

PNABP-634
83549

Postharvest Grain Systems R&D

Technical Assistance Report No. 135
July 1993

STRUCTURAL REFORMS AND THE
NEED FOR A STRATEGIC BASIC
FOOD RESERVE IN EL SALVADOR



Food and Feed Grains Institute
Manhattan, Kansas 66506-2202
USA



STRUCTURAL REFORMS AND THE NEED
FOR A STRATEGIC BASIC FOOD RESERVE
IN EL SALVADOR

by

Cornelius Hugo
and
Kenneth E. Neils

for the

AGENCY FOR INTERNATIONAL DEVELOPMENT

Grant 519-0349-G-00-3117-00

at

Kansas State University
FOOD AND FEED GRAINS INSTITUTE

July 1993

TABLE OF CONTENTS

	<u>Page</u>
TABLES	vi
FIGURES	viii
 <u>Section</u>	
I. INTRODUCTION	1
A. Background	1
B. Purpose of Study	2
C. Acknowledgements	2
II. FROM PRICE STABILIZATION TO STRATEGIC RESERVE STOCKS	3
A. Introduction	3
B. Buffer Stock - Price Stabilization Period	3
1. Industrial development policy setting	3
2. Strategy for implementing the buying high - selling low paradox	4
3. The Salvadorian experience	5
C. Strategic Reserve Scheme	11
III. EVALUATION OF CURRENT STRATEGIC RESERVE POLICIES AND MANAGEMENT	13
A. Introduction	13
B. Purchases	14
1. Corn	14
2. Beans	17
C. Sales	21
1. Corn	21
2. Beans	30
D. Storage	36
1. Corn	36
2. Beans	37
E. Total Costs of the Reserve	37
1. Administrative and management costs	37
2. Shrinkage costs	37
3. Cost of quality deterioration	38
4. Opportunity costs	43
5. Amortization costs	44
6. Total monthly costs	44

<u>Section</u>	<u>Page</u>
F. Management Process	55
1. Achievement of stock objective	55
2. Maintenance problems	55
3. Funding level	56
4. Coordination problems between BFA and GOES	56
G. Results and Implications of Current Strategic Reserve Policies and Management Procedures	57
IV. STRUCTURAL REFORMS, MARKET DEVELOPMENT AND THE ROLE OF STRATEGIC FOOD RESERVE	59
A. Concept of a Strategic Food Reserve	59
1. Definition	59
2. Objectives	59
3. Uses	59
4. Recycling options	59
5. Funding	63
6. Social costs and benefits	63
7. Management	63
8. Stock size determination	64
B. Structural Reforms and Reduced Risks	66
1. Structural reforms	66
2. Reduced risks	67
C. Grain Market System Development and the Strategic Reserve	68
1. The desired grain market system network	68
2. Supporting institutional components	70
3. Improving supporting institutional components	72
4. Additional auxilliary improvements	85
V. SUMMARY FINDINGS AND CONCLUSIONS AND SUGGESTED ACTIONS	87
A. Summary Findings and Conclusions	87
1. Time period before 1989	87
2. Strategic reserve program	87
3. Structural reforms, market development and strategic reserves	89
4. Summary statements	90
B. Suggested Actions	90
1. Intermediate term options for private sector storage of the strategic reserve	90
2. Long-term option	93
V. REFERENCES	95

APPENDICES

LIST OF TABLES

<u>Table</u>	<u>Page</u>
II-1	IRA GRAIN PURCHASES BY CROP YEAR AND CAPACITY UTILIZATION 6
II-2	IRA PURCHASES AS A PERCENTAGE OF GRAIN PRODUCTION 6
II-3	IRA GRAIN PURCHASES BY FARM SIZE 8
III-1	COST OF IMPORTING WHITE CORN 16
III-2	BFA PURCHASES OF NATIONAL CORN FOR THE STRATEGIC RESERVE 18
III-3	BFA BEAN PURCHASES FOR THE STRATEGIC RESERVE 20
III-4	STRATEGIC RESERVE CORN SALES 22
III-5	LOCATION OF IMPORTED CORN IN THE STRATEGIC RESERVE 24
III-6	HISTORY OF PURCHASES, SALES, AND PRICES OF CORN IN THE STRATEGIC RESERVE 25
III-7	LOCATION OF NATIONAL CORN IN THE STRATEGIC RESERVE 29
III-8	LOCATION OF BEANS IN THE STRATEGIC RESERVE 33
III-9	STRATEGIC RESERVE BEAN SALES 34
III-10	HISTORY OF PURCHASES, SALES, AND PRICES OF BEANS IN THE STRATEGIC RESERVE 35
III-11	LOCATION OF CORN AND BEANS IN THE STRATEGIC RESERVE 36
III-12	TECHNICAL SHRINKAGE FACTORS OF CORN AND BEANS IN STORAGE 39
IV-1	THREE SCENARIOS FOR THE DETERMINATION OF SECURITY STOCK FOR OFNACER, BURKINA FASO 64
IV-2	IMPACT OF SAP ON VARIOUS NATIONAL POLICIES 67

LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
III-1	STRATEGIC RESERVE CORN	15
III-2	BFA CORN PURCHASES FOR THE STRATEGIC RESERVE	18
III-3	STRATEGIC RESERVE BEANS	19
III-4	BFA BEAN PURCHASES FOR THE STRATEGIC RESERVE	20
III-5	STRATEGIC RESERVE CORN SALES	22
III-6	STRATEGIC RESERVE CORN IMPORTED	23
III-7	STRATEGIC RESERVE NATIONAL CORN 1989/90	27
III-8	STRATEGIC RESERVE NATIONAL CORN 1990/91	27
III-9	STRATEGIC RESERVE NATIONAL CORN 1991/92	28
III-10	STRATEGIC RESERVE NATIONAL CORN	28
III-11	STRATEGIC RESERVE NATIONAL BEANS 1989/90	31
III-12	STRATEGIC RESERVE NATIONAL BEANS 1990/91	31
III-13	STRATEGIC RESERVE NATIONAL BEANS 1991/92	32
III-14	STRATEGIC RESERVE NATIONAL BEANS	32
III-15	STRATEGIC RESERVE BEAN SALES	34
III-16	ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF IMPORTED CORN	45
III-17	ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF IMPORTED CORN	46
III-18	ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1990/91	47
III-19	ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1990/91	48
III-20	ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1991/92	49
III-21	ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1991/92	50
III-22	ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1990/91	51
III-23	ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1990/91	52
III-24	ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1991/92	53
III-25	ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1991/92	54
III-26	SEASONAL PRICES AND SALES OF BFA CORN	58
III-27	BFA'S SALES PATTERN AND HARVEST PATTERN FOR CORN	58
IV-1	THEORETICAL "LACK OF AN IMPACT" ON MARKET PRICE OF BUYING AND SELLING THE SAME QUANTITY OF RESERVE STOCKS JUST AFTER HARVEST	60
IV-2	THEORETICAL IMPACT ON MARKET PRICE OF BUYING RESERVE STOCKS JUST AFTER HARVEST	62
	THEORETICAL IMPACT ON MARKET PRICE OF SELLING RESERVE STOCKS JUST AFTER HARVEST	62
IV-3	RELATIONSHIP BETWEEN FOOD SECURITY IN INDONESIA AND THE COST OF HOLDING STOCKS	65
IV-4	GENERALIZED MARKETING NETWORK FOR BASIC GRAINS	69
IV-5	SOCIAL VALUE OF IMPROVED INFORMATION	83

SECTION I

INTRODUCTION

A. Background

National food security has been an enduring topic to governments ever since societies coalesced into nations. While policies and programs to achieve desired levels of food security have changed over time, a "reserve" or access to a "security stock" has been a fundamental component of a nation's food security program. These "security stocks" have had varied names and their use has been adapted to meet changing development, social, economic, market and political situations. Generally, three basic kinds of "security stocks" have been used over time to address varied conditions not acceptable from a social or a policy point of view.

First, emergency stocks have been used to redress the social impact of extreme situations which result from natural or man-made causes, and whose severity and duration are impossible or very difficult to predict and measure. Examples include, famines brought about by complete crop failures lasting several years, which in turn were the result of extreme natural causes such as prolonged droughts or plant diseases (Bangladesh, India, Southern Africa); or the real threat of a localized or regionalized famine, as a result of civil conflicts or wars which disrupt the normal flow of food or access to it (El Salvador 1980-1991; former Yugoslavia; Somalia).

Second, contingency or strategic reserves have been more closely associated with short-term supply shortages, caused when demand for basic foods exceeds available market supplies (local or regional), and a release of stock (or imports) is needed to bring back a semblance of normalcy. Unlike the previous one, however, the cause of the shortfall and its magnitude are easier to predict and to measure, since generally this imbalance is caused by non-recurrent natural events (floods, insufficient rainfall, late rains) whose impacts can be remedied within a crop cycle, as production responds to price hikes, or through imports.

Finally, buffer stocks in conjunction with government market interventions have been used to alleviate "extreme" price variations which are deemed detrimental for producers and consumer. Additional justifications for maintaining this buffer stock-market intervention policy included the existence, whether real or perceived, of market failures and distortions, and the need to keep basic food prices and thus labor wages low. The latter are two key elements of the import substitution development model used from the late 1950's until the mid 1980's.

Since the late 1980's, the Government of El Salvador (GOES) has been discussing the relevance of these food reserve-buffer stock schemes, and questioning the effectiveness of government participation and resulting social costs and benefits of these programs. Since 1989, macroeconomic adjustments and structural reforms have brought about the demise of the bufferstock-market intervention scheme. Also, the need for a security stock to counteract any food emergency as a consequence of the civil conflict is no longer justified since the peace accord was signed in January, 1992.

Liberalization of national markets and improved market structure, conduct and performance for basic food commodities; better, more timely, and reliable production and market information; resurgence of regional marketing blocks; and the emergence of new market mechanisms and tools are only a few additional reasons why a critical assessment for the need of a strategic basic grains and edible beans reserve stock program is both necessary and timely.

B. Purpose of Study

The question is not whether the concept of a strategic food reserve (basic food insurance for the nation) is inherently valid. It is, and will continue to be one of the core issues related to social welfare and political stability. The question is whether the same "national food insurance coverage" being provided by GOES with the strategic stocks can be achieved or even increased at a lesser cost to society, given the policy changes and structural reforms taking place.

The team was charged with analyzing current GOES strategic food reserve policy and program, and provide guidance for future policy changes and actions which will provide the same coverage at less social cost. Changes and actions should lead to a planning and management approach for the strategic food reserves which is more compatible with ongoing and future macro, sectoral, and market reforms.

C. Acknowledgements

The needed field research was undertaken during two visits to El Salvador in February and April, 1993. The authors met with many individuals from different institutions in both the public and private sector. The team wishes to express its gratitude for their support, collaboration, arguments and criticism. It is our hope that the suggestions contained in this report will assist GOES efforts in shifting to a less costly and more effective strategic reserve policy and program.

SECTION II

FROM PRICE STABILIZATION TO STRATEGIC RESERVE STOCKS

A. Introduction

As in many other Central American countries, the GOES implemented an intervention strategy in basic grains and edible beans, as called for under the industrial development model which prevailed since the early 1950's. This intervention lasted until 1989 when, due to internal and external pressures, GOES abandoned this program in favor of a strategic reserve scheme. A review of these two policy programs will provide a historical perspective, useful for understanding the conclusions and recommendations of this study.

The first part of the review covers the time period from 1953 through 1989 when GOES intervened in the marketing system for basic grains and edible beans through a buffer stock - price stabilization scheme, its evolution and performance during the next three decades, and the reasons for its demise in the late 1980's. The second part covers the shift in 1989 to the strategic reserve scheme. A thorough analysis of the strategic reserve program currently in place is contained in Section III.

B. Buffer Stock - Price Stabilization Period¹

1. Industrial development policy setting

The industrial development policy that prevailed during three decades since the early 1950's called for, among other things, low and stable labor wages, the import substitution of tradeable basic food items,² certain construction materials and manufactured goods, and the production and export of tropical plantation commodities such as coffee, sugar, and cotton.

Keeping labor wages stable and low was, from a competitive point of view, critical to the industrial development policy. Since food expenditures is the largest component of total expenditures of wage earners, keeping the cost of basic food items low and stable was in turn seen as key to keeping wage earners content and wages competitive. Since the market system for these basic food commodities were perceived to be inadequate and even failing,³ state

¹This part of the report relies heavily on "El Estado y la Comercialización de los Alimentos Básicos: Elementos para una Síntesis", by Guy Christophe, CADESCA, Noviembre, 1990, portions of which have been utilized and full credit is hereby given.

²This include basic grains and derivatives, edible beans, salt, sugar, cooking oil, and milk.

³The concept of "market failure" was used as a key reason as to why the State was thought to be in a better position to achieve policy objectives of low and stable food prices.

intervention was the reasonable alternative to achieve more equity and low and stable prices for essential food commodities. These objectives were to be achieved through consumer price regulation, direct subsidies to industrial users, state intervention in the marketing and importation of deficit food items, and in some cases through direct retail by the State to urban consumers.

Increased production and import substitution of basic grains and edible beans⁴ was to be achieved through a series of policy actions, including subsidized agricultural inputs and credit, "guaranteed minimum prices"⁵ to producers combined with direct purchases by the State, and State monopoly in imports and exports.

This policy duality has become known as the "buying high - selling low paradox". The intended result was increased production of basic foods, lower imports, greater equity in the market system, lower and stable consumer prices, and lower and stable labor wages. These outcomes were considered essential to industrial development of the country.

2. Strategy for implementing the buying high - selling low paradox

The accepted norm for implementing this component of the industrial development policy was through a regulatory agency and a bank. The regulatory agency was responsible for market intervention and the bank was responsible for the production related aspects.

A typical cycle would start with the regulatory agency announcing, ahead of the planting season, the guaranteed minimum prices for the next crop. The pre-planting price incentive plus the subsidized credit and inputs were supposed to stimulate the desire by farmer to increase production. During harvest season the regulatory agency stood ready to buy "any amount" offered at the guaranteed price.⁶ The regulatory agency also served as a credit recovery window for the bank by issuing purchase vouchers which the producer would cash at the bank. The bank would discount his production loan and give the producer the remaining value.

The buffer stock thus acquired by the regulatory agency would be complemented by imports in case of deficits, or balanced by exports in case of surpluses, depending on the food balance sheet calculations made for a given year. The agency proceeded to sell its stock at a ceiling or maximum price during the "lean season" in an attempt to stabilize consumer prices at a level below market

⁴These commodities provide approximately 70% of the calories and protein of the daily nutritional intake of the population.

⁵These prices were supposed to cover the cost a modern technological package which included improved seeds, fertilizers, pesticides, mechanization, etc.

⁶This "official price" was supposed to cover production costs, offer producers a reasonable return, and be above prevailing market prices during harvest season, i.e., the period of time when seasonality dictates lower prices due to excess supply quantities.

prices.⁷ Any excess stock above a certain minimum was exported by the regulatory agency and the minimum was carried over as part of the buffer stock into the next crop season.

This cycle would be repeated season after season, with minimum producer prices and maximum consumer prices being adjusted to keep producer incentives high and consumer prices low. The buffer stock would expand to absorb any production excess or shrink to counterbalance any deficit. A long-term minimum balance was supposed to be kept through imports or exports, depending on the need.

3. The Salvadorian experience

The Salvadorian experience starts in 1950 with the formation of the Instituto Regulador de Cereales y Abastecimientos (IRCA), restructured as the Instituto Regulador de Abastecimientos (IRA) in 1953. It was given the constitutional responsibility for carrying out the buffer stock - price stabilization program in support of the industrialization development policy of the nation. IRA was again reformed in 1971, and expanded during the 1970's when additional storage capacity was added to its network of handling and storage facilities. In 1987/88 IRA ceased to intervene in the grain markets, and by 1991 the process of privatizing its grain handling and storage facilities was underway.⁸

The fundamental objective of the policy remained essentially unchanged during the 37 years of IRA's existence. It was based on the conviction that the market for basic foods had to be regulated, and the best way to achieve this was through direct public intervention. As stated in Article 2 of the "Ley Orgánica del IRA", such public intervention would lead to stable and profitable producer prices and provide salaried consumers with the needed subsidized, low cost basic foods. These fundamental objectives were supported by other auxiliary objectives, such as storage of the basic food commodities and their timely release to consumers, stimulation of production of basic grains and edible beans, and support to the modernization of the marketing system.

a. Grain purchases and production impact

Until its closing in 1987/88, IRA managed to buy between 1 and 3 million quintals of basic grains and beans annually (Table II-1), with white corn being the dominant commodity in volume.⁹ To what degree did these purchases benefit grain farmers, stimulate production, and modernize the market system?

⁷In a mirror image to the guaranteed minimum producer price, this official maximum consumer price was supposed to help consumers during the time period when seasonality dictated higher market prices.

⁸Another four grain handling and storage facilities put into operations by the BFA in 1991 are also being privatized.

⁹No record of sorghum purchases could be provided by IRA.

TABLE II-1

IRA GRAIN PURCHASES BY CROP YEAR AND CAPACITY UTILIZATION

Crop Year	Grains			Total Grain Purchases (QQ)	Storage Capacity (QQ)	Capacity Utilization (%)
	White Corn	Red Beans	Paddy Rice			
80/81	1,212,427	162,104	488,589	1,863,120	2,900,000	64.25%
81/82	NA	NA	NA	NA	2,900,000	
82/83	782,187	126,603	235,128	1,143,917	2,900,000	39.45%
83/84	773,916	184,622	476,158	1,434,696	2,900,000	49.47%
84/85	2,194,017	196,026	737,426	3,127,470	2,900,000	107.84%
85/86	1,441,207	127,775	560,864	2,129,847	2,900,000	73.44%
86/87	1,386,616	419,506	400,205	2,206,327	2,900,000	76.08%
87/88	NP	NP	63,634	63,634	2,900,000	2.19%
88/89	24,120	36,613	95,118	155,851	2,900,000	5.37%

Source: IRA, Purchasing Department

Notes: NA = data not available

NP = no purchases

TABLE II-2

IRA PURCHASES AS A PERCENTAGE OF GRAIN PRODUCTION (%)

Crop Year	Grains			Total Grain Production
	White Corn	Red Beans	Paddy Rice	
80/81	10.59%	18.71%	37.01%	13.66%
81/82	NA	NA	NA	NA
82/83	8.69%	15.25%	30.54%	10.79%
83/84	8.03%	20.10%	50.66%	12.49%
84/85	19.14%	18.56%	53.56%	22.51%
85/86	13.38%	17.01%	37.45%	16.36%
86/87	14.60%	38.35%	39.22%	19.00%
87/88	0.00%	0.00%	6.96%	0.45%
88/89	0.19%	2.95%	7.63%	1.01%

Source: Calculated from IRA, DGEA information

A definitive answer is not possible due to lack of information, a civil war, and an agrarian reform which took place during the same time period. Nevertheless, juxtapositioning two sets of facts will help shed light on the effects of IRA's purchase program at the farm level. First, individual grain purchases were close (in the case of corn) or exceeded the amounts (in the case of beans and rice) deemed necessary to make a seasonal price impact at the farm level (see Table II-2)¹⁰. Second, IRA's guaranteed minimum prices remained on average 14% over trucker prices during the late 1970's and throughout the 80's until its closing in 1987 (Christophe 1990). Third, real farm gate prices deteriorated considerably during the same time period, with corn and beans losing 2/3rds of their real value (Christophe 1990, Hugo 1991). Fourth, farm productivity stagnated (yield increases leveled off or became negative), and production became more and more a function of area cultivated rather than a function of improved technologies (Hugo 1991).

Thus, while the first two facts confirm the criteria which supported the buffer stock-price stabilization program, the last two clearly indicate that it did not achieve the desired results, at least as far as production and farm level impact are concerned. There are many quantitative and qualitative indicators that are useful for demonstrating why the desired impact was not felt sufficient to benefit small grain farmers and to provide an incentive for production of basic grains (that is productivity), at least during the late 70's and the 1980's. Some of these are summarized below.

- An analysis of IRA purchase records in 1990¹¹ revealed that most purchases were in lots which exceeded the average lot size (less than 5 quintals) used by individual farmers at the first assembly level (farm or rural market level).¹² These two observations indicate that most purchases were either made from medium to large farmers or from assemblers who put truck loads together before delivering to an IRA facility.
- An analysis of IRA grain purchases by farm size highlights the fact that farm sizes of less than 10 manzanas which includes the majority of grain producers did not participate in these transactions (Table II-3). Also, the total farm level purchases amounted to a minuscule representation of the total number of farms producing these commodities. Again, this gives credence to the statement that most IRA purchases provided a direct benefit to large farmers and assemblers and not to small grain producers.

¹⁰ During the time period when the storage networks were being designed and constructed, FAO recommended the purchase of 20% of production in order for the "minimum guarantee price" to be prevalent in the market.

¹¹ Reactivating Public Grain Handling and Storage Facilities within the Private Sector, by Hugo, LaGrange and Stryker, NCBA/CLUSA and KSU, October 1990.

¹² A Supply Response Study for Basic Grains in EL Salvador, by Ramos, Worman, and Hugo, FFGI/KSU, December 1992.

TABLE II-3

IRA GRAIN PURCHASES BY FARM SIZE

Farm size in H ₂	< 1	1-2	2-5	5-10	10-20	20-50	50-100	> 100	Total
<u>CORN:</u>									
# of farms	6,681	12,746	13,432	8,310	6,722	5,030	968	814	54,703
Sold to IRA	0	0	0	264	0	27	1	6	298
Percentage	0.00%	0.00%	0.00%	3.18%	0.00%	0.54%	0.10%	0.74%	0.54%
<u>BEANS:</u>									
# of farms	4,195	4,889	7,874	5,056	2,260	1,921	1,056	346	27,597
Sold to IRA	0	0	0	0	0	12	0	0	12
Percentage	0.00%	0.00%	0.00%	0.00%	0.00%	0.62%	0.00%	0.00%	0.04%
<u>RICE:</u>									
# of farms	252	0	766	693	139	466	122	102	2,540
Sold to IRA	0	0	0	0	0	3	0	19	22
Percentage	0.00%	0	0.00%	0.00%	0.00%	0.64%	0.00%	18.63%	0.87%
<u>SORGHUM:</u>									
# of farms	2,226	3,778	8,666	9,065	3,966	4,787	2,103	1,493	36,084
Sold to IRA	0	0	251	140	317	570	59	95	1,432
Percentage	0.00%	0.00%	2.90%	1.54%	7.99%	11.91%	2.81%	6.36%	3.97%

Source: Table 5, El Estado y la Comercialización de los Alimentos Básicos, CADESCA, November 1990, modified.

Notes: 1. Agrarian reform sector is not included. Corn and beans are based on the 1986/87 crop cycle. Rice and sorghum are based on the 1987/88 crop cycle. Farms which reported production in association were tabulated as follows: corn and sorghum as sorghum, corn and beans as beans, corn and some other crop as corn.

2. Since IRA's record do not show sorghum purchases during this time period, it can be assumed that the sorghum purchases were really corn.

- Two counter-arguments to the above statements can be presented on the following premises, first that the facilities were designed to operate at high rates of throughput, making them inefficient to handle the typical small lot size transacted by farmers. Second, and more important, while most purchases may not have been made from small farmers the price impact would have nevertheless been felt at their level through the generalized effect of the price flexibility coefficient¹³. While the first one is technically correct, and larger lots must have contributed to receiving and dispatching

¹³The price flexibility coefficient is the inverse of the price elasticity and reflects the impact on price levels when significant grain volumes are removed or injected into the market system.

efficiency, the low turnover rate of storage capacity (Table II-1) implied a high operational cost to IRA which negated the efficiency gains made in receiving and dispatching. Furthermore, IRA's operation of these facilities, and the public grain standards applied during the three decades did little to modernize the grain market system.

- The second argument, while theoretically correct, is handicapped by structural deficiencies within the grain market system which quite likely diminished the expected positive impacts of the market intervention efforts. For example, lack of spatial co-integration¹⁴ in the grain market system prevented an equitable distribution of the impact of the price flexibility coefficient throughout the market system. Other market distortions induced by public intervention such as price fixing, quotas, permits, and import/export restrictions distorted market price signals, further diluting whatever positive impacts the market intervention efforts might have had.
- The civil war and the break down of the research and extension service since 1979 also contributed to the dilution of any positive effect that IRA's purchases may have had. This is especially true in the conflict zones where the extension service ceased to operate completely.
- Many operational deficiencies also contributed to the dilution of any positive impact IRA might have had on farm prices, including lack of transport, misuse of quality standards (guaranteed price hardly ever paid due to quality discounts), insufficient and untimely dispensing of working capital funds, high transaction costs, form of payment (being used as a collection agency for BFA), late payments, and corruption.
- Finally, all the positive effects that IRA's grain purchases may have had at farm level during the late 1970's and the 1980's were further thwarted by the overwhelming counterbalancing power of misaligned macro-economic prices such as high inflation, overvalued currency, negative interest rates, and import inducing border prices for these commodities. All these combined to generate cheaper imports, lower real farm gate prices for grain producers (loss of 60 to 70% in real purchasing power between 1979 and 1989), and productivity stagnation as farmers were less and less able to afford technological improvements.¹⁵

¹⁴Spatial co-integration refers to the degree a market system is integrated, permitting price discovery to take place rapidly and impartially over different distances, and in reference to a base price provided by a major market, such as a wholesale market.

¹⁵For an in-depth analysis of the effects of these macro-economic prices on grain production during the 1980's see (1) Reinvigorating the Seed Industry in El Salvador, and (2) The Agricultural Inputs Industry in El Salvador, by Hugo, et. al., FIC/FSU, 1992.

b. Grain sales and consumption impact

The economic integration model used since the 1960's was based on an import substitution industrial development process which in turn relied on keeping labor costs down. To achieve and monitor this cost component, governments installed statistical information systems to determine fair minimum wages in the different sectors of the economy, estimate the actual basic food basket, and monitored the consumer price index. Furthermore, laws and regulations for consumer protection were designed and implemented, and a distribution mechanism established to bypass private and "non-competitive" market channels.

A key legal instrument in El Salvador was the Ley de Comercialización y Regulación de Precios (Decreto No. 455 de 1973) which gave the State the right to set producer and consumer prices for the goods included in the basic food basket, monopolize imports and exports, confiscate "hoarded" supplies, set tariffs, quotas, issue permits and licenses, etc. Other laws with limited duration, such as Decree No.544 in 1980, and Decree No.59 in 1984, were also passed to address temporary situations perceived detrimental to salaried workers with measures such as price caps on house rents and medical services, and maximum prices for medicines, grains, cooking oil, milk, gasoline, etc.

In order to circumvent the "uncompetitive" market channels, distribution centers were opened, and participation in market days or "ferias" was undertaken in order to bring these basic commodities directly to the consumer. The IRA, however, never developed as extensive a distribution network, nor participated in market days to the degree this was undertaken by similar institutions in neighboring countries, such as Costa Rica.

Did these efforts on the demand side contribute to keeping the cost of the basic food basket low and thus labor wages? While this might have been true during the first two decades,¹⁶ during the 1980's this side of the equation began to falter as well. Toward the end of the last decade, the price of the basic food basket increased faster than the prices of other goods and services in the economy. Given the weight these basic food items carry in the calculation of the Consumer Price Index (CPI), "it could be asserted that food prices were determining the general price level of the economy" rather than the other way around, namely by non-essential goods and services (Christophe 1990). This would suggest that by the 80's, the "low wage component through the low cost food basket" of the import substitution industrial development model no longer worked. Some key reasons are listed as follows.

- Except for small quantities of corn, beans and polished rice sold directly to consumers through the "centros de distribución" and infrequent participation in the "ferias", most of the beans, corn, and paddy rice was sold to industrial processors (including feed millers) and market agents. These buyers benefitted immediately from IRA's low price and operational subsidies. These industries and market agents did not necessarily transfer

¹⁶The inflation rate was very low during the 60's and early to mid 1970's, putting little pressure on consumer prices. The rural-urban migration rate was much lower as well.

these raw material cost savings to consumers, further contributing to the increasing erosion of the low wage component of the import substitution industrial development model.

- The growth of integrated food industries which need grains (corn and sorghum) for the production of animal feeds was another factor. As the rural-urban migration increased, urban demand for broilers, eggs and milk products also increased, requiring greater quantities of these grains to produce ever larger amounts of animal feed. Increased competition for this human food (white corn and white sorghum) by feed millers and other industrial processors began to divert greater quantities of these grains to non-human consumption. Since the cheapest substitute was and continues to be US yellow corn, this industry was in a position to put downward pressure on internal purchase prices, while creating through relative scarcity (people continue to consume tortillas) upward pressure on consumer prices.
- The "buy-high-sell-low" strategy became impossible to sustain during the inflationary time period after the late 1970's. No matter how high its purchase price, or how low its selling price, they both lagged inflation, and as the negative spread between these two prices increased (producer prices were increased faster than consumer prices), so did IRA's annual operational deficits. Thus, the program's impact at the demand or consumer side was undermined by the macro prices of the economy which were in turn shaped by fiscal and monetary policies, and El Salvador's "small and open economy".

By the time IRA was closed in 1987, this policy strategy had accumulated an operational deficit in excess of 120 million colones, and the low wage component of the import substitution industrial development model had reached a complex and dark paradox: "how could the real producer price for basic grain farmers decline, and simultaneously the real consumer prices for the same products (as such or as value added products) increase" (Christophe 1990)? There is no simple answer, but one thing became very evident - this component of the import substitution development model could no longer be justified. Amidst the macro-economic and structural reforms of the Cristiani Government, IRA was slated for privatization.

C. Strategic Reserve Scheme

In late 1989, the IRA closed and preparations for its privatization were underway. The GOES decided to establish a "Strategic Grain Reserve" composed of corn and beans, and store it in the newly constructed facilities belonging to the Banco de Fomento Agrícola (BFA). Why? Again, no simple answer will suffice. Perhaps it was thought by some government officials to continue an old scheme under a new name. Other possible reasons were the civil war which ended a year later and/or a drought during the 1991/92 crop year which reduced the corn harvest by approximately 25% and agitated the feed millers into action. Officially, the strategic reserve was established to enable the GOES to ameliorate the impacts of a severe production shortfall, and to have access to basic foods in case of an earthquake or some other natural disaster.

Since then, the reserve stock has increased substantially, reaching over 600,000 quintals of corn and nearly 100,000 quintals of beans. What has this reserve accomplished, what has been the social benefits and public costs? An evaluation

of the policies and management procedures of the Strategic Reserves are given in Section III. Also, since BFA grain handling and storage facilities are to be privatized, the issue of the reserves needs to be addressed in light of the macro-economic and structural reforms taking place, the end of the civil conflict, and the available alternatives which can provide equal or better "basic food emergency coverage" at less public costs. These issues will be addressed in Section IV.

SECTION III

EVALUATION OF CURRENT STRATEGIC RESERVE POLICIES AND MANAGEMENT

A. Introduction

In 1989, the GOES decided to no longer carry price stabilization stocks. This decision was made after the GOES initiated its new agricultural policy of less government intervention in the market and the promotion of a more efficient, private sector driven marketing system for basic grains.

Though the GOES has had a Strategic Reserve since 1989, it wasn't until August 1991 that the Ministry of Agriculture officially established guidelines for the management and distribution of the Reserve. A fund of C35 million was initially established by the GOES for the BFA to buy grain, milk, and other food for the Strategic Reserve. The Reserve was constituted in order to prevent any disruption in supplies of the staple foods (namely, corn and beans) in the event of any catastrophe, such as an earthquake, hurricane, drought, or major internal conflict (GOES, 1991a). The Reserve was to be used in an emergency until such time as the basic grains could be imported into the country. The targeted level of basic grains (including beans) in the Strategic Reserve was initially set in 1990 at 500,000 quintals (qq) of white corn and 50,000 qq of red beans, respectively. The operation (including purchasing or rotating of the stocks) of the Reserve was not to distort market prices of basic grains.

The policy of the GOES of having a Strategic Reserve was to be implemented in three stages.

* The first step (commencing in about the second quarter of 1992) was that the GOES would use the storage and drying facilities at the BFA plants for storing and maintaining the Strategic Reserve.

* The second step (implemented about January 1993) was that the GOES would lease private sector storage facilities to store and maintain the Strategic Reserve. Such storage facilities would include the to-be-sold storage facilities of BFA at locations such as Kilo-5 and San Rafael Cedros.

* The third step (implemented about the end of December 1993) was that the BFA would no longer manage the Strategic Reserve, instead the Strategic Reserve would be managed through a system of certificates of deposits and/or other negotiable instruments functioning within a highly competitive marketing system of these basic grains (GOES, 1991a).

The Strategic Reserve consists of both national and imported white corn and beans without distinction made between imported and national. In this Section, the purchasing, selling, storing, and other management activities of the Strategic Reserve are described, developed in terms of costs, and evaluated by commodity type (that is, imported white corn, national white corn, and red beans). In addition, the results and implications of current Strategic Reserve policies and management are given.

B. Purchases

BFA consults with the Ministry of Agriculture (MAG) before purchasing corn and beans for the Reserve. Corn and beans are purchased for the Strategic Reserve soon after harvest from producers and truckers (assemblers). BFA first determines the buying price for corn and beans by collecting the average trucker price (price corn is sold to the wholesaler) on a given day for corn and beans in as many as 28 cities. In addition, the BFA obtains an average trucker price for corn and beans for various cities in El Salvador from the Government Agricultural Statistics Agency (DGEA). BFA typically uses the national average trucker price (minus 2 colones) for corn or beans as its purchase price. Once the price has been approved by the President of BFA and clearance for buying corn or beans has been given by MAG, the managers of each of the BFA storage facilities (at Sirama, Sitio del Niño, San Rafael Cedros, and Kilo-5) are alerted to start preparation for the purchasing of the corn or beans. An announcement of BFA's intentions to purchase corn or beans is then made in the local newspapers. Producers and truckers (assemblers) are then allowed to bring in their product for sale directly to the four BFA facilities.

