Mozambique
Maize Marketing System Appraisal

May 1990

Sigma One Corporation

RESEARCH TRIANGLE OFFICE:

Sigma One Corporation
Post Office Box 12836
Research Triangle Park,
North Carolina 27709-2836

Phone: (919) 361-9800
FAX: (919) 361-5858
Telex 490-000-8487 CGI UI

MOZAMBIQUE

MAIZE MARKETING SYSTEM APPRAISAL

Prepared by:

Norberto A. Quezada
James M. Wallace
Mauro de Rezende Lopes

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Findings

Maize production in Mozambique has fallen significantly during the 1980's, while consumption has actually risen, in great part due to the presence of donated yellow maize. Maize self-sufficiency has declined to less than 20% in 1989. Although since 1986 there has been a recovery in the vegetable production that supplies urban markets, the supplies of grains, sugar, cooking oil, and other basic commodities remain very low. The problems of poor supply are due to deficiencies in marketing networks, a very poor extension system, poorly trained extension agents, lack of access to modern production inputs, poor roads and transportation facilities, counterproductive price controls, as well as insecurities presented by guerrilla warfare.

Uneven rainfall has been a problem, too, but even when maize farmers have sufficient maize to market, there is little available of what they want to buy (rice, sugar, cooking oil, clothing, etc.). Absence of these goods has occurred due to the destruction of a rural trading network present in the immediate pre-Independence period. The government, through its wholesaling and retailing arm, AGRICOM, has failed to provide (and could not have provided in any event) enough services to farms, particularly the family farm sector. This sector is now the backbone of the marketed maize production output.

Government intervention in marketing and pricing has resulted in excessive administrative costs and has been counterproductive regarding maize. Farmer prices are depressed at least relative to international prices.

The GOM has also been unable to fully satisfy farmer needs for permanent trading localities for the barter/sale of their production in exchange for other goods they need. A result is that many family sector farmers have become subsistence oriented, trading primarily with neighbors for things they need. Other farmers have left farming altogether and moved to the cities where minimal supplies of food and other consumables are in greater supply.

Warfare has also been a major reason why many have abandoned their fields. However, government price controls have contributed to farmer decisions to leave production, because producer prices have not kept pace with the real cost of production which includes the cost of risks associated with the insecurities of farming in rural areas subject to armed bandit attacks. A consequence has been the disastrous displacement of thousands of farmers to refugee camps and more secure peri-urban areas.

In order to feed and house these people, the GOM has to rely on donated supplies of food (e.g., yellow maize), clothes, trucks (to transport these goods), and other goods. Those who are not refugees may find employment in the public sector and/or live with relatives, resulting in higher costs for national and local governments and further straining of urban services.

Women carry much of the burden of maize production as males work off-farm in the urban and peri-urban areas or migrate to work abroad. Rural women are overworked. In some areas they represent as much as 90% of the agricultural laborers; yet, women, assisted by their daughters and younger sons, are also the primary care givers and food preparers. Many males are forced to obtain off-farm work, whose income may only be sufficient to sustain themselves and not their family. Another casualty of government policies and the protracted war is the family. Increasingly, its members are dispersed, isolated and overburdened.

Rural extension services are non-existent in most areas, and essentially ineffective in areas where they are. The GOM has assigned a low priority to developing the extension system and so have not been able to disseminate the technological improvements in seed and other factors developed through research carried out by the National Institute of Agricultural Research (INIA). Roads are in poor condition, so that neither extension agents nor private traders and transporters can reach most of the rural farms.

AGRICOM is over-extended and cannot meet the demands of farmers for the supply of consumer goods, nor for the assembling of maize production in quantities and at times farmers require. Headloading is the main form of transporting crops for many farmers. Land tenure laws and the absence of credit also contribute to discourage maize production.

The public sector has been favored over the private also in the transportation industry. GOM convoys are frequently attacked and losses are high. Only a little more than half the public fleet of vehicles is operational. Meanwhile, the private fleet is near exhaustion and without access to replacements and spare parts. The current import licensing system is cumbersome, restrictive and skewed to favor the public sector and private operators who have close personal connections with government officials. Private transporters and traders are willing to service insecure areas if they are allowed to recover the cost of risk. Government pricing controls restrict this recovery of the cost of risk.

In a valiant, but ultimately failed attempt to market maize from surplus areas to maize deficit areas, trade restraints are imposed by district and provincial governmental authorities to control the movement of commodities within the country across provincial and district boundaries. Instead of achieving the laudable goal of meeting consumer and producer needs, especially during the current crisis of war, the result has favored the growth of marketing inefficiency and corruption within the official marketing channels. Parallel markets for maize have developed despite government controls, reflecting the failure of marketing and price controls.

Women also play a major role in marketing, especially in the public markets and dumbanengues. At least 95% of the vendors are female and they provide a necessary service to the consumer. In Maputo and Beira donated yellow and, to a much smaller extent, white maize are sold openly despite government restrictions enforced through the Central Supply Plan (rationing). The GOM itself uses yellow maize as a tradeable when dealing with some private companies. Nevertheless, the urban governments are tolerant of the sale of yellow maize in

public markets only out of necessity. The rationing system is inadequate and allows the same ration amounts for both wealthy and poor.

Recommendations

The GOM must move quickly to redress the problems created by state intervention in marketing and price controls. Nevertheless, gradual, staged removal of controls is recommended to allow participants time to adjust the new system. More specifically, the recommendations are as follows:

Price and Marketing Controls

Price Policy

The government should allow the operation of competitive market forces in the formation of white maize prices; policy would be reformed with the purpose of given maximum price incentives to family farms which account for most of marketed maize. White maize policy would concentrate on enforcing a minimum producer price, which would provide a guaranteed floor level for: a) the months of seasonally low prices after harvest, and b) the areas where buyer competition may not exist.

Even though the maize import needs are currently supplied by donations, the Mozambican economy should be exposed to the forces of the international markets, where the country covers its shortfalls. The price signals of that market represent the opportunity costs of maize to the domestic economy. The operation of a private international trade in maize would ensure that those forces are always participating in the formation of domestic maize prices. The method of calculating international parity prices (IPPs) to determine controlled prices has several shortcomings in the context of Mozambique. The IPPs are calculated at the overvalued exchange rate, which underestimates the real opportunity costs of foreign maize; price quotations are those of yellow maize, US Gulf ports, while white maize is priced higher than yellow maize ; the annual exercise to revise the controlled prices is an uncertain one, subject to delays that affect production decisions; and the exercise can be used as an inflation fighting tool, and not as a production incentive.

Government objectives with respect to ensuring supply to certain consumer groups would be sought through price control of yellow maize. The government should:

1. Discontinue price controls for domestic (white) maize and flour marketed through the private channel, but continue to set appropriate minimum producer prices for government entities, namely AGRICOM, operating through the public marketing channel. Maximum consumer prices would be set only for yellow maize and flour. Furthermore, the GOM should no longer subsidize marketing deficits incurred by parastatals such as AGRICOM.

2. Give AGRICOM, as the enforcer of the floor price policy, the authority: a) to sell white maize at market prices, b) to increase the minimum price for different provinces to recognize transport costs, and c) to increase the floor price over time during the marketing year to recognize storage costs.

The government should enhance the trading position of farmers vis-a-vis the buyers, and contribute to the operation of transparent private markets through:

3. The assembling of price information to be collected nationally and communicated by radio and other media at least weekly.

4. The design and establishment of a system of quality grades and standards for white maize, to be first implemented through the procurement by AGRICOM.

Marketing and Trade Policy

The quantitative restrictions on both international and internal trade have contributed to aggravate the scarcity of maize and other goods in some areas by preventing arbitrage operations and the transfer of grain from surplus areas or countries to deficit areas. By reducing the non-farm goods available in the countryside, the restrictions to rural commerce contributed to depress the marketed maize surplus. The practice of designating district distributors has created concession areas where competition is restricted. One original objective of these quantitative controls was the desire to have state control of commodity stocks in order to control prices, with the result that scarcity was not felt equally in all parts of the country. Particular urban constituencies are granted assured access to a ration of goods, without discrimination on the basis of income, while poor families which produce maize in the countryside suffer depressed prices and routine scarcities.

The maize marketing policy should aim at contributing to the efficient and opportune supplying of national demand. Each province would gain from trade across its borders: provinces that are relatively low cost producers of maize would have surpluses that would be used to supply the needs of high cost, deficit provinces. Likewise, trade would involve other products which would flow in a direction opposite the maize flow. Scarcity and abundance in maize and other products would be shared by all provinces. Should extremely low levels of stocks in certain districts lead to speculative attacks on maize, the government could stabilize prices since it would maintain control of buffer stocks of white maize bought at the floor price, and the state mills and importers would control stocks of yellow maize. Likewise, in a more open, non-administrated foreign trade regime, private importers would act promptly to cover expected scarcities from abroad.

In order to accomplish the goal of orderly supply of national needs through competitive markets and by exploiting the comparative advantages on maize production, the government should:

1. Remove barriers to market entrance by private traders. The law should outline the minimum requirements for the exercise of commerce with little room for interpretation by licensing officials. Applicants that fulfill the requirements would be granted a commerce license on demand, and the license should be valid for the whole country, not just a particular province. The current system of licensing marketing agents, as spelled out in Law 7/79 and Diploma 47/80 should be changed to a registration system where those be instituted. Any number of wholesalers should be allowed to operate in each district even if only one is designated as official distributor of controlled goods.

2. Eliminate inter-provincial controls on private white maize trade, by removing the provincial authorities' power to restrict movement of grain. Private traders should be allowed to market their agricultural and non-agricultural commodities wherever they choose to operate within Mozambique. Private traders would move goods from surplus areas to deficit areas helping to balance supply and demand, and reduce price differences among provinces; at the same time, the gains from trade would be reaped since provinces would export those products for which they have a relative advantage, and use the proceeds to import goods for which they do not have a relative advantage.

3. The crime of "illegal commerce" should be better defined than Law 7/79 currently does. The storage of maize should not be considered a refusal to sell at the controlled prices (the crime of speculation as defined in Decreto 10/82, 10.1). Through storage, private traders would move maize from years of surplus to years of scarcity, helping to stabilize prices.

4. In order to allow a more active interface of the domestic economy with world market forces, the government should abolish the current system of import licenses for white maize and maize inputs. The trade policy should concentrate on the use of import tariffs. If the authorities wanted to make it more or less expensive to import, the tariff could be changed, something that can be done by the Finance Minister under current authority. This system would be more transparent and would not have the uncertainties that characterize the current one. White maize imports with foreign exchange from the parallel market should be permitted without prior license. In the future, yellow maize could also be imported under the recommended, open trade regime. A system of variable tariffs could be instituted to deal with the unstable international prices.

5. In order to ensure the smooth transition to a more liberalized market, white maize should be explicitly excluded from the ration system of Maputo and Beira. This would enhance the targeting of food subsidies through yellow, imported maize. Targeting would be further enhanced by removing all upper- and middle-income families from the rationing systems of Maputo and Beira, while retaining the system for low-income families and

refugees. In this way AGRICOM would be relieved of any obligation to supply the ration system with white maize, and could sell at the market prices the maize procured at the support, floor price.

Marketing Support Services

1. The transport tariff control should be phased out for private vehicles in order to increase the incentive to own and operate trucks. The official tariffs are largely ignored now, but represent an opportunity for harassment of transport operators. The tariff control could remain in place for public agencies as a way of explicitly subsidizing costs of moving goods to areas not well served because of the security risks.

2. Import licenses for trucks and spare parts should not be restricted but made available on demand. Import policy would be handled through the tariff schedule. After all, the binding import restriction is the access to foreign exchange, and the import license itself only adds complication and opportunity for rent-seeking. Imports should be permitted with parallel market foreign exchange. This measure would facilitate the import of equipment through the competitive allocation of foreign exchange and amplified that foreign assistance is designated for the specific use of transportation imports. Initially, credit might not be needed for truck imports since private transporters may have enough of their own resources to pay for the units.

3. An adequate system of road maintenance must be developed with all possible haste for both major highways and feeder roads. The condition of the roads is a significant factor in the poor performance of the maize sector; better transportation will directly enhance maize marketing and production.

Production Issues

1. The GOM should continue to disperse its state farm lands in larger parcels to farmers.

2. The GOM must give a guarantee that farmers currently working their farmland will be able to acquire land titles guaranteeing ownership for themselves and their heirs.

3. Fertilizers must be distributed efficiently and effectively to private sector farmers.

4. Remove out-dated stores of fertilizer and seed from State Agricultural Supply Stores (*Casas Agrarias*), and sell or lease the buildings and the remaining physical equipment to private entrepreneurs or mixed state-private companies.

5. Insure that agricultural supply stores are able to receive sufficient quantities of improved maize seeds, such as Matuba, Manica and CW-2.

6. The GOM must move immediately to develop an adequate agricultural extension system.

7. Private and family sector farmers need access to adequate amounts of credit.

8. The government must redirect the banking system to increase credit to private and family sector farmers.

Gender Issues

1. It is essential for the GOM to disaggregate data by gender,especially in the agricultural sector.

2. The GOM should focus on development programs that enhance female contributions to agriculture.

3. Women must be involved in any land purchase and reallocation schemes.

4. More research should be carried out to learn more about the role of women in agriculture.

5. Women also play a major role in petty commerce, particularly in the public marketplace. The government must protect and enhance this role.

Donor Country Issues

1. Grain donors should be encouraged to reduce gradually their donations of maize in order to encourage consumption and production of alternate grains.

2. Donor countries must coordinate their production input donations with private companies operating in the inputs sector.

3. Donor countries must coordinate their technical assistance programs so as to encourage and facilitate the development of a national Mozambican extension service.

4. USAID should include larger supplies of fertilizers, seed and other non-durable agricultural supplies in its CIP.

Introduction

Statement of the Problem

Mozambique's agricultural production declined dramatically in the 1980's due to the combined effects of disincentive pricing and marketing policies and war-induced disruption of rural activities. The problem facing the Government of Mozambique (GOM) is how to increase, strengthen, and extend production and marketing incentives in a liberalizing economic climate which continues to suffer the constraints of an active, armed rural insurgency.

Objectives of the Study

This study focuses on maize because of its importance as a food staple and source of agricultural income for producers and its concomitant importance as the major cereal provided to Mozambique through massive, donor food-aid imports. The objectives of the study were to:

1. Diagnose the maize marketing system and maize production inputs with particular reference to the Maputo region and the Beira corridor.
2. Identify factors which limit production and marketing, or limit consumer access to maize entering the market.
3. Suggest policy initiatives to improve production, marketing, and consumption of maize.

Many of the issues discussed in the context of maize production and marketing also are clearly critical to other crops or to the food and agriculture sector as a whole.

The study is divided into six sections. The first section is an overview of the maize economy in the region of Eastern and Southern Africa and in Mozambique. The second section describes the production system in Mozambique. The third section describes the marketing system. The fourth section discusses the Government objectives and policies affecting the maize economy. The fifth section debates the pros and cons of alternatives to existing policies, and the sixth section makes some recommendations.

Overview of the Maize Economy

Maize in Eastern and Southern Africa

Maize is the most important cereal in production and in the diet of the Eastern and Southern Africa region. Both white and yellow maize are grown in the region, and both are used as a human food and as animal feed. White maize, however, is predominant in production over the yellow variety, and is also preferred by consumers. In Mozambique all domestic maize is white (**Table No. 1**), but massive donor food-aid in recent years has made yellow maize common, especially in urban markets.

The Mozambican maize sector compares poorly with those of neighboring countries in the Eastern and Southern Africa region. **Table No. 1** shows that maize yields (0.5 mt/Ha) in Mozambique are among the lowest in the region that they have been declining substantially in the last 15 years. Among the countries of the region, Mozambique is the largest maize importer in absolute and per capita amounts. The use of modern production inputs is limited as indicated by the fact that fertilizer use per unit of land is small compared to the average in the region and very small when compared to neighboring Zimbabwe, the fourth largest exporter of white maize. Mozambique pays the highest farm gate price, if calculated at the currently overvalued official rates, but would be the lowest, if parallel rates were used for the calculation (**see Fig. 1**).

The Importance of Maize in Mozambique

Maize is the primary food source in many areas of Mozambique; it is eaten daily in the main meals of rural and urban families alike. Maize is also a very economical source of nutrition in general. In 1979-81, it contributed 15.8 percent of average calories and 24.1 percent of average protein consumption in Mozambique (FAO, 1984, p. 161). However, the importance of maize in the estimated family food basket is somewhat lower that its nutritional importance would suggest. Maize in the forms of grain and flour represents 8.0 percent of the Maputo consumer price index. Cereals (rice, maize, and wheat) represent 15.4 percent, and food represents 50.2 percent of the index. The importance of maize in the food basket is likely to be higher in the rural areas where incomes are lower, the number of available food items is limited, and maize is produced as much or more for home consumption as for the market.

Despite increasing real prices for maize and falling real wages, demand for this grain in the urban areas of the central and southern provinces remains high. One consequence is that land is utilized for maize production that is not suited for it. For example, around the city of Maputo people plant small areas of corn next to roads, in poor soils, in unirrigated areas, etc. Passive observation shows the poor results: stalks are short, stunted and scrawny with only one small ear to each plant. In Chokwe rice yields are quite high relative to maize, yet most people plant some of their prime fields with maize, often with poor results. In rural areas maize is so important that

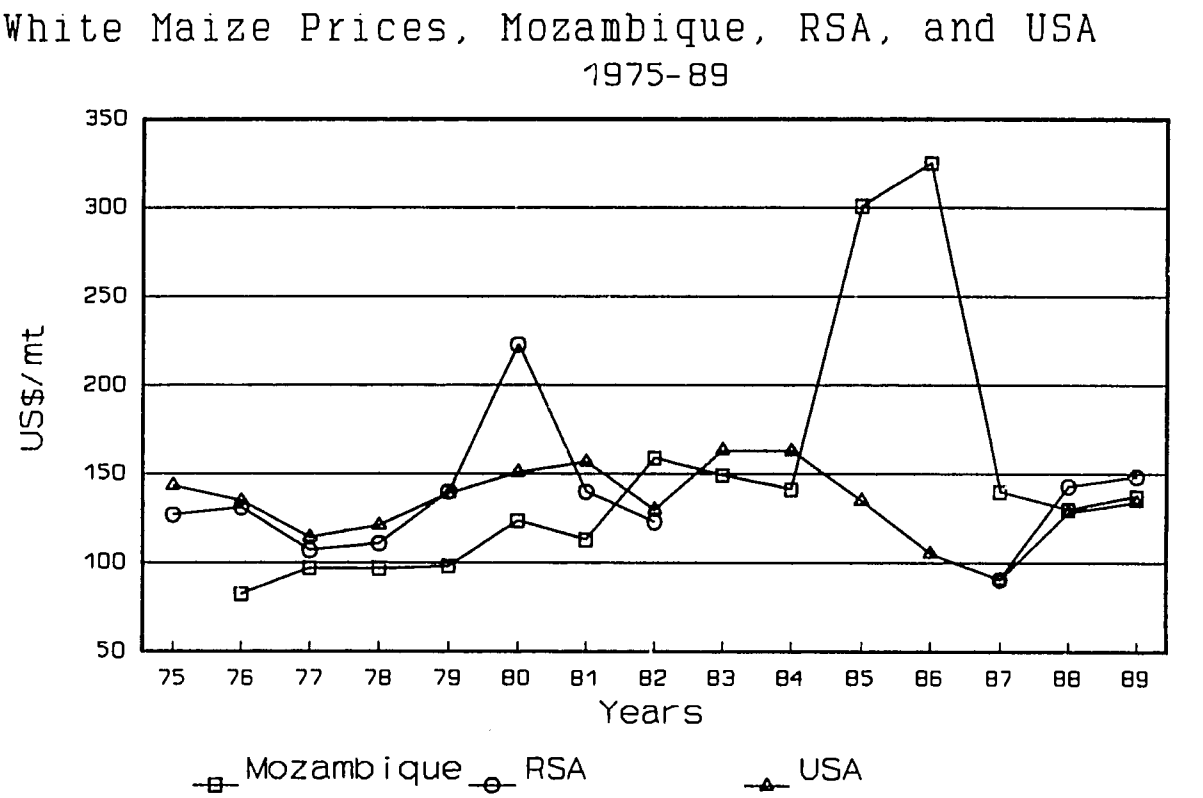
Table No. 1 Maize Statistics, Eastern and Southern Africa.

Variable	Unit	Regional Total or Average[1]	Mozam-bique	Tan-zania	Zim-babwe	South Africa
Arable Land	000Ha		2,860	4,160	2,680	12,355
Maize area harvested, 1985-87	000Ha	9,919	600	1,783	1,260	3,965
Maize yield, 1985-87	mt/Ha	1.3	0.5	1.2	1.6	2.0
Maize production, 1985-87	000mt	12,656	315	2,164	2,062	7,917
Yield growth rate[2], 1972-76 to 1983-87	%/yr	-0.1	-2.6	1.7	-3.4	-1.0
White maize in total, 1988-89	%	97	100	99	93	53
Maize in total cereal area, 1985-87	%	39	67	54	72	54
Net imports of maize, 1985-87	000mt	90	209	73	-328	-2,242
Per capita maize imports, 1985-87	Kg/year	0.4	14.5	3.1	-36.1	-69.4
Per capita maize use, 1985-87	Kg/year	61.4	36.5	95.8	190.5	177.3
Percentage food use of maize, 1985-87	%	81	90	92	64	49
Fertilizer per arable land, 1986	Kg/Ha	10.5	1.9	7.7	57.1	
Farm price[3] of maize, 1988-89	US$/mt		127	92	98	105
Price ratio nitrogen to maize, 1988-89			4.5	6.0	2.8	
Per capita income, 1987	US$	259	170	180	580	1,892
External Debt/Exports Goods & Services	%	369.4	2,461.2	947.0	147.5	
External Debt/Gross National Product	%	115.3	436.0	164.6	43.5	
Debt Service/Exports Goods & Services	%	27.6	31.6	24.6	32.4	
Interest on Debt/Exports Goods & Services	%	11.7	13.5	13.4	9.7	

Source: CIMMYT. 1990. "1989 CIMMYT World Maize Facts and Trends", Mexico, D.F. (forthcoming).
FAO, "Production Yearbook 1988", 1989, pp. 48, 49, 113, and 125.
Maize Board (Republic of South Africa), "Annual Report - 1989", pp. 15, 16, 24, 25, and 33.
IMF, "IFS", vol. 43, n. 3, March 1990, pp. 476-478.
World Bank, "World Debt Tables 1989-90", Washington, 1989, Vol. 1, p. 82; Vol. 2, pp. 262, 374, 442.

1) Regional figures exclude South Africa (RSA).
2) RSA maize yield growth rate is for 1978-81 to 1986-89.
3) Calculated at the official exchange rate.

Figure 1



Source: IMF. "IFS." Tape January 1990; Min. Agricultura.
Note: USA Yellow Maize Price + 20%; Mozambique Prices at Official Exchange Rate.

it is used in place of cash to pay field and day laborers. Furthermore, urban consumers are willing to pay a premium to buy the best maize flour, even purchasing white maize flour imported from Swaziland. Although donated yellow maize in quantity is available in many Maputo markets, thanks to massive food-aid programs, white maize is not.

The most important maize consumption areas are in the southern provinces of Gaza and Maputo. Unfortunately, due to soil and rain conditions maize production is more difficult here than in the central and northern provinces of Manica, Cabo Delgado, Nampula, Zambesia, and Niassa, which in normal times are maize surplus areas. Cabo Delgado and Nampula are currently the principal maize surplus provinces (**Table No.2**), but transportation costs to the high demand areas are prohibitive.

There are no data on the employment of rural labor absorbed by maize production and marketing. However, an indication of its importance can be derived. In 1987-88, 82 percent of the economically active population in Mozambique was involved in agriculture (FAO, 1989, p. 65). Maize occupied 67 percent of the area planted to all cereals, and 23 percent of all harvested area in 1988 (see **Table No. 3**). Considering the higher than average maize labor demand per unit area, it can be argued that maize provides full-time equivalent employment for around a quarter of the economically active population in agriculture, most of whom are women.

The Maize Balance Sheets

Maize production is used to satisfy the food needs of the household, including payment in kind to hired labor. Any remainder is sold (for cash or bartered) in order to acquire goods not produced on the farm. In fact, in addition to price disincentives, the deterioration of the marketing system and rural insecurity, the absence of consumer goods for sale or barter is a factor in the decline of marketed maize output in the 1980's.

Many smaller farms do not produce enough maize to supply household needs. A common method to supplement that deficit is by agricultural work in other people's fields. Even then, maize may be the only crop the small farmer has for sale to meet the need for cash or consumer goods, which "accounts for the finding that a few of the net sellers are poor households" (Blackie, p. 25). Thus, maize is marketed not only by surplus producers, but by deficit producers as well.

Marketed surplus is estimated to represent only 20-30 percent of production, and like production, to have decreased over time. Mozambique's self-sufficiency in marketed maize declined substantially in the 1980's (**Table No. 4**), from 50 percent in 1980-81 to 15 percent in 1988-89. This has occurred, ironically, at a period when per capita consumption of maize has actually increased, a paradox possible due to a sharp increase of donated maize imports (**Fig. 2 and Fig. 3**).

