	1,685	1,901	2,341
Value of traded inputs at domestic prices	ERR	40	88	149	ERR	155	168	184	210	233	224	276
Value added at domestic prices	182	256	409	719	ERR	738	800	888	1,023	1,452	1,677	2,064
Border farm price/t of cane	n.a.	n.a.	n.a.	477	428	386	482	520	856	1,345	1,332	1,663
Value of traded inputs at domestic prices	ERR	36	81	123	ERR	132	135	152	181	197	199	256
Value added at domestic prices	n.a.	n.a.	n.a.	354	ERR	254	347	368	675	1,148	1,132	1,407
EPC Effective Protection Coefficient	n.a.	n.a.	n.a.	2.0	ERR	2.9	2.3	2.4	1.5	1.3	1.5	1.5

n.a. = not available

Table S.23. Total subsidy equivalent to sugarcane growers, 1985-91

Year	Q.R.'s 1/ subsidy equiv. (Mill Col)	Credit subsidy equiv. Mill Col	Public expend. Mill Col	Total subsidy equiv. Mill Col	Domestic value of product 2/ Mill Col	Percent PSE (%)
1985	1,243.3	23.3	15.9	1,282.5	2,188.7	58.6
1986	1,208.5	24.7	16.1	1,249.3	2,406.2	51.9
1987	1,303.0	14.3	20.1	1,337.4	2,528.7	52.9
1988	934.8	26.8	39.2	1,000.8	3,057.3	32.7
1989	745.7	20.0	35.9	801.6	3,695.7	21.7
1990	1,386.5	17.6	41.1	1,445.3	4,632.2	31.2
1991	1,713.8	16.1	61.0	1,790.9	6,153.6	29.1

1/ Obtained by multiplying total cane processed by the difference between domestic and border farm price.

for agriculture (the large producer case).

2/ We multiplied total cane by the domestic price paid.

Source: LAICA, DIECA, National Bank of C.R.

Table 24. Sugar: Consumer Subsidy from market intervention

Year	Prod. raw sugar equiv. (000 t)	Total value at border prices (000 \$)	Total value at border prices Col/t	Domestic price fixed by govern. Col/t	Domestic consump. raw sugar equiv. (000 t)	CSE Mill Col
1983	204.4	45,386	9,128	16,521	130	-959
1984	245.9	43,950	8,006	17,432	135	-1,275
1985	240.3	31,301	6,616	20,078	142	-1,915
1986	245.3	37,347	8,572	21,488	153	-1,980
1987	221.6	34,104	9,728	22,898	155	-2,037
1988	230.5	51,835	17,156	26,060	158	-1,403
1989	215.1	64,840	24,743	31,717	158	-1,099
1990	235.5	63,087	24,542	34,596	165	-1,656
1991	265.3	66,067	28,113	44,000	167	-2,653

Table 5.25. Sugar: Consumer subsidy equivalent, 1983-1991

Year	CSE from market policy Mill Col	Subsidy from sales tax Mill Col	Total CSE Mill Col	Percent CSE
1983	-959.4	214.4	-745.0	-34.8
1984	-1,275.2	235.8	-1,039.4	-44.1
1985	-1,515.0	285.6	-1,629.4	-57.0
1986	-1,979.7	329.4	-1,650.4	-50.1
1987	-2,036.9	354.2	-1,682.8	-47.5
1988	-1,403.1	410.6	- 992.4	-24.2
1989	-1,099.2	499.9	-599.2	-12.0
1990	-1,656.6	569.7	-1,085.9	-19.1
1991	-2,653.2	955.2	-1,698.0	-23.1

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BANANA

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I. PRODUCTION

a. Area, Production, Yields

Table A.1 presents area, production and yields for the period 1980-90.

Table A.1. Banana: Area, production and yield, 1980-90

Year	Area (ha) ¹	Production (000 t)	Yield (t/ha)	Prod. mill boxes ²	Yield (b/ha) ³
1980	25,822	887.6	34.4	48.9	1,895
1981	26,727	931.4	34.8	51.3	1,921
1982	27,401	919.0	33.5	50.7	1,849
1983	26,497	946.9	35.7	52.2	1,970
1984	24,061	937.5	39.0	51.7	2,148
1985	20,539	803.6	39.1	44.3	2,157
1986	20,291	882.3	43.5	48.6	2,397
1987	20,987	942.6	44.9	52.0	2,476
1988	22,022	1,026.7	46.6	56.6	2,570
1989	24,723	1,224.9	49.5	67.5	2,731
1990	28,297	1,344.9	47.5	74.1	2,620

¹ Weighted average because new area coming into production at different times during the year.

² Boxes of 18.14 Kg.

³ Boxes per hectare.

Source: CORBANA, Informe Anual 1990.

b. Production by Regions

Most of the banana (about 98%) is produced along the Atlantic Coast, from Sarapiquí in the Northern most portion to Sixaola, at the border with Panama; the rest is produced along the Southern Pacific coast (Table A.2.).

Table A.2. Banana: Production by region in 1989-90 (000 boxes)

Region	1989	(%)	1990	(%)
Atlantic	66,640	98.7	72,973	98.4
Pococi	20,540	30.4	19,943	26.9
Siquirres	14,488	21.5	16,449	22.2
Matina	9,233	13.7	12,164	16.4
Limón	8,533	12.6	8,819	11.9
Guácimo	5,854	8.7	7,025	9.5
Sarapiquí	4,646	6.9	4,408	5.9
Talamanca	3,346	5.0	4,165	5.6
Pacific	879	1.3	1,166	1.6
Corredores	628	0.9	869	1.2
Golfito	251	0.4	297	0.4
Total	67,519	100.0	74,139	100.0

Source: CORBANA, Sección de Estadísticas

c. Seasonality

Given that production occurs throughout the year, there is no seasonality in the production of bananas but, because of fluctuations in demand in the United States and Europe, there is in sales. Sales increase during the winter months in the north.

d. Type of Producers (Farm Size)

Although some farms are as small as 40 hectares, most of the production occurs on plantations of 100 hectares or more. There are two types of producers: local large farmers or enterprises (about 40%) and transnationals (about 60%).

e. Production Systems and Technological Levels

There is basically one technological level in the production of bananas. This is why the National Banana Corporation (CORBANA), a public entity, and others developed a model for a 250-hectares farm and uses it for estimating costs of production and for fixing minimum producer prices.

II. PRODUCTION INCENTIVES

f. Guaranteed or Administered Prices and Other Incentives

In 1974, through law N°5515, the government began fixing minimum FOB at port producer prices. These are presented in Table A.3.

Besides setting a minimum price, because of natural disasters, plantations abandonment, faltering infrastructure and low productivity and profitability, the government instituted a series of producer incentives during the 1980s to stimulate the activity, thus reversing the negative trends. A brief description of each follows (See Table A.4.).

Area Rehabilitation. This incentive went to producers who decided to improve their farms through investment in infrastructure and other rehabilitating activities. For the first 8 years of production on the rehabilitated farms (or areas of farms) producers received US\$0.30 per box exported, over and above the fixed FOB price, as long as the yields were of at least 2.200 boxes/ha.

Efficient Producer. During 1980-84 producers received a bonus if their yields were of at least 2.000 boxes/ha/year. The bonus was on each box above the 2,000/ha average. Today productivity is about 2.600 boxes/ha/year.