1. Corn

In the past three years (1990-1992), BFA has been building its actual Strategic Reserves of white corn. BFA purchased 81,426 qq, 245,158 qq, 87,794 qq, and 0 qq of national corn in 1989/90, 1990/91, 1991/92, and 1992/93, respectively, for the Strategic Reserve (Figure III-1, Appendix 1, BFA-1). The quantity of ending stocks of white corn (imported and national) has increased from 12,400 quintals at the end of 1989 to 633,681 quintals in 1992. The GOES increased the targeted level of corn in the Strategic Reserve from 500,000 qq to 1,000,000 qq as a response to the drought in 1991 which reduced national production by about 25%.

a. Imported corn

(1) Importing process

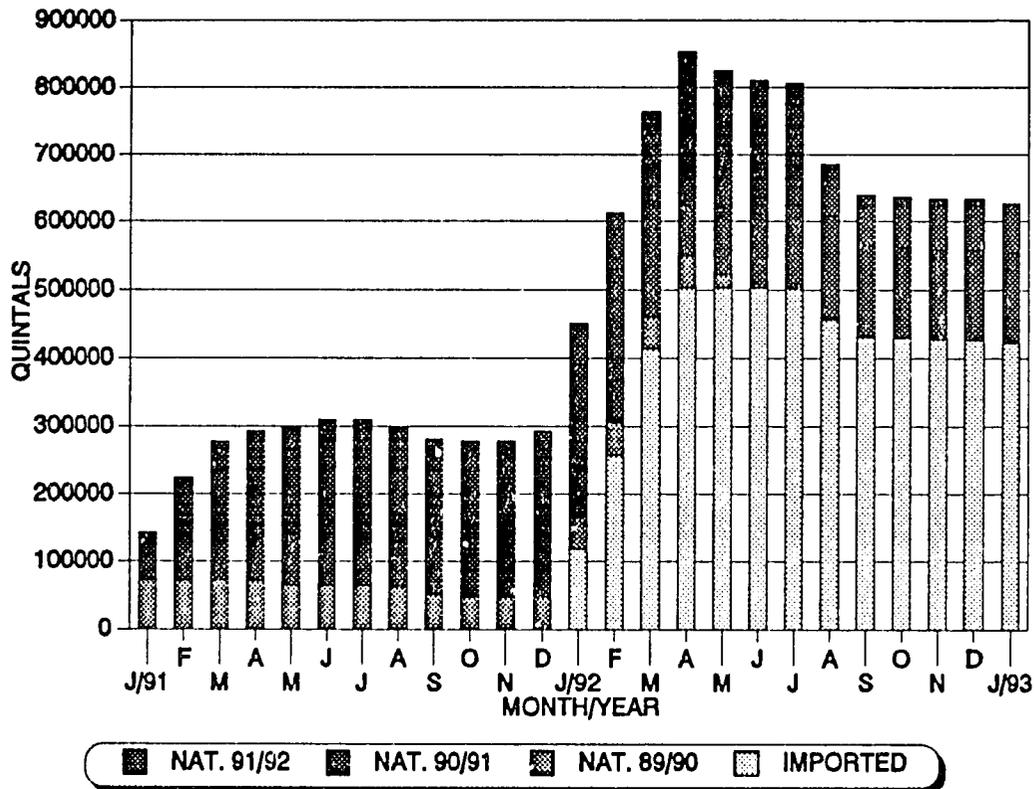
The most recent importation of white corn by the Government of El Salvador was made in 1991 in response to the drought. After being authorized by MAG to import the corn, BFA immediately faxed various companies in the U.S. for quotes for white corn. Within a couple days various offers were received by the BFA. BFA officials tabulated the different offers and set up a comparative financial analysis and an analysis of the quality norms for each of the offers. The Board of Directors of BFA, then, met and awarded the contract to one of the offerees. The company awarded the contract was immediately notified and the irrevocable Letter of Credit was set up. Once the corn arrived at the port on December 26, 1991, a private company hired by the BFA supervised the discharge of the corn and handled any problems that arose.

(2) Time to import

According to the 1991 corn importation results, from the time the request for quotations was faxed by BFA (on October 31) to the supplying firms until the time the shipment of white corn reached the port at Acajutla (on December 26), nearly two months elapsed. This period of time could have been shortened considerably

if the Letter of Credit had been set up initially by BFA with a U.S. bank. The time to import should have closely approximated that experienced by the yellow corn and wheat importers. According to Bartlett and Company, a major white corn exporter from the U.S., delivery of white corn could be made within one month after a Letter of Credit has been opened.

FIGURE III-1
STRATEGIC RESERVE
CORN



(3) Cost of importing corn

There was no white corn imported in 1989-90. In 1991, 506,227 qq was imported in December from the USA at \$159.52/mt (cif Acajutla) or C1301.68/mt or C59.17/qq (BFA-1). Once the corn reached the port, charges (of C17.16/qq) for demurrage, insurance, transport, fumigation, financing, etc. were incurred (Table III-1). The total cost of purchasing the imported corn (not including the cost of financing) was C36,569,838.

The current cost of purchasing and importing (cost and freight to Acajutla) white corn into El Salvador from the US (assume a minimum of 22,000 mt is imported) is about \$128/mt and \$20/mt, respectively. That is a total cost of \$148/mt or C1,281.68/mt or C58.26/qq (Bartlett & Co. estimate on April 16, 1993). Adding

C1/qq of insurance (paid by the buyer) to the total cost equals C59.26/qq. The price of importing white corn is not likely to change more than \$0.50/mt over the next few months (Weidemaier, personal communication). Since December 1991, the exchange rate (Colones/US\$) has changed from C8.16/US\$ to C8.66/US\$.

After the corn arrives at the port there are additional charges (an added \$25.20/mt or C218.23/mt or C9.92/qq more in the case of the corn imports in 1991) as mentioned in Table III-1. Adding C9.92/qq to the cif price equals a composite final import price of C69.18/qq.

TABLE III-1
 COST OF IMPORTING WHITE CORN (22,000 T.M.)
 U.S. GRADE #2
 From the United States
 in December 1991

ITEM	COST
PRICE CIF ACAJUTLA (US\$/MT)	159.52
PRICE OF CIF ACAJUTLA (C/MT)	1,301.68
CORRESPONDENCE (1.5%)	19.53
EXCHANGE OF CURRENCY (1%)	13.02
DEMURRAGE	32.65
SUPERVISION OF DISCHARGE OF CORN	0.35
SHRINKAGE (1.6%)	20.83
FUMIGATION	2.86
INSURANCE	6.25
TRANSPORT	37.62
OPERATING EXPENSES (5%)	65.08
TAXES (1%)	13.02
TOTAL COSTS (C/MT)	1,512.89
TOTAL COSTS (C/QQ)	68.77
FINANCING COSTS (22% FOR 6 MONTHS).....	166.42
TOTAL COSTS WITH FINANCING (C/MT)	1,679.31
TOTAL COSTS WITH FINANCING (C/QQ)	76.33
EXCHANGE RATE US \$1.00 = ¢8.16	

Source: BFA-2

(4) Quality of imported corn

The quality of corn imported by GOES in December 1991 was U.S. Grade #2. The following information, based on three different sampling dates, characterizes the specific quality of corn imported.

Item	Avg. Conc. 26/12/91	Avg. Conc. 29/12/91	Avg. Conc. 2/01/92
Humidity	14.30%	14.25%	14.13%
Impurities	2.95%	2.33%	1.94%
Damaged Grains	7.27%	7.61%	7.19%
Mechanically Damaged Grains	2.24%	2.63%	1.72%
Heat-Damaged Grains	1.20%	1.10%	1.20%
Discolored Grains	1.29%	1.45%	0.99%
Broken Grains	2.98%	2.59%	2.77%
Other Grains			
- Soybeans	0.32%	0.10%	0.14%
- Sorghum	0.28%	0.14%	0.06%
- Wheat	0.43%	0.14%	0.14%

Source: BFA-3

b. National corn

BFA has been buying national corn for the Strategic Reserve principally during the months of December-March (Figure III-2, Table III-2). BFA buys its corn from producers and truckers that bring their corn to the BFA storage facilities.

The BFA follows various quality norms for purchasing national corn. According to the BFA, acceptable levels of concentration of the various factors (humidity, impurities, broken grains, and damaged grains) are as given below.

Factors of Quality	Acceptable Without Discount	Maximum With Discount
Humidity	12%	18%
Impurities	1%	4%
Broken Grains	4%	4%
Damaged Grains	10%	10%

Source: BFA-4

Since 1991, the quality of national corn purchased has been laboratory tested at the time of purchase. Since the concentration of moisture and impurities of the white corn purchased has averaged about 13.80% and 2.29%, respectively, the purchase price has, on average, been discounted. The concentration of broken grains and damaged grains has not been reported.

2. Beans

BFA has also been building its actual Strategic Reserve of beans up to a current (16/02/93) level of 87,136 quintals (Appendix 2). This is up from less than 30,000 quintals in January 1991 (Figure III-3). The GOES increased the targeted level of beans in the Strategic Reserve from 50,000 qq to 100,000 qq in 1991.

FIGURE III-2

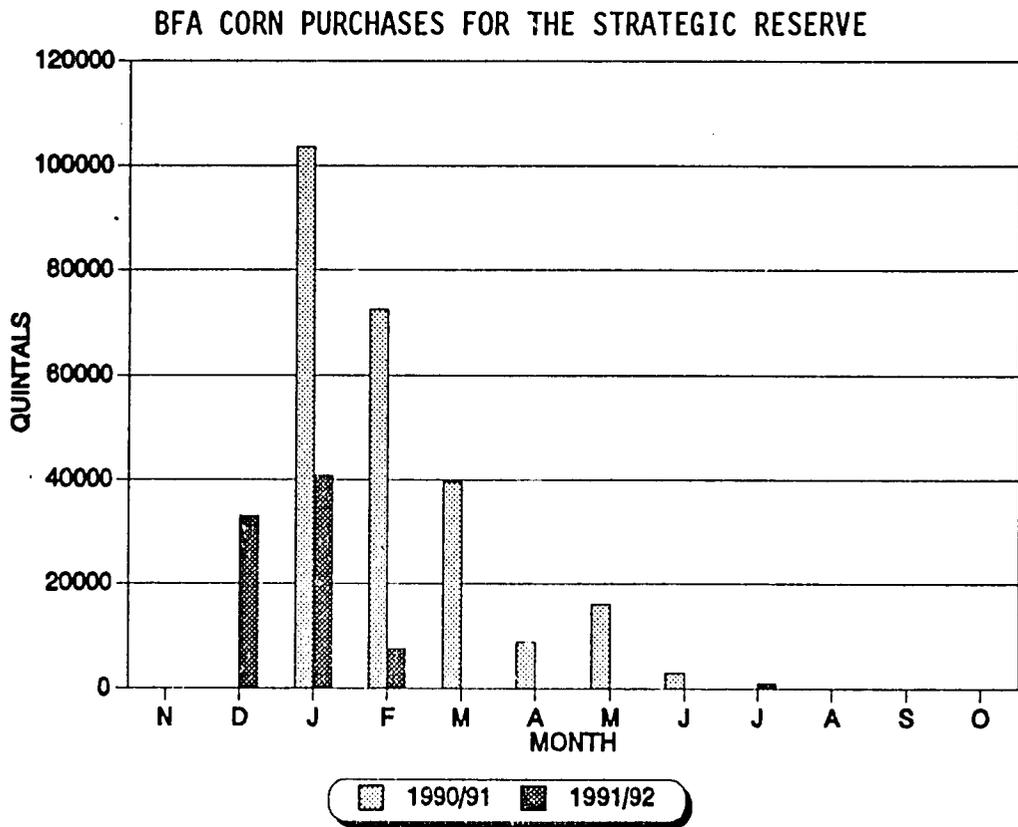
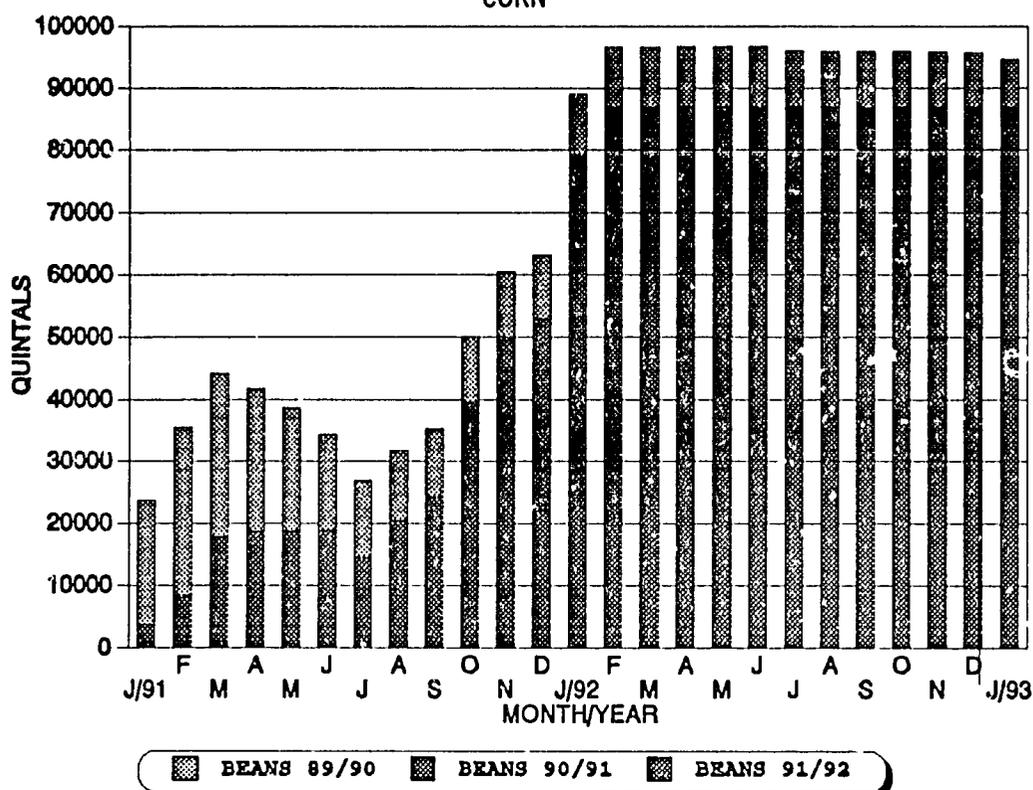


TABLE III-2

BFA PURCHASES OF NATIONAL CORN FOR THE STRATEGIC RESERVE

MONTH	1990/91 PURCHASES	1991/92 PURCHASES
November	--QQ-- 0	--QQ-- 0
December	0	32989
January	103682	40832
February	72518	7635
March	39546	0
April	8875	0
May	16158	0
June	3038	0
July	5	1000
August	0	0
September	0	0
October	78	0

FIGURE III-3
STRATEGIC RESERVE
CORN



a. Imported beans

BFA has bought some red beans that were not produced in El Salvador, although the beans were bought in El Salvador. The process of buying such beans is no different than buying domestic beans. The beans are brought to BFA's storage facilities by trucker-merchants, oftentimes the same truckers that sell national beans to BFA.

b. National beans

BFA has been buying red beans for the Strategic Reserve principally during the months of December-March (Figure III-4, Table III-3). For the Strategic Reserve, BFA purchased 86,811 qq, 56,990 qq, 30,383 qq, and 0 qq of national and imported beans in 1989/90, 1990/91, 1991/92, and 1992/93 (as of January 26, 1993, Figure III-3, Appendix 2, BFA-1). Producers and truckers bring their beans for sell directly to the four BFA storage facilities.

The BFA follows various quality norms for purchasing beans for the Strategic Reserve. According to the BFA, acceptable levels of the various factors (humidity, impurities, broken grains, and damaged grains) are as given below.

Factors of Quality	Acceptable Without Discount	Maximum With Discount
Humidity	12%	15%
Impurities	1%	2%
Broken Grains	2%	2%
Damaged Grains	7%	7%
Contrasting Colored Beans	3%	3%

Source: BFA-5

FIGURE III-4

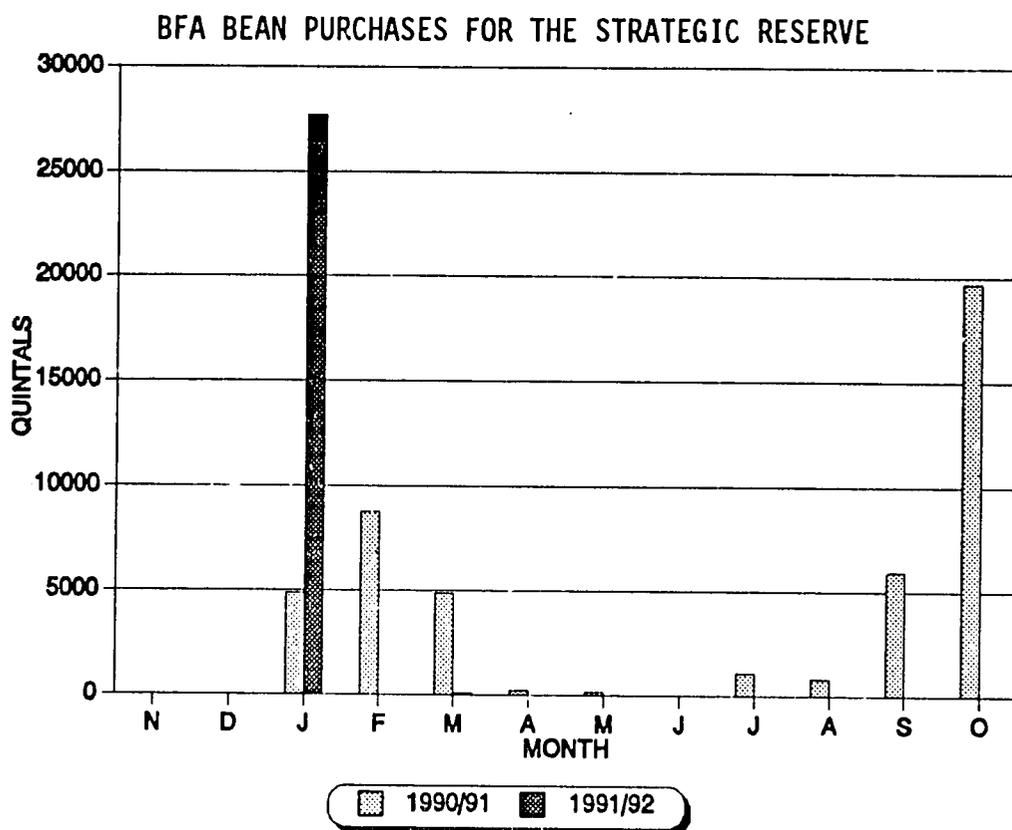


TABLE III-3

BFA BEAN PURCHASES FOR THE STRATEGIC RESERVE

MONTH	1990/91 PURCHASES	1991/92 PURCHASES
	--QQ--	--QQ--
November	0	0
December	0	0
January	4866	27703
February	8752	0
March	4869	119
April	225	0
May	162	6
June	0	0
July	1100	0
August	846	0
September	5946	0
October	19683	0

Since 1991, the quality of the beans purchased by BFA has been laboratory tested at the time of purchase. Since the concentration of moisture of the beans purchased has averaged about 15.64%, the purchase price has, on average, been discounted. The concentration of impurities, broken grains, damaged grains, and contrasting colored beans has not been reported.

C. Sales

Corn and beans are typically sold from the Reserve during May-September. When selling its corn or beans from the Reserve, the Strategic Reserve Unit of the BFA has used two methods in fixing its selling price for these products. The steps involved in the first method used by the BFA are as follows:

- determine the national average trucker price in the market based on national price information from DGEA and the BFA's branch banks in cities throughout El Salvador; for example, in the plan for fixing the selling price for corn in July 1992, BFA determined the national average trucker price in the market to be C90.18/qq (BFA-6).
- from this average price, potential selling prices including rebates of 5%, 7%, and 10% were calculated. These rebates were justified for three reasons: (1) because the trucker-merchant must incur additional costs of transport to and from the storage facility of the BFA (in the example, an average cost of C1.50/qq was figured), (2) because the trucker-merchant may incur additional packaging and handling costs (in the example, an average C1.00/qq was figured), and (3) to provide an adequate incentive to the trucker-merchant to come to purchase the corn or beans from the BFA (in the example, a C5.00/qq was figured).
- The national average trucker price and the prices including the various magnitudes of rebates are then given to the President of the BFA to decide at which price the corn or beans should be sold. The President of the BFA then must receive the approval for employing this selling price from the Minister of Agriculture. In the example, a selling price of C85/qq was approved.

Another version of this method has been for the BFA to collect average trucker prices from each zone (Occidental, Central, and Oriental) in El Salvador, then to determine the prices for each zone that include the 5%, 7%, and 10% rebates. This set of prices for each zone are then given to the President of BFA for his final decision.

A second method, apparently being used currently by the BFA, for fixing its price for selling the corn and beans in the Reserve is where the BFA recommends a minimum selling price (a price substantially below the market price paid to the truckers) to the GOES. Once GOES approves the minimum price, the BFA tries to sell its corn and/or beans at a price that is both 'at or above' the minimum selling price and 'at or below' the current trucker price in the market. This latter method allows the BFA to change its selling price as market conditions dictate without having to seek approval again from the GOES. When using the former method, BFA had to obtain approval from the GOES before it could change its selling price.

1. Corn

Sales of corn from the Strategic Reserve are generally made late in the crop season (June-September) when domestic supplies are generally low and seasonal prices tend to reach their peak (Figure III-5, Table III-4).

FIGURE III-5.
STRATEGIC RESERVE CORN SALES

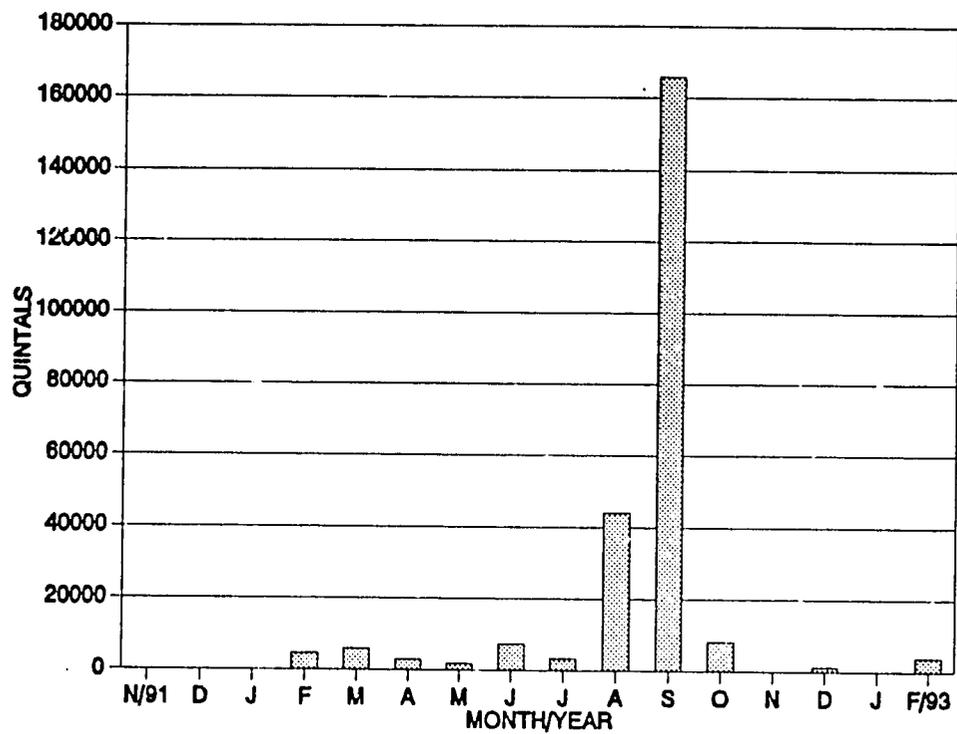


TABLE III-4
STRATEGIC RESERVE CORN SALES

MONTH	CORN SALES
	--QQ--
November 1991	0
December	0
January	0
February	4810
March	5978
April	3000
May	38710
June	7430
July	3345
August	44070
September	165713
October	8189
November	123
December	1500
January	0
February 1993	3975

a. Imported corn

(1) Sales history

The history of imported corn stock rotation (sales) by location is summarized in Figure III-6 and Table III-5. As of February 16, 1993 only about 17% of the total corn imported in 1991 had been sold. In 1992, 77,021 qq of the imported corn was sold to feed manufacturers and individuals at a price of \$66.65/qq.

(2) Sales quality

The quality of the imported corn has deteriorated rapidly since it arrived to El Salvador in 1991. The average concentration of broken and insect-damaged grains in the imported corn sold increased dramatically over time (see Part E.3 - Cost of Quality Deterioration). The imported corn sold in 1992 was sold by the BFA at more than a 6% discount from the national corn sold.

(3) Value of sales

The value of sales of imported corn (as of February 16, 1993) totals C5,133,360 (Table III-6).

FIGURE III-6

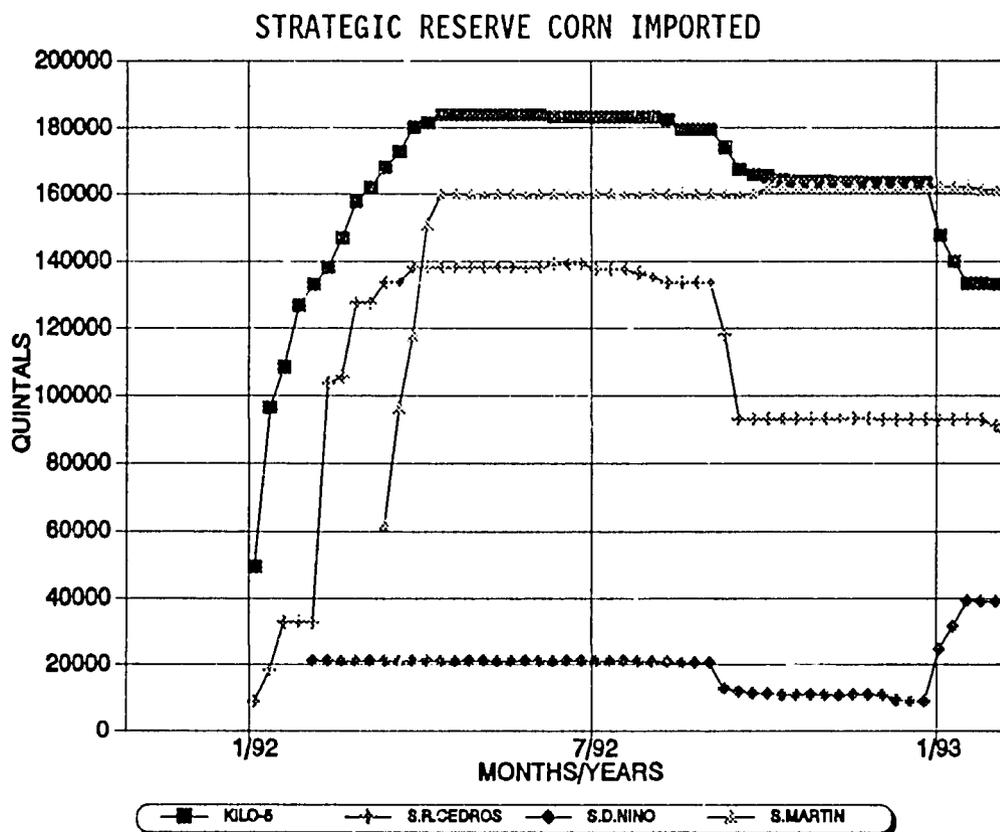


TABLE III-5

LOCATION OF IMPORTED CORN IN THE STRATEGIC RESERVE

Day/Month/Year	Kilo-5	S.R.Cedros	S.D.Nino	S.Martin
	qq	qq	qq	qq
07/01/92	49528.94	8893.79		
14/01/92	96506.89	18480.1		
21/01/92	108520.6	32878.78		
28/01/92	126698.2	32878.78		
04/02/92	132974.1	32878.78	21232.88	
11/02/92	138234.4	103791.3	21232.88	
18/02/92	13879.8	105482.4	21232.88	
25/02/92	157668.1	127588.1	21232.88	
03/03/92	162100	127588.1	21232.88	
10/03/92	168034.1	133652.8	21232.88	
17/03/92	172687.1	133652.8	21232.88	61891.94
24/03/92	180236.1	138095	21232.88	96590
30/03/92	181510	138095	21232.88	118009
07/04/92	183810.2	138095	21232.88	151003.7
21/04/92	183810.2	138095	21232.88	160088.6
28/04/92	183810.2	138095	21232.88	160088.6
05/05/92	183810.2	138095	21232.88	160088.6
12/05/92	183810.2	138095	21232.88	160088.6
19/05/92	183810.2	138095	21232.88	160088.6
26/05/92	183810.2	138095	21232.88	160088.6
02/06/92	183810.2	138095	21232.88	160088.6
09/06/92	183179.2	139125.1	21232.88	160088.6
16/06/92	183179.2	139125.1	21232.88	160088.6
24/06/92	183179.2	139125.1	21232.88	160088.6
07/07/92	183165.2	137534.9	21232.88	160088.6
14/07/92	183162.2	137534.9	21232.94	160088.6
21/07/92	183162.2	137534.9	21232.94	160056.7
28/07/92	183162.2	136461.9	21083.84	160056.7
11/08/92	183162.2	135364.3	21080.84	160056.7
18/08/92	182495.8	133530.8	21080.84	160056.7
25/08/92	179461.4	133530.8	20680.84	160056.7
01/09/92	179461.4	133530.8	20680.84	160056.7
08/09/92	179461.4	133530.8	20680.84	160056.7
14/09/92	174075.5	118238.7	12933.44	160056.7
22/09/92	167307.2	93115.7	12019.14	160056.1
29/09/92	165849.2	93115.7	11533.44	160056.1
06/10/92	165329.2	93115.7	11343.44	162315.9
13/10/92	164437.2	93115.7	11093.44	162315.9
20/10/92	163754.2	93115.7	10993.44	162315.9
27/10/92	163754.2	93115.7	10953.44	162315.9
03/11/92	163754.2	93115.7	10953.44	162315.9
10/11/92	163654.2	93115.7	10953.44	162315.9
17/11/92	163654.2	93293.84	10953.44	162315.9
24/11/92	163441.2	93278.84	10953.44	162315.9
01/12/92	163441.2	92978.84	10953.44	162315.9
08/12/92	163441.2	92978.84	9453.44	162315.9
14/12/92	163441.2	92978.84	8966.94	162315.9
28/12/92	163441.2	92978.66	8966.94	162315.9
12/01/93	147624.8	92978.66	2472.24	162315.9
19/01/93	139939	92978.66	31619.34	162315.9
26/01/93	133290.6	92978.66	39260.14	162315.9
02/02/93	133290.6	92986.56	39260.14	161510.9
09/02/93	133072.6	91200.85	39260.14	161510.9
16/02/93	132790.6	85337.41	39260.14	161510.9

TABLE III-6

HISTORY OF PURCHASES, SALES, AND PRICES OF CORN IN THE STRATEGIC RESERVE

Commodity	Initial Stock (QQs)	Purchases		Sales			Other Adjustments to Stock Level	Ending Stock (QQs)	
		Quantity (QQs)	Price Unit ¢	Value Total ¢	Quantity (QQs)	Price Unit ¢			Value Total ¢
YEAR 1990									
National Corn 89/90	12,399	81,426	64.17	5,225,056	14,121	66.09	933,202	(124)	79,580
National Corn 90/91	---	19,387	69.98	1,356,702	---	---	---	---	19,387
Total	12,399	100,813		6,581,758	14,121		933,202		98,967
YEAR 1991									
National Corn 89/90	79,580	---	---	---	28,364	72.88	2,067,168	(3,515)	47,701
National Corn 90/91	19,387	225,771	70.36	15,885,248	20,274	72.88	1,477,569	---	224,884
National Corn 91/92	---	33,060	70.05	2,315,853	---	---	---	---	33,060
Total	98,967	258,831		18,201,101	48,638		3,544,737		305,645
YEAR 1992									
National Corn 89/90	47,701	---	---	---	46,947	50.19	2,356,230	624	1,378
National Corn 90/91	224,884	---	---	---	93,628	70.00	6,553,705	725	130,531
National Corn 91/92	33,060	55,382	71.28	3,947,520	14,373	72.02	1,035,188	---	74,069
Imported Corn	---	506,227	72.24	36,569,838	77,021	66.65	5,133,360	1,503	427,703
Total	305,645	561,609		40,517,358	231,969		15,078,483		633,681

* Purchase price includes cif Acajutla charges and other port and transport costs.

b. National corn

(1) Sales history

The history of national corn stock rotation (sales) by location and by crop year is summarized in Figures III-7 through III-10 and Table III-7. Sales of national corn in each of the crop years, 1989/1990, 1990/91, and 1991/1992 were as follows:

-----SALES-----					
CROP YEAR	1990	1991	1992	TOTAL	TOTAL PURCHASES
	-----QQ-----				
1989/90	14,121	28,364	46,947	89,432	81,426*
1990/91	-----	20,274	93,628	113,902	245,158
1991/92	-----	-----	14,373	14,373	87,794

* BFA had no records of purchases before June 1990

The 1989/90 corn was sold at C66.09/qq in 1990. In 1991, the 1989/90 and 1990/91 corn was sold at the same price, C72.88/qq. In 1992, the 1989/90 corn had deteriorated badly, consequently, was sold to feed millers at only C50.19/qq, while the 1990/91 corn was sold at C70.00/qq, and the 1991/92 corn was sold at C72.02/qq (Table III-6). Through April 1993, only 521 qq of national maize (1990/91) was sold in Sirama for C65/qq.

