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The Pricing and Distribution of Yellow Maize Food Aid in Mozambique: An Analysis of Alternatives

By

MOA/MSU Research Team

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EXECUTIVE SUMMARY

The emphasis of this paper is on commercial food aid; emergency aid is dealt with as it affects food markets. Principal conclusions of the study are:

- Food aid shipments of maize to Mozambique increased sharply in 1992 and 1993, totalling over a half a million tons each year. Since its inception, the food aid program has saved many thousands if not millions of lives. Significant volumes of aid will continue to be necessary for some years to come, yet the fundamental conditions in the country have changed, and the food aid program must change with them. Properly managed, food aid can contribute to the transition to a robust private production and marketing economy. Improperly managed, food aid may derail or significantly slow the process.
- Prior to late 1992, commercial food aid quantities typically did not meet demand at the very low prices that were charged to consignees. As a result, consignees earned sometimes very sizeable excess profits. During this time, fluctuating food aid volumes and uncertain timing of arrivals greatly contributed to retail price instability. Prices charged to consignees had little if any effect on retail prices. Since late 1992, leakage of emergency grain onto markets has combined with very large commercial shipments to drastically reduce prices. As a result, many consignees have certainly lost large amounts of money over the past months. It remains unclear whether the leakage of emergency grain onto markets is under control.
- Evidence indicates that continued large volumes of yellow maize food aid sold at low prices will create disincentives to the production and marketing of domestic white maize. Due to the current oversupply, a rapid increase in consignee price at this time would likely cause a drastic reduction in consignee demand. The current retail price is approximately half of IPP, but is similar in real terms to market prices from mid 1991 through mid 1992. Import parity prices in Mozambique would be far lower than peak prices that have occurred during times of scarcity. Prices in Swaziland present no barrier to import parity pricing of maize in Mozambique.
- Stabilizing dollar prices results in very little metical price stabilization, due to the unstable metical/dollar exchange rate. Yet even an unstabilized IPP in meticais would have been more stable than actual prices in Maputo since 1990.
- In the south of the country, markets can be relied on to distribute food aid quite widely, depending on effective demand. Markets will be increasingly capable of this in the north. Nonetheless, markets cannot be the only means of food aid distribution. In the north, the weak marketing system may be a greater constraint to increased domestic production than is food aid **at this time**. As the marketing system develops, food aid will become an important constraint unless it is properly managed. In the south and especially the central region, food aid currently is a constraint, due to oversupply. If consignee prices remain low, and if demand is met at these prices, white maize producers in these areas will be faced with serious disincentives.

- Information about commercial and emergency quantities and the timing of their arrival is critical to improving the food aid program. This information must be widely available in a timely manner. Greater coordination is necessary between GOM, donors, NGO's, and private sector traders, if the food aid program is to be effectively reformed.

Principal recommendations, meant as a starting point for discussion, are:

- Donors and GOM should begin now to move towards import parity pricing of maize. They should meet soon with past consignees, inform them that a decision has been made and negotiate the best way to accomplish this.
- The move should begin with the next ship of commercial maize; full import parity should be reached by March, or by the first ship that arrives after March.
- Donors and GOM should develop a system for eliciting demand from consignees. A total of 10 to 20 consignees for each boat (for Maputo and Beira) is probably sufficient to ensure competition. See Chapter Five section III.C for more detail. Key issues which need to be resolved include how to select the 10 to 20 consignees to be surveyed, how to create incentives for accurate responses, and how to create incentives for each to take delivery on the amount they indicate in the second round.
- A "step price" approach should be used to price the grain, based on a 60 month moving average of past prices. The marketing year should be March through February. See Chapter Five, section III.B.2 for more detail. A key issue to resolve is what type of explicit incentive, if any, should be offered *armazenistas* to participate as consignees.
- We recommend that a stock of 10,000 to 15,000 metric tons be maintained in Maputo, to prevent price rises above import parity. The price to purchase from this stock might be 15% to 20% above the consignee price, though this should be negotiated with consignees. Anyone willing to buy at least one or two metric tons at a time should have access to the stock, but purchases by individuals during any given month should be limited to 100 or 200 tons. Consider requiring that all payments be made in full upon delivery. See Chapter Five section III.C for more detail.
- Leakage of emergency grain on to the market must be halted as quickly as possible. Unless this happens, any move to import parity pricing will be extremely difficult.
- Once the emergency program is under control, the GOM and donors should move aggressively towards cash for work projects as a partial substitute to continued free distribution and food for work. A key issue to be resolved is how to finance cash for work projects. See Chapter Five, section IV.B. for more detail.
- The GOM and donors should take the lead in forming a commission composed of donors, officials of the Ministries of Commerce, Finance, and Agriculture, NGO's, and interested traders, in charge of planning volumes, collecting information about market conditions, and making this information widely available to the public.
- The commission would need a technical secretariat with one or two well-trained economists and technical advisors familiar with logistical planning, grain storage, and other issues. See Chapter Five section III.C for more detail.

GLOSSARY

AGRICOM	Empresa Nacional de Comercialização de Produtos Agrícolas
CIF	Cost, Insurance, and Freight
CIM	Companhia Industrial da Matola
COGROPA	Companhia Grossista de Produtos Alimentares, E.E.
DPCCN	Departamento de Prevenção e Combate às Calamidades Naturais
EACM	Empresa de Abastecimento da Cidade de Maputo
EACB	Empresa de Abastecimento da Cidade da Beira
EC	European Community
ERP	Economic Rehabilitation Program
EPP	Export Parity Price
GOM	Government of Mozambique
IMBEC	Importadora de Bens de Consumo, E.E.
IPP	Import Parity Price
metical	Mozambican currency (abbreviated "MT"; "meticais" plural)
MOBEIRA	Moagem da Beira
NGO	Non-governmental organization
NSA	Novo Sistema de Abastecimento
SIMA	Agricultural Market Information and Analysis System, located in the Ministry of Agriculture under the USAID Food Security Project, technical assistance from Michigan State University Dept. of Agricultural Economics
UNOHAC	United Nations Humanitarian Assistance Coordination
WFP	World Food Programme

Table 1. Commercial and Emergency Food Aid Arrivals of Maize (Yellow and White) to Mozambique, 1987 - 1993

Year	Commercial	Emergency and Project	Total
	---------- metric tons ----------		
1987	71,888	62,393	134,281
1988	201,444	180,939	382,383
1989	140,973	120,314	261,287
1990	79,323	147,334	226,657
1991	171,690	207,325	379,015
1992	244,892	280,479	525,371
1993	91,852	390,786	482,638
Jan-June[1]	26,852	248,698	275,550
July-Dec[2]	65,000	142,088	207,088

[1] Actual arrivals
[2] Projected arrivals

Source: 1) 1987-1989: Min. of Commerce, Dept. of Food Security as cited in Louis Berger (1991); 2) 1990-1993: MSU data set based on data from Min. of Commerce "Food Aid Pledges and Shipments" Annual Reports; World Food Program INTERFAIS database and UNILOG dispatches database; USAID unpublished data; and EEC unpublished data. See Annex A for more details.

CHAPTER ONE

INTRODUCTION

Over a decade of civil war and highly centralized economic policies, combined most recently with the 1991/92 Southern Africa drought, have made Mozambique one of the most food aid dependent countries in the world. Most food aid is in the form of yellow maize grain, and the United States is far and away the largest single donor of this product. From January 1992 through June 1993, approximately 800,000 metric tons of maize food aid arrived in the country, amounting to 50 kilograms per person during that time (Table 1). The United States

shipped nearly 670,000 MT, or 83% of the total.[1] Total yellow maize shipments have increased irregularly but sharply since 1987.

Historically, food aid for commercial sale ("commercial food aid") has been a significant portion of the total. From 1987 through June 1993, approximately 43% of all maize food aid was meant for the commercial distribution network. In years previous to the 1992 drought, commercial food aid comprised a larger share of the total. Officially, all commercial food aid was marketed through the *Novo Sistema de Abastecimento* (NSA), a system of ration shops set-up in Maputo, the national capital, and Beira, the principal commercial city. Created in 1981 in Maputo and 1986 in Beira (Alderman, et al., 1991), the NSA was meant to provide a dependable supply of a minimum subsistence ration of basic staples to registered residents of the two cities. Initially, a large proportion of urban and peri-urban residents in the two cities obtained most of their food from the NSA. With increased immigration of rural residents to the cities in the early 1980's, the capacity of the system began to be strained. By the mid-1980's, as the first informal food markets began to emerge, the role of the NSA had further diminished. In recent years, the system has almost completely disintegrated. From October 1991 through May 1992, less than 8% of the yellow maize grain, and only 3% of the yellow maize flour consumed by Maputo residents was purchased in the NSA (Sahn and Desai, 1993). In 1993, no product has been sold through the system.

The progressive decline of the NSA has coincided with the vigorous growth of private food marketing activities in Mozambique since the first economic liberalization measures were instituted in 1985. In that year, vegetable markets were liberalized, and informal markets quickly emerged. In 1987, the scope of liberalization was dramatically widened with the beginning of the Economic Rehabilitation Program (ERP). Since that time, progressive liberalization has lead to a flourishing food trade throughout southern Mozambique.[2] By 1989, informed observers estimated that no less than 25%, and as much as 80% of the maize meant for distribution in Maputo through the NSA was in fact being sold in informal markets (USAID/Maputo, 1990). In 1991/92, 82% of the maize meal, and nearly 60% of the maize grain consumed by Maputo consumers was purchased in these informal market places (Sahn and Desai, 1993).

The dramatic expansion of informal food marketing activities in Mozambique since 1985 is generally seen as a positive response to the significant policy liberalization that has been instituted during that time. Most donors and policy analysts agree that continued development of the private food marketing sector is one of the keys to rejuvenating Mozambique's domestic food production and allowing the country finally to emerge from its extreme dependence on food aid. With the signing of the peace accords in late 1992, the prospects for rapid growth in

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[1] MSU data file FAMERG.SYS. See Annex A for documentation. The calculation of per capita shipments assumes a resident population of 16 million. The food aid figures include both commercial and emergency grain from all donors. Most was yellow grain, but a small proportion was white.

[2] For a more detailed analysis of the informal food marketing sector, see MOA/MSU Research Team, 1993.

domestic food production, and for effective private distribution of that production, are more promising than they have been at any time during the past two decades.

Whether this promise is met will depend on a broad set of factors, including macroeconomic policies, reform of the country's legal system, and the level of public and private investment in infrastructure and productive enterprises. The country's extreme dependence on food aid, however, means that the way in which commercial and emergency aid are managed over the next several years will also have a role to play in the transition to a more prosperous economy. Used correctly, this aid can bridge what is expected to be a narrowing gap between consumption needs and the country's ability to meet those needs (through both domestic production and commercial imports), while at the same time promoting the emergence of a dynamic private production and marketing sector. Inappropriate use of food aid, however, can create significant barriers to this transition, and might leave the country unnecessarily dependent on concessional imports for some time to come.

Three key management dimensions will determine whether food aid facilitates or impedes this transition. These are a) the programming of food aid quantities, both emergency and commercial, b) the pricing of commercial food aid, and c) the design of systems for the distribution of commercial and emergency food aid. Each of these dimensions must be thought out carefully in the context of peaceful, market-lead development in Mozambique.

This report has four broad objectives:

1. To clarify the conceptual issues involved in determining the effects of commercial and emergency food aid on Mozambican producers, traders, and consumers;

2. To analyze the specific conditions in Mozambique that will mediate these effects;

3. To evaluate the effects on Mozambican producers, traders, and consumers of alternative approaches to quantity programming, pricing, and distribution of food aid, including a move to import parity pricing of commercial yellow maize food aid; and

4. To propose a system for the programming, pricing, and distribution of food aid in Mozambique.

The report will focus primarily on commercial food aid. Nevertheless, Mozambique's continued need for emergency aid for some years to come, and the effects this aid may continue to have on markets, require that it also be given attention. Thus, emergency food aid issues will be dealt with as they affect markets and producer production incentives.

The report is based on intensive work carried-out by faculty and staff of the MOA/MSU Food Security Project on the food aid issue over the past three months, as well as information gathered and lessons learned by the Project over the past three years. In early June, an MSU Research Associate travelled to Mozambique for two months to intensify the investigation of the food aid issue in collaboration with in-country staff. She and the Mozambican staff conducted interviews with 15 Mozambican consignees and numerous informal traders, and officials involved in the food aid program. Due to the importance of white maize trade within

the region, she also travelled to Swaziland and South Africa to consult with traders and government officials in those countries. While there, the project developed a better understanding of the influence of policy in those countries on the white maize trade. This is an issue which will be quite important in evaluating any move to import parity pricing for yellow maize in Mozambique. In addition to extensive interviews, an attempt was made to collect data on food aid arrivals from as many sources as possible, and to create as accurate a data base as possible on those arrivals.

The report is organized as follows. Chapter Two speaks to the objectives of food aid in Mozambique, including the implications of the ending of the war for those objectives and the means by which they are pursued. Chapter Three reviews Mozambique's experience to date with food aid, chronicling the break-down of the NSA, the emergence of informal markets, and the situation as of mid 1993. Chapter Four presents conceptual and empirical views of the effects of food aid on retail and producer prices. Both abstract economic theory and detailed knowledge of market conditions in Mozambique are used to draw conclusions about how food aid might affect prices at each level. Based in part on this analysis, Chapter Five presents a detailed discussion of alternative approaches to the programming, pricing, and distribution of food aid, including both commercial and emergency. Chapter Six presents conclusions and recommendations.

CHAPTER TWO

THE OBJECTIVES OF FOOD AID IN MOZAMBIQUE

Mozambique's transition to a peace-time economy, which began with the signing of the peace accord between FRELIMO and RENAMO leaders on October 4 1992, has important implications for the objectives and management of food aid. It is important that the nature of these implications be understood if food aid is to facilitate the transition out of war and into a dynamic economy with effective markets and economic institutions. In addition, it is necessary to understand the sometimes competing interests of food aid donors and recipients.

I. The Transition to Peace

Within Mozambique, donors and the GOM largely agreed on the principal objectives of food aid prior to October 1992. The overarching objective was to bridge the gap between domestic production and some measure of food needs. Related objectives were to ensure a safety net for urban consumers (i.e., low cost supplies of selected staple foods), and to provide relief for impoverished rural residents, primarily *deslocados*, without sufficient production or effective demand to meet basic caloric needs. Other shared objectives were to save foreign exchange and finance development activities.

These objectives were not substantially different from those in many other countries receiving large amounts of aid, and were probably appropriate, given Mozambique's precarious condition throughout the decade of the 1980's. Domestic production except for family sector subsistence had largely collapsed, such that, by 1988, total grain imports (both commercial and as food aid) amounted to 85-90% of total marketed supplies (Kyle 1991). By 1989, the value of exports had fallen to only 13% of imports (the latter not including the imputed value of food aid), and the current account deficit for that year was more than $750 million (Kyle 1991). In rural areas, even in the higher potential north, substantial proportions of family sector households were caught in very low levels of income and calorie consumption (MOA/MSU 1992b). Without question, the food aid program prevented the starvation of thousands, possibly millions, of people.

Despite this, two qualifications need to be raised in any discussion of the objectives and success of food aid in Mozambique. First, the success achieved in attaining the objectives has been mixed. The safety net was initially pursued through the sale of commercial food aid through the NSA at prices well below CIF levels. The eventual failure of this system has already been discussed. Emergency food aid was channelled to impoverished rural households through a system of government enterprises (primarily DPCCN - *Departamento de Prevenção e Combate às Calamidades Naturais*), bilateral and multilateral donor organizations, and private non-governmental organizations (NGOs). This system suffered from serious problems, though as mentioned it undoubtedly saved many lives. Principal among the problems were large diversions to informal markets of grain meant for emergency distribution, with negative consequences for markets for local production (see below).

Foreign exchange savings were a natural outcome of the food aid program, facilitated by the donors largely dropping the typical "additionality" condition. This is a condition in U.S. food aid legislation which requires that aid be additional to normal commercial imports in the receiving country, rather than substituting for those imports (Ruttan 1993). This requirement is related to the surplus disposal objective of the U.S. government, and is an attempt to use food aid to increase the total amount of exports, concessionary and commercial. At the same time, U.S. legislation states that food aid should not cause any production disincentives in the receiving country. Yet by making food aid additional to normal imports, total supply in the receiving country is increased, which will, under most circumstances, reduce prices below what they would otherwise have been. Producers can thus face reduced production incentives. These two objectives, to ensure additionality and at the same time avoid production disincentives in the receiving country, thus are in clear conflict. The difficulties of reconciling them are central to many struggles over food aid throughout the world.

While foreign exchange has been saved through the program, the same straightforward success cannot be claimed for the financing of development projects. Significant funds have been generated, yet the World Bank's 1989 Food Security Study concluded that the amounts deposited in accounts for the recuperation of counterpart funds from the sale of commercial food aid reached only 13% of the CIF value of the donated commodities in 1988 (cited in USAID, 1990)[3]. The reason for the very low figure was a combination of government fixed sales prices below import parity, and difficulties in collecting funds on all delivered product, associated with large leakage into informal markets. The foregone revenue amounted to nearly 10% of expected total tax revenue during that year. In recent years, increased GOM and donor attention to this issue has improved collection rates.

The second qualification is that, due apparently to the war, certain concerns that typically accompany a high reliance on food aid were pushed to the background. For one, the effects of food aid on domestic production were not given top priority during the war. Too, the promotion of private sector food marketing activities was not initially given a high priority in the commercial food aid program, though this began to change over the past two years. The reduced emphasis given to these two concerns was probably appropriate in a war-time setting. Rural marketing risks and the difficulty of buying food and consumer goods in rural markets had already pushed many smallholders towards a marked reliance on own production to ensure their survival (MOA/MSU 1992b). The prospects for a vigorous marketing response in the midst of the war could not be considered good.

Yet Mozambique is no longer at war, and it has staked its economic future on making a successful transition to a market economy with a largely private production and marketing sector. Thus, the objectives of the food aid program, and the means of attaining them, must be rethought in the context of this transition. A key question is whether commercial food aid should be used to create a new urban safety net to replace the NSA, or whether it should be used simply to close the gap between market demand and supply (from domestic production and imports) at market prices. Regarding emergency food aid, a key challenge will be to design a system that will meet the needs of impoverished rural residents, refugees returning

[3] See also Riley (1992) for a more recent discussion of the collection of counterpart funds.

from Malawi, and demobilized FRELIMO and RENAMO troops while not impeding the transition to increased domestic production and marketing.

II. The Compatibility of Donor and Mozambican Objectives

The strongest and most persistent criticism that has been formulated against food aid in general, not just in Mozambique, is that it creates a discincentive for domestic production, thereby contributing to long term dependence.[4] This criticism stems from the use of food aid by industrialized countries as a tool for surplus disposal. In this argument, the recipient country's need for the product is given secondary importance relative to the donor's desire to a) reduce the costs of its own agricultural policies through reduction of stocks, and b) open new markets, increasing commercial demand for donor production and thus reducing the need for donor governments to accumulate future stocks. The additionality requirement in U.S. food aid legislation is one outgrowth of this concern in donor countries. Yet, as mentioned previously, U.S. legislation also attempts to guard against production disincentives, so that no simple portrayal of donor objectives captures the whole truth.

Before the disincentive issue can be clearly addressed, one must answer the question "disincentive compared to what"? If we begin with a closed economy whose market clearing price is above the import price, then any import, be it commercial or concessional, will decrease domestic market prices. This will create a "disincentive" for local production compared to the previously closed situation. Thus, a yardstick is needed against which to measure whether a disincentive has in fact been created. In what follows, the world price will be used as that yardstick. Any policy which results in market clearing domestic prices below the export parity price (EPP) will be judged to cause a disincentive to local production, while any policy that increases these domestic prices above the import parity price (IPP) will be seen to cause an artificial production incentive.[5] Market clearing prices between export and import parity will be considered neutral.

Empirical evidence across many countries indicates that the disincentive criticism has been exaggerated (Von Braun and Huddleston, 1988). Probably the most important conclusion that can be drawn from the many studies of food aid is that government price and import policy in general, and its policy toward food aid in particular, are the primary determinants of food aid's effects on domestic production. Quoting Timmer, et al. (1983):

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[4] See Isenman and Singer (1977) for an early review of this issue. See also Von Braun and Huddleston (1988), Jones (1989), and Shaw (1991).

[5] The concepts of import parity and export parity prices will be important throughout this paper. The IPP is a measure of the opportunity cost of domestic production for a country which imports the product, or which would do so if policy permitted. It is the price the country would pay if it imported, and is calculated as the CIF world price adjusted for transport costs to internal consumption points. The EPP is an opportunity cost measure for a country which exports, or which would do so if policy permitted. It is the price the country would receive to export to world markets, and is typically considered to be equal to the FOB price in the relevant world market port (e.g., U.S. Gulf).

> Countries that relied on food aid supplies to keep prices low (relative to world prices) created serious disincentives for their farmers. In countries where aid displaced imports, did not distort farm prices, and had a large enough flow to affect the level of ... resources available for development, its impact was entirely mediated by the ... (country's) development strategy. When this was positive ... aid helped. When it was not ... it did not. (p. 289, parentheses added)

Table 2 summarizes the extent to which recipient and donor country objectives are attainable under alternative management policies for food aid. Each column represents a different

Table 2. Relationship Between Food Aid Characteristics and Donor and Recipient Country Objectives

	Is Objective Attained when Food Aid is:		
	Not Additional to Normal Imports and sold at Market Prices?	Additional to Normal Imports and Sold at Market Prices?	Additional and Distributed Free to "Vulnerable Groups"?
RECIPIENT OBJECTIVES			
Avoid Disincentive	Yes	No	Probably not
Save Foreign Exchange	Yes	No	Yes
Increase Consumption	No	Yes	Yes
Increase Dev. Resources	Yes	Yes	No
DONOR OBJECTIVES			
Reduce Stocks	No	Yes	Yes
Open Markets	Possibly (long term)	Probably	Possibly

Note: Adapted from Von Braun and Huddleston (1988)

management approach, or food aid policy, and the body of the text indicates whether each of the given objectives is obtainable under each approach. Clearly, not all objectives are attainable under a given policy. If disincentives to local production are to be avoided, commercial food aid must not be additional to normal imports. Thus, the recipient country objectives of increased consumption and expanded development resources must be given lower priority, as must both of the donor objectives. If donor objectives or recipient country consumption objectives are pursued aggressively, production disincentives will likely be created, and foreign exchange will not be saved.

Local donor missions can play a key role in balancing the interests of host and donor country governments with the interests of recipient country citizens, both consumers and producers. Three key challenges in Mozambique are:

a) to develop a system to decrease commercial food aid shipments in an orderly way and in response to market demand for yellow maize within Mozambique,

b) to reduce emergency shipments in response to real reductions in need, and

c) to redesign the distribution of emergency aid to minimize negative impacts on local production and the development of local markets.

Two aspects of local market development are relevant, and each can be negatively affected by poor food aid management. The incentive to produce for the market is directly related to expected price levels, which can be dramatically influenced by food aid quantities. Price levels may also affect incentives for traders to participate in the market, but probably more important is the way in which food aid is delivered. Commercial food aid going to very few consignees obviously decreases competition, at least at some levels of the system. Free emergency distribution, if not targeted very effectively to those without effective demand, may remove much of the market for commercial traders and processors. Neither of these situations is conducive to the development of a healthy private production and marketing sector in Mozambique.

CHAPTER THREE

FOOD AID AND MARKETS: THE MOZAMBICAN FOOD AID EXPERIENCE TO DATE

I. The NSA and Food Rationing in Maputo and Beira

In the early 1980s, the combination of weather problems and war interrupted the supply of food to the cities, causing long lines and shortages. Coupled with decreased exports and a lack of foreign exchange, commercial imports could not meet the food needs of the cities. In response, the government of Mozambique established the *Novo Sistema de Abastecimento* (New Supply System) (NSA) to distribute and ration limited food supplies, first in 1981 in Maputo and then in 1986 in Beira. Goods under the fixed price NSA regime were yellow maize grain and flours, rice, sugar, edible oil, beans, dry fish, salt, and soap. The central government fixed prices at all levels of this system and organized supplies and distribution through government warehousing agents and wholesalers (EACM in Maputo and EACB in Beira). Marketed food aid was imported for distribution until September 1990 through using IMBEC (*Importadora de Bens de Consumo, E.E.*) and then through COGROPA, EACM, CIM and Mobeira. As the main mills in Maputo and Beira, CIM and Mobeira received grain which was processed into a partially de-germed meal for distribution within the NSA system[6]. COGROPA was responsible for the distribution of food aid grain within the system, while EACM and EACB distributed flours and other products for the NSA. The DPCCN handled emergency food aid supplies in a completely separate operation, distributing commodities free of charge in rural areas, often in collaboration with international NGO's.

After functioning with some effectiveness for the first few years, the NSA began to lose importance. From 1987 onward, fewer and fewer supplies were available from NSA shops. The combination of unreliable and irregular arrivals of food aid and the emergence of private sector markets reduced consumers' dependence on the NSA shops. Substantial leakages occurred from both the NSA and the emergency distribution system into the private sector. Louis Berger International (1991) estimated the leakages from the NSA to be 50 percent or greater in 1990/91. This does not mean that the food aid left the human food chain[7]; instead, the maize was available through the local *dumbanengue* (informal market, called *chungamoio* in Beira), at a higher price than that officially set for the NSA shops.

II. Economic Rehabilitation Program (ERP) and Food Aid Allocations

As discussed earlier, in 1987 the ERP greatly broadened the scope of market liberalization efforts which were already under way in the country. As a result, markets for a wide range of food and non-food items rapidly sprung-up in urban areas. Over time, these markets spread to

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[6] Discussion concerning meals and their quality can be found in Chapter V.