Area Expansion. This incentive, which was virtually eliminated in 1987 when the area restitution plan began, went to producers planting new farms or expanding old ones. They received US\$0.30 per box of banana exported from those farms or areas.

Table A.3. Banana: Minimum FOB producer prices fixed by the government (US\$ per box)

Year	Grade one	Grade two
1980	3.33	2.33
1981	3.40	2.40
1982	3.40	2.40
1983	3.40	2.40
1984	3.40	2.40
1985	3.40	2.40
1985	3.55	2.55 a/
1986	3.85	2.85
1987	3.90	2.90
1988	3.94	2.94
1989	3.97	2.97 b/
1989	4.34	3.34 c/
1990	4.34	3.34
1991	4.29	3.29 d/
1991	5.29	4.29 e/

a/ Fixed 12/31/85.

b/ Fixed 06/30/89.

c/ Fixed 12/31/89.

d/ Fixed 04/03/91.

e/ Fixed 04/04/91.

Source: CORBANA

Table A.4. Banana: Producer incentives and public expenditures,
1980-90 (000 dollars)

Year	AR	EP	AE	I	FA	FC	PL	A.REST	TOTAL
1980	346	87	632	695	83	3,536	2,172	0	7,551
1981	24	24	1,714	89	0	1,530	10,953	0	14,334
1982	26	8	2,108	62	0	668	11,948	0	14,820
1983	20	2	2,796	50	22	1,599	9,124	0	13,613
1984	7	9	3,072	0	0	882	11,263	0	15,233
1985	0	0	2,805	0	0	671	7,865	0	11,341
1986	0	0	1,125	0	0	0	0	0	1,125
1987	0	0	706	0	0	0	0	464	1,170
1988	0	0	355	0	0	0	0	1,396	1,751
1989	0	1	13	0	0	0	0	3,235	3,249
1990	0	105	49	0	0	0	0	5,423	5,577

AR = Area Rehabilitation
 EP = Efficient Producer
 AE = Area Expansion
 I = Infrastructure
 FA = Fund Administration
 FC = Funds to CORBANA
 PC = Price Compensation
 A.REST = Area Restitution

Source: CORBANA, Informe Anual, 1990

Fund Administration. CORBANA used small portions of the area rehabilitation fund for this purpose.

Price Compensation. During 1980-85, when the fixed prices did not seem to cover production costs, the government returned a certain portion of the export tax to producers. After 1985, the fixed prices were acceptable (seemed to cover costs) and the program was canceled.

Area Restitution. This incentive substituted the area rehabilitation program. Under this scheme producers received US\$ 0.30 per box exported from all areas under restitution. Almost all farms or companies have areas that qualify for this incentive.

g. Credit

Banana production demands high investment capital which the producers obtain from national and international sources (especially the transnationals), mostly at commercial rates. CORBANA, however, provides, at times, short term credit at rates 5 points above the basic rate. The information on total credit from each source was unavailable to us, except for the credit from the national banking system in 1991. That year the activity received ₡5,318.7 million at an interest rate of 37%. The average commercial rate was 39.8%. Thus, the subsidy equivalent was ₡148.9 million.

h. Traded Inputs

See Appendix A.

i. Income Tax

There is no indication that banana producers are exempt from paying income taxes.

j. Public Expenditures

Public expenditures, which are specified in Table A.4, include infrastructure and contributions to CORBANA. Infrastructure. These are funds that the state spends (out of export taxes collected) to build and rehabilitate roads, bridges, ditches for the benefit of farms located in different areas or facing different infrastructural problems. Contributions to CORBANA. Until 1985 the government contributed to CORBANA (the National Banana Corporation, previously association, a semi-public institution, which oversees and directs the industry) US\$ 0.06 per box exported. But because of delays, the system was changed in 1986 and the farmers began to finance CORBANA with US\$ 0.05 per box exported. During 1986-90 no funds were disbursed by the central government for infrastructure of to CORBANA.

III. MARKETING

k. Exports and Exporters

Costa Rica exports about 99% of all commercial banana produced. Table A.5 presents the evolution of exports during the period 1980-90.

Table A.5. Costa Rica: Banana exports, 1980-1990

Year	Volume mill boxes a/	Volume (000) tons	Value mill US\$ b/	Average ¹ FOB price \$/box	Average FOB price \$/Kg
1980	48.9	887.5	183.1	3.74	0.21
1981	51.3	931.4	220.4	4.29	0.24
1982	50.7	919.0	171.2	3.38	0.19
1983	52.2	946.9	175.3	3.36	0.19
1984	51.7	937.5	176.2	3.41	0.19
1985	44.3	803.6	149.6	3.38	0.19
1986	48.6	882.3	184.2	3.79	0.21
1987	52.0	942.5	199.0	3.83	0.21
1988	56.6	1,026.7	219.6	3.88	0.21
1989	67.5	1,224.8	278.2	4.12	0.23
1990	74.1	1,344.9	315.8	4.26	0.23

a/ Boxes of 18.14 Kg.

b/ Based on FOB price.

¹ These are average actual prices for both classes and thus are different from those presented in Table A.3

Source: CORBANA, Informe anual de 1990.

Although in recent years some banana have been exported directly to foreign markets, the tradition is that almost all of the product is sold to transnational marketing firms on an FOB, on ship, basis. Table A.6 shows the quantities of banana sold to the different firms. It should be noted that some of these firms also produce fruit of their own.

Table A.6. Costa Rica: Banana exports by marketing firms, 1980/85-90 (000 boxes)

Marketing firms	1980-85	1986	1987	1988	1989	1990	Average	Percent
Cia Banan.	47,260	839	792	969	879	0	4,613	8.5
BANDECO	100,601	19,982	20,858	22,713	25,456	24,493	19,464	35.8
COBAL †	31,560	6,389	5,840	6,701	7,095	9,530	6,101	11.2
Chiriqui	12,265	3,026	3,122	2,497	2,750	3,134	2,436	4.5
Standard	104,871	18,268	21,107	21,839	24,387	26,671	19,740	36.3
BACORI	0	0	0	0	6,173	6,805	1,362	2.5
UNIBAN	0	0	0	0	764	1,206	179	0.3
Others	2,556	133	239	1,678	12	300	465	0.9
Total	299,113	46,637	51,958	56,597	67,518	74,139	54,360	100

† Compañía Bananera del Atlántico; used to be United Fruit Co.

Source: CORBANA, Informe Anual 1990.

1. Internal Transport

Internal transport from farms to ports, which is done in containers, mostly refrigerated, is paid by the farmer. Specialized transport companies, trusted by the transnationals, provide this service. During October 1991 the rate was about \$22/box.

Once the fruit is cut and boxed it must be refrigerated within 48 hours. The marketing firm can keep the banana for several days in refrigerated containers while awaiting a ship. When this happens, the cost is borne by the marketing firm, not the producer.

m. Port of Embarkation and Country of Destiny

Table A.7, which presents exports by ports of Costa Rica and Panama, shows that most of Costa Rica's banana (86%) is exported through port Limón, on the atlantic coast; and Table A.8, which presents exports by country of destiny, shows that the major markets are the United States (55% on average) and Germany (29%).

n. Export Taxes and Other Barriers

Producers and multinational marketing firms together are required to pay a number of taxes that, at times, significantly lowers the net price received by producers. These are:

The Bunch Tax. Is a US\$0.02 per bunch that the farmers

must pay, and that is deducted from the FOB price set by the government. Now, since each bunch yields about 1.2 boxes of 18.14 Kg, the tax amounts to about US\$0.0167 per box (Table A.9). The proceeds from this tax goes to the different municipal governments in the cantons where the banana is produced.