(2) Sales quality

National corn has generally deteriorated less and at a slower pace than the imported corn. Nevertheless, the deterioration in the quality of national corn is significant as indicated in the difference in the 1992 selling price of C2.02/qq between the 1990/91 and the 1991/92 corn (see Part E.3 Cost of Quality Deterioration).

(3) Value of sales

The total value of sales of the national corn (as of December 31, 1992) is given below:

-----SALES-----				
CROP YEAR	1990	1991	1992	TOTAL PURCHASES
	-----QQ-----			
1989/90	933,202	2,067,168	2,356,230	5,356,600
1990/91	-----	1,477,567	6,553,705	8,031,272
1991/92	-----	-----	1,035,188	1,035,188
TOTAL	933,202	3,544,735	9,945,123	14,423,060

Source: BFA-1

FIGURE III-7

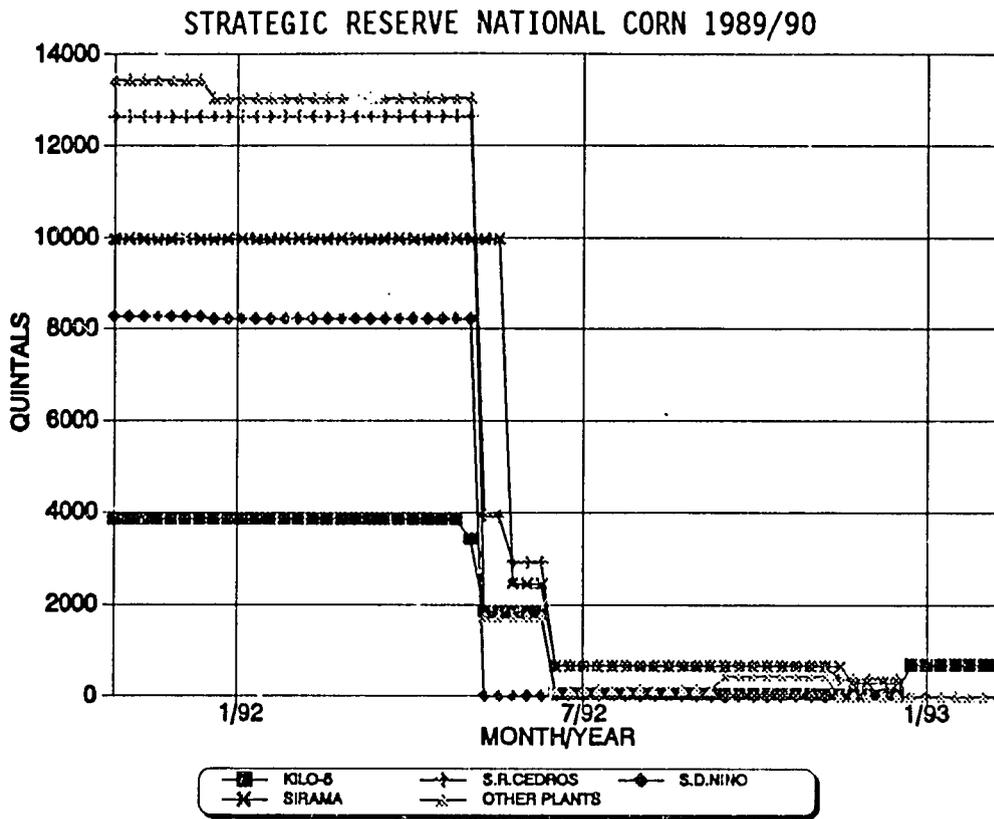


FIGURE III-8

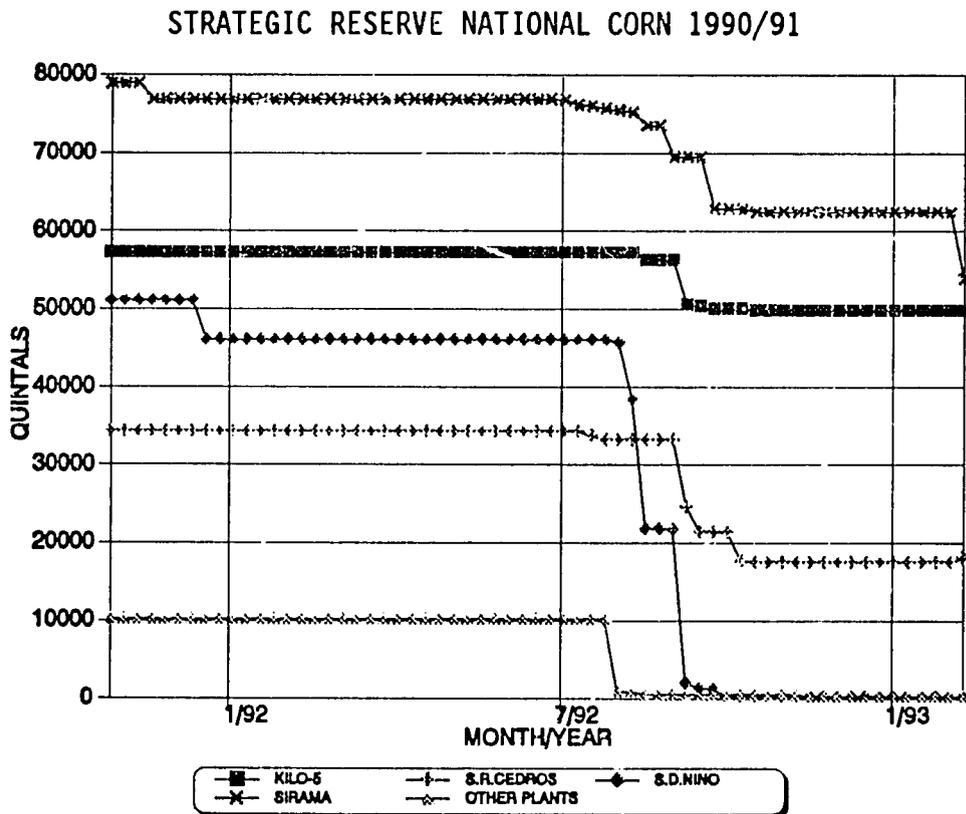


FIGURE III-9

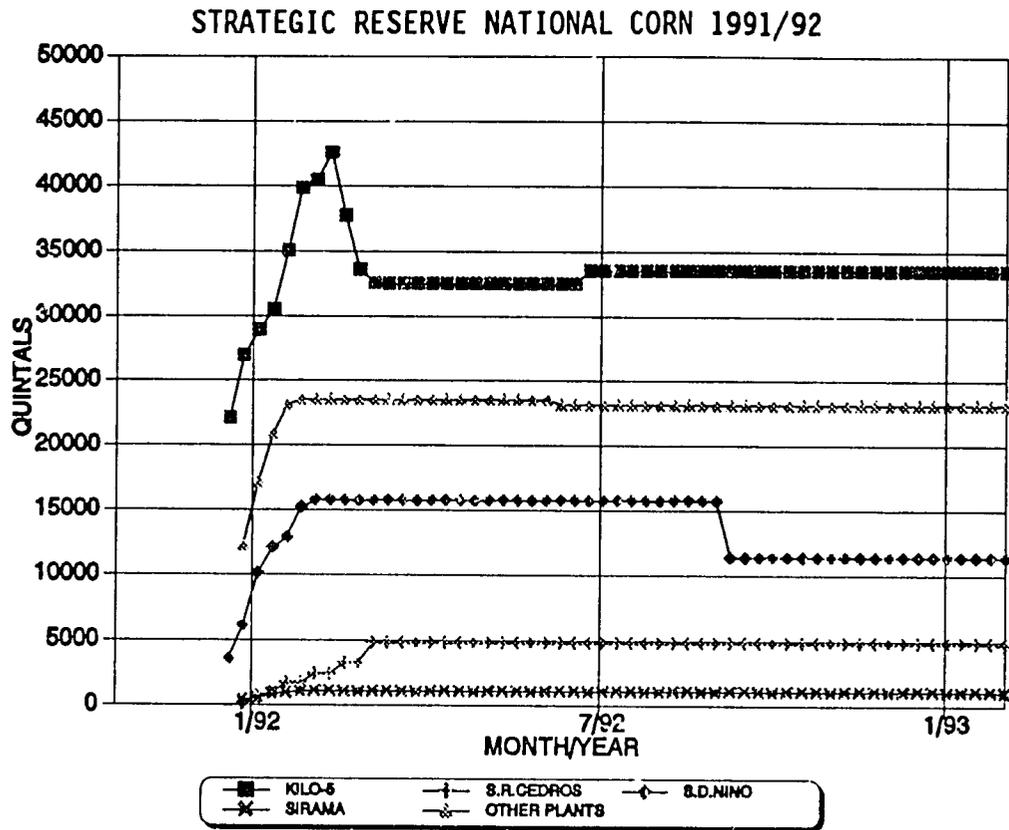


FIGURE III-10

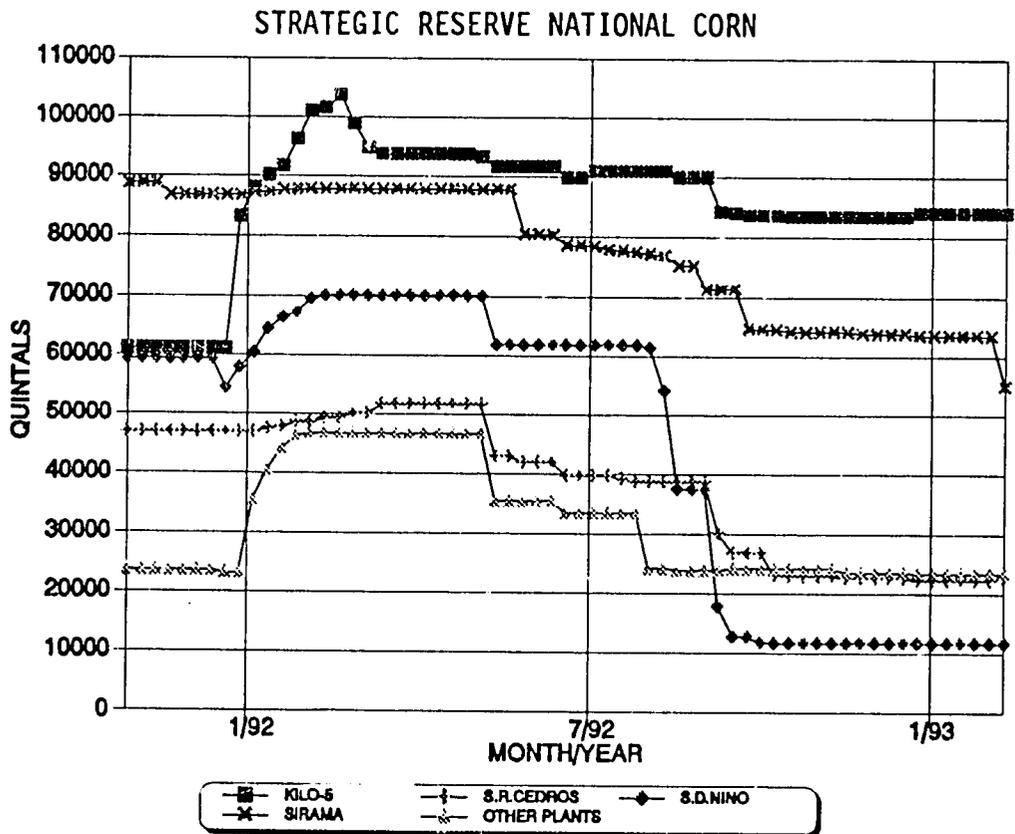


TABLE III-7
LOCATION OF NATIONAL CORN IN THE STRATEGIC RESERVE

DAY/MONTH/YEAR	KILO-5	S.R. CEOROS	S.D.NINO	SIRAMA	OTHER PLANTS
29/10/91	61161.15	46947.59	59407.18	88887.21	23686.49
04/11/91	61161.15	46947.59	59407.18	88887.21	23686.49
12/11/91	61161.15	46947.59	59407.18	88887.21	23686.49
19/11/91	61161.15	46947.59	59407.18	86887.21	23686.49
26/11/91	61161.15	46947.59	59407.18	86887.21	23686.49
03/12/91	61161.15	46947.59	59403.18	86887.21	23686.49
10/12/91	61161.15	46947.59	59403.18	86887.21	23686.49
17/12/91	61160.15	46947.59	54352.18	86849.21	23275.39
23/12/91	83274	46947.59	57972.93	86849.21	23275.39
07/01/92	88121.2	46988.49	60437.03	87260.58	35540.91
14/01/92	90113.63	47599.96	64477.85	87385.04	40445.01
21/01/92	91708.81	47911.08	66435.13	87772.57	44186.01
28/01/92	96205.92	48652.5	67270.47	87821.09	46454.4
04/02/92	101027.5	48652.5	69599.95	87951.49	46828.06
11/02/92	101604	49389.04	70130.18	87951.49	46828.06
18/02/92	103733.4	49389.04	70130.18	87951.49	46828.06
25/02/92	98923.37	50206.44	70130.18	87951.49	46828.06
03/03/92	94793.37	50206.44	70130.18	87951.49	46828.06
10/03/92	93745.76	51747.76	70130.18	87951.49	46828.06
17/03/92	93732.37	51747.76	70130.18	87951.49	46828.06
24/03/92	93732.37	51747.76	70130.18	87951.49	46828.06
30/03/92	93732.37	51747.76	70130.18	87951.49	46828.06
07/04/92	93732.37	51747.76	70130.18	87951.49	46828.06
21/04/92	93732.37	51747.76	70130.18	87951.49	46828.06
28/04/92	93732.37	51747.76	70130.18	87951.49	46828.06
05/05/92	93302.84	51747.76	70130.18	87951.49	46828.06
12/05/92	91732.37	43047.76	61930.18	87951.49	35528.06
19/05/92	91732.37	43047.76	61930.18	87951.49	35528.06
26/05/92	91732.37	42047.76	61930.18	80441.49	35528.06
02/06/92	91732.37	42047.76	61930.18	80441.49	35528.06
09/06/92	91732.37	42047.76	61930.18	80441.49	35528.06
16/06/92	89932.37	39807.28	61930.18	78641.49	33580.28
24/06/92	89932.37	39807.28	61930.18	78641.49	33580.28
07/07/92	90932.37	39807.28	61915.18	78581.49	33580.28
14/07/92	90932.37	39807.28	61899.18	77958.69	33580.28
21/07/92	90932.37	39242.98	61890.18	77787.99	33580.28
28/07/92	90932.37	38742.98	61890.18	77508.09	33580.28
11/08/92	90932.37	38742.98	61518.34	77235.89	24273.98
18/08/92	90932.37	38736.98	54189.44	77003.89	24273.98
25/08/92	89977.87	38736.98	37574.64	75346.89	23898.83
01/09/92	89977.87	38736.98	37574.64	75346.89	23898.83
08/09/92	89977.87	38736.98	37574.64	71350.89	23898.83
14/09/92	84285.11	30110.68	17865.44	71350.89	23897.83
22/09/92	84059.16	26873.68	12811.44	71350.89	24203.71
29/09/92	83719.16	26873.68	12711.44	64709.59	24201.61
06/10/92	83719.16	26873.68	11761.44	64637.59	24201.61
13/10/92	83711.16	23175.58	11721.44	64637.59	24201.61
20/10/92	83511.16	23003.58	11720.44	64264.59	24201.61
27/10/92	83511.16	23003.58	11720.44	64264.59	24201.61
03/11/92	83488.16	23003.58	11720.44	64264.59	24201.61
10/11/92	83488.16	23003.58	11720.44	64264.59	24201.61
17/11/92	83488.16	22697.18	11719.44	64265.39	23528.53
24/11/92	83488.16	22697.18	11719.44	63912.39	23528.53
01/12/92	83488.16	22697.18	11719.44	63912.39	23528.53
08/12/92	83488.16	22697.18	11719.44	63912.39	23528.53
14/12/92	83488.16	22697.18	11719.44	63912.39	23528.53
28/12/92	84126.47	22324.57	11719.44	63604.26	23522.58
12/01/93	84126.47	22324.57	11719.44	63604.26	23522.58
19/01/93	84126.47	22324.57	11719.44	63604.26	23522.58
26/01/93	84126.47	22324.57	11719.44	63604.26	23522.58
02/02/93	84126.47	22324.57	11719.44	63604.26	23522.58
09/02/93	84126.47	22324.57	11719.44	63604.26	23522.58
16/02/93	84126.47	22880.41	11719.44	54986.52	23522.58

2. Beans

a. Imported beans

Beans produced outside of El Salvador, imported into El Salvador and purchased by the BFA in El Salvador are not segregated in storage from the national beans bought and stored by the BFA. The history, quality, and value of sales of the beans in the Reserve are given below under national beans.

b. National beans

(1) Sales history

The history of bean stock rotation (sales) by location and by crop year is summarized in Figures III-11 through III-14 and Table III-8.

From 1990 until April 20, 1993, a total of 77,183 qq of beans have been sold from the Reserve by the BFA (Figure III-15, Table III-9).

The price of 58,700 qq of 1989/90 beans sold in 1990 was C230.10/qq. In 1991, 17,528 qq of 1989/90 beans and 361 qq of 1990/91 beans were sold at the same price of C223.28/qq. In 1992, only 594 qq of 1989/90 and 1990/91 beans were sold. The 483 qq of 1989/90 beans that were sold had deteriorated to the extent that the BFA received only C81.59/qq, while the 1990/91 beans sold for C278.86 (Table III-10). So far in 1993, BFA has sold 7841 qq of 1989/90 beans of very poor quality for a price of C80/qq.

(2) Sales quality

BFA has sold all remaining 1989/90 beans. Since 1992, the beans were in poor quality having become hard and difficult to cook in a short period of time. Although relatively few quintals of the 1990/91 and 1991/92 beans have been sold, the quality of these beans remains fair to good.

(3) Value of sales

The value of sales of the beans (as of December 1992) is given below:

CROP YEAR	-----SALES-----			TOTAL PURCHASES
	1990	1991	1992	
	-----qq-----			
1989/90	13,525,278	39,136,528	39,408	52,701,214
1990/91	-----	80,604	30,953	111,557
1991/92	-----	-----	-----	-----
TOTAL	13,525,278	3,994,256	70,361	17,589,895

Source: BFA-1

FIGURE III-11

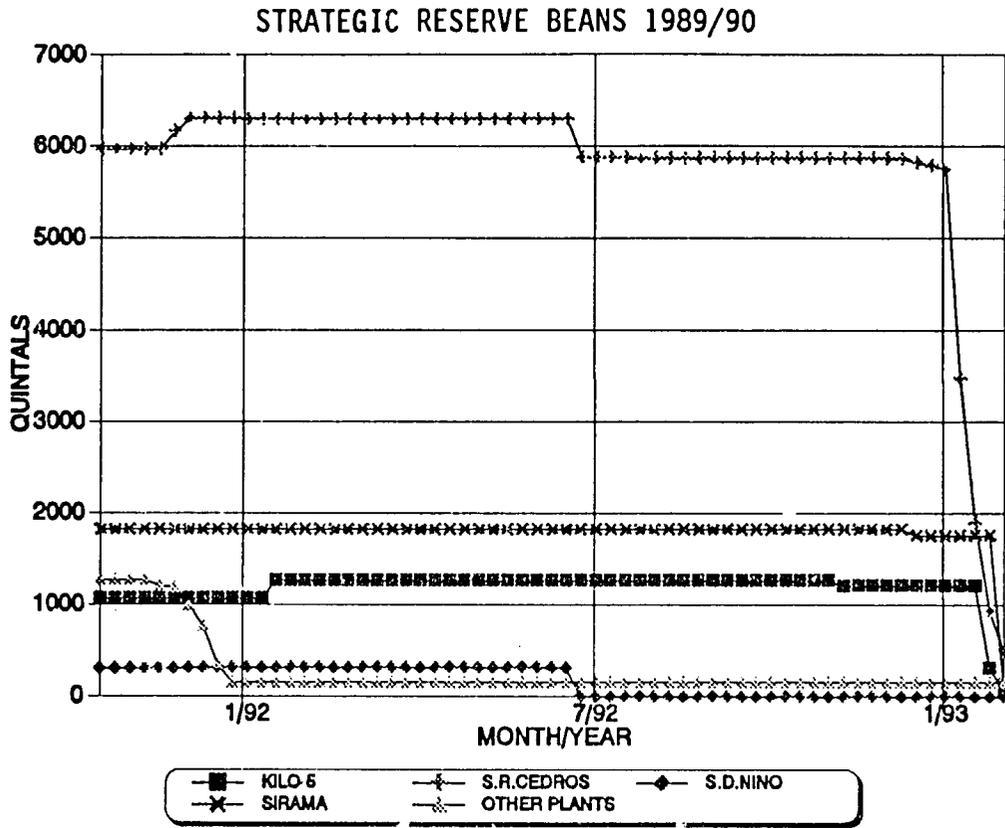


FIGURE III-12

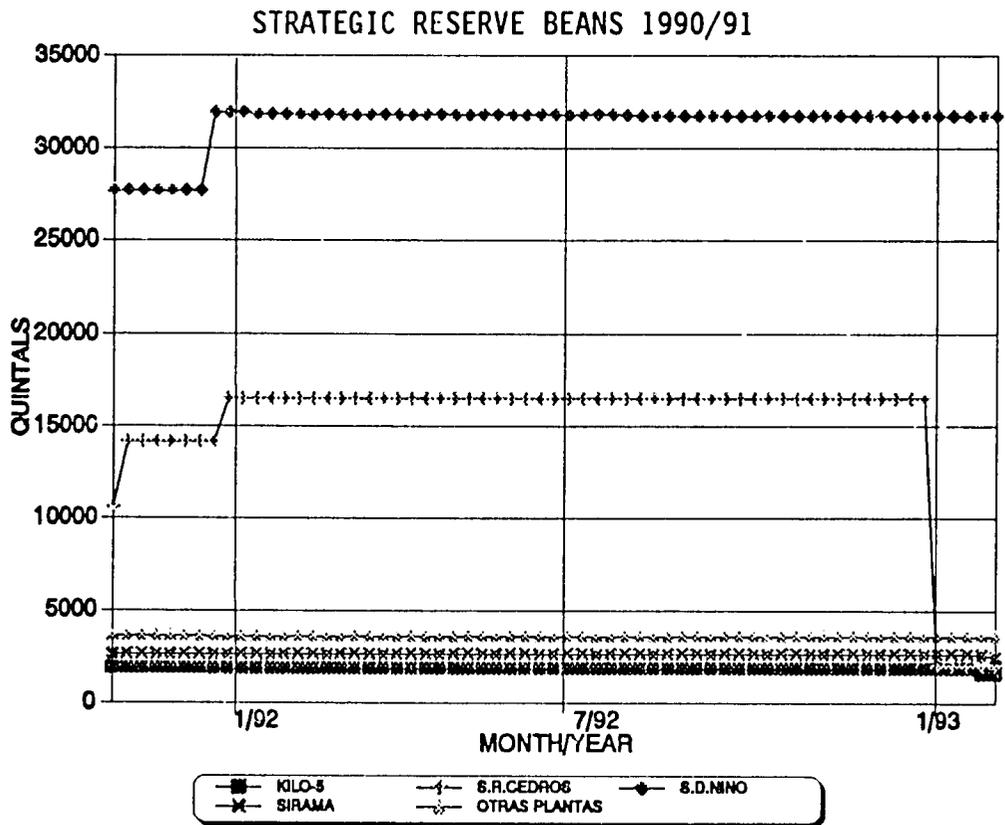


FIGURE III-13

STRATEGIC RESERVE BEANS 1991/92

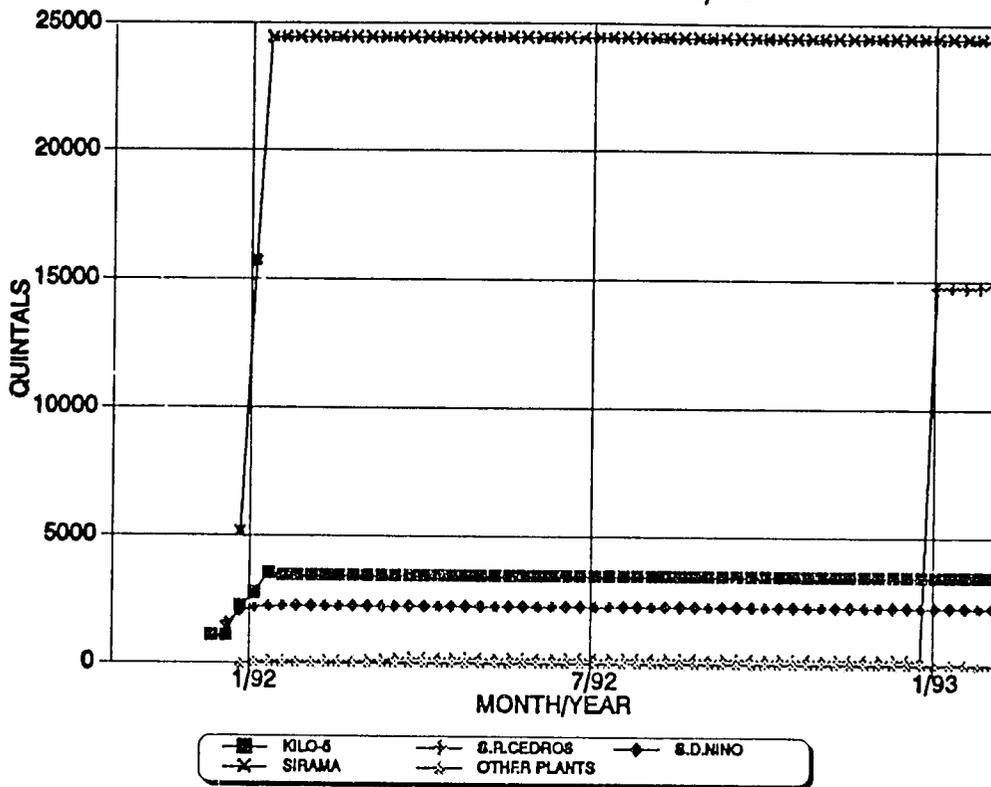


FIGURE III-14

STRATEGIC RESERVE BEANS

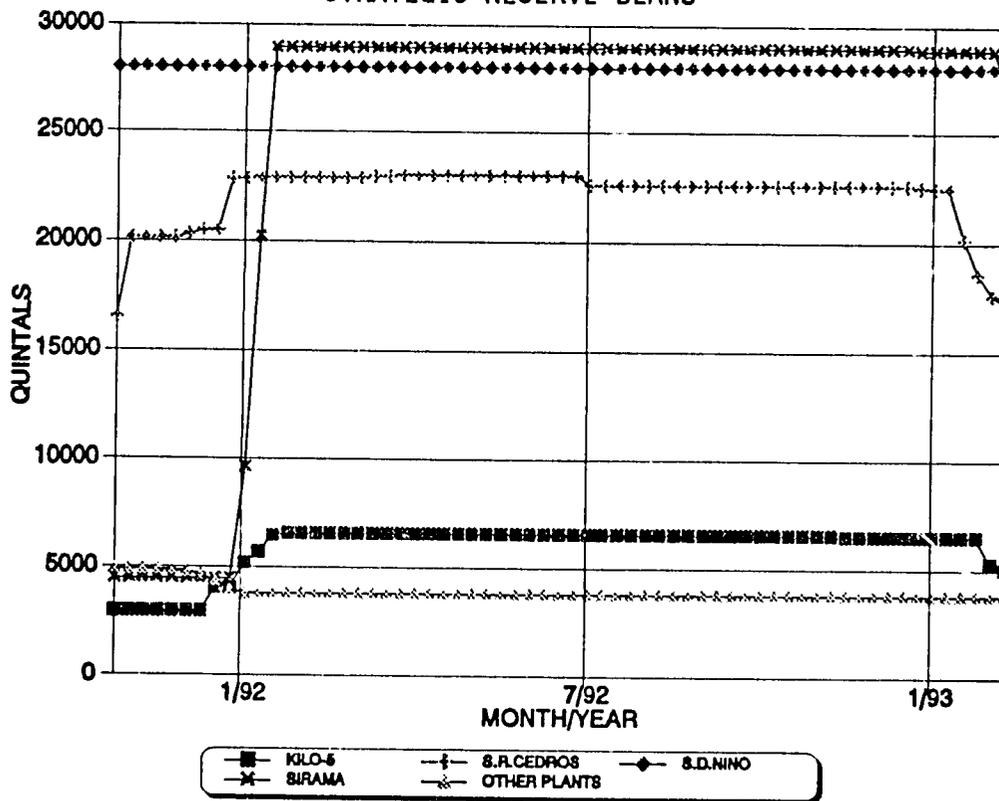


TABLE III-8
LOCATION OF BEANS IN THE STRATEGIC RESERVE

DAY/MONTH/YEAR	KILO-5	S. R. CEDROS	S. D. NINO	S. MARTIN
	qq	qq	qq	qq
29/10/91	2944.83	16529.69	28006.94	4481.36
04/11/91	2944.83	20132.08	28006.94	4481.36
12/11/91	2944.83	20132.08	28006.94	4481.36
19/11/91	2944.83	20132.08	28006.94	4481.36
26/11/91	2944.83	20132.08	28006.94	4481.36
03/12/91	2944.83	20330.22	28006.94	4481.36
10/12/91	2944.83	20470.68	28006.94	4481.36
17/12/91	4027.83	20470.68	28006.94	4480.73
23/12/91	4027.83	22831.28	28006.94	4480.73
07/01/92	5185.19	22831.28	28006.94	9645.97
14/01/92	5707.84	22890.29	28006.94	20199.7
21/01/92	6474.58	22890.29	28006.94	28940.85
28/01/92	6578.44	22890.29	28006.94	28940.85
04/02/92	6578.44	22890.29	28006.94	28940.85
11/02/92	6578.44	22890.29	28006.94	28940.85
18/02/92	6578.44	22890.29	28006.94	28940.85
25/02/92	6578.44	22890.29	28006.94	28940.85
03/03/92	6578.44	22890.29	28006.94	28940.85
10/03/92	6578.44	22938.57	28006.94	28940.85
17/03/92	6578.44	22938.57	28006.94	28940.85
24/03/92	6578.44	23007.55	28006.94	28940.85
30/03/92	6578.44	23007.55	28006.94	28940.85
07/04/92	6578.44	23007.55	28006.94	28940.85
21/04/92	6578.44	23007.55	28006.94	28940.85
28/04/92	6578.44	23007.55	28006.94	28940.85
05/05/92	6578.44	23007.55	28006.94	28940.85
12/05/92	6578.44	23007.55	28006.94	28940.85
19/05/92	6578.44	23007.55	28006.94	28940.85
26/05/92	6578.44	23007.55	28006.94	28940.85
02/06/92	6578.44	23007.55	28006.94	28940.85
09/06/92	6578.44	23007.55	28006.94	28940.85
16/06/92	6578.44	23007.55	28006.94	28940.85
24/06/92	6578.44	23006.41	28006.94	28940.85
07/07/92	6577.44	22585.86	28006.94	28940.85
14/07/92	6577.44	22585.86	28006.94	28940.85
21/07/92	6577.44	22585.86	28006.94	28940.85
28/07/92	6577.44	22585.86	28006.94	28940.85
11/08/92	6577.44	22574.86	28006.94	28940.85
18/08/92	6577.44	22576.9	28006.94	28940.85
25/08/92	6577.44	22576.9	28006.94	28940.85
01/09/92	6577.44	22576.9	28006.94	28940.85
08/09/92	6577.44	22576.9	28006.94	28940.85
14/09/92	6577.44	22576.9	28006.94	28940.85
22/09/92	6577.44	22576.9	28006.94	28940.85
29/09/92	6577.44	22576.9	28006.94	28940.85
06/10/92	6577.44	22576.9	28006.94	28940.85
13/10/92	6577.44	22576.9	28006.94	28940.85
20/10/92	6577.44	22576.9	28006.94	28940.85
27/10/92	6577.44	22576.9	28006.94	28940.85
03/11/92	6577.44	22576.9	28006.94	28940.85
10/11/92	6577.44	22576.87	28006.94	28940.85
17/11/92	6518.44	22576.87	28006.94	28940.87
24/11/92	6524.09	22576.87	28006.94	28940.87
01/12/92	6524.09	22576.87	28006.94	28940.87
08/12/92	6524.09	22576.87	28006.94	28940.87
14/12/92	6524.09	22576.83	28006.94	28940.87
28/12/92	6524.09	22529.63	28006.94	28873.57
12/01/93	6524.09	22499.63	28006.94	28873.57
19/01/93	6524.09	22455.57	28006.94	28873.57
26/01/93	6524.09	20185.57	28006.94	28873.57
02/02/93	6524.09	18605.57	28006.94	28873.57
09/02/93	5306.74	17635.57	28006.94	28873.57
16/02/93	5066.41	17287.25	28006.94	26957.71

FIGURE III-15

STRATEGIC RESERVE BEAN SALES

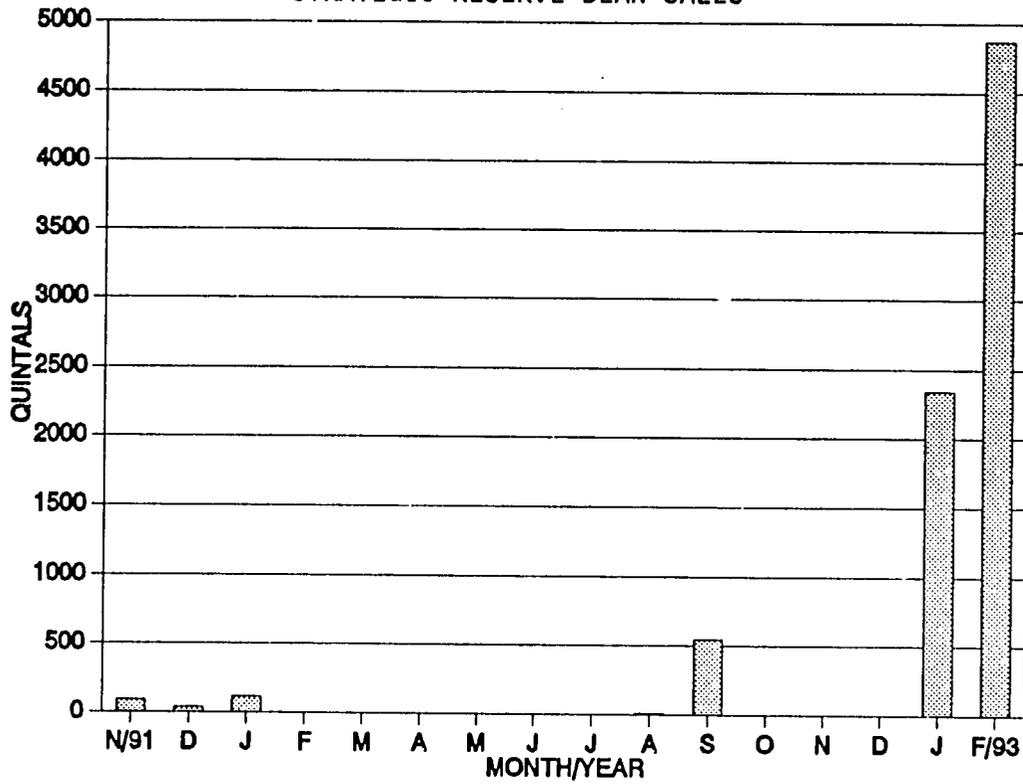


TABLE III-9

STRATEGIC RESERVE BEAN SALES

MONTH	SALES OF BEAN
	-----QQ-----
November 1991	88
December	40
January	113
February	0
March	0
April	0
May	0
June	2
July	0
August	11
September	547
October	0
November	0
December	0
January	2344
February 1993	4874

TABLE III-10

HISTORY OF PURCHASES, SALES, AND PRICES OF BEANS IN THE STRATEGIC RESERVE

Commodity	Initial Stock (QQs)	Purchases			Sales			Other Adjustments to Stock Level	Ending Stock (QQs)
		Quantity (QQs)	Price Unit ¢	Value Total ¢	Quantity (QQs)	Price Unit ¢	Value Total ¢		
<u>YEAR 1990</u>									
Red Beans 89/90	---	86,811	198.91	17,267,576	58,780	230.10	13,525,278	(46)	27,985
Red Beans 90/91	---	1,345	249.80	335,981	---	---	---	---	2,345
Total	---	88,156		17,603,557	58,780		13,525,278		29,330
<u>YEAR 1991</u>									
35 Red Beans 89/90	27,985	---	---	---	17,528	223.28	39,136,528	(594)	9,863
Red Beans 90/91	1,345	55,645	266.65	14,837,739	361	223.28	80,604	---	56,629
Red Beans 91/92	---	2,645	201.07	531,830	---	---	---	---	2,645
Total	29,330	58,290		15,369,569	17,889		3,994,256		69,137
<u>YEAR 1992</u>									
Red Beans 89/90	9,863	---	---	---	483	81.59	39,408	436	8,944
Red Beans 90/91	56,629	---	---	---	111	278.86	30,953	94	56,424
Red Beans 91/92	2,645	27,738	195.70	5,428,327	---	---	---	---	30,383
Total	69,137	27,738		5,428,327	594		70,361		95,751

D. Storage

Purchased corn or beans are stored in BFA's silos or warehouses. As of February 1993, about 70% of the imported and national corn in the Reserve was stored in bulk in silos at BFA's four facilities (Kilo-5, San Rafael Cedros, Sirama, and Sitio del Niño) and the former IRA facilities at San Martín. Only national corn and beans (in sacks) were stored in the warehouses.