Table No. 2 Maize: Marketed Production, by Sector, Purchased by AGRICOM, and by Province, 1981-89 (Metric Tons).

	1981	1982	1983	1984	1985	1986	1987	1988	1989
Total	78,322	89,151	55,803	82,561	58,581	21,474	27,331	44,579	80,067
SECTOR:									
Family	36,843	36,454	24,984	40,432	29,651	11,678	16,315	34,247	64,813
Others	41,479	52,697	30,819	42,129	28,930	9,796	11,016	10,332	15,254
AGRICOM			30,031	41,312	23,242	9,638	18,097	31,488	59,608
			53.8%	50.0%	39.7%	44.9%	66.2%	70.6%	74.4%
PROVINCE:									
Cabo Delgado	3,541	8,036	5,026	11,151	9,534	5,878	7,769	8,633	18,363
Nampula	4,639	6,546	5,951	13,263	9,821	3,979	7,366	7,981	17,600
Zambesia	25,647	20,539	17,725	27,146	14,150	2,413	582	2,189	6,930
Niassa	7,068	17,468	15,700	15,470	7,798	1,160	1,858	4,138	6,427
Tete	21,494	25,623	6,221	12,990	4,466	1,436	268	1,854	4,007
Manica	8,294	6,957	3,017	1,062	5,698	4,535	6,105	10,496	15,769
Sofala	1,129	145	109	112	1,390	306	806	2,512	1,651
Inhambane	523	60	105	805	555	171	322	128	1,188
Gaza	4,103	1,258	1,819	562	2,939	1,154	1,726	2,516	1,358
Maputo	1,884	2,519	130		2,230	442	529	4,132	6,774
Nacional	78,322	89,151	55,803	82,561	58,581	21,474	27,331	44,579	80,067
CD+N+Z	33,827	35,121	28,702	51,560	33,505	12,270	15,717	18,803	42,893

Source: AGRICOM, "Some Statistical Extracts", May 1989, pp. 1.2 and 2.5.
AGRICOM, "Documento Final de Colectivo Alargado", March 24, 1990, Annexes 1 and 3.

Table No. 3 Mozambique. Land Utilization, 1979/81, 1987-88.

	1979/81	1987	1988
	----------Thousand Hectares----------		
Total Arable Land	2,850	2,860	
Harvested area	2,798	2,544	2,636
Cereals	959	824	894
Maize	607	600	600
Sorghum	255	130	200
Rice	73	70	70
Millet	20	20	20
Wheat	4	4	4
Roots and Tubers	616	596	596
Pulses	124	125	125
Peanuts	173	150	150
Cotton	131	82	95
Coconuts	453	415	420
Vegetables	184	196	198
Cane	52	40	40
Citrus	39	36	36
Banana	67	80	82

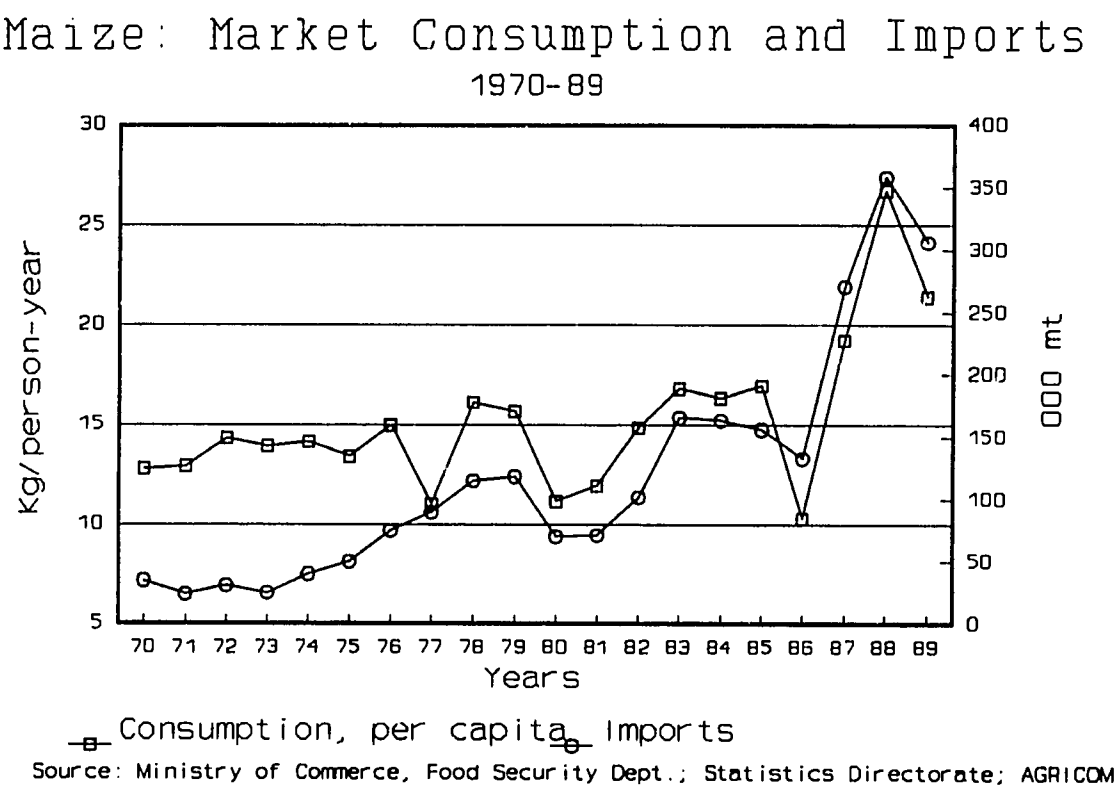
Source: FAO, "Production Yearbook 1988", Rome, 1989, pp. 48, 113-238.'

Table No. 4 Maize Balance Sheets, Market and Emergency Consumption, 1981/82-1989/90.

Year	Initial Stocks	Marketed Output	Imports			Supply	Apparent Consumption		
			Total	Commercial	Donated		Total	per capita	Self-sufficiency
	Thousand mt							Kg	%
1980	5.0	65.0	70.1	57.6	12.5	140.1	135.1	11.2	48.1
1981	5.0	78.3	71.0	26.7	44.3	154.3	148.7	12.0	52.7
1982	5.6	89.2	101.7	20.3	81.4	196.4	189.4	14.9	47.1
1983	7.0	55.8	165.6	0.0	165.6	228.4	220.1	16.8	25.4
1984	8.3	82.6	163.5	0.0	163.5	254.4	219.3	16.3	37.7
1985	35.1	58.6	156.4	18.6	137.8	250.1	233.8	17.0	25.1
1986	16.3	21.5	133.3	0.0	133.3	171.1	146.1	10.3	14.7
1987	25.0	27.3	270.7	0.0	270.7	323.0	280.5	19.2	9.7
1988	42.5	44.8	358.5	0.0	358.5	445.7	397.5	26.7	11.3
1989	48.2	80.1	306.3	5.0	301.3	434.6	347.6	22.9	23.0

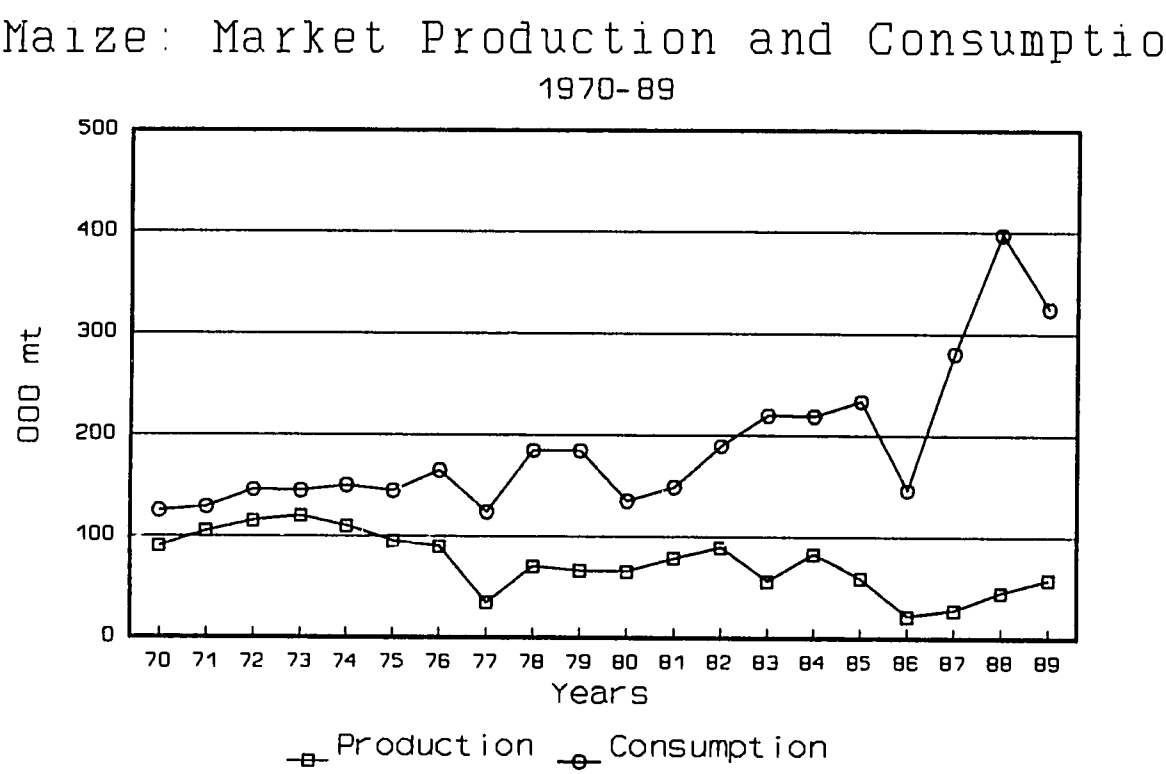
Source: Ministry of Commerce. Food Security Department.
Notes:
a) This table does not include consumption in the farm household or by laborers paid with maize.
b) "Donated" imports include imports for resale, and for free distribution to displaced people and special feeding programs.

Figure 2



Source: Ministry of Commerce, Food Security Dept.; Statistics Directorate; AGRICOM

Figure 3



Source: Ministry of Commerce, Food Security Dept.; Statistics Directorate; AGRICOM

One of the most significant factors in this decline is the internal guerrilla warfare that has caused the abandonment of farms, destruction of existing crops, and disruption of the marketing channels for production inputs and surplus production. In addition, the absence of credit, fertilizer, and extension agents, as well as government policies have been major contributing factors. The government policies which have affected maize output and marketing, have included price control, exchange rate and interest rate control, emphasis on large cooperative farms, and quantitative restrictions to trade, among others. Government policies and inadequate investment in road maintenance, research, and extension also affect the maize sector. A discussion of these and other factors is contained in the next two sections dealing with the country's maize production, marketing, and pricing systems.

Mozambique's Production System

The Family Farm Sector

The family farm sector is extremely important for the provision of maize in the economy. The Ministry of Agriculture recognizes four types of farms: "commercial (and private) farms", "family farms", "cooperative farms", and "state (and/or mixed) farms". The average size of the family farm is about 1 hectare, while the commercial farm averages about 80 hectares, the cooperatives 60.7 hectares and the state farms 1614 hectares (Bruce, 1989, p.32—see **Table No. 5**). Since 1981 the percentage of marketed production by family farms has increased very significantly, while the production of the other three have declined (AGRICOM 1990—Annex 1). In 1981, family farms accounted for less than half of the total marketed production of maize (47 percent), while the other three accounted for 53 percent. By 1989, over 80 percent of the total marketed maize production came from family farms (AGRICOM 1990, anexo 1). Mozambican maize production is closely linked to this sector (see **Table No. 2**). However, it is the private farmer family that is best equipped to increase production.

Problems related to the war and the economy have severely affected the family farm sector. Many families have become refugees, others have abandoned their fields for lands closer to the cities, some have not been able to farm intensively for fear of bandit attack at critical times and many government employees and other urban dwellers have taken up farming to supplement their eroding income. Other farmers, unable to reach the market in a timely way due to poor roads, the lack of an adequate rural marketing network and low producer prices now withhold their production from the market and trade with neighbors for necessities. (See Annex A for specifics on production and extension in the provinces of Manica, Gaza, and Sofala.)

The family farm sector is not uniform in composition, especially in light of the dislocations caused by the rural insurgency. We believe a more useful, descriptive classification is warranted. In this study, we use the following terms:

1) subsistence farms;
2) semi-subsistence farms;
3) green zone farms; and
4) private farmer farms.

Subsistence farm families have little land, education, modern technological knowledge, or cash. They produce primarily for the family, but may barter with neighbors for other basic foods and commodities. These farms have agricultural production that could be marketed, but they are unable to bring their maize or other produce to market due to distance, fear of attack, lack of transportation and/or the absence of consumer goods to buy. They do not use modern agricultural inputs and are located in areas distant from urban markets or where transportation access is difficult. Many, but not all, are in areas severely affected by guerrilla/bandit attack.

Table No. 5 Farm Types and Areas by Province

Province and Sector	Number	Percent of Total	Average Farm Hectares	Total Hectares	Percent of Total
Maputo Province					
Commercial Farmers	850	0.81	25	21,250	14
Family Farmers	92,400	87.7	0.8	73,920	51
Coop Members	12,100	11.48	30	6,000	4
State Farms	15	0.01	3,000	45,000	31
Gaza Province					
Commercial Farmers	1,173	0.95	20	23,460	15
Family Farmers	120,000	97.02	1	120,000	75
Coop Members	2,500	2.02	60	2,500	2
State Farms	13	0.01	1,000	13,000	8
Manica Province					
Commercial Farmers	250	0.27	60	15,000	8
Family Farmers	90,000	98.08	1.5	135,000	77
Coop Members	1,500	1.63	120	1,500	1
State Farms	12	0.01	2,000	24,000	14
Sofala Province					
Commercial Farmers	120	0.17	100	12,000	15
Family Farmers	70,000	98.97	0.8	56,000	72
Coop Members	600	0.85	50	600	1
State Farms	6	0.01	1,500	9,000	12
Zambezia Province					
Commercial Farmers	160	0.13	180	12,800	8
Family Farmers	120,000	99.53	1	120,000	71
Coop Members	400	0.33	50	400	0
State Farms	12	0.01	3,000	36,000	21
Nampula Province					
Commercial Farmers	120	0.07	80	9,600	2
Family Farmers	250,000	99.53	1.5	375,000	97
Coop Members	800	0.32	75	800	0
State Farms	6	0.00	400	2,400	1
Cabo Delgado Province					
Commercial Farmers	60	0.0	100	6,000	8
Family Farmers	80,000	97.48	0.8	64,000	86
Coop Members	2,000	2.44	40	2,000	3
State Farms	5	0.01	400	2,000	3

Source: Ministry of Agriculture, cited in Bruce 1989.

Semi-subsistence farm families are located nearer cities and towns relatively secure from sustained bandit attack and occupation. Transportation is still a significant problem. They have small plots, rarely use modern agricultural inputs, little education, cash and access to credit. They supplement their income by working as employees, agricultural laborers or in the mines of neighboring countries. Distance to wage earning work requires the adult males to be absent during most of the agricultural cycle.

Green zone farmers have plots in the agricultural areas ("green zones") surrounding the principal cities. Generally, many of these farms are small garden plots worked by the families of government employees and other urban workers, many of whom have little knowledge of farming. Others are refugees from strife-torn rural areas who moved to the city for security reasons, sharing a residence with relatives and eventually obtaining small plots for gardening. Still others are members of cooperatives where the members share farm duties on common land, but still have access to lands farmed for private use. Typically, the plots are quite small. Many males work in the city, leaving the wives to manage the garden plots. After the Economic Recovery Program (ERP) began, there was sufficient price incentive for green zone farmers to sell their garden crops in the sanctioned, public markets and informally on street corners ("dumbanengues"[1]). For green zone farmers, transportation is less of a problem, educational levels are higher and there is greater access to modern technological inputs, extension and credit. However, these areas are also densely populated, and, due to the threat of bandit attack, there is little opportunity for expansion of production except through more intensive exploitation of current agricultural land. Unfortunately, many lack access to sufficient cash to utilize improved agricultural inputs.

Private farmer families are middle size farmers. Often, they are also family farms in that the family is heavily involved in and dependent on marketed production, with the distinction that they have significantly more land and generally greater technological knowledge about modern farming practices. They are different also in that the male head of household is more likely to be present working the farm. We observed that many of the successful private farmer families are former Portuguese colonists, often married to ethnic African Mozambicans. They have greater access to means of transportation and better knowledge of market prices and the marketing system in general. In Chokwe, a large number of private farmers have one or two trucks, often acquired through the U.S.A.I.D. Commodity Import Program (CIP).

There are really no large-scale farm families, although there are a few, **private commercial farmers**, **state-farms** (owned and operated by the state or by state-organized) **cooperatives**, and **mixed (state/private company) enterprises**. Private commercial farmers operate land rented from the state in order to market production in urban areas. The operators

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[1] Dumbanengue means in the Maputo dialect "trust your feet", referring to the fact that vendors in those markets need to be prepared to run at any time, in case police or other authorities descend. In Beira they are called "Chungamoio" which signifies "to have courage" for the same reason.

are very knowledgeable about modern farming technology and market conditions (margins and market networks).

The production from state farms have been declining drastically since 1981 (See **Table No. 13**), while the private and family sectors have begun a slow recovery, thanks to the Economic Recovery Program, from the disastrous 1983-1987 period. Divestiture of the state farms has been proceeding since 1985 due to their failure as a production strategy (Bruce, 1989, p. 8). However, the government seems to be favoring private farmer families and mixed (state/private) enterprises in the divestitures taking place at least in Chokwe and, according to Bruce (1989, pp. 10-11), in Maputo and Nampula. It is unclear what the Government's policy is toward the large, private, commercial farmers. One of the problems is that it would lead to large concentrations of land in the hands of private individuals, a system somewhat associated with the pre-Independence period. In any event, it is clear that for the foreseeable future the family farm sector will provide the bulk of the marketed output for maize and other basic staples.

The Family Farm Household

In order to analyze the factors affecting the bulk of maize production in Mozambique, it is helpful to look at the "family (or household) economic enterprise" rather than just the "family farm," since the family is often being supported by a variety of economic activities. Many women supplement their agricultural work by selling some vegetables they produce in a public market or dumbanengue. This is particularly true for semi-subsistence and green zone households. Husbands and wives in all four types of family sector household farms are assisted in various ways by the many members of the household. For example, a household's tractor driver might be one of the sons; older children take care of the youngest ones allowing the parents to go about their work; daughters help in the preparation of the food by shelling the maize and mashing it, or by getting water or firewood, preparing charcoal, etc. In this way, the household is an enterprise unit with inputs and outputs coming from different sources in many cases. In some respects, with little land, the semi-subsistence and green zone households have greater flexibility than subsistence and private farmers to spread their risks and tend not to be dependent on a single source or a single person for their survival.

Agricultural production in Mozambique, in any event as in much of East and Southern Africa, is traditionally a female activity (Sheldon, 1989, p. 1; see also Skjonsberg for a Zambian example.). According to the 1980 census, 97 percent of all economically active females work in the agricultural sector (Antunes, 1985, p. 26). Previous research indicates that a minimum of 60 percent of all agricultural work is done by women. In the agricultural cooperatives of the Maputo Green Zones, 95 percent of the membership is female (Sheldon, 1989, pp. 7-9). During field visits to agricultural areas under study nine out ten agricultural workers were female in the Green Zones of Beira and Maputo, eight out ten in Gaza province (Xai-Xai and Chokwe), and in Manica (Chimoio and Vanduzi) seven out of ten.

In many subsistence farm households, and especially in semi-subsistence households, males are largely absent from agriculture. They must earn cash through agricultural labor for hire, mine work in South Africa and Zimbabwe, and wage earning in urban Mozambique. Since Independence, the Mozambican government also has been a major source of employment for males. With respect to the subsistence farmer households also, due to the pressures of war and cash needs, males are probably absent in large numbers. However, from our field observations, subsistence household males are somewhat more likely to be working on the farm than in semi-subsistence households.

The absence of men from family agriculture in such large numbers can only indicate that agriculture is not as remunerative as other economic activities. Data from other countries indicate that males would be more actively involved in agriculture if their producer prices were higher and if consumer goods were available regularly in the rural areas. Given the severe stresses on the peasant family in recent times of war, inadequate government services, endemic disease and economic decline, a diversity of income sources is a vital survival strategy.

Women in fact have the major role in agricultural decisions: time allocation, crop decisions, harvest decisions, sale decisions, recruitment and overseeing of workers, cash dispersal, etc., at least when men are not around. This was confirmed in our interviews and observations in the areas we visited. The men may be nominally the "owners" of the land and in charge, but even when the men are at home, women make important agricultural decisions. Where husbands are working in wage activities, they rarely ask the wife how she allocates her time in acquiring and preparing food. Women are generally not tractor drivers nor ox-plow leaders (these are more male-oriented activities), but the woman is not reluctant to give orders to the drivers and to the foremen (always males) when the husband is absent.

Generally, the husband exerts greater influence in decisions related to large purchases and to the dispersal of large quantities of crops. For example, in a semi-subsistence household, the decision to acquire a tractor might typically be the man's, but the decision whether and how many sacks of maize to sell on any given day is usually the wife's prerogative. In the case of multiple wives in an extended family compound, each wife will have her own "machamba" (farm land) and house, but will share the hearth with the others. In cases where the husband has a wage income, such as in the green zone households and among semi-subsistence farm males working in mines it occurs with some frequency that he chooses to spend it on himself rather than on household needs. On the other hand, it is quite common for men working in foreign mines to send home to the family money, food, and other household needs. This supports the characterization of the household in the family farm sector as an economic enterprise unit, with the wife playing a critical role in production and marketing of farm commodities within the circle of the varied economic activities performed by the unit.

Under current circumstances of war and economic stress, farm households must have access to a variety of economic opportunities, and in many cases proximity to an urban center is necessary for survival. Consequently, much of the family sector production entering the urban markets comes from peri-urban areas where semi-subsistence, green zone and private farmer

households predominate. Still the majority of farm households are subsistence farms located in rural areas. For many of these a reversion to subsistence production has become the principal survival strategy. The war has contributed to the overall decline in marketed production by increasing the costs associated with road maintenance, transportation and marketing. At the same time, marketing controls on private traders and caps on producer prices have contributed to the deterioration of the rural marketing system. Also, the parastatal AGRICOM, E.E. (the Government's agricultural marketing arm) has been unable to replace the private trading system in rural areas; farm households generally are not able to sell their maize when *they* want to and buy essential consumer goods *they* need to.

Rainfall

The amount, duration, and distribution of rainfall are important determinants of maize yields. Maize does not do well in either excessive drought or excessive humidity. Rainfall in Africa must be treated as a variable rather than a constant. Given the last two decades of drought in much of Africa, followed by the recent complaints of excessive rain, it is extremely difficult to suggest that there is a "normal" rainfall level.[2] The rainfall in the southern provinces (Gaza and Maputo) is considerably more variable than in the rest of the country. The principal irrigated growing areas of Gaza (Xai-Xai and Chokwe) have humid soils and are susceptible to excessive humidity. In fact, Blakie (p.21) suggests that more damage may occur through excessive humidity than drought.

Farmers have several means to compensate for the risks inherent in rainfall variability. Market dependent, semi-subsistence households and private farmers will plant with the first rains even though there is a risk that the rainy season has not really started (Blackie, pp. 20-21. Small private farmers and large semi-subsistence farm households have enough land to stagger plantings to spread the risk. Still others, such as green zone farmers and larger private farmers may select improved seed varieties with higher tolerance for drought and moisture variability.

Rainfall is critically important in maize production, especially in Mozambique, and often there is either too much or too little. Droughts have been cited as a significant reason for small quantities of marketed domestic maize, and in the 1989-90 agricultural year, heavy rains have been blamed for reduced yields in some unirrigated areas. However, decline in maize production is not due principally to rainfall variability, but it remains as a significant factor.

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[2] See Nicholson (1986, p. 126 in Hansen and McMillan, 1986) for an extended discussion of African climatic patterns. Nicholson says that there may be thirty year alternating cycles in rain and drought. However, it may be that there are really 80 year cycles. It is not known as yet what the real patterns are. Too little information is available.

Although all farmers are affected by swings in the unexpected changes in precipitation amounts, semi-subsistence farmers are probably the most affected of all. Their hectareage is small and they are generally market-dependent. Private farmers are more able to vary their production, according to the availability of water. They do not plant just one or two crops, as do the semi-subsistence farmers. Subsistence farmers are also affected, but they are less dependent on the market and tend to cultivate a variety of crops in the fields they do have. Some green zone farmers have access to irrigation to help them in periods of drought.

Fig. 4 shows 10-year average monthly rainfall in selected stations, showing October to March the period of heaviest precipitation. The unimodal rainfall means that only a single crop may be grown in any one year (Blackie, p. 3). Rain in any given year may, of course, vary from the average seasonal pattern and, as a consequence, production can be very volatile. Since the rainfall tends to be similar in the region, maize production in the different countries can have a large positive covariance. So, when there is a drought in Mozambique, there is also drought in neighboring countries. This, among other factors, explains the small maize trade in the Southern African region (Blackie, p. 10).