Ad-valorem Tax. This is 1% of the FOB price, and is paid by the producer.

Surcharge (Exchange Differential). Only during 1982/83, when the exchange rate fluctuated widely. Was to cover exchange risks, and was paid by the farmer.

Export Tax. This direct tax is paid by the multinational marketing firm, and does not affect the fixed FOB producer price. However, it can be argued that without the tax, producers could be paid more. The tax varies very much; in 1990 it went from US\$0.15/box to US\$0.22/box on March 14, then on September 3 it went up to US\$0.50 (supposedly temporary, of which US\$0.08 was earmarked for expanding port facilities); it was still US\$0.50 in November 1991. The average rate is presented in Table A.9.

Table A.7. Banana: Exports according to port of embarkation (000 boxes)

Year	Limon	Golfito	Sixaola	Armuelles	Caldera	Total
1980	36,073	11,881	971	0	0	48,925
1981	39,920	10,279	1,144	0	0	51,343
1982	37,752	10,905	2,006	0	0	50,663
1983	41,122	8,314	2,763	0	0	52,199
1984	44,105	5,040	2,538	0	0	51,683
1985	40,617	841	2,843	0	0	44,301
1986	43,467	282	3,052	573	1,263	48,637
1987	47,100	0	3,122	792	944	51,958
1988	51,276	0	2,497	969	1,855	56,597
1989	61,479	0	2,750	879	2,410	67,518
1990	69,750	0	3,134	1,166	89	74,139
Average	46,606	4,322	2,438	398	596	54,360
Percent	85.7	8.0	4.5	0.7	1.1	100.0

Source: CORBANA, Informe Anual 1990.

Table A.8. Banana exports per country of destiny (000 boxes), 1980-90

Year	U.S.A.	Germany	Italy	Belgium	Sweden	Other a/	Total
1980	25,346	12,339	5,614	3,140	0	2,486	48,925
1981	28,272	15,054	4,145	2,211	57	1,604	51,343
1982	28,877	14,764	4,096	1,287	283	1,356	50,663
1983	30,732	14,443	4,251	969	473	1,331	52,199
1984	31,117	15,115	3,826	1,114	245	266	51,683
1985	27,358	14,062	1,275	1,016	492	98	44,301
1986	28,857	14,500	3,834	1,024	264	158	48,637
1987	29,533	17,545	2,628	1,300	610	342	51,958
1988	32,717	15,892	6,816	607	233	332	56,597
1989	35,158	18,371	8,340	4,722	199	728	67,518
1990	31,774	20,587	6,711	13,506	565	996	74,139
Average	29,976	15,697	4,685	2,809	311	882	54,360
Percent	55.1	28.9	8.6	5.2	0.6	1.6	100.0

a/ Others include Ireland (721) and Czechoslovakia (6) in 1989; and Portugal, France, England, Holland, Ireland and Poland, Yugoslavia, Greece and USSR in 1990.

Source: CORBANA, Informe Anual 1990

CORBANA tax. A tax of US\$ 0.05 per box is paid by each producer for the financing of CORBANA.

Ministry of Health tax. A tax of ¢1.5 per box is paid by producers to the Ministry of Health for administering a program in health and environment (Table A.9)

o. Export Costs

Given that the quoted producer price is for the fruit placed in the ship, beside transport to the port, the producer must cover all others costs incurred to place the product on the ship. These include labor, cartons, dock rights, delays at port, paper work. In 1991 these costs were estimated at \$0.13 for internal transport, \$0.25 for loading and port charges, \$0.02 for general expenses, and \$0.03 for other expenses. This summed to US\$0.43 per box. We assumed that this total, was the same for the previous years, in dollar terms.

Table A.9. Banana: export and other taxes, US\$ per box, 1980-91

Year	Export tax	Bunch tax	Ad-val. tax	Exch diff tax	Fee to COR-BANA	Contribution to diff funds	Min. of Health tax	Sub-total	Total
1980	0.80	0.02	0.04	0.00	0.00	0.00	0.00	0.05	0.85
1981	0.95	0.02	0.04	0.00	0.00	0.00	0.00	0.06	1.01
1982	0.95	0.02	0.03	0.17	0.00	0.00	0.00	0.22	1.17
1983	0.94	0.02	0.03	0.17	0.00	0.00	0.00	0.22	1.17
1984	0.70	0.02	0.03	0.00	0.00	0.00	0.00	0.05	0.75
1985	0.66	0.02	0.03	0.00	0.05	0.00	0.00	0.10	0.76
1986	0.27	0.02	0.04	0.00	0.05	0.00	0.00	0.10	0.37
1987	0.22	0.02	0.04	0.00	0.05	0.00	0.00	0.10	0.32
1988	0.18	0.02	0.04	0.00	0.05	0.00	0.00	0.10	0.28
1989	0.15	0.02	0.04	0.00	0.05	0.00	0.00	0.11	0.26
1990	0.30	0.02	0.04	0.00	0.05	0.03	0.02	0.16	0.46
1991	0.50	0.02	0.04	0.00	0.05	0.03	0.02	0.16	0.66

‡ Estimates based on previous years, except for export tax.
 Sub-total does not include export tax.

IV. METHODOLOGY

Nominal Protection

Border Prices. Border prices were estimated in two ways. First, we took the FOB, port fixed by the government and add the export tax paid by the marketing firm. The rationale is that farmers could receive a price higher in the amount of the tax paid to the government. Second, we took international prices, FOR, ports in USA, and deducted a US\$2.5 per box freight and insurance (as estimated by CORBANA) and a 2.5% return to the marketing firm, to arrive at FOB, Limón border price.

As international prices, we took FOR, USA, principal ports for 1986-91, reported by UPEB (Union of Banana Exporting Countries). For 1980-85 we used prices for bananas exported from Latin America, at U.S ports, as reported by IMF, Financial Statistics, Yearbook 1991. These, as well as the border prices are reported in Tables A.10 and A.11.

The return to the marketing firm was arrived at the following way. We subtracted the prices fixed by the government (FOB) and the freight rate (US\$2.5/box) from the FOR, U.S ports to obtain estimates of the return to the marketing firms. The lowest return was US\$0.18/box or 2.76% of the price. On this basis, and considering that the returns estimated this way are likely to be overstated, we decided to use 2.5% of the FOB price as the probable return.

Table A.10. Banana: Average border prices, FOB, port Limon, (US\$ per box), 1980-91.