Of the total capacity in the four BFA facilities for corn and/or beans of 330,000 qq in silos and more than 660,000 qq in warehouse space, only about 62% of the capacity (as of February 16, 1993) was utilized for storing corn and beans. The percentage of total estimated capacity used at K-5, S.R.Cedros, S.D.Niño, and Sirama was 78.29%, 51.29%, 50.02%, and 64.33%, respectively.

1. Corn

As of February 16, 1993, BFA had a total of 615,436 qq of imported, 1990/91, and 1991/92 corn remaining in the Strategic Reserve.

a. Imported corn

BFA is storing about 418,893 qq of imported corn in four different storage facilities (Table III-11).

TABLE III-11

LOCATION OF CORN AND BEANS IN THE STRATEGIC RESERVE

LOCATION	IMP.CORN	NAC.CORN	BEANS

-----QQ-----			
Acajutla Kilo-5	132,791	83,428	5,066
San Martín	161,511	-----	-----
San Miguel	-----	1,137	45
San Rafael Cedros	85,337	22,880	17,287
Sirama	-----	54,986	26,958
Sitio del Niño	39,260	11,719	34,007
Texpasa	-----	-----	3,618
Usulután	-----	-----	154

b. National corn

About 196,531 qq of national corn is stored by the BFA in five different storage facilities (Table III-11). Of this total, about 122,548 qq of the 1990/91 crop and 73,983 qq of the 1991/92 crop remain.

2. Beans

BFA stores about 87,134 qq of beans in sacks in seven different storage facilities (Table III-11). Of this total, there are remaining about 874 qq, 41,345 qq, and 44,915 qq of the 1989/90, 1990/91, and 1991/92 crops.

E. Total Costs of the Reserve

A major concern for the GOES is the cost of insuring national food security with a Strategic Reserve of corn and beans. Besides the cost of purchasing the corn and beans for the Reserve, it is possible to estimate the average monthly cost of a quintal of corn or beans in the Strategic Reserve, especially since the stocks in the Strategic Reserve have been held from 1-3 years.

The cost items for imported corn, national corn (by crop year), and beans (by crop year) include the cost of administrating and managing the storage of the Reserve, shrinkage costs, costs of quality deterioration, opportunity costs on the stock purchased and the administrative and managing costs, and amortization costs.

1. Administrative and management costs

The cost of administrating and managing the Reserve includes:

- * Salaries and benefits of all employees at each of the plants
- * Maintenance costs, such as telephone, tires, spare parts, electricity, diesel for the dryer(s), fumigants, and insurance on the stock in the Reserve
- * Office supplies
- * Incidentals

Using average monthly costs of storage of corn and beans (in January 1993) at each of the four facilities (including Acajutla Kilo-5, San Rafael Cedros, Sitio Del Nino, and Sirama), a weighted average cost (including only maintenance and administrative costs) per quintal (using the average quantity stored in 1992) in all four facilities (Appendix 3) was calculated as follows:

<u>Plant</u>	<u>C/qq/month</u>
Kilo-5	0.2479
S.R.Cedros	0.3607
S.D.Niño	0.5100
Sirama	0.4186
Weighted Average	0.3468

2. Shrinkage costs

Shrinkage costs are based on the average monthly decrease in moisture in the corn and beans from the time the product is bought until the time the product is sold.

a. Imported corn

In terms of shrinkage, the actual drop in average moisture content of imported corn in the Reserve from 14.30% to 10.68% (as estimated by E. Morales in February 1993) from December 1991 until February 1993 (14 months) represents a drop in weight of 3.624% (E. Morales, personal communication). Since the corn is sold at that percentage moisture, the weight loss represents a real loss in value. If the shrinkage was pro-rated on a monthly basis, the shrinkage would be about 0.2588%/qq/month or approximately C 0.1875/qq/month. (Coincidentally, BFA has, as of 1993, decided to account for much more of the moisture loss by establishing a weight loss factor of 0.25%/qq/month for the first 6-12 months and 0.125%/qq/month thereafter.)

b. National corn

BFA has recorded the moisture content of national corn and beans when they were purchased and when they were sold (Table III-12). The average shrinkage rate of 1989/90 corn sold in 1991 or 1992 was 0.365%/month over an average period of 11.4 months. Using BFA's results from having tested over 105,000 qq of national corn 1990/91, the average shrinkage rate of 1990/91 corn was only 0.1369%/month. Using BFA's results from having tested over 15,000 qq of national corn 1991/92, the average shrinkage rate of 1991/92 corn was 0.2875%/month. The 1989/90 corn that was sold (at C72.88/qq) in 1991 had a cost of shrinkage of C0.266/qq/month, while the 1989/90 corn sold (at C50.19/qq) in 1991 had a cost of shrinkage of C0.064/qq/month. The 1990/91 corn that was tested had an estimated cost of shrinkage of C0.0958/qq/month (at C70.00/qq). The 1991/92 corn that was tested had an estimated cost of shrinkage of C0.2071/qq/month (at C72.02/qq).

c. Beans

The average shrinkage rate of 34,500 qq of 1990/91 beans tested by BFA was 0.1058%/month. The cost of shrinkage was estimated at C0.2950/qq/month (using C278.86/qq as described for BFA's bean sales in Table III-10). The average shrinkage rate of 3473 qq of 1991/92 beans tested by BFA was 0.0656%/month. The cost of shrinkage was estimated at C0.1829/qq/month (using C278.86/qq).

3. Cost of quality deterioration

a. Imported corn

According to E. Morales (1993), about 53% of the total imported corn in the Reserve has deteriorated to the extent that it is likely to be sold only for animal consumption. The remaining 47% is of fair quality and likely to be sold for human consumption.

The average level of granos dañados (damaged grains) in the imported corn has increased from 5.16% (BFA-6) to 24.11%. The average level of granos picados (insect-damaged grains) has (as of February 1993) increased to 7.57% from probably less than 2%.

TABLE III-12

TECHNICAL SHRINKAGE FACTORS OF CORN AND BEANS IN STORAGE

FACILITY	PRODUCT TYPE	QUANTITY OF PRODUCT	ARRIVAL DATE OF PRODUCT		AVERAGE DATE OF ARRIVAL	AVERAGE MOISTURE CONTENT	WEIGHT OF WATER IN PRODUCT	AVERAGE CONCENTRATION OF IMPURITIES	QUANTITY OF IMPURITIES
			FROM	UNTIL					
		QQ				%	QQ		QQ
KILO-5	BEANS-89/90	5771.48	21/03/90	02/01/92	14/08/91	14.84	856.46		58.68
	BEANS-90/91	1902.94	02/01/91	13/03/91	06/02/91	13.44	255.7		21.98
	BEANS-91/92	3497.35	06/12/91	17/01/92	27/12/91	13.51	472.6		38.19
	CORN-89/90	23907.56	15/02/90	14/11/92	12/08/90	13.38	3198.88	2.29	547.98
	CORN-90/91	44511.26	26/11/91	14/02/92	04/01/92	14.02	6238.67		
	CORN-90/91	58070.77	08/10/90	14/06/91	05/02/91	13.47	7823.15	1.03	597.29
	IMPORTED CORN	186183.5	27/12/91	07/04/92		14.81	27582.74		
S.R.CEDROS	BEANS-89/90	26677.98	08/02/90	09/12/91	12/01/91	16.36	4364.22		
	BEANS-90/91	1997.4	06/12/90	25/06/91	03/16/91	14.16	282.84	0.32	6.47
	CORN-89/90	14841.47	07/02/90	04/10/90	05/06/90	14.33	2126.87		
	CORN-90/91	4879.26	23/12/91	02/03/92	01/26/92	14.21	693.57	0.42	20.77
	IMPORTED CORN	139622.11	30/12/91	28/02/92	*	14.32	19993.89	3.47	4851.97
S.D.NINO	CORN-91/92	16107.77	06/12/91	07/02/92	06/01/92	14.34	2310.61		
	IMPORTED CORN	21232.94	02/01/92	03/02/92	18/01/92	14.26	3027.9		
	CORN-90/91	52362.88	08/10/90	24/01/91	01/12/90	13.38	7005.44		
	BEANS-90/91	33034.25	19/12/90	16/12/91	17/06/92	14.19	4687.92		
	BEANS-91/92	2294.74	09/12/91	30/04/92	18/02/92	13.79	316.5		

* Average arrival date not clear

TABLE III-12

TECHNICAL SHRINKAGE FACTORS OF CORN AND BEANS IN STORAGE (cont.)

FACILITY	PRODUCT TYPE	QUANTITY OF PRODUCT	LIQUIDATION DATE FROM	DATE OF PRODUCT UNTIL	AVERAGE DATE OF LIQUIDATION	NO. OF DAYS (AVG. ARRIVAL - AVG. LIQUIDATION)	AVERAGE MOISTURE CONTENT	WEIGHT OF WATER IN PRODUCT	DIFFERENCE IN MOISTURE CONTENT (ARRIVAL - LIQUIDATION)	RATE OF DECREASE IN MOISTURE CONTENT	AVERAGE CONCENTRATION OF IMPURITIES	QUANTITY OF IMPURITIES
							%	QQ	%	%	%	QQ
KILO-5	BEANS-89/90	4559.53	26/06/90	16/09/92	*		11.37	518.55	-3.47			11.58
		1140.33	08/01/93	11/01/93	*		12.1	137.96	-2.74			22.88
	TOTAL	5699.86					11.52	656.51	-3.32			34.46
	BEANS-90/91	19.49	19/08/91	12/11/91	*		11.8	2.3	-1.64			0.03
	TOTAL	1852.89	07/01/93	08/01/93	07/01/93	575	11.92	220.89	-1.52	-0.0793		3.96
	BEANS-91/92	3472.6	05/01/93	07/01/93	06/01/93	375	11.92	223.19	-1.52			3.99
	CORN-89/90	23145.06	26/10/90	24/12/92	*		8.72	2020.23	-4.66			7.96
	CORN-90/91	7450.2	25/08/92	27/10/92	*		10.84	807.65	-2.63		0.94	217.89
	TOTAL	49031.45	15/01/93	09/03/93	10/02/93	719	10.94	5362.79	-2.53	-0.1768	0.0423	24.55
	40	IMPORTED	56481.67	07/04/92	09/03/93	*		10.93	6170.44	-2.54		0.4282
		180082.15					10.23	19039.25	-4.58		0.4705	273.22
S.R.CEDROS	BEANS-89/90	25917.21	29/06/90	29/01/93	*		12.49	3333.14	-3.86			
	BEANS-90/91	1954.81	05/07/91	22/01/93	*		12.30	245.02	-1.86		0.198	3.87
	CORN-89/90	14298.94	01/08/91	23/10/91	*		10.88	1615.26	-3.45			
	CORN-90/91	4745	18/12/92	29/01/93	01/08/93	355	12.67	601.14	-1.55	-0.1306		35.11
	IMPORTED	133758.67	15/06/92	09/10/92	*		11.73	16386.14	-2.59		1.61	2251.22
S.D.NINO	CORN-91/92	15364.69	17/09/92	15/01/93	17/11/92	315	11.33	1740.16	-3.02	-0.2875		
	IMPORTED CORN	20560.7	23/07/92	07/01/93	*		11.28	2318.33	-2.98			
	CORN-90/91	51163.9	30/10/90	16/10/92	01/09/92	630	11.29	5777.81	-2.09	-0.0993		
	BEANS-90/91	32647.31	04/02/91	18/01/93	23/01/92	376	12.85	32647.31	-1.34	-0.1073		
	BEANS-91/92	2286.33	11/11/92	18/01/93	*		12.69	2286.33	-1.11			

* Average liquidation date not clear

TABLE III-12

TECHNICAL SHRINKAGE FACTORS OF CORN AND BEANS IN STORAGE (cont.)

FACILITY	PRODUCT TYPE	LOSSES ALREADY ACCOUNTED FOR	MINUS MOISTURE SHRINKAGE LOSS	MINUS LOSSES IN IMPURITIES	PERCENTAGE TECHNICAL SHRINKAGE	QUANTITY OF TECHNICAL SHRINKAGE	THEORETICAL DIFFERENCE
					%	QQ	
KILO-5	BEANS-89/90						
	BEANS-90/91	71.62	199.95	24.22			-152.55
	BEANS-91/92	24.75	31.77	30.23			-37.25
	CORN-89/90	762.5	1178.65	330.09			-746.24
	CORN-90/91						
	CORN-90/91						
S.R.CEDROS	IMPORTED	1589.12	1652.71	324.07			-387.66
	BEANS-89/90	6101.35	8543.49				-2442.14
	BEANS-90/91	760.77	1031.08				-270.31
	CORN-89/90	42.59	37.2	2.6		2.8	-0.01
	CORN-90/91	542.53	511.61		1.6	237.46	-206.54
	IMPORTED	134.26	92.43		1.6	78.07	-36.24
S.D.NINO	IMPORTED	5863.44	3688.84	2600.75			-426.15
	CORN-91/92	743.08	570.45			186.85	-14.22
	IMPORTED	672.24	709.57				-37.33
	CORN-90/91	1198.98	1227.63				-28.65
	BEANS-90/91	386.94	494.09				-107.15
	BEANS-91/92	8.41	26.47				-18.06

To determine the loss in value as a result of the deterioration of the grain quality one could use the discounts BFA is currently willing to employ in selling the different qualities of corn. The difference in value between the purchase price (C72.42/qq) and the second best quality of corn described as "regular" by Morales (of which there is 185,000 qq) is C10.863/qq (based on 85% of the purchase price). The difference in value between the purchase price and the third best quality of corn described as "mala" by Morales (of which there is 210,500 qq) is C15.93/qq (based on 78% of the purchase price). The average difference in value between the purchased corn and the current imported corn is C13.5598/qq. Over 14 months, this represents a deterioration of about C0.9686/qq/month.

b. National corn

According to E. Morales (1993), about 28.4% (14.84% of the 1990/91 corn, and 51.47% of the 1991/92 corn) of the total national corn in the Reserve is of "buena" quality; about 42.8% (40.40% of the 1990/91 corn and 46.98% of the 1991/92 corn) is of "regular" quality; and 28.8% (44.77% of the 1990/91 corn and 1.54% of the 1991/92 corn) is of "mala" quality.

The average level of granos dañados in the national corn was estimated by Morales (1993) at 17.00% (19.90% of the 1990/91 corn and 12.08% of the 1991/92 corn). The average level of granos picados was estimated at 6.82% (7.54% of the 1990/91 corn and 5.61% of the 1991/92 corn).

To determine the loss in value as a result of the deterioration of the grain quality one could use the discounts BFA is currently willing to employ in selling the different qualities of corn. The difference in value between the purchase price (C72.42/qq) and the "buena" corn (of which there is 18,000 qq of 1990/91 corn and 36,700 qq of 1991/92 corn) is C7.242/qq (based on 90% of the purchase price). The difference in value between purchase price and the "regular" corn (of which there is 49,000 qq of 1990/91 corn and 33,500 qq of 1991/91 corn) is C10.863/qq (based on 85% of the purchase price). The difference in value between the purchase price and the "mala" corn (of which there is 54,300 qq of 1990/91 corn and 1,100 qq of 1991/92 corn) is C15.93/qq (based on 78% of the purchase price). The average difference in quality between the purchased 1990/91 corn and the current 1990/91 corn is C12.5939/qq. The average difference between the purchased 1991/92 corn and the current 1991/92 corn is C9.0773/qq. Over 24 months, the 1990/91 corn has lost in terms of quality deterioration C0.5247/qq/month. Over 12 months, the 1991/92 corn has lost C0.7564/qq/month.

c. Beans

According to E. Morales (1993), there are 44,700 qq of 1991/92 beans that are of "buena" quality and 41,325 qq of 1990/91 beans that are of "regular" quality in the Reserve.

To determine the loss in quality of the beans, one could use a similar system of discounts as BFA is considering employing with the various qualities of corn. The "buena" quality of beans could be valued at 10% less than the purchase price. The "regular" beans could be priced at 15% less than the purchase price. Using such a scenario, the 1990/91 beans (purchased at a weighted average price of C266.25/qq) would have lost a value of C39.94/qq or C1.7365/qq/month over 23 months. The 1991/92 beans (purchased at a weighted average price of C196.17/qq) would have lost a value of C19.62/qq or C1.6350/qq/month over 12 months.

d. Total cost of quality deterioration

The total cost of quality deterioration from the time the corn and beans were purchased until they were sold is given in the following table:

Commodity	Total Qty Purchased ---QQ----	Total Cost of Quality Deterioration -----C-----
Imp.Corn	506,227	5,362,900
Nat.Corn 89/90	93,825	1,024,853
Nat.Corn 90/91	245,158	1,712,858
Nat.Corn 91/92	88,442	647,176
Beans 89/90	86,811	2,034,446
Beans 90/91	56,645	1,650,520
Beans 91/92	30,383	877,014
TOTAL	1,077,108	13,909,767

4. Opportunity costs

Opportunity costs on the capital required for purchasing the corn and beans and on the working capital (administrative and management costs) used in carrying out all Strategic Reserve operations must be included as part of the total costs of a Strategic Reserve.

The opportunity cost of the purchasing of the commodities is discussed below by commodity type. The opportunity cost on the working capital (estimated at C0.3468/qq/month in part E.1) would equal 0.0624/qq/month (assuming a cost of capital of 18% per year) for both corn and beans.

a. Imported corn

The opportunity cost of the purchasing of the imported corn could be estimated at 18% (the current capital cost) of the remaining 418,899 qq valued at C58.8589/qq (185,000 qq at C61.557/qq and 210,500 qq at C56.4878/qq). This would equal C0.8829/qq/month.

b. National corn

The opportunity cost of the purchasing of the 1990/91 national corn could be estimated at 18% (the current capital cost) of the remaining 122,548 qq valued at C59.7639/qq (18,000 qq at C65.178/qq, 49,000 qq at C61.4057/qq and 54,300 qq at C56.4876/qq). This would equal C0.8965/qq/month.

The opportunity cost of the purchasing of the 1991/92 national corn could be estimated at 18% (the current capital cost) of the remaining 73,990 qq valued at C63.2715/qq (36,700 qq at C65.178/qq, 33,500 qq at C61.4057/qq and 1,100 qq at C56.4876/qq). This would equal C0.9491/qq/month.

c. Beans

The opportunity cost of the purchasing of the 1990/91 beans could be estimated at 18% (the current capital cost) of the remaining 41,346 qq valued at C226.3125/qq. This would equal C3.3947/qq/month.

The opportunity cost of the purchasing of the 1991/92 beans could be estimated at 18% (the current capital cost) of the remaining 44,915 qq valued at C176.55/qq. This would equal C2.6483/qq/month.

d. Summary of opportunity costs

In summary, the total opportunity costs are estimated as follows:

Commodity	Opp. Cost of Purchases	Opp. Cost of Work.Cap.	Total Opp. Cost
	C/qq/month	C/qq/month	C/qq/month
Imported Corn	0.8829	0.0624	0.9453
Nat'l Corn 1990/91	0.8965	0.0624	0.9589
Nat'l Corn 1991/92	0.9491	0.0624	1.0115
Beans 1990/91	3.3947	0.0624	3.4571
Beans 1991/92	2.6483	0.0624	2.7107

5. Amortization costs

Amortization costs are considered equal for each quintal of corn or beans in the Reserve. Amortization payments are based on an interest rate of 18% over 30 years. The factor, then, used to estimate the annual amortization cost of the four facilities (Sitio Del Nino, San Rafael Cedros, Sirama, and Kilo-5) would be 5.5168. Given an original cost of C99,419,612 for the four facilities, the annual amortization payment would be $C99,419,612/5.5168 = C18,021,246/\text{year}$ or approximately C1,501,770/month or 2.1375/qq/month (including 702,572 qq of corn and beans in BFA storage as of February 16, 1993).

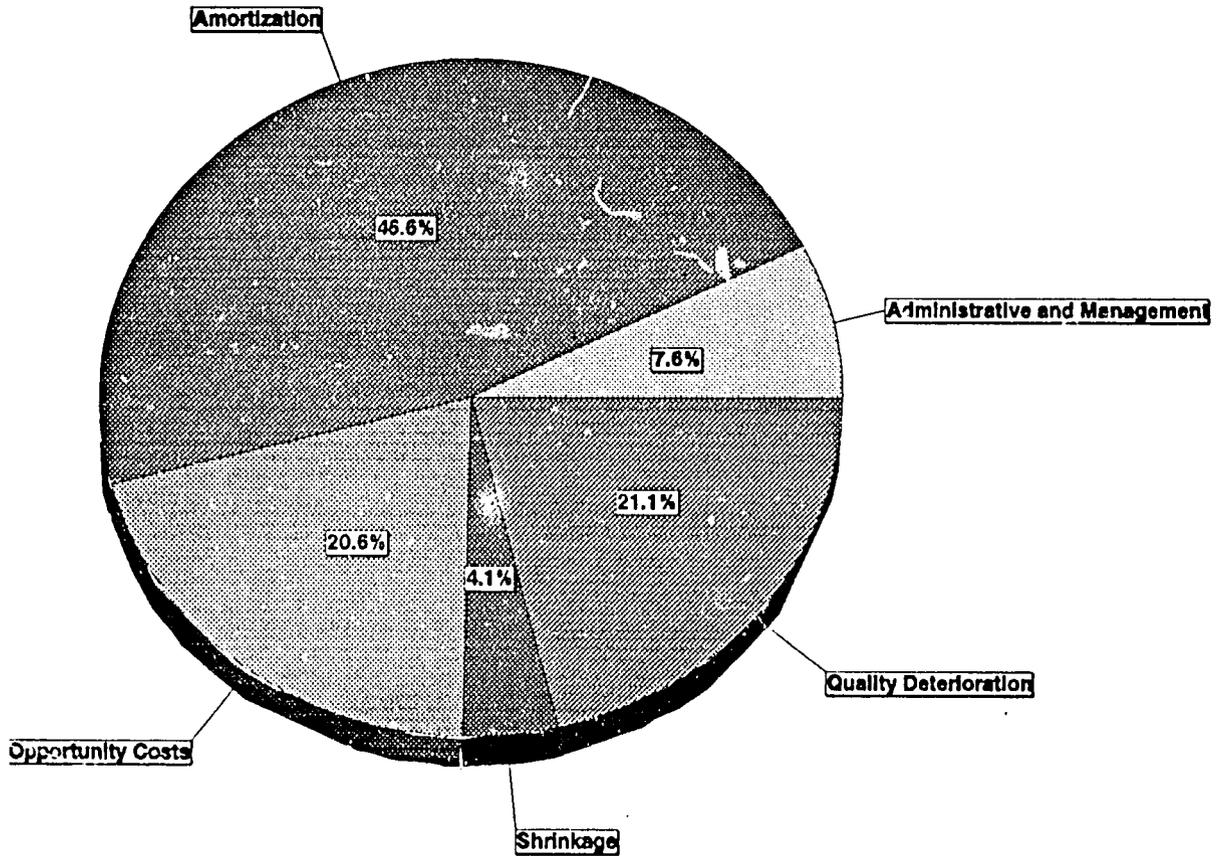
6. Total monthly cost

The total monthly costs for the corn and beans in the Reserve are as follows:

Cost Item	Imp. Corn	Nat. Corn 90/91	Nat. Corn 91/92	Nat. Beans 90/91	Nat. Beans 91/92
	C/qq/month				
Admin & Mgt	0.3468	0.3468	0.3468	0.3468	0.3468
Shrinkage	0.1875	0.0958	0.2071	0.2950	0.1829
Qual.Deter.	0.9686	0.5247	0.7564	1.7365	1.6350
Opp. Costs	0.9453	0.9589	1.0115	3.4571	2.7107
Amortization	2.1402	2.1402	2.1402	2.1402	2.1402
TOTAL	4.5884	4.0664	4.4620	7.9756	7.0156

On an annual basis, the total estimated economic costs and the total estimated accounting costs (including only administration and management, shrinkage, and quality deterioration costs) of the corn and the beans in the Strategic Reserve are given in Figures III-16 to III-25.

FIGURE III-16
 ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF IMPORTED CORN

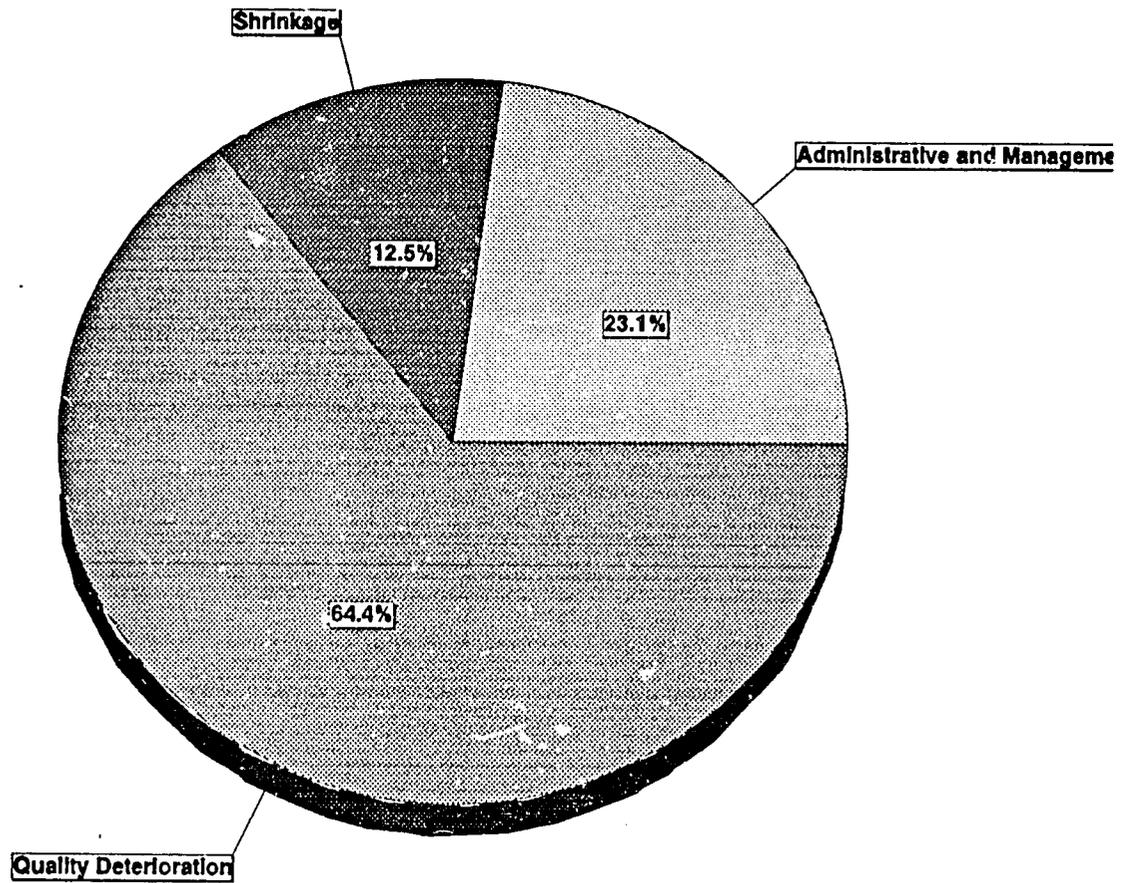


ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF IMPORTED CORN

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	2.25
Quality Deterioration	11.62
Amortization Costs	25.65
Opportunity Costs	11.34
Total Annual Economic Costs	55.02

FIGURE III-17

ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF IMPORTED CORN

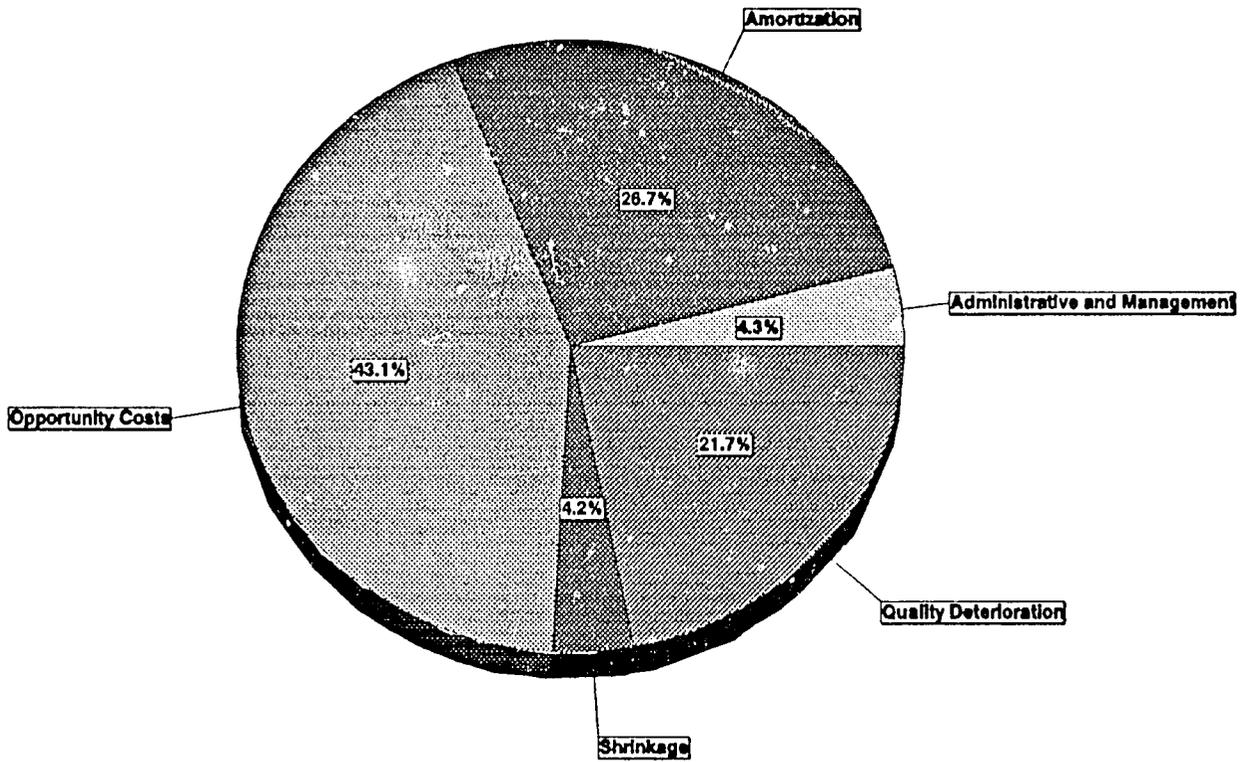


ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF IMPORTED CORN

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	2.25
Quality Deterioration	11.62
Total Annual Accounting Costs	18.03