[7] The Mozambican livestock sector basically disappeared during the war, so leakage into feed was not a difficulty there, unlike other countries in the region.

outlying rural areas. The objectives of food aid under the ERP still include assuring accessibility of the poor in urban areas to staple foods. However, the program placed increased importance on the role of commercial food aid in providing counterpart funds to the Government for general budgetary support as well as for specific development purposes. Both the Mozambican Government and the donors sought to introduce greater fiscal responsibility into the commercial food aid system. Public sector agents, including CIM, IMBEC, and COGROPA, were in arrears in the payment of counterpart funds, so donors and the Ministry of Commerce approached the private sector in 1991 to receive and market food aid, particularly yellow maize shipments in Maputo and Beira. Private firms were the direct consignees for 20 percent of the total 1991 commercial yellow maize food aid shipments (23,000 out of 113,000 mt; Austral 1992). By 1992, this figure had risen to approximately 75%.[8]

Private sector consignees were chosen on the basis of financial capacity and likelihood of payment of counterpart funds, logistical capability (transport and storage), and geographical area of operations. This latter criterion was used in an attempt to allocate specific quantities to various regions of the country. When the Ministry of Commerce requested food aid, regional allocations were specified and consignees were selected to distribute according to that allocation. A consignee was authorized to receive product for Nampula province, for example, if it had a major center of operations in Nampula. However, there was little enforcement of the distribution of such allocations by the Ministry of Commerce. While it is clear that some consignees did distribute in the areas they were assigned, it is also clear that much grain flowed purely in response to market prices. The amount of supplies that actually were distributed outside the port cities is thought to be quite large, but cannot be accurately quantified.[9]

Allocations to specific traders and parastatal consignees are usually decided by a committee composed of representatives of the Ministry of Commerce Department, the Ministry of Finance, and the Bank of Mozambique. Several traders in Maputo and elsewhere complained that the decision making process is not transparent. Traders do not know why they receive amounts that are less than or greater than the amount that they solicited. In some shipments, more than three times the amount of grain arriving was requested, so the government had to ration the quantity among consignees. Some consignees have raised the issue of favoritism in the allocation of limited quantities.

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[8] Of the estimated 245,000 mt of commercial grain that arrived in 1992, 170,000 have already been delivered to private sector consignees. These amounts give a figure of 69%. 26,000 mt are still in the warehouses at the port and listed under ownership of the Ministry of Commerce. If all of this grain is eventually delivered to private consignees, they will have received 80% of the total (196,000/245,000).

[9] See MOA/MSU (1993) for more detail on the informal food marketing system in Maputo and southern Mozambique.

The allocation system has been superseded in some cases by the donors, an example being the July 1992 maize shipment from the EEC. The EEC places very high priority upon financial solvency and payment of counterpart funds. Ensuring competitive marketing of the food aid appears to be less of a concern. In the case of the July shipment, the EEC chose two private consignees, one a wholesaler and one a miller, to receive 7,500 metric tons each. In contrast, the USAID shipment received about three weeks later was allocated to 27 consignees by the interministerial committee after a newspaper announcement soliciting requests for allocations.[10]

Maximum prices for food aid products have been set by the *Commissão Nacional de Salarios e Preços*, not by the Ministry of Commerce. In their efforts to keep food prices low, the prices for many goods were regulated at all levels from consignee to retail level through 1987. With the ERP, some products were deregulated, but yellow maize was among those goods for which the government continued to set price until very recently. In August 1993, the prices for yellow maize and remaining consumer goods were officially liberalized, legalizing what had already been occurring in markets for at least two years. The market prices for food staples are thus determined by supply and demand forces for each commodity.

III. The Informal Retail Sector

The entrance of private traders as direct food aid consignees was less important in the weakening of the NSA than the emergence of parallel markets throughout the major urban areas. From 1987 onwards, in both Maputo and Beira, informal markets became a major source of consumption goods, particularly for lower income consumers. The official retail prices were below the informal market prices for maize products. However, there was a substantial margin for owners of NSA shops and others to divert foods from the official market to the *dumbanengues*. For example, in May of 1992, the official price of maize grain sales to the public was 485 meticais per kg, while the average retail price for yellow grain in Mucoriama market in Maputo was 45% higher, at 702 meticais per kg (USAID/Maputo unpublished[11]). These diversions, coupled with the irregular arrival of food aid supplies, resulted in NSA shops' inability to meet consumer needs. Sahn and Desai (1993) present survey results indicating that only 34.6 percent of households in Maputo with ration cards actually purchased any NSA commodities (during the survey period October 1991 - April 1992), whereas the parallel markets accounted for up to 82 percent of household purchases for NSA commodities (82 percent for yellow maize flour with bran; 59 percent of yellow maize grain). In addition, informal markets present advantages for low income consumers, primarily in the ability to make very small purchases on a daily basis.

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[10] See MOA/MSU Research Team (1993) for more detail. Note that the number of consignees on the previous shipment in May, 1992 was less than 10.

[11] All prices in this paper are stated in nominal terms unless stated otherwise.

IV. Commercial Maize Imports

Aside from national production of white maize, the informal sector obtains yellow maize from diverted food aid and white maize (mostly meal) from small scale commercial imports from neighboring countries. In Maputo, maize products, along with sugar and wheat flour, are imported by small scale traders (primarily women), although the quantity of these unofficial imports is unknown. Since those imports violate Customs Union (SACU) agreements for Swaziland and import duties are rarely paid in Mozambique, maintaining records is difficult at best.[12] The Maputo/Manzini road was open even during times of war, but hijackings and attacks limited traders' travel to periods when the price margins were fairly high. In July and August of 1992, monitoring of the Basuca wholesale market in Maputo indicated that 11% of the volume of **all** products arriving came from Swaziland and South Africa (MOA/MSU Research Team 1993). Of all white maize grain and meals arriving in the market, 49.8% was from Swaziland. This is consistent with the historical importance in Maputo of the white maize trade with Swaziland, but white maize supplies throughout the region were extremely scarce during this period due to the southern Africa drought. Thus, it is unclear whether this figure reflects Swaziland's typical share in the Maputo market. Although the risk of attack has decreased with the signing of the Peace Accord, informal trade in maize products between Mozambique and Swaziland has not increased due to the relatively high cost of white maize products in Swaziland, and the over supply of yellow maize in Maputo. Imports depend upon the relative prices of products in the countries as well as the risks and costs of transport and availability of foreign exchange.

As will be discussed in more detail in Chapter Four, the presence of large maize stocks in Mozambique has kept prices low in the country; however, as these stocks diminish, through consumption or deterioration, prices should begin once again to rise. The informal flow of maize products from Swaziland, Zimbabwe, Malawi, or South Africa should then increase to more normal levels.

Currently there are no large scale commercial maize imports to Mozambique, though rice is imported in this way. When asked why the two products were so different in this regard, traders indicated that maize trade is a high risk venture for them. The planning of emergency and commercial food aid shipments is not transparent. Food aid shipments are often delayed or rescheduled, volumes are changed, and there is no systematic mechanism for making that information publically available. One trader said that he depended upon faxes from port authorities around the world to know what was due to arrive in Mozambique. Most traders are not so well connected, and therefore are subject to great uncertainty. Traders also raised the issue of grain quality. Given the price risks indicated elsewhere in this paper, traders prefer to deal with rice and other commodities for which the aid shipments are smaller, the price risks are smaller, or the margins are greater to cover the risks.

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[12] For the 1993/94 marketing year, it was estimated that 10,000 metric tons would leave Swaziland for Mozambique (Famine Early Warning System, Ministry of Agriculture and Cooperation, Kingdom of Swaziland). This number was estimated to evaluate food security for Swaziland and should be used with caution as an approximation. Actual quantities may have been significantly larger.

Regional trade in white maize only occurs informally at the present time, although triangular aid purchases have been used in the past. The triangular purchases involve commercial transactions in one country (for example, WFP purchases maize in Zimbabwe) for delivery as food aid in Mozambique. This kind of trading seems more likely in the future than formal commercial trade in maize between Mozambique and its neighbors. Traders in South Africa and Swaziland mentioned the legal difficulties and high costs with operations in Mozambique. One trader from South Africa indicated that his firm closed a Maputo office because it could not compete in the market without informal payments at the border and other illegal activities. Informal trade is likely to continue.

V. The Current Situation

To avert famine with the recent drought, donors responded with large quantities of food aid. Between August and December 1992, approximately 330,000 metric tons of yellow maize arrived in Mozambique as emergency, commercial, or project food aid (WFP 1993b[13]). This is more than double the amount of maize grain that entered the country during the same period of 1991. Looking at the period when the prices were relatively stable, from July 1990 through July 1991, the average monthly arrival of commercial yellow maize grain was about 9,000 metric tons. Just for the commercial programs, the average monthly arrival during the last five months of 1992 was 39,000 metric tons. These unprecedented volumes badly strained storage and distribution capacity. The important lesson from this episode is the need for much better coordination among donors, GOM, and private sector consignees.

As a result, both private and public sector agents in Mozambique have experienced since at least February 1993 serious difficulties with yellow maize. The difficulties include existing stocks in poor quality, continued arrival of new emergency grain, very low retail prices in some areas (even below prices paid by consignees), as well as substantial leakages of emergency food aid on to the market. Through a lack of coordinated emergency and commercial food aid planning and poor timing of some aid arrivals, there are surplus stocks of yellow maize in Maputo and Beira. In Maputo, commercial food aid maize stocks were estimated to be 37,900 metric tons on July 14 1993, most of which arrived in late 1992. On the emergency side, 76,000 metric tons for reserve stocks arrived during July, of which 51,600 was for Maputo and the southern zone, augmenting what was already in country.[14] These stocks and arrivals coincide with the harvest period for domestic white maize production, which occurs primarily from April through August. SIMA data shows that yellow maize prices were very low not only in port cities, but also in interior areas such as Gaza and

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[13] Accurate data is difficult to come by, and different sources can give different numbers. See Annex A for documentation of the data base constructed by the authors.

[14] WFP (WFP, 1993a) estimates emergency maize stocks of 58,198 and commercial maize stocks of 38,200 throughout the country as of 1 May 1993. Emergency requirements for Maputo province are 10,962 over the May 93 - April 94 period; total emergency needs for May 93 - Dec 93 in Maputo, Gaza, and Inhambane provinces are 33,233 metric tons for returnees and internally displaced persons. This does not include anything for the market sector; it is strictly emergency needs.

Inhambane in the south and Manica and Chimoio in the central region. White maize prices were also extremely low in the central region.

To estimate maize stock needs and outflows, it is necessary to estimate the consumption needs in both the markets and the emergency programs. World Food Programme and the Ministry of Commerce Department of Food Security have worked to determine those needs, but without a new census and detailed information on refugees and internal migration of population, it is difficult to assess the expected drawdown from stocks. Recent estimates for monthly consumption in the southern zone of the country are for 12,000 metric tons of maize for the emergency programs. In the past, monthly arrivals of 9,000 metric tons of commercial food aid have resulted in relative price stability, giving at least an approximation of demand in the market sector. In the hands of just the private agents in Maputo, there were about 30,000 metric tons of commercial yellow maize grain in mid-July. White maize stocks are unknown; some private traders have purchased white maize from local production and will retain it in storage; but some traders indicate that by October, additional maize supplies will be needed. Most of the current stocks of yellow maize are in poor condition and will most likely not be acceptable for human consumption by October.

White and yellow maize are close substitutes and their prices tend to move together, except during times of great scarcity.[15] Figure 1 of Chapter Four indicates that since December 1992, the price of yellow maize has been relatively stable, around 450-500 meticais per kilo, in spite of no significant commercial food aid arrivals since January. For the first time, the private sector demand for yellow maize has been met and exceeded such that consignees do not take their full allotment and stocks remain in government possession in warehouses. At least one reason for the lack of interest in commercial food aid stocks is the presence of emergency supplies in many markets, reducing demand and depressing the market prices.

[15] The degree of substitutability between white and yellow maize is central to a discussion of the potential disincentive effects of yellow maize food aid on white maize production. This issue will be addressed in more detail in section IV of Chapter Four.

Given the transport and communication difficulties within the country, surplus yellow maize food aid in some areas depresses the prices for domestically-produced white maize, while in

Table 3. Mean Retail Market Prices of White and Yellow Grain in Selected Areas of Southern, Central and Northern Mozambique, May-September, 1993

Location	White Grain	Yellow Grain
Southern Region		
Maputo	777	412
Xai-Xai	948	463
Chokwe	829	301
Inhambane	1057	425
Massinga	595	434
Central Region		
Beira	365	257
Manica	254	150
Chimoio	278	178
Northern Region		
Nampula	526	451
Ribaue	396	NA
Monapo	424	NA

NA = Not available in market
Source: SIMA, MOA/MSU Food Security Research Project

other markets prices for white maize remain relatively high (Table 3).[16] For example, in the central region (see Figure 2 in Chapter Four for a map of Mozambique) prices of both yellow and white maize grain were extremely low between May and September, 1993. As a point of comparison, the minimum **producer** price for white maize grain during 1993 was 425 MT/kg, nearly 70% above the mean retail market prices in Manica and Chimoio, and 16% above the retail price in Beira. The consignee price (wholesale level) for commercial food aid yellow

[16] See section IV, Chapter 4 for further discussion of the effects of yellow maize food aid on white maize prices.

maize was 329 MT/kg during this time, about double the retail yellow grain prices in Manica and Chimoio and 28% above the retail price in Beira. On average in the central region, white grain prices were about 50% greater than yellow grain prices.

In the southern region, yellow maize prices were approximately double those in the central region, but still low when compared with the marketing costs which must be added to the 329 MT/kg consignee price. Despite the large amount of yellow grain in the market, white grain prices could not be considered depressed in this area (as they were in the central region), averaging 841 MT/kg, more than 100% above yellow grain prices.

White grain prices were relatively low in Nampula province of the northern region, though this does not appear to be directly related to the presence of yellow maize in the market: this grain never appeared in the Ribaue and Monapo markets, and was present only during five weeks in Nampula city.

Traders outside Maputo complained of the irregular arrivals of large quantities of emergency yellow maize food aid which would swamp a local market, making it impossible for the commercial sector to operate. Leakages from emergency food aid arrive on the market in two basic ways: illegal diversion from the program, and families selling food they obtained in food for work or free distribution programs to purchase other goods. In small markets, the latter influence is thought to be important, whereas in larger markets, such as Xai-Xai, the illegal movement of emergency maize results in a selling price below the consignee price for maize, as occurred in July 1993. Entire truck loads of grain have been known to disappear.

When yellow maize is distributed free or against work to households during the white maize harvest, yellow maize flows back into the markets. Households prefer white maize when it is available, depending upon the relative prices of the two grains. After years of war and at least a year of drought, households may use the cash from yellow maize sales to make long-delayed purchases or to pay back accumulated debt. While this benefits the individual households making the sales, it contributes to the depressed prices in markets, and thus undercuts local producers.

The prices for yellow maize in Manica and other markets in the country indicate that yellow maize emergency food aid must be entering the markets either through household sales or through theft, since retail prices are below those of the consignees, excluding even transport costs. In eight markets of the Agricultural Market and Information System (SIMA), the average May retail price was below 329 MT/kg, the consignee price at port (PSA_M. MA/MSU, May 1993). With such low prices, consignees with stocks would have to sell yellow maize at a loss.

In all commercial food aid shipments prior to November 1992, consignees competed for the rights to receive an allocation. By November 1992, however, a combination of a higher consignee price (up to 362 meticais per kilo from 249) along with continued arrivals of both commercial and emergency yellow maize, resulted in an excess supply of food aid maize in relation to the demand by consignees. Consignees refusing to accept all of the maize allotted to them was evidence of the excess supply. Quality issues have been raised by consignees regarding some of the shipments, as well. The unfortunate result is excess supplies of yellow

maize which will no longer be in good condition when the need for food rises again in October or November.

To support producers of white maize, the government through its *Commissão Nacional de Salarios e Preços* established on March 24 1993 a pan-territorial minimum producer price for white maize of 425 meticais per kg. AGRICOM, the government marketing agency, lacks sufficient capital and access to new lines of credit to purchase all white maize offered at this official price, so there is no effective government mechanism to assure that farmers receive the minimum price. As the SIMA indicates, there are markets throughout the country in which farmers are receiving much less than the minimum, while in other markets the average price is higher (PSA-M, MA/MSU, various months, 1993). The estimated production was 533,000 metric tons, yet the marketed surplus is estimated to be only 80,000 metric tons (MEDIAFAX, May 19 1993). Observers from Medicins Sans Frontier (MSF) indicate that rural households do not appear to be building up their food stocks. Most households, even during the harvest period, indicate less than 3 months of food needs in household stocks. The extent to which the war and drought have modified expectations and actions regarding stocks remains to be seen. During the war, food stocks were an easy target for confiscation or theft, such that rural families were unable to retain stocks. Storage facilities, where they existed, were targets; warehouses can be seen in many parts of the country without roofs or window panes, just empty shells. Rebuilding such facilities, as well as improving household storage capacity, are part of the economic rehabilitation necessary in rural areas. Unfortunately, in the months prior to the 1994 harvest, rural supplies may be very small compared to needs. The return of refugees adds to the rural food aid needs.

CHAPTER FOUR

FOOD AID EFFECTS ON PRICES: CONCEPTUAL AND EMPIRICAL VIEWS

I. Types of Grains and Meals in the Market[17]

Any review of food aid and maize marketing in Mozambique (or any country in Southern Africa) requires that analysis carefully distinguish among the different qualities of maize meal and between the color of the grain used as raw material for the meal. Consumer preference in Mozambique for maize meal is clearly affected by color **and** quality of the final product consumed. This means specifying in the analysis whether meals are made at home or in a custom or commercial mill, and how much of the germ and bran has been removed. This process is commonly referred to in Portuguese as removing some or all of the "farelo", either by hand or by machine. The final product, "chima" in Portuguese, or "Uswa" or "Uswha" in Changane, is made by adding maize meal to boiling water. It is eaten with a sauce made from green leafy plants of various types, and other high protein foods, depending on resources available.

Consumers eat maize meal made commercially or by hand pounding. There are three major ways that consumers in cities of Mozambique traditionally prepare their own maize meal by first purchasing maize grain and then hand processing it, mostly at home. All forms of these traditional products remove the germ and bran - "farelo". In general, these meals are produced only with white grain; for a number of reasons, yellow grain is not hand-pounded.

Hand Pound Meal-Pilão is a very high quality meal that is made by first removing the germ and bran by hand pounding in the *pilão*, next soaking the remains in water for 1 to 2 days (*deixar de molho*), and then preparing the final meal, also by hand pounding in the "pilao". The meal that emerges from the second pounding must be sun dried, which can take another day, depending on the weather.

Hand Pound Meal-Alguidar is a variation used mostly in the South of the country to make a maize paste that is cooked immediately, in contrast to meal which can be stored for a number of days. The first two stages are the same: the *farelo* is removed by hand pounding in the *pilão* and the remains are then soaked for 1 or 2 days. Next the soft corn remains are placed directly into a shallow bowl-"alguidar"-and slowly mashed with a wooden instrument. After preparing, a pasty material is placed a little bit at a time into boiling water to prepare the *chima*. This product still requires at least two days to prepare, though it is quicker than making a final meal in the pilão.

Hand Pound/Custom Milled Meal is also a variation on the first method. The first stage of processing is identical. But rather than soaking, the pounded grain is taken directly to a small

[17] This section draws heavily from Weber, et al. (1992).

custom hammer mill, rather than pounded in the *pilao*. Grain can thus be de-germed and made into meal in the same day. This method, while much faster, still takes a number of hours, due primarily to the hand pounding.

The three main types of wholly machine processed maize meals are:

Whole meal, produced by small custom hammer mills spread throughout both urban and rural areas. Dry whole grain is placed directly into the hammer mill. Since the germ and bran are not removed, whole meal has a 97-99% extraction rate, so except for minor impurities, almost all the grain put into the mill comes back as meal. Across much of Southern Africa this meal is referred to as *mugaiwa*,

Partially de-germed meal, from which a part of the bran and germ has been removed by a commercial process. Normally done only in large commercial mills in Maputo and Beira, this meal generally has an 80-96% extraction rate per 100 kgs. of grain. This meal is referred to as partly sifted meal, bolted meal, or roller meal in most SADC countries, and

Fully de-germed meal from which most of the bran and germ has been removed by a commercial milling process. This has a 60-75% extraction rate per 100 kgs. of grain. This is referred to as super-sifted meal or sometimes breakfast meal in Southern African countries. Pre-independence, this product was made in Mozambique and was sold under the brand name *Celeste*. Many consumers still refer to this brand name as a type of very high quality maize meal. This quality meal is also referred to in Mozambique as *farinha matabicho* because it is consumed at breakfast (*matabicho*). To the extent this product is currently available in these two urban markets in Mozambique it is generally imported informally from Swaziland or Zimbabwe. Commercial mills in Maputo and Beira have the milling equipment to manufacture this product, but produce very little, if any, for the open market.

To make matters more complicated, generally for machine milled maize meals there are also quality differences within each type of meal depending on the milling technique utilized, the quality and degree of impurities in the raw grain, and whether or not vitamins have been added to nutritionally enrich the meal.

In Maputo, the most common meal in informal markets is yellow whole meal. This product can be found except during periods of extreme scarcity of yellow grain. Partially degermed yellow meal is the next most common, though its availability depends on whether CIM (the local industrial mill) obtains food aid supplies. Prior to the Southern Africa drought, partially degermed white meal, both domestic and from Swaziland, was quite common, and whole white meal could also be found on most days. These two products have been extremely scarce since about March 1992. The hand pounded meals are produced almost exclusively with white grain, but seldom appear on the market in Maputo (they are much more common in Beira).

II. Maize Grain and Meal Preferences at Retail

The conventional wisdom in Eastern and Southern Africa is that urban consumers strongly prefer the refined white maize meals produced by industrial roller mill technology, and are not responsive to price differences between various types and colors of meal. Emerging evidence throughout the region calls this belief into question. In Mozambique, the evidence is clear that consumers will choose other grades of flour if the market presents them with choices based on price. Based on Maputo price data from March 1990 through June 1993, consumers shopping in informal markets in Maputo have typically paid a 35% to 38% premium for white grain over yellow grain.[18] The preference for white color over yellow color that this premium reveals is less than one might have expected from many statements regarding the strength of preference for white maize.[19]

Price premiums for partially degermed yellow meal over whole yellow meal have been about 30% between 1990 and 1993. At these price relationships, poor consumers strongly prefer whole yellow meal. Sahn and Desai (1992) estimate that the poorest 20% of consumers in the capitol city, Maputo, allocate 15% of total expenditures to yellow maize grain and meal, and only 3% to white maize and meals. Whole yellow meal alone has a 6.6% share. Within this quintile, only vegetables and fruits have a higher budget share than whole yellow meal. The upper 20% of income earners allocate only 1.5% of expenditures to yellow grain and meals, and about the same to white maize and meals.

III. Effects on Retail Prices

A. A Static Conceptual Analysis: Summary

Annex B presents a formal economic analysis which examines conceptually the implications of alternative pricing and distribution policies for commercial food aid on market prices of the commodity being donated (yellow maize). The principal focus is on the effects of the official consignee price and the number of consignees on consumer prices. The next section evaluates the similarities and key differences between the assumptions of these models and the characteristics of the marketing system as it works in Mozambique. These two analyses -

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[18] The price difference between white and yellow grain increased dramatically after the effects of the 1992 drought began to be felt. White maize was in such scarce supply that its prices remained very high even as yellow maize prices fluctuated with the arrival of food aid shipments. Prior to and after the drought, white maize grain prices tracked yellow prices very closely. See Figure 1.

[19] Estimates of the productivity difference between white and yellow grain are about 15%. Thus, the market should be able to support at least that large a price difference between the grains. The actual observed differences in Mozambique have been strongly influenced by administratively determined quantities of yellow maize from food aid, and prices out of Swaziland. The latter hold no systematic relationship to the price at which commercial yellow maize food aid is first sold. Whether the price difference would be even lower than that observed to date in a fully market setting must await further research.

abstract, formal, and simplified in this section, less abstract and more "realistic" in section B - allow important generalizations to be made regarding the best policy for the pricing and distribution of food aid. The reader with an interest in formal economic analysis should read Annex B before continuing. This section will present a summary of the analytical results from the Annex.

The static models begin with the simplest "base case" in which we examine a single time period and assume that the market structure among consignees and lower in the system (primarily informal wholesalers and retailers) is perfectly competitive. This first case also assumes that there is no source of supply beyond food aid. Each case then introduces selected complications, to more closely approximate the real world situation. The second case introduces the presence of an outside source of supply. This is meant to capture the white maize trade with Swaziland as well as domestic white maize production. Both are influential on Maputo prices during normal levels of supply. Case three is a variant of case two, assuming an infinitely elastic outside supply as opposed to case two's finitely elastic supply. Finally, case four keeps the assumption of an outside source of supply (finitely elastic), but assumes a monopoly market structure at the consignee level for yellow maize in Mozambique.

The analyses show that as long as the quantity of food aid offered by donors is less than what consignees will accept at the official consignee price, this price has no effect on retail prices. This result holds whether there are "many" or "few" consignees. The consignees capture a rent[20], and the retail price is determined entirely by the quantity placed on the market. This generally describes the situation in Mozambique prior to late 1992, when consignees accepted all the grain that arrived and would likely have taken more had it been offered.

If the quantity of food aid exceeds what consignees will accept at the fixed price, consignees do not accept all the grain being offered, and they do not earn any rents.[21] In this case, the official price *does* affect the retail price, through its effect on the quantity of food aid the consignees agree to purchase. If donors and government increase the official price, consignees will accept less volume, and the market price will rise. If instead the official price is decreased, consignees will accept more volume, and the market price will fall. The clear indicator that the quantity of food aid offered exceeds consignee demand would be food aid supplies left in storage, or not accepted off the boat by consignees. This became a serious problem beginning in late 1992, with the very large arrivals of commercial grain, and leakage of emergency grain onto the market. Thus, since about November 1992, this situation captures an important characteristic of the food aid market.

A final result is that, for a given official price, a group of competitive consignees is more likely to accept all the food aid than is a monopoly consignee or a small number of collusive consignees. Stated slightly differently, a group of competitive consignees will accept more grain at a given price than will a monopoly consignee. Thus, on average, supply to the market

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[20] Defined as the difference between the minimum profit they would require to participate and the profit they actually earned.

[21] This is not to say they do not earn profits. Recall that rents are defined as "excess" profits - profit beyond what the consignee requires to stay in business.

will be lower, and retail prices higher, when there is a monopoly over food aid at the consignee level than when sufficient consignees have access to make the system competitive. This has important implications for the design of a distribution scheme.

B. An Empirical View

The type of analysis summarized above and presented in Annex B has strengths and weaknesses in developing an understanding of real world problems and potential solutions to them. The primary strength is that it allows one to focus on only those characteristics deemed most germane to the problem. While the advantages of such a tight focus can be considerable, the disadvantage is that the real world is never so simple as the model, and the complications that the model omits may be important to an effective understanding of the problem.