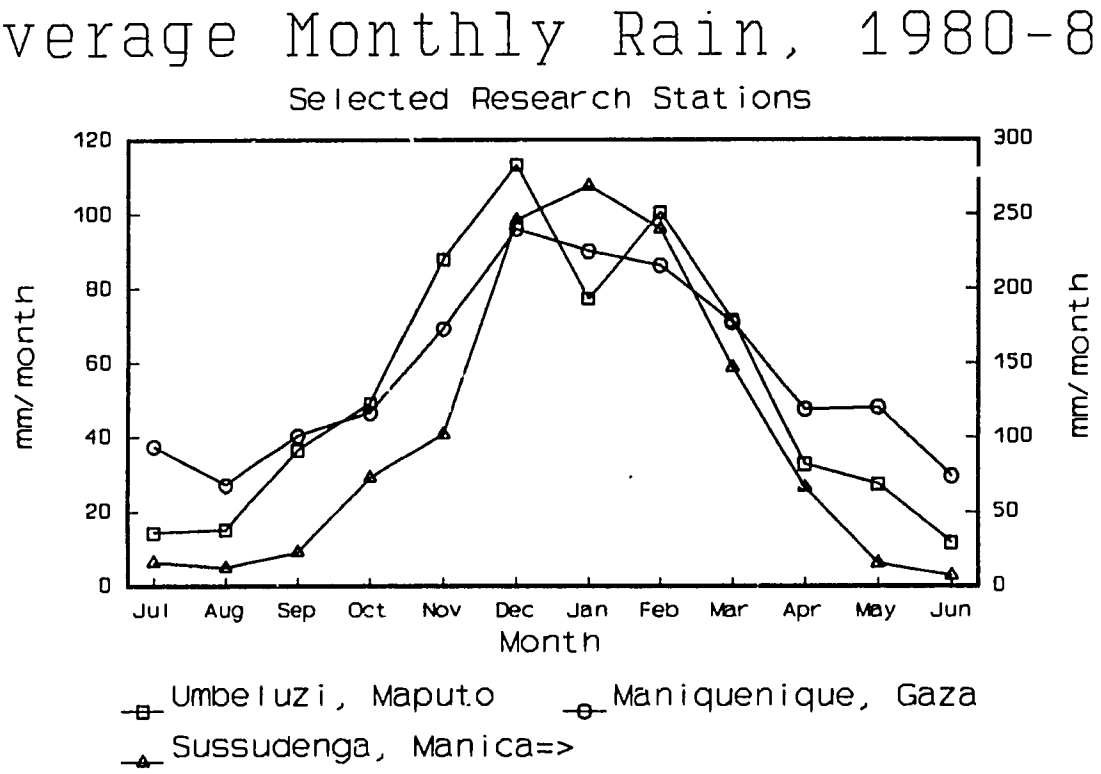
The part of the country with the highest demand for maize consumption (the area with the largest population density, and the greatest preference for maize as the key grain in the diet) comprises the southern provinces (Maputo, Gaza and Inhambane), followed by the central (Manica, Sofala and to a lesser extent Tete) and last by the northern provinces (Zambezia, Nampula, Niassa and Cabo Delgado) where cassava is more important in the rural diet. Paradoxically, the climatically most favorable areas for growing maize are in the north, followed by the central provinces and the least hospitable areas for maize are located in the southern provinces.

Land Tenure

Current laws do not encourage land tenure security among farmers and contribute to less intensive land utilization for agricultural production. These negative effects of the law are exacerbated by actual land allocation practices, which are highly localized and retain significant elements of traditional and political influences. The principal advantage of the current system is that land acquisition, though difficult to acquire in some areas, is not expensive.

According to the Mozambican Constitution and the 1980 Lei de Terras adopted at the Cuarta Sessao da Assembleia Popular all land belongs to the State; individuals have the right to use land after application to and acceptance by the appropriate State institutions. The farmer receiving land from the State must work the land for three years, before she is allowed to change land allocations. However, the current law does not provide protection from indemnification and alienation of land use rights. A farmer may only assign to his/her heirs the structural improvements made on top of the land, such as a house, but not the land itself. Furthermore, the State has priority access to the land and may remove a farmer from his/her land without warning or remuneration. Farmers are being given land use titles for periods of 5, 15 and 50 years,

Figure 4



Source: INIA.

although farmers are still skeptical of the value of titles with such limitations. Additional restrictions occur for some farmers, who must grow specific cereals for the market on a significant percentage of their land in order to maintain land use rights (See Bruce, 1989, p. 10).

In an update on his review of land tenure in Mozambique, Bruce notes that new, draft Constitutional provisions indicate that the Government is moving in the direction of allowing private property (Bruce, 1990, annex 2). Nevertheless, there is, as yet, no unequivocal statement guaranteeing it by the state.

The laws, though in practice are not always enforced, do not provide security for farmers. Farmers are accustomed to being able to have their children inherit their machambas (farm plots). These factors discourage successful farmers from acquiring more land to augment their production acreage. Also, the laws do not take into account indigenous land tenancy practices.

Soil Fertility and Fertilizer Use

Although Mozambique has relatively rich soils, continued cultivation of maize in the same areas without any crop rotation, and erosion from inadequately protected fields has led to depleted soils. Soils have been cropped without nutrient replacement for many years. This condition contributes greatly to the decline in productivity (See Annex B). This is particularly the case for semi-subsistence and subsistence farmers, who do not have the means to acquire fertilizers or allow land to fallow, but is a problem also among private farmer lands, as well.

Since maize is a heavy feeder, there is a clear need for added soil fertility through the use of fertilizer if yields are to be increased from the relatively poor levels presently existing in the Southern and Central provinces.[3] (see **Table No. 6**) However, even for areas studied in Gaza and Maputo provinces which have received donor-financed fertilizer imports, fertilizer supplies are particularly unreliable. Transport costs make fertilizer an increasingly expensive input (see **Table No. 7**), not only to the landlocked areas in the interior, but also to areas near to ports and to areas well served by asphalted roads, such as Chokwe, Xai-Xai, and Chimoio.

[3] One alternative to fertilizers would have been cattle manure. Cattle manure use rates, according to information gathered among extension agents, are also very low, when it is used at all, since quantities available are limited (the once sizeable herds have been decimated in recent years by the armed rural insurgency).

Table No. 6 Maize Yields of Different Varieties with and without Inputs in Southern Mozambique.

Variety	---With Inputs--- Umbeluzi	Chókwe	--Without Inputs-- Umbeluzi	Chókwe
	----------mt/Ha----------			
Kalahari	6.76	5.19	5.51	0.32
Mayo 82	5.36	5.84	4.63	0.90
CW-2	8.04	6.46	5.23	0.83
Matuba (control)	5.45	6.26	4.80	0.99
Manica (control)	7.70	4.28	6.30	0.32
Mean	6.21	5.17	5.29	0.67
Coefficient of Variation	13.3	19.7	15.4	39.4

Source: Bueno, A., M. Perreira, and D. Mariote, "Comportamento de Variedades de Milho Avaliadas com e sem Aplicação de Insumos em Duas Localidades no Sul de Moçambique", INIA, Maputo, 1989.

Notes:

1) The averages include the results of other varieties not included in this table.
2) The results for Umbeluzi, Maputo, for the "without inputs" situation may have been distorted because of the presence of residual fertilizer applied to previous crops.

Table 7 Prices of Selected Farmers' Inputs

Farmer Inputs	1986 Prices	1987 Prices	1987 %change	1988 Prices	1988 %change	1989 Prices	1989 %change
Seeds							
Kalahary (Kg)	60	180	200.0	250	38.9	510	104.0
Silver Mine (Kg)	30	150	400.0	250	66.6	500	100.0
PNR (Kg)(12-24-12)	350	380	8.5	450	18.4	700	55.5
Fertilizers							
Urea	11,000	50,000	354.5	150,000	200.0	330,000	120.0
Ammonium Sulphate	9,000	16,000	77.8	76,000	375.0	210,000	176.3
N.P.K.	9,000	25,000	177.8	50,000	100.0	180,000	260.0
Insecticides and Other							
Aldrini (Kg)	500	900	80.0	1,800	100.0	3,200	77.8
Atrazine (Kg)	600	900	50.0	1,800	100.0	3,080	71.1
Dual 96% (Lt)	650	1,000	53.8	5,000	400.0	8,000	60.0
Maize Prices (Kg)	13	40	207.7	65	62.5	110	69.2
Fertilizer/Maize Price Ratio (*) (NPK)	0.7	0.6	---	0.8	---	1.6	---
Seed/Maize Price Ratio (*) (Kalahary)	4.6	9.5	---	6.9	---	6.4	---

Sources: Original Data: CAFUM and BOROR Comercial.

(*) Per Kg ratio

As a natural consequence of all these situations, most subsistence and semi-subsistence farmers, and even many private farmers in the better-off machambas, place fertilizer low in their ranking of priority needs. These farmers generally do not have contact with on-farm trials, do not value them, and are not convinced that fertilizer makes a major difference in maize yields. Furthermore, there is significant disagreement among local agricultural technicians whether fertilizer is really a critical ingredient for increased productivity. Nevertheless, as Blackie (1988,

pp. 17, 21) as shown, fertilizer is important to maize productivity especially for rain-fed maize crops. Private farmer families do use fertilizer and improved seeds (when they can afford it), however, as do private commercial farmers, which they buy from state and private agricultural supply companies.

Fertilizer supplies in rural areas, where the majority of subsistence and semi-subsistence farmers are located, are either very out-dated or unavailable. AGRICOM is responsible for the marketing of agricultural inputs, including fertilizer, in many areas. But their supply network is limited. The number of their fixed posts and mobile brigades (see **Table No. 8**) fell by 60% between 1984 and 1988 (AGRICOM, 1989, p. 8). The Rural Agricultural Supply Shops (Casas Agrarias) also sell inputs in some rural areas, but the fertilizer is often out-dated or, due to poor storage, have become inert. When subsistence and semi-subsistence farmers purchase useless fertilizer and have a bad experience with it, they are less likely to try it again, even though fertilizer, under current conditions is essential for maize increasing yields.

Table No. 8 Entry of Produce into Agricom's Stores by Origin
('000 t)

ORIGIN	1983	1984	1985	1986	1987	1988
Mob. Brigades	9.1	7.8	4.9	2.2	4.0	3.8
Fixed Posts	6.1	6.4	4.4	2.8	3.5	3.8
Consumer co-op	3.2	4.8	3.1	2.3	2.7	3.4
Private shops	19.5	19.7	17.5	11.8	19.5	30.0
O.Intermediary	2.5	2.1	2.0	1.1	2.1	6.9
State Farms	15.1	25.0	4.5	1.8	4.3	2.3
Co-op Farms	0.4	0.8	0.5	0.4	0.6	0.3
Private Farms	0.8	2.0	0.7	1.1	2.3	2.3
Joint Farms	:	:	:	:	:	0.7
T O T A L	56.7	68.6	37.6	23.5	39.7	53.5

Source: AGRICOM, "Some Statistical Abstracts," May 1989, p. 14.

Access to Modern Agricultural Inputs

Much of the existing maize technology available in the world cannot be applied in Mozambique under current conditions. The subsistence and semi-subsistence farm sector, the backbone of the marketed production, is generally ill-prepared to utilize it due to: illiteracy, lack of cash, lack of maintained roads, lack of access to credit and lack of access to appropriate technology (in part due to an inadequate extension service), not to mention the rural insurgency that makes transportation dangerous and sporadic at best. Nonetheless, the cost of improved

technologies, and the associated risks, constrains in an absolute way the ability of small farmers without access to credit to try improved seeds and fertilizer. Subsistence and semi-subsistence farmers are especially sensitive to the cash requirements of using modern inputs. Unfortunately, they also are poorly situated to repay credit outlays initially. Most of the domestic seed production by Sementes de Mozambique (SEMOC), for example, is bought by state agricultural enterprises. Subsistence and semi-subsistence farmers generally rely on local (regional) varieties they have traditionally utilized, even though there are improved varieties appropriate for particular regions available through SEMOC (See **Annex C**). Private farmers and green zone farmers utilize improved domestic and imported seed varieties to a significant extent.

There are not many companies, public or private, in Mozambique in the business of distributing inputs, at least on a national scale. With BOROR Comercial practically dead, the principal state company importing inputs is INTERQUIMICA, E.E. Fertilizer is produced domestically by the state company, Quimica Geral. The private firm, Companhia de Fumigaçoes de Mozambique—CAFUM—has sales offices in almost all provinces (except Niassa). Sementes de Mozambique—SEMOC—is a mixed enterprise (80% state owned) and distributes nationally.

A significant problem for both CAFUM and SEMOC is that, at least in the case of maize, at present the market for modern inputs in Mozambique is very poor, largely because the family farm sector does not use modern inputs. Cost is a major factor. **Table No. 7** clearly shows a rapid rise in the cost of maize inputs between 1984 and 1989. Between 1983 and 1986, farm input prices were kept constant, but supplies were extremely scarce. In 1986-1987, fertilizers, seeds and insecticide, and output prices underwent a major adjustment (**Table No. 7**). In 1988-1989, the increases in input prices outpaced the maize output prices. For example, the fertilizer/maize ratio increased from 0.7 in 1986 to double that in 1989 (1.6). Both subsistence and semi-subsistence farmers, as well as green zone and private farmers are not so naive they cannot recognize increasing costs. The necessary price adjustments on inputs that took place when prices were freed has acted as a deterrent to modern inputs usage. Over the same period of time, maize producer (farmgate) prices by comparison had only modest increases (See **Table No. 9.**).

The low demand also affects the ability of input companies to expand their operations. Another problem for private input companies is the competition with donations from donor countries. For example, of the mere 13,000 tons of seed sold and distributed in Mozambique between 1988 and 1989, SEMOC produced 4800 and imported 3200 tons. The rest (50 percent -8000 tons) was distributed by the Natural Disasters Relief Department (DPCCN), Private Volunteer Organizations (PVO's), USAID and other donors.

Production Credit

Official banks in Mozambique do not provide the financing required for maize production (and marketing). Green zone farmers, private farmers and commercial farmers and enterprises are probably the only ones able to make significant input purchases, but little credit

is available for the small farmer. They are in critical need of credit before and during cultivation to meet the cash costs of seed, fertilizer, pesticides, and other expenses up to the time their crops are harvested and sold. Most of the credit available goes to large, state-owned enterprises, rather than private, subsistence, semi-subsistence and green zone farmers.

Table No. 9. Mozambique. Real Official Prices (Deflated by Consumer Price Index), 1980=100, 1975-89.

	Maize			Sorghum		Rice	
Year	Farm Gate	Ware-house	Consu-mer	Farm Gate	Consu-mer	Farm Gate	Consu-mer
1975	n.a.	68.4	n.a.	n.a.	n.a.	n.a.	n.a.
1976	66.2	74.2	73.1	81.2	n.a.	94.0	105.9
1977	83.1	91.5	74.2	103.9	n.a.	103.9	103.9
1978	82.3	90.6	73.5	102.9	n.a.	102.9	102.9
1979	80.8	88.9	72.1	100.9	100.9	100.9	100.9
1980	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981	98.2	97.1	98.2	130.9	124.9	98.2	98.2
1982	124.4	124.4	106.6	138.2	128.2	133.8	97.4
1983	97.3	97.3	83.4	108.1	100.2	104.6	76.1
1984	74.3	74.3	63.7	82.6	76.6	79.9	58.2
1985	124.6	130.9	101.4	153.4	115.1	99.0	45.0
1986	89.9	94.4	73.1	110.6	83.0	71.4	32.5
1987	105.0	119.9	45.0	122.5	191.0	81.3	36.5
1988	113.1	119.8	111.9	116.0	126.6	84.2	164.1
1989	147.3	156.0	114.8	169.6	141.2	125.2	214.7

Source: Ministry of Agriculture (farm prices).
Ministry of Commerce, CNSP, (price index for 1975-79).
Direcção Nacional de Estatística, "Informação Estatística", 1987, p. 50; 1986, p. 34 (price index for 1980-87).
Policy Framework Paper (PFP), February 1989, Table B.1, p. 40.
Note: Assumes an inflation rate of 50% in 1988 and of 30% in 1989, as per the PFP, p. 40.

The principal credit-granting institutions in Mozambique are Banco de Moçambique-BM (Bank of Mozambique), Banco Popular de Desenvolvimento-BPD (People's Development Bank), Caixa de Crédito Agrário e Desenvolvimento Rural-CCADR (Agricultural and Rural Development Bank), which is actually a branch of BPD, but is independently managed, and Banco Standard Totta.

BM only lends to large enterprises in non-grain agriculture, mostly for export crops. BPD does much of the grain financing, but its operations are concentrated on state farms which produce maize and large commercial farmers. CCADR was created in 1988 with the specific purpose of taking over all credit operations of BPD for the family-farm section and cooperatives.

Credit rationing is required, because interest rates were maintained at the same levels without adjustments for inflation. Thus, credit was cheap; it went to subsidize the failing state farm enterprises and other large state enterprises. Many of these enterprises have failed and loans have not been repaid. Consequently, there is little money available for loans. So, now, in the private sector only the large commercial (private) farmers have access to credit. Although this is a wise decision to restrict credit to this sector, the private sector needs it more than the public sector.

Rural Extension Services

The present rural extension system, under the coordination of the Rural Development Department at the Ministry of Agriculture, is undergoing reorganization, albeit at a very slow pace reflecting the low priority the government has put on the provision of technical assistance in the light of ERP-imposed budget restrictions. As in the past, extension services are biased towards state and private, commercial farms. There is still little close contact with farmers in the private sector and especially in the family farm units. Subsistence and semi-subsistence farmers receive almost no extension service. Green zone farmers, by virtue of their proximity to the urban areas where the majority of extension staff are stationed, are better served.

According to information gathered at the Ministry of Agriculture, there are approximately 80 agronomists in Mozambique, 320 middle-level technicians, and approximately 3,000 low-level technicians. In terms of ratios only, the picture is not that bad: 1:4 for agronomist to middle-level technicians, and 1:5 for middle- to low-level technicians. The problem, however, is that there are not enough agronomists in the field since most of them are located in Maputo. Furthermore, the technicians have little formal training. Additionally, transportation to subsistence and semi-subsistence farms is difficult, given the poor condition of roads, the lack of transportation, and the lack of security from guerrilla attacks. Even in Chókwe where the local Agricultural Management Unit (UDA) has a permanent staff of extension agents, the maize crop production is still poor. Only one agronomist works in the Chokwe UDA—in an administrative position. There was no on-farm experimentation and local research and adaptive procedures for testing the technological packages suggested by agricultural research.

Finally, there is no apparent coordination between the national agricultural research institute (INIA), despite its positive and valuable work, and government extension services. The deficiencies in extension services is also an important reason for the poor performance of maize yields. There are many reasons for low maize yields, but the rural extension services have failed to disseminate the available technology of improved seeds and fertilizer use. In general, the extension services have had little, if any, impact on maize yields.

The Marketing and Price System

The Marketing Channels

Maize consumption is supplied by domestic production and, increasingly, by imports. Both imported and domestic marketed maize flows to the consumer through either official or private channels (**Fig. 5**). In either case, the marketing can be done through the exchange of money or as barter. Before the maize is consumed it has to be processed in mills, even though the milling is frequently done at home. More than half of domestic (white maize) production is consumed in the household or used as a wage good to pay workers. Some domestic maize is directly exchanged by the farmer with neighbors. From 20-30 percent of white maize production actually enters the marketing channels. Yellow maize flows primarily through official channels in the urban areas of Beira and Maputo, but significant quantities are sold privately for resale in open urban, public markets. It is difficult to estimate the amount of yellow maize sold in this way, because private sales are not officially sanctioned and retailers were reluctant to discuss their sales. A rough estimate puts it at least 10 percent of total stock.

The private channel for domestic white maize involves the direct sale to consumers and to private traders. The former typically involves a sale to a rural maize deficit consumer or the settlement in kind of wages. The sale to a private merchant can be paid for in cash or with other items, such as clothes, soap, fuel, groceries, among others. The maize then proceeds to wholesalers and retailers in the urban free markets, as well as to the informal markets (e.g, dumbanengues).

Prices do vary over time in the private channel, but the evidence is not robust since the government does not collect open market prices. **Table No. 10** presents price data obtained from recall information provided by farmers to the team. The prices vary substantially from the official farm gate prices. They seem to include a transportation premium as the prices in Xai-Xai—closer to the Maputo market—are higher than those in Chimoio. In the two regions, farmers indicated that they sold maize before harvest at substantially higher prices than at harvest time. Prices also differ according to the region and the type of maize (**Table No. 11**). White maize tends to be double the price of yellow maize, for both grain and flour. Prices for white maize tend to be much lower in maize producing areas, like Chimoio, than in deficit areas, like Maputo.

The official channel involves the sale of maize to AGRICOM, E.E., the state marketing agency. Farmers can deliver maize to AGRICOM warehouses, or to its itinerant purchasing points. In recent years, AGRICOM has concentrated purchases at its warehouses, which implies that the farmer is typically selling to a private trader who in turn delivers to AGRICOM, which may require the delivery of maize in order to sell that trader other goods handled by the agency.

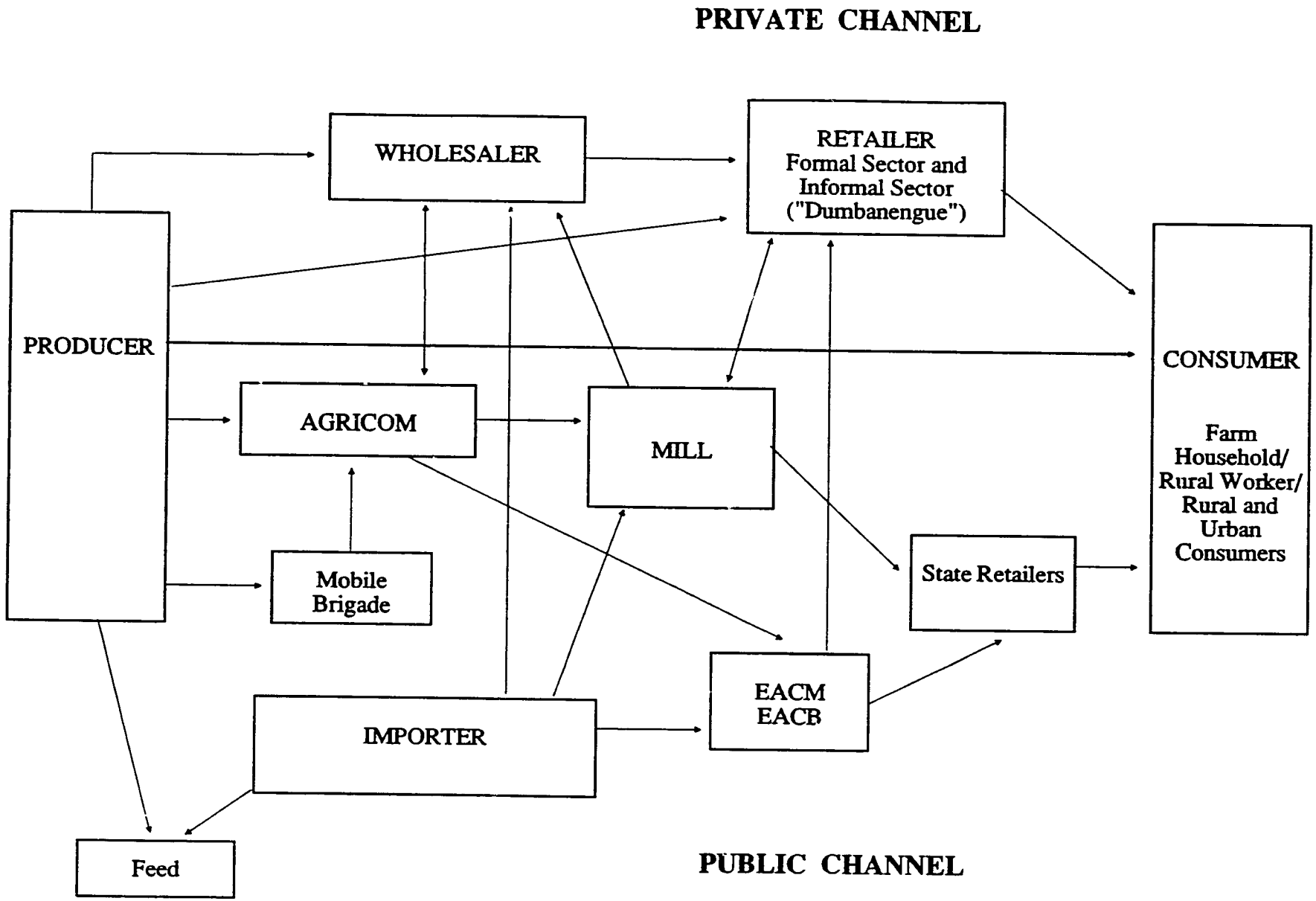


Figure 5 Mozambique. Maize (White and Yellow, Grain and Flour) Marketing Channels, 1990.