FIGURE III-18

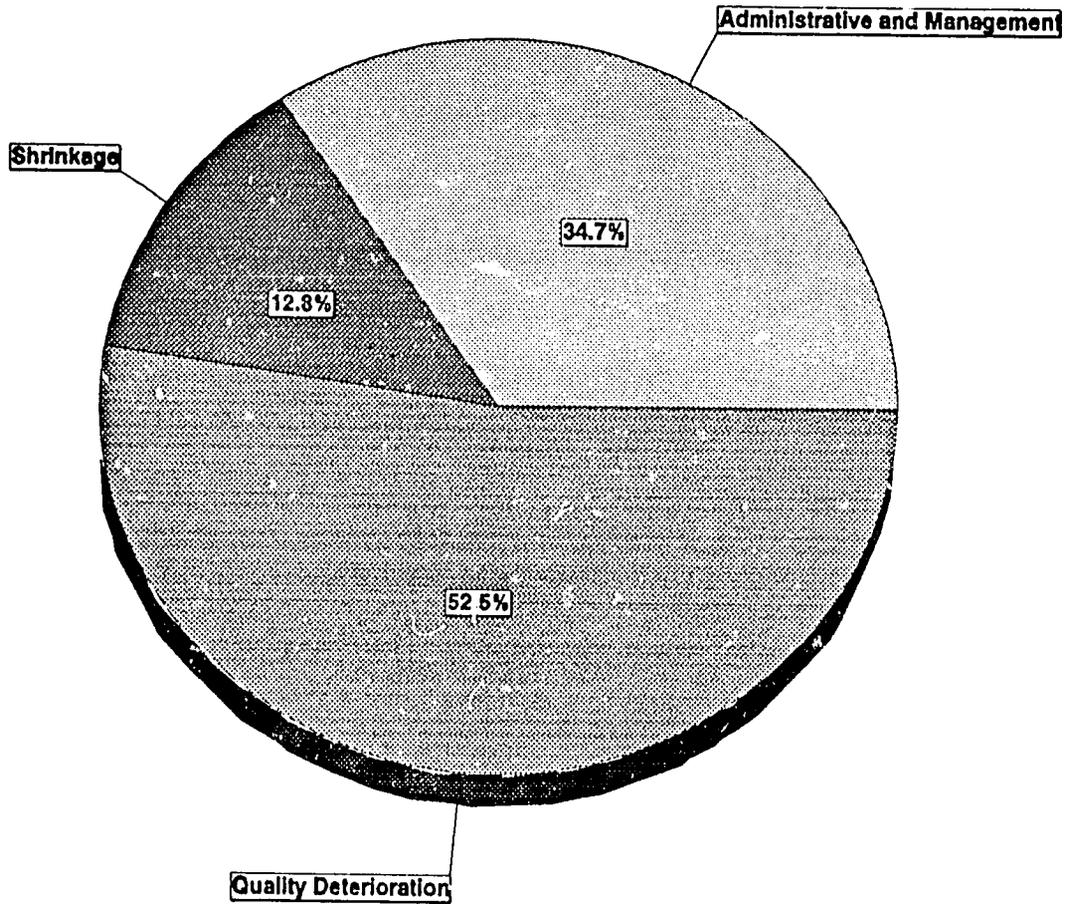
ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1990/91



ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1990/91

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	1.54
Quality Deterioration	6.30
Amortization Costs	25.65
Opportunity Costs	11.50
Total Annual Economic Costs	49.15

FIGURE III-19
 ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1990/91

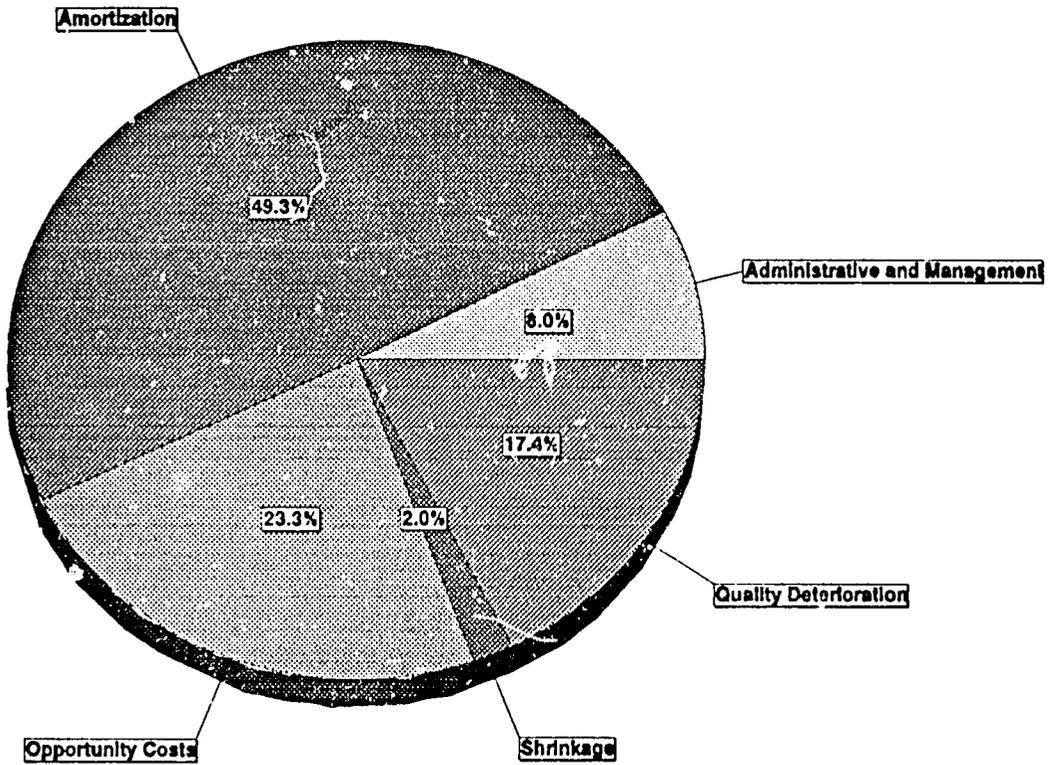


ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1990/91

COST ITEM	--C/QU/YEAR--
Administrative and Management	4.16
Shrinkage	1.54
Quality Deterioration	6.30
Total Annual Accounting Costs	12.00

FIGURE III-20

ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1991/92

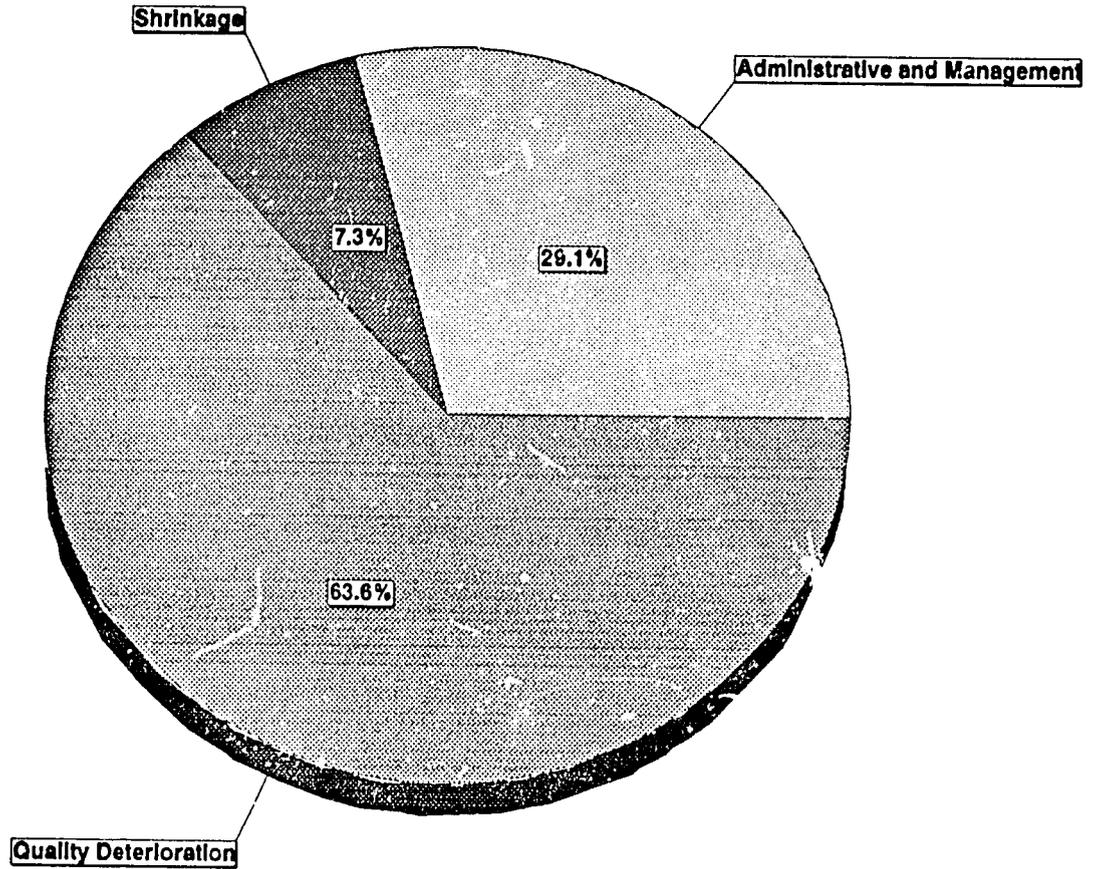


ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL CORN 1991/92

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	1.04
Quality Deterioration	9.08
Amortization Costs	25.65
Opportunity Costs	12.14
Total Annual Economic Costs	52.07

FIGURE III-21

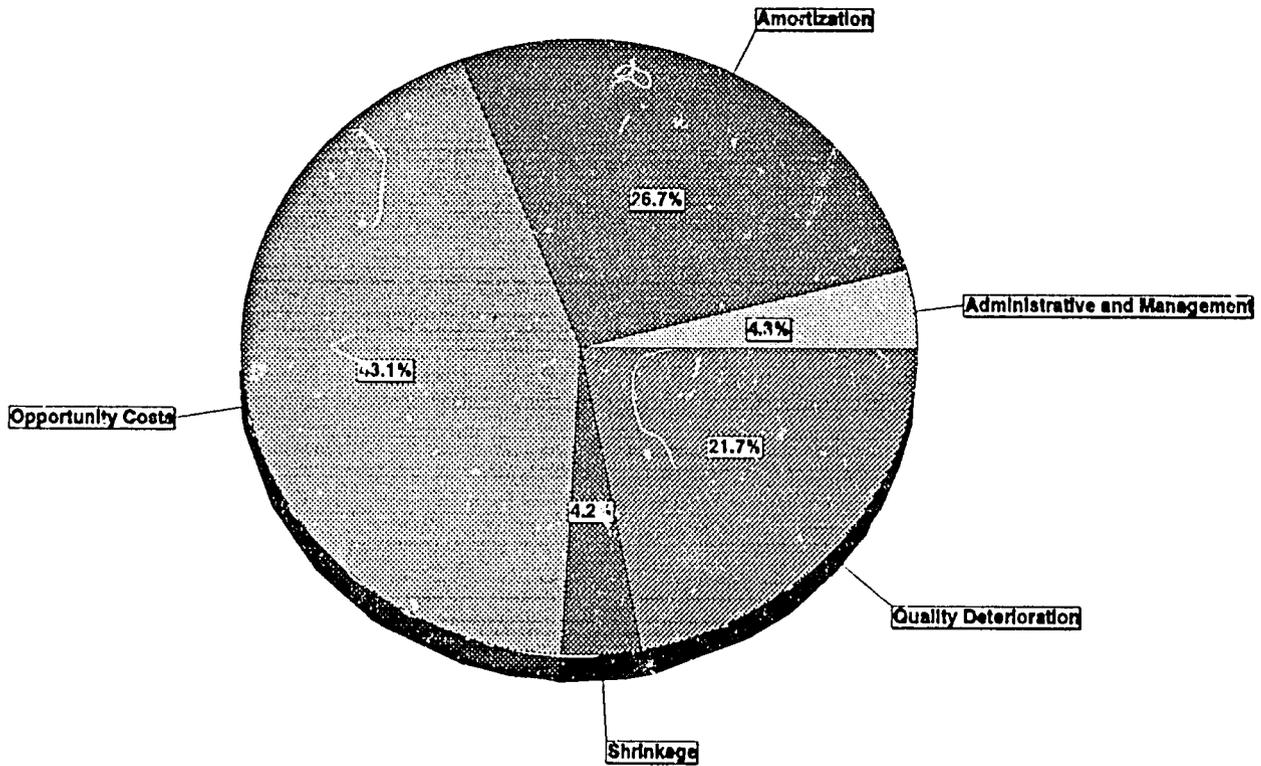
ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1991/92



ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL CORN 1991/92

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	1.04
Quality Deterioration	9.08
Total Annual Accounting Costs	14.28

FIGURE III-22
 ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1990/91

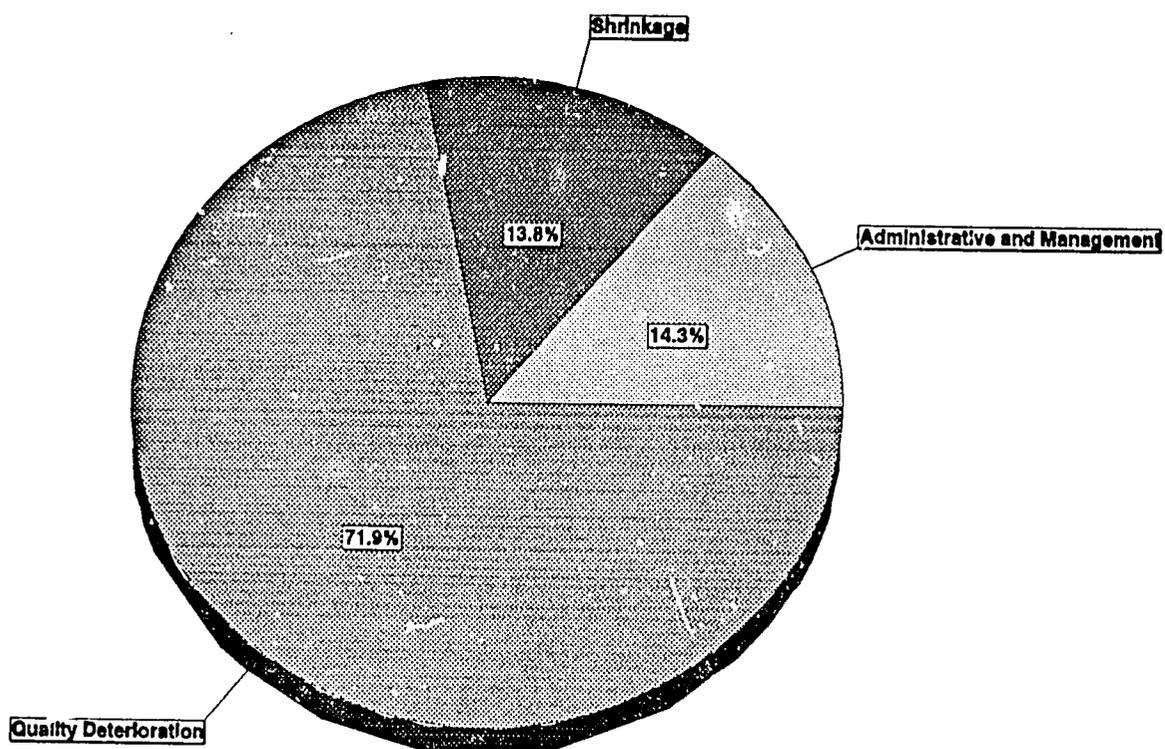


ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1990/91

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	4.00
Quality Deterioration	20.84
Amortization Costs	25.65
Opportunity Costs	41.48
Total Annual Economic Costs	96.13

FIGURE III-23

ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1990/91

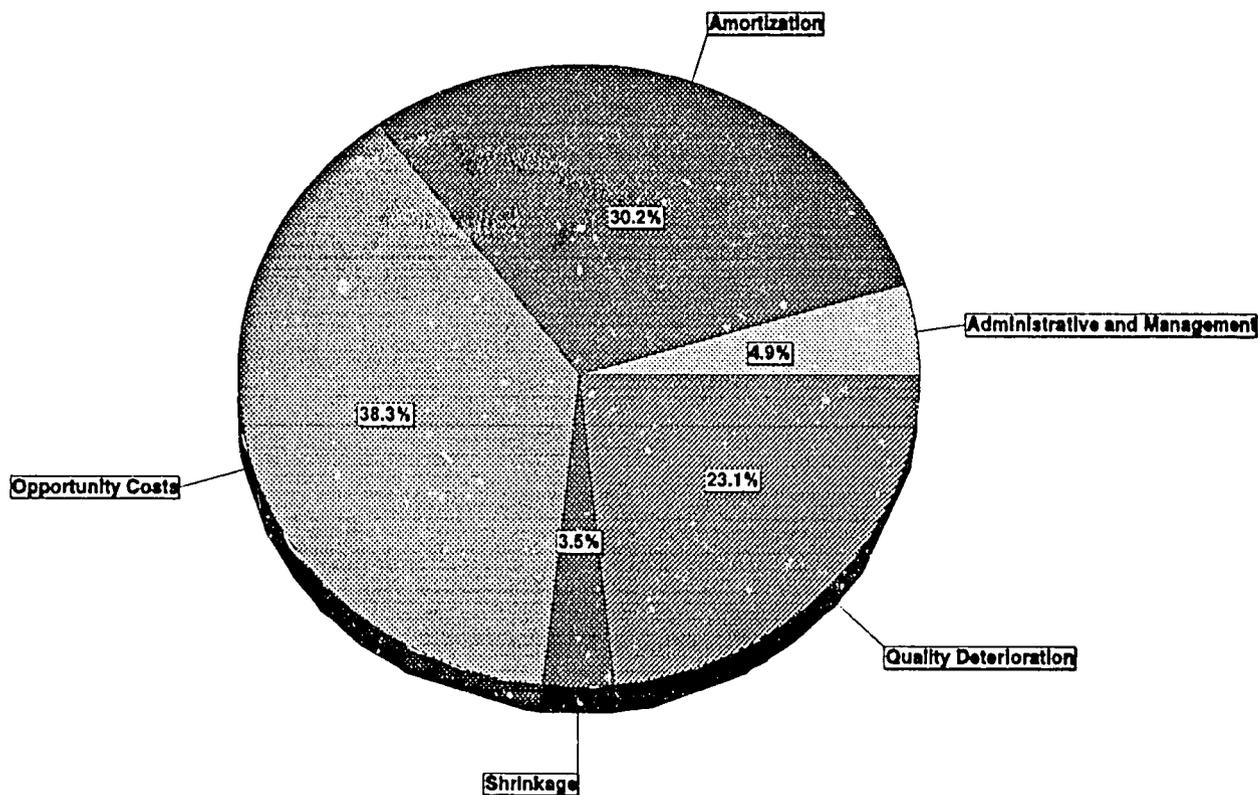


ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1990/91

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	4.00
Quality Deterioration	20.84
Total Annual Accounting Costs	29.00

FIGURE III-24

ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1991/92

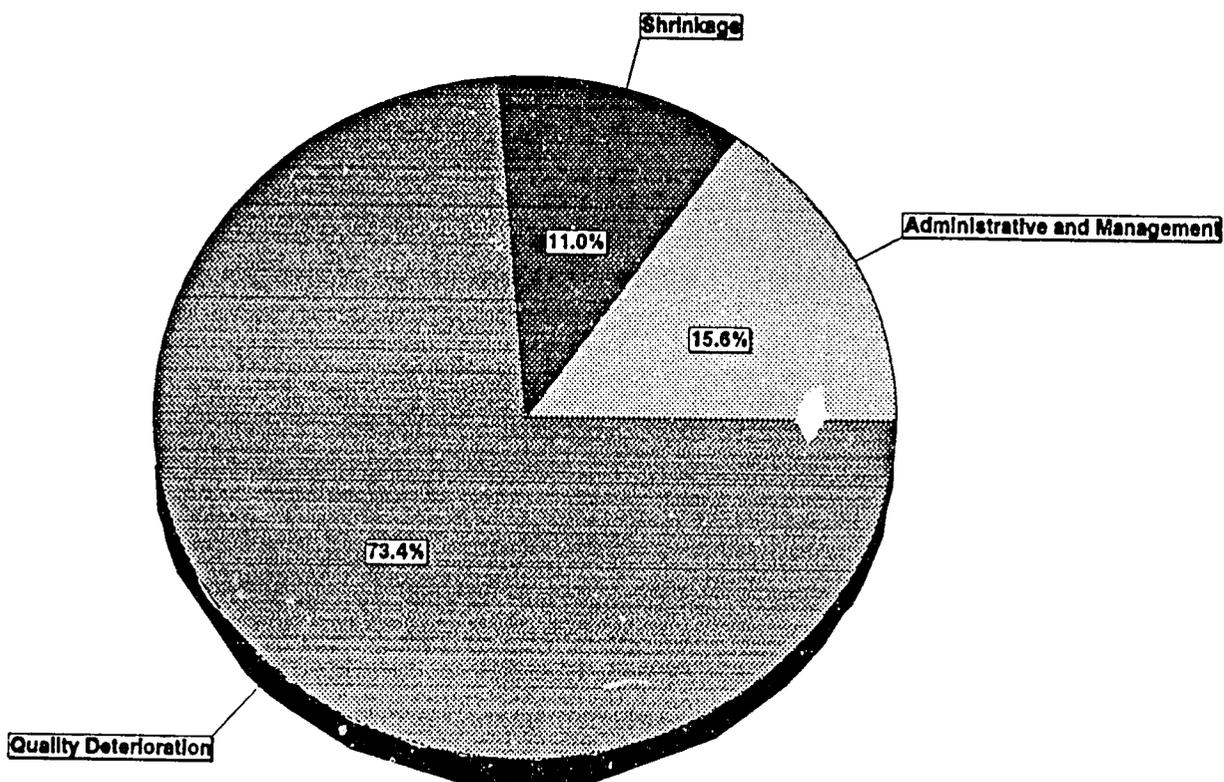


ESTIMATED TOTAL ANNUAL ECONOMIC COSTS OF NATIONAL BEANS 1991/92

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	2.94
Quality Deterioration	19.62
Amortization Costs	25.65
Opportunity Costs	32.52
Total Annual Economic Costs	84.89

FIGURE III-25

ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1991/92



ESTIMATED TOTAL ANNUAL ACCOUNTING COSTS OF NATIONAL BEANS 1991/92

COST ITEM	--C/QQ/YEAR--
Administrative and Management	4.16
Shrinkage	2.94
Quality Deterioration	19.62
Total Annual Accounting Costs	26.72

F. Management Process

BFA manages the majority of its Reserve stocks of corn and beans at its four facilities (Kilo-5, Sitio Del Niño, San Rafael Cedros, and Sirama) and San Martín. Each facility has a Manager and an Assistant Manager and support staff. The Management of each storage facility files status and operations reports to the Strategic Reserve Unit at the BFA Headquarters in San Salvador. At least twelve persons in the Unit coordinate and administer over the procedures for purchasing, selling, storing, and maintaining the stocks of corn and beans. In this Unit, the weekly purchases, sales, and remaining stock levels at each of the facilities are recorded.

Though the Strategic Reserve Unit and the BFA have developed an organized accounting and reporting system, the lack of a performance-driven Strategic Reserve management system coupled with clear, yet specific Strategic Reserve objectives on the part of the GOES continues to hamper the efficiency and effectiveness of the Strategic Reserve program. Without a performance contract between the BFA and the GOES and without specific Reserve management objectives clearly integrated into BFA's operations, storage and maintenance problems, funding problems, and coordination problems will continue to escalate the social costs of the Reserve.

1. Achievement of stock objective

The stock objective of the Strategic Reserve has been to maintain a one month's supply of corn and beans in the event of an emergency need such as an earthquake or a flood. Although the utilization for corn and beans on a monthly basis has not been adequately estimated, the best guess as per the annual corn and bean balance sheets might be a utilization rate of approximately 1,000,000 qq of corn and about 120,000 qq of beans. As of an April 1993 report by Morales, the Strategic Reserve consisted of about 587,000 qq of corn and 86,000 qq of beans.

The fact that over 45% of the corn in the Reserve is most likely saleable only for feeding to animals means that the total stock available for human consumption is approximately 322,800 qq. Furthermore, of the remaining corn for human consumption, 267,500 qq of that corn needs to be sold in the next six months before its quality deteriorates to animal feed quality.

In summary, though the GOES has had an objective stock level for corn and beans in the Strategic Reserve, the rotation of stocks in order to maintain stocks fit for human consumption has not been a consistent part of the management process.

2. Maintenance problems

a. Location of stocks and quality deterioration

The climate at different grain storage locations has had a significant bearing on the degree of infestation and consequent deterioration of the corn and beans. Specifically speaking, all corn, even the 1991/92 national corn, that has been stored in the hot and humid climate at the Sirama plant has deteriorated, as a result of insect infestation, to animal feed quality. The worst quality imported corn in the Reserve has been reported at the storage facility at Kilo-5, which

is also located in a relatively hot and humid location. It has been suggested that the above mentioned corn at these two facilities be sold immediately (Morales, 1993).

The higher cooking time requirements of the 1990/91 and 1991/92 beans stored at Sirama and Kilo-5, indicate that the hot and humid climate may have had adverse affects on the quality of the beans. As a result, it has been recommended that they be transferred from Sirama and Kilo-5 to Sitio del Niño and San Rafael Cedros, where the climate is relatively cooler (Morales, 1993).

b. Stock storage and maintenance problems

The following storage and maintenance problems have been detected at the BFA storage facilities:

- * Water leaks in the silos at San Rafael Cedros and Kilo-5 has resulted in spoiled corn.
- * Corn, particularly the imported corn, was not cleaned before being stored in the silos or in the stacks, resulting in some difficulty in aerating the corn.
- * The onset of insect infestation has not been closely monitored and, as a result, the fumigation treatments have not succeeded in keeping damage to the corn and beans to a minimum.
- * Routine and in-depth grain inspection and reporting procedures have not been formalized and integrated into an overall management plan.
- * Aeration procedures of stocks in the silos have not been correctly implemented due to the lack of applied technical knowledge and the lack of necessary equipment for timely use of these procedures.
- * Insufficient numbers of coverings (tarpaulins) for the stacks have resulted in poorly timed fumigation efforts and rapid insect re-infestation rates in stacks.

3. Funding level

Plant Managers do not have adequate budgets for operating an efficient and effective grain storage and maintenance program at their respective facilities. A few specific areas of insufficient funding include:

- * Fumigants, and equipment (plastic sheeting) for sealing the stacks
- * Equipment for measuring ambient climactic conditions and conditions inside the silos
- * Communications (telephone) and transport
- * Travel and per diem for maintaining close contact with Headquarters

4. Coordination problems between BFA and GOES

The principal problem between BFA and GOES is that BFA must operate on technical and economic agendas while GOES typically operates on a socio-political agenda. For example, when BFA detects the need to sell a given quantity of corn and/or beans that would otherwise deteriorate to an unwanted state (fit only for animal consumption), BFA must obtain permission to sell from the GOES. GOES, on the other hand, considers what the socio-economic and political impact of the sale

of the stock may be on the producers. Without sufficient analytical determinations being made on the impact of the stock sales, the GOES oftentimes ignores the warnings from BFA of the ensuing technical problems with the stocks and takes a politically more acceptable choice of no stock sales. Then when the stocks are finally sold, the timing, as in 1992, could not have been worse. In 1992, the majority (over 70%) of the nearly 232,000 qq of corn sold from the Reserve was sold during September, a month in which over 10% of the new crop was harvested (Figures III-26 and 27). The huge sales of corn from the Reserve certainly contributed to the free fall in the price of corn in September (Figure III-27). Not only were the producers who sold their product in September adversely impacted by the September sales of the corn in the Reserve, but also the producers who sold their corn in the months from October-February.

G. Results and Implications of Current Strategic Reserve Policies and Management Procedures

The results of current Strategic Reserve policies and procedures indicate that the GOES has implemented an extremely expensive and problem plagued program of purchasing, storing, maintaining, and selling a Reserve of corn and beans. At a social (economic) cost of approximately 4 colones per quintal per month to maintain the corn in the Reserve, the yearly cost would be approximately C48/qq/year. That translates into more than \$120/mt/year, a cost not socially or economically feasible in any country (Neils, Lea, and Reed, 1992).

The problems between BFA and GOES in administering and managing the Strategic Reserve are common in other countries where the objective of the Reserve and the agendas of the implementing agency and the government are at odds. Other countries in a relatively similar stage of economic development and market liberalization as El Salvador have found the need to de-politicize the management of the Strategic Reserve and to integrate the private sector into the overall management scheme of the Reserve.

FIGURE III-26

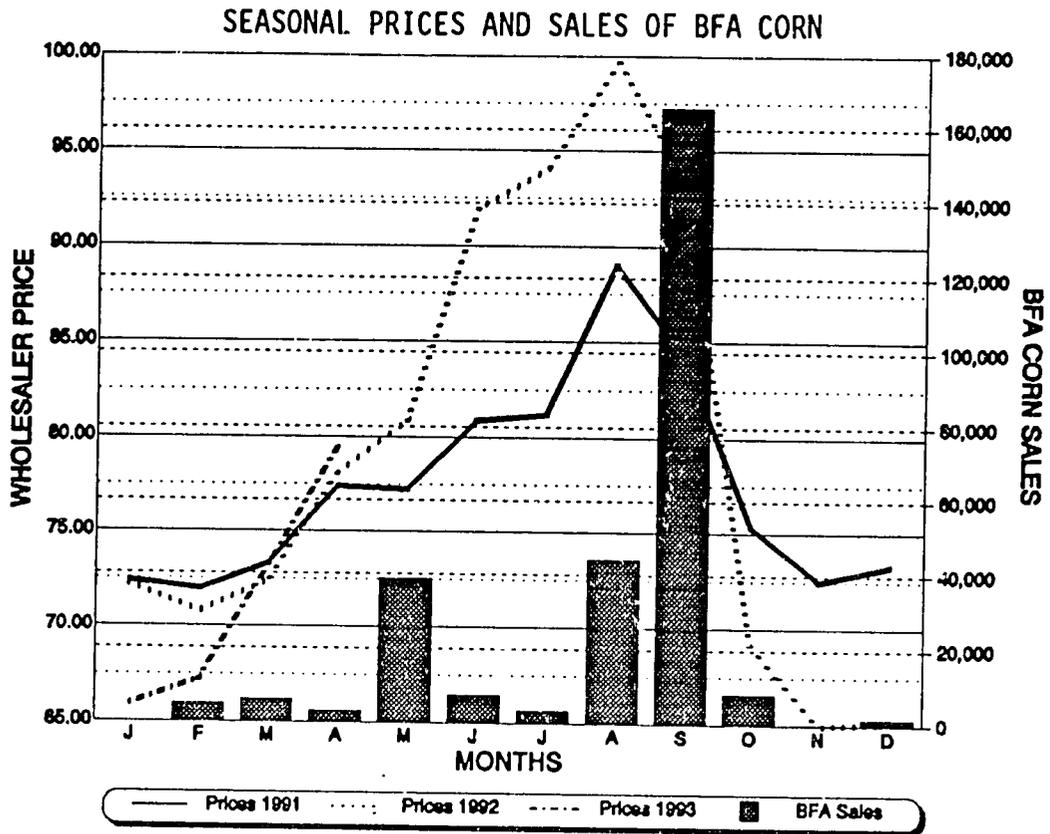
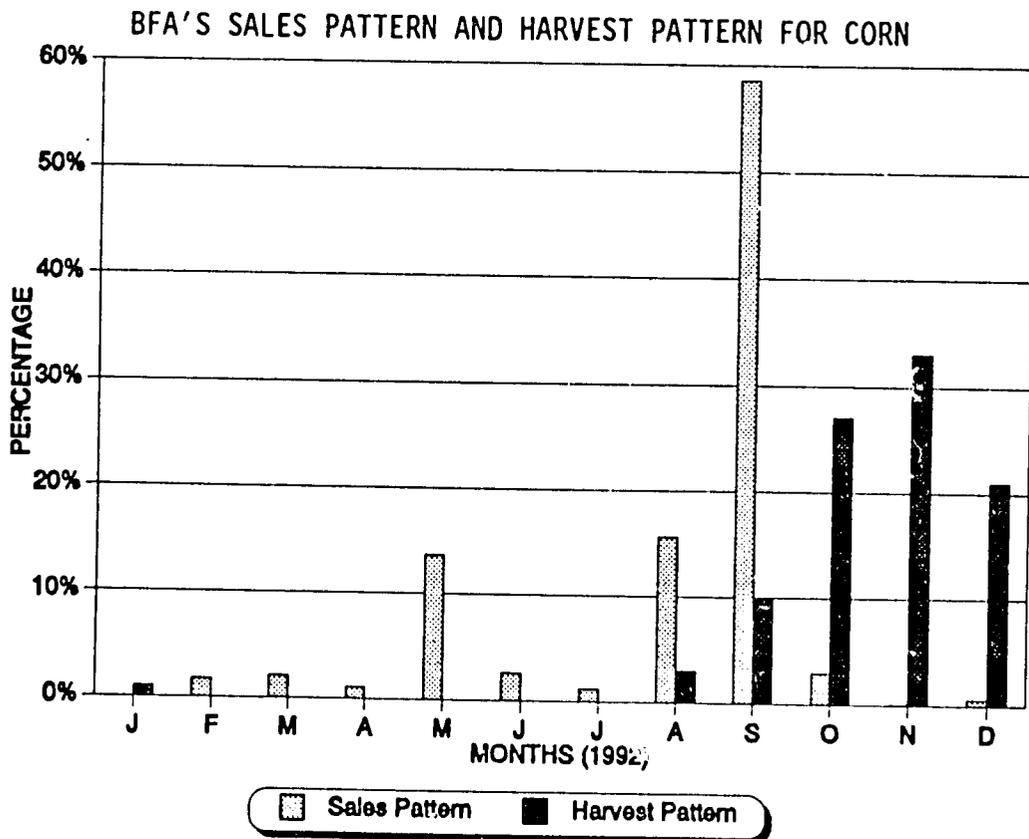


FIGURE III-27



SECTION IV

STRATEGIC FOOD RESERVES, STRUCTURAL REFORMS, AND MARKET DEVELOPMENT

This Section is divided into three parts. The first part describes the more classical concept of a Strategic Food Reserve as it has been applied in many countries around the world over. The second part describes the implications that structural reforms have on the need for a Strategic Reserve. The last part reviews the current and future market development efforts in El Salvador and the region, and its implication on a Strategic Food Reserve.