In the specific case analyzed here, there are two strengths of the approach. First, the informal marketing sector in the southern area of the country (where most commercial food aid is destined) is highly competitive. Thus, the models' assumption of a competitive market structure beyond the level of consignee is probably appropriate. The second strength is that monopoly and near monopoly conditions **at the level of consignee** have been created in the past. This has occurred when the EEC delivered grain to only two consignees, only one of whom operates directly in Maputo. Also, prior to 1992, USAID delivered to a very restricted set of consignees. Thus, case 4 in Annex B captures the essence of these situations.

There are, however, at least two important limitations of the models. First, and most importantly, they assume that all traders have perfectly accurate information about all relevant aspects of the market. Second, the models assume that the consignee price is knowable with certainty. Regarding the consignee price, we know that the effective price paid is in fact not easy to determine. First, the official terms of the sale often vary: how much does the consignee pay up-front?, what interest rate is he charged if he pays less than 100%?, how many days of grace is he granted?, if not required to pay 100% up-front, is full payment ever made? These are some of the questions that can strongly influence the effective price the consignee pays. In general, these complications will result in an effective price below the official price, increasing consignee rents when food aid supplies are scarce or decreasing losses when supplies are excessive.

Regarding market information (the first limitation of the models), there are four salient characteristics in the Mozambican context where informational limitations may have serious effects:

1. Current and future food aid shipments,
2. Current and future prices and volumes of white maize grain and meals out of Swaziland and Mozambique,
3. Current and future volumes of emergency grain being diverted to the market, and
4. The effects on consumer demand of the emergency grain which remains off the market (being consumed by those who received it).

Poor information regarding the first point is a problem endemic to the market. Most traders below the level of consignee have little or no idea that a ship is arriving until very shortly

before it does arrive, and many might never be certain of the quantity of grain on the ship. Others, principally the large consignees scheduled to receive the grain, have relatively good timing and quantity information, at least about the next shipment. Economists refer to this situation of unequally distributed information as the problem of *asymmetric information*. It is a problem which plagues markets throughout the Third World.

Not enough is known about market fluctuations in Swaziland and South Africa. If these are great, they can contribute to uncertainty in Mozambique, due to the importance of the white maize meal trade between the countries.

Information about the third and fourth points is also poor, and has become a serious problem since late 1992. Consignees and other traders have had no way of predicting how much emergency grain would appear for sale, and have probably been unable to make any more than a very gross estimate of quantities which have actually arrived on the market. Other consignees selling grain or meal outside of Maputo have had no way of knowing how emergency grain distribution would affect their business until they actually experienced sharp drop-offs in demand.

These informational problems have two key effects in the real world of Mozambique. First, consignees may underestimate both the volume of emergency grain leaking on to the market and the effect of delivered emergency grain on demand for their product. As a result, they may accept "too much" grain from commercial food aid shipments, leading to a market clearing price below that needed to cover costs and give an acceptable profit. This is clearly what has happened since late 1992 (see Chapter III, section E). The cost to the system of this situation is not just financial losses to some consignees, but rather the generalized uncertainty that it creates for all traders. In the end, consumers generally pay for this uncertainty in the form of higher prices and less reliable supplies.

Second, informational asymmetries may allow some well informed consignees to manipulate the market, creating difficulties for less well informed traders further up the system. See MOA/MSU Research Team (1993, pp. 33-35) for a detailed description of one incident of apparent market manipulation.

C. Synthesis of Implications for Retail Prices

Upon further reflection, results of the static analysis appear fairly robust. That analysis gave two counterintuitive results. One was that consignee price has no effect on retail prices unless the amount of food aid being offered is more than consignees are willing to accept at the official price. The second result, which follows directly from the first, was that delivering all grain to a single consignee (creating a monopoly in food aid) would not result in prices above those with "many" consignees if the quantity of food aid supplied was less than what the consignee was willing to accept at the official price. This result was qualified by the statement that a monopolist would accept less, resulting in higher market prices, than would a group of competitive consignees.

The "real world" analysis of the previous section strengthens the first result. When supplies of food aid become large, uncertainty regarding the effects of emergency food aid supplies means

that consignees may accept "too much" commercial grain, and market prices may fall below the level indicated by the official price. Thus, in practice, the official price in this circumstance will only *influence* the market price, albeit strongly, rather than directly *determining* it. The second counterintuitive result of the static analysis is weakened but not eliminated by the analysis in section B. In the real markets of Maputo, informational asymmetries mean that a monopoly consignee will be in a better position to manipulate prices upwards than would a relatively large group of consignees. Nevertheless, the monopoly consignee faces an unavoidable fact: another boat will be arriving at some time in the future, and the consignee needs to have largely sold his grain by the time that boat arrives. This effectively reduces the control the monopolist can exert over the quantity flowing to market. Because of imperfect and asymmetric information, however, the monopolist does maintain some, possibly significant, ability to manipulate the market.

Figure 1. Commercial food aid arrivals and maize grain prices in Maputo, March 1990-June 1993

The record of yellow and white maize price movements since early 1990, summarized in Figure 1, confirms the essential results of these analyses. Specifically it shows that a) food aid arrivals strongly influence yellow maize grain price movements, b) consignee prices have little effect on these prices, and c) white maize prices are strongly influenced by yellow maize prices, and thus by food aid arrivals.

Figure 1 plots Maputo retail prices of yellow and white maize grain along with consignee prices and commercial food aid arrivals of yellow maize grain since March 1990. Comparison of two one-year periods - July 1990 to July 1991, and July 1991 to July 1992 - provides simple graphical evidence of the strong relationship between food aid arrivals and prices for yellow maize. During the first period, food aid shipments were evenly spaced over the months and there were no large increases in the prices for white and yellow maize. The second period (July 1991-July 1992) was quite different. From August 1991 through October 1991, there were no commercial food aid arrivals and the prices rose rapidly from 373 meticais per kg to 575 meticais per kg, a rise of 54% in only two months. In November and December, almost 60,000 metric tons of yellow maize food aid arrived and the price returned to a low of 323 meticais per kg. Another period ensued from January through April 1992, during which no food aid arrived and no regional production was being harvested. The result was a price climb of 126% (from 323 meticais to 729 meticais per kg[22]). The negative consequences of such price fluctuations are felt by the urban poor, who are dependent upon yellow maize as the least costly consumption staple, and who have little savings or credit with which to smooth their consumption in the face of such large fluctuations in price.

[22] Note that these are monthly average prices which smooth out some of the variation. The lowest price observed in Mucoriama Market during January 1992 was 313 while the highest price during April 1992 was 1067, representing an increase of 241%.

Since late 1992, the previous pattern of sharp price rises associated with interruptions in commercial food aid arrivals has not repeated itself, despite the lack of any significant commercial food aid arrivals since January. The price for yellow maize has remained relatively stable around 425 meticais per kg, historically low in real terms. To understand this difference in behavior between the two periods, one must recall the very large amounts of emergency food aid which arrived on top of the historically large amounts of commercial aid at the end of 1992 and beginning of 1993 (Section III.F.). The apparently unprecedented leakages from the emergency program during this time are the key reason that prices have remained so low for so long. As a measure of how low these prices are in real terms, note that the last time Maputo had sustained prices of around 400 MT/kg was two to three years ago, from mid-1990 through mid-1991. Since that time, accumulated inflation has reached or exceeded 100%. Thus, in real terms, yellow grain prices have not been this low since data collection first began in March 1990.

Consignee prices have apparently had little effect on consumer prices. Without question, retail prices fluctuate over the short term independently of consignee prices, which are fixed for long stretches of time. Over the longer term, it also does not appear that consignee prices have had a noticeable effect: these prices have approximately doubled since January 1991, yet retail prices are at levels last seen from mid-1990 through mid-1991. Furthermore, these retail price levels, only about 25% above prices paid by consignees, leave no room for normal consignee profits.

These results are consistent with the theoretical analyses above. Since demand for commercial food aid grain was not satisfied until late 1992, consignee price should have had no effect on retail prices. Since late 1992, when we suggest that commercial arrivals probably were sufficient to satisfy consignee demand, prices have fallen further than they otherwise would have, due to large leakage of emergency grain into markets. If this emergency grain had not come on to the market in such large volumes, the consignee price during this time may have placed a floor under retail prices.

In analyzing the effects on consumer prices of the potential movement to import parity pricing of yellow maize grain food aid for commercial sale, one key piece of information is the level of margins which would be seen in the system if it were working competitively. In the context of our previous analysis, another way of asking this is what the margin would be between consignees and consumers in Maputo if a group of competitive consignees were receiving just the amount of food aid they wanted, given the price they are charged. This is not an easy question to answer, since there is no way of directly determining when, if ever, demand and supply of food aid were in balance. Nevertheless, we suggest that September and October 1992 may have been such a time. As we have argued, prior to this time food aid was nearly always under-supplied: consignees were probably earning excess profits (rents), and would have taken more grain had it been available. July 1992 was the last month of a seven month period in which only one ship had arrived, and prices had been highly unstable. In August, over 65,000 MT arrived and prices began to fall. They reached a low in September, and changed little in October. It is not until after November 1992 that food aid became clearly over-supplied to the market, as much grain was being left in government storage warehouses to spoil.

So if we accept that September-October 1992 represents a time when supply and demand of yellow maize food aid was in approximate balance in Maputo, we find that the mean retail price of yellow grain was 487 MT/kg while the consignee price averaged 296 MT/kg (262 in September and 329 in October). This shows a total gross margin of 191 MT, or approximately 65% ((487-296)/296). Currently, a CIF price for yellow maize in Maputo might be around $150/mt. At current exchange rates, this comes to approximately 675 MT/kg[23], appropriately viewed as a consignee level price. Applying our 65% margin, we calculate that a consignee price of 675 MT/kg would result in a retail price of about 1,100 MT/kg, **if consignee demand were just satisfied at the 675 MT/kg price**[24]. As a point of comparison, in real terms this price would be similar to market prices which prevailed from mid-1990 through mid-1991, when frequent small arrivals of yellow maize kept prices relatively stable. Thus, while this price would represent more than a doubling of current prices, it would not be unusually high in real terms.[25]

A final issue is the effect of food aid arrivals on white maize prices. This issue is quite important, as a major objective for the country over the next several years is to increase dramatically its production and marketing of white maize grain. Referring again to Figure 1, we see that through July 1992, retail white maize price fluctuations were highly correlated with those of yellow maize, showing a simple correlation coefficient of 0.77, significant at 0.001[26]. But from August 1992 through April 1993, these two prices separate, as shown by the statistically insignificant correlation coefficient of -0.089. This was a period of extreme scarcity of white maize products due to the drought that affected most of Southern Africa. Since the relatively normal domestic white maize harvest began in April 1993, the price series have returned to a more normal relationship.

Thus, it is clear that, under normal supply conditions for each grain, the quantity of yellow maize arriving on the market has a very strong influence on retail prices of white maize. Whether these retail price signals are then transmitted through the system to the producer level is an important empirical question which will be examined in the next section.

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[23] ($150/mt)(MT4500/$)/(1000kg/mt)=675 MT/kg. Note that the market exchange rate at the time of this report was rising rapidly.

[24] This is a maximum estimate of retail prices. As the consignee price of yellow maize increases, the percentage margin earned by all traders might fall.

[25] We have not calculated deflated prices because of the difficulty of obtaining a reliable price index. Nevertheless, estimates of inflation range between 30% and 50% per year.

[26] Essentially, this means that there is only a 0.1% probability that these two series are in fact uncorrelated. See Annex C for a similar analysis using detrended data. Results are very similar, with a correlation coefficient of 0.66, also highly significant.

IV. Effects on Producer Prices

As noted in Chapter Two, section II, potential disincentive effects on producers have historically been one of the most contentious issues involving food aid. Despite this, Jones (1989) notes that "there is little quantification of the costs of discincentives effects of food aid ...; none of the studies of programme and/or emergency aid attempt it" (p. 2). This section, while not arriving at a formal quantification of these costs, will examine systematically the factors that determine whether there will be an effect, and how large that effect will be.

A. A Static Conceptual Analysis: Summary[27]

Annex E presents a graphical economic analysis of the effects of yellow maize food aid arrivals in urban areas of Mozambique on production of white maize in rural areas of the country. The analysis demonstrates that these effects depend on three key parameters: the elasticity of supply of white maize out of Swaziland and Zimbabwe (the relevant world market for Mozambique), the elasticity of domestic supply of white maize, and the cross-price elasticity of demand (the degree of substitutability) between yellow and white maize. The effects of yellow maize food aid on domestic white maize production are more negative as world market supplies become less elastic, as domestic supplies become **more** elastic, and as the degree of substitutability between yellow and white maize increases (i.e., as their cross-price elasticity becomes more positive).

In addition to these demand and supply parameters, a comprehensive assessment of the production incentive effects of yellow maize food aid must evaluate the performance of food markets in Mozambique in two other respects. First, are spatially separate food markets at a given level in the system (e.g., at retail) integrated through the flow of product in response to price incentives? If they are, then price changes at this level in urban markets will be passed-on quickly and completely to rural markets. The analysis in Annex E assumed, for ease of exposition, that Mozambican markets are integrated, with prices between the two areas differing only by a fixed marketing margin. In fact, markets may be more or less integrated, and the degree of integration will determine to what extent changes in the urban price of white maize, induced by yellow maize food aid arrivals, are passed-on to rural areas. Section B below examines the empirical record in Mozambique to determine to what extent markets show evidence of integration, and to analyze the factors that may affect market integration in the future.

Second, are markets in a given geographical area well-connected across levels in the marketing system? In other words, will fluctuations in price at the retail or wholesale level be transmitted to the producer level? If so, how quickly and completely will this transmission take place? If price transmission to the farm level is quick and complete, then farmers will be vulnerable to any retail or wholesale price reductions caused by increased food aid arrivals. To the extent that prices are not effectively transmitted in this manner, farmers will be insulated from these potentially negative effects. This issue of "price transmission" was

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[27] For an alternative analysis of the producer incentive effects of yellow maize food aid, see Dorosh, et al. (1993).

ignored in the analysis of Annex E. Only one level of the system was examined, implicitly assuming that price transmission to other levels is strong.

Finally, the results from the analysis in Annex E depend on the initial assumption that rural Mozambique would export to urban areas under normal post-war circumstances. If rural areas would not supply the cities even under these improved conditions, then much more food aid could be brought into urban areas without affecting incentives for rural production. Are rural areas currently supplying significant volumes of white maize to Mozambican cities? Is there reason to believe that these volumes would be greatly increased in a peace-time setting? Again, we must look at the empirical record.

B. An Empirical View

This next section will use empirical information developed over the past three years in the MOA/MSU Food Security Project to address four questions:

1. Is urban Mozambique an important market for white maize from rural Mozambique? If the answer is "no", then the importance of the final three questions is greatly reduced. **We suggest that the answer is "yes".**

2. Is there reason to believe that yellow maize food aid arrivals will depress white maize prices in the port in which they arrive? This is the issue of the degree of substitutability (quantified by the cross-price elasticity of demand) between white and yellow maize. If the two products are very weak substitutes, then yellow maize food aid will have little effect on white maize prices, and questions 3 and 4 below lose importance. **We suggest that among the large number of poor urban consumers, these products are and will continue to be important substitutes.**

3. If yellow maize volumes do affect white maize prices in the port city in which they arrive, will these price effects be passed-on to farmers? This question involves the two issues of market integration and price transmission. **We suggest that market integration is relatively strong in some areas, weak in others, but likely to improve steadily throughout the country.** We conclude that price transmission is still relatively weak throughout the country, but that this too is expected to improve. As each improves, the effects of yellow maize food aid arrivals on urban prices of white maize will be increasingly passed-on to farmers.

4. Finally, if these price effects are passed-on, what will be the response of domestic production and imports of white maize? In other words, what will be the relative declines in the volume of each when demand for white maize in Mozambique falls? This question relates to the issue of the elasticity of supply in world and domestic white maize markets. **We suggest that the relevant world market for white maize to Mozambique is Swaziland and Zimbabwe, and that supply from these two countries is inelastic**. This unresponsive world market supply will increase the negative effects on domestic production of any decrease in demand for white maize caused by increases in yellow maize food aid. In other words, we suggest that any

decline in total white maize demand in urban Mozambique is likely to be borne primarily by domestic production, not by imports.

1. Is Urban Mozambique an Important Export Market for Rural Mozambique?

Knowledge of maize movements within the country and interviews with formal sector *armazenistas* and informal wholesalers both indicate that rural Mozambique currently ships white maize to the cities, but that the volume of trade would be greater if yellow maize were absent or if it carried a higher price. Lower transport costs would also increase the shipments. SIMA researchers can document shipments of white maize from Cabo Delgado to Maputo and Beira, Nampula to Maputo, Manica to Maputo and Beira, and Gaza and Inhambane to Maputo (see Figure 2 for a map of Mozambique).

During late 1991 and early 1992, MOBEIRA (the industrial maize mill in Beira) purchased approximately 1,800 MT of white maize from Cabo Delgado province. CIM of Maputo purchased 4,800 MT during the same time, also from Cabo Delgado. **In both instances, the mills indicated that they had purchased white grain only because they risked running out of stocks of yellow maize grain from food aid** (Weber, et al., 1992). It seems reasonable to suggest that these firms would have purchased larger quantities of white maize over the past years had they never had access to yellow maize. Other traders make the same contention. Of five *armazenistas* interviewed in Maputo during September 1993, four indicated that they would like to purchase domestic white maize in the future, but that they were not currently doing so. All four cited the very low prices of yellow maize as one key reason for their lack of interest in white maize. Most also made reference to the high cost of transport from northern and central provinces to Maputo.

Despite these problems, some *armazenistas* are purchasing domestic white maize. In August, a trader in Nampula sold 2,000 MT of grain FOB Nacala for shipment to Maputo. In Maputo, one of the interviewed *armazenistas* was purchasing white grain for sale in Maputo. Finally, informal traders in *Bazuca* market are purchasing white maize from northern Maputo, Gaza and Manica provinces. The total quantity, however, is lower than it would be if more of the large *armazenistas* were involved, and low yellow maize prices are one key reason that they are not.

Observation and interviews on the retail level support the idea that low yellow maize prices are reducing the market for white maize. Prior to the drought, one typically found significant volumes of whole white meal in Maputo and Beira markets. This product has been entirely absent from Maputo during 1993, and was found during only four weeks in Beira. This despite the presence of white grain (though in relatively small volume) in both cities during the entire year. When retail vendors were asked why they were not purchasing white grain, having it custom-milled into whole meal, and selling that meal, the most common response was that there was no market for the product, due to the low prices of yellow meal. Traders have found that the low price of yellow grain and meal has eliminated this once important market niche. Consumers who can afford white meal prefer to purchase the grain and hand-pound it into a superior product.

Figure 2. Map of Mozambique (provinces and selected districts)

In sum, there is ample evidence that rural areas of Mozambique have in the past and are currently supplying urban Mozambique with white maize. There is also strong reason to believe that this supply would be significantly greater if yellow maize were not in such abundant supply and if its price were not so low. Finally, as the rural marketing system improves with investment in roads, rehabilitation of rural stores, and increased ability of farmers to store product, trade between the rural and urban areas should increase. This is one key element of the long-term development challenge that Mozambique faces.

Is urban Mozambique a "large" market for rural Mozambique? Stated differently, will changes in demand in urban areas lead to significant changes in prices and production in rural areas? If total consumption in urban areas is only a small proportion of that in rural zones, then these urban demand shifts may be of little importance for farmers. Available evidence indicates that throughout the country, but especially in the south, urban areas are large enough to be significant markets for rural areas. In the south, Dorosh, et al. (1993) estimate total consumption of maize (white and yellow) of 115,000 MT in Maputo/Matola, and 130,000 MT in rural areas. Per capita consumption of yellow and white maize combined is estimated to be higher in urban than in rural areas (cassava makes-up the difference in rural areas). Furthermore, marketed surplus in rural areas is a small proportion of total production. Demand in Maputo as a proportion of this marketed surplus is certainly very large. As a result, changes in demand in the city can have major effects on production for the market in rural areas. Since a long-term development goal is to integrate rural producers into the national economy, it would seem important not to undercut the principal market for the country's basic staple.

It is worth noting that during May through October 1993, no white maize entered Maputo from Swaziland, despite the good harvest in that country and in South Africa. Thus, rural Mozambique has been the only supplier of white maize to the city. Beira in the center and Nampula in the north are also large population centers which have the potential to significantly affect production incentives in the rural areas. This will be increasingly true as the marketing systems improve and pass-on price effects more completely from urban to rural areas.

2. Are White and Yellow Maize Substitutes in Consumption?

The degree of substitution in consumption between yellow and white maize in Southern Africa is a complex economic and social issue. For many years governments in the region held the two prices nearly equal through a highly controlled marketing system. Quantities of each product were also administratively allocated, with yellow maize typically being assigned to livestock feed uses. Under these conditions, consumers clearly prefer white maize, since its official price is equal to that of yellow, and since in practice yellow is not even available for human consumption and has come to be associated with animal feed.

In recent years, these marketing systems for white and yellow maize have begun to change, in some cases quite rapidly. Official policy has in some cases introduced price differentials between the two products, and yellow grain and flours have begun to be found on the market, allowing consumer preferences to influence and react to market-determined price differentials between yellow and white products. Nowhere in the region

has market availability of yellow maize been greater than in Mozambique. Since 1990, yellow maize grain and various types of yellow meal have been readily available in informal markets. During late 1991 and early 1992, the poorest consumers in Maputo allocated 15% of their total household budgets to yellow maize in its various forms. No other staple had such a high budget share among the poor.

Recall from section I of this chapter that there are essentially three kinds of maize meals on the market (with some quality variation within each). **Hand-pound meals** are generally considered to be of the highest quality and carry the highest price. They are typically produced only with white grain. **De-germed (or refined) meals** are produced with both white and yellow grain in larger scale industrial mills. These meals are less preferred than hand pound meals, but are preferred to **whole (or unrefined) meals**. The latter are also produced with both white and yellow grain, but in small local hammer mills, and always carry the lowest price. Thus, consumers preferences are defined over color and processing characteristics. In general, more refined meals are preferred to less refined meals, and white color is preferred to yellow. Refined yellow meals may be preferred to whole white meals, but unambiguously, hand-pound white meal is most preferred, and whole yellow is least preferred. In a market setting, of course, the effect of these preferences is to generate price differentials; the least preferred (thus cheapest) goods may be consumed in larger volume than the more preferred (and thus more expensive) goods, depending on market and general economic conditions. In Maputo and Beira, probably no maize product has been consumed in larger volume than whole yellow meal, the least preferred good. This has been possible due to the availability of market-priced yellow grain, the existence of many small hammer mills, and the large numbers of very poor residents in the cities attempting to assure adequate consumption at minimum cost.

In evaluating substitutability between white and yellow grain, therefore, attention must be paid not only to color but to processing differences. While hand-pound white meal and whole yellow meal may not be close substitutes, whole white and whole yellow meals may show very close substitutability. Our analysis of price movements of white and yellow maize grain, and our knowledge of consumer behavior in Mozambique and Southern Africa in general both suggest that white and yellow maize are likely to be close substitutes in consumption. This substitute relationship is likely to be especially strong for the unrefined meals of each grain.

Figure 1 of section III.C. of this chapter shows monthly prices of white and yellow maize grain in Maputo from March 1990 through September 1993. As the discussion in that section demonstrated, yellow maize grain prices have been driven largely by the volumes of commercial yellow maize grain food aid arriving in Maputo. That discussion also demonstrated that the prices of the two grains moved together very closely prior to the southern African drought of 1991/92. In fact, the yellow maize grain price alone explains 59% of the variation in the white maize grain price from March 1990 through July 1992.[28]

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[28] Based on the simple correlation coefficient of 0.77 reported in section III.C. of this chapter ($0.77^2=0.59$). From the detrended analysis in Annex C, we get an R^2 of 0.43, equivalent to a correlation coefficient of 0.66. Thus, correcting for positive trends in each series does not

(continued...)

During the drought, the two prices moved independently, due to the extreme scarcity of white maize caused by the drought.

Co-movement of the two price series during periods of normal supply of each product could be explained either by highly correlated contemporaneous supply shifts of each product, or by strong substitution between the two, or by some combination of both factors. Supply of white maize to Maputo is determined primarily by seasonality of production in Swaziland and Mozambique, while yellow maize supply is determined entirely by food aid arrivals. The latter have shown no stable relationship to the seasonal white maize production pattern. Thus, we are left with substitution in consumption as the best explanation for the close co-movement of white and yellow maize prices in Maputo.

This conclusion is consistent with knowledge of consumer behavior in Mozambique and southern Africa in general. Recent research in Zimbabwe (Rubey 1992) suggests that consumer experience with yellow maize during the years of market reform and during the 1992 drought has changed preferences among many consumers in that country. Prices of the two grains are no longer administratively fixed at equal levels. Quantities available are no longer set administratively either. Partly as a result, yellow maize is now perceived by some Zimbabweans, especially the poorest, to be an acceptable alternative to white maize. These consumers now indicate a willingness to substitute between whole white meal, the traditional and previously lowest cost staple food, and whole yellow meal, depending on prices of the two products. Thus, the appearance of yellow maize grain in the country, and the processing of that grain into whole meal at low cost, has had a direct effect on demand for white maize among lower income consumers: whole white meal must now compete with whole yellow meal.

The same logic can be applied to Mozambique. Traditionally, hand-pounded white meal has been the staple food for most consumers, especially in rural areas. In urban areas, changed preferences for convenience created a market for machine milled (either industrially or in small local mills) white meals. Prior to the drought, refined white meal from Swaziland and CIM and whole white meal from local hammer mills were commonly found in the market. **In the absence of yellow maize, whole white meal would be the lowest cost staple food available to poor urban consumers (and possibly rural consumers as well, depending on opportunity costs of time in rural areas)**.[29] If yellow grain were not present in the market, consumers would have few if any alternatives to consuming whole white meal as their basic staple. In the current situation, with much yellow grain in the market, whole yellow meal has displaced whole white meal as the principal staple of poor households. Viewed from this perspective, yellow maize in the form of whole meal can only be viewed as a substitute for white maize among consumers, and thus a competitor with domestically produced white maize.

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[28](...continued)
change the conclusion of strong correlation in price movements.

[29] We know that whole white meal (called *mugayiwa*) is commonly consumed in rural areas of Zimbabwe.

The presence of yellow maize has brought large benefits to consumers, especially the poorest. By providing an option even cheaper than whole white meal, the real income of those choosing to consume whole yellow meal has been increased. Eliminating this option would not be in the interest of these consumers. Thus, the question is not whether or not yellow maize should be available, but rather in what volumes and at what cost.