Table No. 10. White Maize, Farm Gate Prices, Point Observations, April 1989-February 1990.

Time Period	Chimoio Manica	Xai-Xai Gaza
At Harvest (April)	84-94	100-120
Mid-Season (August)	160	..
Before Harvest (February)	200-300	300-400
Official Price	110	110

Source: Mission estimates.

Table No. 11. Maize Prices in Selected Localities, 1990.

Locality	Unit	Yellow Grain Avg	Yellow ---Flour--- Min	Yellow ---Flour--- Max	White ---Grain--- Min	White ---Grain--- Max	White ---Flour--- Local	White ---Flour--- Imported
			----------Meticals----------					
Maputo	Kg	280	227	530	400	533	454	1000
Chimoio	Kg	..	..	..	138	160	285	..
Beira	Kg	200	..	..	..	..	..	..
Xai-Xai	Kg	..	..	..	500	..	..	..
Chókwe	Kg	..	..	..	..	..	600	800

Source: Mission.

AGRICOM has also reduced in number its fixed posts and mobile brigades that operate in the remoter agricultural areas. They rely more on licensed, private traders to assemble the maize for them. The private traders bring the maize to an AGRICOM warehouse, where it is unloaded. From AGRICOM, the maize later is again sold to retailers and other state agencies that supply consumers or delivered to a state milling operation, where subsequently, it will be loaded by a licensed private trader for delivery to retail outlets. Often, the retailer is the very same private trader/assembler that brought the maize to the AGRICOM warehouse. AGRICOM stores the maize briefly, but adds no service other than weighing. The assembler is not permitted to deliver assembled maize directly to his retail outlets, creating some extra costs and inefficiencies. In the official channel, maize transactions are typically valued at the official, controlled prices. **Table No. 12** shows the origin of produce into AGRICOM's stores.

Table No. 12 Entry of Produce into Agricom's Stores by Destination
('000 t)

ORIGIN	1983	1984	1985	1986	1987	1988
Public	13.3	10.1	11.2	10.6	6.5	7.3
Retailers	10.8	6.9	6.9	3.5	3.5	4.8
Wholesalers	..	0.5	0.5	2.3	0.2	0.9
Social entit.	9.8	7.9	9.2	9.2	6.0	6.5
Mills	10.6	17.4	6.5	6.1	11.0	8.7
Seeds	3.4	3.1	3.0	2.2	2.0	3.5
Other*	25.9	4.2	1.5	3.2	4.3	2.4
TOTAL	73.8	50.1	38.8	37.1	33.5	34.1

Source: AGRICOM, "Some Statistical Extracts," May 1989, p. 15.

The official channel tends to handle more than half the quantity of marketed maize. According to official data, the participation of AGRICOM is increasing, probably a reflection of its increasing activities and also of the fact that the grain that ends at its warehouses may have been purchased through a private trader. The bulk of the marketed maize comes from the semi-subsistence farmers. While other sectors are reducing their participation, the semi-subsistence farmers are rapidly increasing their contribution to the maize market (**Table No. 2 and Table No. 13**). This is paradoxical in that private farmers and commercial farmers are better equipped to increase production than semi-subsistence and subsistence farmers.

Table No. 13 Marketed Quantities by Production Sectors in 1981-1988 (thousand tonnes)

YEAR	STATE	CO-OP	PRIVATE	FAMILY	TOTAL
1981	78	4	22	198	302
1982	101	3	20	137	261
1983	54	2	14	79	149
1984	61	2	13	98	179
1985	46	2	15	88	151
1986	30	1	9	83	123
1987	35	1	11	105	152
1988	27	1	17	121	168*
Summary	432	13	122	909	1479

*Two thousand tonnes were marketed by the Joint Sector (Sector Misto)

Source: AGRICOM, "Some Statistical Extracts," May 1989, p. 5.

Domestic marketed production is not enough to supply national needs and sizeable imports are required to fill the gap. Maize imports (like other imports) can only be made with an import license, which explains why they are handled through the public channel exclusively, and in particular through a state importer, the IMBEC company. Commercial maize imports have all but disappeared, although small quantities are sometimes seen in the Maputo market. Donated imports are typically yellow maize under different commercial arrangements. Some imports are for free distribution to the people affected and dislocated by the war. Other imports are sold to wholesalers and retailers, with the proceeds in local currency used in accordance with the agreements between the donating party and the government. These sales are accomplished at the official prices.

There also occurs a significant amount of unofficial yellow maize retailing at parallel market prices. Although this is technically illegal, its open practice is tolerated by local officials in urban areas such as Beira and Maputo. Retailers and wholesalers sell quantities of yellow maize sacks to public market vendors, always women, who sell maize in small quantities to consumers for their immediate day-to-day needs. From time to time the Government also has used donated, yellow maize as a payment in kind for services rendered by non-governmental private institutions and companies.

The Domestic (White) Maize Marketing Points

Farmers are relatively dispersed and produce in remote areas. Financial conditions are extremely fragile in the country, transport services are poor at best, roads are deteriorating rapidly and the administration lacks a well-trained and well-paid cadre. Furthermore, for historical and cultural reasons, members of government believe that shopkeepers and private traders, left to their own devices, would attempt to fix prices in order to exploit the rural poor. Many officials condemn wholesalers and retailers as "superfluous middlemen", and they have refused to accept the rural shopkeepers as normal agents reaching farmers in remote areas and delivering a critically needed service. Instead, the government has attempted to supplant them with parastatal companies, such as AGRICOM, that are conceded "direct" direct channels from farmgate-to-consumer. By depriving farmers of alternative outlets to sell their produce and buy their goods, these policies have created marketing disincentives among subsistence and semi-subsistence farmers. The whole system, however, besides being costly, has not attained its ultimate goal of having farmers paid a floor price.

At The Farmgate

Subsistence farmers generally do not sell regular quantities of maize. They sell occasional sacks depending on their needs for basic goods. In rural areas traditional bartering takes place with neighbors not only in exchange for commodities, but also in exchange for labor assistance. Semi-subsistence farmers sell maize regularly, but primarily as the need arises. Currently both semi-subsistence and private farmers are holding onto their maize for longer periods and are not selling it in large quantities when the mobile brigades of AGRICOM and/or private traders are in the area. The principal reasons given are low producer prices and the absence of consumer goods from the rural areas.

In the past, rural stores (often run by "Indianos"[4]) played a vital role in providing the farmers with consumer goods and credit. Farmers handed over part of their crop in exchange for salt, soap, textiles, used clothing, and a small assortment of articles for daily use, when available. Credit arrangements, to be paid back at harvest, were made prior to planting. Today, the principal purchasing agents are the parastatal, AGRICOM, and a few, local, urban-based private traders also contracts with some private traders to be its purchasing agents in the rural areas. The reduction of AGRICOM's fixed posts and mobile brigades have made it difficult for subsistence and semi-subsistence farmers (and even private farmers) to acquire these goods, when they need them. At the same time, AGRICOM through its network of agents has been successful in controlling the majority of the production, which has made it less profitable for private traders

[4] "Indiano" is a Mozambican term referring to persons of Indian or Middle Eastern ancestry who follow Hindu or Islamic practices. Typically, they are involved in commerce. Non-Indian Mozambicans dislike them, believing that they are wealthy and that their wealth is derived through unfair, collusive, and exploitative business practices.

to operate in remote agricultural zones, chiefly where the subsistence and semi-subsistence farmers are found. This also affects the availability of credit, since it is the private traders who have traditionally provided that service and AGRICOM generally has not.

Farmers are withholding significant portions of their maize production. Maize is stored above the ground in native structures until they need to sell it, barter it, exchange it for labor or consume it. If maize is beginning to spoil or they must acquire cash immediately, farmers can sell it to AGRICOM at their next visit or headload it to an AGRICOM warehouse.

At present, farmers market their production in an environment where existing transport, storage and milling conditions are inadequate. The purchasing agents do not compete for the available maize, thus creating a paradox of having poor surpluses and lower prices at harvest. Buying agents' prices and weighing practices depend on bargaining power, which, in turn, depends on the time of the year. At harvest time the prices are relatively low, but in the off-season, when prices are relatively high, farmers have only small, if any, quantities of maize to sell (See **Table No.9**).

Semi-subsistence and private farmers learn of consumer prices and producer prices by word of mouth from neighbors rather than through official and unofficial media. Regarding maize price news, producer prices are announced through the newspaper primarily. Most subsistence and semi-subsistence farmers can not read. Radio dissemination is practiced, but not consistently. Consumer prices are announced separately from the producer price in a false attempt to control "speculation". The newspaper treats legitimate producer/marketing practices to bring food to the market at the time of highest demand as if this were unpatriotic and worthy of public censure. This discourages farmers from increasing production at times when there is the greatest consumer demand.

Government institutions have not been able to guarantee to all farmers the floor prices. In the 1988-1989 crop year, prices received by farmers in maize-surplus areas were in the range of 84.00 to 94.00 MT/kg, while official minimum prices were 110.00 MT/kg. The reason for such underpricing is that then official purchase prices paid by AGRICOM, 134.00 MT/kg, did not allow the assembler sufficient margins for the transportation cost to and from isolated areas, if he paid the official price of 110.00 MT/kg to the farmer. The system of having one single price for the whole country is bound to fail and to generate among farmers distrust in official prices.

There are, of course, strong economic and political reasons for fixing prices given the effects of the rural insurgency. However, whether the government can in fact really control prices depends greatly on the structure of production as well as upon its financial power and the efficiency of its administration.

The United States Agency for International Development (USAID), concerned about the lack of transportation mobility for smaller farmers, has developed a program called the Commodity Import Program (CIP) whereby tractors and trucks and other production inputs are

made available to private importers and distributor retailers at lower costs who in turn attempt to sell the equipment to middle level farmers with the ability to use them effectively. The program has been heavily focused in Maputo and Gaza provinces.

Large numbers of these trucks and tractors were visible in these provinces. Some private farmers we observed owned two trucks (though the first one was not necessarily purchased through the CIP program). They used these trucks to haul their own produce and inputs so that they did not rely on private or public transporters. Furthermore, they did not make hauls for neighbors for a profit as a regular activity. Smaller farmers who were neighbors did not benefit systematically from the acquisition of the trucks by middle level farmers. Finally, private farmers who obtained trucks through the CIP program did not become private traders, but remained farmers. They used the trucks to haul their produce to market and did not use either the public or private sector transport fleet. However, there were some non-farming wholesalers who were able to acquire CIP trucks, which they did use to enhance their marketing and assembling capabilities. In one case, a large wholesaler was able to obtain his CIP derived truck because of his governmental connections as an officially designated and licensed wholesaler-retailer; in another, a licensed, district wholesaler was able to buy a medium-size truck from his brother who had an government- issued import license. Nevertheless, private farmer output seems to be increasing in Gaza province (AGRICOM, 1989, Appendix 2).

Assemblers, First Handlers and Intermediaries

For the many semi-subsistence farmers who face difficulty in taking their produce to major markets, and even to local markets, local buyers **should** play a more vital role than they do now. In many southern African countries, they undertake the initial task of assembling produce from farms or local country markets (See Reeves). In the pre-Independence era small, village shopkeepers performed this task. However, today there are very few private itinerant traders, country buyers, rural shopkeepers, miller-wholesalers, wholesale merchants or agents of mills who do this. The principal assembler has become AGRICOM and/or its agents in most cases. Most of the non-governmental agents performing this task are private traders who own wholesale outlets and retail stores, and the majority of these have received a governmental license to service particular districts or cities. Consequently, not much competition in buying is taking place at this level.

Competition and the prices of "controlled commodities"—the items farmers want the most (sugar, salt, cooking oil, rice, etc.)—is strictly regulated. For example, if a designated trader charges more than the official price for cooking oil, he can lose his license to trade. Yet, these are the items that are least in supply. The lack of supply of these basic commodities, coupled with their artificially low price, conspires to limit the amount of goods coming onto the market, limits the potential for business for private traders and reduces the competition necessary that would encourage more realistic profit margins for the trader. Competition will tend to stabilize maize prices at realistic levels for consumers, too.

Private traders operating in the rural areas have very limited capital resources. They must arrange for transport of at least part of their farmgate purchases to a local mill or wholesaling point. Thus, they must also have a permanent locale to store and dispense, as well as to provide credit advances to the farmers with whom they work. Most of these advances are made in terms of goods, which are paid in kind. This system is quite fragile, since not many supplies are available. They provide a few consumption goods on credit against maize pledged for delivery after harvesting.

Private traders and rural shopkeepers are viewed as agents exploiting the rural poor, despite the critical activity they perform in the marketing chain. A majority (approximately 95%) of all the private wholesalers and traders, at least in the areas visited, were Indianos. In Mozambique there is a very strong belief that the Indianos practice price fixing. We found no evidence to support this belief.

Indianos are, however, discriminated against in access to credit facilities, allegedly because they would use the credit to buy non-essential consumption goods. They are also limited in their access to commodities that the state will allow them to receive from AGRICOM and other government-approved wholesalers. In spite of these restraints on making a living, these business persons continue to operate as assemblers, wholesalers and retailers.

Government licensing is a key ingredient to prevent free entry. This corresponds to granting a monopoly of purchasing in specific areas. All market operators are licensed, margins are (tentatively) fixed and market charges specified in stages. The most significant aspect of this intervention has been the establishment of depots to buy at designated floor prices under government "production-incentive" programs. It must be remembered, however, that because of transport difficulties, or because producers have already committed their crop to a local buyer, a substantial number of producers are not able to sell their produce freely. The presence of a parastatal buyer, such as AGRICOM with its buying posts and designated rural shops which act on behalf of AGRICOM, along with a policy of controlling prices, has acted as a major deterrent to both competition and marketing efficiency. Small local buyers use the fixed price as an upward limit on the price they can pay, and then deduct the transport cost from that pre-established level. As mentioned in the previous section, farmers have been paid 94.00 MT/kg for their maize, when the minimum price was 110.00 MT/kg.

If less regulation were involved, private traders and retailers would have to compete for the maize available. In the rural areas, shops cannot compete against prices of their urban counterparts largely due to the lack of merchandise to sell and the unavailability of credit or cash advances for maize procurement (and simple things like sacks).

Wholesalers

In Mozambique there is no fixed pattern or sequence of wholesaling channels. Some established, pre-Independence firms do combine trading, trucking and milling, but this is not the norm.

Wholesalers are important because they carry major responsibilities in the market process: (a) they provide some capital necessary to acquire the maize and hold it until resale takes place; (b) they bear the risk of having stocks seized by armed groups, of damage to the grain, and of adverse changes in prices (at harvest time); (c) they have to find a market (intermediary) for the product; (d) they are often the assemblers for AGRICOM, together with the retailers.

Wholesalers serve other important functions, too: (e) they finance retail customers on a weekly or monthly basis to facilitate sales; (f) they must purchase or lease storage facilities; (g) they need to obtain a place of business with accounting and communication facilities; (h) they acquire working capital; and, (i) they develop a working knowledge of sophisticated business procedures and acquire a network of suppliers and customers. But, government restrictions curtail the essential ingredients for successful wholesaling operations. Not much credit is available and the supply and assortment of goods is extremely limited. Wholesalers we visited were generally better off financially than most citizens, but were not living luxuriously, contrary to the beliefs of many Mozambicans.

Currently, the government attempts to ensure that all wholesale purchases from producers and all sales of imported/donated maize be undertaken by a single wholesaler in a district, on their own or through district retailers. This is not physically possible in many localities; nevertheless, government regulation makes entry into wholesaling difficult and non-competitive for non-parastatal firms or individuals.

Provision of wholesale services has to command an economic reward. Under prevailing conditions in Mozambique, the size of the economic reward, embodied in low margins, does not cover costs and risks incurred. Wholesalers have to hire costly transport services when maize has to be taken to risky areas (which today is nearly everywhere outside the urban areas). If the provincial/district allocation and licensing controls restricting entry of competitors into the marketing chain were removed, the wholesalers would be likely to pay better prices to farmers, by bidding against each other for maize. Whether the wholesalers would be more or less competitive than they would be without such control will depend on their skill, commercial knowledge and bargaining power. But one thing is certain, licensing has reduced competition.

With regard to wholesale margins, the amount varies according to the type of maize sold and whether it is sold in the official system or in the parallel market. An official wholesaler at Chokwe reported that the general wholesaler's margin (for white maize) for the 1988-1989 crop year was:

1. Price paid at harvest time: 134.00 MT/kg (white maize)
2. Net Margin to Wholesale: 5%
3. Transport Cost: 7%
4. Other Expenses: 3%
5. Tax at Wholesale Level: 5%

Note: The percent values on items 2, 3, and 4 are over and above the price paid. The tax rate of 5% is over the value invoiced to retailers. Transport costs are only 7% due to relatively safe roads.

For sales in the parallel market, it was reported that the net margin to wholesalers may reach 25%, assuming that all other percentage values remain constant.

In Maputo, the reported wholesale margins (for yellow maize) were:

1. Price paid for maize: 90 MT/kg
2. Net Margin to Wholesaler: 3.5%
3. Transport Cost: 12%
4. Expenditure on Food: 5.5%
5. Loading/Unloading Charges: 1%
6. Tax at Wholesale Level: 5%

Note: Item 4 refers to expenses on food for troops accompanying the military convoy of trucks. The percent values on items 2, 3, 4, and 5 are over and above the price paid. The tax rate of 5% is over the value invoiced to retailers.

Margins are relatively low where safe roads are available, informants reported. High margins are the rule for roads without military protection. Here the cost of transport can go as high as 25%, and often wholesalers hire trucks instead of using their own.

Many wholesalers and private traders have retrenched, withdrawing from maize marketing in areas subject to attacks of armed groups, particularly as the available cargo vehicle fleet has been reduced and the lack of access to imports prevented them from replacing the fleet. The private traders further reduced their official and legal purchasing operations when AGRICOM opened the possibility of using them as purchase agents, taking care of grain transport, and allowing them to buy back the grain at district warehouses at subsidized prices. AGRICOM pays them 134.00 MT/kg and allows them to buy the same grain at 118.00 MT/Kg. This system further aggravated the process of reducing private trading in maize.

At The Retail Level

In Mozambique, maize retailing takes place in established retail shops as well as at the public markets. Stallholders, typically women, are particularly flexible in that they are able to sell in small quantities and still earn a profit. The bulk of the sales are measured out in small tin cans (about .6kg/can of flour or .75kg/can of grain kernels). The majority of consumers buy

small quantities daily to satisfy their immediate needs for white maize. One can see along roads or in major streets, consumers purchasing maize and maize flour from individual sellers. Retail sale of maize at parallel market prices is tolerated by some urban governments, as the rationing systems of Beira and Maputo does not provide sufficient maize quantities for all participants. Stallholders acquire yellow maize also from retail shops, as well as other, unofficial sources. Producers also retail directly to consumers when they bring truckloads of maize (and/or other produce) to sell at known street localities. The Government has also recognized that excessive market controls can produce scarcities, hence they wisely tolerate sales through unofficial channels.

The Mozambican government has tended to give greater attention to controlling consumer prices than to providing adequate producer prices and market margins, thus reflecting the political influence of city populations. In effect, the Government is subsidizing the food costs of the 15 - 20 percent of the urban population, which has a direct, probably negative affect on the 80 - 85 percent rural, farm population. One consequence mentioned earlier is the lack of availability of consumer goods in the rural areas, as well as the cash with which to buy them when they are.

Current government practices regarding price control are unrealistic and not reflective of normally occurring fluctuations in supply and demand of maize. It **is normal** to expect prices to be lower when supplies are high during the March-May harvest period and to rise during subsequent months due to high costs of holding stocks in unofficial trading, when supplies are increasingly scarce. In June/July 1989, prices of white maize flour were approximately 200.00 MT/kg and in January 1990 the prices reached 1,000.00 MT/kg in Maputo ("imported" maize sold at parallel markets) (See **Table No. 11.**). Yellow maize flour from local production had been sold at 500.00 MT/kg in the parallel market. At these prices, quantities sold were very small—one tin can worth at a time. Demand also affects price. Mozambicans prefer white maize, and are willing to pay a premium to obtain it. This is why yellow maize is much more available in the public markets and dumbanengues, and prices reflect those preferences.

Women in Retail

Women play a major role in Mozambican commerce, although primarily in petty commerce, often in what the literature calls the "informal sector"[5]. Slightly more than 95 percent of all the stall renters in public food markets and vendors in the dumbanengues are women. Women also are involved in marketing at the producer end, due to the fact that the majority of the people working in agriculture are women. Somewhat less frequently, in the larger retail stores, women are shop clerks and take over for their husbands when they are away.

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[5]The term "informal sector" refers to individuals operating a business outside formally organized commercial channels. A true dumbanengue situation is an example of a business in the informal sector.

Most women selling in the urban public food markets and dumbanengues work there full-time, although they have many other domestic tasks that require their attention, not the least of which is tending their own machambas (farms). However, most of the food they sell in the markets is not from their machambas, but is bought from wholesalers or directly from producers, and in the case of maize, most of their supply comes through the unofficial, private channel.

By examining applications for vendor stall space and in discussions with the male employees that run the public markets, the team found that it was rare for a man to be a stall vendor, except as an employee or close relative of a female vendor. Less than 4 out a hundred vendors are males. Site visits and interviews in 16 urban markets visited in the four provinces also confirmed that more than 95% of all stall owners are women.

There are no statistics to indicate how many women are employed in food marketing; however, an interview with the Director of the Office of Urban Services of the City of Maputo (Direcção dos Servicos Urbanos do Conselho Executivo de Cidade de Maputo) revealed that there are at least 43 public food markets in Maputo (not including unofficial dumbanengues). The Director said that there are two categories of official markets: A and B. Category A type refers to markets with adequate sales equipment and facilities such as a roof, a balance, a place to wash the vegetables, electricity, cement stalls, uniforms and lavatories. The Category B type only have wooden stalls to keep the food off the ground and an administration building. Mercado do Povo, Mercado J. Mondlane and Mercado Xipaminine fall into Category A for example, while Mercado Estrela Vermelha, Mercado Volcan and Mercado Metical are in Category B.

A third category, but one that is unofficial is the true dumbanenge, which is a non-governmentally sanctioned locality where there are no organized market services, and where the district/city government does not charge for selling. There is some confusion nowadays over this term, because Category B type markets look disorganized, and are called dumbanengues, even though they are now tolerated and regulated by the district/urban government. However, a true dumbanengue is illegal, and the persons selling in the street can be arrested or at least forced to abandon their retail sales activity. The officials are less tolerant of this informal sector type of food sales, and hence the appropriateness of the name "dumbanengue", "trust your feet". One can easily observe the many people selling along the streets from a cloth spread on the ground or on top of a small box such things as cooked corn cobs, cigarettes, gum, candy, nuts, leafy green vegetables, charcoal, bananas, etc.

There are thousands of women gainfully employed in retail sales in public markets. By counting the number of stalls (246) at a medium size market like Mercado J. Mondlane, we estimate that there are at least 10,000 women who are stall owners in Maputo markets. Another way to check this is through the receipts received from stall vendors by the City of Maputo. The count for July 1989 is 42.7 million MT. A conservative estimate of the number of vendors paying receipts is nearly 12,000, with women accounting for more than 11,000 of the total. It is interesting to note that the office mentioned above does not maintain statistics on the numbers of public markets nor on the number of vendors.

These figures do not include women working in a true dumbanengue situation. The growth of urban food markets and the low supply of staples in officially sanctioned retail outlets has been spectacular in the recent two years with massive displacement of people from the countryside to the urban areas on account of the rural insurgency, the city/district government permits the organized, but hygienically inadequate Category B, dumbanengue-like, food markets to exist without harassment.

The explosive growth of this type of retail sales reflects some significant facts:

(1) There is consumer demand for the small units offered;
(2) The vendors perform a convenience function for consumers;
(3) It provides employment for the unskilled and the otherwise unemployed;
(4) It provides an additional family income greater than that obtainable from current minimum wages;
(5) It develops entrepreneurial skills in a country deficient in many types of human resources; and,
(6) It requires little governmental expenditures for regulation.

The percentage of women selling in dumbanengues is the same or higher as in officially recognized markets. Probably due to financial exigencies brought on by the inflationary economic policies of the government and by dislocations brought on by the war, this type of marketing is becoming more common in the cities of Beira and Maputo.

The market is a significant locality for female employment. For many women, it may be their only source of income, but for many others it represents a very important second income without which the family, already under great stress today, could not survive. A person working in a stall at a Maputo or Beira market can make between 50,000 and 300,000 Mt per month, or more in rare cases, depending on commodity and demand in Maputo or Beira. This represents a wage 3 to 15 times greater than the lowest official minimum wage.

The informal retail sector is a growing, vigorous part of the economy, and plays an important role in the distribution of many commodities. Furthermore, the participation of women in this sector is socially appropriate in that it is an area where women can work outside the home, earn an income, and still take care of their young children. Deregulation of price controls has permitted this to happen. Similar effects are to be expected when maize price controls are removed.