Year	First border			Second border			
	Dom. fixed	Exp. tax	FOB border	FOR USA	Freight	Return to firm	FOB border
1980	3.74	0.80	4.54	6.93	2.50	0.17	4.25
1981	4.29	0.95	5.24	7.41	2.50	0.19	4.73
1982	3.38	0.95	4.33	6.92	2.50	0.17	4.25
1983	3.36	0.94	4.30	7.93	2.50	0.20	5.23
1984	3.41	0.70	4.11	6.85	2.50	0.17	4.15
1985	3.36	0.66	4.02	6.98	2.50	0.17	4.31
1986	3.79	0.27	4.06	6.80	2.50	0.17	4.13
1987	3.83	0.22	4.05	6.51	2.50	0.16	3.85
1988	3.88	0.18	4.06	8.16	2.50	0.20	5.45
1989	4.12	0.15	4.27	9.03	2.50	0.23	6.30
1990	4.26	0.30	4.56	8.88	2.50	0.22	6.16
1991	5.19	0.50	5.69	9.44	2.50	0.24	6.70

* Estimated as 90% of 5.29 and 10% of 4.29
Freight rates are based on estimates for 1990. Neer/ backdate

Table A.11. Banana: International prices, FOB ports USA, in US\$/box

Year	Months												
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Avg
1986	5.77	7.02	8.92	10.08	6.92	6.13	5.83	5.87	7.54	6.83	5.18	5.50	6.80
1987	6.80	7.53	7.46	5.82	7.77	6.30	7.26	5.76	5.98	4.41	6.80	6.25	6.51
1988	7.50	8.43	8.94	8.20	9.97	10.18	7.14	5.97	9.22	7.06	6.91	8.36	8.16
1989	6.87	8.29	11.53	11.96	10.74	8.62	7.16	9.34	8.34	8.83	8.57	8.05	9.03
‡ 1990	9.56	11.11	8.63	8.84	7.85	7.21	10.60	8.00	9.46	7.54	nd	nd	8.88
‡ 1991	9.44	10.69	13.68	11.85	9.45	12.13	7.47	7.19	6.55	5.90	nd	nd	9.44

‡ Note: nd means not available; and averages are of only 10 months
 Data for 1980-85 was unavailable.
 Source: UPEB.

Border farm price. To obtain the border farm price, we deducted total export costs borne by the producers, including transport to the port, from the border FOB (Table A.12).

Domestic Farm Price. From the FOB, port fixed by the government, we deducted export costs and the different taxes paid by farmers, and added the total incentives received by farmers, in US\$/box (Table A.13). For the latter, we divided total incentives by total boxes exported. It should be noted that this is not entirely correct, since all farmers did not receive these incentives, especially during 1990-91, when incentive were mostly for new areas. Nonetheless, most farms or companies seem to participate either with new areas or in other programs, when existed. Table A.14 presents the domestic farm price for 1980-90.

Table A.12. Banana: Border farm prices in Guapiles, US\$/box, 1980-1991

Year	FOB at port #1	FOB at port #2	Total export costs	Farm price #1	Farm price #2
1980	4.54	4.25	0.43	4.11	3.82
1981	5.24	4.73	0.43	4.81	4.30
1982	4.33	4.25	0.43	3.90	3.82
1983	4.30	5.23	0.43	3.87	4.80
1984	4.11	4.15	0.43	3.68	3.72
1985	4.02	4.31	0.43	3.59	3.88
1986	4.06	4.13	0.43	3.63	3.70
1987	4.05	3.85	0.43	3.62	3.42
1988	4.06	5.45	0.43	3.63	5.02
1989	4.27	4.30	0.40	3.87	5.90
1990	4.56	6.16	0.41	4.16	5.75
1991	5.69	6.70	0.43	5.26	6.27

Table A.13. Banana: Producer incentives, in (000) dollars and \$/box, 1980-1991

Year	Area rehab	Effic. producer	Area expansion	Price compen.	Area restit.	Total	Average per box
1980	346	87	715	2,172	0	3,320	0.07
1981	24	24	1,714	10,953	0	12,715	0.25
1982	26	8	2,108	11,948	0	14,090	0.28
1983	20	2	2,820	9,124	0	11,966	0.23
1984	7	9	3,072	11,263	0	14,352	0.28
1985	0	0	2,805	7,865	0	10,671	0.24
1986	0	0	1,125	0	14	1,139	0.02
1987	0	0	706	0	464	1,170	0.02
1988	0	0	355	0	1,396	1,751	0.03
1989	0	0	13	0	3,235	3,248	0.05
1990	0	0	41	0	5,423	5,464	0.07
1991							

Source: CORBANH, Informe Anual 1990.

Table A.14. Domestic farm price of banana in Guapiles, 1980-1991
(US\$/box)

Year	Domestic FOB Fort	Export costs	Taxes [§] subtotal	Producer incentiv	Net domest farm price
1980	3.74	0.43	0.05	0.07	3.33
1981	4.29	0.43	0.06	0.25	4.05
1982	3.38	0.43	0.22	0.28	3.01
1983	3.36	0.43	0.22	0.23	2.93
1984	3.41	0.43	0.05	0.28	3.21
1985	3.36	0.43	0.10	0.24	3.07
1986	3.79	0.43	0.10	0.02	3.28
1987	3.83	0.43	0.10	0.02	3.32
1988	3.88	0.43	0.10	0.03	3.38
1989	4.12	0.40	0.11	0.05	3.66
1990	4.26	0.41	0.16	0.07	3.77
§ 1991	5.19	0.43	ERR	ERR	ERR

§ Subtotal refer to all taxes paid, except export taxes, which are paid by the marketing firm.

Effective Protection

Data on use and cost of traded inputs was totally unavailable. CORBANA claim not to have such information, and we had no access to the model for a 250-hectare plantation. For 1990, we obtained a rough list of traded inputs from a banana technician and made adjustments as best we could. For the readily identifiable inputs which are listed in the tariff law, we followed the usual procedure. For the others, we approximated following general guidelines. It turned out that all inputs were adjusted as if the tariff level was 9.6%, the most common level for that year. For obvious reasons, we did not project the costs backwards to include more years.

Producer Subsidy Equivalent

This index was not estimated, since the data on credit was lacking, there is no reported public expenditure on research and extension (it is argued that banana research is undertaken by the multinational corporations) and there is no domestic consumption.

Consumer Subsidy Equivalent

This index cannot be calculated in this case, since the product is grown entirely for the export market.

V. INDICES

Table A.15 presents estimates of nominal protection coefficients for both versions of border prices. The figures show that the estimates are very similar except for the latter years, when substantial increases in the international price was not matched by similar increases in the minimum prices set by the government. Table A.16 presents the details of the estimation.

The EPC for 1990 was estimated as follows:

$$EPC1 = (3.75-2.03)/(4.13-1.85) = 0.75$$

$$EPC2 = (3.75-2.03)/(5.73-1.85) = 0.44$$

Where \$3.75 is the domestic farm price; \$2.03 is the cost of traded inputs at domestic prices; \$4.13 and 5.73 are the two estimates of border farm price; and \$1.85 is the cost of traded inputs at border prices (see Appendix A).