A. Concept of a Strategic Food Reserve

1. Definition

The Strategic Food Reserve is defined as a national food security strategy that insures a supply of prescribed staple foods (only grains and edible beans will be included, although milk and other commodities may be a part of some Strategic Reserve strategies) in the event of unforeseen catastrophes, such as earthquakes, floods, and droughts.

2. Objectives

The objectives of a Strategic Food Reserve are:

- to provide immediate supplies (freely distributed if need be) of staple commodities to the population in need when the emergency situation presents itself, and
- to serve as a stop-gap measure of supply until the staple commodities can be imported

3. Uses

The Strategic Food Reserve is used only in cases of emergency and only on a short-term basis, i.e., as a temporary provision to guarantee minimum consumption until regular food aid or sales arrive which replenish the market (Neils, Lea, Reed, and Kebbati, 1992). The release of the Reserve stocks should be immediate and as widespread as required. Many countries have instituted a Disaster Preparedness and Prevention Plan which officially states the operational plan of usage of the Reserve. The use must not be for purposes of stabilizing prices or for augmenting supplies of a specific commodity when the estimated harvest is poor.

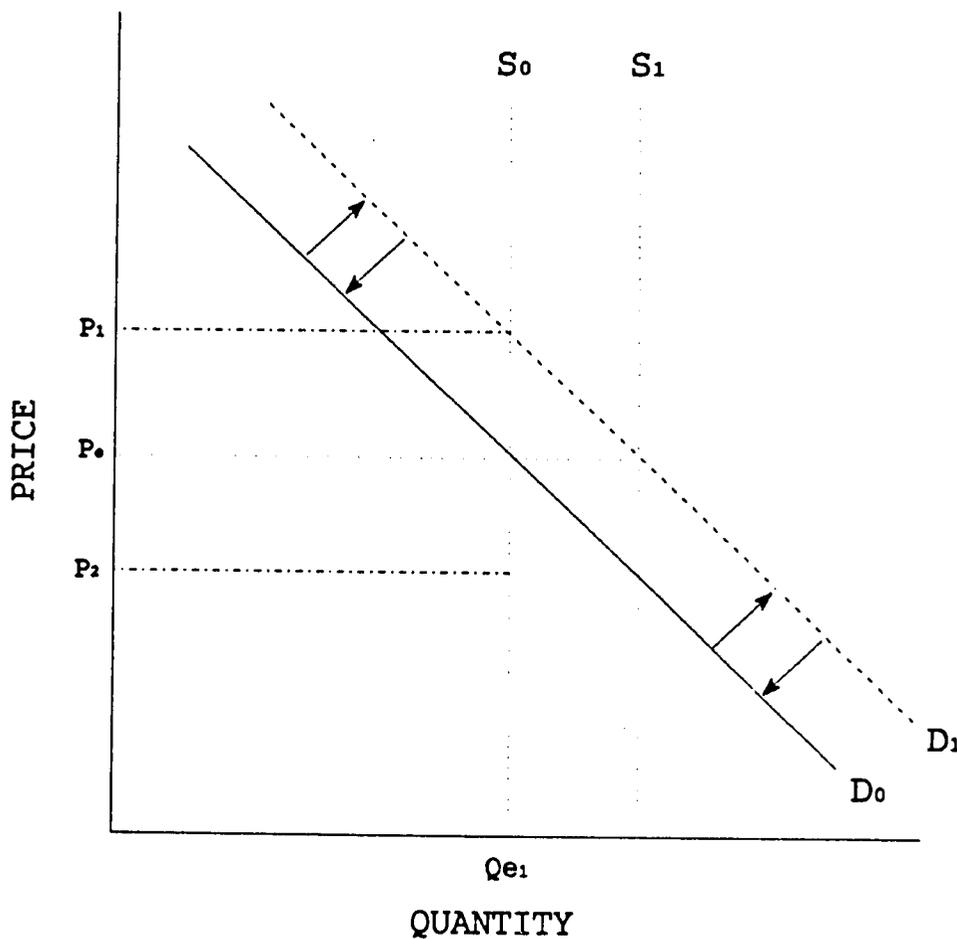
4. Recycling options

Reserve stocks must be recycled well before the quality of the stocks deteriorate to the extent the stocks are not fit for human consumption or the quality is too inferior to sell the stocks at reasonable prices in the market. Generally speaking, it is recommended that about one-third to one-half of Reserve stocks be recycled each year (Neils, Lea, Reed, and Kebbati, 1992).

The major consideration when Reserve stocks are being recycled is what impact will it have on market prices, producers, and consumers. Two different approaches to recycling stocks have various advantages and disadvantages. The first approach of buying and selling an equivalent quantity of Reserve stocks at relatively the same time within the market has theoretical appeal (Figure IV-1). One would think that selling a given quantity of stock and then buying back an equivalent quantity of stock during the same time period would have no impact on market prices, producers, and consumers.

FIGURE IV-1

THEORETICAL "LACK OF AN IMPACT" ON MARKET PRICE OF BUYING AND SELLING THE SAME QUANTITY OF RESERVE STOCKS



For example, assume that at harvest time, quantity Q_{e1} is seasonally in balance with demand at price P_e . If the government buys quantity X , it would shift the demand curve from D_0 to D_1 and price would increase to P_1 . However, if the government were to sell the same amount X at the same time, the supply curve would be shifted to S_1 , pulling the price down to the original price P_e , leaving market prices unchanged.

While appealing in theory, there are practical problems with such an approach, including:

- the impact on market prices of selling stocks from the Reserve storage facilities may not be canceled by the opposite impact of buying stocks for the Reserve, particularly in the applied case where spatial price differences exist in markets throughout the country, and market co-integration is weak, as is the case in EL Salvador
- buying and selling an equal amount of stock at the same time can have exactly the opposite effect on price when the buying and selling transactions take place in different locations, but the volumes sold and bought are not the same at each location, and the local markets are unable to compensate
- the possibility that the same "old" stock sold by the agency, or a similar quality of stock might be bought back would lead to a financial loss in the transaction, and complicate the already difficult problem of quality maintenance and stock rotation
- quantities bought and sold are not the only price determining variables; quality is an important and changing determinant of prices; prices will not remain unaffected when different qualities are sold and bought

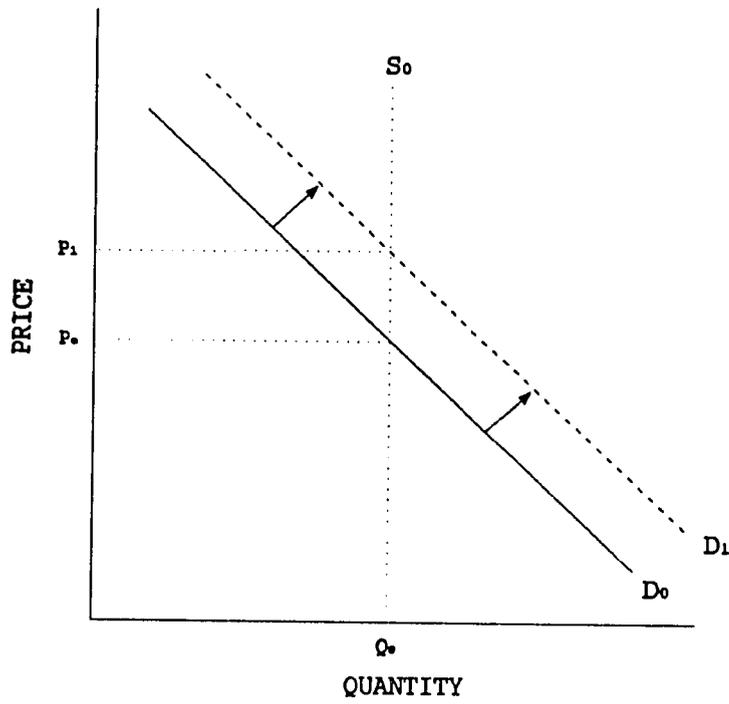
The second recycling approach includes buying stocks for the Reserve shortly after harvest when prices are near their lowest annual level and quality is best, and selling (recycling) stocks typically at the end of the crop year when prices are generally near seasonal highs (Figure IV-2). If properly managed, this approach includes the following secondary advantages:

- the buying of Reserve stocks may boost producer prices for many producers during a period of time when producer prices are otherwise at a seasonally low level; thus, depending on the quantities bought, and the amount of time used by the government to replenish the stock, the "balance" price P_0 during harvest may be increased to a new higher level at P_1 (upper section of Figure IV-2)
- when national (including on-farm) stocks are at their lowest level, that is, just before harvest, relatively few producers are likely to be impacted if at all by lower prices, when stocks are sold for rotation purposes; consumers may benefit for the same reason, i.e., by the injection of supplies into the market when seasonal prices reach their highest point; again, depending on the amount injected in the market and the amount of time used, the normal market price P_0 could be lowered to P_2 (Lower section of Figure IV-2)
- there is little/no impact on consumers when buying and selling an equivalent quantity of stocks at different times of the year since the number of consumers impacted at any given time period during the year is the same; and
- the end of the crop year is also opportune for planning to recycle stocks as it is the time when staple commodities may otherwise be imported in order to augment national supplies before the new crop reaches the market.

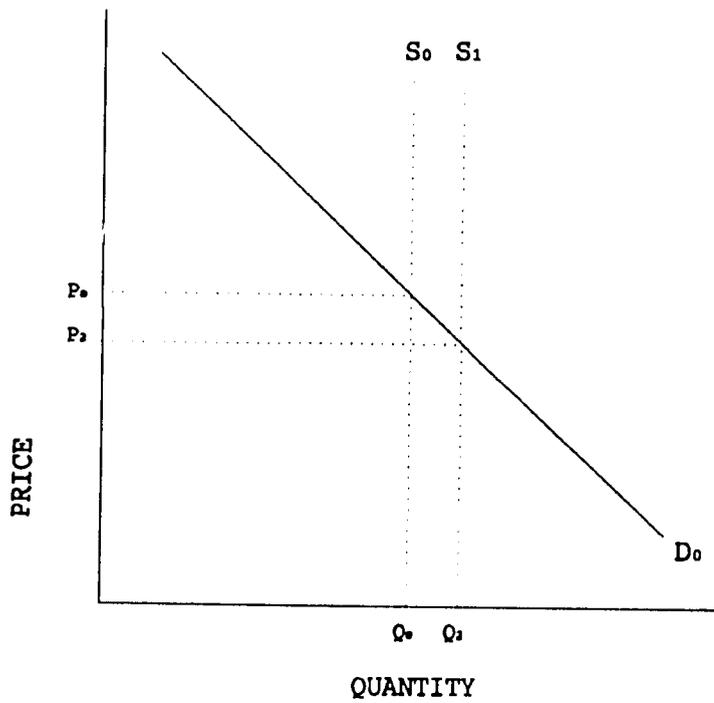
It must be emphasized that these advantages must be secondary or incidental to the basic purpose of the Strategic Reserve. Stock rotation should be undertaken in such a fashion so that impact on market prices are minimized.

FIGURE IV-2

THEORETICAL IMPACT ON MARKET PRICE OF BUYING
RESERVE STOCKS JUST AFTER HARVEST



THEORETICAL IMPACT ON MARKET PRICE OF SELLING
RESERVE STOCKS JUST AFTER HARVEST



5. Funding

Funding of the Strategic Reserve is the responsibility of the Government. The funding level must be adequate for covering all accounting costs of the Reserve. Such costs include both variable and fixed costs, including

- round-trip stock transport costs to and from the storage facility
- stock and facility maintenance costs
- insurance and security costs
- labor, management, and administrative costs
- handling and management fees, and
- amortization costs.

6. Social costs and benefits

Generally speaking, it is possible to quantify social costs and benefits using classical welfare analysis. In the case of the Strategic Reserve, the social costs can be estimated using a similar approach as in Section III. However, estimating social benefits of the Reserve is difficult because the price at which Reserve stocks are delivered under emergency conditions could vary from as low as zero to as high as the expected market price. Using the El Salvador example, assume, for example, that one million quintals of corn were consumed per month and after a catastrophe (e.g., earthquake) hit El Salvador only 600,000 qq were delivered to the market the month following the catastrophe resulting in prices at the consumer level of C200/qq as compared to C100/qq just before the catastrophe hit. Assuming no seasonality in corn prices normally occurs during the month of the catastrophe, what would be the benefit of having the Reserve?

In this example, the benefit (to consumers) would be estimated at $600,000 \text{ qq} \times \text{C}200/\text{qq} = \text{C}120,000,000$ minus $1,000,000 \times \text{C}100 = \text{C}100,000,000$ equal to twenty million colones. The total economic cost of 400,000 qq of corn held in the Reserve for at least 1.5 years on average would equal $400,000 \text{ qq} \times \text{C}48/\text{qq}/\text{year} = \text{C}19,200,000$.

However, the GOES would not necessarily be selling the Reserve stocks at C100/qq. The stocks may even be distributed free of charge if necessary. Therefore, social benefits need to be measured in terms of the number of lives saved, the degree of malnutrition prevented, and other qualitative measurements. To that end, the social benefits, though difficult to measure, should be accompanied by social costs that are based on the most efficient and cost effective Strategic Reserve policies and procedures.

7. Management

Management of the Strategic Reserve should be the responsibility of an apolitical, possibly autonomous, organization established by the government. In countries considered to have relatively successful Strategic Food Reserve strategies, the development of an organization operating apart from the government but with a defined set of operating policies and procedures, and, in many instances, a performance contract in place (between the managing organization and the government), has proven to be an effective system.

The Board of Directors of such a managing organization would have representatives from various ministries of the government, private sector participants, active donor representatives, et. al. The budget for the organization would be developed by the organization's staff with approval by the Board of Directors. The

government would then mutually agree on a contract (preferably linked to performance) with the Board of Directors of the Strategic Reserve organization.

8. Stock size determination

The stock size of the Reserve has been estimated through various methods, including the typical method, direct estimation method, and the indirect approximation of the required stock.

a. Typical Method

The typical method is "to simply count the number of people not directly involved in the production of cereals and multiply that number with some measure of minimum quantity of consumption needed in case of emergency" (Kottering, 1988). An example of this is given in Table IV-1.

TABLE IV-1

THREE SCENARIOS FOR THE DETERMINATION OF SECURITY STOCK FOR OFNACER BURKINA FASO

Scenarios	Target Group	Time Period for Arrival of Food Aid and/or Imports			
		60 days	90 days	135 days	180 days
		-----Tonnes-----			
Scenario 1					
150	500000	12329	18493	27740	36986
kg/capita	1000000	24658	36986	55479	73973
	2000000	49315	73973	110959	147945
	3000000	73976	110959	166438	221918
	4000000	98630	147945	221918	295890
Scenario 2					
170	500000	13973	20959	31438	41918
kg/capita	1000000	27945	41918	62877	83836
	2000000	55890	83836	125753	167671
	3000000	83836	125753	188630	251507
	4000000	111781	167671	251507	335342
Scenario 3					
190	500000	15616	23425	35137	46849
kg/capita	1000000	31233	46849	70274	93699
	2000000	62466	93699	140548	187397
	3000000	93699	140548	210822	281096
	4000000	124932	187397	281096	374795

Source: World Bank, What Level of Emergency Reserves Ought to be Provided for in The Sahelian Countries, 1975.

The argument for this method asserts that those people will be the first ones to be affected by very high prices and the first ones to lack private household fall back reserves.

b. Direct Estimation

The direct estimation method assumes that the emergency stock is intended for those at risk of not being able to obtain their minimum food intake. This method stands as a response to the data limitations and insufficient and highly

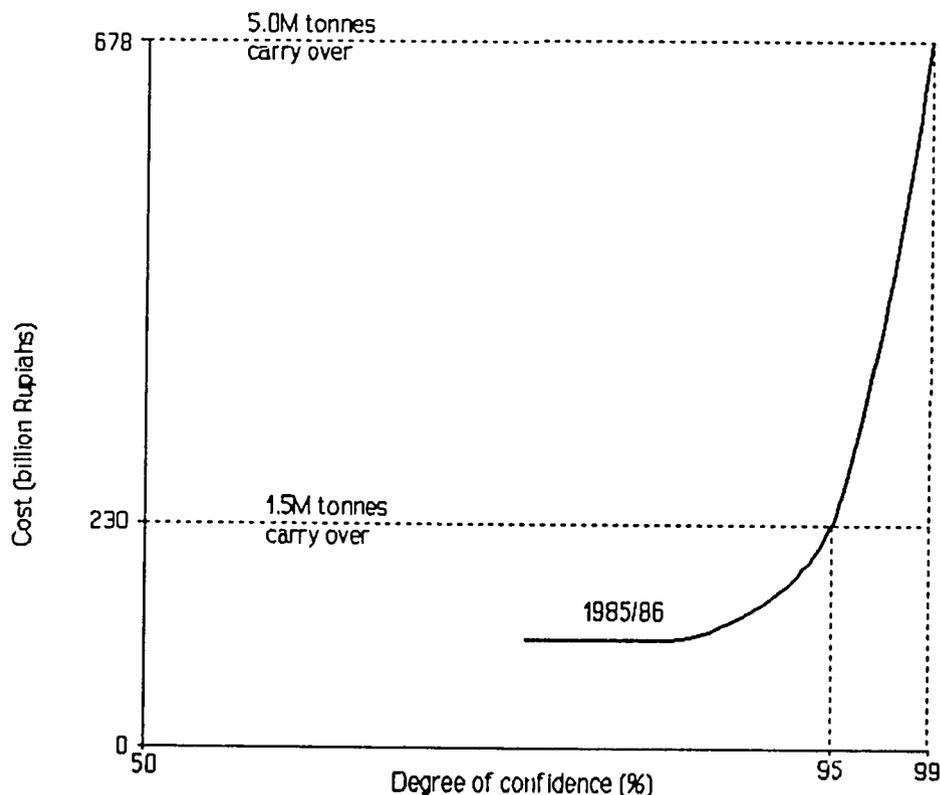
uncertain information on production, marketing, and consumption found in many developing countries. The method involves "counting the number of people likely to go hungry during a temporary crisis, multiply that number by their daily minimum need and multiply it once more by the length of time of the import gap" (Kottering, 1988).

c. Indirect approximation of the required stock

The indirect approximation method is data intensive as compared to the direct estimation method. The general idea in this method is that a specific level of stocks can be related to some level of insurance (confidence level), and that the decision of what stock level to set can be made by comparing the extra bit of insurance with the extra bit of spending required to maintain the additional stocks (Kottering, 1988). This method has been used, for example, in Indonesia to determine the carryover stock level needed for a given required level of food security (Calverley, 1988). The results of the analysis indicated that at low levels of confidence (<90 percent), small increases in stock levels have significant effects on improving food security (Hindmarsh and Trotter, 1990). Beyond about 90 percent confidence limits, very substantial increases in stocks increase food security by very small margins. For example, in 1985/86, increasing the stock level from 1.5 to 5 million tons increased the level of confidence from only 95 to 98 percent (Figure IV-3).

FIGURE IV-3

RELATIONSHIP BETWEEN FOOD SECURITY IN INDONESIA AND THE COST OF HOLDING STOCKS



B. Structural Reforms and Reduced Risks

The GOES has implemented free market and liberalized trade policies which will likely lead to long-term economic growth. These structural reforms are also leading to less government intervention in the marketplace and a stronger private sector.

As the GOES relinquishes direct participation and control on its economy, while increasing regulatory and facilitating functions, the private sector will be in a better position to assume the risks inherent in grain storage and marketing. These structural reforms, are laying the foundation for the direct involvement of the private sector in insuring national food security.

1. Structural reforms

Structural Adjustment Programs (SAP) are designed to promote sustainable, real economic growth through an economic environment that enhances economic efficiency and competition, and result in more optimal utilization of resources. The specific impacts of SAP on fiscal, monetary, trade and commerce, exchange rate, and labor policies are given in Table IV-2. Such SAPs affect the basic grains and bean production and market systems through at least some of the following developments:

- A liberalized national grain market that allows grain to flow where prices are attractive and where the demand is greatest. Under the circumstances of a catastrophe, a liberalized market can attain a degree of national food security that is impossible under a controlled economy. Under liberalized market conditions, various instruments can facilitate the mobilization of stocks when needed for emergency purposes.
- Regionalized grain markets that complement the impact of facilitating instruments by allowing the free flow of grain to markets where prices are attractive and demand is greatest.
- Import price bands for basic grains that protect producers from low international prices, that are, after all, a function partially of the highly subsidized US and EEC policies. In the El Salvador case, the imposition of an import price band has contributed to an increase in the national production of corn in recent years from 10 to a record level of over 15 million quintals.
- Privatization that puts government assets (such as grain handling and storage facilities) in the hands of the private sector and leads to opportunities for the Government to insure national food security through private sector-held stocks.
- Government facilitating a private sector that produces more efficiently the products needed by society (including the staple commodities such as corn). The production response from the private sector tends to be higher yields, inefficient producers tend to drop out of production, while other producers tend toward the production of higher-valued products.

TABLE IV-2

IMPACT OF SAP ON VARIOUS NATIONAL POLICIES

POLICIES	STRUCTURAL ADJUSTMENT
Fiscal	<ul style="list-style-type: none"> - Increase efficiency - Reduce government size - Shift government expenditure from current to investment items - Improve revenues through a less distorting tax structure - Charge real prices for public utilities and services
Monetary	<ul style="list-style-type: none"> - Allocate resources to private investment
Trade and Commercial	<ul style="list-style-type: none"> - Eliminate price controls - Free international trade - Reduce import tariffs - Reduce tariff spread - Eliminate subsidies - Promote exports
Exchange Rate	<ul style="list-style-type: none"> - Sustain real exchange rate
Salary	<ul style="list-style-type: none"> - Increase flexibility in labor market

2. Reduced risks

The impact of liberalized national grain markets, regionalized free trade, privatization, etc. is a reduction of risks throughout the national food production and marketing system. In an environment of reduced production and marketing risks, the need for a Strategic Reserve is also reduced. This is because (1) production and markets are spread over a wider area, decreasing the risk of a stock out in the event of an emergency situation, (2) markets tend to be more efficient and transparent, (3) there are generally less interruptions in the flow of grain from surplus to deficit market centers, (4) price discovery mechanisms are more immediate, and (4) the private sector is increasingly more capable of delivering the quality and quantity of staple grains desired by the consumer.

In the case of El Salvador, where the import replacement time is less than one month, existing on-farm stocks and industrial stocks are considered more than sufficient to alleviate any concerns of a temporary market failure. Furthermore, El Salvador has public policies and private sector initiatives in place that make it possible for the GOES to own stocks that are actually stored and maintained by the private sector.

With the structural reforms in place within the country, then, national food security can be achieved through a well-informed private sector, a Government that facilitates and regulates the market, and a Government that works closely with the private sector to provide national food security at times of catastrophes.

In summary, the fear of market failure, or even the probability of an emergency situation are no longer valid reasons for having a physical Strategic Reserve carried by the public sector.

C. Grain Market System Development and the Strategic Reserve

The long-term option for a privately held yet Government-controlled Strategic Reserve is predicated on the existence of an efficient and effective market system for basic grains and edible beans in El Salvador and the region.¹ While a grain market system exists in the country and region, its current structure prevents the kinds of conduct and performance which would allow the GOES to implement a low cost private sector-held yet Government-controlled Strategic Reserve.

Section IV-C is presented in two parts in order to illustrate the changes and additions needed to bring the current grain market system to such a state, enable the GOES to switch to the low cost Strategic Reserve option, and have the most efficient, market oriented grain system to boot.

The first part illustrates the desired grain market network and its components, and summarizes the needed supporting institutional components. The second part elaborates on the condition of those components existing in the Salvadorian grain market system which should be changed, and new ones which should be added to the system in order to achieve the type of structure which will allow the private sector to carry all the grain inventory, while the GOES monitors the situation and decides whether it should buy and carry some level of "insurance" at any given time.

1. The desired grain market system network²

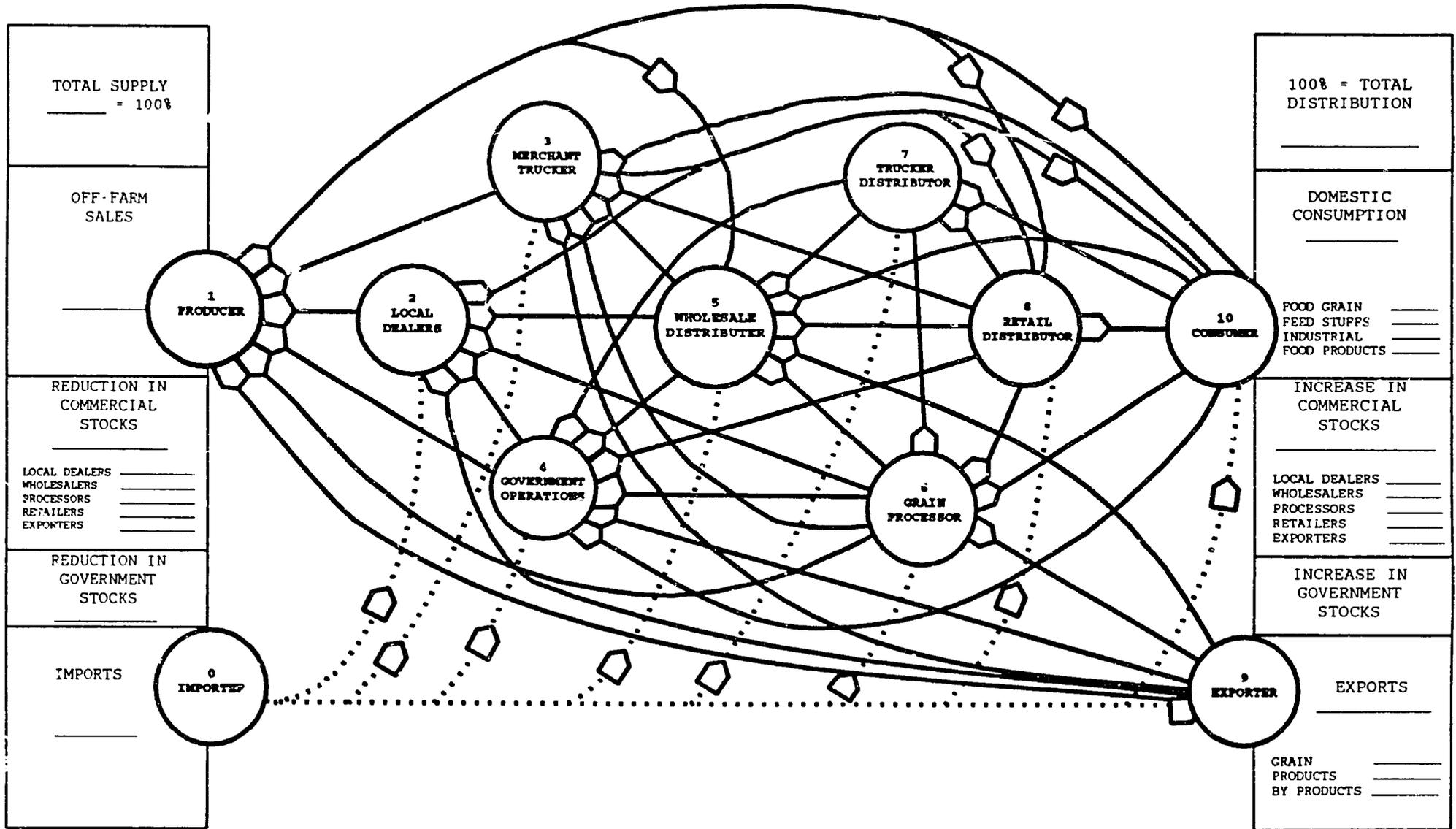
Grain marketing is the process of getting the product from the producer (sources) to the consumer (destinations) in the product form and at the time and place desired by the consumer. Thus, marketing includes such activities as assembly, storage, grading, transporting, processing, packaging, pricing, buying, selling, financing, and the assumption of risk. A schematic presentation of this process is given in Figure IV-4.

¹The region includes Guatemala, El Salvador, Honduras, and Nicaragua which are forming a regional trading block.

²This part is based on an unpublished paper written by Dr. John Dale (Zach) Lea, entitled "Physical and Institutional Components of a Grain Market System", Food and Feed Grains Institute, Kansas State University.

FIGURE IV-4

GENERALIZED MARKETING NETWORK FOR BASIC GRAINS



SOURCE: FOOD AND FEED GRAINS INSTITUTE, KANSAS STATE UNIVERSITY, MANHATTAN, KANSAS

Total market supply at any given time is provided by (1) off-farm sales, (2) reduction in commercial stocks, (3) reduction in government stocks, and (4) imports. Total supply must equal total distribution or utilization which is represented by (1) domestic consumption and industrial utilization, (2) increase in commercial stocks, (3) increase in government stock, and (4) exports.

Whether a country uses the third and fourth sources and destinations for a particular grain depends on the level of national production versus consumption and the degree of public involvement in the grain markets. In the case of El Salvador regional grain trade is a seasonal occurrence, and imports of yellow corn and rice from the US is also very common. Public market participation is now limited to GOES Strategic Reserve stocks, and stocks belonging to Non Government Organization (NGO's) which are used for humanitarian and development assistance.

The network linking sources and destinations is represented by a sequence of marketing agents who perform the many marketing activities previously described. For example, buying, pricing and selling is repeated every time a transaction takes place between any two market participants. Storage occurs at every marketing stage, except that quantities stored (demand for storage or time utility) and concentration of storage (possession utility) is different at each stage. Processing (form utility) also occurs at nearly every marketing stage, except that the type of processing differs, depending on the stage, such as cleaning and drying at farm level, blending at wholesale, and milling at processing level.

The conduct and performance of all marketing agents, and therefore the efficiency and equity achieved at all levels of the system depends, to a great extent, on the existence and the quality of certain supporting institutional components.

2. Supporting institutional components

While necessary, the presence of such a network is not sufficient to guarantee efficiency (benefits greater than costs; competition) and effectiveness (getting the job done). For such a marketing system to perform the most efficiently and effectively, its structure must also be supported by certain "facilitating" institutional components. These are summarized as follows.

- Supportive legal environment: to provide laws, regulations, and codes which support entrepreneurial activity, encourage competition, guarantee food safety and wholesomeness, and promote a safe work environment. Examples include, property rights, enforceable contracts, insurance, free market prices, free import-export, official grade and standards, standard weights and measures, work safety codes, and food processing and environmental laws and regulations.
- Active financial system: to provide sufficient credit at market rates to support grain merchandising operations which require large amounts of working capital, together with statutory regimes which allow grain or grain products to be used as collateral.

- Bonded service system: to provide bonded warehousing for grains and cereal based products, as well as other custom services, such as grading, cleaning, drying, storage, conditioning, and processing to third parties.
- Warehouse receipt system: to provide liquidity to the grain market system by separating physical location of the grain from its legal ownership; to provide negotiable instruments for credit collateral or transfer of ownership, regardless of physical location of grain.
- An agricultural commodity exchange: to normalize and facilitate the buying and selling of grains and grain products (cash and term contracts), the hedging of price risks, and the development of information on supply and demand; to discover and disseminate transparent and competitive market prices to allow market agents to operate competitively.
- Inspection systems: to monitor the performance of financial and warehousing systems, the commodity exchange, and food processors and distributors to assure their integrity and maintain the market's confidence and trust in them.
- Information system: to provide relevant and timely market and technical information to producers, consumers, market agents, industrial processors, and other users in order to facilitate competition, increase productivity, and assure food safety and quality.
- Trade associations: to provide representation, insurance, training and other services to members, enhancing members' stability, skills and profitability.
- Human resource development: to improve the skills and performance of managers, traders, operators, inspectors, technical personnel and others provided by a combination of private and public institutions.

These nine supportive institutional components represent the sufficient conditions which must be in place to bring about a conduct and performance of the grain market system's structure which is socio/economically acceptable. In other words, market agents behavior will be such that producers and consumers will be satisfied with the quantity, quality and prices paid and received for their products at any given time.

Given the structural reforms, the regionalization of the market for basic grains, and the potential for improving existing and adding new supportive institutional components, the current grain market structure is in a position to undergo the necessary changes and improvements and be perfectly capable to effectively respond to the type of crisis for which a strategic reserve is being kept. This, in turn would allow the GOES to introduce and maintain the least cost Strategic Reserve option.

3. Improving supporting institutional components

a. Supportive legal environment

A supportive legal environment is perhaps the most difficult component to frame and implement. The number, age and complexities of existing laws, regulations and codes called for a separate research effort in this area. Such effort was undertaken by Dr. Ulises Flores in his work entitled "Aspectos Legales en la Comercialización de Granos Básicos", MAG, PRISA, Contrato de Consultoría 2/92. For this report the relevant sections dealing with commercialization laws, and weights and measures will be summarized.