3. How effective is Market Integration and Price Transmission in Mozambican Food Markets?

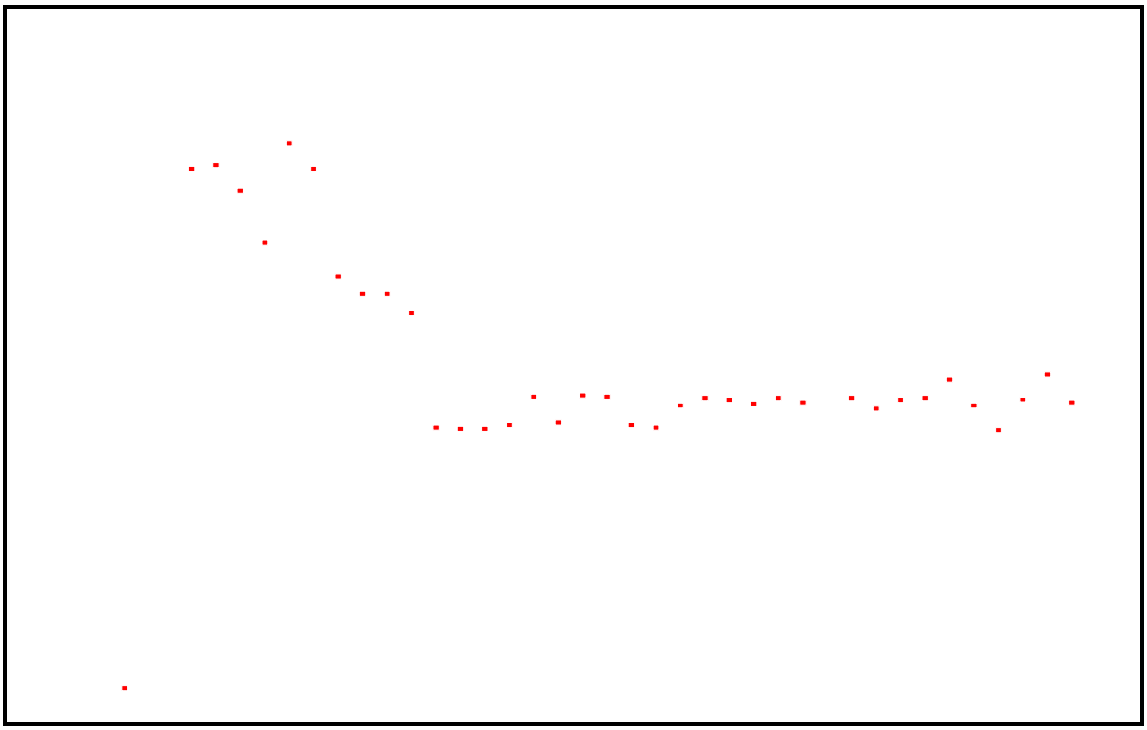
Previous analysis of market price data gives reason to believe that levels of market integration and price transmission might be different for the south of the country as compared to the central and northern regions (Tschirley and Varela 1993). Thus, the analysis that follows is done separately for each. Southern provinces are Maputo, Gaza, and Inhambane. Central provinces are Sofala, Manica and Zambezia, while northern provinces are Nampula and Cabo Delgado.[30] Insufficient farmer price data in the central provinces will limit us to an analysis of market integration in that region.

Southern Provinces: Previous analysis has demonstrated that southern markets show increasing signs of effective spatial integration at the retail level (MOA/MSU Research Team, 1993; Tschirley and Varela 1993). This integration is a result of substantial trade flows in response to price differentials, effected by both formal sector *armazenistas* and informal traders. Not all markets in the region are well integrated. Among those monitored by the SIMA, price movements in Vilanculos still appear to be relatively independent of Maputo and other southern markets. This is to be expected, since the very poor quality of the road between Inhambane city and Vilanculos makes trade difficult. There are undoubtedly other markets in the region that are relatively unconnected with Maputo because of poor roads. Nonetheless, the road system is being rapidly improved, and previous experience indicates that market integration should continue to strengthen as this happens. Thus, the spatial integration assumption of the previous section seems appropriate. While many small markets are not well integrated, the principal markets are, and other markets are expected to follow. This implies that any retail price effects in Maputo from the arrival of food aid can be expected to be felt within a short period of time (likely less than one week) at the retail level in most areas of Gaza and Inhambane.

[30] The analysis which follows uses data from the MOA/MSU SIMA. The SIMA does not operate in Tete and Niassa, so these provinces are not considered in the analysis. Manica and Sofala are considered only in the market integration analysis; district level coverage in these areas has given insufficient price observations at the producer level to allow fruitful analysis of price transmission.

Figure 3. White Maize Grain Prices, Maputo and Chokwe (Jan-Sep 1993)

Figure 5. White Maize Grain Prices, Maputo and Homoine (Jan-Sep 1993)



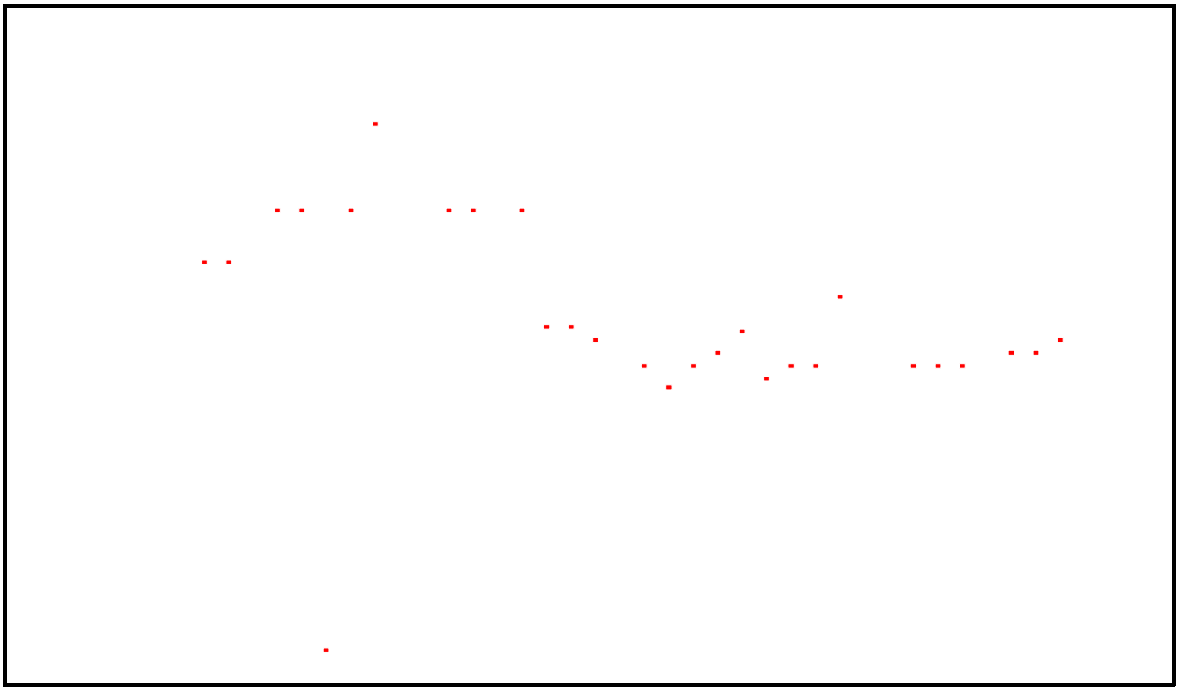
Will the marketing system in these provinces then transmit this price effect down to the producer level? Are markets as well integrated over levels of the system as they are over space? Data limitations preclude a conclusive answer to this question at this time.

Available evidence, however, indicates that price transmission from retail to producer levels in the southern provinces is uneven. In other words, price transmission may be relatively strong at some times and in some areas, but quite weak at other times or in other areas. Figures 3 through 5 show producer and retail prices of white maize grain in Chokwe (province of Gaza), Homoine, and Massinga (both in the province of Inhambane), from January through September 1993. Each figure also shows the retail price in Maputo. In each district, retail prices show some tendency to move with retail prices in Maputo. This tendency is strong in Massinga, and less strong but still apparent in Homoine and Chokwe. This reflects the generally effective spatial integration of retail markets in the southern region of the country. If price transmission from retail to producer levels were also strong, one would expect district producer prices to follow a pattern similar to that of district retail prices, though always at a lower level. This pattern is quite apparent in Massinga. When retail prices in Maputo and Massinga were high prior to the harvest, producer prices were also high. As retail prices fell, so did producer prices (though more rapidly), and all three then stabilized beginning around late March. The pattern is also apparent, though less strong, in Chokwe. Producer prices hovered around Mt 1,000/kg prior to the harvest, when retail prices were also high. As retail prices fell, so did producer prices. Thus, price transmission in Massinga and Chokwe appears to have been good during this period. In Homoine, price transmission appears to have been quite weak. This is best illustrated by the very low producer prices even when retail prices were high in February.

Overall, available evidence gives reason to expect that price transmission will continue to strengthen in the southern area of the country. The spatial integration of many markets in this region proceeded very quickly once price controls and movement restrictions were eliminated. Price transmission has followed, though at a slower pace, as traders have entered the system at the producer level to compete with existing *lojistas* (many of whom enjoyed previous monopolies). With peace, further entry of traders at the producer level, better capitalization of existing traders, and increased knowledge and understanding among traders and farmers of the system in which they operate, price transmission from retail to producer levels should become more effective. As a result, the implications of the static analysis of the effects of yellow maize food aid on white maize producer prices largely hold: food aid can have strong effects on producer prices by reducing the size of the principal "export" market (Maputo) available to the southern provinces.

Central Provinces: Lack of sufficient producer price data precludes an analysis of price transmission in this region. Retail data for Beira, Manica and Chimoio, however, indicate that

Figure 6. Retail White Maize Grain Prices in Beira, Manica and Chimoio (Jan-Sep, 1993)



market integration appears to be relatively strong, at least along the Beira corridor. This is to be expected, given that this area had for some years prior to the peace accord been relatively safe for travel, and the main road had been maintained. Figure 6 demonstrates that retail white maize prices in Manica and Chimoio have followed very similar patterns, being quite high from January into March, then falling through May and remaining low since that time. Beira has shown greater variability, but has followed the same general pattern. Interestingly, the gross margin between the internal markets and Beira has been stable and quite low during the last seven weeks of the period analyzed. Prices in Beira during August and September were 27%

above those in Manica, and 22% above those in Chimoio. It should be noted that market integration outside of the corridor may be less strong than within the corridor, due to poor infrastructure and a shorter history of trade. Currently, neither the SIMA nor any other organization collects prices in towns outside of the corridor, so that such an analysis is not possible.

Northern Provinces: Though reliable data on marketed quantities is not available, it is clear from repeated observation and study that total marketed volumes of maize (combined white and yellow) in the north are lower than volumes in the south. This is due to the presence for several years of large volumes of yellow maize food aid (commercial and emergency) in southern markets. In addition, the population concentration in the south has supported active trade in rice, wheat flour, sugar, beans, and other commodities. The volume of trade in these commodities has been much lower in the north. As a result, the marketing system in the north, including the number of traders, and especially the number of new entrants in the informal sector, is significantly less developed than in the south. Thus, neither spatial market integration nor price transmission has been as strong in the recent past in the northern provinces as in the south. Figures 7 and 8 show retail and producer prices of white maize grain in Ribaué and Monapo, both in the province of Nampula, accompanied by Nampula city retail prices. Roads from each of these districts to Nampula are open and used by traders, and are complemented by a rail line used by farmers and informal sector traders.

Spatial market integration between Ribaué and Nampula, as suggested by the relative movement of retail prices in each location, appears to have improved dramatically during this harvest season.[31] Beginning in early April, retail prices in Ribaué have followed a pattern very similar to that in Nampula. Also as expected, prices in Ribaué, the production zone, are below those in Nampula, which is known to receive grain from Ribaué and nearby districts. SIMA researchers have documented continual trade flows between Ribaue and Nampula city, and so are confident that the similarity of price movements in the two areas are not the result of similar seasonality in production without actual trade flows. Integration between Nampula and Monapo is not so apparent, with retail prices in Monapo showing very little fluctuation.

[31] See Tschirley and Varela (1993) for a discussion of the weak spatial market integration observed in Ribaué and other districts of Nampula as late as April 1993.

Figure 7. White Maize Grain Prices, Nampula and Ribaue (Jan-Sep 1993)

Producer prices in the province of Nampula are very "sticky" around the official minimum price. This pattern is a continuation of what had been observed previously, as early as late 1990 (see MOA/MSU Research Team, 1992a). Due to a lack of sufficient competition in rural areas, the minimum price has been interpreted as if it were an official fixed price, and farmers are paid only the minimum. One should note that this result is partly due to the fact that price information is collected among rural *lojistas*. These traders were the previous officially sanctioned buyers, they continue to enjoy a strong position in many areas, and most have apparently not seen a need to adjust to the new policy of market prices. *Comerciantes ambulantes*, or informal sector traders, are known to pay prices more in line with perceived supply and demand conditions. These traders are very few and small, however, and have not captured enough of the market to force most rural *lojistas* to change their behavior. As a result, available data and information indicates that there has been little price transmission from retail to producer levels in Nampula province.

If this weak price transmission continues, food aid supplies in the north may have little effect on producer incentives; but the continuation of this pattern also implies a lack of development in the marketing system and the continuation of a primarily subsistence orientation among smallholders. Clearly, the objective is to create an active and efficient marketing system throughout the country, one in which smallholders participate actively. Once this begins to happen, the effects of food aid on producer incentives will grow. **Thus, in the north, the frailty of the marketing system may at this time be a greater constraint to increased farm production and marketed surplus than the presence of food aid. Efforts must be directed at improving this marketing system, being conscious of the growing effect that food aid supplies will have as these efforts succeed.**

4. How Elastic are World Supplies of White Maize to Mozambique?

We have argued in the previous three sections that there is increasing reason to believe that large volumes of yellow maize food aid arriving in urban areas could have negative effects on the producer price of white maize throughout the country. The final question is what the relative effects of any price decrease will be on white maize imports and domestic production: which of these will absorb the greatest portion of any decrease in total consumption of white maize? This issue relates to question number four above: the elasticity of supply of white maize from imports and from domestic production.

We suggest that white maize import supply to Mozambique is inelastic. This argument is based on three observations. First, the world white maize market is very thin, in the sense that only a small proportion of total production enters the market during any year (Kingsbury, 1989). The ability of a country to procure all the supply it wants in such a market without significantly affecting the price is limited. Second, the volume of trade in white maize world markets is unstable. This is due to the concentration of trade volume which comes from southern Africa (over 90%), and the high covariance of production across countries in this region (Jayne, et al., 1994). For example, from 1975 through 1983, the covariance of exports from South Africa and Zimbabwe, the world's two largest white maize exporters, was 0.63. The coefficient of variation of South African exports was 0.47, while that for Zimbabwe was 0.49. The southern Africa drought of 1992 is only the latest, albeit very severe, example of region-wide weather disasters which drastically reduce supplies for all countries. Thus,

supplies of white maize tend to be scarce or abundant in all countries of the region at the same time. These factors make it very difficult for countries to use international trade to smooth domestic production fluctuations.

Finally, the relevant world market for white maize to Mozambique is informal trade with Swaziland and Zimbabwe. These markets present special conditions that increase the inelasticity of supply. Mozambique has not historically received significant volumes of white maize from countries other than Zimbabwe and Swaziland (small amounts arrive periodically from South Africa and possibly other countries of the region). Supply to Maputo/Matola from Swaziland is likely to be inelastic for two reasons.[32] First, the Maputo/Matola market is not "small" relative to the Swaziland market. The common assumption in economic analysis that countries face an infinitely or highly elastic supply from the world market and thus are "price-takers" is based on the idea that the market in most countries is very small relative to the world market. Thus, any change in quantity demanded by the country has an insignificant effect on total demand, and thus on prices, in the world market. This is clearly not the case in Maputo/Matola. The population of these cities is greater than that of Swaziland. Total white maize production in Swaziland varies around 80,000 metric tons, less than total consumption in Maputo/Matola. Swaziland must import one-third to one-half of its maize needs from South Africa. Approximately 90% of this maize is processed in a single mill, Swaki Mills, which produces about 40,000 MT of refined white meal per year. Frequent empirical observation over the past three years indicates that the dominant non-Mozambican white maize product in the Maputo market is the *Ligugu* refined white meal from the Swaki mill. White grain from Swaziland is found infrequently and in small quantities. The SIMA research team has never observed whole white meal from Swaziland in any Maputo market. White refined meal from South Africa also appears very infrequently and in small volume. Thus, world market white maize supply to Maputo is essentially limited to refined white meal from a single mill (Swaki) in Swaziland. In light of this, and in view of the large size of Maputo relative to Swaziland, we conclude that supply from Swaziland is inelastic.

The second reason to expect inelastic supply is that nearly all the trade is conducted informally. Import duties are not paid on the border, and sales of white maize products outside of the Customs Union (of which Mozambique is not a member) violate Swaziland's agreement with the Union. The trade as it is currently conducted, in small scale, is feasible for traders and authorities are willing to overlook it. If traders were to attempt to increase greatly the volume of this trade, transactions costs could rapidly become prohibitive.

Zimbabwe previously supplied refined white meal and white maize grain to Beira. However, these products have been entirely absent from the Beira market during 1993, due to the high prices in Zimbabwe. Maize grain and meals from domestic production have been the only white maize products in the market during this year[33]. If price relationships change, refined white meal could once again begin entering Mozambique. The primary reason to expect this renewed supply to be inelastic is the highly controlled nature of the export marketing system in

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[32] See Annex D for a more in-depth discussion of markets in Swaziland.

[33] From SIMA data. The SIMA has distinguished between imported and domestically produced maize only for the past year.

Zimbabwe. Research in that country indicates that the large-scale, centralized maize milling system which has been in place since before independence captures nearly all the marketed maize (Jayne and Rubey, 1993). Some unrefined white meal (*mugayiwa*) is produced in local hammer mills and sold in rural markets, but these are very thin. Moreover, the SIMA has never detected this unrefined meal in Beira markets. The refined meal and grain that does arrive does so through informal channels, and expressly against Zimbabwean policy. While authorities have begun to liberalize internal trade, foreign trade remains controlled.

In sum, evidence indicates that world market supply of white maize to both Maputo/Matola and Beira is inelastic. This will force any adjustment in quantities demanded within Mozambique on to domestic production. This production is also likely to be relatively inelastic, for a series of reasons, some of which are discussed in the next section. Yet the lack of any legal controls on maize production and marketing, plus the improvements associated with the ending of the war, suggest that supply response in Mozambique is likely to be more elastic than that in either Swaziland or Zimbabwe. If this is the case, then domestic white maize production, not imports, will carry the brunt of any reduction in internal demand caused by increased yellow maize food aid. Certainly as rural infrastructure and marketing systems recuperate after the war, the supply response will become increasingly elastic, and domestic production will be increasingly vulnerable to depressed prices.

C. Producer Response to Price Changes

Regardless of the producer price effects that food aid has, our ultimate interest is in the influence those price effects have on producer behavior. The simple conclusion that higher prices will increase production and benefit most producers, while lower prices will decrease prices and hurt producers, is certainly true in the long run. But in the short and medium run the magnitude, and for some groups of farmers even the direction, of these effects cannot be taken for granted (Eriksson, 1993; de Janvry, et al., 1992). In other words, both theoretical and empirical studies indicate that producers can, under certain circumstances, respond to higher food prices with **lower** production; under others, they may not respond at all.

A full review of the literature and analysis of the supply response to price changes in Mozambique is beyond the scope of this paper. Nonetheless, two key points may be made. First, producers are more likely to show a very weak or negative production response to higher prices if the non-agricultural economy in rural areas is severely underdeveloped. Specifically, if producers find it very difficult to purchase all the consumer goods they want, and if they have few opportunities for off-farm work, they may reduce production as prices rise. Second, the immediate effect of a price rise on a producer's real income depends on that producer's position in the market. If the producer sells more of the product than he or she buys (being defined as a "net seller"), a price increase will also increase real income. If the producer does not participate in the market, a price increase will have no direct effect on real income. Finally, if the producer is a "net buyer", buying more of the good than he or she sells, an increase in the price of the good will decrease real income.

Empirical research conducted in 1991 in rural Nampula province, along with SIMA data, shows that consumer goods were quite scarce in most markets (MOA/MSU Research Team, 1992b). This same research shows that opportunities for off-farm labor were much more

restricted than in most other Sub-Saharan Africa countries. Both of these conditions suggest the possibility of a very weak or even negative producer response to higher prices. Clearly, the principal reason for these conditions was the war which continued to affect farmers' lives at the time the research was conducted. With the ending of the war, one would expect these conditions to improve, and for producer response to price incentives to be increasingly positive. In the medium and long runs, there seems little reason to doubt that this will happen. But large improvements in the rural economies of Mozambique will require several years. During that time, producer response to improved price incentives is likely to be weaker than some might expect. Thus, preventing maize grain food aid from entering the country at highly subsidized prices should be viewed as part of a long-run strategy to reactivate agricultural production.

CHAPTER FIVE

ALTERNATIVE APPROACHES TO QUANTITY PROGRAMMING, PRICING, AND DISTRIBUTION

I. Introduction

Mozambique has demonstrated a sustained commitment to liberalizing its economy since it took the first steps in that direction in 1985. Eventually, the country's goal is to be self-reliant in providing for its food needs. Essentially, this means ensuring sufficient domestic supplies through a workable combination of domestic production and commercial imports financed largely with earned foreign exchange. Liberalized international trade in basic foodstuffs would be one key component of such a regime.

Clearly, Mozambique is far from that objective at the present time. As has been said before, food aid, both commercial and emergency, will continue for some years to be a very significant portion the total food supply, especially of maize. Yet this paper has argued from the outset that food aid can and should be used to facilitate the transition to a self-reliant, essentially private economy, open to and effectively utilizing world markets. Doing so requires that one understand the essential characteristics of such an open economy, and design a food aid program which is compatible with it.

One of these essential characteristics is that prices on world markets are largely outside the control of domestic traders. In economic jargon, world market prices are "exogenous". This implies that domestic traders must accept these prices as given, and adjust the quantities they demand. If world market prices increase, they demand less; if prices fall, traders demand more. **Prices determine quantities, not *vice versa***. The key result which flows from this characteristic is that domestic prices will track world prices for any product in which the country participates in world markets. If the country consistently exports, prices will approximate the EPP. If it consistently imports, domestic prices will move closely with the higher (by transport and other costs) IPP. If the country produces enough to meet its needs at market clearing prices that are above export parity (precluding exports) but below import

parity (making imports unattractive), it will not participate in world markets. In this case, domestic prices will be free to fluctuate within the band defined by import and export parity without regard to world price movements. In the medium to long-run, however, prices even in a self-sufficient country will tend to track world price movements[34]. All of this depends, of course, on free trade in international markets.

This model of an essentially open economy, towards which Mozambique is moving, will be the basis for evaluating the alternative approaches to quantity programming, pricing, and distribution of food aid presented in the following sections. The objective will be to begin now to create a domestic grain economy which mimics as closely as possible the type of economy which is emerging in the country.

II. Auctions

In a typical auction, a fixed quantity is offered to participants, and the highest bidder receives the product. Modifications can be introduced to allow several participants to share the quantity. In either case, the essential characteristic of the auction is that price adjusts to quantity, rather than *vice versa*. This clearly violates the condition specified above, that quantities adjust to price.

Yet this simple view of auctions does not capture the whole truth, **if suppliers to the auction are responsive to expected prices.** In a setting where both suppliers and demanders are subject to market forces, suppliers have an incentive to provide more product if they expect the price to be high. Thus, in repeated auctions, a high price during one would induce greater supply for the following auction, if the suppliers expected demand to remain strong. In other words, while quantity is not responsive to price during a single auction, it can be over repeated auctions. Thus, auctions in a setting where suppliers are responsive to price could satisfy the above requirement.

In the context of commercial food aid, however, only demanders are in a market setting. Suppliers (donors) receive no payment for the product, and the price at which it sells thus provides them with no incentive. For this reason, there is no reason to expect that food aid quantities will be responsive to prices in an auction system, even over repeated auctions. Furthermore, there is reason to expect that food aid arrivals will continue to be irregular (see Figure 1 for historical evidence in Mozambique) unless a system is specifically designed to stabilize them. Irregular arrivals that are unresponsive to price signals constitute a recipe for highly unstable internal prices, as demonstrated by the record in Mozambique since 1990. Auctions would therefore not appear to be a viable option for the pricing of commercial food aid in Mozambique.

[34] If domestic prices in such an economy move outside of the band defined by import and export parity prices, trade will take place, thus pushing prices back into the band.

III. Fixed Price Systems

In contrast to an auction, in which price is forced to adjust to the quantity being offered, the concept behind the kind of fixed price systems discussed in this section is that quantities will adjust to a pre-announced price. This process is similar to what happens in a commercial import system, since traders are unable to affect the world market price. They must accept this as given, and adjust the quantity they purchase based on the price. As long as they do so effectively, final prices within the country will be very similar to world market prices. A major goal of a fixed price commercial food aid system in Mozambique is to keep domestic prices in line with world prices, or world price trends. **For this to happen, mechanisms must be developed to ensure that demand for the commercial food aid is satisfied at whatever price is applied**. This is probably the key requirement of the system. If this is done successfully, it would result in a major decrease in price instability. It should also improve incentives for domestic production of white maize, as world prices have been far higher than consignee prices over at least the past three years.

A word about terminology, specifically the term "fixed price", is in order. In any economic system, someone or some system must fix prices. In a country with free international trade, the world market does this. Yet the market alone cannot do so for food aid, since aid is not transacted on world markets. Thus, someone must fix a price. The point of the following sections will be to show how to do so with due regard to world markets.

A. Import Parity Pricing: The Pros and Cons of the World Price as a Guide for Domestic Price Policy

Should yellow maize food aid prices in Mozambique be tied in some systematic way to world market prices? If so, how should world prices be used to calculate the domestic sales price? Before answering these questions, one must first ask "which world price?" The answer depends in part on whether the country would be an exporter or an importer on world markets under normal conditions. An importer would pay the IPP. An exporting country must compete in the relevant world market, and should thus use the EPP. This is generally taken to be the FOB price of the competitive world market, also adjusted for internal transport.