Table 15. Banana: Nominal protection coefficients 1980-90

Year	NPC 1	NPC 2
1980	0.81	0.87
1981	0.84	0.94
1982	0.77	0.79
1983	0.76	0.61
1984	0.87	0.86
1985	0.86	0.79
1986	0.90	0.89
1987	0.92	0.97
1988	0.93	0.67
1989	0.95	0.62
1990	0.91	0.66

Table A.16. Nominal protection coefficients for banana, 1980-91

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Border farm price												
FDB at port Limon, case 1	4.54	5.24	4.33	4.30	4.11	4.02	4.06	4.05	4.06	4.27	4.56	5.69
FDB at port Limon, case 2	4.25	4.73	4.25	5.23	4.15	4.31	4.13	3.85	5.45	6.30	6.10	6.70
Export costs, including transport	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Border farm price (1)	4.11	4.81	3.90	3.87	3.68	3.59	3.63	3.62	3.63	3.84	4.13	5.26
Border farm price (2)	3.82	4.30	3.82	4.80	3.72	3.88	3.70	3.42	5.02	5.87	5.73	6.27
Domestic farm price												
FDB port Limon fixed by government	3.74	4.29	3.38	3.36	3.41	3.36	3.79	3.83	3.88	4.12	4.26	5.19
Export costs, including transport	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Less all taxes paid by farmers	0.05	0.06	0.22	0.22	0.05	0.10	0.10	0.10	0.10	0.11	0.16	ERR
Plus incentives received, \$/box	0.07	0.25	0.28	0.23	0.28	0.24	0.02	0.02	0.03	0.05	0.07	ERR
Net domestic farm price	3.33	4.05	3.01	2.93	3.21	3.07	3.28	3.32	3.38	3.63	3.75	ERR
NFC 1	0.61	0.84	0.77	0.76	0.87	0.86	0.90	0.92	0.93	0.95	0.91	ERR
NFC 2	0.87	0.94	0.79	0.61	0.86	0.79	0.89	0.97	0.67	0.62	0.65	ERR

MELON

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I. PRODUCTION

a. Area, Production and Yields

Melon production for exports is a very recent non-traditional activity in Costa Rica¹. It began in 1980 when the parastatal enterprise DAISA, a subsidiary of the state owned Development Corporation (CODESA) started its melon program with the cultivation of 30 to 40 hectares in the province of Guanacaste (North Pacific), under technology developed in Israel. It was a joint program in which DAISA signed contracts with local farmers, guaranteeing purchase of their product and providing technical assistance and traded inputs. But in 1983 DAISA canceled this program and the private sector continued to produce and market melons, albeit with very low yields (3 to 4 tons per hectare) and high post-harvest losses. During 1983-84 melon was also grown at several locations in the Central Pacific region (Paquera, Orotina), but low yields and high post-harvest losses continued, as well as marketing problems due to the inexperience in selling CIF, Miami. In 1985, however, producers began selling FOB, Costa Rican ports, and the activity gained momentum; 115 hectares were planted that year by three firms. This was increased to 250 hectares in 1986, 435 in the 1987/88 crop year and an estimated 1,200 hectares during 1988/89 (Table E.1). Most of the area are in Guanacaste, and a smaller proportion at Parrita and Quepos in the Central Pacific region (CNAA, 1989). It is reported (CAAP, CINDE) that by 1987 yields in Guanacaste had increased to 13 t/ha, with some farmers obtaining as much as 18 t/ha.

Table E.1. Estimates of area planted to melon, 1985-1991

Year	Area
1985	115
1986	250
1987	n.a.
1988	435
1989	1,200
1990	2,050 ^a
1991	3,435 ^a

^a Includes only areas of farms of more than 80 hectares.
Source: CAAP, CINDE.

¹There are smaller farms growing local cultivars for the domestic market. These cultivars are different from those grown entirely for exports.

b. Location

Most of the production takes place in the province of Guanacaste; a smaller proportion is grown in areas of the Central Pacific region: Quepos, Parrita, Paquera, Orotina.

c. Seasonality

Given that the United States is the major buyer of Costa Rican melons and that there is a window in this market during January-April², planting and harvest of melon for exports are conditioned by this opportunity (see Table E.2).

d. Type of Producers

About 70% of the producers own farms of more than 80 hectares; the other 30% produce melons on smaller farms, mostly for the domestic market.

e. Technological Levels

In essence, all of the melon for exports is produced under the technology adapted from Israel, which consists of planting in fumigated beds covered by plastic, and drip irrigation through which fertilizer and pesticides are applied. The other technology, which uses gravity for irrigation and in which fertilizers and pesticides are applied manually, is used mostly for the local cultivars.

Table E.2. Melon: Planting and harvesting dates

Planting	Harvesting
May, June, July	Aug, Sep, Oct
Nov, Dec, Jan	Jan, Feb, Mar, Apr

Source: Bianonte, P. "Olericultura ..."

²There seems to be another window during August-October, but since this is the rainy season in Costa Rica during which the quality of melons deteriorates, advantage cannot be taken of this opportunity.

II. PRODUCTION INCENTIVES

f. Producer Incentives

There is no guaranteed or minimum producer price. Being a non-traditional export crop, producers receive incentives via what is called the Export Contract. It contemplates the following benefits: (i) duty exemption on imported raw materials and intermediates, (ii) duty exemption on imported machinery and equipment, (iii) exemption from sales and consumption taxes, (iv) 100% exemption from corporate income tax, (v) a deduction of 50% of the costs of purchase of stock in exporting firms, and (vi) negotiable tax credits based on the FOB value of exports. The latter incentive contemplates a direct subsidy of between 10 and 30% of the FOB value of the product exported. This subsidy, which comes out of the overall government budget, is paid to the owner of the export contract. This means that if the producer owns the contract, he receives all of the subsidy; if the marketing firm owns the contract, it can keep all of the subsidy, unless it negotiates some sort of sharing arrangement with the producer.

g. Credit

Melon producers received ample amounts of subsidized credit from the national banking system throughout the decade of the 80s. Producers, at times, have also received credit from melon export companies, under the obligation to sell them their product.

In 1991 producers received \$106.5 million credit at an estimated interest rate of 37%, as opposed to the 39.79 percent paid by other credit users. Thus, on an annual basis, the subsidy equivalent is estimated at \$2.93 million (Table E.3).

It should be noted that small producers pay an interest rate of only 15%, but we considered all export melon producers to be large farmers. Thus, the subsidy equivalent might be underestimated.

h. Traded Inputs

It was pointed out elsewhere (see Appendix A) that traded inputs were exempt from tariffs starting in 1987. On the other hand, it was also pointed out that melon producers are exempt from duties on all imported machinery and equipment, as part of the incentives provided by the Export Contract.

Table E.3. Credit to melon producers, 1988-91

Year	Total credit (000 Col)	Inter. rate a/ (%)	Commercial rate b/ (%)	Difference	Subsidy Equiv.c/ (Colones)
1988	29,170	26.0	31.5	5.5	1,604,350
1989	145,561	27.0	31.0	4.0	5,822,420
1990	151,470	34.0	36.9	2.9	4,392,633
1991	106,527	37.0	39.8	2.8	2,929,504

a/ We took the rate reported by the Banco Nacional de Costa Rica for agriculture (the large producer case).

b/ We used the rate quoted by the BNCR for "other activities".

c/ We assumed that loans were for twelve months.

Source: Dpto. Crédito Rural, Banco Nacional de Costa Rica.

i. Income Tax

Melon producers and exporters are exempt from corporate income tax, as one of the incentives provided by the Export Contract. Estimates of the subsidy equivalent are contained in Table E.4.

j. Public Expenditures

The gross of public expenditures on melon production is contained in the incentives provided through the Export Contract. Expenditures on research and extension are close to zero. No quantitative data was available, however.

Table E.4. Subsidy equivalent of income tax exemption, 1991

Yield per hectare	20,000 kg
Total production costs per ha	577,745
Total costs per kilo	24.69
plus packing costs	3.92
plus transport	0.02
plus port charges	0.01
Overall costs per kilo	28.63
Estimate of domestic farm price	40.54
Profit per kilo (40.54-28.63)	11.90
Exports in 1991 was (in kg)	38,974,500
Total profit estimated at	463,800,000
Average tax rate estimated	27%
Subsidy equivalent	₡ 125,226,000

III. MARKETING

A. Export Market

K. Exports and Export Markets

The principal melon export companies are: Del Monte, Agrofrut and Agroexpo.