(1) marketing laws, regulations and codes

The Salvadorian situation:

A revision of 26 sets of laws, regulations and codes going back to 1945, and ending with the current Consumer Protection Law of 1992 clearly indicates that this fundamental component is not supportive of current development philosophy, i.e., a price-driven, market oriented economy, with a facilitating public sector.

As Dr. Ulises documents, the 1992 Consumer Protection law has all the good intentions of protecting the consumer "through the establishment of norms which protect the consumer from fraud and abuses". This is clearly spelled out in the first Article of the Law. However, the Articles dealing with the implementation of the Law, and applicable to basic grains are throwbacks to the old mind set of "government knows it all and will do everything better". A few examples will suffice, such as fixing market prices (Article No.5 and No.30), inspecting all businesses (Article No.21), regulate imports and exports (Article No.5c), and define "hoarding" and act against such (Article No.5d).

These few examples are sufficient to demonstrate how a well intentioned law becomes a "bad" one. It not only contradicts the current policy framework of encouraging more private sector involvement, freer markets, entrepreneurship, and less government intervention, but it is literally impossible to apply in an equitable and complete manner, given a shrinking public sector.³

Advantages of changes and additions:

The best action to take is to change the 1992 Law to bring it into harmony and balance with current policies and efforts. This, however, is not political expedient, given the current political climate in the nation and the importance attached to this Law by center and center-left political and non-political groups.

As an intermediate step, Dr. Flores suggests an amendment to the 1992 Consumer Protection Law which would exempt basic grains from the Law via a legislative decree. A "Proyecto de Decreto" is contained in the end of the section dealing with commercialization laws.

³Detailed and interesting reading is contained in Dr. Flores report.

(2) Official grain grading system

The Salvadorian situation:

The Salvadorian grain market system works on the basis of "informal" quality grades and standards. These informal grades link quality to price, and are agreed to between buyers and sellers based on physical inspection of the grain when the merchandising transaction takes place. Experience plays a large role in order to know whether the grain meets the desired quality. For example, new corn will demand a lower price because it has certain quality characteristics which makes it less desirable than old corn from the previous harvest. In beans it is the reverse, older beans are less lustrous and have hardened, needing more cooking time, and therefore demand a lower price than beans from the new harvest. Excessive moisture contents are adjusted with volume discounts by adding an additional amount of grain (ranging from 0 to 10 lbs, depending) to each standard purchase unit, the quintal, which weighs 100 pounds.

Industrial corn and bean processors have their own purchase quality standards to meet their own quality needs in their final products. Discounts are applied when the quality falls short of their buying standards, premiums are unheard-of. While correct from an operational point of view, these "private standards" are applied unilaterally by the buyers, leaving the sellers no option or means to verify the correctness of the sample based quality determination.

The lack of official grades and standards has other disadvantages, including the discovery of a market price (what quality to what price), no commingling of grain while in storage (increases cost of this operation), no blending possibilities to increase merchandising efficiency, and adjust quality to customers' needs (avoid not getting a premium when delivering grain which exceeds a user's private purchase standard).

Advantages of an official grain grading system:

To be effective, a grading system should reflect those grain qualities that are most important to grain users (buyers). A grading system that can measure this range of factors will provide greater information and thereby contribute more to the communication between producers and users than a system which does not identify separate grading factors. Grain grades are based on numerical values for the set of factors selected to reflect quality variation of each type of grain. Common grain grading factors include type or class of grain, moisture content, test weight, removable foreign matter (dockage), broken kernels, damaged kernels, and insect infestation and damage.

The facilitating features of a grain grading system allows the market system to be more fluid, responsive, and tend to reduce transaction costs. Together with regulations and codes they provide a system for redressing quality discrepancies between origin and destination points. The facilitating features are as follows:

- The application of grain grades permits grain trade to be undertaken by description rather than physical inspection. This allows transactions to take place without face-to-face negotiations between buyer and seller, and physical inspection of the grain each time a transaction takes place.

Rather, trading takes place on the basis of quality description provided by samples of the commodity.

- Commingling of grain during storage and transport is made possible. This feature reduces the need for segregated storage and transport and the settling of quality differentials between origin and destination through volume or price discounts and premiums.
- Grain grades permit separation of different qualities while in storage and the blending of such qualities to meet specific users' needs.
- Differentiated pricing according to quality grades. Different quality grades (say three) can be used to reflect a range of qualities-price relationships which enhances communication via price signals between producers and users of grain.
- Use of trading grade. Grain trading is made on the basis of the known quality characteristics of the "trading grade" which reflects the basis (in the US it would be US#2) on which purchase and selling bids are made, and from which quality premiums or discounts are applied, depending on qualities supplied and desired.

(3) Weights and measures

The Salvadorian situation:⁴

The only legal references to weights and measures in El Salvador are contained in two decrees. The first dates back to 1885, when an attempt was made to legislate the adoption of the French metric system. This effort was not successful. The second legislative decree in 1930 established an office of weights and measures in an attempt to implement the metric system. This second effort was unsuccessful as well.

Today the common measure for weights in grain transactions continue to be the Spanish measures of pound, "arroba" (25 lbs), and quintal (100 lbs), which are also used in official measurements of production, commerce, basic food basket and other statistics.

According to Article No.1 of the "Código de Comercio", customs and practices can constitute a legal activity if they are not regulated otherwise. Since the attempts to implement the metric system failed and "customs" prevailed, and weights and measures are not regulated by any other legal instrument, it "must be concluded that in the case of basic grains, customs is the law".

Advantages of official weights and measures:

The advantages of having official weights and measures (including those established by customs) are similar to those derived from official grade and

⁴Aspectos Legales en la Comercialización de Granos Básicos, by Dr. Ulises Flores.

standards. Uniformity throughout the system facilitates communication, market transactions, record keeping, gathering of statistical numbers, analysis and dissemination of results.

Since the volume measures are so ingrained in the system, and well understood by all participants, nothing would be gained by a mandate to change to another system. Rather, what is needed is thorough periodic inspection and supervision of the scales being used throughout the country for weighing different lot sizes, such as small retail, sack and truck scales. This service can be provided by an inspection unit of the Federal Government which might already be undertaking similar regulatory activities, or through a properly licensed and bonded private sector firm.

b. Improved and new market instruments

(1) Marketing credit

The Salvadorian situation:

Grain marketing requires substantial amounts of money in the form of operating or working capital, therefore, liquidity is one of the key elements of an efficient and responsive grain market system. In El Salvador it is evident that liquidity is a major bottleneck in grain marketing. The lack of credit or the inability to access credit for merchandising is the most often mentioned constraint by producers, merchandiser and final users of grains.⁵ This constraint is even mentioned by the largest and best connected industrial users in the nation.

Without access to borrowed capital, the number of grain marketers is limited to those with adequate personal financial resources to finance their marketing operations. On the other hand, many potential and actual grain marketers, including producers, have little personal capital which can be used directly or as collateral to support operating capital loans. This situation affects the degree of competition by reducing the number demand sources for these basic commodities.

In short, liquidity assures that sufficient numbers of traders are actively involved in trading (including speculators) so that no group of traders can achieve an above-normal level of market power. It would also assure better producer and consumer prices by creating competitive pressures at both ends of the marketing network, and by allowing traders to stock larger amounts of grain than what they can, by using only their working capital asset.

Advantages of sufficient liquidity and a modern financial system:

Given that a high level of competition is desirable to assure the efficiency of grain marketing, it is in the interest of society to establish a legal and

⁵Based on market surveys undertaken in 1990 and 1992, and experiences in obtaining credit for the newly privatized IRA grain handling and storage facilities.

institutional environment that will facilitate access to borrowed operating capital for grain marketing purposes. This challenge can be solved and the way opened for broad-based participation in grain marketing activities by a financial system which uses the grain as the underlying collateral.

Since the grain is "a readily marketable staple" it can be used as the collateral foundation for a credit system that promotes the flow of credit to both large- and small -scale enterprise or producers. Grain under the control of an independent third party acting on behalf of a borrower and lender is an excellent collateral. If the terms of the contract are not met by the borrower, the lender will have little difficulty selling the stored grain and reclaiming the borrowed funds.

The marketability of the collateral provides an additional advantage in securing lendable funds. Due to the low risk associated with loans collateralized with grain, these loans can be sold to investors at small discounts from their face value. This financial instrument is called banker's acceptance. The issuing bank accepts a producer's warehouse receipt as collateral and allows the producer to write drafts for money which are "accepted" by the bank (the bank that honors the draft and disburses the money to the producer). The bank can then sell or "rediscount" the resulting banker's acceptances to an investor, usually another commercial bank, an investment bank, the nation's central bank or an individual investor. The bank which issued the banker's acceptance pledges to repay the amount of the acceptance. The fact that the issuing bank becomes liable for the banker's acceptance makes the acceptance significantly more marketable. An investor need only verify the credit standing of the issuing bank rather than that of the producer.

An additional attractive feature of banker's acceptances is that they provide issuing banks an avenue for generating bank business (issuing credit) beyond the bank's otherwise restricted limits (Reid, 1992). Properly structured transactions based on warehouse receipts and banker's acceptances simply funnel funds from an external money market through the bank and should not impact the bank's reserve needs relating to its internal funds. In addition, the underlying collateral and the maturity of the banker's acceptances are related to a readily marketable commodity; thus banker's acceptances are self-liquidating. Self-liquidation implies that the money to repay the investor will become available at repayment time as a result of the borrower's planned business activities.

As a result of these characteristics, commercial banks can be assured of making a reasonable return on these transactions, since they can funnel money from readily available sources at predictable costs to their customers who have agreed to pay for the origination of the loan and an interest charge. Clearly, such a system enhances the availability of operating capital to owners of grain and marketing agents. Thus, regulations can be promulgated allowing special lending limits for loans based on warehouse receipts and banker's acceptances. The basic components of such a financial system are adapted from Glaessner, et. al.(1992).

- Physical storage facilities controlled by either third parties or the lending institutions (the second choice exists in El Salvador in the form of warehouses called Almacenes Generales de Depósito);

- Warehouse regulations and enforcement (through inspection) to insure the availability for resale of stored grain and the integrity of the warehouse receipts;
- Insurance to protect the value of the stored grain from physical hazards, warehouse mismanagement, or fraud;
- Warehouse receipts and the necessary regulatory and statutory apparatus to assure their integrity and clearly define the rights and liabilities of each party having an interest in the warehouse receipts and the grain;
- Laws and regulations which facilitate the process of intermediation, i.e., the issuance of banker's acceptance and the development of a secondary market for acceptances; and
- Policies relating to macroeconomic conditions, taxes, and government intervention in the grain marketing system which support the development of a private market for grain stock financing.

(2) Bonded warehouse services

The Salvadorian situation:

In El Salvador grain can be stored in warehouses known as Almacenes Generales de Depósito".⁶ These warehouses are nearly all managed by the commercial divisions of banks and are used to deposit merchandize in the custody of the banks until all liens are paid-off. Mostly, they are used to store imported goods which are retrieved when all expenses associated with the import transaction, such as letter of credit, import duties, and custom dues are paid.

These Almacenes are also used by large users of basic grains, such as feed millers, corn flour, and snack-food producers to store grain and other goods as collateral for short-term working capital loans. When a client deposits grain in the warehouse, a warehouse deposit receipt and a "negotiable title" (bono de prenda) are issued. The title can be endorsed to the bank for a given amount of credit. As additional grain is bought with the first line of credit, it is deposited in the bank's warehouse, and additional credit may be given. The client cancels his credit as he retrieves the grain and sells it or uses it to manufacture animal feed or human food.

Unlike bonded warehouses these Almacenes carry only a minimum of insurance against loss due to fire or theft. The clients are responsible for maintaining the quality of their grain, and no commingling is allowed. Each client rents warehouse space which is separate from other clients by partitions made out of wood, wire or cement walls. Some facilities may have small silos for rent. In this case the client rents the whole silo, whether he uses the full silo or not. The warehouse receipt is non-negotiable and the negotiable title is endorsable

⁶See Título 4to; Operaciones de Organizaciones Auxiliares de Crédito; Capítulo I; Ramas de Operaciones; Ley de Instituciones de Crédito y Organizaciones Auxiliares (LICOA), 1970.

only to the bank for credit. A bank official must physically inspect the stored grain before such credit is authorized. No third party (State or Federal Government) monitoring or control takes place.

Advantages of a bonded warehouse system for grains:

The primary function of warehouses in a grain marketing system is to establish independent or third party control over the stored products. These warehouses are regulated by the State or Federal Government and are required to carry a bond as assurance that the financial means will be available for paying storage customers any shortfall in stored grain, should the warehouse experience financial difficulty. Such warehouses are called bonded warehouses. The bonds are usually furnished by bonding or insurance companies. In addition to the bond, warehouses are also required to carry insurance on the full value of any stored grain.

There are two general types of warehouses categorized according to their ownership:

- Third-party warehouses are owned by private- or public-sector firms or organizations and act only as custodian of the stored products;
- Field warehouses are generally owned by the owner of the stored products. However, to establish independent control over the stored products, control over the warehouse is turned over to a field warehousing agent. The field warehouse is separated from other warehouse components owned by the proprietor by appropriate and effective means, such as partitions, fences and locks.

In the absence of appropriate physical and legal facilities (regulations and enforcement), it may be necessary for the lending institutions to establish and operate a system of warehouses in conjunction with governmental authorities or establish a quasi-public corporation to own and operate warehouses issuing receipts (Glaessner, et.al., 1992). Such a system could be put in place in El Salvador under "Almacenes Generales de Depósito" already operated by banks.

(3) Negotiable warehouse receipts

The Salvadorian situation:

Negotiable warehouse receipts are not yet part of the grain marketing system in El Salvador. As with the lack of and limited access to direct credit for working capital needs, the lack of this marketing instrument reduces the potential liquidity in the market and, therefore, the level of competition. Its absence also prevents GOES from switching to the lowest cost option for the Strategic Reserve which would allow GOES to negotiate a limited amount of receipts to cover its food reserves, if such reserves as needed.

The limited system for grain warehousing and the certificate of deposits which are being used as warrants to obtain credit with the banks which own the Almacenes is a basis which can be used to introduce the negotiable warehouse receipt.

Advantages of negotiable warehouse receipts:

When grain is deposited into a warehouse, the depositor receives a warehouse receipt. Valid warehouse receipts must contain certain essential terms such as the date of issuance, the issuing warehouse location, description of the grain, warehouse person's lien, and whether or not the receipt is negotiable. To assure the usefulness of the document, warehouse receipts must be supported with a statutory scheme which clearly defines the rights, duties and liabilities of each party to a warehouse receipt.

"To promote bank financing of warehouse receipts, it is necessary that the warehouse receipt be negotiable and that a mechanism exist for the bank to acquire a priority security interest in the warehouse receipt and the stored agricultural products" (Reid, 1992). The acquisition of the priority security interest assures the holder of the receipt (usually a bank) that no other party having claims against the owner of the grain (marketer or producer) or the issuing warehouse will have a higher priority claim. It is also necessary that a mechanism exist to track all activity relating to a given receipt. This is necessary to prevent fraudulent use of warehouse receipts, such as a person using a warehouse receipt to obtain credit from one source or to obtain financing from one source and then sell the grain without repaying the loan.

The "primary market" for warehouse receipts refers to the initial extension of credit. Typically, a producer or marketer pledges a warehouse receipt to the bank which agrees to allow the marketer to draw drafts which are accepted by the bank. The bank accepted draft or "banker's acceptance" is sold at a discount (rediscounted) to an investor in the "secondary market". Facilitating this process are: first, the statutory regime required for valid warehouse receipts, secondly, laws establishing banker's acceptances as valid financial instruments wherein the accepting bank's liability becomes primary and the drawer's (borrower's) liability becomes secondary. Thirdly, the banker's acceptance must be negotiable. Additionally, the nation's central bank should establish certain criteria which allow the banker's acceptance to be eligible for rediscounting to the central bank, thereby assuring issuing banks a market for the acceptances. Reid (1992) lists the following criteria as essential for such rediscounting eligibility:

- The grain financed by banker's acceptance should be limited to nonperishable, readily marketable products;
- The maturity of the banker's acceptance should correspond to the duration of the storage of the grain so that the storage transaction is self-liquidating. Self-liquidation implies that the accepting bank receive payment for the banker's acceptance upon sale of the grain. "An effective method of ensuring that the banker's acceptance is self-liquidating is to limit 'eligible' acceptance to a maturity of six months".
- It is preferable that the warehouse receipt be issued by a licensed, independent warehouse.
- The major advantages of introducing the bonded warehouse and the negotiable warehouse receipt system, include (1) additional liquidity in the market, (2)

increased competition, (3) better market information, (4) normalized and regulated trade of the receipts in the commodity exchange, and (5) the ability of GOES to switch to the low cost option for the Strategic Reserve.

(4) Warehouse regulation and inspection system

The Salvadorian situation:

Advantages of a warehouse regulation and inspection system:

The purpose of regulation is to foster confidence in warehouses as custodians of agricultural products and issuers of warehouse receipts. Licensed, independent warehouses are akin to banks in accepting deposits of valuable goods. As do depositors of money, grain depositors depend on their government to establish and enforce operating standards to insure that the grain is handled properly and that it will be available to the depositor without unnecessary delay. The Federal and/or the State government are responsible for establishing the regulatory apparatus for licensing, examining and regulating warehouses, and to define and regulate the rights and liabilities of each party to the warehouse receipt (Reid, 1992). Warehouse regulations should assure the following:

- Physical facilities appropriate for storing and caring for grain;
- Competent personnel with the capability and training:
 - * to inspect, grade, weigh, store, and retrieve grain
 - * to maintain proper records and issue appropriate documents
 - * to monitor the condition of the grain and take precautionary, preventative and combative measures against grain quality deterioration or damage
- Adequate warehouse insurance to cover the value of the grain in case of physical losses or loss due to fraudulent acts of the warehouse management;
- Enforcement actions taken when appropriate.

(5) Commodity exchange

The Salvadorian situation:

El Salvador is the third country in Central America to initiate the process of introducing a cash and term commodity exchange for agricultural products.⁷ It is expected that the exchange will start operating by the end of the year at the earliest. The process, an initiative of the private sector, is being slowed down due to the lack of funds for equipment, experience, and to a degree, support from the public sector. All legal aspects of this new marketing instrument, as

⁷The other two are Costa Rica, which started the exchange in mid 1992, and Guatemala, which started in March of 1993.

related to its structure, management, regulation, operation, and other issues are in the process of being resolved.

Advantages of a commodity exchange (cash and term):

A commodity exchange is an association formed by persons or institutions connected with the agricultural sector to provide marketing services for agricultural products. The exchange itself does not buy or sell the products, transport, store, process, or fix product prices. The exchange is a non-profit organization which provides a meeting place for its members and brokers, and where market and market prices are discovered, and where information regarding harvest, utilization, supply, demand, costs, trends and other important information is obtained.

As a consequence, an agricultural commodity exchange serves as a vital center for the discovery of market information and dissemination, and as a link between all factors representing supply and demand for the commodities registered. To provide these two key marketing functions, the exchange provides or is linked to such services as product normalization, insurance, storage, financing, and others which in turn tend to stabilize the market, provide fluidity, and diminish uncertainties in regard to demand and supply. The major advantages of such a marketing instrument for agricultural commodities include:

- It facilitates market transactions (buying and selling of grains) by normalizing the transfer of possession without their physical presence;
- It guarantees consummation of market transactions (spot or term), and the quality of products sold and bought;
- It provides a mechanism for adjusting quality and quantity differentials which fall outside established ranges;
- It standardizes quality (trading grade) for the market and provides pricing according to quality differentials;
- It improves market information gathering, analysis and dissemination on the basis of volumes and qualities;
- It facilitates price discovery in the market, and provides a reference price which allows the whole market to function on the differential in basis;
- The term market provides a mechanism to hedge price risks;
- The term market guarantees a future delivery price, even before beginning the production process; this, in turn facilitates securing credit for production and marketing (Lizarazo, 1992).

c. Improved production and marketing information

Grain marketing efficiency is enhanced when timely and relevant market information is provided to guide marketing decision making. Improved information

increases trader's confidence that the price at which they trade is the best available. Government can foster this process by collecting and disseminating certain classes of data and information and by encouraging the private sector to develop information services in response to the needs of marketers.

The GOES has restructured the Agricultural Statistics Agency (DGEA) as part of the overall structural adjustment program in El Salvador. The DGEA, the only source of statistical information on all aspects of production and marketing in El Salvador, has, through recent training programs, incorporated improved methods for estimating production and collecting marketing data and is reporting more reliable statistical results. The social value of improved information, the reduction of risk as a result of improved information, and the impact on the need for a Strategic Reserve can be illustrated in the following example:

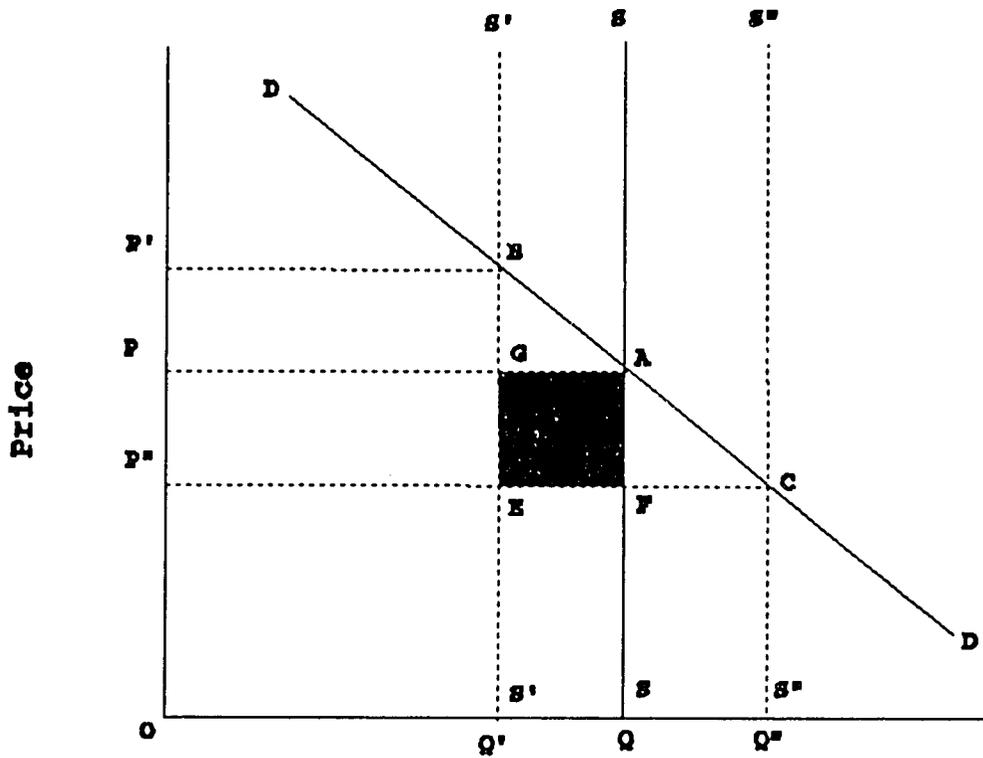
For staple grains, the social cost of misreporting of future production through such errors as acreage or yield estimates, may arise because of distortions in the optimum consumption patterns of the staple grains. Because staple grains like corn, beans, rice, and sorghum, are produced during a relatively short period of time within the year, their consumption patterns depend very much on the storage and inventory policies of producers and marketing firms with storage capacity. For example, the expectation of an abnormally small crop in the upcoming harvest and higher prices can be expected to result in a decreased rate of depleting the inventories during the remainder of the current period. This in turn results in increased prices and a decreased rate of consumption during the current period (Figure IV-2).

Suppose that DGEA estimates the current period's production as OQ' as opposed to the actual production OQ . Private grain inventory firms, in forming grain price expectations for the coming period, expect the average price to equal OP' . In other words, they would expect the future price to be higher by PP' (or BG) than would be the case had no error been involved in the production estimate. Consequently, inventory holders find it profitable to decrease their rate of depleting their inventory for the remainder of the year, until the current price has risen by PP' . Consumption then would contract to QQ' , or by the amount $Q'Q$. In turn, the inventory carry-over into the next production period would be increased by the same amount, $Q'Q$. As a consequence, the reduction in consumption during the current period would reduce consumer welfare by the area $ABQ'Q$.

Because of the abnormally large carryover into the next period, assume that supply in the next period would increase by the amount $Q'Q$ which is equal to QQ'' in Figure IV-2. The total quantity, then, of grain put on the market during the next period would be a decrease in the average price down to OP'' as opposed to price OP which would have prevailed had there been no reporting errors. The decrease in price, however, results in an increase in consumption during the next period by the amount QQ'' . Thus total consumer welfare is increased during the next period by $ACQ''Q$. The overall result of reporting errors that gave rise to

FIGURE IV-2

SOCIAL VALUE OF IMPROVED INFORMATION



the decline is a net loss in consumer welfare equal to rectangle $AGEF$ (area $ABQ'Q$ minus area $ACQ'Q$), the shaded area in Figure IV-2, assuming that the demand curve is linear.

Since the private grain inventory firms have access to the improved production and marketing statistics from DGEA, it can be expected that these firms will be basing their price expectations and market supply decisions on more reliable data. The chances that their price expectations come true should be greater than before when they had relatively less market information. In statistical terms, the expected returns to grain inventory firms should be accompanied by a lower standard error, that is, lower risk. Reduced risks due to access to more reliable marketing information should lead to greater entry of firms into the business assuming barriers to entry are not too great. More firms mean greater competition and the likelihood that firms will do what is necessary to maintain their market share of consumer demand within the marketplace even if that means importing staple grains when there is an abrupt supply shortage of staple grains within the country. Under keen competition, grain inventory firms are likely to maintain sufficient grain reserves to prevent any chance of being short stocks when opportunity knocks.

A smooth flow of staple grains to markets in El Salvador would, also, lessen the need for a Strategic Reserve. If there was an emergency situation, the GOES

could have, for example, negotiated warehouse receipts from the grain inventory firms to redeem to obtain physical stocks to distribute.

d. Trade associations

Trade associations can play a significant role in the development of a market, an industry or a nation. They provide the focal point through which members can identify and seek solutions to common problems and challenges. They provide the communication link to non-members through which members can broaden their search for new knowledge and solutions to common problems. These efforts can have a political orientation and involve efforts to monitor and influence public policy for the benefit of their members. Or the efforts can have a trade or industry orientation and involve activities to provide training and improve business practices and conditions for their members.

e. Training for professionals

Training is central to grain marketing efficiency since the need for skilled marketers increases with the complexity of the markets and its exposure to global competition. The skills needed and the priority for training are related to the evolutionary stage of the marketing system. For example, the provision of certified grain grading services and the training required to support the services are not yet appropriate components of the Salvadorian grain market system, but will be once the commodity exchange accepts basic grains as one of its products to be traded on a cash (spot) or term basis.

The organization assuming the leadership role in providing the training will depend on the organization's responsibility in operating a given grain marketing system component. Clearly, leadership will come from the public sector, private sector grain marketing firms and associations, and private firms providing services to the industry, such as banks and insurance companies.

4. Additional auxiliary improvements

Brief mention will be made of two additional auxiliary improvements with tremendous potential to strengthen national food security and assist in the transfer to a private sector held "strategic reserve" system.

a. MAG, CENTA restructuring

Both the Ministry of Agriculture (MAG) and the National Agricultural Experiment Station (CENTA) are in the process of being restructured under the Programa de Reforma e Inversión Sectorial Agropecuaria (PRISA). The main objective is to transform MAG into a lean and policy oriented Ministry, and CENTA into a center of excellence for research and extension. Both institutions will be led and staffed by professionals, earning competitive salaries linked to performance and skill indicators.

A successful transformation of both institutions should result in improved sectoral policies, research results and extension activities. These should lead to improvements in farming system practices, productivity, and agricultural production. Measurable outputs in basic grains would include increased

productivity (improved input-output ratio), greater volumes of production, increasing farm-gate incomes, and improvements in soil conservation and environmental protection.

b. COSUDE postharvest project

The Government of Switzerland through the Corporación Suiza de Desarrollo (COSUDE), has sponsored very successful grain postharvest projects in Honduras, Guatemala, and Nicaragua. These projects aim at diminishing postharvest losses to the lowest possible levels by introducing appropriate technology at the small farm level. An integrated approach consisting of teaching, extension, rural cottage manufacturing of storage bins, quality control, and follow-up has led to significant progress in loss reduction, improved incomes, and quality of life in rural areas of these countries.

While the grain storage technology used in the project is known in this country, the project's best potential is of diffusing it throughout the country, and intensifying its use. The results of the project in El Salvador should be as predictable as those results obtained in the other countries. Moreover, improved on-farm grain storage throughout the country, coupled with a market oriented-price driven food system is a winning combination to keep large portions of a basic food reserve in excellent condition and readily accessible.

COSUDE has made contacts with MAG and CENTA about establishing such grain postharvest project in El Salvador. The project should be formalized and initiated in the shortest time possible.

SECTION V

SUMMARY FINDINGS AND CONCLUSIONS AND SUGGESTED ACTIONS

Over 40 years of inward looking development efforts are now being replaced by an outward looking economic development framework. Since 1989 the GOES has undertaken an unprecedented number of macro, sectoral and institutional reforms which will profoundly influence the welfare of Salvadorian citizens for years to come. A great deal of trust is being put on the strength and performance of a market driven, open economy, and a smaller, less interventionist, and more regulatory oriented public sector. The maintenance of a Strategic stock of white corn and beans seems an anachronism when contrasted with the expected results of the macro-economic, sectoral and institutional reforms undertaken by the GOES since 1989.

A. Summary Findings and Conclusions

A review of the time period before 1989, when the "buying-high and selling low" paradox was a key policy instrument (Section II), an analysis of the Strategic Reserve Scheme adopted since that time (Section III), and a review of the type of grain market system that would fit the new policy environment brings us to the following summary findings and conclusions.

1. Time period before 1989

- while public intervention in grain production and marketing might have achieved the desired economic and social impact during the first half of the time period such policy was in effect (1950's to mid 70's), misalignment of macroeconomic and sectoral policies, inflationary pressures, institutional and budgetary constraints, and operational deficiencies overwhelmed whatever overall positive impact such intervention might have had between the late 70's and the closure of IRA in 1988.
- the direct impact of such intervention was apparently never perceived by the objective social group, namely small grain farmers and consumers. This is especially true during the second time period when the "guaranteed minimum price" offered by IRA to farmers, but received by intermediaries and larger farmers began to decline drastically in real terms, and buyers of the grains (mostly industrial processors (corn) and wholesalers (beans,)) absorbed the subsidies in their gross margins, and failed to pass the "savings" on to consumers.
- the shift to a Strategic Reserve stock in 1989 was motivated by a series of political reasons and backthrows to old policies, and was not the result of a well analyzed and planned food policy, congruent with the macro-economic and sectoral reforms taking place. It was not until August 1991 when the first guidelines for the Reserve were issued by GOES.

2. Strategic reserve program

- While the Reserve is now being maintained as a security stock, its management and operation has not been satisfactory, leading to a high loss rate and financial drain. The results of current Strategic Reserve policies and procedures indicate that the GOES has implemented an extremely expensive and problem plagued program of purchasing, storing, maintaining and selling a Reserve of corn and beans. At a social (economic) cost of approximately 4 colones per quintal per month to maintain the corn Reserve, the yearly cost would be approximately C48/qq/year, or more than \$120/mt/year, a cost not socially or economically feasible in any country.
- * Substantial quality and financial losses have been incurred due to quality deterioration while in storage. For example 53% of the total imported corn in the Reserve has deteriorated to the extent that it must be sold only for animal consumption; another 3.62% was lost due to loss in moisture content when the imported corn dried from 14.3% to 10.68% while in storage. The total cost of quality deterioration from the time the corn and beans were purchased until they were sold over this three year period has exceeded 13 million colones.
- * In order to sell such deteriorated stock, substantial "price discounts" have been needed, further compounding the financial loss of BFA.
- * The timing of the sales has not been optimal, sometimes coinciding with the harvest (corn, September 1991; beans, January and February 1993). The timing of these sales have put downward pressure on prices during harvest time, or shortly thereafter, when prices tend to be at their seasonal low points.
- * The total cost of maintaining the Strategic Reserve has been substantial, bringing into doubt the scope and quality of the insurance coverage (intended social benefits) being provided by the program. The total monthly cost per quintal month has ranged from 4.5 colones per quintal per month for imported corn to as high as 7.9 colones per quintal per month for beans.
- The fundamental problem which has led to these unacceptable losses and costs is that the objectives of the Reserve and the agendas of the implementing agency and the GOES are at odds. While the BFA must operate on technical and economic agendas, the GOES operates on a socio-political agenda. For example, when BFA detects the need to sell a given quantity of stock, BFA must obtain permission to sell from the GOES. GOES, on the other hand, considers what the socio-economic and political impact of the sale of the stock may be on producers and consumers (throwback to old policy framework). Without sufficient analytical determinations being made on the impact of stock sales, the GOES oftentimes ignores the warnings of BFA of the ensuing technical problems with the stocks and takes the political more acceptable choice of no stock sales. Then, when the stocks are finally sold, the timing cannot be worse, as in 1992 when 70% of the stock sold from the Reserve was injected in the market during the month of September - the beginning of the corn harvest.

- Other management problems which contributed to these losses and high cost include (1) failure to rotate stocks at a rate sufficient to keep quality from deteriorating, (2) BFA's pricing policies (setting prices rather than taking market prices, or bids), (3) the location of stocks in facilities located in areas with hot and humid climates, such as Sirama and Kilo-5, (4) operational, storage and maintenance problems (facilities and stocks), (5) inadequate funding levels for site operations, and (6) coordination problems between BFA and GOES.
- The diverging agendas of BFA and GOES, the management problems, the quality and financial losses, and the high maintenance costs are due to the lack of a performance-driven management system, with clear, congruent, and specific objectives on the part of GOES. Without a performance contract between the BFA and the GOES, and without congruent and specific Reserve management objectives clearly integrated into BFA's operations, the stock recycling, storage, funding, and coordination problems will continue to escalate the social costs of the Reserve.