There has been much discussion about the development of equality in the work place and the home for Mozambican women. Yet, the importance of women in the marketplace has not been a significant research subject. By contrast, there has been much concern for improving the status of women in agriculture. The reason for this disparity arises out of the denigration post-Independence researchers and government leaders have had for the market principle, which is extended to the public marketplaces.

One Maputo city official remarked to a member of the team that the reason why "dumbanengueiros" should not be permitted in the city is that they represent the worst elements of society: thieves, outcasts, shiftless, etc. However, a simple observation of informal sector vendors reveals that most of them are poor women with small children.

The Role of AGRICOM in the Marketing System

In the mid 1980's, in order to stimulate crop marketing and to generate surpluses, AGRICOM, the marketing parastatal, was transferred to the Ministry of Commerce, which already had control of the pricing and marketing policies. This decision was intended to guarantee tighter control over the distribution of consumer goods and to stimulate crop marketing through official, government-dominated channels.

Transport services are also provided by state-owned companies, such as AGRICOM, Camionagem de Mozambique, and TRANSCARGA. These parastatals lessened the market power of private traders. They unfairly compete with private haulers and transporters who lack the government subsidies provided to them. Previously, fuel had been rationed and used as a means of controlling the private fleet, however, they have now been removed.

This attempt to control the private traders and eliminate competition generally has been successful since many private traders became purchase agents of AGRICOM for transactions on grain and consumer goods. They still sell their purchased crops, almost immediately, to AGRICOM, due to security limitations and credit unavailability. Part of their surpluses are exchanged for consumer goods, such as used clothes, since AGRICOM has a near monopoly on the distribution of these goods also, which concomitantly competes (probably unfairly) with the domestic, clothing manufacturing industry.

An increasing number of smaller and even medium-sized private traders are willing to resell their purchased crops to AGRICOM as soon as they buy any amount of crops in order to keep their capital turning over. The substantial increase in prices, has meant that now many traders are facing financial difficulties in obtaining working capital. They limit their marketing activities in favor of AGRICOM, which is crowding out the private sector in marketing, as an institutional trader, at both ends (buying maize and selling consumer goods).

Table No. 2 shows the maize purchased by AGRICOM in relation to the total maize marketed. The pattern of purchases vary according to the amount of surpluses generated in each province. The purchases reach approximately 75% of the maize sold. AGRICOM takes the bulk of it, thus replacing the private sector in the marketing process.

Interviews conducted in Southern Gaza and Maputo revealed that where private trading is allowed to take place, AGRICOM loses importance as a buyer. In this area, maize is in such short supply that surpluses virtually do not exist. AGRICOM purchases only about 15% of the total maize production in Xai-Xai, for example, during periods of temporary surpluses. This

happens because private traders, and farmers do not want to hold stocks. There are a few reasons for such behavior: a) the price freeze system for all levels does not allow the private traders to pay for defense costs for protecting the storage deposits in the fields; b) parallel market margins per harvest do not compensate for paying for security and interest charges in the stocks (actually 26% per year) for an average 6 month storage period: c) the presence of AGRICOM which crowds out the private sector in the storage market. The private sector would rather prefer to have AGRICOM buy the grain, provide all the storage services, and later on sell to them at subsidized prices, rather than to pick up all the costs in a regulated market, where demand constraints do not allow risk premiums to carry the charge for the increasing risk in holding stocks. Under these circumstances no private storage market will prosper, at least as long as the State subsidizes the private distribution sector with cheap maize.

In the long run, benefits from this market intervention probably accrue to a few private traders preferred and licensed by the government. Neither the consumer, nor the producer, nor the majority of private business persons gain. Most of these favored, private traders are thus government agents, and do not have to take risks in their business.

For example, when AGRICOM stores the grain for 6 month and returns it to private channels without any additional price spread, this acts as a disincentive to the development of storage facilities, storage technology, stock markets, technical distribution of supply over the year, from harvest to off-season, and to private trade in grain. The favored, private traders benefit the most, because they have a delivery point where they can sell the grain they bought from the farmer, (often at the minimum price). Later on, there is a guaranteed supplier at subsidized prices. This helps to explain why the private sector channels have not been fully operational, and why farmers do not have higher prices during harvest time. In the long run there won't be much competition in the rural sector and storage market, at least as long as this government agency remains as a buyer of "first resort".

In sum, AGRICOM is an institutional intermediary with privileged access to credit, consumer goods, farm supplies, transport means and, for some merchandisers, it is the only source of supply. This privileged position guarantees a firm hand in the bargaining process in trade in rural areas. Its presence facilitates government intervention in prices. On the other hand, government has to pay a price for this intervention by absorbing price spread costs, storage and interest costs. This further pulls Mozambique's rapidly mounting debts deeper into the red.

The Transportation Industry

Although transportation is a critical service for maize marketing, this sector has been in a long-term decline since Independence. Also, roads are in a deplorable state. Private transporters are still providing services to maize marketing agents, but their fleets are being depleted. Disadvantages of cost and timely availability have weakened marketing economic efficiency of traders. It is widely recognized that the shortage of truck transportation is a critical constraint to rehabilitation of the rural commercial network. And rural areas are the most poorly served with these services. Although a few rehabilitation programs are under way, there is still quite a lot to be done along these lines. The need for help in stimulating private-sector transport in rural areas and attention to deteriorating road conditions is growing every year. The following section outlines the transportation situation in the four provinces studied by the team: Maputo, Sofala, Manica and Gaza.

The Transport Industry In The Maputo-Matola Area

Compared to other provinces visited, the transportation sector in the Province of Maputo is by far the best, although the private sector has suffered from the lack of access to spare parts, poor replacement of old trucks, unattractive tariffs and competition from state-owned companies which have their own fleets. The existing tariffs, given the economic conditions of the province, are low, and do not provide much incentive to operate on risky roads outside the capital. Also, additional costs are incurred by users when cargo has to be escorted by the military (mainly the cost of food for the soldiers). Since private traders would rather rent a truck instead of using their own, the transporters have had to bear the risk of taking long-distance hauls to the provincial districts, without being paid for the extra risk. The replacement of the fleet is thus threatened by not enough capital in the face of high costs of replacement trucks.

The roads connecting the capital to provincial districts are paved, although the road system needs more regular maintenance. A few segments do need immediate rehabilitation, since the asphalt coverage has been removed by heavy traffic. Most of the other roads were built before Independence and are graveled to a satisfactory condition. Passenger transportation competes with the trading sector for most of the light trucks available, thus overburdening traffic on the roads. In Maputo, from a total fleet of 278 buses, only 54 are fully operational. This forces light trucks to take passengers on countless journeys to the nearby villages. Therefore, the roads are permanently subject to heavy traffic.

The transport industry is fairly competitive. In terms of heavy trucks there are 10 transporters operating in the Maputo-Matola area. Transporter Salema, has approximately 25 trucks; two others have approximately 8 trucks, and all the remaining 7 transporters have 2 to 5 trucks each. In terms of light trucks, there is a great number of owner operators who provide adequate services to traders and wholesalers. Although maize has to compete with general cargo

for the services available, there is still enough competition among private haulers to guarantee fair tariff rates for maize cargo.

The province of Maputo, compared to others, is well serviced by repair shops, larger maintenance facilities specialized in trucks, and dependable, authorized dealers, particularly for light-sized trucks. However, access to spare parts prevents appropriate vehicle maintenance. Foreign exchange is generally not available and usually, transporters need to resort to a used spare parts market, mostly obtained from scrap trucks.

The Transport Industry in the Province of Sofala

The transport industry in Sofala is concentrated in Beira, and operates along the route from Beira to Chimoio. There are 6 transporters: Carrelo with 8 trucks of 20-22 tons, Nobre with three trucks, Saura with five trucks, Ravati with four trucks, Unita with five trucks, and Banu with eight trucks. Besides these, TRANSCARGA has 22 trucks, Camionagem de Mozambique six trucks, and AGRICOM has about eight. Within the safe areas official tariff rates are strictly adhered to. This is guaranteed by the state-owned companies which invariably charge the official rates.

The private sector fleet averages 20 to 22 years. About 80% of the fleet is in serviceable condition despite the lack of critically needed spare parts. The deterioration of roads has increased vehicle wear and tear.

In general, there is a great differentiation in charges, probably reflecting operating costs under different security conditions. A key element in understanding the variability of freight rates is that there is no regular service over regular routes.

The official tariff rates for Sofala province are:

Weight Intervals	Official Rates
Up to 4.5 tons	6,700 MT/hour
From 5 to 7.5 tons	7,806 MT/hour
From 7.5 to 10 tons	8,167 MT/hour
From 10 to 16 tons	9,656 MT/hour
More than 16 tons	12,611 MT/hour

These tariff rates are limited to 30 km hauls. Beyond that the rates are:

(a) 95.80 MT/t/km for gravel roads and earth tracks,

(b) 76.70 MT/t/km for asphalt roads.

Current rates charged by most of the transporters on less than 30-km hauls are 25% over the official rates. Most transporters think that these rates may cover the costs of the state-owned companies, which have new trucks, such as TRANSCARGA, which still have spare parts (which have been brought to the country through foreign donations and have easier access to spare parts), and pay a relatively low salary to truck drivers. However, for private transporters with a relatively old fleet, high repair costs, lack of foreign exchange access to buy spare parts through official channels, and having to pay better salaries to truck drivers, these rates are totally unrealistic.

The official tariff rates are also totally unrealistic for earth roads. In an asphalted road, speed limits go from 40 to 70 km/hour. On earth roads, these drop to 10 to 30 km/hour. On earth tracks, transport can only be made with tractors limited to 3-ton trailers. Poor roads force the use of tractors, which are very costly and inefficient. Draft animals with bullock charts would be better for short distances, but they are not available in Sofala. So, maize transport is primarily dependent on the availability of four-wheel drive pick-ups in most of the remote areas.

Not surprisingly, most truck owners complained that the greater part of their gross profits were spent on maintenance and repair expenditures on their vehicles. Every year repair costs have higher outlays. Deterioration of the roads is given as the main reason for the rise in truck defects as well as the rise in fares. So, most of the transporters now do not go to the interior, they confine themselves to the paved roads and safe portions of those roads. Without transport, maize surpluses are reduced considerably (to volumes evacuated by AGRICOM, mainly).

Transport capacity is much greater than current transport volume due to the unsafe condition of the roads. If safety conditions improve, potential transport volumes probably will exceed transport capacity. So far, transporters are sharing available transport business equitably and avoiding collusion.

Current Status of Roadways in Sofala

According to information gathered in Beira, with interviews conducted among transporters, there are only a few roads which remain operational in the province. From 11 routes where maize formerly flowed to provincial markets, only three remain fully operational.

Beira-Inchope:	this is a safe, asphalt road, which sometimes, not too often, requires military protection. The speed limit is around 70 km/hr.
Inchope-Gorongosa:	this is an asphalt road which is not safe, requires repairs. Speed limit was 60-70 km/hr and is now down to 40 km/hr.

Gorongosa-Marinque:	once an asphalt road, it is now in very poor condition, and in some segments not even a gravel road; not considered safe at all.
Marinque-Caia:	this road is almost cut off. There is minimal traffic on this part of Route 1.
Beira-Dondo:	a safe, top-quality asphalt road with a high traffic volume all year round.
Dondo-Muanza:	an unsafe, low traffic gravel and dirt road. Speed limit: 40 km/hr.
Muanza-Inhaminga:	once a gravel and dirt road, now it has been reduced to an earth track.
Buzi-Machanga:	earth road, requires heavy military protection. Not much traffic. Once an important road for maize.
Buzi-Chibabava:	once an important road for maize, it is now cut-off by attacks of armed groups. No traffic. Not much information.
Chibabava-Chitobe:	this road goes deep into areas under control of armed groups. No information available.
Inhambane-Mhamatanda:	once a part of Route 1, it is said to be now cut-off by military operations. Civilians are supplied by helicopter. No traffic at all.

The decline in road traffic over the last few years is due not only to bandit attack but also due to road deterioration. There is a sizeable unsatisfied demand for passenger transport. In terms of volume and composition of goods moving into and out of Beira, imports include a relatively high share of maize, and "exports" include salted fish and sugar. In the maize harvest season, around April, return tonnage from Chimoio to Beira is negligible, thus maize backhauls have to carry the transport charges for round trips. Even a tripling in local maize surpluses—estimated around 1,900 tons—would not begin to cause additional demand for transport. With freight traffic based on weight, the relative share of transport costs in the total end consumer price of basic goods and commodities, such as maize, is high. Transport cost reductions, if passed on, should be reflected in significant price reductions for the products mostly in demand by the subsistence households in Manica and Sofala. The likelihood of transport cost reductions reaching end consumers is a function of the way in which transport services are organized and operate.

Current Status of Railways in Sofala

Dondo-Moatize: this is the Tranzambeze railway which belongs to the Cambinhos de Ferro de Mozambique. It has at least one bridge destroyed. Not operational nowadays.

Dondo-Manica: this railway belongs to Caminhos de Ferro de Mozambique. It is fully operational. It belongs to Beira Corridor, and it is protected by both Mozambican and Zimbabwean armies.

Transport Services in the Province of Manica

Most of the trading storehouses have their own transportation vehicles to deliver the merchandise to the shops. The latter, however, had almost no transport. Among trading storehouses, the light truck (3-5 tons) is still, far and away, the most important means of transport. Most shops are located within one to two hours' travelling distance from the storehouse. In Chimoio some traders live in town, where they have a storehouse and also have a shop for retailing non-controlled goods. These are the ones who can afford to buy a van or a truck since trading in urban centers is relatively more profitable.

The main route from Chimoio to Beira traverses both Manica and Sofala provinces in the central regions from east to west, crossing a maize producing area of Gondola and Nhamatande, with Km-198. Another important route for maize is an asphalted route leading from Inchope northwards towards Gorongoza and Marinque, and Cata. This route carries only occasional supplies of merchandise and would bring maize to Beira, because the security situation would not allow a regular traffic of sizeable volumes.

The Chimoio-Beira route is used to take maize to Beira and bring fish and sugar to Chimoio. Regular freight tariff rates for this route on a 7/8-ton truck is from 250,000 to 280,000 MT for a full load; and approximately 121% more than the official tariff rate.

Data on traffic, passengers and goods is not available in the offices of the Provincial Directorate of Transportation. However, according to information from area truckers and traders, traffic in regional and district roads are only possible with military escort. Truck convoys are the preferred targets or armed groups. The convoys go through Zimbabwe, and the distance increases roughly 1,500 Km, and the time spent in the road increases 10 to 12 days.

There is virtually no passenger transportation available. The northbound trucks carry a disproportionate number of passengers to Tete. Almost all passengers travel by truck.

Another important road for maize is Chimoio-Sussundenga. Sussundenga is a leading maize producing area. This is a regional road that has been upgraded to a gravel, standard road, and in its present condition, cannot accommodate the heavy traffic required during harvest time.

It is cut off in periods of heavy rain. Speed limits are below 40 Km/hour. No repairs have been made contributing to the curtailment of maize surpluses.

Another important road for maize has been the Inchope-Donde-Espungabera road. This road was a first-class asphalted route, once a key road for the evacuation of maize surpluses. However, Espungabera is now in an area frequently attacked by armed bandits. The combination of poor road conditions and the armed bandit attacks has prevented any maize from leaving the Espungabera area. To go to Espungabera (and Rotanda) one now has to go through Zimbabwe.

A few other key roads for the maize trade are the one from Chimoio to Nhacolo, the one to Macossa and the one to Rotanda. All three are cut off because of poor maintenance and attacks of armed groups. These three district roads are in the poorest possible condition. Even the asphalted road to Guro, once a key route also for maize, has to have military escort beyond Vanduzi.

District-grade roads have been downgraded to tracks, according to transporters. They do not accept even short hauls on those roads. Vehicle transport is not possible except in a few roads during the dry season. They are really no more than jeepable tracks. Animal transport for hire has disappeared completely. Even for short distance haulage, tractors and trailers have to be used. On the average, in Manica, the access tracks which connect the producing areas with the main roads are 40 km long, and the maximum speed of tractors on them is between 5 to 10 km/hour, carrying a maximum of 5 tons. Poor roads force the transporters to use tractors which are very costly and inefficient. Given present conditions, animals would do better were it not for the threat of their being killed by the bandits.

The local transport industry has three basic subsectors: (a) the pick-up; (b) the small three to five ton truck; and (c) five to eight ton trucks. A single fleet of 15 twenty-two ton trucks belong to Banun transporters, and only a few eventually serve Manica (they often go to Tete, through Zimbabwe). The first two sectors are competitive, according to information obtained among users. The truck is mainly operated by the vehicle owner, which serves the surrounding secure areas. There is no supply of regular services to farm areas. The owners say they do not serve rural areas because the vehicles have to make empty return trips, since now no economic activity of importance takes place in the region.

Freight tariff rates do not follow at all the indicator prices "negotiated" by the government, and they are difficult to establish, because they fluctuate both with the type of freight and with road conditions along the route. The officially "suggested" tariffs—the "frozen established rates"—are followed by AGRICOM, Camionagem de Mozambique and TRANSCARGA, only. The government-owned fleet also competes with the private trucking industry. The bulk of the transport services is provided by the state through its parastatals.

Transport Services in the Province of Gaza

Secondary/district and access roads are in poor condition. Important roads such as Ponela-Manchutse road, which was in the past a high-standard, all-weather district road, is now a low-class rural road where speed limits were downgraded to 5-10 km per hour, due to poor conservation and heavy traffic.This road is a high-traffic road with approximately 54 three-ton to twenty-ton trucks per hour. According to local information, it takes 4 hours for a truck of twenty tons to cross 38 km (an average speed of 9.5 km/hour). At this speed, consumption of fuel and transport costs are extremely high. Traffic volume does justify a feasibility study for rehabilitation of that specific road. The area through which this road goes is heavily agricultural; again, access roads were in very poor conditions.

In Xai-Xai, there are only a few transporters. One of them has six trucks with an estimated average age of 8 years. Four other transporters have between two and four trucks, including some three-ton trucks. Regular freight rates for hauls to Maputo (km-220) is 17 MT/kg, which is considered to be a high freight rate (this freight rate is twice the official tariff rates). At present high volumes are transported in the region, there is competition and not much collusion among transporters.

Agricultural workers have to walk daily 8 to 10 km to go to the farms. There is a shortage of passenger transportation in Xai-Xai and many trucks are diverted from loads to passenger transport.

Chokwe, in contrast, is well served in terms of transport. Large-scale bulk hauls are made by five 22-ton trucks owned by the Management Unit (UDA) of the irrigation perimeter, (which also serves the private sector). There are private transporters, one having 3 trucks; the others have one truck apiece, most of them with 5-6 ton trucks. Besides that, there are plenty of three-ton trucks, pickups, and *carrinhas*, for short hauls and short distances. Since the economy in Chokwe is in a dormant, slow growth stage, the supply of transport services is fair.

Transport services in Chokwe guarantee the supply of seeds, fertilizer, and other inputs to the perimeter and, in return, the trucks take cotton lint and cotton seeds to Maputo. Most transport is made with military escort even along district roads.

With respect to Chokwe roads that are used for maize marketing, interprovincial Route 1 is the key highway. It is used both to bring maize to the area (yellow maize) and to evacuate the surplus maize produced there. From Chokwe to Maputo the road can be divided into the following portions:

(a) From Chokwe to Macia the road is in poor condition, the maximum speed limit is 30 km/hour, and trucks use first, second, and third gears only;
(b) From Macia to Manhica, the road is in good condition, maximum speed is 60-70 km/hour, and trucks may use fourth and overdrive gears;

(c) From Manhica to Marracuene, the road is as bad as from Chokwe to Macia;
(d) Finally, from Marracuene to Maputo, again the road is in good condition.

The average truck driver's salary is 60,000 Mt/month plus food and expenses, which is a poor salary, compared to what drivers make in Manica and Sofala, since truck drivers there generally make four minimum wages (about 90,000 Mt/month on roads that are relatively safe). In Manica and Sofala, the larger, more successful transporters pay their drivers a percentage of the delivered tonnage, plus expenses. This gives the drivers more incentive to deliver as much of the cargo as possible.

Maize Transport Resources and Constraints: General Considerations

Recent imports of trucks and donated vehicles, at least in the last 8 to 10 years, were concentrated on government parastatals and ministry departments, such as DPCCN (the Natural Disaster Relief Department), AGRICOM, Camionagem de Mozambique and TRANSCARGA. In 1987 alone, the DPCCN fleet grew from approximately 250 to 435 vehicles. Out of a total fleet of 225 trucks Camionagem de Mozambique has only 104 that are operational (46%). Out of AGRICOM's fleet of 106 trucks only 83 (78%) are operational. Precise figures for DPCCN are not available. TRANSCARGA has 36 trucks. There is no doubt that there exists a need for vehicles to carry emergency relief, but without a private transportation sector there is a danger the entire marketing transportation sector will collapse. The Mozambique Transport Sector Review (1989:V) report reached the same conclusions, although under the ERP program, a system-wide, gradual improvement is planned. Unfortunately, there are no clear statements guaranteeing open access to foreign exchange for imports of trucks and spare parts.

Private sector transportation has been neglected and apparently the only concession made to this sector is a move towards auctioning the unutilized and inoperative public sector fleet to the private sector. Heretofore, the state-owned companies have had privileged access to the scarce vehicles available. It is estimated that the ratio between public to private vehicles is 4 to 1 among the heavy trucks. The average age of the private sector fleet is estimated to be 20 years. For the last ten years, at least, most private transporters have not been able to buy replacement vehicles and even spare parts to keep their existing fleet operating, at least with regard to medium-sized to heavy trucks.

It is also necessary to mention the severe lack of spare parts, service shops, qualified mechanics, regular authorized dealer repair services, and all the necessary repair and maintenance of a well-managed fleet. We were impressed by the number of recoverable broken-down vehicles of the cargo transport fleet in repair facilities waiting for spare parts. Nevertheless, there are few authorized dealers who can provide a full and reliable range of services for the vehicles. The access to these dealers is limited also, since all spare parts must be purchased with foreign exchange. Some enterprising private transporters have developed their own support systems, including lubricant storage, a stock of recovered spare parts, their own repair facilities and qualified mechanics, which allow them to operate the miracle of having 22-year-old trucks still

operational. But, these are near exhaustion. Their trucks only operate intermittently since there is a limit to this method of keeping old vehicles on the road and in service.

The deterioration of the remaining private fleet could leave maize-producing areas virtually unserved by transport services. Private transporters are confined to short-distance hauls due to severe shortage of means. Nevertheless, they would operate outside the military-protected convoy route, if other restrictions on vehicle maintenance could be overcome and if they had access to new, replacement trucks and if there were greater assurances of higher profits. At the same time, many transporters and traders are willing to work in less secure areas if they have access to new trucks and spare parts.

Road Conditions and Constraints

The overall picture of the non-paved roads is not at all favorable. All rural roads have been so severely degraded that they are in a deplorable and rapidly deteriorating state. The lack of maintenance has left its mark in wear, tear and erosion on the roads. The once, well-built, well-maintained rural roads, originally wide enough for two vehicles, have now become single lane roads. The lack of adequate drainage on the earth roads has also left its marks everywhere. All non-paved roads are in critical need of some sort of periodic resurfacing. They have not been graded (this service should be been done twice a year). Even the graded earth roads have had poor maintenance, if they have had any at all. Severe rutting forces vehicles to move at extremely low speeds.

The poor condition of roads also has negative effects on the development of private trading and transportation. This problem also has a negative effect on the utilization of the scarce transport that is available: the transporters would rather take hauls on asphalt roads. The poor road situation reduces the number of journeys to the rural areas, as well as increases the wear and tear of an already depleted fleet of vehicles. It also causes an increase of non-operational units and of the maintenance costs.

Major asphalted roads are generally in good shape. However, there are many segments that need immediate repair. In some segments, they have become narrow and twisting and the lack of shoulders allows little space for sudden evasive action. Serious accidents on all Mozambique's roads claim too many lives. The trucks carry unprotected passengers because there are no buses available. Passenger transportation competes with cargo for the scarce, middle-sized trucks available. These roads only meet the minimum required standards. Transporters voiced considerable concern over the potential number of traffic accidents as well as the safety of pedestrians and property with such narrow road width and too much twisting to avoid potholes and drop-offs.

Due to an uncountable number of damaged road segments, trucks have to slow to speeds of 5 km/hour in some places, which inevitably increase costs. Vehicle operating costs over the paved roads are now as much as 50 percent higher than they were in the past, and the smaller number of journeys that a truck can take everyday—at least half of what they had in the

past—impose unnecessarily high transport costs on the road users. As regards paved roads, unless maintenance work commences soon, the roads will deteriorate to the point where normal maintenance is no longer possible and large and currently unnecessary expenditures will be required in the future to rehabilitate or reconstruct them.

Road Maintenance

In maize surplus areas such as Chimoio, farm-to-market roads are critical to evacuate maize from the producing areas. Land slides, mud holes and signs of erosion plague all rural access roads. In the rainy season roads acquire vast, muddy potholes. This brings hardships to the poor of the family farm sector. The subsistence farm which could provide the marginal surplus that would allow Mozambique to begin the recovery process in maize production are now isolated from local markets. Poor farmers have reported that they only sell enough maize to buy only the most needed goods, since headloading is the only available means to take their produce to nearby markets. Even in an urban region like that of Beira, top quality standard earth roads and rural access roads of have been reduced to service tracks.