About 90% of all exports go to the United States; and about 80% of all the melon produced is exported; the rest is consumed domestically or is processed for exports also. Table E.5 shows the quantities exported and average FOB price for the period 1985-91.

1. Internal Transport

Given that production is concentrated in the provinces of Guanacaste and Puntarenas, the product must be transported long distances to both the local market (San José) and the port of Limon for exports. Because there isn't a standard way to protect the delicate fruit during transportation, losses seem to be high.

m. Port of Embarkation and Country of Destiny

The principal port of embarkation is Limón; and the principal country of destiny is the United States, with about 90% of the total (Table E.6).

Table E.5. Melon exports, 1984-91

Year	Quantity tons	FOB Price US\$/kg
1984	593.8	0.66
1985	555.1	0.58
1986	807.0	0.38
1987	1,992.0	0.25
1988	7,183.8	0.21
1989	22,075.7	0.25
1990	37,903.5	0.23
1991	38,974.5	0.35

For 1991 is average price until June.

Source: DGEC

Table E.6. Melon: Countries of destiny, 1984-1987

Year	Country	Quantity (tons)	Average price (US\$/kg)	Weighted Average (US\$/kg)
1984	U.S.	590.3	0.66	0.65
	Colombia	3.5	0.24	
1985	U.S.	466.2	0.57	0.58
	Colombia	4.4	0.43	
	Germany	2.1	0.60	
	Holland	65.1	0.65	
1986	U.S.	735.7	0.36	0.37
	Colombia	6.9	0.83	
	G. Britain	64.5	0.51	
1987*	U.S.	1,963.4	0.24	0.25
	Colombia	8.4	0.97	
	Germany	14.3	0.44	

Percent going to the United States: 95.7

* Only January through June.

Source: CENPRO's information system.

n. Export Taxes and Other Barriers

As part of the incentives to non-traditional exports, melon producers with export contracts do not pay any taxes; they rather receive a subsidy from the government (CATS). These tax credit certificates are based on the amount of domestic value added of the exported product (see schedule in Table E.7).

Table E.7. Tax credit certificates schedule for 1991

Value added (%)	Percent of FOB	

Contracts approved before January 1, 1990		
35 -50.5	15	U.S., Pto Rico, Honduras and Panama
> 50.5	20	Other third markets, mainly Europe
Contracts approved between 1/1/90 and 8/5/90		
0 -35	11.0	
35-40	11.0	
41-45	11.5	
46-50	12.0	
> 50	12.5	
Contracts approved after May 8, 1990		
0 -35	0.0	
35-40	8.0	
40-45	9.0	
45-50	10.0	
50-55	11.0	
55-100	12.0	

In 1991 the CATS amounted to \$274.2 million or 17.9% of FOB.

Source: CENPRO

o. Export Costs

In 1990, export costs, which included internal transport, brokerage services and phytosanitary certificate, were estimated to be ₡50.36 per box of Cantaloupe (18 kg) and ₡38.89 per box of Honey Dew (12 kg). In 1991 export costs were estimated by specialists at about US\$ 0.44 per box for transport from Guanacaste to Port Limon, and US\$0.22 for port charges and handling. This totaled US\$ 0.66 per box or US\$0.0367 per kilo, equivalent to ₡4.13 per kilo (at exchange rate of ₡112.59/1US\$ average for Jan-Apr 1991).

B. Imports

According to the Ministry of Agriculture, about 5% of domestic consumption is imported from Nicaragua. Table E.8 below presents the quantities imported during 1984-87.

Table E.8. Imports of melon from Nicaragua

Year	Quantities tons	Price US\$/kg
1984	115.8	0.55
1985	118.1	0.60
1986	94.9	0.52
1987	7.0*	0.28

* Until April only.

C. Domestic Market

p. Domestic Consumption

Most of the domestic melon is consumed in the Central Valley, in and around San José, and is brought to a central distribution point (CENADA), with refrigerated warehouses, about 15 Km out of San José. Table E.9 presents yearly quantities of melon offered during marketing days at CENADA. About 75% is consumed between January and April, and during this period a large percentage (at least 40) is rejects from melon for exports.

Table E.9. Sales of melon in centralized domestic market, 1981-1991

Year	Quantity (t)
1981	42.6
1982	206.2
1983	149.9
1984	370.0
1985	438.5
1986	603.0
1987	695.0
1988	524.0*
1989	767.0
1990	890.0
1991	1,277.0

* Only 8% was rejects from exports; the rest was local cultivars grown for the domestic market.

Source: PIMA

q. Marketing Costs and Storage Requirements

Small producers sell their product to middlemen (transporters) who assemble sufficient melons to sell to wholesalers, and these then sell to retailers (supermarkets, fruit stands, farmer's fairs). In order to prolong its shelf life, the melon must be refrigerated, and most of it goes to CENADA's refrigerated warehouses before being sold to wholesalers

and retailers on the same day³. It is estimated (Arauz and Mora, 1983) that as much as 35% is lost during the marketing phase; 20% at the farm level and 15% at the wholesale level.

r. Price Controls and Other Forms of Intervention

There is no price control on the domestic melon. Buyers and sellers arrive at different prices throughout each marketing day at CENADA, and this institution registers the daily minimum, maximum and modal prices.

D. Domestic and Export Prices

Table E.10 presents average yearly domestic and export, FOB, Port Limón, prices. In 1986 the freight rate was about US\$0.19/kg. It should be noted that different types of melon are sold in each market.

Table E.10. Domestic and export (FOB, Limon) melon prices, 1984-1991

Year	Domestic ¢/kg	Exchange rate	Export US\$/kg	Domestic US\$/kg
1984	17.4	44.1	0.66	0.39
1985	25.1	50.5	0.58	0.50
1986	25.5	55.6	0.38	0.46
1987	25.1	62.7	0.25	0.40
1988	31.4	75.5	0.21	0.41
1989	32.7	81.0	0.25	0.40
1990	35.8	92.7	0.23	0.39
1991	45.4	135.5	0.35	0.37

* Simple average of monthly modal prices, not weighted average.

Source: PIMA, DGEC.

³Officials at CENADA assured us all melons are sold the same day they arrive.

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IV. METHODOLOGY

Border Price

- a. We deducted the export costs from the FOB price at the port to obtain the actual price received at the farm level (these are border prices).
- b. We then obtained the total amount of CATS for 1991, adjusted it to its present value (since it matured in 12 months), and converted to a per ton and per kilo basis, as follows. Exports were 389,745 tons and CATS were \$274.2 million. Thus, CATS were equivalent to \$7.03 per kg exported, or \$5.27 per kg exported in present value terms (we took 75% of the face value)
- c. We then add this amount to the border farm price to obtain the actual or total domestic price received.
- e. We then estimated the NPC as the ratio of the domestic and border prices.
- f. In order to obtain the EPC we used the values for traded inputs* shown in Table E.11.

V. INDICES

Table E.12 shows the procedure followed to estimate nominal and effective protection coefficients for 1991. The dearth of hard data prevented us from estimating these coefficients for the previous years. The central bank, who pays out the CATS, does not know how much was paid to melon exporters during the years prior to 1991.