3. Structural reforms, market development and strategic reserves

The macro and structural reforms implemented by the GOES should bring about long-term economic growth, with less government participation and a stronger private sector. Such reforms affect the basic grains and bean production and market system through at least some of the following developments:

- A liberalized national grain market that allows grains to flow where prices are attractive and where the demand is greatest.
- Regionalized grain markets which allow the free flow of grains over a widely dispersed market area in the region, where prices are attractive and demand is greatest.
- Import price bands for basic grains that protect producers from low international prices, that are, after all, a function partially of the highly subsidized US and EEC policies.
- Privatization that puts government assets (such as grain handling and storage facilities) in the hands of the private sector and leads to opportunities for the Government to insure national food security through private sector-held stocks.
- A Government providing or strengthening other facilitating functions in support of a private sector that produces and markets more efficiently the products needed by society (including the staple commodities such as corn and beans). These other functions include (1) a supportive legal environment, (2) an active financial system, (3) a bonded warehousing system, (4) a warehouse receipt system, (5) an agricultural commodity exchange, (6) an inspection system, (7) a production and market information system, (8) trade associations, and (9) human resource development.

The impact of these reforms and the provision or strengthening of facilitating functions is a reduction of risks throughout the national food production and marketing system. In an environment of reduced production and marketing risks, the need for a Strategic Reserve is also reduced. This is because (1) production and markets are spread over a wider area, decreasing the risk of a stock out in the event of an emergency situation, (2) markets tend to be more efficient and transparent, (3) there are generally less interruptions in the flow of grain from surplus to deficit market centers, (4) price discovery mechanisms are more immediate, and (4) the private sector is increasingly more capable of delivering the quality and quantity of staple grains desired by the consumer.

4. Summary statements

- The Strategic Reserve Program in place is too costly, both in terms of economic (social) and accounting (actual) costs for the level of benefits (insurance coverage) provided.
- With the structural reforms taking place in the country, national food security can be achieved through a well-informed private sector, a Government that facilitates and regulates the market, and a Government that works closely with the private sector to provide national food security at times of catastrophes.
- In the case of El Salvador, where the import replacement time can be less than one month, existing on-farm stocks and industrial stocks are more than sufficient to alleviate any concerns of a temporary market failure.

In summary, the fear of market failure, or even the probability of an emergency situation are no longer valid reasons for having a physical Strategic Reserve carried by the public sector.

B. Suggested Actions

Although the GOES has made some recent decisions on at least rotating a significant portion of its corn and beans in the Reserve, the next step in the management of the Reserve will likely be an indication of how quickly the GOES wants the Reserve put in private hands. At this stage, then, the GOES has various intermediate-term options for the Strategic Reserve available that follow closely the short-term consequences of recent decisions, and support the privatization efforts of the BFA and IRA facilities. These intermediate-term options that follow should be considered in light of the potential long-term options stated at the end of this Section.

1. Intermediate-term options for private sector storage of the strategic reserve

Now that the four BFA storage facilities are being privatized, and the decision has been made to sell (between May 3 - August 15, 1993) 15,000 qq of beans and 532,600 qq of corn from the Strategic Reserve, the need for weighing various intermediate-term options for managing the Strategic Reserve is of greater urgency.

a. San Martín Option

If the GOES and BFA follow through and sell the designated portion of the Strategic Reserve corn and beans and GOES decides to keep the BFA managing the Reserve, the remaining balance of the Reserve stocks could be stored in the former IRA storage facilities at San Martín. The San Martín facilities, however, need some rehabilitation before the complex can be used as efficiently as is required for storing and maintaining the Reserve (Acasio, 1993). Moreover, the storage and maintenance policies and procedures at the facility would need to be upgraded in order to maintain the quality of the stocks. Under this option, it would behoove the GOES to negotiate a performance contract with the BFA. Under such a contract, the BFA would be held accountable for the terms in the contract which would require maintaining a Reserve that meets a particular quality standard. Purchasing, storage, recycling, and sales activities would need to follow detailed procedures that would allow the GOES to carry out its requirements as set forth in the performance contract.

A representative purchasing policy would include:

- a tendering process whereby producers or middlemen would be allowed to sell corn to the BFA upon meeting strict quality requirements linked to moisture content, dockage, damaged grain, etc.
- not purchasing beans since beans are not easily stored beyond six to eight months without losing quality and appeal by the consumer.

A representative storage policy would include:

- cleaning, and if needed, drying the grain at the time of purchase.
- monitoring the quality of the grain through regular periodic grain inspection by approved grain inspectors.
- accounting for losses and shrinkage and re-valuing the grain in storage on a regular periodic basis.

A representative recycling policy would include:

- selling the grain before it deteriorates to the extent that it no longer can be sold for human consumption at market prices (this should not happen if the storage policy outlined above is implemented).
- recycling 1/3 to 1/2 of the grain bought the same year.
- that the recycling of the Reserve stocks be contingent on a plan being in place for replenishing the recycled stock.
- recycling policy should be carried out without seeking to impact market prices.

A representative sales policy would include:

- a tendering process whereby the BFA sells stocks from the Reserve to the highest bidder.

Funding for the Reserve would coincide with skilled personnel having authority and responsibility, a carefully designed activity chart, equipment requirement list, and a monitoring and evaluation system that insures effective implementation.

b. Private Sector Negotiated Storage at Plants Sold by BFA

In order to provide an incentive to the private sector for investing in the BFA facilities, the GOES may need to work out a stimulus program for those interested in the facilities by allowing them to store the Reserve over a significant time period, thus providing a necessary flow of revenue to them.

If the GOES' idea is to keep the Reserve in the four BFA facilities as well as at San Martín, the GOES could negotiate a one-time multi-year contract with the private buyers of the four BFA storage facilities. The buyers would be paid to store and maintain a given level of the corn in the Strategic Reserve.

The contract with each of the owners of the Reserve stock would terminate once the entire stock within that respective facility is sold. If future stocks (namely, corn) for the Reserve were purchased by BFA, the GOES would need to compare the projected costs of using their own facilities at San Martín (assuming it is not sold) to store those stocks versus using private sector facilities.

Where the private sector is contracted to handle and maintain the Reserve, a performance contract and bond between the GOES and the private managing organizations would need to be developed, with similar conditions as mentioned above in Option 1.

c. Management of the strategic reserve through a bidding process or other agreement basis

Even if only the designated portion of the corn and beans in the Reserve are sold, the GOES may prefer to make arrangements with the private sector to have a Reserve available the following crop year through a system of bids or other bilateral type agreement with the private sector. To arrange for such a Reserve and to perform the various management and administrative activities, the GOES could establish a small, autonomous public sector food security unit (without commercial ties to the market) that would be provided an adequate budget. The unit would make the necessary decisions as to the establishment and coordination of the activities associated with the Reserve. A performance contract between the unit and the GOES could be negotiated. Besides operating under the conditions given in Option 1, various public warehousing rules and regulations may need to be incorporated within the contract.

2. Long-term option

The intermediate options outlined above should be taken as "stop-gap" measures while structural reforms take hold, and privatization of public grain handling and storage facilities takes place. Beyond that (within the next two years), the GOES should accelerate (1) the strengthening of existing facilitating functions, and (2) the implementation of new facilitating functions.

Existing facilitating function in need of strengthening include:

- Supportive legal environment: to provide laws, regulations, and codes which support entrepreneurial activity, encourage competition, guarantee food safety and wholesomeness, and promote a safe work environment. Examples include, property rights, enforceable contracts, insurance, free market prices, free import-export, official grade and standards, standard weights and measures, work safety codes, and food processing and environmental laws and regulations.
- Active financial system: to provide sufficient credit at market rates to support grain merchandising operations which require large amounts of working capital, together with statutory regimes which allow grain or grain products to be used as collateral.
- Information system: to provide relevant and timely market and technical information to producers, consumers, market agents, industrial processors, and other users in order to facilitate competition, increase productivity, and assure food safety and quality.
- Trade associations: to provide representation, insurance, training and other services to members, enhancing members' stability, skills and profitability.
- Human resource development: to improve the skills and performance of managers, traders, operators, inspectors, technical personnel and others, provided by a combination of private and public institutions.

New facilitating functions include:

- Bonded service system: to provide bonded warehousing for grains and cereal based products, as well as other custom services, such as grading, cleaning, drying, storage, conditioning, and processing to third parties.
- Warehouse receipt system: to provide liquidity to the grain market system by separating physical location of the grain from its legal ownership; to provide negotiable instruments for credit collateral or transfer of ownership, regardless of physical location of grain.
- An agricultural commodity exchange: to normalize and facilitate the buying and selling of grains and grain products (cash and term contracts), the hedging of price risks, and the development of information on supply and demand; to discover and disseminate transparent and competitive market prices to allow market agents to operate competitively.

Inspection systems: to monitor the performance of financial and warehousing systems, the commodity exchange, and food processors and distributors to assure their integrity and maintain the market's confidence and trust in them.

Given the structural reforms, the liberalization and regionalization of the market for basic grains, and the capacity for improving existing and adding new supportive institutional components, the private sector will be in a position to carry the total inventory of grains and beans for the country, and be perfectly capable to effectively respond to the type of crisis for which a strategic reserve is now being kept. This scenario would allow the GOES to introduce and maintain the least cost Strategic Reserve option.

The Government, if it so wishes can carry a reserve on paper, by holding negotiable warehouse receipts which can be redeemed at any time in the market through the agricultural products commodity exchange. The system guarantees immediate access to the amount and quality of grain the GOES owns on paper (negotiable warehouse receipts), and it can choose to change the amounts held "in reserve" by buying or selling receipts at the exchange.

This option represents a truly market driven production and marketing system for basic grains, with GOES access to a private sector held Strategic Reserve at minimum social cost and maximum "insurance coverage".

SECTION VI

REFERENCES

- Acasio, Ulysses, Report to Privatization Unit of MAG on Grain Handling and Storage Facility at San Martin, San Salvador, El Salvador, 1992.
- BFA-1, "Informe de Compras, Ventas, y Existencias de Cereales."
- BFA-2, "Analysis Financiero Ofertas 22,000 T.M. de Maíz Blanco a Granel."
- BFA-3, "Certificado de Analisis de Laborataric." varios resúmenes - 1993.
- BFA-4, "Normas de Calidad para Maíz Blanco Nacional Cosecha 1990/91."
- BFA-5, "Normas de Calidad para Frijol Rojo Cosecha 1990/91."
- BFA-6, "Planteamiento para Fijacion Precio Venta de Maíz Blanco Cosecha 1990/91." 09/07/92.
- BFA-7, "Breve Informe sobre la Importación de Las 22,000 T.M. de Maíz Blanco para Consumo Humano US#2."
- Calverley, Food Security: A Case Study in Indonesia, Overseas Development Natural Resources Institute Annual Report, London, 1987.
- Christophe, Guy, "El Estado y La Comercialización de los Alimentos Básicos: Elementos para una Síntesis", CADESCA, Noviembre 1990.
- Flores, Ulises, "Aspectos Logísticos en la Comercialización de Granos Básicos", MAG, PRISA, 1992
- Glaessner, T., G. Reid and W. Todd, 1992. Appendix 1, developing private market for agricultural stock financing, In: M.G. McGarry and A. Switz (Editors), The World Grain Trade: Grain Marketing, Institutions, and Policies. Westview Press, Boulder and San Francisco, pp. 199-235.
- GOES, 1991a. Ministerio de Hacienda, "Convenio de Ejecución para la Importación y Comercialización de Granos Básicos."
- GOES, 1991b. Unidad de Planificación, "La Reserva Estrategia de Granos Basicos."
- Hindmarsh, Paul and Bruce Trotter, Developments in Grain Storage for Food Security, Overseas Development Natural Resources Institute, Chatham Maritime, Kent, UK, 1990.
- Kottering, Andrens, "What Level of Emergency Grain Stocks in Mali" (draft). World Bank, Washington, D.C., September, 1988.
- Lea, Zach, "Physical and Institutional Components of a Grain Market System", unpublished paper, FFGI/KSU, Manhattan, Kansas, 1992.

- LICOA, Ley de Instituciones de Crédito y Organizaciones Auxiliares, 1970.
- Lizarazo, Luis José, "Papel de las Bolsas Comerciales en el Mercado de Productos Agropecuarios", IICA, Junio 1992.
- Morales, Edgar. 1993. "Análisis, Evaluación y Recomendaciones Sobre el Manejo de la Reserva Estratégica." BFA.
- Morales, Edgar, Consultant-BFA, personal communication.
- Neils, K.E., John D. Lea, Carl Reed and Khalid Kebbati. "National Food Security Stock Policies and Procedures in Sub-Saharan Africa - Literature Review and Inventory." Technical Assistance Report No. 122, Food and Feed Grains Institute, Kansas State University, January 1992.
- Neils, K.E., C. Reed, J.D. Lea. "National Food Security Stock Policies and Procedures in Sub-Saharan Africa - Recommendations." Technical Assistance Report No. 127, Food and Feed Grains Institute, Kansas State University, May 1992.
- Neils, K.E. "Training Manual in Marketing for the Personnel of the Agricultural Statistics Office of the Government of El Salvador." Technical Assistance Report No. 132, Food and Feed Grains Institute, Kansas State University, February 1993.
- Reid, G., "The World Grain Trade: Grain Marketing, Institutions, and Policies", Appendix 3, legal preconditions for agricultural storage financing. In: M.G. Mc Garry and A. Schmitz (Editors), Westview Press, Boulder and San Francisco. 1992. pp. 239-253.
- Weidemaier, David, Bartlett and Co. (Kansas City), personal communication.

APPENDIX 1

TOTAL CORN IN THE STRATEGIC RESERVE*

Date	White Corn Imports	White Corn 89/90	White Corn 90/91	White Corn 91/92	Total Corn
		-----qq-----			
13/06/90		0			0
18/07/90		62347.64			62347.64
25/07/90		81736.93			81736.93
30/07/90		81736.93			81736.93
08/08/90		81736.93			81736.93
15/08/90		81736.93			81736.93
22/08/90		81736.93			81736.93
29/08/90		81736.93			81736.93
05/09/90		81736.93			81736.93
12/09/90		81736.93			81736.93
19/09/90		81736.93			81736.93
26/09/90		81736.93			81736.93
03/10/90		81736.93			81736.93
10/10/90		81736.93			81736.93
17/10/90		81721.93			81721.93
24/10/90		80595.63			80595.63
31/10/90		80595.63			80595.63
07/11/90		80595.63			80595.63
14/11/90		72694.78			72694.78
28/11/90		69595.63			69595.63
05/12/90		68708.58			68708.58
08/01/91		68708.58	40704.24		109412.82
15/01/91		73036.54	57372.4		130408.9
22/01/91		73026.54	78573.7		151600.2
29/01/91		73026.54	103682		176708.5

TOTAL CORN IN THE STRATEGIC RESERVE (cont.)*

Date	White Corn Imports	White Corn 89/90	White Corn 90/91	White Corn 91/92	Total Corn
	-----qq-----				
05/02/91		73026.54	124423.8		197450.3
12/02/91		73026.54	143883.5		216910
19/02/91		73027.14	159756.7		232783.9
26/02/91		73027.14	176199.9		249227.1
05/03/91		73027.14	192943.9		265971
19/03/91		73027.14	215746.4		288773.6
02/04/91		73027.14	217960.7		290987.8
09/04/91		73027.14	220681.8		293708.9
16/04/91		73027.14	220872.5		293899.7
23/04/91		73027.14	220872.5		293899.7
29/04/91		65350.58	224620.9		289971.5
07/05/91		65350.58	227192.9		292543.5
14/05/91		65290.58	232458		297748.6
21/05/91		65278.58	237155.9		302434.4
28/05/91		65278.58	240779		306057.6
04/06/91		65278.6	242835.2		308113.8
12/06/91		65278.57	243660.2		308938.7
19/06/91		65278.08	243737.5		309015.6
26/06/91		65278.08	243816.6		309094.7
02/07/91		65278.08	243831.8		309109.9
17/07/91		65276.08	243831.8		309107.9
23/07/91		65275.58	243830.8		309106.4
30/07/91		65274.58	243821.8		309096.4
05/08/91		65027.73	240982.9		306010.7
13/08/91		62909.34	235811.7		298721
20/08/91		61244.42	232013.2		293257.6
27/08/91		60698.92	230772.6		291471.5

TOTAL CORN IN THE STRATEGIC RESERVE (cont.)*

Date	White Corn Imports	White Corn 89/90	White Corn 90/91	White Corn 91/92	Total Corn
		-----qq-----			
03/09/91		57895.19	230404.7		288299.9
10/09/91		53361.29	230352.3		283713.6
17/09/91		48250.62	230058.3		278308.9
24/09/91		47792.62	230017.8		277810.4
30/09/91		48247.62	229853.3		278100.9
08/10/91		48194.72	229844.9		278039.6
15/10/91		48148.62	229839.4		277988
22/10/91		48148.62	229836.4		277985
29/10/91		48158.52	229931.1		278089.6
04/11/91		48158.52	229931.1		278089.6
12/11/91		48158.52	229930.5		278089
19/11/91		48158.52	229931.1		278089.6
26/11/91		48158.52	229931.1		278089.6
03/12/91		48158.52	229927.1		278085.6
10/12/91		48158.52	229927.1	12655.57	290741.2
17/12/91		48158.52	224925.1	22369.75	295453.4
23/12/91		47700.52	224884	32989.01	305573.5
07/01/92	58428.73	47700.52	224884	45763.69	376776.9
14/01/92	114987	47700.52	224884	57437.03	445008.5
21/01/92	141399.4	47700.52	224884	65429.18	479413.1
28/01/92	159577	47700.52	224883	73820.95	505981.5
04/02/92	187085.7	47700.52	224883	81476.01	541145.2
11/02/92	263258.6	47700.52	224883	83319.28	619161.4
18/02/92	273595.1	47700.52	224883	85448.62	631627.2
25/02/92	306489.1	47700.52	224883	81456.02	660528.6
03/03/92	310921	47700.52	224883	77326.02	660830.5
10/03/92	384811.7	47700.52	224883	77819.73	735215

TOTAL CORN IN THE STRATEGIC RESERVE (cont.)*

Date	White Corn Imports	White Corn 89/90	White Corn 90/91	White Corn 91/92	Total Corn
	-----qq-----				
17/03/92	424162.8	47700.52	224883	77806.34	774552.6
24/03/92	457573	47700.52	224883	77806.34	807962.8
30/03/92	491841.6	47700.52	224883	77806.34	842231.4
07/04/92	503226.6	47700.52	224883	77806.34	853616.5
21/04/92	503226.6	47700.52	224883	77806.34	853616.5
28/04/92	503226.6	47700.52	224883	77806.34	853616.5
05/05/92	503226.6	47270.99	224883	77806.34	853186.9
12/05/92	503226.6	10500.52	224883	77806.34	816416.5
19/05/92	503226.6	10500.52	224883	77806.34	816416.5
26/05/92	503226.6	8990.52	224883	77806.34	814906.5
02/06/92	503226.6	8990.52	224883	77806.34	814906.5
09/06/92	503226.6	8990.52	224883	77806.34	814906.5
16/06/92	503625.7	1560.9	224883	77447.7	807517.3
24/06/92	503626.8	1560.9	224883	77447.7	807518.4
07/07/92	502021.6	1560.9	224743.7	78447.7	806773.9
14/07/92	502018.6	1560.9	224104.9	78447.7	806132.1
21/07/92	501950.7	1560.9	223425.2	78447.7	805384.5
28/07/92	501950.7	1560.9	223425.2	78447.7	805384.5
11/08/92	499628	1560.9	212689	78447.7	792325.6
18/08/92	497164.1	1560.9	205128.1	78447.66	782300.8
25/08/92	493729.8	1560.9	185526.7	78447.66	759265
01/09/92	481905	1547.5	168246.8	78447.66	730147
08/09/92	474088	1547.5	154418	78447.66	708501.2
14/09/92	465304.4	1547.5	147614.8	78447.66	692914.3
22/09/92	432498.4	1853.38	143475.7	74068.66	651896.2
29/09/92	430554.4	1853.38	136293.4	74068.66	642769.9
06/10/92	432104.2	1853.38	135271.4	74068.66	643297.7

TOTAL CORN IN THE STRATEGIC RESERVE (cont.)*

Date	White Corn Imports	White Corn 89/90	White Corn 90/91	White Corn 91/92	Total Corn
	-----qq-----				
13/10/92	430962.2	1853.38	131525.3	74068.66	638409.6
20/10/92	430179.2	1853.38	130779.3	74068.66	636880.6
27/10/92	430139.2	1853.38	130779.3	74068.66	636840.6
03/11/92	430039.2	1853.38	130756.3	74068.66	636717.6
10/11/92	430039.2	1853.38	130756.3	74068.66	636717.6
17/11/92	430217.4	740.03	130537	74068.66	635563.1
24/11/92	430202.4	740.03	130537	74068.66	635548.1
01/12/92	429689.4	740.03	130537	74068.66	635035.1
08/12/92	428189.4	740.03	130537	74068.66	633535.1
14/12/92	427702.9	740.03	130537	74068.66	633048.6
28/12/92	427702.7	1378.34	130531	74068.66	633680.7
12/01/93	427791.7	1378.34	130531	74068.66	633769.6
19/01/93	426852.9	1378.34	130531	74068.66	632830.9
26/01/93	427845.4	1378.34	130531	74068.66	633823.3
02/02/93	427048.3	1378.34	130531	74068.66	633026.2
09/02/93	425044.5	1378.34	130531	74068.66	631022.5
16/02/93	418899.1	1378.34	122548.1	73989.55	616815.1

* Information on maize by crop year not available before August 1991

Source: BFA

File: PLANTAS2.WQ1

APPENDIX 2

TOTAL BEANS IN THE STRATEGIC RESERVE*

Date	Beans 89/90	Beans 90/91	Beans 91/92	Total Beans
	-----qq-----			
13/06/90	87000			87000
18/07/90	78452.74			78452.74
25/07/90	74157.06			74157.06
30/07/90	71346.64			71346.64
08/08/90	68967.5			68967.5
15/08/90	68111.7			68111.7
22/08/90	66332.22			66332.22
29/08/90	61092.99			61092.99
05/09/90	58903.95			58903.95
12/09/90	54277.93			54277.93
19/09/90	52108.19			52108.19
26/09/90	49674.07			49674.07
03/10/90	46390.41			46390.41
10/10/90	44171.99			44171.99
17/10/90	41877.06			41877.06
24/10/90	36168.44			36168.44
31/10/90	34956.54			34956.54
07/11/90	34223.45			34223.45
14/11/90	33729.74			33729.74
28/11/90	31027.91			31027.91
05/12/90	30783.51			30783.51
08/01/91	30783.51	2280.23		33063.74
15/01/91	25843.53	3475.23		29318.76
22/01/91	25736.73	4495.45		30232.18
29/01/91	27792.07	4865.93		32658
05/02/91	27658.22	5215.9		32874.12
12/02/91	27058.65	6043.68		33102.33

TOTAL BEANS IN THE STRATEGIC RESERVE (cont.)*

Date	Beans 89/90	Beans 90/91	Beans 91/92	Total Beans
	-----qq-----			
19/02/91	26969.43	8924.7		35894.13
26/02/91	26602.71	13617.83		40220.54
05/03/91	26509.81	17197.89		43707.7
19/03/91	26298.11	18487.26		44785.37
02/04/91	25190.8	18661.82		43852.62
09/04/91	23688.18	18711.86		42400.04
16/04/91	22742.16	18711.86		41454.02
23/04/91	22742.16	18711.86		41454.02
29/04/91	21378.22	18711.86		40090.08
07/05/91	21378.22	18711.86		40090.08
14/05/91	19781.11	18876.91		38658.02
21/05/91	19225.63	18874.12		38099.75
28/05/91	19158.2	18874.12		38032.32
04/06/91	17657.07	18876.12		36533.19
12/06/91	16919.73	18873.44		35793.17
19/06/91	13945.08	18867.12		32812.2
26/06/91	13343.48	18853.19		32196.67
02/07/91	13978.44	18865.95		32844.39
17/07/91	12115.63	18835.5		30951.13
23/07/91	11992.74	18827.05		30819.79
30/07/91	11721.83	19952.91		31674.74
05/08/91	11454.46	19949.84		31404.3
13/08/91	11293.47	19946.73		31240.2
20/08/91	11252.36	20830.84		32083.2
27/08/91	11382.94	20798.51		32181.45
03/09/91	11240.42	20345.37		31585.79
10/09/91	11172.69	21331.6		32504.29

TOTAL BEANS IN THE STRATEGIC RESERVE (cont.)*

Date	Beans 89/90	Beans 90/91	Beans 91/92	Total Beans
	-----qq-----			
17/09/91	10839.51	24416.67		35256.18
24/09/91	10819.95	28698.78		39518.73
30/09/91	10777.47	26745.31		37522.78
08/10/91	10590.5	31285.78		41876.28
15/10/91	10589	38172.65		48761.65
22/10/91	10576.9	42611.62		53188.52
29/10/91	10445.28	46427.73		56874.01
04/11/91	10444.28	50030.57		60474.85
12/11/91	10424.28	50292.52		60716.8
19/11/91	10444.28	50029.02		60473.3
26/11/91	10385.28	50028.67		60413.95
03/12/91	10562.47	50022.94		60585.41
10/12/91	10520.43	50022.44	473.88	61016.75
17/12/91	10292.65	49997.44	1809.67	62099.76
23/12/91	9871.24	56629.03	2644.87	69145.14
07/01/92	9671.26	56615.03	9476.31	75762.6
14/01/92	9669.26	56504.72	20782.99	86956.97
21/01/92	9669.26	56504.73	30338.08	96512.07
28/01/92	9863.59	56504.73	30257.61	96625.93
04/02/92	9863.59	56504.73	30257.61	96625.93
11/02/92	9863.59	56474.73	30257.61	96595.93
18/02/92	9863.59	56474.73	30257.61	96595.93
25/02/92	9863.59	56474.48	30257.61	96595.68
03/03/92	9863.59	56474.48	30257.61	96595.68
10/03/92	9861.59	56474.48	30307.89	96643.96
17/03/92	9861.59	56474.48	30307.89	96643.96
24/03/92	9861.59	56474.48	30376.87	96712.94

TOTAL BEANS IN THE STRATEGIC RESERVE (cont.)*

Date	Beans 89/90	Beans 90/91	Beans 91/92	Total Beans
	-----qq-----			
30/03/92	9861.59	56474.48	30376.87	96712.94
07/04/92	9861.59	56474.48	30376.87	96712.94
21/04/92	9861.59	56474.48	30376.87	96712.94
28/04/92	9861.59	56474.48	30376.87	96712.94
05/05/92	9861.59	56474.48	30382.77	96718.84
12/05/92	9861.59	56474.48	30382.77	96718.84
19/05/92	9861.59	56474.48	30382.77	96718.84
26/05/92	9861.59	56474.48	30382.77	96718.84
02/06/92	9861.59	56474.48	30382.77	96718.84
09/06/92	9861.59	56474.48	30382.77	96718.84
16/06/92	9860.34	56474.48	30382.77	96717.59
24/06/92	9859.45	56474.48	30382.77	96716.7
07/07/92	9120.84	56474.48	30382.77	95978.09
14/07/92	9120.84	56474.48	30382.77	95978.09
21/07/92	9120.84	56474.48	30382.77	95978.09
28/07/92	9120.84	56474.48	30382.77	95978.09
11/08/92	9109.84	56424.43	30382.77	95917.04
18/08/92	9111.88	56424.43	30382.77	95919.08
25/08/92	9111.88	56424.43	30382.77	95919.08
01/09/92	9111.88	56424.43	30382.77	95919.08
08/09/92	9111.88	56424.43	30382.77	95919.08
14/09/92	9111.88	56424.43	30382.77	95919.08
22/09/92	9111.88	56424.43	30382.77	95919.08
29/09/92	9111.88	56424.43	30382.77	95919.08
06/10/92	9111.88	56424.43	30382.77	95919.08
13/10/92	9111.88	56424.43	30382.77	95919.08
20/10/92	9111.88	56424.43	30382.77	95919.08

TOTAL BEANS IN THE STRATEGIC RESERVE (cont.)*

Date	Beans 89/90	Beans 90/91	Beans 91/92	Total Beans
	-----qq-----			
27/10/92	9111.88	56424.43	30382.77	95919.08
03/11/92	9111.88	56424.43	30382.77	95919.08
10/11/92	9090.88	56424.4	30382.77	95898.05
17/11/92	8831.88	56424.4	30382.79	95639.07
24/11/92	8831.88	56424.4	30382.79	95639.07
01/12/92	8837.53	56424.4	30382.79	95644.72
08/12/92	8837.53	56424.4	30382.79	95644.72
14/12/92	8837.51	56424.38	30382.79	95644.68
28/12/92	8944.01	56424.38	30382.79	95751.18
12/01/93	8914.04	56424.38	30382.79	95721.21
19/01/93	8869.98	41870.99	44935.18	95677.15
26/01/93	5599.98	41870.99	44936.18	92407.15
02/02/93	5019.98	41870.99	44936.18	91827.15
09/02/93	3149.98	41553.64	44936.18	89639.8
16/02/93	874.47	41345.63	44915.16	87135.26

* Information on beans by crop year not available before August 1991

Source: BFA

File: PLANTAS2.WQ1

APPENDIX 3

MONTHLY COST OF STORAGE
WHITE CORN AND RED BEANS
ACAJUTLA KILO 5

<u>ADMINISTRATIVE COSTS</u>	<u>COSTS (COLONS)</u>
Plant Manager	8851.06
Security Guard	1852.50
Assistant Plant Manager	1986.40
Security Guard	1806.90
Maintenance Person	1649.20
Security Guard	1747.05
Administrative Assistant	2025.40
Security Guard	1585.55
Security Guard (week-end)	830.30
Security Guard (week-end)	830.30
Plant Technician	1702.50
Machine Operator	<u>1140.00</u>
Sub-Total	26007.11
Maintenance Costs	
Telephone	156.80
Tires	160.00
Spare Parts	700.00
Gasoline	
Electricity	4698.40
Diesel for Dryer	1200.00
Fumigants	18000.00
Insurance	<u>8936.91</u>
Sub-Total	33852.11
Office Supplies	166.00
Incidentals	<u>5000.00</u>
Sub-Total	<u>5166.00</u>
Total	65,025.22
Average Quantity of Grain Stored in 1992 (QQ)	262268.78
Average Cost/qq/Month	<u>0.2479</u>

MONTHLY COST OF STORAGE
WHITE CORN AND RED BEANS
SITIO DEL NINO

ADMINISTRATIVE COSTS	COSTS (COLONS)
Plant Manager	8134.96
Security Guard	1806.90
Assistant Plant Manager	1140.80
Security Guard	1615.00
Maintenance Person	1865.80
Security Guard	1321.45
Administrative Assistant	2057.70
Security Guard (week-end)	1562.75
Security Guard (week-end)	1102.95
Grain Analyst	1637.80
Plant Technician	2058.65
Maintenance Person	1513.35
 Sub-Total	 25817.31
 Maintenance Costs	
Telephone	150.00
Tires	160.00
Spare Parts	700.00
Gasoline	
Electricity	3122.58
Diesel for Dryer	600.00
Fumigants	8802.00
Insurance	5202.08
 Sub-Total	 18736.66
Office Supplies	183.33
Incidentals	5000.00
 Sub-Total	 5183.33
 Total	 49737.30
 Average Quantity of Grain Stored in 1992 (QQ)	 97529.67
 Average Cost/qq/Month	 0.5100

MONTHLY COST OF STORAGE
WHITE CORN AND RED BEANS
SAN RAFAEL CEDROS

ADMINISTRATIVE COSTS	COSTS (COLONS)
Plant Manager	5209.62
Security Guard	741.00
Assistant Plant Manager	2254.35
Security Guard	741.00
Maintenance Person	855.80
Security Guard	741.00
Administrative Assistant	1140.00
Security Guard (week-end)	741.00
Security Guard (week-end)	741.00
Grain Analyst	1637.80
Plant Technician	2192.60
Maintenance Person	855.00
Maintenance Person	855.00
Maintenance Person	855.00
Machine Operator	1140.00
Security Guard	741.00
Sub-Total	21440.37
Maintenance Costs	
Telephone	80.00
Tires	160.00
Spare Parts	700.00
Gasoline	
Electricity	6399.10
Diesel for Dryer	1200.00
Fumigants	18000.00
Insurance	8803.52
Sub-Total	35342.62
Office Supplies	183.33
Incidentals	5000.00
Sub-Total	5183.33
Total	61966.32
Average Quantity of Grain Stored in 1992 (QQ)	171810.66
Average Cost/qq/Month	0.3607

MONTHLY COST OF STORAGE
WHITE CORN AND RED BEANS
SIRAMA

ADMINISTRATIVE COSTS	COSTS (COLONS)
Plant Manager	5584.31
Security Guard	1799.30
Assistant Plant Manager	1276.80
Security Guard	1535.20
Maintenance Person	1925.65
Security Guard (week-end)	1163.75
Security Guard	1140.00
Plant Technician	2084.30
Machine Operator	1140.00
Sub-Total	17649.31
Maintenance Costs	
Telephone	240.00
Tires	160.00
Spare Parts	700.00
Gasoline	
Electricity	6533.24
Diesel for Dryer	600.00
Fumigants	8802.00
Insurance	4335.07
Sub-Total	21370.31
Office Supplies	404.00
Incidentals	5000.00
Sub-Total	5404.00
Total	44423.62
Average Quantity of Grain Stored in 1992 (QQ)	106136.70
<u>Average Cost/ QQ/Month</u>	<u>0.4186</u>