In deciding which parity price to use, one must carefully consider not only the country's current competitive position in world markets, but its likely position in the medium and long-run. In the short and medium run, Mozambique is clearly an importer of maize, so that the IPP is most appropriate. The conventional wisdom is that, as domestic production increases after the end of the war, domestic white maize will force yellow maize out of the country's consumption basket, and Mozambique will be a food exporter. This would require that surplus northern areas of the country supply the deficit south. Yet the reality may be more complex. In the context of liberalized trade throughout the southern African region, Mozambique could export white maize while importing both white and yellow maize: northern surplus areas might supply Malawi and possibly southern Tanzania, while the deficit south continues to purchase Swazi and South African white maize as well as domestic white maize from the north and yellow maize from the international market to complement domestic white supplies from Gaza and Inhambane provinces. Nevertheless, it is reasonable to conclude that, at least for the next several years, the IPP will be the relevant world price for Mozambique.

But this doesn't answer the question of why the world price should be used as a guide in the first place. Mellor (p. 288) states that "ideally, international prices reflect underlying global supply and demand balances and hence serve as a basis for determining the comparative advantage for agriculture in individual countries". A more pragmatic observation is that nearly every country needs at some time to use world markets, whether to dispose of surpluses or to cover deficits. If domestic prices are far removed from world prices when this need arises, the cost of using world markets can be extremely high. In fact it is probable that the costs will be high; very high domestic prices will tend to create surpluses, which would have to be subsidized to be disposed of on world markets. Likewise, very low domestic prices lead to deficits, and if imports are to be used to keep the price low, they too will have to be subsidized.

Nevertheless, a plausible argument against using the world price as a guide in domestic price policy states that the **level** of this price is biased downward by agricultural subsidies in developed countries, and its **movement** is influenced by what are often primarily political decisions in these same countries. For this reason, the argument goes, neither world price levels nor movements are viable guides for domestic price policy. This argument is more effective against the comparative advantage reasoning of Mellor than it is against the more pragmatic consideration which followed it.

Furthermore, even assuming that Mozambique were to decide that world prices should be used in some manner as a guide for domestic price policy, it will have to deal with a number of difficulties in applying these prices. One difficulty is that world prices may be more unstable than many countries are willing to accept. As a result, many attempt to insulate their domestic markets to one extent or another from world price fluctuations. Further, a country using world prices as a guide generally desires to plan its domestic production based on long-run, or at least medium-run, trends in those prices. Two problems emerge in attempting to estimate these trends. First, short-run fluctuations in world prices often do not reflect these trends and could unduly disrupt domestic planting decisions. This reinforces the desire not to import all world market fluctuations into domestic markets. Second, agricultural subsidies in developed countries may well cause price levels to underestimate true market clearing prices.

A final difficulty in using world prices as a guide involves exchange rates. For world prices expressed in domestic currency to accurately reflect the country's opportunity cost of producing rather than importing the commodity, they must be converted using what economists call a "real" exchange rate. This rate can and often does differ both from official and market rates, and is very difficult to calculate.

The use of world prices as guides to domestic price policy is not entirely straightforward. Given the arguments in favor and against their use, as well as the practical difficulties in their application, the most balanced conclusion seems to be that "... world price is ... a rough guide that can neither be rigidly followed nor completely abandoned in national pricing policies" (Mellor, p. 62). In departing from a rigid application of world prices, insulation from their fluctuations is most easily justified, even if the best means of obtaining this insulation are not self-evident. Deviation from medium or long-run world price levels is more problematic. If a country such as Mozambique chooses to keep domestic prices of maize below world prices,

this should be for specific, well analyzed reasons, and likely with the eventual goal of eliminating the difference.

B. Which Import Parity Price?

Having accepted the principle that the IPP is a useful guide for pricing policy in Mozambique, one is left with the question of which IPP to apply. There are two basic options: use the actual world market price when the ship departs from port, even if this is unusually high or low; or use past world market prices to calculate a (more stable) trend in world prices, and apply this trend price. In either case, one has to decide how to convert the dollar price into local currency. In this section, we will draw some lessons for Mozambique from three approaches to fixing the IPP:

a. An "average price" approach in which the dollar price varies for each ship, being equal to the average of some fixed number of past world prices (called a "moving average"),

b. A "step price" approach in which the dollar price is fixed for an entire marketing year (March-February), based on the moving average series, and

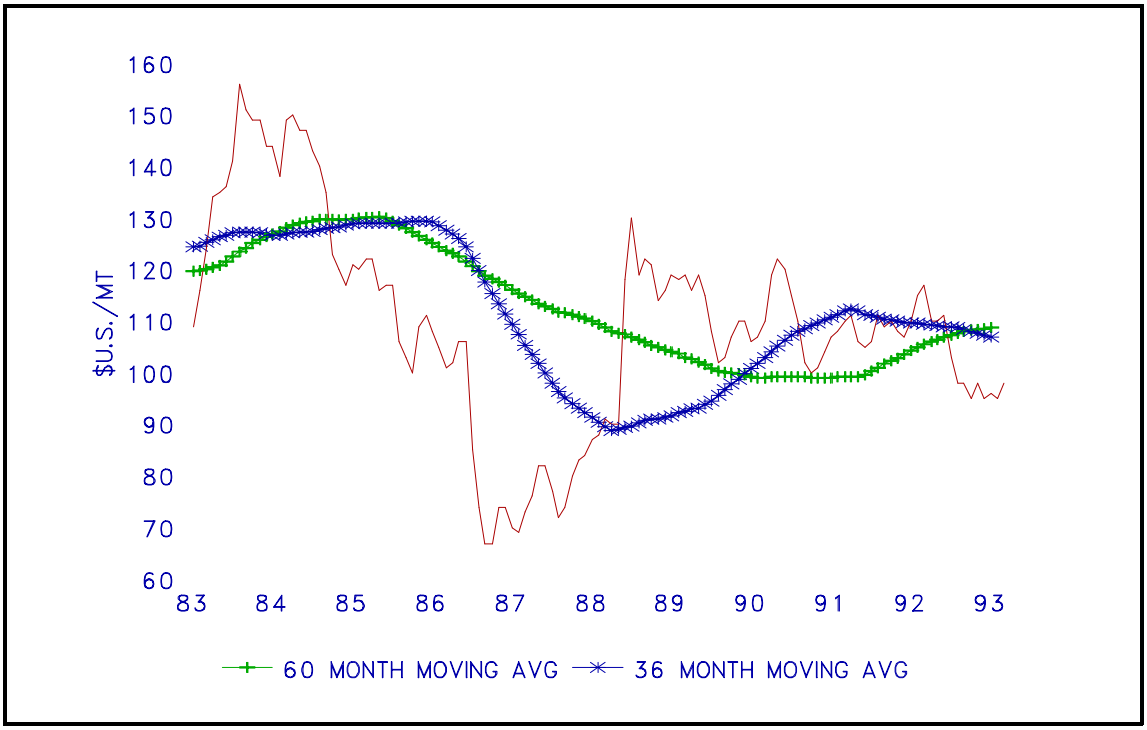
c. A "market price" approach in which the dollar price is equal to the actual world market price (without averaging) three months prior to the ship's expected date of arrival

In all three approaches, the dollar price is converted to meticais using the market exchange rate. **Note that all prices are FOB, U.S. gulf ports. IPPs at the consignee level would be approximately $50 to $60 higher, due to transport and port costs.**

1. Average Price Approach

This approach uses a "moving average" of past world prices to eliminate very short-run fluctuations while at the same time tracking world price trends. Such an average is based on a fixed number of observations (e.g., 60 or 36 months) and is updated each period: the latest price is added, the earliest price is dropped, and the average is recomputed. The moving average can be calculated with any frequency of data, but for price policy purposes, monthly

Figure 9. Moving averages and actual world prices of yellow maize grain, 1983-1993



data is typically used. Figure 9 shows two monthly moving averages, 36 and 60 months, along with actual U.S. FOB Gulf prices of yellow maize grain between 1983 and 1993. Each moving average is moved forward three months, under the idea that donors may want to announce the price to consignees with three months anticipation. For example, the 60 month moving average for January 1993 is equal to the average of the 60 months of prices up through September 1992 ($100.97). This means that in October 1992 (the earliest that September data can be factored into the moving average), donors could have announced the consignee price which would be in effect three months hence, in January 1993.

Note that each moving average tracks world prices, but with much less fluctuation. Note also that the 60 month moving average is more stable than the 36 month. A moving average, then, is one potentially attractive way to stabilize import prices while maintaining a systematic relationship between what importers (or consignees) pay and actual world prices.

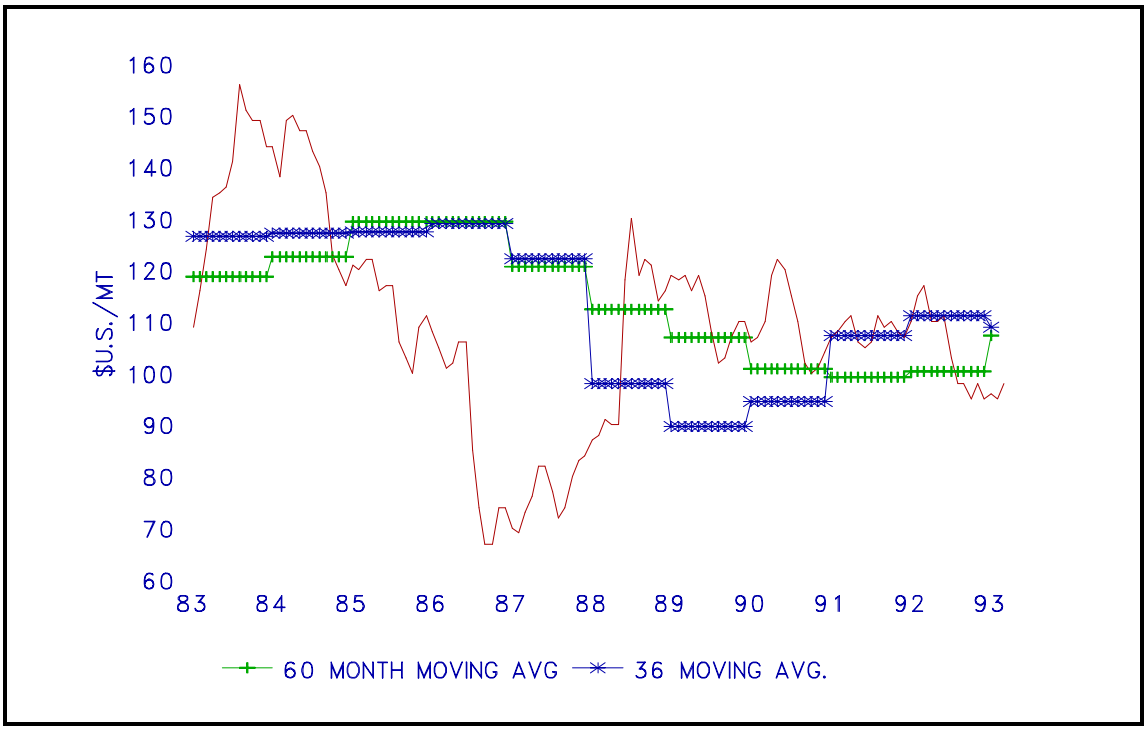
2. Step Price Approach

The average price approach requires one to recalculate the moving average every month and make the result known to all consignees. A simpler approach, which may also be easier for traders to operate in, is to fix a single dollar price for an entire year, based on the moving average, then update it at the end of each year. In this way the series resembles a set of "steps" over time. There are many different ways to go about this, but the essential points are to choose an appropriate marketing year, and then to announce prior to planting the consignee

dollar price that will be in effect during that year. The announcement prior to planting is meant to help both traders and producers plan in an environment of reduced uncertainty.

In Figure 10, two different step price series, based on the 36 and 60 month moving averages, are presented with the actual U.S. Gulf FOB price. The marketing year begins in March, with the beginning of the white maize harvest, and runs through the following February. The dollar price, fixed throughout the marketing year, is made equal to the moving average through August of the previous year. This means that when all August data becomes available in

Figure 10. Fixed world prices of yellow maize grain, based on moving average of past prices, 1983-1993



September, around the time that planting starts, donors and GOM can announce the dollar consignee price which will be in effect from the following March through February. This is then updated every year.

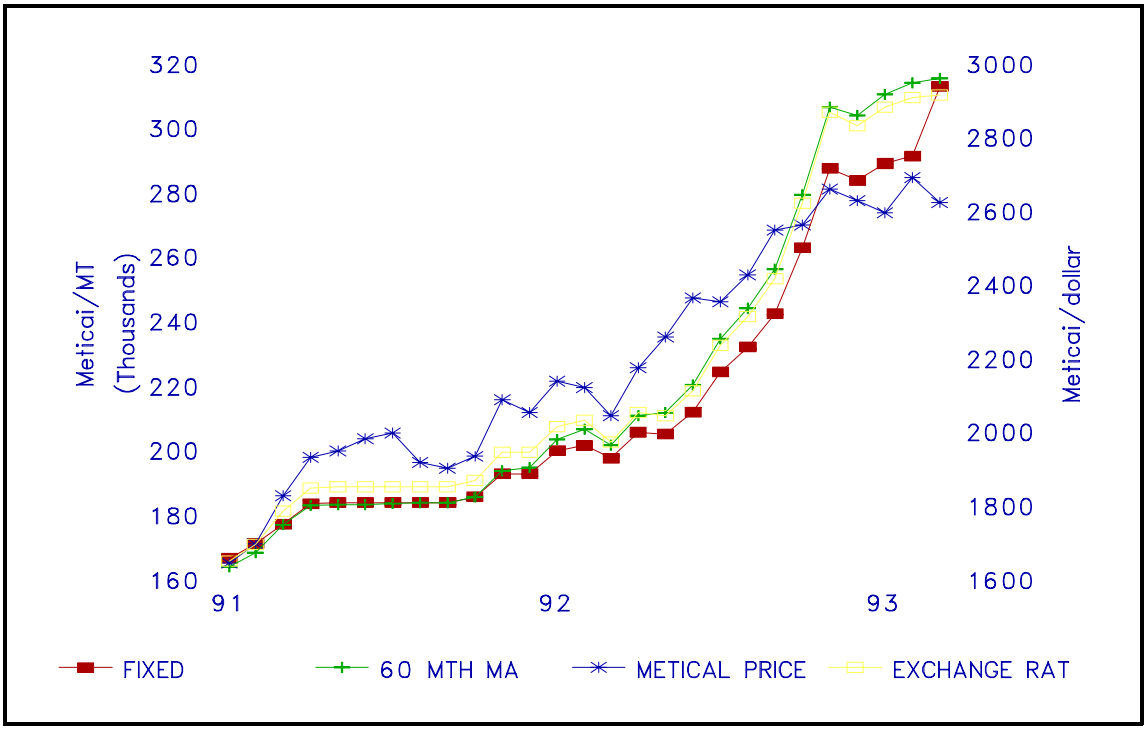
The step price series show similar characteristics to the moving averages. They track world prices but are much more stable. The series based on the 36 month moving average, however, is subject to much larger changes from year to year. This reflects the fact that the 36 month moving average is less stable than the 60 month, especially during periods of rapid change in actual world prices.

3. Market Price Approach

Both the average and step price approaches have been presented in dollar terms. Each dramatically stabilizes dollar prices while maintaining a systematic relationship between consignee sales prices and actual world prices. In contrast, the market price approach uses actual world prices converted to meticais. How do these three approaches compare once all are expressed in meticais? Do the first two approaches result in greater stabilization of metical prices?

Figure 11 shows that the answer, at least for the period analyzed, is essentially "no". This graph has four data series. The unstabilized metical price, the step price converted to

Figure 11. Sixty month moving average and fixed price approaches, converted to meticals, January 1991 - March 1993



meticais, and the 60 month moving average price converted to meticais, are all measured on the left hand axis. The metical/dollar exchange rate is measured on the right hand axis. Note that the unstabilized metical price series shows greater month-to-month fluctuation, but changes less from the beginning to the end of the period than do the two stabilized series. Over the entire period, it is difficult to argue that any of the series stabilized in dollars are less variable in meticais than the simple metical price. The reason for this is that the exchange rate shows much greater fluctuation during this period than do world prices. Thus, over the entire period analyzed, stabilizing dollar prices removes only a small portion of the total variability in metical prices.

Nevertheless, it is worth noting three sub-periods in the graph where the effect on metical prices of stabilizing dollar prices differ:

January 1991 - July 1991: During this period, the exchange rate is quite stable, and the two stabilized series are in fact less variable than the simple metical price.

August 1991 - August 1992: This is a period of rapid change in the exchange rate, and its movement therefore dominates all the series. The two stabilized series are no less variable than the simple metical price during this time.

September 1992 - March 1993: Once again, the exchange rate is fairly stable during this period, and the 60 month moving average series shows much less variability than does the simple metical price. The step price series does not perform as well as the moving average during this time (it shows greater variability) because it straddles a change in the fixed dollar price in March, resulting in a jump in the fixed metical price as well.

The important result of this analysis is that an unstable exchange rate eliminates most if not all the benefits of stabilizing dollar prices. If Mozambique continues to experience a highly unstable exchange rate, there would seem to be little value in pursuing any pricing strategy other than applying "the price of the day" in dollars and converting it to meticais. Note also that even without stabilization, world prices converted to meticais are significantly more stable than market prices have been in Maputo. The steepest price rise in Figure 11 is from March 1992 through October 1992, when metical denominated FOB maize prices rose from approximately 210 MT/kg to 280 MT/kg. This is a rise of 33% in seven months. In contrast, market prices in Maputo have on two occasions nearly doubled in the course of only three months. One month price changes of 20% to 25% have not been unusual.

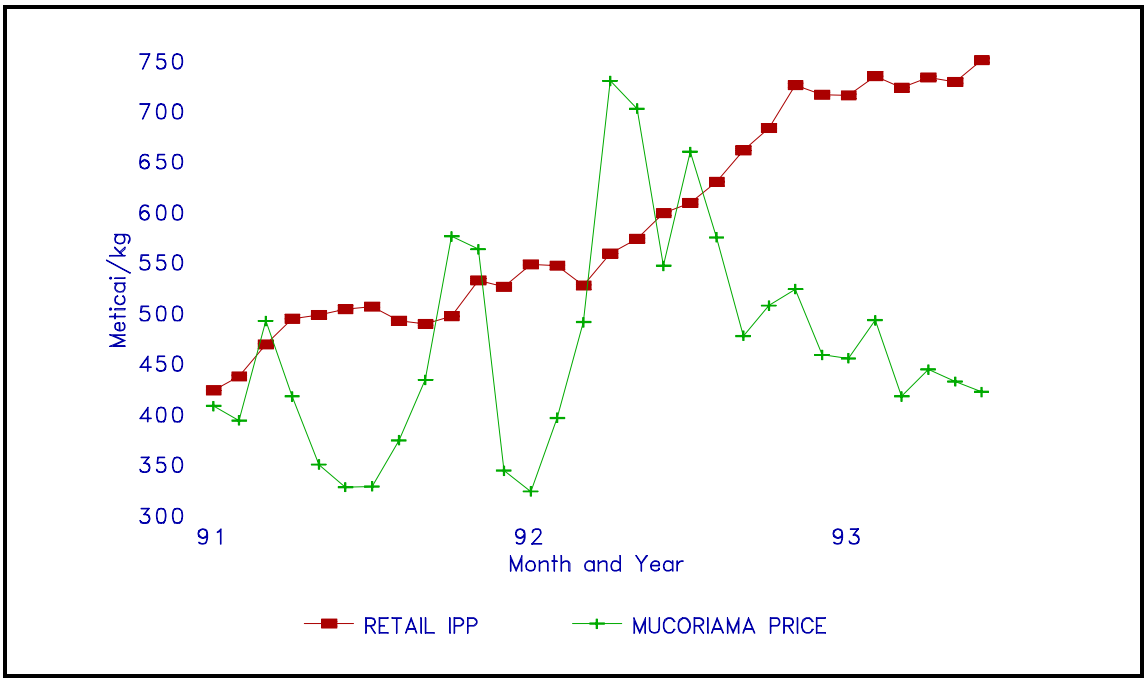
An alternative approach is to stabilize directly the metical prices by applying the average or fixed price approaches to metical, rather than dollar, price series. In practice, this would likely not be effective, for the same reason that stabilization of dollar prices gives little metical stabilization: the rapid devaluation of the metical. The exchange rate is changing so rapidly (Figure 11), that it would be necessary to bring the series up-to-date with some frequency (e.g., every three months) using the current exchange rate, for two reasons. First, one would not want to create too large a gap between actual sales prices and IPPs. Second, fixing "pan-seasonal" prices creates serious disincentives for private sector storage, which is essential if the marketing system in Mozambique is to continue improving its performance. If the exchange rate is updated frequently, however, much of the benefit of directly stabilizing metical prices is lost, since most of their variability originates from the exchange rate.

C. Meeting Demand

A key requirement of the fixed price system is always to meet demand for the maize grain at the price being charged. If this is done, then domestic price levels and variability should approximate those found in world markets. This happens more or less automatically in an effective free market, as traders follow the profit motive and decide which market, domestic or world, is most attractive to buy on or sell to and thereby force the domestic price to converge to the world price. Figure 12

illustrates the different path prices in Maputo may have taken from late 1990 through the present had this been done. The retail IPP in this figure is an approximation of what actual

Figure 12. Retail import parity prices and Mucoriama market prices, Maputo



retail prices would have been under a market price approach to import parity pricing of yellow maize grain, and with demand always being met. It assumes that insurance, freight, port charges, and handling total a constant $60/metric ton, and that the gross marketing margin from consignee to retail is 65% (see Chapter Four, section III.C.3. for a discussion of "competitive" marketing margins). As the figure shows, retail prices would have been on average higher by 25% (587 MT/kg vs. 468 MT/kg), but much more stable than actual market prices, following a steady upward trend. Too, the recent depression of yellow grain prices in Maputo due to the oversupply of commercial and emergency grain on markets exaggerates the difference between normal domestic prices and IPPs. Through late 1992, the difference between the two series averaged only 11% (522 MT/kg vs 471 Mt/kg).

There are three essential requirements if donors and the GOM are always to meet demand at the prices charged. First, they must develop jointly a system to elicit demand from consignees at known prices. This system must be flexible enough to accommodate both donor needs for advance planning of quantities and consignee limitations on the length of their feasible planning horizon. Donors prefer long horizons, consignees short ones; a balance must be struck. Second, the system must have some amount of grain in storage to cover the inevitable errors between expected and actual demand for the grain. Finally, donors must take the initiative to supply consignees with the most reliable information possible regarding arrivals of commercial and emergency grain from all sources. The following is a discussion of some of the key issues which must be considered in designing such a system.

1. Eliciting Demand

Key questions include a) how many traders to survey in estimating total demand, b) how to structure the inquiry to increase the accuracy of response, c) how far ahead of time to inquire, and d) what incentives to build into the system to encourage accurate response followed by acceptance of the amount requested. Past experience with private sector distribution, especially USAID's dealings with a large number of consignees, should help in answering these questions.

The system should include enough traders to ensure effective competition between them in selling the maize. At the same time, the number should not be unduly large, since the collection of counterpart funds may become much more difficult as the number of consignees increases. This is an important issue, since it relates directly to the amount of funds that are generated for development activities. Depending on conditions in Maputo, we suggest that an effective balance might be struck with anywhere from 10 to 20 consignees.[35]

The survey should be structured to maximize the information available to potential consignees and thereby increase the accuracy of their response. One approach would be to conduct the survey in two rounds. In a first round, 10 to 20 traders are sent a sheet with the following information:

- the purchase price,
- the date of arrival (probably four months hence: see below),
- the names of every other potential consignee being included in the survey,
- current stocks and physical location of emergency grain,
- planned distribution of emergency grain in storage (location and means of distribution),
- location and size of cash for work programs, and
- planned emergency arrivals over the next six months, and destination of the grain (to storage or distribution)

Consignees are assured that their response will be confidential, and are then asked to estimate how much grain they would want on the specified delivery date. They could be given two weeks to respond, during which time they will presumably collect any information they need to give an accurate response. When the responses are returned, a second sheet is sent to the same group of traders, informing them of the **total** amount requested by all consignees (not the individual amounts), updating where necessary any of the other information sent in the first round, and asking them if they would like to modify their request. They could once again be given two weeks to respond. Such an approach might ease the information difficulty and

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[35] An important issue to consider is the geographic market that each consignee tends to operate in. For example, consignees with mills north of Maputo (e.g., Capela and de Sousa) may tend not to sell in Maputo, but rather in the area around their mill. One would want sufficient consignees **selling in Maputo** to ensure effective competition there. Given what we know about southern markets, this would likely then be sufficient to enforce competition in areas north of the city in Gaza and Inhambane provinces (see Chapter Four, section IV.2 for discussion of this issue).

result in better estimates than would a single round approach. Some experimentation might be necessary. Yet given the long period of time during which Mozambique will be dependent on food aid, it seems appropriate that some time and effort be dedicated to developing an effective way to do this. Nevertheless, errors will certainly be made no matter the system, which points out the need for a regulatory stock (see below).

There is no single answer to the question of how far ahead to inquire among potential consignees regarding desired quantities. A balance is needed between the need of donors needs to plan ahead and limited consignee ability to do so. Following the two-step procedure outlined above, a reasonable solution might be to conduct the first round four months prior to expected arrival, finishing the second round one month later, or three months prior to arrival. We emphasize that one of the prime determinants of consignees' ability to give reasonably accurate responses regarding demand three months hence is reliable information about projected grain arrivals **from all sources**. This important issue will be discussed further below.

A final issue in eliciting demand is what incentives to create to encourage accurate response by consignees followed by acceptance of the amount requested. It may be necessary to create incentives regarding payment mechanisms so that participation as a consignee is attractive to traders, and then to predicate continued inclusion on acceptance of the amounts requested. Interest rates, loan period, and amount of payment required up-front are mechanisms that can be used to attract and then keep traders in the program.

2. Regulatory Stocks

Maintaining a stock of maize to help stabilize prices around the IPP is an important part of the commercial distribution system. One might ask why this is necessary, since in a fully market setting, no public agency would carry such a stock, and traders would have to deal as best they could with world and domestic market price instability. Probably the best answer is that consignees purchasing food aid are not operating in a fully market setting. Specifically, consignees are not able to go to the market at any time to obtain more grain if they expect current supplies to be short. The food aid program is not that flexible. This fact argues for a way in which to cover demand when it exceeds supply.