Table E.13 presents estimates of the producer subsidy equivalent of the measures instituted to incentivate the production and exports of melon.

Consumer subsidy equivalent was not estimated since we were concerned only with melon for exports, a cultivar different from the one grown for the local market.

*We were able to obtain payments of CATS and detailed production costs for export melon (avio) only for 1991. The Central Bank does not have the yearly amounts of CATS by crops, and we were told that it would take months for them to do the separation. They separated the 1991 figures as a favor. This is why NPC and EPC for the rest of the period were not estimated.

Table E.11. Melon: Domestic and border values of traded inputs, 1991

DOMESTIC				
Tradable Inputs	Units	Quantity	Unit	
			Value	Total
Fertilizer: 5-30-10	kg	500.0	28.0	14,000.0
Fertilizer: Urea	kg	9.0	34.7	312.7
Fertilizer: Potassium nitrate	kg	45.0	124.5	5,602.5
Insecticide: Metamidofos	lt	1.8	1,361.8	2,451.3
Insecticide: Metomil	kg	1.3	1,550.0	1,937.5
Insecticide: Bacillus turingiensis	kg	3.3	3,560.0	11,570.0
Insecticide: Pyremitrin	lt	0.5	4,816.5	2,408.3
Fungicide: Benomyl	lt	1.3	3,145.8	3,932.3
Fungicide: Metalaxil	lt	3.0	2,053.3	6,159.8
Rodenticide	kg	5.0	474.8	2,373.8
Fumigant: Metil-Broaide	kg	250.0	171.7	42,922.5
Plastic	lt	270.0	229.5	61,967.7
Insecticide: Endosulfan	lt	5.0	1,069.0	5,345.0
Insecticide: Diazinon	lt	6.0	2,117.7	12,706.2
Insecticide: Dimetoato	kg	1.5	776.6	1,164.9
Fungicide: Clorotalonil	kg	4.0	2,008.4	8,033.6
Fungicide: Mancozeb	kg	3.5	409.1	1,431.9
Fungicide: Tiabendazol	lt	1.0	5,125.0	5,125.0
Fertilizer: Calcium Nitrate	kg	20.0	42.7	854.4
Insecticide: Metil-Oxidimeton	lt	1.0	2,815.0	2,815.0
Fungicide: Captan	kg	1.0	631.0	631.0
Fertilizer: Monoaamonic fosfate	kg	12.5	59.6	745.0
Fertilizer: Menorel B	kg	0.5	125.5	62.8
Agricultural oil (Stylet oil)	lt	9.0	176.3	1,586.8
Fertilizer: Diatomita	kg	1.0	13.6	13.6
Insecticide: Triadimefon	lt	1.7	8,708.0	14,368.2
Herbicide: Paraquat	lt	3.0	655.1	1,565.2
Herbicide: Glifosato	lt	2.5	1,377.9	3,444.8
Seed	kg	1.4	36,000.0	50,400.0
Machinery: loosen subsoil	hr	0.4	2,000.0	800.0
Machinery: plow	hr	2.5	1,500.0	3,750.0
Machinery: light disk	hr	6.0	2,500.0	15,000.0
Machinery: fungicide & insecticide	hr	78.0	500.0	39,000.0
Machinery: Apply fertilizer	hr	7.0	780.0	5,460.0
Machinery: Cultivate	hr	3.0	2,100.0	6,300.0
Machinery: Apply herbicide	hr	3.0	1,040.0	3,120.0
Machinery: Level	hr	1.0	3,000.0	3,000.0
Machinery: Rotator	hr	3.0	2,000.0	6,000.0
Machinery: Foliar fumigation	hr	0.9	1,300.0	1,170.0
Machinery: Bedding	hr	1.5	3,100.0	4,650.0
Machinery: Put plastic	hr	0.2	1,600.0	320.0
Machinery: Cut guides	hr	2.8	1,040.0	2,912.0
Machinery: Harvest	hr	16.0	900.0	14,400.0
TOTAL				372,213.6
Cost of traded inputs per kg of melon				18.6

1/ For cantaloupe produced in Guanacaste with yields of 20 tons/ha.
Based on avio (credit breakdown) for assistance.

Table E.11... continuation

BORDER				
Tradable Inputs	Units	Quantity	Unit Value	Total
Fertilizer: 5-30-10	kg	500.0	26.9	13,461.5
Fertilizer: Urea	kg	9.0	32.2	289.5
Fertilizer: Potassium nitrate	kg	45.0	119.7	5,387.0
Insecticide: Metamidofos	lt	1.8	1,205.1	2,169.3
Insecticide: Metosil	kg	1.3	1,371.7	1,714.6
Insecticide: Bacillus thuringiensis	kg	3.3	3,150.4	10,238.9
Insecticide: Pyrethrin	lt	0.5	4,262.4	2,131.2
Fungicide: Benomyl	lt	1.3	2,783.9	3,479.9
Fungicide: Metalaxil	lt	3.0	1,817.1	5,451.2
Rodenticide	kg	5.0	420.1	2,100.7
Fumigant: Metil-Bromide	kg	250.0	151.9	37,984.5
Plastic	lt	270.0	186.6	50,380.2
Insecticide: Endosulfan	lt	5.0	946.0	4,730.1
Insecticide: Diazinon	lt	6.0	1,874.1	11,244.4
Insecticide: Dimetnato	kg	1.5	687.3	1,030.9
Fungicide: Clorotalonil	kg	4.0	1,777.3	7,109.4
Fungicide: Mancozeb	kg	3.5	362.1	1,267.2
Fungicide: Triabendazol	lt	1.0	4,535.4	4,535.4
Fertilizer: Calcium Nitrate	kg	20.0	41.1	821.5
Insecticide: Metil-Oxidimeton	lt	1.0	2,491.2	2,491.2
Fungicide: Captan	kg	1.0	558.4	558.4
Fertilizer: Monoamonic fosfate	kg	12.5	57.3	716.3
Fertilizer: Manorel B	kg	0.5	120.7	60.3
Agricultural oil (Stylect oil)	lt	9.0	156.0	1,404.2
Fertilizer: Diatomita	kg	1.0	13.1	13.1
Insecticide: Triadimefon	lt	1.7	7,706.2	12,715.2
Herbicide: Paraquat	lt	3.0	555.1	1,665.4
Herbicide: Glifosato	lt	2.5	1,167.7	2,919.3
Seed	kg	1.4	36,000.0	50,400.0
Machinery: loosen subsoil	hr	0.4	1,694.9	678.0
Machinery: plow	hr	2.5	1,271.2	3,178.0
Machinery: light disk	hr	6.0	2,118.6	12,711.9
Machinery: fungicide & insecticide	hr	78.0	423.7	33,050.8
Machinery: Apply fertilizer	hr	7.0	661.0	4,627.1
Machinery: Cultivate	hr	3.0	1,779.7	5,339.0
Machinery: Apply herbicide	hr	3.0	681.4	2,044.1
Machinery: Level	hr	1.0	2,542.4	2,542.4
Machinery: Rotator	hr	3.0	1,694.9	5,084.7
Machinery: Foliar fumigation	hr	0.9	1,101.7	991.5
Machinery: Bedding	hr	1.5	2,627.1	3,940.7
Machinery: Put plastic	hr	0.2	1,355.9	271.2
Machinery: Cut guides	hr	2.8	881.4	2,467.8
Machinery: Harvest	hr	16.0	762.7	12,203.4
TOTAL				328,201.5
Cost of traded inputs per kg of melon				16.4

Table E.12. Estimate of NPC and EPC for melon, 1991

Border	Colones/kg
FOB at ports (US\$0.35)	39.40
Less export costs	4.13
FOB at farmgate	35.27
Domestic	
FOB at ports	39.40
Less export costs	4.13
FOB at farm (border)	35.27
Add tax certificate (CATS)	5.27
NPC = (40.54/35.27)	1.15

Domestic value added (40.54-18.6)	21.94
Border value added (35.27-16.4)	18.87
EPC = (21.94/18.87)	1.16
EPC* = (21.94/16.67)	1.32

* If exemption was granted on all imported inputs, as stated by the law creating the Export Contracts).