There simply are no private contractors to perform simple maintenance services at the provincial and district levels. Small scale contractors do not exist due to absolute lack of equipment. We asked questions about the location of basic equipment that should be available in the districts. We were told that all the equipment were located at provincial road repair brigades sites. But, as a matter of fact, there weren't any dump trucks, small bulldozers, and graders to maintain the roadways. In Chokwe we saw three, large-sized, motor scrapers abandoned in a small village. A few pieces of equipment and machinery were at the Unidad Direcção de Agricultura (UDA), but UDA was in extremely short supply of trained personnel, site foremen and machine operators.

Road usage has decreased as roads have fallen into disrepair to such a point that in many areas only tractors with trailers can be used during harvest time. This leaves rural areas almost isolated. The few extension agents that there are cannot reach out-of-the-way *machambas*.

Operating costs for vehicles arising from the wear and tear experienced by an already depleted fleet are now much higher than necessary. Since traders and farmers cannot afford additional costs, many areas no longer have any transportation services. Poor roads limit competition even when maize supply is low and demand high.

The condition of the roads is responsible in part for the poor performance of the maize sector. Maize, like most grain, has a low specific value and it is dependent upon a low transport cost. Improved transportation and road access has a direct positive effect on marketing opportunities for maize.

One bright area for the future is that the government has already relaxed tariff regulations for commodity and human transportation services. This will encourage an adequate supply of transport services, and thereby reduce the likelihood of monopolistic profits. The problem is

access to importing trucks and spare parts. Since most general cargo can be carried in several different trucks from small to light and heavy trucks, and there is a great need for hauling in all stratum of cargo lifts, there is not too much incentive for transport enterprises to collude. One word of caution: care must be taken not to expend scarce resources on urban transport at the expense of needed inputs for the rural transport sector. More than 80% of the citizens live and work in rural areas.

Government Objectives and Policy Affecting the Maize Sector

Government influences the maize economy both through indirect and direct means. The indirect means have been the macroeconomic (trade and exchange rate) policies that affect the economy as a whole, but which may have differential impacts in the sectors of the economy. The direct means have been the sectoral policies addressed to agriculture and the maize subsector in particular. The sectoral policies affect marketing including direct intervention in marketing flows, price control, credit availability, and the research and extension system.

Macroeconomic Environment

Maize is a tradable good in Mozambique, and as such can be quite sensitive to the exchange rate. The Mozambican currency (the metical) has been strictly controlled by the monetary authorities, and there are indications that it has been substantially overvalued. An overvalued metical means that maize is being imported at a lower price than would be the case under equilibrium in the exchange market. In technical terms, the nominal exchange rate, meticais per dollar or dollars per meticais, expresses the price of one currency in terms of other. To define the trading condition of a country we need measures that take into account the exchange rates of the several countries with which it trades. Let us define the **nominal effective exchange rate index** as the ratio of an index of the year average Mozambique exchange rate to a weighted geometric average of exchange rates for the currencies of her trading partners; let us also define the **real effective exchange rate index** as a nominal effective exchange rate index adjusted for relative movements in the national price indicators of Mozambique and its trading partners[6]. An appreciation of the real index implies that, in general, imports are becoming less expensive and exports more expensive to the foreign buyer.

The real effective exchange rate appreciated 244 percent from 1980 to 1986. The exchange controls in 1980 suggest that the metical may not have been at equilibrium in that year. This considerable exchange rate distortion was a major disincentive to production in the tradable sector, of which agriculture is part; the distortion was also an incentive to import inputs, but their impact in maize value was minimal. Only in 1988, after the effect of the devaluations associated with the IMF agreement, had the real exchange rate depreciated in relation to 1980[7].

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[6] IMF, "IFS", 1989 Yearbook, p. 5.

[7] Mozambique, "Economic Policy Framework, 1989-91", 1989, p. 40.

The Relevant International Price for White Maize

In order to compare the maize prices in Mozambique with those from the world markets, we need to determine: a) the exchange rates to convert national prices to a common currency; and b) the most relevant international market from which to draw the price series.

White maize is a minor crop compared to yellow maize, both in production and in trade. The estimated world production of white maize in 1984 was 50 million tons compared with 400 million tons of yellow maize (FAO, 1984, p. 1). White maize trade has reached 3 million tons at its maximum, less than 5 percent of total maize trade (Id, p. 7). The Republic of South Africa, a Mozambique neighbor, is largest exporter of white maize, followed by the USA, and Zimbabwe, another neighbor. Typically, the RSA accounts for some two thirds of world exports, even though its participation varies substantially with the climatic conditions and the size of the crop. The USA is the largest exporter of yellow maize and the USA export price is used as a basis for comparisons of national prices.

The USA export price, in turn, is determined in relation to prices discovered in major grain exchanges where large volumes are traded each day. White maize is not traded in exchanges, and the export prices are generally determined on a tender basis. We need to decide whether to use the yellow maize prices, which refer to larger and more transparent world markets than white maize, and which country market price to use.

The prices of both white and yellow maize for the USA and the RSA are examined in **Table No. 14**. In the USA, white maize has carried a premium in relation to white maize of some 21 percent, with a coefficient of variation of 85 percent. In the RSA, white maize has carried a premium in relation to white maize of only 6 percent, with a much higher coefficient of variation of 180 percent. On the other hand, the RSA white maize export price has been some 19 percent above the USA yellow maize export price, with a coefficient of variation of 95 percent.

Since Mozambique is a maize deficit country, both the RSA and Zimbabwe would be the natural suppliers of white maize because of their proximity and similarity of varieties. This is not case, however, since Mozambique has no capability of making commercial imports and depends on donations, and because of political reasons that tend to prevent imports from South Africa, either under a national initiative or under requirement from the donating countries.

Even though white and yellow are very close sister species, they have followed separate technological routes, and could be considered different crops in the production side. They are certainly different on the consumption side, white maize used primarily for human consumption, and yellow maize used primarily for animal consumption. Both maizes, though, compete for similar resources and have common consumption uses that make their prices be partially determined from common market forces.

Table No. 14 Maize Export Prices, White and Yellow, USA and RSA, 1970-89.

Year	USA Yellow Gulf	USA White Kansas	USA White/ Yellow	RSA White/ USA Yellow	RSA Yellow port	RSA White port	RSA White/ Yellow
	$/mt	$/mt	%	%	$/mt	$/mt	%
1970	58	73	25.3	11.6	63	65	3.2
1971	58	69	18.4	13.2	59	66	11.9
1972	56	57	2.3	4.1	60	58	-3.3
1973	97	114	17.0	14.9	105	112	6.7
1974	132	167	26.2	1.2	134	134	0.0
1975	120	146	22.1	6.2	126	127	0.8
1976	112	119	6.0	16.7	121	131	8.3
1977	95	116	21.6	12.2	104	107	2.9
1978	101	12	27.0	10.2	111	111	0.0
1979	116	118	2.1	21.1	131	140	6.9
1980	126	215	71.0	77.4	151	223	47.7
1981	131	161	23.3	7.2	141	140	-0.7
1982	108	102	-5.6	13.8	124	123	-0.8
1983	136	155	14.0	..	n.e.	n.e.	..
1984	136	186	36.9	..	n.e.	n.e.	..
1985	112	n.a.	..	..	112	n.e.	..
1986	88	n.a.	..	..	83	n.e.	..
1987	76	n.a.	..	20.3	83	91	9.9
1988	107	n.a.	..	33.7	144	143	-1.0
1989	112	n.a.	..	32.9	133	148	11.4
Average			20.5	18.5			6.5
Coefficient of Variation			85.0	94.5			179.5

Source:
IMF, "IFS", January 1990 tape (USA yellow maize prices).
IMF, "IFS", Vol. 43, No. 3, March 1990, pp. 476-479 (RSA exchange rates).
FAO, 1984, p. 10 (white maize prices for USA and RSA up to 1984 and RSA yellow maize price up to 1984).
South Africa Maize Board, "Annual Report", 1988 issue, p. 23, 1989 issue, p. 23 (prices from 1985-89)
Notes:
a) The Mozambique Producer Price was obtained using the official exchange rate.
b) Yellow maize price is increased 20% to obtain a proxy for white maize.
c) "n.e." means no exports were made in that year, "n.a." not available.
d) Coefficient of variation is the standard deviation as a percentage of the mean.

It appears, then, that the white maize international price is a valid one as a comparison with Mozambique's domestic price. In the paper of which this annex is part, the Mozambique's producer price of white maize is compared to the South Africa white maize export price, and with the USA yellow maize export price. The latter is increased by 20 percent to reflect importation costs, and which represent the average premium of RSA over USA prices.

Control of Maize Marketing

Supply Plan

Maize marketing falls generally under the supply management goals of the Central State Plan (Plano Estatal Central - PEC), and particularly under the regional supply regulations of the Supply Plan (Plano de Abastecimento). The Ministry of Commerce plays the key role in determining the objectives of and the quantitative restrictions to trade within the country and on imports. At the regional level this authority is vested in the Provincial Commerce Directorates. The Ministry of Commerce is in charge of issuing the licenses for maize imports. Importers need to obtain an additional authorization from the monetary authorities to gain access to foreign exchange; imports are not legal if paid for with foreign exchange obtained in the parallel market. In the case of maize, the foreign exchange is usually provided by the donors under the food aid programs.

The Ministry of Commerce issues licenses for private wholesale and joint wholesale-retail operations, enforces price and quantity control, and also undertakes attendant legal prosecution[8]. The licensing of retail operations is done by the Provincial Directorates[9]. The license indicates the types of goods to be sold and the geographical areas where the applicant can operate.

The Provincial Commerce Directorates designate one official distributor for each of the districts in the province. These distributors receive the still-controlled basic goods (maize, rice, sugar, soap, and oil) and supply these to retailers in their assigned districts. Controlled goods carry low margins but ensure trade with customers who also purchase other goods carrying larger margins. The distributor can also have access to non-controlled goods supplied by government agencies, such as used clothes, among other goods. In some cases, the Commission may require a particular merchant to serve as official distributor in a distant district as a condition to obtain the retail license for a district where he wants to do business.

The Supply Plan indicates the supply and utilization goals for each province, as well as the necessary imports and goals for inter-provincial trade. The unanticipated maize shortfalls or

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[8] Law of Private Commerce No. 7/79, 3 July 1979, and the accessory Diploma Ministerial No. 47/80 of 11 June 1980.

[9] Law 7/79, Article 22, and Diploma 47/80, Article 4.

surpluses (not contemplated in the Supply Plan) can only be covered by interprovincial trade after the provincial governments express their opinion and the Provincial Commerce Directorates have given the authorization[10]. The law provides for confiscation of goods being marketed illegally (Law 7/79, Art. 8). The numerous check points on the interprovincial roads, which are manned by the army, provide a means to control such movements, and provide the opportunity for charges to be collected from violators; in practice, however, non-violators of this law can equally be extorted by corrupt check point officials or by insurgents.

The ability of the government to enforce the Supply Plan depends critically on the quantity of maize it can command in the different provinces. The quantity control is achieved through AGRICOM for domestic grain, and for imports through import licenses and through state trading companies. Since imported maize is much more important than domestic maize in total marketed consumption, the market power wielded by the Ministry of Commerce is considerable. Since the larger mills are state owned, the control is further strengthened in the case of maize flour.

Rationing

The quantity control is also exercised in parts of the country through allocation to consumers through rationing and the designation of a particular store where consumers may purchased the rationed goods. A ration card is issued to each household and provides guaranteed access to a pre-determined quantity of rationed goods valued at the official prices. The pre-determined quantity are generally insufficient to cover household needs; the unfulfilled needs are obtained outside this system, in non-controlled markets.

The rationing system is more strictly enforced in the cities of Maputo and Beira, which have municipal corporations[11] in charge of supplying the rationed quantities to the different distributors and retailers. In other cities, the Government cannot guarantee adequate supplies of the controlled goods and therefore ration systems do not exist. In Chimoio, Ministry of Commerce officials have attempted to set up a sort of rationing system, issue a sort of "ration card", and control supply to the distributors and retailers. In Xai-Xai, however, there is no ration system, probably because the government can not control quantity. Xai-Xai is close to Maputo

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[10] See, for example, the Price Regulation of February 21, 1990, Section IV - "Supply and Marketing", BR III Serie, No. 14, April 4, 1990: "1. Surplus agricultural products would be channeled to other provinces only in accordance with the goals established by the plan, or in situations unforseen by it after the Provincial Governments have been heard. 2. There could be duly authorized cases in which the products of one province could be marketed in another, principally by reasons of economy in transport or other that justify it."

[11] The Empresa de Abastecimento de Cidade de Maputo (EACM) and the Empresa de Abastecimento de Cidade de Beira (EACB), respectively.

and maize tends to flow there to supply the "dumbanengues" that pay higher prices than the official ones.

The rationing systems of Beira and Maputo are open to any certified city resident, regardless of income. This means that the highest wage earner has the same amount of ration as the lowest. Rations are increased depending on certification of increase in family size. Some government officials believe the rationing system should be made more efficient by purging higher level wage earners from the ration roles. This would increase rationed amounts for the poorer citizens.

Taxes

Maize imports are subject to two separate charges: the customs service charge and the tariff. The service charge is 7.5 percent of the import value. The tariff is of the ad-valorem type, and is applied to commercial imports even when they are made by trade parastatals; emergency imports are exempted. It is fixed by the Finance Minister within ranges given by the Council of Ministers[12]. The current rate fixed by the Finance Minister is 2.5 percent over the cif value (**Table No. 15**), but he can vary the tariff from 1 to 41 percent without consulting the Council.

Maize marketed domestically, either from local production or from imports, is subject to the circulation tax. This is a sales tax applied at every transaction in the marketing channel, at the rates of 10 percent at the producer level, 5 percent at the wholesale level, and 10 percent at the retail level. For maize, the 10 percent tax at the producer level is not applied. The tax is levied over the full value of the sale, not just on the value added. Maize sales are subject to this tax except sales at workers canteens, student restaurants, and health institutions[13].

Price Control

Price intervention is widespread and involves several authorities in government[14]. The Council of Ministers is the highest price intervention power. Producers are represented through the Ministry of Agriculture. However, family farmers have no direct input into the development of the Agriculture Minister's producer price recommendations. The Council implements its price policies through the National Commission of Salaries and Prices. Policy advice is provided by the National Planning Commission and the Ministers. The Finance Minister plays an important

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[12] Decreto No. 20/88, Conselho de Ministros, Boletim da República (BR), I Serie, No. 52, 28 December 1988, pp. 6-9.

[13] Decreto No. 1/87, Conselho de Ministros, BR, I serie, No. 4, 30 January 1987, pp. 56-60; amended by Decreto No. 19/88, BR, I Serie, No. 52, Suplemento, 28 December 1988, pp. 5-6.

[14] Decreto No. 11/82, BR, I Serie, No. 23, 22 June 1982, pp. 4-5.

role in the establishment of subsidies and their financing. In particular cases the Ministers and the Provincial Governors can determine price for products or industries within their fields of competence.

Table No. 15 Tariffs on Cereals and Inputs, 1990.

Code	Article	Tariff	Range Minimum	Range Maximum
		Percent		
10.01	Wheat	2.5	1	41
10.05	Maize, seed	0.0	1	41
10.05	Maize, consumption	2.5	1	41
10.06	Rice	2.5	1	41
11.01	Cereal flours	2.5	1	12
11.02	Semolas	12.0	1	12
29.00	Chemicals	15.0	9	21
31.00	Fertilizers	0.0	1.8	12
87.01	Tractors	2.5	0	28
87.02	Trucks	8.0	0	28

Source: Diploma No. 16/89, Ministry of Finance, Boletim da República, I Serie, No. 6, 8 February 1989, pp. 41, 42, 55, 60, and 126 (for the actual tariffs).
Diploma No. 18/88, Ministry of Finance, Boletim da República, I Serie, No. 52, 28 December 1988, pp. 8-9 for the range).

The Mozambican government can intervene in price determination through three separate ways[15]:

a) Price fixation at both producer and consumer ends on a list of products, including maize, other cereals and food products, and other necessities. The fixed prices are determined by the National Commission of Salaries and Prices.

b) Margin fixation over manufacturing production costs, as determined by the relevant Minister or Provincial Governors.

c) Authorization for free market prices, as indicated by the Commission of Salaries and Prices.

Maize (grain and flour) is still subject to price control in 1990, together with some six basic, essential other food items (rice, wheat flour, bread, sugar, oils, and soap). The other items only have margin control or have been moved to the free price list, as part of the actions taken within the framework of the Economic Recovery Program (ERP) under IMF/IBRD supervision. The seven controlled articles represent 21 percent of the cost of living in Maputo.

The prices subject to price control are typically also subject to margin fixation, since prices are fixed for several stages in the marketing chain[16]. Producers are accorded minimum prices, and consumers maximum prices. Small or negative margins between producer and consumer prices imply the government pays a subsidy to the state marketing agency, AGRICOM. Two minimum maize prices are fixed for the producer: at the farm gate and at the warehouse gate of AGRICOM. In both cases the enforcement of the minimum producer prices is done through purchases, and less so by prosecution of violators.

The farm gate price is applied when AGRICOM sends out "mobile brigades" or establishes "fixed sites" to buy directly from farmers. In these occasions when AGRICOM buys directly from farmers, it typically offers non-farm goods for sale. Maize can then be paid with money or in kind. Farmers have to rely, however, on other sources for those non-farm items for most of the year since AGRICOM only visits the countryside around harvest time.

Recently, AGRICOM has been concentrating on purchases at its warehouses. To this effect, it has been requiring wholesalers to bring in predetermined quantities of white maize in order to be able to buy other items. Since wholesalers' purchases are done without invoices, there is no way to enforce the official farm-gate price. The situation may arise that the farm-gate to district warehouse-gate price spread is not enough for wholesalers who would then be paid

[15] Decreto No. 10/82, BR, I Serie, No. 23, 22 June 1982, pp. 2-4.

[16] The fixed prices, and the implicit gross margins, include the circulation tax described earlier.

lower prices and the farm gate price becomes a maximum rather than a minimum price. In 1988-89, this spread has varied from 15 to 30 percent (**Table No. 16**).

Table No. 16 Gross Mark-ups from Official Prices, Maize, Sorghum, and Rice, 1976-89.

	Maize				Sorghum	Rice
Year	D.W./ Farm	D.W. Sale/ Purchase	Consumer/ D.W.	Consumer/ Farm	Consumer/ Farm	Consumer/ Farm
	%	%	%	%	%	%
1976	28.8	..	..	93.2	..	25.5
1977	26.6	..	..	56.3	..	11.3
1978	26.6	..	..	56.3	..	11.3
1979	26.6	..	..	56.3	83.3	11.3
1980	15.0	..	..	75.0	83.3	11.3
1981	13.8	37.4	12.0	75.0	75.0	11.3
1982	15.0	26.1	3.4	50.0	70.0	-19.0
1983	15.0	26.1	3.4	50.0	70.0	-19.0
1984	15.0	26.1	3.4	50.0	70.0	-19.0
1985	20.8	11.5	5.7	42.3	37.5	-11.9
1986	20.8	11.5	5.7	42.3	37.5	-11.9
1987	31.3	-68.8	82.9	-25.0	185.7	-50.0
1988	21.8	..	..	73.1	100.0	116.8
1989	21.8	-11.9	27.1	36.4	52.6	90.8
1990	22.2	-1.9	25.8	50.8	56.0	..

Source: Ministry of Agriculture.
Notes:
a) D.W. means District Warehouse, which typically belongs to AGRICOM.
b) All margins include the circulation tax. For maize, the "Consumer/D.W." column includes the gross margins of the wholesaler and the retailer. For sorghum and rice, the "Consumer/Farm" margin includes the gross margins of the district warehouse, the wholesaler, and the retailer.
c) The producer price for paddy was converted to rice equivalent dividing it by 0.60, the technical conversion coefficient.

Negative or small gross margins mean that the marketing costs are not covered or that subsidies are necessary. The subsidies, when present, are given at the level of the district

warehouses, which are operated by AGRICOM. Subsidies were necessary in 1987 and 1989 to cover negative gross mark-ups by the district warehouse. In 1987, when the ERP was introduced maize was heavily subsidized; in 1989 the subsidy was smaller, and implied a transfer of Mt40.60 per Kg. In theory, any person operating a district warehouse could have obtained this transfer, but actually only AGRICOM receives the subsidy. In the 1990 marketing year the subsidy has been reduced to Mt35.80 per Kg.

The overall relation between consumer and farm prices (gross margin) has been very unstable. The gross margin for maize has been smaller than the gross margin for sorghum, but larger than the gross margin for rice, at least until 1987 (**Table No. 16**). Over time the gross margin has been declining more for maize than for either sorghum or rice.

In making decisions as to what to plant and in what quantities, farmers respond to both the relative farm prices and real level of the price of maize. Even when the farmer produces firstly to provide maize for the household, maize has to be sold to buy other essentials and the farmer interacts with the outside price relations which represent the trading opportunities the farmer has to face.

Results of the Intervention

One negative result of the fixed price policy is that room is not provided for prices to reflect the marketing costs of transportation and storage. Pan-territorial prices do not recognize the value added to marketed goods through the transfer from one location to the other. Pan-temporal prices fail to recognize that storage entails depreciation costs, financial costs, and deterioration risks. In both cases, a disincentive is provided to private participation in marketing. The public channel agencies can comply with the price regulation by ignoring the transportation costs either because they can be covered with subsidies or by profits from other goods. E.g., profits from the sale of donated, used clothes helps AGRICOM cover marketing costs. The private sector can hide the transportation and storage costs. The price and marketing controls in Mozambique have had other, equally important consequences.

Relative Prices

The price control has introduced considerable distortion of the relative prices in the cereal economy. Price relations in Mozambique are distorted both internally and in relation to international markets. The internal distortion arises because of different schedule for price changes for each commodity, and the presence of different levels of subsidy. As a consequence the internal price relations are blurred and vary constantly thus introducing an additional element of risk to the process of resource allocation (**Table No. 17**).

Table No. 17 Sorghum and Rice Consumer Prices Relative to Maize: Mozambique and USA, 1970-89.

Year	---Mozambique--- Sorghum	Rice	------USA------ Sorgo	Rice
1970	n.a.	n.a.	87.3	269.3
1971	n.a.	n.a.	84.2	272.9
1972	n.a.	n.a.	93.8	322.7
1973	n.a.	n.a.	79.8	338.5
1974	n.a.	n.a.	76.1	349.6
1975	n.a.	n.a.	78.0	291.9
1976	n.a.	238.1	78.1	228.6
1977	n.a.	230.0	78.0	291.8
1978	n.a.	230.0	77.6	330.2
1979	110.0	230.0	77.9	274.9
1980	78.6	164.3	85.4	328.2
1981	100.0	164.3	80.6	360.8
1982	94.4	150.0	83.5	282.7
1983	94.4	150.0	78.9	231.9
1984	94.4	150.0	72.5	233.0
1985	89.2	73.0	76.4	283.8
1986	89.2	73.0	78.2	325.4
1987	333.3	133.3	80.3	357.0
1988	88.9	240.9	76.7	335.0
1989	96.7	307.3	79.4	306.9
1990	89.5			
Averages:				
1970-89			80.1	300.8
1976-89		181.0	78.8	297.9
1980-89	115.9	160.6	79.2	304.5
Coefficient of Variation:				
1970-89			5.8	13.4
1976-89	.	29.5	3.8	14.5
1980-89	62.7	32.0	4.4	14.4

Source: Ministerio de Agricultura; IMF. "IFS." Tape January 1990.
Note: USA Gulf yellow maize price was increased by 20% to reflect the white maize premium, and RSA export prices.
Coefficient of variation is the standard deviation as a percentage of the mean.

In Mozambique, in relation to the rest of the world, maize has been underpriced with respect to sorghum and overpriced with respect to rice. While in the USA the price of rice is around 3 times the price of maize, in Mozambique the price of rice was only 1.6 times the price of maize in average for 1980-89. In 1989, for the first time, the official rice-maize price ratio was the same in Mozambique and outside.

While in the USA the price of sorghum is around 0.8 times the price of white maize, in Mozambique the price of sorghum is 1.1 times the price of maize. The price relations are more stable in the international markets than in the domestic market, as indicated by the smaller coefficients of variation (**Table No. 17**).

Real Prices

The real price has been quite unstable (**Table No. 18**)[17]. The real price increased in the late seventies, and then decreased in the early eighties; it has again increased again after 1987 under the implementation of the ERP[18]. Two comments are in order. First, the consumer price index may not be the appropriate deflator as it contains many articles a good number of which do not enter in the cost to produce maize. However, deflating by the consumer index can indicate the purchasing power of the farm price. Second, the index reflects prices subject to control, and could be underestimating the true rate of price increase; the government does not have a systematic way of collecting open, parallel market prices.