Much research over the past two decades has demonstrated the potentially insupportable cost of grain reserves used for price stabilization (Johnson 1975; Bigman 1985; Pinckney 1988, 1989; Ahmed and Bernard 1989). While this concern should not be ignored in Mozambique, it needs also to be placed in context. Simply put, there is no reason for storage in support of the food aid program to be unduly costly. First, one of the largest costs in most storage schemes is interest on the capital invested in the grain. With donor and GOM collaboration, this need not be an important cost for the food aid program. Donors do not have capital directly tied-up in the grain, since it has been donated. GOM, however, must deposit agreed-upon counterpart funds in bank accounts monitored by the donors. These funds are not generated until the product is sold, so that grain in storage means fewer funds in the accounts at any given point in time. If donors are flexible to allow payment into the accounts only upon sale, then GOM need not incur any direct budgetary costs to meet this requirement. The only cost, then, would be the opportunity cost of having development funds tied-up in grain rather

than available to finance projects and other development activities. This indirect cost should be easily supported, since the size of the required stock is small relative to the yearly flow of commercial grain through the system. As a proportion of total funds generated, then, the capital tied-up in the stock will also be small.

The reason that the stock can be relatively small is that it will not be made to bear the entire brunt of price stabilization. Continual arrivals of food aid shipments mean that the reserve stock need only absorb residual instability created by the difference between actual consignee demand and arrival volumes. Probably the key result of most analyses of price stabilization schemes has been that effective use of trade, instead of exclusive reliance on stocks, can dramatically reduce costs. This is precisely what would be done in Mozambique, with "trade" in this case being concessionary imports (food aid).

If the GOM and donors do an effective job of eliciting demand for commercial food aid, the size of the reserve stock in Maputo could probably be as small as 10,000 MT, or approximately one month of consumption. The stock could be smaller in Beira. These stocks would have to be rotated to ensure quality, and continually replenished when drawn down. Mechanisms for doing this in a systematic manner must be developed. Too, though costs will be relatively low, GOM and donors must reach agreement on how to pay them. Other issues include where the grain will be stored, and how GOM and donors can ensure their security. Collaboration among parties is essential if these details are to be worked out in a satisfactory manner.

3. Providing Information

Market observation and interviews with consignees and informal sector traders over the life of the MOA/MSU Food Security Project have repeatedly highlighted the importance of information in the marketing system, and the problems which have been created by poor and unequally distributed information. Unfortunately, food aid has been a major source of uncertainty. Actual times of arrival (ATA) often differ significantly from estimated times of arrival (ETA), most informal traders do not even know ETAs or volumes on ships that have arrived, and donors are often ill informed regarding each others' activities. If food aid were a small portion of total supply in Mozambique, these problems might be considered less pressing than others. But the very large volumes of food aid which the country receives, and which it will continue to receive for some years, make it imperative that donors and GOM collaborate actively to improve the amount, quality, and distribution of information on commercial and emergency food aid programs. Above all, this information must be available in a timely manner to all private sector traders who desire it, whether rural or urban, including consignees, other *armazenistas*, informal wholesalers, and *loja* owners. This information should include:

1. Planned emergency and commercial arrivals for one year, including regional allocations. This information will be meant to allow traders to form "ballpark" expectations. It should be made clear to all that these figures are subject to possibly substantial change.

2. Scheduled arrivals of emergency and commercial grain over the next three to six months. This should include donor, product, origin, ship name, quantity, ETA, port, and expected sales price to consignees.

3. Monthly updates. Any changes from the schedule in number two should be published on a monthly basis.

4. Status of ships in port: quantity originally on board, quantity unloaded to date (preferably by consignee), estimated date of completion, and any relevant information on quality and other aspects of the shipment.

5. Planned emergency distribution over the next three to six months, by geographical area. This information should include volumes by type of distribution (food for work, free distribution), and volumes to be monetized.

Newspaper and radio should both be used to distribute this information. Newspaper alone will exclude many traders, especially those in rural areas which will nevertheless be strongly affected by the food aid program. Radio alone is a "soft" medium in that it is difficult to document the information which is broadcast. Both together should reach nearly all interested traders.

D. How Fast to Move

Regardless of the specific pricing approach applied, a key decision is how quickly to move to import parity. GOM and donors must carefully consider both the equity and the feasibility of a rapid move to world price levels.

1. Equity

Figure 12 and the discussion of competitive margins in section III.C of Chapter Four dramatically illustrate the equity implications for consumers of such a move. The discussion in Chapter Four showed that retail prices in September 1993 would likely be close to 1,100 MT/kg if consignees were charged an IPP and their demand for the grain were satisfied. This represents more than a doubling of current market prices. Figure 12 shows that this large difference between domestic and IPPs has existed and grown larger for some time.

Moving suddenly to an import parity regime would impose serious hardship on the lowest income consumers in the country, especially in large urban centers. Sahn and Desai estimate that the poorest 20% of consumers in Maputo allocate 15% of their total food and non-food expenditures to yellow maize grain and meals. Price elasticities of demand are likely very low, as is typical of basic staples in poor countries. If we assume a price elasticity of 0.30, then a doubling of prices will decrease the real incomes (purchasing power) of the poorest 20% of households by 6%[36] [37]. This is a serious reduction in light of their already very low real

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[36] A yellow maize price elasticity of 0.30 means that, if prices increase by 1%, the quantity (continued...)

incomes. These households are also the least likely to have savings to tide them over until incomes adjust, nor are they likely to be able to use credit to smooth their consumption. In short, the cost of an immediate adjustment to world prices would seem to be unreasonably large for these consumers. The current problem of unsustainably low prices took some months to develop. A well designed transition of a few months towards more realistic price levels would thus seem appropriate.

Such a transition could be designed while taking into consideration issues of producer equity in addition to consumer equity. The desire to avoid production disincentives is at the heart of the move to import parity pricing. One option which might effectively balance producer and consumer interests is to announce at the beginning of October 1993, that the move to import parity will be phased in, such that consignee prices will be at this level by the beginning of the next maize harvest in March 1994. This would provide clear signals to traders as to the relative competitiveness of domestic production versus commercial food aid. It should provide incentives for some of them to invest more heavily in mobilization of the domestic harvest. Announcing the policy some months prior to the harvest should also improve the effectiveness of price transmission to the producer level, as traders organize to purchase larger volumes of domestic production.

2. Feasibility

The very serious oversupply of yellow maize which has developed since late 1992 significantly complicates the feasibility of moving to import parity pricing. In addition, prices and price policy out of Swaziland, and to a lesser extent South Africa, must be considered, though they do not currently represent a constraint to import parity pricing in Mozambique.

Many consignees have been badly hurt by events since late 1992. Retail yellow maize prices in Maputo since mid-1993 have been only about 30% above consignee prices which had been in effect since October 1992. This compares with a best estimate of 65% for a maximum competitive gross margin between consignee and retail, without storage (Chapter Four). Considering storage and interest costs, and product deterioration, it is clear that many consignees have lost a great deal of money on grain delivered since late 1992[38]. Retail prices in many areas outside of Maputo have been lower than in the city, reflecting large movements of emergency grain onto commercial markets, through a combination of diversions and

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[36](...continued)
actually purchased decreases by only 0.3%. This is a typical price elasticity for a basic staple in a poor country.

[37] This calculation ignores income effects of the price change. It also applies the elasticity, which is properly meant for only very small ("marginal") changes in prices, to a doubling of prices. In the absence of a fully specified model of household behavior, however, the calculation gives a good idea of the magnitude of effect that this price change would imply for poor consumers.

[38] This statement assumes that consignees have paid the full countervalue of the product they accepted. To the extent that they have not, losses will be less.

household sales. Section V of Chapter Three discusses the current situation of maize markets in more detail.

Consignees have expressed grave concern about the current situation. One can imagine that this concern would be heightened by a proposal to approximately double the price they pay for yellow maize. Furthermore, it is not yet clear that the leakage of emergency grain onto the market is under control. Table 1 at the beginning of this report shows that projected emergency arrivals for the last half of 1993 are only 57% of arrivals during the first half of the year. Yet total emergency arrivals during 1993 are 39% above those of 1992 and nearly 90% above those for any other year on record. It is not clear whether the system has yet been able to digest this extraordinarily large volume of grain. Detailed information on current commercial and emergency stocks, and on projected emergency distribution is critical to more adequately assess the current situation.

Under normal circumstances, white maize meal prices out of South Africa and Swaziland could place a ceiling on the price that can be charged consignees for yellow maize grain.[39] This ceiling would emerge as consumers switch rapidly to white over yellow maize meal as the price of the latter increases. Recall that previous analysis has shown a market determined price premium of around 30% for white maize grain over yellow, when each product was in normal supply. If an increasing consignee price begins to reduce this premium, consumers will choose white over yellow, and this reduction in demand for yellow will be transmitted to consignees. These will begin reducing the amount of yellow grain consignees will accept; demand for yellow could largely dry-up if the two prices are similar and if traders can obtain sufficient volumes of white meal out of Swaziland.

In the current environment, however, Swazi white meal prices provide ample room for increasing the price of yellow grain in Mozambique.[40] Based on sales prices in Swaziland and transport, the cost to Maputo wholesalers of getting Swazi white maize meal to Maputo is currently more than 1,300 MT/kg (Table 4)

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[39] The rigidity of this ceiling would depend on the elasticity of supply of white maize meal out of Swaziland to Maputo. A very elastic supply would result in a relatively firm ceiling on yellow maize prices. An inelastic supply would allow greater room for yellow maize price increases. See Chapter Four, section III.B.4. for discussion of the probable elasticity of supply of white maize to Maputo.

[40] There is also reason to believe that white maize meal prices out of Swaziland and South Africa may seldom if ever be low enough to seriously undercut yellow maize priced at import parity. This possibility needs further investigation. See Annex D for a more detailed discussion of maize price policy in these two countries, and effects on trade with Mozambique.

Table 4. Regional White Maize Grain and Flour Prices

Product/Place	Price/unit		
	Rand/ton	Dollars/ton (3.3 rand/$)	Meticais/kg (4,500 meticais/$)
White Maize Grain			
Prod Price: South Africa	417	126	568
Prod Price: Mozambique	351	106	478
Prod Price: Swaziland	540	164	737
Prod Price: Zimbabwe	465	141	635
Maize Board Price to millers for white grain: SA	545	165	744
World Price: US Gulf Ports FOB*	347	105	473
World Price CIF Durban*	495	150	675
World Price CIF Maputo*	512	155	698
White Maize Flours			
Swazi White Maize Sifted Flour in Swazi (50-kg bags: Rand 53 each)	1060	342	1,348
Swazi White Maize Sifted Flour in Swazi (50-kg bags: Rand 49 each)	980	316	1,244
Swazi White Maize Sifted Flour in Maputo (50-kg bags, Rand 49 each plus 4,000 meticais/sack freight)	1051	339	1,334
SA White Maize Sifted Flour in SA (50-kg bags, Rand 40 in Pretoria/Johannesburg)	800	242	1,091
SA White Maize Sifted Flour in Maputo, informal trade (as above, plus 100 Rand/ton freight)	900	273	1,227
SA White Maize Sifted Flour in Maputo, formal trade (as above, plus 17% import duty)	1036	313	1,413
Moz whole white meal, Bazuca			960

* World prices are approximate. Flour prices are wholesale level.

Sources: Maize Board of South Africa, price announcement memo of June 28, 1993; interviews with South African and Swaziland traders, as well as observed market prices; SADCC Food Security Monthly Update, 31 May 1993, Harare, Zimbabwe; Comissão Nacional de Salários e Preços, 30 March 1993.

. Based on typical margins, this would result in a retail price of 1,700-1,800 MT/kg, more than three times the price of whole yellow meal in Maputo. Historical evidence indicates that the vast majority of consumers in Maputo are not willing to pay such a large premium for this higher quality white meal. In fact, there has been no Swazi white maize meal in Maputo markets during all of 1993, despite normal production in that country and no known barriers to the previously flourishing informal trade. This fact is most plausibly explained by the very large difference in relative prices.

Available data allow an indirect estimation of the price premium consumers in Maputo may be willing to pay for refined white meal from Swaziland over whole yellow meal. Recall from Chapter Four that the historical premium for white grain over yellow grain (taken as an indication of the "pure preference for color") is 35% to 38%. Also from Chapter Four, the historical preference for refined yellow meal over whole yellow meal is about 30%. This is taken as an indication of the "pure preference for processing". These two figures give an estimated premium of refined white meal over whole yellow meal of 77%.[41] We estimated earlier that import parity pricing of yellow maize grain would result in a retail maize grain price of approximately 1,080 MT/kg. Based on a milling charge of 30-50 MT/kg, whole yellow meal prices at retail would not exceed 1,100 MT/kg, giving a 60% price difference between refined white and whole yellow meals (1750/1100). So Maputo consumers might on average be willing to pay as much as 77% more for refined white meal than for whole yellow meal, while import parity pricing of yellow maize would result in a price difference of about 60%.

These figures are all very approximate, but seem reasonable in light of available evidence. They suggest that a movement to import parity pricing would result in a greater inflow to Mozambique of white maize meal from Swaziland, thus reducing demand for yellow grain. They do not suggest a drastic reduction in demand for food aid. The most balanced conclusion thus seems to be that, at this time, prices in Swaziland do not present a significant barrier to import parity pricing of yellow grain in Mozambique. The current yellow maize over-supply and continuing uncertainty about

[41] The premium is equal to the product of the two premiums minus 1.0: (1.365)(1.3) - 1 = 0.77.

emergency distribution does present such a barrier. In short, this analysis indicates that donors should feel free to move toward import parity on yellow maize, but that they should do so with caution, and above all in consultation with consignees.

IV. Distribution

Once quantities of food aid are determined and prices are applied, the way in which food aid is distributed may have important effects on the functioning of markets. Distribution issues are especially important on the emergency side.

A. Commercial Food Aid

The two key issues in Mozambique regarding commercial food aid distribution are the appropriate number of consignees for any given shipment, and what size of regulatory stock to hold, if any. This issue of consignee numbers was analyzed in Chapter Four, section III, where it was concluded that "on average, supply to the market will be lower, and retail prices higher, when there is a monopoly over food aid than when sufficient consignees have access to make the system competitive". All else equal, one would thus prefer to have sufficient consignees to ensure competition. The issue was further discussed in Chapter Five, section III.C. Here, it was noted that the challenge is to balance the desire for effective competition with ease of administration and ensuring repayment of counterpart funds. We concluded that "an effective balance might be struck with anywhere from 10 to 20 consignees", depending on the geographic market that each tends to operate in.

Section II of this chapter discussed the issue of regulatory stocks, why they might be necessary in the food aid program being proposed, and how large they might need to be. This section will attempt briefly to address three other key details of a stocking scheme: who should have access, under what conditions they should have access, and what price they should be charged.

The primary reason for maintaining a reserve stock is to help stabilize prices around import parity. In addition to this concern with price stability, it is conceivable that concerns about market power at the level of consignee might arise under certain circumstances. Though collusion seems unlikely among as many as 20 consignees, markets in Mozambique are still relatively undeveloped and the capital and know-how necessary for effective trading is not widely distributed. The design of the reserve stock might be used to address this concern by allowing informal wholesale traders, in addition to consignees and other *armazenistas*, to have access to the stock. By allowing access to anyone willing to purchase, for cash payment, at least one or two metric tons at a time, informal wholesalers would have some recourse in the event that consignees were able to collude and drive-up the price they charge. At the same time, it would be necessary to design the stock release policy so that non-consignee traders desire access to it only if consignees are, in fact, driving up the price. To prevent large *armazenistas* (consignees or not) from capturing the entire stock, it may be necessary to limit total purchases by any individual during a given month to 100 or 200 metric tons.

The price charged to individuals drawing on the reserve stock should be above the consignee price, for three reasons. First, there will be costs of maintaining the stock, and these should be

recovered in the sales price. Second, if the consignee price were applied to product from this reserve, consignees could rightfully complain that they would have difficulty moving their own stock, since potential clients could buy from the reserve rather than from consignees. Finally, the reserve is meant to prevent undue price increases beyond import parity. It will not be capable of preventing relatively small deviations, and should not be used for this purpose. By charging a higher price for product from the reserve, this product will come into play only when prices show a significant jump, and the use of the reserve will thereby be more or less automatically limited to its feasible objective.

The price for reserve grain might be fixed 15% to 20% above the consignee price, though the final figure could be negotiated with consignees. Such a difference should allow consignees to earn normal profits on their own product without providing an incentive to their clients to bypass them and purchase from the reserve. At the same time, it would bring the reserve into play before price increases become extreme. Finally, we expect that, under normal circumstances and assuming approximately 15 consignees for any given shipment (we suggest 10-20), competition among those consignees will keep profits at normal levels. If these are below the 15-20% price premium on reserve stock, consumers will be benefited.

By charging such a premium on product from the reserve, it should be feasible to avoid any administrative rule on when the reserve should be open and when closed for purchases. In other words, the reserve could be always open, but with the likelihood that traders would choose to buy only when market prices have risen beyond levels allowing *armazenistas* to earn normal profits. Thus, the stock should be largely self-regulating, and the burden of administering it should thereby be reduced.

B. Emergency Food Aid

There are two basic ways in which emergency food aid may affect food markets. The source and type of food aid to be distributed, along with related policies, must be determined by the donors, recipient countries and the NGOs involved. Once the aid is obtained, the design of the delivery system to households in need must be decided.

1. Source of food aid

The proper source of food aid depends upon donor objectives, recipient country needs, and supplies in various markets. Yellow maize food aid from the U.S. to Mozambique is from surplus U.S. production, whereas the WFP and others have purchased white maize in Zimbabwe for delivery in Mozambique. The Zimbabwean purchases are an example of "triangular trade" in which a donor makes cash purchases of food in one developing country with surpluses and ships the food to a recipient country. Another alternative, which NGO's are beginning to use in Mozambique, is the use of local purchases of white maize from surplus regions (Nampula, for example) for distribution in the same area during the hungry season or for shipment to the south where local production is insufficient for needs.

The motivation behind local purchases is three-fold. First, locally-purchased goods may be preferred by consumers. In Mozambique, white maize is preferred over yellow maize. Also, local purchases may reduce transport and storage costs. More importantly, local purchases

are thought to provide development incentives to local commerce, while avoiding the producer disincentives of additional imported supplies.

Research on the cost-effectiveness of local purchases and triangular transactions indicates that these can be cost-effective, but they are not necessarily so. The lack of regular surplus production of white maize in the region means that transactions occur irregularly. The developmental effects are thus mitigated since donors are likely not able to make long term commitments to buy. In Southern Africa, the recent drought provides experience on the covariance of production risks across countries in the region and the consequent inability to depend upon regional supplies during crises.

In Mozambique, initial efforts at local purchase during June and July 1993 were not successful. The prices at which traders offered white maize were well above IPPs (ranging from $250 - $300 per metric ton, compared to approximately $155 per metric ton IPP for yellow maize grain). Traders were unable to fulfill the terms of the contract, both in volumes and in price. During the 1993 harvest, World Vision negotiated local purchases in Nampula Province for 4,000 metric tons, using a newspaper announcement for bids. Problems arose in getting the quantities offered at the prices negotiated and two traders dropped out of the process when they could not fulfill conditions agreed upon. The high offer prices limited WFP efforts at local purchase, as well. More recently, price bids by traders have been lower, and NGO's have had more success in local purchases.

NGO presence in the maize market had effects during 1993 which illustrate both the potential and the problems associated with local purchases in a setting such as Mozambique. Traders' expectations that NGO's would purchase large quantities clearly stimulated them to purchase and store white grain that they may not have otherwise obtained. During August 1993, traders continually referred to SOMOL as a principal outlet for their supplies. One of SOMOL's principal activities was grain sales to NGO's. At the same time, differing expectations between traders and NGO's have lead to some friction. As stated earlier, very high initial bid prices by traders caused NGO's to refuse to buy. Later reductions in prices lead to sales, but traders interviewed in Nampula City complained that the prices were too low, and that they had a serious problem of white maize stocks which they could not move. Many of these problems might be expected in the early stages of local purchase activity in a setting such as Mozambique, where information is poor, marketing infrastructure is underdeveloped, and the system is in a state of flux from policy changes and the ending of the war. Nevertheless, it is clear that local purchases are not an easy solution to concerns about disincentive effects of yellow maize food aid. Such purchases can benefit farmers, traders, NGO's, and food aid recipients if they elicit a marketed supply response that would not have been forthcoming in the absence of the NGO activity, and if expectations of traders and NGO's are similar. In 1993 in Nampula province, the supply response seems to have been forthcoming, but conflicting expectations and unstable market conditions caused some difficulties between the parties.

2. Delivery Systems

With peace, food aid policy is shifting its emphasis from emergency objectives to development objectives. Food for work and cash for work are frequently cited as means to utilize

assistance for development purposes. In both food for work and cash for work, physical infrastructure construction projects are most frequently designed to employ labor. Programs may be targeted administratively based on income or asset criteria or they may be self-targeting through low wage rates or provision of inferior goods.[42] With these labor programs, there must be seasonal excess labor supply and the target population must be capable of the work (Clay 1986).

In Mozambique, food and cash for work schemes need to be designed carefully. Many refugees are returning to fields on which a substantial amount of work is needed in preparation for cropping. Drawing scarce labor into public works projects to the detriment of agricultural production would be a mistake in the long run. There may be seasonal surpluses in labor supplies such that public works projects can be scheduled to avoid conflicts with agricultural production. This issue needs to be investigated, and works projects designed with this in mind.

Another issue of particular importance in Mozambique is the response of food markets to increased demand. Cash for work projects increase the demand for food by increasing cash income. If supplies of food and consumer goods are not elastic, local inflation could be the result (von Braun, Teklu, and Webb, 1991). In areas in which the markets are fragmented due to lack of roads and other infrastructural problems, markets do not function efficiently and food for work programs might be most appropriate. In areas where the markets do function and trade is relatively competitive, food for work undermines the commercial trading sector whereas cash for work promotes the development of the private sector marketing system, a key goal in Mozambique. This requires that donors assess needs carefully to understand whether hunger is caused by households' lack of entitlement or by the market's inability to provide food.

A major difficulty in Mozambique is the lack of human resources for the administration of labor-based public works programs, whether they be food or cash for work. Food for work takes more administrative capacity than cash for work, but both are management intensive. (This is noted by von Braun, Teklu, and Webb (1991), as well as in conversations with WFP personnel in Maputo). The administrative requirements of these projects can be seen as one of their indirect benefits, since they may help develop local administrative capacity and construction skills for maintenance of public works. Long run development goals can be met through this training. Given the limited investment capacity of GOM, labor-based programs that increase local maintenance capacity, for example, are critical for long-run infrastructure needs. For the donor community, the increased administrative costs present a problem. Programs may be assessed by the ratio of received benefits over total costs and high administrative costs mean a relatively low ratio which will need justification.

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[42] For further information regarding the issues, practices, and experiences with food and cash for work programs, see Clay (1986) and von Braun, Teklu, and Webb (1991). The latter also summarizes experience in Africa with labor-based programs.

An additional problem is caused by the planning needs and long time periods between planning and execution of public works projects. While labor-based assistance programs can contribute to development in the medium and long run, they cannot be used to relieve an immediate excess supply problem or impending famine. Emergency programs for distribution must be separately developed. With its combination of highly vulnerable populations (returning refugees and internally displaced persons) and severely damaged infrastructure, development plans in Mozambique must include a range of short, medium, and long run strategies in which food aid plays a central role.

Thus, there is no simple answer to how best to distribute emergency food aid. A range of approaches must be used in any situation. We suggest, however, that cash for work schemes should receive significantly greater emphasis than they currently do, especially in the south and central portions of the country. Evidence indicates that many areas of the southern and central regions are effectively integrated into a marketing system, with trade flows from surplus to deficit areas, and that this integration is likely to continue to improve. In the north, there is evidence of emerging, though still weak, integration. The market can therefore be increasingly relied upon as an effective distributor of food aid to those in need. The challenge will be to put cash in the hands of those who have insufficient effective demand. Evidence also indicates that food for work and free distribution have had serious negative effects on markets in the central region, depressing prices at the same time that they reduced market demand (since potential buyers received food either free or against work). None of this is to say that well targeted free distribution and food for work no longer have a role to play in Mozambique. It is to say that targeting needs to improve, that quantities distributed in these ways need to be reduced, and that a significantly greater proportion of the emergency effort needs to be dedicated to cash for work.

Cash for work programs raise two important issues beyond those already discussed: how they are to be financed, and their effects on the commercial food aid program. Donors may be unwilling to finance cash for work programs directly. Instead, the financing may require the monetization (selling into the market) of grain that was initially meant for emergency distribution. The most likely candidates for carrying out this monetization are NGO's. It is critical that the price these organizations charge be comparable to that charged for grain sold directly in the commercial food aid program. If the price on monetized emergency grain is significantly below that of commercial grain, the potentially large volumes which could be monetized would negate the positive effects of an import parity pricing scheme on incentives for domestic production of white maize.

Monetizing emergency food aid will likely require that less commercial food aid be sold into the market, for three reasons. First, not all revenue from the monetization will be delivered to recipients, since cash for work programs involve administrative and material costs. Second, recipients will not spend all the cash that they receive on yellow maize products. In economic terms, the income elasticity of demand for yellow maize grain, while relatively high for the lowest income consumers, is unquestionably less than one and likely not higher than 0.20. Finally, yellow maize that recipients do buy is likely to carry a price above what it was monetized at, since it will have passed through some levels of the marketing system.

These three factors will reduce the absorption of yellow maize through cash for work programs. To the extent that these programs benefit only those who previously had severely restricted effective demand, the absorption of yellow maize will be increased. Nevertheless, monetized emergency food aid will inevitably substitute for commercial food aid. A simple example will illustrate. Let's assume that 20% of the revenue from monetized emergency grain for cash for work is used for administrative and material costs. This leaves 80% for delivery to recipients. Let's furthermore assume a relatively high income elasticity of demand for yellow maize among recipients of 0.30. This means that 24% (0.8*0.3) of total revenue from monetization will be spent on yellow maize. Finally, let's assume that the marketing margin on the grain which was monetized is 30%. This means that, of the volume of grain which was monetized, only 18.5% (0.24/1.3) will be purchased by project beneficiaries. The other 81.5% will be a net addition to the amount of grain that would have been available in the market without the cash for work project. To avoid reducing market prices, commercial food aid quantities will have to be reduced accordingly.