Table E.13. Estimate of Producer Subsidy Equivalent (PSE) for melon, 1991

Item	Amounts (Colones)
Tax Credit Certificates	274,200,000
Production Credit	2,929,504
Income tax exemption	125,226,000
Research and extension	0
Total PSE	402,355,504

In order to obtain the percentage PSE, we divided the total PSE by the FOB value at farm level, without the CATS.

Total PSE	402,355,504
FOB value at farm ($\$35.27 \times 38,974,500$)	1,374,630,600
Percentage PSE	29

APPENDIX A

TRADED INPUTS

Until December 1985 the tariff rates for traded inputs, which were 10% for all, was determined by Law No.1738 of March 30, 1954 (see attached sheet).

In December, 1985, Law No.7017 abolished the previous and instituted an array of rates for the different inputs. This Law underwent several partial modifications during 1986-91, creating many changes in the rates applicable to the different inputs. The tariff history in the accompanying table, which were assembled by CONDECOR, a consulting firm, is the result of an attempt to capture all of the changes that occurred.

According to Law FODEA of May 1987, all agricultural inputs can be exempted from import tariffs, as long as the benefits are transferred to the farmers. This would lead one to believe that after that date the tariff rates were zero. But this is not true. Since the tariff rates are not zero (in fact, they were increased after May 1987), importers of agricultural inputs, including farmers, must go through a very lengthy, cumbersome and costly process in order to obtain the exemption. So, in practice, there were tariff rates after May 1987.

According to a very large farmer, some importers know the steps that must be followed in order to obtain the exemptions with a low cost. But these then do not pass on the benefits to the farmers, since the opportunity costs to the farmer is equivalent to the tariff savings.

These considerations lead us to take the reported rates as existing and apply them during our adjustments.

Sales tax. Given that almost all of the traded inputs were exempted from sales tax (10%) throughout the period, the border prices were also estimated without the tax. In the few cases in which some inputs were not exempted (some in 1989 and 1990, the tax was taken as a distortion and removed when estimating border prices.

Adjustments. See respective input tables (on disk).

Table A.1. Tariff levels for principal traded inputs (percent ad-valorem)

INPUTS	a/ b/ c/												
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	
NITROGEN FERTILIZER													
All primary (urea)	10	10	10	10	10	10	4	10	8	8	9.6	8	
Ammonium nitrate 1/	10	10	10	10	10	10	23	23	23	14	9.6	4	
All others	10	10	10	10	10	10	13	13	13	9	9.6	4	
PHOSPHATED FERTILIZER													
All primary	10	10	10	10	10	10	4	10	8	8	9.6	8	
Others	10	10	10	10	10	10	13	13	13	9.5	9.6	4	
POTASSIC FERTILIZER													
All Primary	10	10	10	10	10	10	4	10	8	8	9.6	8	
Others	10	10	10	10	10	10	13	13	13	10.5	9.6	4	
COMPLETE FORMULA	10	10	10	10	10	10	13	13	13	9	9.6	4	
INSECTICIDES													
Chlorinated	10	10	10	10	10	10	35.5	23	23	18	14.9	13	
Aldrin, Heptachloro	10	10	10	10	10	10	30.5	18	18	18	18	18	
All Others:	10	10	10	10	10	10	20.5	8	8	8	9.6	13	
FUNGICIDES													
Of Captafol, etc.	10	10	10	10	10	10	18	20	18	18	18	18	
All Others	10	10	10	10	10	10	8	8	8	8	9.6	13	
HERBICIDES													
Propanil and others	10	10	10	10	10	10	23	23	23	18	18	18	
Glifosato, Paraquat	10	10	10	10	10	10	18	18	18	18	18	18	
All Others	10	10	10	10	10	10	8	10	8	8	9.6	13	
GROWTH REGULATORS	10	10	10	10	10	10	8	10	8	8	9.6	13	
MACHINERY													
Flows, etc.	10	10	10	10	10	10	23	23	23	23	23	23	
Other Agricultural	10	10	10	10	10	10	8	20	10	9	9.6	13	
Plow parts	10	10	10	10	10	10	23	23	23	23	23	23	
Combines & Harvester	10	10	10	10	10	10	8	20	10	9	9.6	13	
Tractors & parts	10	10	10	10	10	10	8	20	10	9	9.6	13	

1/ And mixtures with.

a/ The top 9 inputs paid a sales tax of 10%, which was taken into account.

u/ Also, weighted average of two prevailing rates (2/3 and 1/3).

c/ Rates are weighted average of two prevailing rates (2/3 and 1/3).

For 1980-83 Law No.1738 of March 30, 1954.

For 1984-91, Law No.7017 of December 1985, and subsequent modifications.

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Table A.2. Costa Rica: Exchange rates used for most commercial transactions

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1980	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	8.60	11.37	12.09	14.23
1981	13.43	13.90	16.49	18.67	16.77	18.06	18.92	18.90	18.90	31.09	36.58	36.01
1982	35.50	37.23	37.78	38.14	38.18	38.20	38.25	38.29	40.28	40.30	40.30	40.50
1983	40.50	40.50	40.50	40.50	40.50	40.56	40.50	40.50	41.75	41.75	42.58	43.65
1984	43.65	43.65	43.65	43.65	43.66	44.00	44.25	44.25	45.00	45.85	48.00	48.00
1985	48.02	48.59	49.02	49.35	49.61	50.40	50.94	51.55	52.17	52.59	53.15	53.65
1986	53.95	54.24	54.81	55.20	55.64	56.11	56.56	56.98	57.45	57.86	58.37	58.91
1987	59.36	59.75	60.27	61.08	61.62	62.65	62.99	63.58	64.84	66.07	67.31	68.84
1988	71.56	73.98	74.23	74.68	75.34	76.10	76.65	77.28	77.95	78.66	79.26	79.85
1989	80.07	80.36	80.66	80.94	81.25	81.55	82.07	82.67	83.11	83.51	83.96	84.48
1990	84.69	85.18	85.91	86.65	88.02	89.66	91.43	92.95	95.96	97.24	99.63	102.34
1991	106.85	110.58	114.74	118.20	120.90	123.72	126.04	128.62	130.67	132.75	134.35	

Rates from Jan 80 to Dec 83 are interbank and from Jan 84 to Dec 89 free interbank rates reported by Central Bank. These are the rates that were used for most of the commercial transactions. Rates from Jan to Dec 90 are from IMF's IFS, and are equiv. to interbank.

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