A different picture emerges when the maize prices are compared to input prices. In the period between 1984 and 1989, when the real price has apparently increased, the fertilizer[19]/maize price ratio has turned against maize production. It increased from 0.7 in 1986 to 1.6 in 1989 (**Table No. 7**). Seed prices have also increased faster than maize prices. In general, the rate of growth in input prices has been higher than for maize.

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[17] The consumer price index was the deflator used. Part of the instability is explained by the keeping the nominal prices fixed for extended periods, while the deflator was changing.

[18] The statement in relation to 1988-89, assumes an inflation rate of 50% in 1988 and 30% in 1989, as per the PFP, 1989, p. 40.

[19] Fertilizer considered as pure nitrogen.

Table No. 18 Maize, Mozambique Producer Prices, and USA and RSA Export Prices, 1970-89.

Year	Mozam-bique White	USA Yellow	RSA White	--White Maize-- RPM/ USA	RPM/ RSA
	$/mt	$/mt	$/mt	%	%
1970	..	58	65	..	..
1971	..	58	66	..	..
1972	..	56	58	..	..
1973	..	97	112	..	..
1974	..	132	134	..	..
1975	..	120	127	..	..
1976	83	112	131	61.4	63.2
1977	97	95	107	84.9	90.8
1978	97	101	111	80.2	87.4
1979	98	116	140	70.9	70.2
1980	123	126	223	81.8	55.4
1981	113	131	140	72.2	80.8
1982	159	108	123	122.7	129.4
1983	149	136	n.e.	91.5	n.e.
1984	141	136	n.e.	86.7	n.e.
1985	301	112	n.e.	223.3	n.e.
1986	325	88	n.e.	308.5	n.e.
1987	140	76	91	154.3	154.0
1988	117	107	143	91.5	82.2
1989	138	112	148	102.6	92.7

Source: Ministry of Agriculture (Mozambique prices in Meticals).
IBRD, "World Tables 1988-89 Edition", pp. 414-415 (Mozambique exchange rates for 1976-87). IBRD, "Mozambique Public Expenditure Survey", Report 7615, September 1989 (1988-89 exchange rates).
IMF, "IFS", January 1990 tape (USA yellow maize prices).
IMF, "IFS", Vol. 43, No. 3, March 1990, pp. 476-479 (RSA exchange rates).
FAO, 1984, p. 10 (white maize prices for USA and RSA up to 1984).
South Africa Maize Board, "Annual Report", 1988 issue, p. 23, 1989 issue, p. 23 (prices from 1985-89).
Notes:
a) USA Yellow maize price is increased 20% to obtain a proxy for white maize (see Annex A for an explanation).
b) "n.e." means no exports were made in that year. "RPM" means People's Republic of Mozambique.
c) The 1989 exchange rate was estimated at Mt 800/US$ from personal accounts.

International Prices

White maize prices to the farmer were below the export prices in the USA and RSA in the seventies, and higher in the eighties (**Table No. 18**). In this comparison, however, it is necessary to understand the critical role played by the official exchange rate used. It appears, for example, that the Mozambique price was substantially higher than the USA export price in 1985-86 (**Fig. 1**). We know, though, that in those years the official exchange rate had greatly appreciated in relation to 1980[20].

After the devaluations of 1987-89, farmers' prices, calculated at the official exchange rate, were about as similar as the export prices in the USA and RSA. The comparison of prices would lead to a different conclusion if the parallel exchange rate were used. In 1989 the parallel rate was double the official rate; the consequence is that Mozambican prices then appear about half their level outside of the country. Farmer prices are depressed at least 50 percent relative to international prices due to the overvalued currency. Under a more flexible monetary regime, the equilibrium exchange rate would probably increase, settling closer to the parallel rate than to the official rate. In those circumstances, the farm level price would be found to be considerably below the international parity prices valued at the parallel exchange rate.

Marketed Production

In the last two decades the general trend of marketed production has been downward, while consumption has increased over time, at a particularly fast pace in the eighties (**Table No. 4**). The proportion of domestic marketed consumption supplied by domestic marketed production has declined sharply in the eighties; the self-sufficiency ratio has declined from 50 percent in 1980 to 17 percent in 1989 (**Table No. 4**). The urban Mozambican people have been eating more yellow maize due to its wider availability and lower price in Maputo and Beira since it is imported under concessional agreements, and probably the tastes have been changing away from white maize. Nevertheless, Mozambicans prefer by far white to yellow maize and would eat more white if supply patterns change.

In the 1987-89 period there has been an upturn in the marketed production trend. This is partially the result of apparent strengthening in the official real producer price in the same period. Rainfall has also been in an upward trend cycle in the 1987-89 period. Marketed production needs to increase substantially to attain the level reached in the last decade. In normal rainfall conditions, the real price would need to be maintained. The increase in the official price for the 1990/91 marketing year was only 15 percent from the previous year, which is the same as the target inflation for 1990 but half the 30 percent inflation of 1989.

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[20] Policy Framework Paper, February 1989, p. 40.

Design of an Alternate Policy

The problems Mozambique has experienced in maize production and marketing are as much due to governmental economic policies as they are to the problems caused by the war and banditry in the countryside; furthermore, the problems affecting maize are most likely the same problems affecting the supply of other dietary staples.

The woeful state of maize production in Mozambique is an indication of the desperate state into which the Mozambican economy has fallen; furthermore, reliance on food imports is severely hindering the country's potential for economic recovery.

There is also indication that malnutrition among the very young has become a significant problem not only in the war-ravaged areas, but also in rural and urban areas, such as Chokwe and Maputo, normally secure from bandit attacks. The Mozambican Government, cognizant of the need for economic reforms, has begun to develop economic policies that will guarantee enhanced production of basic agricultural commodities. It is critical that these reforms be continued and the pace intensified. The government must continue to open the inputs and marketing system to the private sector.

Simultaneously, the government must move quickly to address long-term issues of the development of human capital resources, which is the only sure way to ever tap fully the enormous resources of the country.

Considerations

The design of any new policy for maize has to take into consideration basic facts of the current political and economic situation in Mozambique. The country is still undergoing turmoil caused by the guerilla attacks of political opponents. Since 1987 it has been implementing a structural adjustment program under the supervision of multilateral financial institutions. The country is a highly indebted one, and the capacity to borrow is rather limited.

In Mozambique, the team heard repeatedly two principal apologetic statements concerning Mozambican economic problems: (1) the war has created severe social and economic dislocations; and (2) the liberalization of vegetable market prices demonstrates that the government has made significant progress in economic reform of the marketing system. Both statements are true. At the same time, government administrators and international donor agents provide a disservice to real reform when they use these statements to explain why maize production continues to decline even in areas relatively secure from sustained bandit attacks.

Guerilla warfare

Warfare is an endemic element in Mozambican life and is a major impediment to the restoration of adequate levels of maize production. Despite optimistic statements from many Mozambicans, peace is not on the horizon. The attacks have gradually become more frequent each year. The Government has complete control primarily in the urban areas and certain other rural areas, such as along the Beira Corridor. Despite the effects of the insurgency on the inhabitants, the majority of Mozambicans still live and farm in the countryside, although migration to urban centers and refugee camps has not abated. There is still significant productive capacity available in the rural areas that can be tapped when farmers and traders receive sufficient profit margins to pay for the production and marketing risks they take. The team found many people who said they were willing to run the risks associated with production and marketing in insecure areas if they were able to charge prices sufficient to cover their expenses.

The government is very concerned about caring for the many refugees streaming into the large cities of Maputo and Beira. It has been reluctant to allow totally unrestricted marketing in the country in order to avoid the precipitous prices rises that could make it difficult for many poor and dislocated Mozambicans to buy food.

However, this well motivated desire has had the paradoxical consequence of encouraging more migration and less production. Many of the most essential staples and commodities are not available in the rural areas: clothing, cooking oil, sugar, etc. By maintaining low prices and a relatively constant supply in the Maputo and Beira, the Government is in fact encouraging continued in-migration and increased depopulation of the agriculture producing countryside.

In sum, there is no doubt that the guerrilla war is a significant constraint on maize production and marketing, but our research suggests that there is latent productive capability that can be drawn upon through a restructuring of marketing regulations and channels.

Economic Recovery Program (ERP)

The current situation in Mozambique is very difficult. The Economic Recovery Program (ERP) was the beginning of the recognition of the problem, and recognizing the problem is half the battle. However, the problems created by past economic policies are enormous and change will continue to be painful. Some of the consequences of these policies have led to poor supply of basic staples, clothing, health services, and transportation for all but the wealthy. A key question is how to control the level of pain while policy reform is implemented and positive results begin to accumulate significantly.

The government is implementing a structural adjustment which has been associated with the food price increases since 1987. The currency has been devalued close to one hundred percent in dollar terms, subsidies have been reduced, and the rate of wage increases has been contained (PFP, 1989, p. 2). The ERP intends to maintain "on a transitional basis, some elements

of an administered economy in order to secure the essential needs of those displaced by the war" (idem, p. 6). Maize prices are controlled because of its large importance as a staple.

The ERP imposes severe restrictions on the government as to the availability of funds to invest in agricultural growth. The government deficit cannot be increased because of inflation considerations. Even the maize subsidy existing in 1989 is being reduced in 1990, although the new price structure still implies losses to AGRICOM (**Table No. 15**).

Considerable progress has been made in stabilizing the economy, even though strong inflationary pressures remain and the parallel exchange rate is double the official one. After three years of adjustments, in 1989, Mozambique confronts an overall budgetary deficit of 7.1 percent of GDP and an external deficit before grants of 59 percent of GDP (PFP, 1990, pp. 2, 7). Other developing economies have entered into structural adjustment programs with more favorable indicators as those of Mozambique in 1989.

Foreign Debt

Mozambique is a highly indebted country. Total foreign debt as proportion of exports is considerably higher in Mozambique than in the Eastern Southern Africa region. While the debt/exports ratio is 147 percent in Zimbabwe and 369 percent in the region, in Mozambique it is 2,461 percent. Total foreign debt as a proportion of Gross National Product is also higher in Mozambique than in the region (**Table No. 1**). While the debt/GNP ratio is 43 percent in Zimbabwe and 115 percent in the region, in Mozambique it is 436 percent. The debt overhang is certainly to become a major obstacle to investment in agricultural infrastructure. The policy changes have to recognize that the ability to borrow is very limited. The debt service load has been reduced largely by rescheduling of payments, and debt forgiveness (PFP, 1990, p. 10).

Maize Policy Objectives

A new policy for the maize sector would be part of a larger policy framework, and would be designed with several goals and objectives in mind. The broadest goal would be to further economic and social development for all groups within society. The economy wide objectives of the country have been stated by the government (PFP, 1989, pp. 4-5):

"a) To reverse the decline in production and restore a minimum level of consumption and income for all the population, particularly in the rural areas;
b) to reduce the domestic financial imbalances and strengthen the external accounts and reserves;
c) to enhance efficiency and establish the conditions for a return to higher levels of economic growth...;
d) to reintegrate the official and parallel markets;
e) to restore orderly financial relationships with trading partners and creditors."

The strategy adopted by the government focuses primarily on the agricultural sector and, in particular, "on the family and efficient commercial sectors where the potential for growth is highest" (PFP, p. 5).

The objectives of a maize policy would be twofold:

a) Contribute to enhance the food security of the population through larger domestic production, and the generation of household purchasing power.

b) To encourage balanced development in agriculture through policy coordination with the other sectors within agriculture and the economy as a whole.

The effect of incentives on maize production need to be assessed in light of the effect on aggregate output. Maize is interrelated with other crops through the competition for productive resources and through consumption. Thus, price policy needs to lead to efficient price relations in the economy. Relative prices, not the level of individual prices, are the signals that affect resource allocation.

As the economy continues the adjustment process, the reactivation of the different economic sectors will occur at diverse rates. In the aggregate, output can grow if more resources are devoted to agriculture or if technology changes. Agricultural response is going to be slow as in the short run the main factors of production are fixed (Binswanger, 1990, p. 231). A favorable maize policy, by itself, would tend to increase the utilization of productive resources, particularly land and labor dedicated to maize, but a price will be paid in terms of further deterioration of non-favored crops. Policy change, then, has to take other crops into account.

Policy Alternatives

This section addresses alternative marketing policies and their potential consequences for the economy within the context of current crisis of Mozambique. Before discussing changes the study team feels might enhance the production and supply of maize, it is valuable to examine what the consequences would be to maintain the government's current set of policies.

A crude model was developed to examine the effects of wage and price increases on the farm household of peri-urban areas in strife-torn Mozambique. The model was based on data gathered by team observations and insights derived from other relevant studies (e.g., Skonsberg, 1989; Renkow, Leonard and Franklin, 1983; General Union of Cooperatives and UNICEF, 1986; Parillon, Franklin, Harrell, and Valverde, 1985; Mozambique-Ministerio de Comercio, Depto. de Segurança Alimentar, 1988; Mozambique, Direcção Provincial de Saude-Tete, 1988).

The model suggests that if the real producer price of maize and other staples remain constant, urban migration would be encouraged, farm production would decrease significantly, which, in turn, would make Mozambique more dependent on imported food. The scenario would

worsen if there was a rise in wages without a rise in producer prices. Mozambique already is unable to feed itself. Unemployment is already high. The model suggests that current pricing policies will lead eventually to heighten social unrest and even economic ruin.

If, however, real maize producer prices are allowed to rise to their appropriate market level, (which probably would at worst be no more than a 100% increase), farm production would increase measurably and the flow of urban migration might even reverse as urban workers (males) return to the "machamba", now finding farm production more profitable than selling their labor in the cities.

Finally, insights derived from the model and from observations by the team suggest that if there were some way to distribute equitably at very low costs simple farm inputs such as fertilizers, production would increase rapidly, and a nutritional deficit would be avoided as farm households recover their male workers from urban employment.

Although the data inputs for this model are imprecise, gross trends are clear and match experiences in other developing countries that have faced similar production and marketing problems, for example, Tanzania (Renkow, Leonard and Franklin, 1983) and Panama (Franklin and Harrell, 1985). These trends suggest the critical importance of the government's decisions concerning full liberalization of producer prices and how to respond to demands for wage increases by wage earners and salaried employees.

The following section discusses the pros and cons of retaining current policies, as opposed to more drastic ones. In the end, the best alternative for change seems to be one that takes a more gradual approach.

Alternative A: Retain Current Policies[21]

There are some attractive reasons for the Government to retain current marketing policies. Subsidies to the urban consumer would continue to protect some of the middle socio-economic levels from the inevitable erosion of purchasing power. Price increases on agricultural goods would continue to be controlled. This would help the Government to maintain its political legitimacy among the 15 percent of Mozambican citizens living in urban areas, especially in the southern provinces of Gaza and Maputo. In the short run, labor conflict would be about the same as it is now; strikes would be relatively frequent, but less so than were the prices to be completely decontrolled immediately.

However, in both the long run and the short run, disadvantages would probably outweigh the advantages. Subsistence farm families would continue to have little incentive to increase marketed production. Basic consumer goods would still be absent from most rural areas. For

[21] By "current policies" we mean the set of policies described in the section on Government Intervention.

the private farmers, inputs would remain high and yields would probably remain constant or decline. The level of maize supply (as well as other staples) to the urban populace and consumer goods and services to the rural would gradually worsen. The development of human capital resources for the agricultural sector would have to be put on hold. Of course, foreign dependency for maize imports would be maintained. The lack of basic consumer goods might lead to a greater increase in urban migration. Urban and/or more semi-subsistence farmers might withhold more maize production from the market. Migration to the cities, particularly Maputo, Beira and Chimoio, already straining inadequate urban services, would lead to even more severe hardships for those urban populations.

Alternative B: Immediate Removal of Government Controls.

The team has found that government intervention in the domestic maize trade and in external production input markets have contributed greatly to declining production and reduced domestic maize supply. An argument can be made for recommending that the Government end this intervention quickly in order to stimulate rapid agricultural recovery.

As far as the advantages go with regard to this alternative, there would be increased opportunities for a better rate of return for wholesalers and intermediaries, which in turn would encourage a more rapid recovery of domestic production levels. Mozambique would be less dependent on foreign maize imports sooner. Subsistence farmers in less secure rural areas would have more incentive to return to cash production despite the risk of attack. Less demands would be placed on scarce government resources to protect machambas in less secure areas, as farmers and private traders receive adequate profit margins to compensate for the cost of risk. Increased farm production would stimulate the production of other consumables, as farmers have more cash as well as a need to purchase the food and other goods they cannot produce. In other words, more subsistence farmers would re-enter the market with their crops. Semi-subsistance farmres perhaps would seek ways to increase yields and private farmers could better afford to utilize more adequate inputs. Large numbers of male, urban, wage earners might find farm work more profitable and public sector wage rolls would decline as a result.

Unfortunately, the country is not really equipped to fully take advantage of a completely free market system at the present time. Most family sector farmers have little knowledge of modern agricultural technology; most are also illiterate. There is no extension system in place. Nor is public transportation equipment in place to handle major increases in the farmer's marketing needs. The road network to the machambas and small towns is too severely deteriorated for efficient assembling in remote production areas. In general, the rural network for assembling maize is inadequate and cannot handle large production increases immediately. If farmers become frustrated in marketing their commodities they lose confidence in the future. Widespread distrust of private traders, most of whom are "Indians" could not be overcome quickly. Wealth disparities and ethnic distrust will also slow the development of a rural trading network. Also, a too rapid rise in consumer prices would create some resistance among public employees to implementing government policies.

Alternative C: Gradual, Staged Removal of Government Controls.

The Conclusions and Recommendations section discusses in detail the particular suggestions we make concerning a gradual removal of government interventions in maize marketing. Here we only briefly discuss the benefits of a gradual approach to the removal of government marketing and pricing controls.

With a gradual removal of Government interventions in pricing and marketing, the Government would keep the agricultural parastatals in place during a transition period during which the subsidized state-controlled economy would be transformed into to a freer, market system. This would provide more time for the necessary adjustments in the rural marketing system to occur. A gradual approach would also give the participants in the system more time to adjust psychologically and economically to the new system. Freer market channels will eventually encourage greater supplies of currently scarce consumer goods and staples in rural areas. Maize imports would gradually decline while domestic maize production recovers, albeit less gradually than in the scenario of alternative B. An expanded rural production system enhances the marketing system providing more jobs that contribute to alleviating disguised unemployment. Males will have greater economic incentives to spend more time working on and expanding machamba production. This would have a positive result for the females, in that it might reduce their already overloaded level of responsibilities. In general, this could have a very positive effect on the unity of the Mozambican family.

Conclusions and Recommendations

The Economic Recovery Program (ERP) has made substantial progress in bringing a degree of stability to the economy by reducing the inflation rate and stabilizing the exchange rate. The increase of production incentives has been noticeable, but far from sufficient to achieve the economic growth objectives. The progress made has relied heavily on high levels of foreign assistance and successful re-negotiation of foreign debts. The adjustment process has not ended since there are disequilibria still present in the economic aggregates, as the government recognizes[22]. The turning around of the economy is lending support for a continued phased approach to economic reforms. However, the desire to accomplish the inflation targets is preventing a faster realignment of the exchange rate.

If the current overvaluation of the currency is maintained, all sectoral price incentives will be erased. The official maize prices are below parallel (open-air, public markets) market levels in Maputo as well as in cities of the interior. The robust prices for white maize products show the relative scarcity of white maize, and are reflecting the parallel exchange rate used to import flour. The easing of controls would probably lead to strengthened real prices at the farm level and to an enhanced marketing system as inter-provincial price differentials are allowed to reflect the cost of transport, and as intra-year price variations reflect the costs of storage. Prices would then play the function of automatically allocating maize in an economically efficient way.

The current system of fixed prices is a costly operation[23] that redistributes income in a regressive way; price repression is a direct reduction of income of the poor income families that produce white maize, income that is transferred to less poor families in the cities. Price incentives should be given to domestic production in order to achieve higher levels of production, to restore higher levels of self-sufficiency, and to increase rural income levels.

There is a need then to reform the current price and marketing policy, something that has been done successfully some years back in the case of vegetables, and is now being done with almost all crops. Maize has remained under controls due to its importance as a staple. Though still under control, maize producer prices have been adjusted upwards which, combined with favorable rainfall, has resulted in a significant increase in marketed maize after 1987.

A complete liberalization of maize markets has been avoided in order to prevent disruptions that would leave certain deficit districts without adequate supplies of this staple. Thus

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[22] "Economic Policy Framework 1990-92", Draft, 1990, pp. 2-3.

[23] In 1989 the subsidy was in the order of US$2.8 million (59,608 mt bought by AGRICOM at a subsidy of Mt40.60/Kg). In 1990, the subsidy to be received by district warehouses will be of Mt/35.80 per Kg of white maize, equivalent to US$39.25 per mt at the official rate of Mt/912 per US$ (Comissão Nacional de Salários e Precos, 21 February 1990, III.4).

the need to use a phased approach to introduce the reforms. A key objective is to ensure sustainable changes to avoid the possibility of reversals. The phased approach would suggest introducing reforms differentiating between white maize from yellow maize, and would point to beginning the process in those provinces that are away from the hostilities and where maize free markets have been allowed to operate, such as Gaza province.

There will still be some problems to be resolved, even with the gradual approach. Pressures on urban services would still be high, even if male workers spent more time in farm production. Women would have somewhat less say in the acquisition and the utilization of farm inputs and outputs. Inflation will continue to be a problem and public sector employees may yet be dissatisfied with the nature and the pace of the reforms. If middle and upper income wage earners are removed from the rationing roles of Beira and Maputo as we suggest, there may be significant levels of discontentment among those affected. Finally, even gradual removal of price and marketing controls will not remove the envy and dislike of the "Indian" traders. This is a particularly thorny problem in the light of Mozambique's socio-economic history just before and since independence, especially since the recovery of the marketing system will be carried heavily on the backs of the traders. Again, resentments may run high if the private traders appear to benefit superordinately from marketing reforms.

The recommendations are presented in relation to four sets of issues: price and marketing, production, gender, and donor country. In general, the recommendations are in line with Alternative C, that is, the gradual removal of government controls.

Price and Marketing Controls

Price Policy

The government should allow the operation of competitive market forces in the formation of white maize prices; policy would be reformed with the purpose of given maximum price incentives to family farms which account for most of marketed maize. White maize policy would concentrate on enforcing a minimum producer price, which would provide a guaranteed floor level for: a) the months of seasonally low prices after harvest, and b) the areas where buyer competition may not exist.

Even though the maize import needs are currently supplied by donations, the Mozambican economy should be exposed to the forces of the international markets, where the country covers its shortfalls The price signals of that market represent the opportunity costs of maize to the domestic economy. The operation of a private international trade in maize would ensure that those forces are always participating in the formation of domestic maize prices. The method of calculating international parity prices (IPPs) to determine controlled prices has several shortcomings in the context of Mozambique. The IPPs are calculated at the overvalued exchange rate, which underestimates the real opportunity costs of foreign maize; price quotations are those of yellow maize, US Gulf ports, while white maize is priced higher than yellow maize (See

Table No. 18). The annual exercise to revise the controlled prices is an uncertain one, subject to delays that affect production decisions. Instead, the exercise can be used as an inflation fighting tool, rather than as a production incentive[24].

Government objectives with respect to ensuring supply to certain consumer groups would be sought through price control of yellow maize. The government should:

1. Discontinue price controls for domestic (white) maize and flour marketed through the private channel, but continue to set appropriate minimum producer prices for government entities, namely AGRICOM, operating through the public marketing channel. Maximum consumer prices would be set only for yellow maize and flour. Furthermore, the GOM should no longer subsidize marketing deficits incurred by parastatals such as AGRICOM.

2. Give AGRICOM, as the enforcer of the floor price policy, the authority: a) to sell white maize at market prices, b) to increase the minimum price for different provinces[25] to recognize actual transport costs, and c) to increase the floor price over time during the marketing year to recognize storage costs.

The government should enhance the trading position of farmers vis-a-vis the buyers, and contribute to the operation of transparent private markets through:

3. The assembling of price information to be collected nationally and communicated by radio and other media at least weekly.

4. The design and establishment of a system of quality grades and standards for white maize, to be first implemented through the procurement by AGRICOM.

Marketing and Trade Policy

The quantitative restrictions on both international and internal trade have contributed to aggravate the scarcity of maize and other goods in some areas by preventing arbitrage operations and the transfer of grain from surplus areas or countries to deficit areas. By reducing the non-farm goods available in the countryside, the restrictions to rural commerce contributed to depress the marketed maize surplus. The practice of designating district distributors has created concession areas where competition is restricted. One original objective of these quantitative

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[24] The 1990 price review (Ministry of Agriculture, 1989) after considering several alternatives ended up with a producer price increase of 15 percent, the same as the target inflation rate in the PFP.

[25] For the 1990/91 marketing year, AGRICOM will buy and sell in the Gaza province at prices substantially higher than the official ones (AGRICOM, 1990, Annex 14.2).

controls was the desire to have state control of commodity stocks in order to control prices, with the result that scarcity was not felt equally in all parts of the country. Particular urban constituencies are granted assured access to a ration of goods, without discrimination on the basis of income, while poor families which produce maize in the countryside suffer depressed prices and routine scarcities.