Note that the assumptions in this example result in a high-end estimate of absorption; higher project costs, lower income elasticities of demand, and higher marketing costs would all reduce up-take by project participants, such that it may be as low as 10%. This presents a serious policy challenge to the design of emergency food aid programs which include the monetization of emergency grain to finance cash for work: how can one design monetization to capture the benefits of cash for work while reducing the probability of excessive food aid supplies to the market in the commercial program? Two options exist:

1. Allow NGO's to monetize their own grain, but maintain close coordination with the commercial food aid program. Keep prices of monetized emergency grain and commercial grain comparable, and allow NGO's to monetize only those amounts of grain, and in those areas, that have been previously communicated to the commercial program.

2. Channel all monetized food aid through the commercial program, earmarking an agreed upon proportion of revenues for NGO's to finance cash for work programs.

The advantages of the second approach may be substantial. First, it would eliminate any possibility of price differences on yellow maize from different sources, since all would move through the single commercial food aid channel. Second, this approach would allow direct control of the amount of food aid grain directly entering markets, eliminating one source of uncertainty for consignees responsible for receiving the grain. This improved information is an important benefit when attempting to program commercial food aid quantities based on market demand for the food aid grain, as has been proposed in this document.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

This chapter will summarize briefly the key conclusions that have emerged from the analysis in this paper, and present a series of recommendations that may form the broad outlines of a plan of action for the continued reform of the food aid program in Mozambique. As stated at the outset of this paper, the emphasis will be on commercial food aid; emergency aid will be dealt with as it affects food markets.

I. Summary of Conclusions

Food aid shipments of yellow maize to Mozambique have been among the largest in the world for many years, and these volumes increased sharply in 1992 and 1993, totalling over a half a million tons each year. Since its inception, the food aid program has saved many thousands if not millions of lives. Significant volumes of aid will continue to be necessary for some years to come, yet the fundamental conditions in the country have changed, and the food aid program must change with them. Peace has arrived, and private markets are continuing to develop, though they are still weak, especially in northern areas of the country. Properly managed, food aid can contribute to the transition to a robust private production and marketing economy. Improperly managed, food aid may derail or significantly slow the process.

Prior to late 1992, commercial food aid quantities typically did not meet demand at the very low prices that were charged to consignees. As a result, consignees earned sometimes very sizeable rents (or excess profits). During this time, fluctuating food aid volumes and uncertain timing of arrivals lead to extreme retail price instability. Prices charged to consignees had little if any effect on retail prices. Since late 1992, leakage of unprecedented quantities of emergency grain onto markets has combined with very large commercial shipments to drastically reduce prices throughout the marketing system. The consignee price would likely have placed a floor on retail prices during this time if it were not for the large leakage of emergency supplies. Due to this leakage, many consignees certainly lost large amounts of money during 1993.

Evidence indicates that continued arrivals of large amounts of yellow maize sold at low prices will create disincentives for the production and marketing of domestic white maize. At the same time, the presence of yellow maize in the market has provided consumers with increased options, especially among the poorest. The problem is not the mere presence of yellow maize, but rather the volumes which enter and the prices which are charged. Very large volumes depress market prices and harm farmers. Lesser volumes with low consignee prices generate excess profits for consignees with little or no pass-through of the low prices to consumers. We suggest that an orderly reduction in the amount of food aid and a consignee price approximately equal to import parity levels are consistent with the long-run goal of reactivating the rural economy and integrating it into the national market system.

It remains unclear whether the leakage of emergency grain onto markets is under control. Thus, a rapid increase in consignee price at this time (October 1993) would likely cause a drastic reduction in consignee demand: they would have little if any market for the more expensive product. The retail price during September 1993 is approximately half of IPP, and is similar in **nominal** terms to prices which prevailed from the middle of 1990 through the middle of 1991. Again, immediate movement to IPP does not seem warranted, due to the doubling of consignee prices that it would induce, but a systematic move in that direction may be appropriate. A phased move to IPP over the course of some months will not result in real prices any higher than those typically found in the past. In addition, IPPs will be lower than peak prices that have occurred during times of scarcity.

Prices of white maize in Swaziland present no barrier to import parity pricing of maize in Mozambique. Due to the nature of supply from this source, we believe that they seldom if ever will present such a barrier.

Stabilizing dollar prices results in very little metical price stabilization, due to the unstable metical/dollar exchange rate. Whether consignees would value dollar price stabilization in its own right needs to be investigated. Yet even an unstabilized IPP in meticais would have been more stable than market prices in Maputo since 1990.

Market integration is improving in many areas of the south and center of the country. It is still weak but also improving in the north. This means that in many areas of the south and center, markets can be relied on to distribute food aid quite widely, depending on effective demand. Markets will be increasingly capable of this in the north. Nonetheless, markets cannot be the only means of food aid distribution. Various mechanisms for emergency distribution will continue to be important in many areas.

Price transmission from the retail to the producer level is still relatively weak, especially in the north, but this too is improving. In the north, the weak marketing system may be a greater constraint to increased domestic production than is food aid **at this time**. Yet food aid has had negative effects in this area, as traders indicate that low yellow maize prices in Maputo have reduced the flow of white grain from the north to the south. As the marketing system develops, food aid will become a more important constraint unless it is properly managed. In the south and especially the central regions, food aid currently is a constraint, due to oversupply. If consignee prices remain low on future commercial food aid shipments of yellow maize, and especially if demand is met at these prices, white maize producers in the south and center will be faced with serious disincentives.

Information about commercial and emergency quantities and the timing of their arrival is critical to improving the food aid program and allowing it to facilitate rather than impede market development. This information must be widely available in a timely manner. To generate this information, greater coordination among participants is necessary. More to the point, it is necessary to include private sector traders, from throughout the country, in the process. They can provide the best available information on supply conditions, and they will be affected by both commercial and emergency supplies, so they need to be kept informed.

II. Recommendations

The following recommendations are meant to be concrete proposals for debate. We suggest that they would be effective starting points for the discussion, but emphasize that final details of the design need to be reached through a process of dialogue between donors, GOM, and prospective consignees.[43]

We recommend that donors begin now to move towards import parity pricing of maize.

How fast to move: The GOM and donors should meet at the earliest possible date with past consignees, inform them that a decision has been made to move towards import parity pricing of yellow maize, and negotiate with them the best way to accomplish this. An agreement on the basic timetable should be quickly agreed on, then widely announced through newspaper and radio.

We suggest that the move begin with the next ship of commercial maize which arrives, and that full import parity be reached by March, or by the first ship that arrives after March. The logic of this timing is based on the crop calendar: planting is taking place now over the next month, and the harvest begins in March. Both traders and producers should know prior to planting what the new food aid policy is, to remove this important source of uncertainty. Reaching import parity by the beginning of the harvest will help reduce the possibility that new commercial food aid shipments will cause production disincentives for white maize. See Chapter Five, section III.D for more detail.

Eliciting demand: We suggest the approach outlined in Chapter Five section III.C. This is a two-round process. In the first round, in both Maputo and Beira, a group of 10 to 20 consignees are given information on the purchase price, the date of arrival, the names of other potential consignees being surveyed, current stocks and physical location of emergency grain, and planned emergency arrivals over the next six months. They are asked to indicate the quantity of commercial maize food aid they would like to receive four months hence, and are given two weeks to respond. Following receipt of the responses, they are told the total quantity requested among all consignees, and each is given a chance to revise his or her request. They again have two weeks to respond. Thus, the process starts four months, and ends three months, prior to expected arrival of the grain.

Key issues which need to be carefully resolved include how to select the 10 to 20 consignees to be surveyed, how to create incentives for accurate responses, and how to create incentives for each to take delivery on the amount they indicate in the second round.

Pricing the grain: We suggest that a step price approach be used, based on a 60 month moving average of past prices. The marketing year should likely be March through February. We are recommending the step price approach instead of the market price approach (even though our analysis showed very little stabilization of metical prices in this approach) for a

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[43] See OECD (1993) for an example of how this has been done with apparent success in the Sahel, through the Food Aid Charter to the Countries of the Sahel.

number of reasons. First, if exchange rates do stabilize, then the step price approach will provide greater metical price stability than the market price approach. Second, dollar price stability might itself be valuable to consignees. Finally, this approach may be administratively simpler, since dollar prices have to be calculated only once a year, rather than determined for each new ship. We recommend the 60 month rather than the 36 month series because the latter is subjected to rather large price changes from year-to-year. See Chapter Five, section III.B.2 for more detail.

A key issue to resolve is what type of explicit incentive, if any, should be offered *armazenistas* to participate as consignees.

Maintaining a Reserve stock: We recommend that a stock of 10,000 to 15,000 metric tons be maintained in Maputo, with physical management of the stock contracted to a private firm. A smaller stock should be kept in Beira. The price for traders wishing to purchase from this stock may be 15% to 20% above the consignee price, though the final figure should be negotiated with consignees. Anyone willing to buy at least one or two metric tons at a time should have access to the stock, but purchases by individuals during any given month should be limited to 100 or 200 tons. Consider requiring that all payments be made in full at time of delivery. See Chapter Five section III.C for more detail.

The stock should be rotated with each arriving ship; to ensure this, as a ship arrives, each consignee might be required to accept an amount of grain from the reserve stock (instead of from the new shipment) proportional to his/her share of the current shipment. This same amount would be deposited into the reserve from the new shipment to maintain the stock. For example, suppose the reserve stock is 15,000 metric tons. Suppose also that a ship with 40,000 metric tons arrives in port, and consignee X is to receive 10% of that amount (i.e., 4,000 mt). Then that consignee would be obligated to receive his 3,000 metric tons in the following proportion: 1,500 mt from the reserve stock (this being 10% of that stock), and the balance (2,500 mt) from the new shipment. 1,500 mt from the shipment would be deposited in the stock to replenish it. A consignee receiving 15% of the shipment (6,000 mt) would receive 2,250 mt (15% of 15,000) from stock, and 3,750 mt from the shipment. For this trader, 2,250 mt from the shipment would be deposited in the stock to maintain its level.

Emergency distribution: Leakage of emergency grain on to the market must be halted as quickly as possible. Unless this happens, any move to import parity pricing will be extremely difficult. At the same time that leakage is reduced, mechanisms must be developed to avoid excessive emergency deliveries that will harm local markets. It is important to note that excessive deliveries in one market area, given the weakness of markets in many areas, can have negative effects on that market; overall emergency supplies need not be excessive.

Once the emergency program is under control, the GOM and donors should move aggressively towards cash for work projects as a partial substitute to continued free distribution and food for work. These projects should be implemented soon in areas where markets have demonstrated effective integration. This would include large areas of the south and central regions of the country. The north should be monitored for signs of improved market integration, and cash for work begun as soon as possible. We recommend that NGO's

not be allowed to monetize grain to finance these projects. Rather, financing could be through earmarking an agreed-upon proportion of revenues from the commercial food aid program for the financing of cash for work projects.

Market prices should be used to help plan emergency distribution. Commercial food aid is first sold in urban areas, principally Maputo and Beira. For this grain to reach rural areas (where most emergency distribution takes place) involves sometimes substantial transport costs. Thus, if yellow maize is present in the markets where emergency distribution is being conducted, its price should be above prices in the urban areas. In addition, both prices should be above consignee prices (recall that we estimated a 65% competitive marketing margin from consignee to retail in Maputo). Distortions in these price relationships may be an indicator of leakage from emergency distribution to the market. Specifically, if rural prices in emergency distribution areas are similar to or below urban prices, this may indicate that recipients are selling some of their rations to the market, or that the emergency distribution has depressed demand in the area. In either case, it would be desirable to reduce emergency distribution in the area to avoid negative effects on local production and marketing of white maize.

Coordinating the process: The GOM and donors should take the lead in forming a commission composed of donors, officials from the Ministries of Commerce, Finance and Agriculture, NGO's, consignees, and other interested traders. This commission would be in charge of planning commercial food aid volumes through use of the system proposed above for eliciting demand, or some similar system. It would also be responsible for collecting a wide range of relevant information and making it widely available to the public in a timely manner. This information should include but not be limited to data on market prices and supplies, emergency distribution plans (free distribution, food for work, cash for work), prospective commercial and emergency arrivals, and current status of ships in port. The commission would need a technical secretariat with one or two well-trained economists familiar with food markets in Mozambique and technical advisors familiar with logistical planning, grain storage, and other issues. Newspaper and radio should both be used to distribute information. See Chapter Five section III.C for more detail.

A good example of this type of coordination may be found in the Sahel, where donors and government have formed the Food Aid Charter to the Countries of the Sahel. This Charter provides a broad statement of principles which forms the basis for more specific negotiations regarding food aid programs. See Annex F for a copy of the Charter.

ANNEX A

DRAFT FOOD AID DATA BASE DOCUMENTATION

Data files:

SANTOS.SYS: US Commercial food aid yellow maize shipments for 1992 and beginning of 1993, based on daily unloading data from USAID/Maputo office.

FAPSTOT.SYS: Based on the MinComm DSA Food Aid Pledges and Shipments Annual Reports. Has data for maize, beans, rice, and wheat. Data for 1992 is incomplete, especially since 6/92.

WFP.SYS: World Food Programme database from Rome.

FA-EEC.SYS: Data on EEC emergency and commercial arrivals, January 1992 - mid 1993, based on Socotec records. White and yellow maize products only.

USEMERG.SYS: Combines several data sources (old USAID Emergency Food Aid spreadsheets, WFP and UNILOG data sheets) to develop data set of US emergency and project maize shipments.

WFPPROJ.SYS: Monthly emergency needs projection from WFP based on estimates of beneficiaries (number of returnees and internally displaced) and monthly per person consumption needs of 13.5 kgs of maize. Not included in the computer file are the needs for pulses and edible oil, although these estimates can be found in the document.

Data Source for Maize Food Aid Shipments						
Donor or Agency	Type of Aid	past through 1989	1990	1991	1992	1993
USAID	Commer	WFP.SYS*	USAID Spreadsheet*	USAID Spreadsheet*	SANTOS.SYS	WFP.SYS and UNILOG data*
USAID	Emerg/ Project	USEMERG.SYS and WFP.SYS*	USEMERG.SYS WFP.SYS FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS
EEC	Commer	WFP.SYS*	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	FA-EEC.SYS	WFP.SYS and UNILOG data*
EEC	Emerg/ Project	WFP.SYS*	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	FA-EEC.SYS	WFP.SYS and UNILOG data*
WFP	Emerg/ Project	1987-present in WFP.SYS but some problems*	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS
Others	Commer	WFP.SYS*	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	UNILOG data*
Others	Emerg/ Project	WFP.SYS*	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	WFP.SYS and FAPSTOT.SYS	UNILOG data*

* Indicates that we have hard copy of data but have not entered the data into a computer file as yet.

ANNEX B

A STATIC CONCEPTUAL ANALYSIS OF THE RETAIL PRICE EFFECTS OF YELLOW MAIZE FOOD AID

The purpose of this section is to examine conceptually the implications of alternative pricing and distribution policies for commercial food aid on market prices of the commodity being donated. In the case of Mozambique, that commodity is yellow maize grain. The principal focus is on the effects of the official consignee price and the number of consignees on consumer prices. The models used are necessarily simplified, but gradually introduce key characteristics of the situation in Mozambique. In the body of the report, we evaluate the similarities and key differences between the assumptions of the model and the characteristics of the marketing system as it works in Mozambique. These two analyses - abstract, formal, and simplified in this section, less abstract and more "realistic" in section B - allow important generalizations to be made regarding the best policy for the pricing and distribution of food aid.

We begin with the simplest "base case" in which we examine a single time period and assume a perfectly competitive market structure with no source of supply beyond food aid. The second case introduces one key modification: the presence of an outside source of supply. This is meant to capture the white maize trade with Swaziland, which is so influential on Maputo prices during normal levels of supply.[44] Case three is a variant of case two, assuming an infinitely elastic outside supply as opposed to case two's finitely elastic supply. Finally, case four keeps the assumption of an outside source of supply (finitely elastic), but assumes a monopoly market structure at the consignee level for yellow maize in Mozambique.

The models show two levels of demand. Retail demand depicts the demand of retailers for yellow maize, this being derived from exogenous consumer demand. It is the willingness of retailers to pay to wholesalers for varying quantities of product. Wholesale demand is demand by consignees who have access to food aid. It depicts the willingness of these consignees to pay for varying quantities of product, and is derived from the demand curve they face. Exogenous consumer demand is not included, as it would only complicate the analysis without adding any insights.

A distinction is made between 1) the structure of the market for food aid at the level of consignee, and 2) the market structure beyond this level and for any outside source of supply. Donors and GOM in effect determine market structure at the consignee level by how many

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[44] The model abstracts from the fact that yellow and white maize and meals are different products. While this is clearly counterfactual, it should not be the source of serious objections to the model - yellow and white maize are highly substitutable in consumption. This means that the entry of white maize from Swaziland will strongly influence the price of yellow maize, just as the arrival of a boat of yellow maize, during periods of normal white maize supply, strongly influences the price of white maize (see Figure 8 in MOA/MSU Research Team, 1993).

consignees they approve. At higher levels, the market for food aid is assumed always to be competitive, as is the market at all levels for outside supplies (Swaziland). This seems reasonable, given what we know of the marketing system in Maputo, and the trade with Swaziland (MOA/MSU Research Team, 1993).

It should be noted that the results relate only to mean market clearing prices during a time period lasting from the arrival of one food aid shipment and ending immediately prior to the arrival of another such shipment. Price fluctuation within these periods, and other issues not addressed with the formal models, will be examined through logical analysis outside the formal models.

One of the key outcomes that the models highlight are the "rents" received by consignees. These are defined as the difference between the willingness of consignees to pay and what they actually pay, times quantity. In other words, rents might be viewed as the "excess profits" that consignees earn just by having first access to the grain at fixed prices.

I. Case 1: The Base Case

This is the simplest case. All others will introduce complications to it. It is a perfectly competitive, single period, closed economy model. Specific relevant characteristics include:

1. Supply is perfectly inelastic, being fixed by donor/GOM decision. There is no source of supply other than food aid

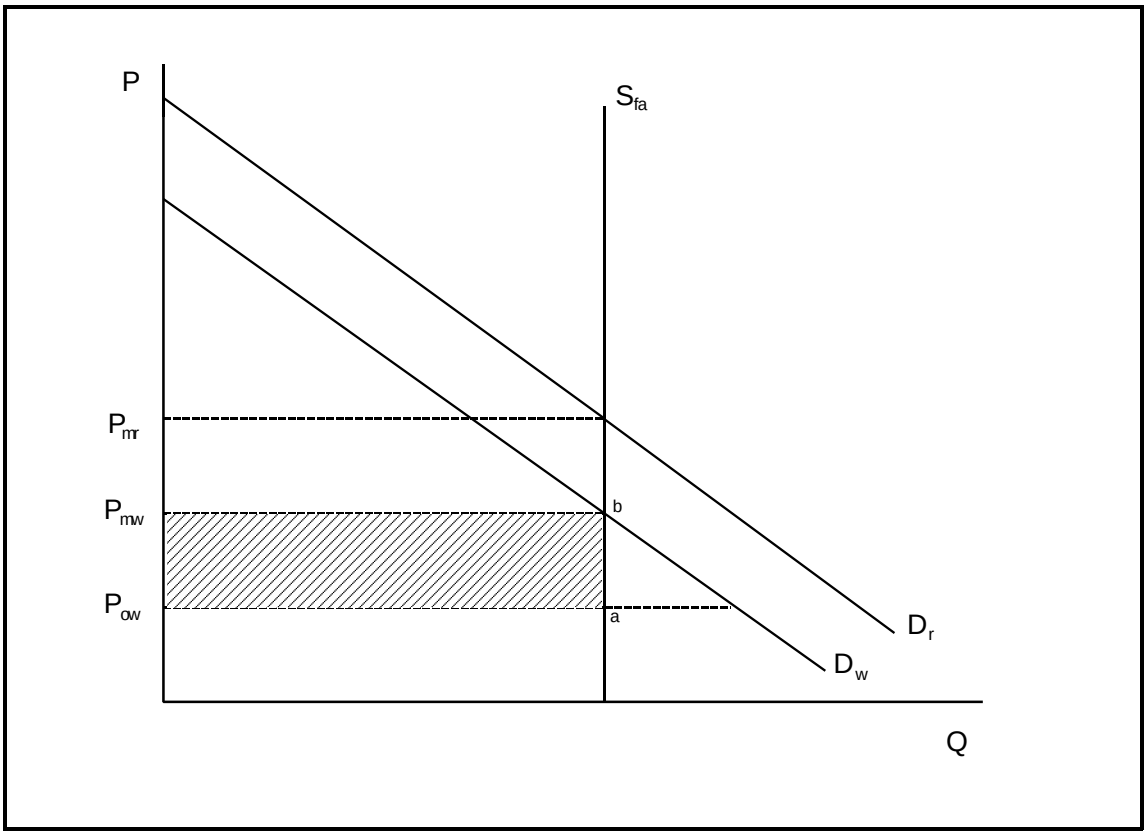
2. It is a single period model, implying

    a. no uncertainty about the amounts to be shipped in future periods (there are no future periods)
    b. all supply must be sold during this period

3. The market structure is perfectly competitive, but ...

4. The government/donor determined sale price to consignees is below the willingness of consignees to pay for the fixed supply. Thus, we have product rationing.

Figure B1. The Base Case



Results are depicted in Figure A1, where

D_r = retail market demand

D_w = wholesale (those who receive food aid) market demand, derived from retail demand (assume fixed mark-up for ease of exposition)

S_{fa} = fixed supply from food aid during this period

P_{mr} = market determined retail price (willingness to pay to wholesalers)

P_{mw} = unobserved market determined wholesale price (willingness of wholesalers to pay for available supply)

P_{ow} = official price to wholesalers

Results and Implications: Wholesalers pay P_{ow} but their willingness to pay is P_{mw}, resulting in a rent of $P_{ow}abP_{mw}$ (the shaded area in the graph). They sell at P_{mr}. Key implications are:

1. As long as the official sales price to consignees is less than the willingness of consignees to pay for the fixed supply (i.e., $P_{ow} < P_{mw}$), the retail price is entirely determined by the quantity of food aid supplied to the market.

2. An increase in the official consignee price (P_{ow}) up to the willingness of consignees to pay (P_{mw}) will <u>not</u> affect the sales price at retail. Rather, it will decrease the rent to wholesalers.

3. When the official price is exactly equal to the consignees' willingness to pay ($P_{ow} = P_{mw}$), all rents will be eliminated. Past this point (when $P_{ow} > P_{mw}$), consignees will not accept all the food aid at the official price P_{ow} - they are not willing to pay that high a price for such a large quantity. As a result, supply to the market will fall and retail prices will rise.

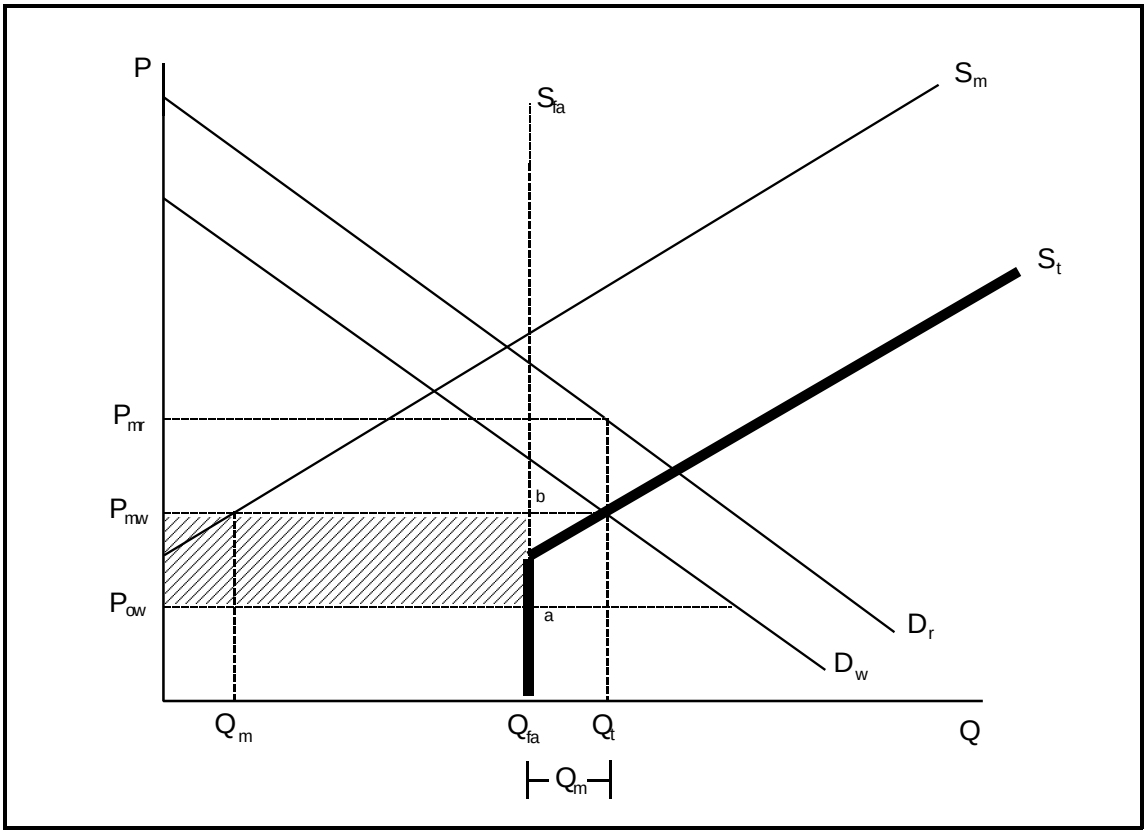
   So when the official consignee price is greater than the consignee's willingness to pay ($P_{ow} > P_{mw}$), consignee price **does** influence retail price, through its impact on the quantity of food aid that the consignees agree to accept and place on the market.

4. A perfect auction would force wholesalers to bid their actual willingness to pay P_{mw}, thus eliminating rents without affecting consumer prices.