The maize marketing policy should aim at contributing to the efficient and opportune supplying of national demand. Each province would gain from trade across its borders: provinces that are relatively low cost producers of maize would have surpluses that would be used to supply the needs of high cost, deficit provinces. Likewise, trade would involve other products which would flow in a direction opposite to the maize flow. Scarcity and abundance in maize and other products would be shared by all provinces. Should extremely low levels of stocks in certain districts lead to speculative attacks on maize, the government could stabilize prices since it would maintain control of buffer stocks of white maize bought at the floor price, and the state mills and importers would control stocks of yellow maize. Likewise, in a more open, non-administrated foreign trade regime, private importers would act promptly to cover expected scarcities from abroad.

In order to accomplish the goal of orderly supply of national needs through competitive markets and by exploiting the comparative advantages on maize production, the government should:

5. Remove barriers to market entrance by private traders. The law should outline the minimum requirements for the exercise of commerce with little room for interpretation by licensing officials. Applicants that fulfill the requirements would be granted a commerce license on demand, and the license should be valid for the whole country, not just a particular province. The current system of licensing marketing agents, as spelled out in Law 7/79 and Diploma 47/80 should be changed to a registration system where those be instituted. Any number of wholesalers should be allowed to operate in each district even if only one is designated as official distributor of controlled goods.

6. Eliminate inter-provincial controls on private white maize trade, by removing the provincial authorities' power to restrict movement of grain. Private traders should be allowed to market their agricultural and non-agricultural commodities wherever they choose to operate within Mozambique. Private traders would move goods from surplus areas to deficit areas helping to balance supply and demand, and reduce price differences among provinces; at the same time, the gains from trade would be reaped since provinces would export those products for which they have a relative advantage, and use the proceeds to import goods for which they do not have a relative advantage.

7. The crime of "illegal commerce" should be better defined than Law 7/79 currently does. The storage of maize should not be considered a refusal to sell at the

controlled prices (the crime of speculation as defined in Decreto 10/82, 10.1). Through storage, private traders would move maize from years of surplus to years of scarcity, helping to stabilize prices.

8. In order to allow a more active interface of the domestic economy with world market forces, the government should abolish the current system of import licenses for white maize and maize inputs. The trade policy should concentrate on the use of import tariffs. If the authorities wanted to make it more or less expensive to import, the tariff could be changed, something that can be done by the Finance Minister under current authority. This system would be more transparent and would not have the uncertainties that characterize the current one. White maize imports with foreign exchange from the parallel market should be permitted without prior license. In the future, yellow maize could also be imported under the recommended, open trade regime. A system of variable tariffs could be instituted to deal with the unstable international prices[26].

9. In order to ensure the smooth transition to a more liberalized market, white maize should be explicitly excluded from the ration system of Maputo and Beira. This would enhance the targeting of food subsidies through yellow, imported maize. Targeting would be further enhanced by removing all upper- and middle-income families from the rationing systems of Maputo and Beira, while retaining the system for low-income families and refugees. In this way AGRICOM would be relieved of any obligation to supply the ration system with white maize, and could sell at the market prices the maize procured at the support, floor price.

Marketing Support Services

10. The transport tariff control should be phased out for private vehicles in order to increase the incentive to own and operate trucks. The official tariffs are largely ignored now, but represent an opportunity for harassment of transport operators. The tariff control could remain in place for public agencies as a way of explicitly subsidizing costs of moving goods to areas not well served because of the security risks.

11. Import licenses for trucks and spare parts should not be restricted but made available on demand. Import policy would be handled through the tariff schedule. After all, the binding import restriction is the access to foreign exchange, and the import license itself only adds complication and opportunity for rent-seeking. Imports should be permitted with parallel market foreign exchange. This measure

[26] This system of free trade and variable import costs, also an import price policy, has been used for the case of in Chile. A white maize import price band is being considered for implementation in El Salvador.

would facilitate the import of equipment through the competitive allocation of foreign exchange and amplified that foreign assistance is designated for the specific use of transportation imports. Initially, credit might not be needed for truck imports since private transporters may have enough of their own resources to pay for the units.

12. An adequate system of road maintenance must be developed with all possible haste for both major highways and feeder roads. The condition of the roads is a significant factor in the poor performance of the maize sector; better transportation will directly enhance maize marketing and production. The Mozambique Transport Sector Report (1989) outlines specific steps and priorities which coincide with few exceptions with the findings of this report regarding the transport sector.

Production Issues

1. The GRPM should continue to dispose of its state farm lands in larger parcels to farmers with adequate knowledge of appropriate agricultural technologies and adequate investment capital to make efficient use of modern inputs. These farmer recipients will become sources of technological information for surrounding smaller farmers, as has happened in some localities in the Maputo Green Zones.

2. The GOM must give a guarantee that farmers currently working their farmland will be able to acquire land titles guaranteeing ownership for themselves and their heirs. The GOM will not have to move quickly on implementation, and in any event cannot (Bruce 1989), but the mere statement of forthcoming private property guarantees will stimulate farmer confidence in the changes the GOM will be making in production and marketing policy.

3. A program whereby fertilizers can be distributed efficiently and effectively to both small *and* middle level farmers should be developed.

4. Remove out-dated stores of fertilizer and seed from State Agricultural Supply Stores (*Casas Agrarias*), and sell or lease the buildings and the remaining physical equipment to private entrepreneurs or mixed state-private companies.

5. Insure that agricultural supply stores are able to receive sufficient quantities of improved maize seeds, such as Matuba, Manica and CW-2. Also, provide agricultural supply store operators with information about appropriate use of seeds and fertilizers. Short courses in agricultural technology for agricultural supply store operators may be an interim solution for the lack of extension agents in most rural areas.

6. Family sector farmers need access to adequate amounts of credit and concomitant problems that ensue in case weather-related problems lead to poor harvests

7. The government must redirect the banking system to increase credit to private sector farmers as it decreases the role of state farms in production. Bank officers must receive training on how to develop credit applications and arrangements for all farmers.

8. The GOM must move immediately to develop an adequate agricultural extension system; assistance applied here can become a very effective way for donors to help Mozambique become less dependent on international aid. Better involvement of the agricultural research institute (INIA) in planning and assisting extension is important in this regard.

Gender Issues

1. When government officials collect data in the agricultural sector, it is essential to disaggregate data by gender, especially in the agricultural sector. This will make the woman's role clearer and can assist better in planning development activities. More research should be carried out to learn more about the role of women in agriculture, taking into account regional differences. Time allocation studies would be particularly useful (See Skjonsberg, 1989, for an appropriate example).

2. Given the very large number of females involved in agriculture, special training of agricultural assistants needs to be carried out so that they have a special sensitivity to the roles of women in agriculture. The GOM should focus on development programs that enhance female contributions to agriculture rather than on petty income methods, such as sewing and crafts.

3. Women must be involved in any land purchase and reallocation schemes. Women's rights to hold, buy sell and inherit land must be explicitly guaranteed and enforced. Women should also be involved in any considerations that deal with capital intensification and credit.

4. Women also play a major role in petty commerce, particularly in the public marketplace. In order to enhance and protect this important, family income-supplement area of female commercial activity, the government should:

   (1) establish a low cost, accessible licensing system for "dumbanengue" vendors, a system that encourages responsible entrepreneurial growth among vendors rather than threatening them with fines and incarceration;

(2) allow informal sector vendors to increase the size of the physical structures they currently use by permitting appropriate vacant lots to become used as vending sites;

(3) for some vendors mobile, tri-cycle type facilities may be encouraged and credit granted for acquisition of this type of equipment. This will allow them to keep their items off the ground, yet enable them to return home and keep the area clear for pedestrians;

(4) permit kiosks to be erected on streets when and where appropriate;

(5) charge reasonable rental fees for spaces occupied by kiosks;

(6) keep registration and licensing laws very simple, especially since most sellers may have poor reading/writing comprehension skills;

(7) if credit is available, provide informal petty merchants with some;

(8) encourage research in the informal sector to know who the vendors are, how they get started, what services they provide, and how their profits are used in terms of capital growth investment and importance to the family;

(9) encourage informal sector vendors to organize into associations to discuss needs, improve practices, and make appropriate gestures for credit;

(10) since the majority of informal sector vendors are women, gently encourage the development of female leadership in the informal sector retail organizations; and,

(11) develop policies in consultation with informal sector women—do not develop policies *for* them. (Initially, this consultation may take the form of research by consultants, with Mozambican counterparts from Eduardo Mondlane University, the Ministry of Commerce and district/city authorities.)

Donor Country Issues

1. Grain donors should be encouraged to reduce gradually over a brief period its donations of maize in order to encourage consumption and subsequent production of alternate grains. This should have a salubrious effect on domestic white maize production. At current import levels, monitoring of the distribution of emergency relief maize donations is impossible. Sharply scaled down donations for emergency relief, though it sounds harsh, may have in fact several benefits: (1)

encourage greater Mozambican self-reliance on food production, (2) encourage peace talks, (3) through improved monitoring of distribution procedures better ensure that those who really need emergency relief get it.

2. Removal of upper and middle income individuals from the rationing systems of Beira and Maputo should be encouraged by donor agents.

3. Donor countries must coordinate their production input donations with private companies operating in the inputs sector. For example, without coordination low cost seed imports may severely damage local, private seed vendors.

4. Donor countries must coordinate their technical assistance programs so as to encourage and facilitate the development of a national Mozambican extension service. The Instituto Nacional de Investigação Agrícola (INIA) should be an integral part of the extension service development plans. The development of an extension service must be a high priority.

5. USAID should carefully reassess its CIP program to decide whether larger supplies of fertilizers, seed and other non-durable agricultural supplies can be included in its procurement plan. It seems that the CIP-financed plan for trucks and parts has been successful in supplying transportation needs for private farmers, but it may not have had as much positive benefit for small farmer needs.

Annex A

Production and Extension in the Provinces of Manica, Sofala, and Gaza

A. Manica

According to information gathered in interviewing the extension agents in the Provincial Directorate of Agriculture, production has fallen in the Province of Manica due to a double price squeeze. On the one hand, official output prices have been controlled by the government, at a pre-fixed level which in the last two years have not covered the rising cost of production. The new maize price of 126.00 MT/kg increased 14.55% over last years' prices, while inflation rates for this crop year were above 25%. On the other hand, input prices, which are not controlled, increased on average more than 50% due to rather scarce supplies.

According to the extension agents interviewed there are three factors which are constraining production:

(a) the tight control on maize prices which do not allow commercial farmers to plant with an adequate amount of inputs (output prices do not reflect costs of production);

(b) the lack of permanent rehabilitation of feeder roads, which is a severe constraint in evacuating the grain at a reasonable transport cost (transporters do not provide services to distant farmers);

(c) the severe lack of trained extension agents in the province.

The maize cropping areas have been continuously cultivated for decades. No fertilization is currently used to recover soil fertility. It is interesting to note how divergent the opinions are concerning yields. One extension agent who guided the consultantsto a distant area in Vanduzi, told us that fertilizer is not at all necessary! However, even a poor farmer of the family sector we talked with told us that the two principal problems plaguing maize production in that region (Vanduzi) were: (a) depleted natural soil fertility, since continuous cropping in the same area produced near total soil exhaustion; and (b) the lack of draft animals for plowing the land and for transport. The extension agents do not have a consistent opinion regarding the question of the need for fertilizer use. This situation may have contributed to the sad situation that Manica is no longer self-sufficient in maize production. It now depends on imported yellow maize for supplying the urban centers in mid-season.

Production in Manica is monitored through a national plan called the State Central Plan (PEC). According to this plan, each province has to produce an expected amount of marketable surplus of maize, depending on previous production and consumption records and production

yields. This is a central planning system in effect since independence. Although it has been adjusted downwards every year, the present levels of these surpluses for Manica are (in total):

	SECTORS	PEC		Other Farmers
a)	State Companies	2800		--
b)	Production Cooperatives	394		203
c)	Private Sector (Commercial)	2700		3800
d)	Family Farm Sector	10000	*	n.a.
	TOTAL	15987		4003

(*)—estimate
n.a.—not allowable

According to this plan, farmers are required to register as members of the Plan. However, many farmers abandoned the Plan in order to market their produce in a free market. At present 4,003 tons of maize is marketed freely, outside the Plan. Last year's estimated surplus was 15,721 tons of maize, and the actual surplus had been only 7,718 tons. This year's estimated surplus is 19,900 tons, but the staffers of the Ministry of Commerce in Chimoio do not believe that the estimated effective surplus marketed through official and parallel market will reach 14,000 tons.

Manica was one of the few provinces which generated some surplus to feed Beira. Now increasingly higher amounts of yellow maize move into the province from Beira. In Sofala, Gaza and Maputo, this Plan and the accompanying control system is not at all feasible.

B. Gaza

B.1 Xai-Xai

The production area around Xai-Xai has approximately 14,000 ha and is located on the left bank of the Limpopo River. This area, like most of the Limpopo River Basin, has top quality soils, although they are too heavy for cultivation by hand. During colonial days it was, and still is, for at least a part of the area, a booming irrigation perimeter developed by the Portuguese colonists. Now the area is divided into 3-4 hectare small farms (machambas), some of them reaching up to 5-7 has. depending on the number of family members cultivating the land. There are a few cases of 24-27 has. The supply of modern inputs in Xai-Xai is practically non-

existent. Farmers plant commercial grains, and the 21 middle-level technicians of the extension service cannot recommend any technological improvements, because there are no inputs available to purchase.

However, the region has a reasonable potential for developing a double-cropping system, at least 21,000 tons of rice and 28,000 tons of maize. Present production does not reach one third of these volumes. An estimated volume of production potential with improved yields is not possible at this point given available technology and extension assistance.

Given the hard soils and the size of the area to be planted in the perimeter, it is necessary to use mechanical technology: tractors and harvesters. Extension agents said there is not enough labor to cultivate the whole area. However, it seems impossible to use mechanical technology in a profitable way without using biological technology as well. And, the supply of mechanical services and the genetic potential of the seeds are both very poor.

This is a rural area with a low level of farming activity, with the perimeter having excess capacity, and with the cultivated land being occupied by small and isolated farmers using low levels of technology. A few extension agents interviewed said this is a "traditional" system of technology being used for decades and which is "very successful". The farmers' practices are influenced by a common wisdom among the extension agents and themselves that "perennial natural fertility of the soils required no use of fertilizer". It will be difficult to break this time-tested belief. Small farmers already exhibit natural resistance to change, a high level of risk aversion, lack of motivation, and face external and internal rationing, being both due to the low level of technology. Environmental, cultural, and behavioral constraints are further enhanced by the extension agents' attitudes towards technology.

There are two other key things to mention:

(a) farmers are growing grain with low levels of yields in areas with high costs of water; in other words, they are doing subsistence cropping in irrigation perimeters (even with high yields it is hard to pay for water in irrigation farming); and,

(b) farmers are doing rain-fed cultivation with water, not irrigated cropping, which are quite different technologies, if the first one can be called so.

These two points have to be properly clarified to the extension agents.

Another point worth mentioning is that the permanent cultivation in the same area exhausts the soil and facilitates the reproduction of streak virus (and also stalk borer). The fields visited exhibited yellow plant leaves and heavy infestation of this virulent pathogen. The sanitary conditions of the crops were the worst possible. That is why the yields in maize do not go beyond 1 ton/ha (and rice beyond 1.5 tons/ha).

With respect to the relative sizes of the marketable surpluses, this region has the same problem found elsewhere in the four provinces visited, particularly Sofala and Manica. The farmers interviewed said they do not produce more because "there is not much to buy". The rural stores, even in safe and protected areas, do not have enough consumer basic goods to offer the farmers. A large family farmer we visited in Xai-Xai has excess capacity and a tractor but does not cultivate all the land available, due to the lack of basic consumer items.

B.2 Chokwe

Chokwe is located in a 30,000 ha irrigation perimeter called Regadio do Limpopo. Out of this area, less than 10,000 ha are cultivated and only a little over 3,000 ha are sanitized. The potential of the area for maize production, at present yields, is approximately 64,800 tons. Today's production reaches less than 9,000 tons. In a double-cropping system, another 45,900 tons of rice could be produced in the same area at present (relatively poor) yields; however, today's production of rice reaches only approximately 11,000 tons. This area has a potential production four times larger than present production.

The perimeter is organized into four farming systems. The first system is the leading sector in technology and includes the stated-owned farms and the commercial private sector. Both sectors use extensive mechanization, relatively high technology, and intensive use of modern inputs. They plant hybrids (PRN 473), use fertilizer (15-30-15) and urea, resulting in generalized yields of 3 tons/ha (NPR doses are 200/250 Kg/ha, and the urea dose is 200 Kg/ha).

The second system includes cooperatives and the family farm sector, which use no mechanization, so that each farmer cultivates a small area, uses draft animals when available, regional seeds, virtually no modern inputs except in some cases, and small amounts of fertilizer—yielding around 1.5 tons/ha. The best seeds used are open pollenization's Matuba, a variety for southern provinces. The family farm sector does not use the hybrids, which are better for the "winter-dry" season, due to technological limitations. The Matuba cultivar, in that season, may yield up to 2 tons/ha.

The critical problems for developing maize production in that area are:

a) Poor management of irrigation systems on the part of the farmer;

b) Farmers do not have access to modern inputs; there are a few insecticides, very little fertilizer available, and no permanent access to a regular flow of modern inputs (no guarantee of a supply);

c) There is no farm credit available, and the BPD only has limited operations in Chokwe agriculture;

d) Infestation of spotted stalk borer (*Chilo Partellus),* Downy Mildew and Streak Virus (this last one has devastating effects on crops and yields);

e) Mechanization is not available and not even tractors for renting custom work are available;

Unless these problems are solved, the maize production in Regadio do Limpopo is condemned to low (if not extremely low) yields.

In terms of extension services, the region is better served compared to other regions. For the 14,770 farmers of the perimeter, there are 15 lower-level technicians, 6 middle-level technicians, and two agronomists. The extension services offer demonstration fields and on-farm tests of new varieties. But still, these services are poor for irrigation technology. Farmers practice a dry-farming system or rain-fed farming system with water, at least in the case of maize, which is something different from modern irrigation farming systems.

C. Sofala

Sofala, once a province which could provide most of the maize for its consumption, now relies heavily on grain imports for subsistence, its maize output is not sufficient to meet demand even in traditional areas where maize was produced, such as Gorongoza, Duanza, and Dondo. The technicians of Provincial Directorate of Agriculture told the team that during the post harvest period, the high grain deficit period of February, maize has to be carried into these areas in sizeable quantities, from imported supplies of yellow maize. This was the only source of maize supply, with surpluses, in the Province of Sofala.

Based on the interviews conducted with farmers, extension agents and technicians in the Sofala Provincial Directorate of Agriculture, the most important factors limiting production are:

a) a low level of germination of the so-called regional seeds, hardly reaching 70%, (in most cases around 60%);

b) depleted soil fertility, after years of cultivation of maize in the same areas;

c) irregularity in the weather, with droughts and floods occurring often;

d) unsafe conditions in the fields, due to frequent attacks of armed groups.

Annex B

Some Problems Associated with Fertilizer Usage in Mozambique

Productivity of maize fields is low compared to other countries in the region (See **Table No. 1**). Fertilizer could improve yields, but they are not used extensively in Mozambique. Availability and cost are major limiting factors, but there are other problems we found associated with fertilizer use. Some of them are:

(a) Compound fertilizer appropriate for specific areas is unavailable;

(b) Some of the donated fertilizer available and still being sold is now old and deteriorated since it has been in storage for as much as two years;

(c) Fertilizer prices are too high relative to current maize prices: in 1984 the farm gate fertilizer-maize ratio was 2.9, and in 1989 it was 3.9;

(d) The differences among households in fertilizer use largely reflect relative income, and particularly access to credit;

(e) Fertilizer use is also centralized among better-off farmers who have access to technology and use an appropriate combination of modern inputs, which means that poor farmers have not been able to have access to technology due to poor extension services;

(f) Where unimproved maizes are grown, the demand for fertilizer is likely to be very modest; most of the seeds planted are called "regional" seeds (which means they have not been selected through a seed program);

(g) It is "common wisdom" among a number of agricultural technicians that without fertilizer, the local varieties are the best options; this is not accurate according to the results from test trials made by the research center for maize at the National Institute for Agricultural Research (INIA);

(h) Although research reports show that yield response to fertilizer use is quite high, agricultural technicians have not been exposed to recent literature along these lines.

Annex C

Maize Research at the National Institute of Agrarian Research (INIA)

Mozambique has a Maize Research Project in the Instituto Nacional de Investigação Agrícola-INIA (National Agricultural Research Institute), within its Departamento de Agricultura e Sistema de Producção-DASP (Agriculture and Production System Department).[27] Among the priorities of the project, the most important are related to collection and improvement of germ plasm, general plant breeding on maize, the introduction of improved exotic germ plasm, the implementation of test trials, on-farm research, tests with alternative technologies to yield improvement, and tests of soil fertility.

Although the research center is small, it plays a critical role in the technological research in the country. The center has approximately five senior staff stationed at INIA's headquarters in Maputo, but the program work spans several provinces of the country. The research unit has published monographs and research reports which are extremely valuable to assess the efficiency of modern inputs in further enhancing maize yields. Their results are summarized in this section of the report in general terms.

Table No. 7 shows the results of trial tests made by INIA staff aimed at identifying superior genotypes that are suitable for the growing conditions in the southern provinces. The trials have been made with 19 varieties, including 3 locally developed ones: the MANICA, MATUBA, and CW-2 varieties. The results show that without inputs the yields are very low. By using modern inputs in Chokwe, yields can increase 6.25 times for the MATUBA cultivar, 13.3 times for MANICA, and 7.7 times for the CW-2 cultivar. These yields show the potential for a dramatic increase in farm income and improved cultivation where maize is produced and consumed.

It is also worth noting that all these local cultivars did as good or even better than all 16 other varieties tested. The most promising genotype was CW-2, a white maize developed in Mozambique by crossbreeding varieties which in previous trials had shown tolerance to maize streak virus, a virulent pathogen which has devastating effects on crops and yields. Maize yields could be substantially increased if the varieties were more broadly adopted, particularly CW-2. It must be said also that MANICA and MATUBA seeds are already available to farmers by seed distributors.

There are a few other research reports which help to assess the present status of technology available to producers in the provinces selected for this study. Their most important findings can be summarized in the following items:

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[27] See, for example, Bueno, A. et al., "Situação Atual e Programa de Investigação de Milho em Moçambique", DASP, INIA, Maputo, 1989.

(a) The Unidade de Direcção Agrícola-UDA (Agricultural Management Unit) which is responsible for agricultural management of the irrigation perimeter of the Limpopo River, currently stationed in Chokwe, issued in 1982 a handbook of extension services and technological recommendations, which indicates that modern inputs such as fertilizers and insect controls, combined with the appropriate selection of seeds will increase maize (and rice) yields to high levels;[28]

(b) This handbook has been updated by research made at INIA, which suggests technological packages for growing maize, including fertilizer use, recommended pest and insect controls, use of insecticides, selection of the appropriate seeds, and control of streak virus (***Chilo partellus***, or "listrado"), stalk borer, downy mildew and termites;[29]

(c) A recent study also has shown that even local varieties, planted mainly in the Limpopo River Valley, are responsive to even moderate levels of fertilization: using almost no fertilizer yields may reach 2.6 tons per hectare, but by using 160 Kg of nitrogen per hectare yields can reach up to 4.8 tons per hectare (these yields must be compared to current yields around 600 Kg per hectare), and with the improved seed yields would reach 5.5 tons per hectare;[30]

(d) Another recent study showed that the control of stalk borer, an insect which causes most of the damages to maize crops in the fields, is economically feasible by the application of Cipermetrina, a pyretroid relatively inexpensive and non-toxic to the farmer (if properly used);[31]

(e) A recent report on cultivar performance, done by a seed distributor (SEMOC), showed the yield potential of Manica and Matuba varieties, and their superiority to imported seeds: among the twenty-one varieties tested (both open pollinated and hybrids), both local varieties and imported Kalahari performed better than the general average, without inputs. With inputs, among pollinated varieties, only Manica gave above average yields.[32]

Finally, there are also other results from on-farm experimentation which shows that the use of modern inputs, at relatively low levels can dramatically increase yields. According to

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[28] See Unidade de Direcção Agrícola (UDA), "Manual de Normas Técnicas Agrícolas", 1982.

[29] See Jimenez, H. et al., "Pacote Tecnológico", INIA, 1989.

[30] See, for example, Instituto Zemun Polje, "Análise dos Resultados da Experimentação Agronômica", 1989.

[31] See INIA, "Broca de Caule", 1989.

[32] See, SEMOC, "Crop Yield Trial. Annual Report 1988/89", Seed Technology Department, October 1989 (research done with the collaboration of INIA and the Department of Agronomy at University Eduardo Mondlane).

information gathered in INIA, the use of modern inputs may have the following increases in yields:

(a) By using the appropriate seeds, such as MATUBA and MANICA, the yields may increase approximately from 30 to 35%;

(b) By using 100 Kg of Urea per hectare, the yields may increase another 50%, approximately;

(c) By using CIPERMETRINA for stalk borer control, yields may increase approximately 25%.

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