II. Case 2: Open Economy

Market structure is still competitive, but now there exists an elastic (market based) supply source in addition to the still perfectly inelastic food aid supply. Figure A2 depicts this

Figure B2. Open Economy Model with Less than Infinitely Elastic Outside Supply



situation, where

S_m = the market based outside supply,

S_t = total supply (horizontal summation of food aid and external supplies),

Q_m = quantity imported from external market,

Q_{fa} = quantity supplied to the market from food aid,

Q_t = total quantity supplied to the market, and

all other terms are as previously defined

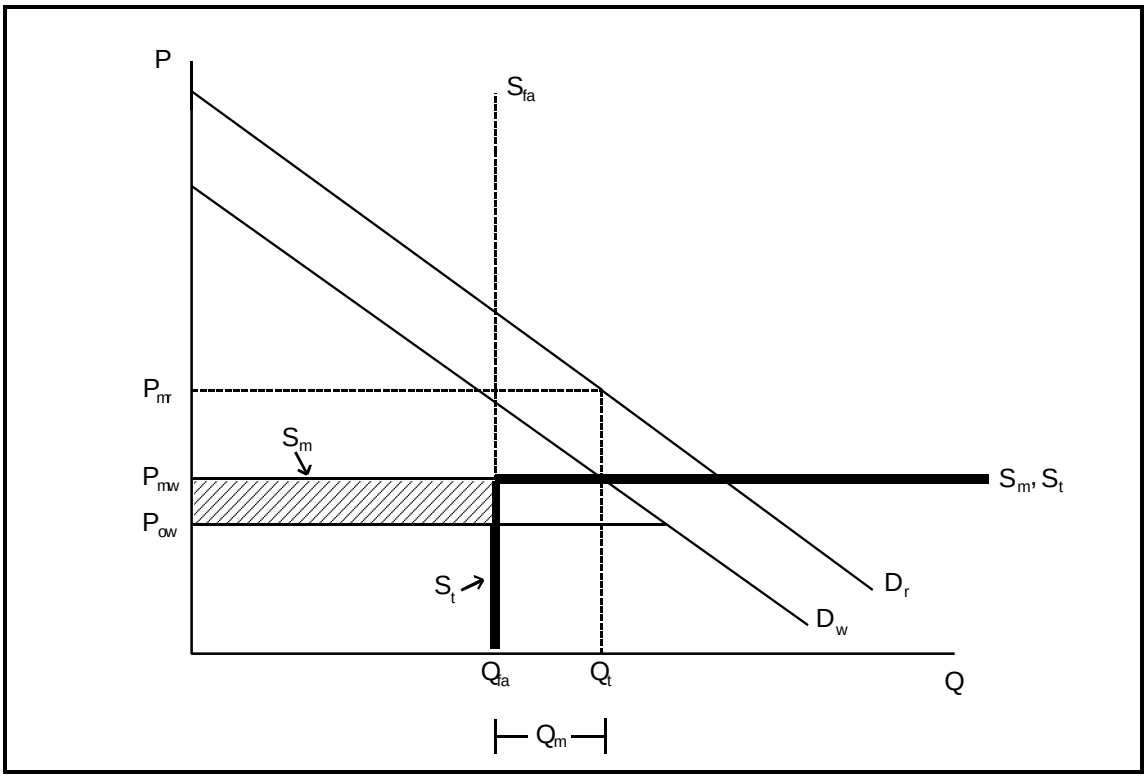
Results and Implications: Wholesalers are willing to pay P_{mw}, obtaining $Q_{fa}+Q_m = Q_t$. This quantity is sold at P_{mr}. Rent is $P_{ow}abP_{mw}$ (the shaded portion of the graph). Thus, relative to the base case, quantity supplied to the market increases, resulting in a decrease in the market price and in the rent accruing to consignees.

Implications are not fundamentally different from base case. The official consignee price has no effect on consumer prices unless it exceeds the willingness of consignees to pay for the fixed quantity of food aid. As the official price moves beyond this point, total quantity supplied to the market falls and consumer prices increase.

III. Case 3: Infinite Outside Supply Elasticity

This is a special case of the previous one. Quantity supplied to the market is further increased, and consignee rents and retail prices are further reduced. But rents are not eliminated unless

Figure B3. Open Economy Model with Infinitely Elastic Outside Supply



the exogenous willingness of consignees to pay is less than or equal to the official consignee price ($P_{mw} <= P_{ow}$).

The official consignee price has no effect on consumer prices <u>under any circumstances</u>. If P_{ow} exceeds P_{mw}, no food aid is purchased, and the same total quantity is supplied to the market, this time entirely from the outside market.[45]

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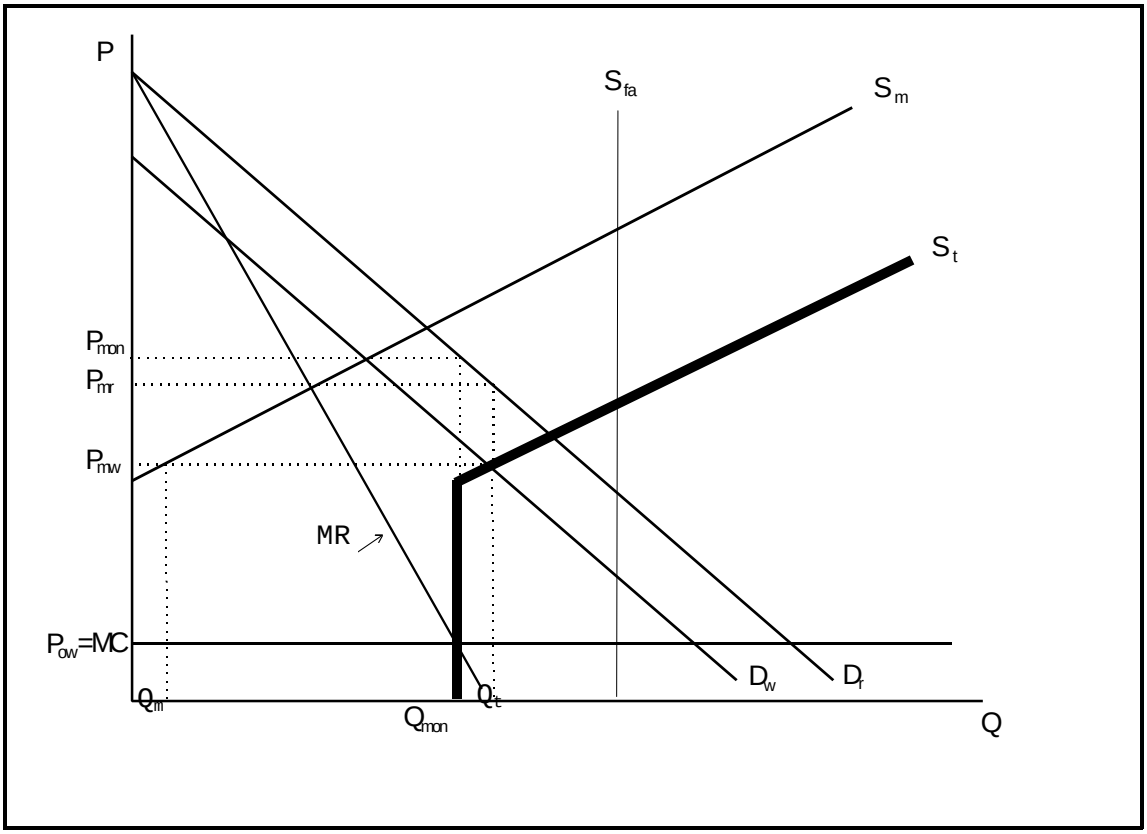
[45] It is worth noting that this analysis itself provides no basis for determining what proportion of Q_t is provided from the two sources (outside market vs. food aid), except in the unambiguous case where $P_{ow} > P_{mw}$. In practice, the transactions costs of the two markets would likely determine which is used and in what proportions to provide Q_t. And since donors (continued...)

IV. Case 4: Monopoly with Open Economy

In this situation, depicted in Figure A4, a single consignee is granted access to all food aid, but there exists an elastic source of outside supply for which market structure is competitive.

Figure B4. Open Economy Monopoly Model



Results and Implications: If the quantity supplied of food aid is greater than the amount of food aid the monopolist will accept (S_{fa}>Q_{mon}):

1. The monopolist would accept only Q_{mon}, attempting to charge P_{mon}. But competitive traders accessing the alternative supply source (they have no access to the food aid) would bring in quantity (Q_t-Q_{mon}), paying P_{mw} and selling at P_{mr}. Thus, supply would be increased (from Q_{mon} to Q_t) and price reduced (from P_{mon} to P_{mr}) from a simple monopoly case.

2. The official consignee price P_{ow} does affect the retail market price by affecting the quantity of food aid the monopoly consignee is willing to accept. The outside supply

[45](...continued)
and government have an obvious incentive to dispose of all food aid, they will tend to provide favorable conditions to ensure this.

reduces the retail price P_{mr} below what it would otherwise be, but the official price P_{ow} nevertheless has an effect.

Another way of expressing this is to say that the monopolist still influences price (because he decides how much food aid to accept, based, of course, on P_{ow}), but no longer exactly determines it due to the presence of an alternative supply source.

If the quantity supplied of food aid is less than the amount the monopoly consignee will accept ($S_{fa}<Q_{mon}$), the consignee accepts all food aid and thereby loses control over the market price. This is now entirely determined by the quantity of food aid S_{fa} plus the quantity brought in by competitive traders from the outside market. We have returned to case two, where the official consignee price P_{ow} has no influence on market price, but where the market price is lower than it would be in the absence of a market based outside supply source.

V. Summary of Key Implications

As long as the quantity of food aid offered is less than what consignees will accept at the official price, this price has no effect on retail prices. This result holds whether there are "many" or "few" consignees. The consignees capture a rent, and the retail price is determined entirely by the quantity placed on the market. If the quantity of food aid exceeds what consignees will accept at the fixed price, consignees do not accept all the grain being offered, and they do not earn any rents.[46] In this case, the official price does affect the retail price, through its effect on the quantity of food aid the consignees agree to purchase. The clear indicator that this has happened would be food aid supplies left in storage, or not accepted off the boat by consignees. This is what happened beginning in late 1992, with the very large arrivals of commercial grain, and leakage of emergency grain onto the market.

[46] This is not to say they do not earn profits. Recall that rents are defined as "excess" profits - profit beyond what the consignee requires to stay in business.

ANNEX C

DETRENDING ANALYSIS OF WHITE AND YELLOW MAIZE GRAIN PRICES

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NOTE:          GMA = yellow maize grain
               GMB = white maize grain


    REGRESSION OUTPUT:  GMA against time,
        3/90 - 7/92

    Constant                   314.2069
    Std Err of Y Est           95.31081
    R Squared                   0.36178
    No. of Observations              29
    Degrees of Freedom               27

    X Coefficient(s)  8.275862
    Std Err of Coef.  2.115408


    REGRESSION OUTPUT: GMB against time
        3/90 - 7/92

    Constant                   400.5172
    Std Err of Y Est           122.4915
    R Squared                  0.543045
    No. of Observations              29
    Degrees of Freedom               27

    X Coefficient(s)      15.4
    Std Err of Coef.  2.718679


    REGRESSION OUTPUT: GMB deviations from trend
      against GMA deviations from trend, 3/90-7/92

    Constant                   1.05E-15
    Std Err of Y Est           92.31191
    R Squared                  0.432058
    No. of Observations              29
    Degrees of Freedom               27

    X Coefficient(s)  0.844763
    Std Err of Coef.  0.186395
    t statistic:      4.532119
```

Table C1. Data used in detrending analysis of white and yellow maize grain prices in Maputo, March 1990 - July 1992

Year	Mth	PY	PW	t	TY	TW	DY	DW
1990	3	342	400	1	322	416	20	-16
	4	294	384	2	331	431	-37	-47
	5	287	409	3	339	447	-52	-38
	6	376	504	4	347	462	29	42
	7	456	483	5	356	478	100	5
	8	369	526	6	364	493	5	33
	9	389	523	7	372	508	17	15
	10	433	563	8	380	524	53	39
	11	448	638	9	389	539	59	99
	12	476	702	10	397	555	79	147
1991	1	407	570	11	405	570	2	0
	2	393	677	12	414	585	-21	92
	3	491	730	13	422	601	69	129
	4	417	500	14	430	616	-13	-116
	5	349	508	15	438	632	-89	-124
	6	327	561	16	447	647	-120	-86
	7	328	571	17	455	662	-127	-91
	8	373	472	18	463	678	-90	-206
	9	433	561	19	471	693	-38	-132
	10	575	747	20	480	709	95	38
	11	562	938	21	488	724	74	214
	12	343	823	22	496	739	-153	84
1992	1	323	585	23	505	755	-182	-170
	2	395	618	24	513	770	-118	-152
	3	490	567	25	521	786	-31	-219
	4	729	806	26	529	801	200	5
	5	702	1022	27	538	816	164	206
	6	546	889	28	546	832	0	57
	7	659	1037	29	554	847	105	190
	8	574	1222	30				
	9	467	1239	31				
	10	507	1356	32				
	11	626	1466	33				
	12	458	1235	34				
1993	1	454	1717	35				
	2	492	1452	36				
	3	417	1059	37				
	4	443	625	38				
	5	431	596	39				
	6	421	728	40				

ANNEX D

NOTES ON THE ROLE OF SOUTHERN AFRICAN REGIONAL MARKETS IN SUPPLYING MAIZE TO MOZAMBIQUE

In the past Mozambique has received food aid supplies and commercial maize products from its neighbors, including Malawi, Zimbabwe, South Africa, and Swaziland. With peace and the likely increase in export production and incomes, Mozambican traders will be in a better position to expand participation in regional markets. The major question to resolve is to what extent those markets will be able to supply the Mozambican market and at what prices. Maize is a basic staple for the low income population and maize supplies and prices are an important determinant of welfare. Knowledge of potential private sector activity contributes to the ability of the Mozambican government and donors to develop assistance plans with a long term development outlook. The supply of white maize out of these neighboring countries may also have important implications for the amount of commercial yellow maize food aid which will be demanded at import parity prices.

This annex focuses on markets in Swaziland and South Africa, the major suppliers to the southern region of Mozambique.

Maize markets in Swaziland

Informal imports from Swaziland have arrived in Mozambique throughout the war years, with the road between Maputo and Manzini considered dangerous but passable. The signing of the peace accord has effectively opened the road to increased trade, although the relatively high prices in Swaziland preclude an immediate increase in trade for maize products (see Chapter Five, section III.D).

Maize production in Swaziland is insufficient to meet the domestic market demand of 120,000 to 160,000 metric tons. Production varies around 80,000 metric tons, leaving a gap of about 40-60 percent which is usually met with supplies from South Africa. Maize marketing is centralized in Swaziland, although about 70% of the domestic crop never enters the official market. It is not clear how much of this maize is marketed informally within Swaziland, or to Mozambique. SIMA researchers have observed Swazi white maize grain in Maputo markets, but not in large quantities. Within Swaziland, maize is often milled by hand or at small local hammer mills for consumption at home or within the local area. There is a government-set pan-territorial, pan-seasonal price to producers, although wholesale and retail prices are not controlled. The government is virtually the sole purchaser of maize and so maintains the floor price.

The largest mill in the country, Swaki Mills, is owned by a private corporation. In 1985, when the owners threatened to close the mill, the government decided for food security reasons to rent the mill, creating the National Milling Corporation (NMC) to manage it. NMC is the buyer of all maize purchased in the government channel (i.e., all officially marketed maize). The Swaki mill processes approximately 40,000 Mtons per year, with private commercial mills

processing another 5,000 MTons. As noted above, there are also small hammer mills throughout the country, which combine with home processing for the majority of local maize processing.

The Central Cooperative Union (CCU) was established in 1971, but really began to expand maize marketing operations in 1989 when it used government silos and sold grain to the NMC. The government has promoted development of the cooperatives to market more smallholder production in the country and facilitate services to the smallholders. Expansion of marketed surplus within the country would mean less dependence on other markets for white maize.

The current pricing policy is based on concepts of import parity or opportunity costs rather than production costs. South African markets are viewed as the alternative source of supply in determining opportunity costs. If smallholders respond to the policy and produce surpluses, it will be necessary to shift to an export parity pricing scheme, rather than import parity. That does not appear likely in the near future such that producer prices in Swaziland, currently at 37.35 Emalangeni per 70 kg sack (about $163 per ton) will remain above the Mozambican producer prices, posted at 425 meticais per kg (approximately $100 per ton) (See Table 3 in this document).

There are additional constraints on the development of trade in maize products between Swaziland and Mozambique. Depending upon weather and productivity, about 50% of the maize grain commercially milled in Swaziland comes from South Africa. As a member of the Customs Union, Swaziland is considered part of the South African domestic market and as such receives maize grain for milling at the South African domestic price, currently Rand 545 per ton ($US 165 per ton) for mills. Officially, Swaziland is not permitted to resell white maize products outside the Customs Union because it relies on Customs Union supplies of the grain. De facto, when the price differential is high and Mozambican traders arrive to purchase, exceptions to the rules are made and maize products cross the border. For example, during July of 1992, wholesale selling prices in Maputo (Basuca market) for white maize meals was 53,000 meticais per 50 kg bag (about $16.50 at the parallel exchange rate, or $330 per ton) (MOA/MSU Research Team 1993 and USAID exchange rate series), high enough for traders to justify the risks involved as well as the costs in Swaziland.

Even during the recent drought, when South Africa was rationing its white maize by a compulsory mixing of white and yellow at mills, Swaki Mill received South African maize. At times of surplus white maize production, South Africa will sell as much white maize to Swaki as is requested since the option of exporting the surplus to Japan or another market outside the Union is less attractive. The world market price for white maize is below the domestic wholesale price (and sometimes below the final price received by farmers), such that the Maize Board looks to markets within the Customs Union before attempting export sales.

Mozambique has not joined the Customs Union, and there is no reason to expect that it will. This means that trade between Swaziland and Mozambique of white maize products will remain informal and thus small in scale although potentially large in total volume, unless there

are changes in the rules. Since it is to the South African Maize Board's advantage to sell white grain to Swaziland which is then sold as meal to Mozambique, either changing the policies or looking the other way seem likely in times of surplus.

Maize Markets in South Africa

In South Africa, a single channel policy has been used since 1987. The Maize Board is responsible for the marketing of all commercial maize grain in the country. Smallholder production of white maize is outside Maize Board control, averaging only 500,000 metric tons annually out of a total white maize production of over 4 million tons. Much smallholder production is consumed on the farms, such that the sector generates only a small marketed surplus. Large commercial farmers are generally required to market through the Maize Board, receiving a fixed, pan-seasonal and pan-territorial price. There have been some recent exemptions permitting commercial farmers to sell on the market directly. Prices have generally been based on concepts of import parity rather than export parity, resulting in relatively high producer support prices.

Millers purchase all their white maize grain from the Maize Board, which designates the warehouses and silos from which the mills are authorized to obtain the grain. Ostensibly, this is to allocate supplies minimizing transport costs and decreasing producer price variability, thereby keeping consumer prices low and producer prices stable. It is important to note that controls on millers' prices to wholesalers and retailers were eliminated in 1971, so that the only official maize prices in the system are those of the Maize Board.

Pricing in South Africa under the single channel scheme is controversial. Pan-territorial pricing results in producers in areas near mills and urban areas subsidizing those in more distant areas. Most white maize production is in the Western Transvaal and Northern Free State, distant from the main mills and consumption points. The producer prices are generally higher than export parity prices, resulting in losses for the Maize Board when excess supplies are exported. The real price in export markets has been at or below the Maize Board's domestic selling price every year since 1980/81 (NAMPO, 1993).

The Kassier Report (1992) has recommended market liberalization of the marketing system for maize. One caveat of the recommendation is that there should be protection against dumping and imports with subsidies that keep the world market price low. Setting producer support prices based on export parity pricing will probably accelerate the recent decline in maize production area.

Policy changes under a new government in South Africa add another element of risk and uncertainty. A major function of the single channel maize policy is South African food security based upon self-sufficiency of maize production. The Maize Board maintains reserve stocks of yellow and white maize and in 1991 increased the stocks from 900,000 metric tons to 1,200,000 metric tons. The recent drought renewed discussion of the importance of maize stocks for food security, as almost 4 million metric tons of maize were imported to meet demand. Food security needs may become a focal point with a new government since maize is a low income staple. In discussions in South Africa, there appears to be no consensus on the future of the Maize Board and the single-channel scheme with controlled maize grain prices.

Issues in regional maize markets and potential for trade

The issue of consumer preferences becomes important in looking at the white maize markets in the region. While thorough studies have yet to be published concerning preferences, an informal study conducted by the Maize Board in South Africa indicates that consumers are willing to pay a 40-50% price premium to obtain white maize. In Swaziland, white maize was imported at a 70% price premium ($75 per ton over yellow maize at world prices) due to consumer unwillingness to purchase yellow maize or the mixed yellow/white maize meal. In Zimbabwe, a study is currently underway to determine the degree of preference for white maize, but it is thought to be high, as in South Africa.[47] In Mozambique, preferences appear to be less strong, with consumers historically paying a market determined 30% price premium for white maize. Thus, with scarcity of white maize in the region, it is likely that prices in the neighboring countries would go relatively higher for the white maize, while Mozambique could use world markets for yellow maize to keep food prices down.

One of the basic problems with reliance upon regional white maize supplies is that of covariant risks in production. When there is a major drought in the region, supplies are scarce in all of the countries in the region. Production variability due to weather is high, resulting in extreme fluctuations in South African production (NAMPO 1993) (See Table A2-1), similar to other countries in the region. The area planted to maize has declined gradually over the past twenty years from about 4.1 million hectares in 1985/86 marketing year to 3.6 million hectares in 1992/93 (USDA/ERS production database, 1993). As a result, supply availability of white maize for export remains highly variable, ranging from none in 1983/84, 1984/85, and 1992/93, and as high as 2,500,000 metric tons in 1989/90. The world market also evidences high variability in supply. It is unknown what effect the recent demand for white maize in world markets will have on production in Argentina, the United States, and other countries. Unless there is a supply response, world white maize markets will remain thin.

One of the blocks to increased regional trade is high transport costs. This is also true for domestic production in Mozambique, where production surpluses from the northern and central regions are shipped to the maize-deficit south. Lowering of domestic and interregional transport costs would expand the potential for such trade. Transport costs are a function of volumes moved and small tonnage cargoes can cost up to and beyond $30 per ton from South Africa to Maputo.[48] While the signing of the peace accord signed October 1992 has reduced

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[47] In Swaziland, various people indicated that the unwillingness of Swazi consumers to eat yellow maize was the association of yellow maize with scabies. Apparently in the early 1980's, yellow maize arrived at a time when a scabies epidemic occurred, leading to the perceived link. In Zimbabwe and South Africa, the preference is based on a perception that yellow maize is appropriate animal feed while white maize is for human consumption. In Mozambique and possibly in South Africa, the texture of the grain and the resulting meals is said to differ. White maize grain is a superior product for hand pounding.

[48] Transport costs estimates given during a trip to South Africa in July 1993 ranged from a low of 85 Rand per ton ($25.75) to as high as 100 Rand per ton ($30) by rail or truck from

(continued...)

transport risks and thereby lessened the costs, but without investments in port, rail, and road infrastructure, the costs of trading will result in high marketing margins from production to consumption regions.

An additional hindrance to maize trade from any other country is the Mozambican imposition of import duties and fees which sum to 17.5% of the value for maize products. These duties and fees represent substantial wedge between world prices and market prices in Mozambique. For a relatively low value commodity such as maize, this policy results in restricting the legal maize transactions. Various traders in Maputo cited the duties and fees as a major reason why they dealt in rice and other commodities rather than maize.

Thus, high variance and covariance of production and marketed surplus of white maize within the southern African region, high transport costs, and tariffs on official trade all limit the usefulness of the world white maize market for Mozambique. Supplies are likely to be most scarce and high cost when Mozambique has greatest need. When supplies are available, they are likely to be inelastic. The advantage that Mozambique has over its neighbors is greater consumer acceptance of yellow maize, as long as the market is allowed to price it below white maize. This currently allows Mozambique to utilize food aid more effectively, and could in the future (when foreign exchange is less limiting) allow it to utilize world yellow maize markets to stabilize domestic maize prices.

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[48](...continued)
the Pretoria/Johannesburg area. For comparison, freight is about $50 per ton from Gulf Ports or Thailand for large ships, for a trip of 2 weeks or greater.

Table A2-1: Total Maize Production, Imports, and Exports

Marketing Year [1]	Mozambique		South Africa				Swaziland		Zimbabwe			
	Production [2]	Imports	Production		Exports [3] & [4]	Imports [4]	Production [5]	Imports [5]	Production		Exports	Imports
	White	Yellow	White	Yellow	White and Yellow		White	White	White	Yellow	White and Yellow	
1982/83	350	91	4200	4000	5096	89			1761.5	24.5	492	0
1983/84	330	71	2100	2000	833	2389	32.3	50.3	881.1	22.9	252	0
1984/85	350	215	1750	2800	712	2076	147.8	46.3	1223.8	24.2	0	269
1985/86	400	403	3500	4200	1204	224	147.8	22.2	2842	118	285	0
1986/87	459	111	3300	4300	3538	34	170	21.5	2278	110	495	0
1987/88	271	132	3579	3489	2357	31	156	10	944	77	393	0
1988/89	322	293	3780	2951	1390	57	100.3	27.5	2072	150	314	0
1989/90	330	261	6553	4999	4909	3	111.7	32.1	1885	209	174	0
1990/91	453	227	4365	3977	1784	0	135	16	1603.5	242.5	410	0
1991/92	327	379	3810	4016	1393	369	153	10.8	1053.8	282.2	230	83
1992/93	133	525	1232	1690	0	3950	45.6	127.3	372.6	144.4		
1993/94	533		4060	3974			84					

Notes:

[1] Marketing years extend from April through March, beginning with the harvest period, except for South Africa which has a marketing year from May through April.

[2] Work continues in Mozambique to improve estimates of production, consumption, and imports; these data should be taken as approximate at best. They are taken from several different data sources; see sources below. Also note that in the past two years, the Early Warning Unit of the Ministry of Agriculture has developed new estimation methods for production; thus, the most recent estimates are based upon a new methodology.

[3] Exports for South Africa include sales to Customs Union members: Botswana, Lesotho, Swaziland, and Namibia, as well as to the independent Black states. During the years 1983/84, 1984/5 and 1992/93, there were no exports outside the Customs Union. South Africa exports and imports both white and yellow maize grain and products.

[4] Export and Import data for 1982/83 through 1985/86 are approximations based on figures presented in the Maize Board *Annual Report*.

[5] Swaziland production and import data does not distinguish between white and yellow maize, although most maize produced or imported in the country has been white.

Source: Swaziland: Economic Planning Office, Ministry of Economic Planning and Development (1993), *Development Plan 1993/94 - 1995/96*, Mbabane; and Early Warning Unit of the Ministry of Agriculture and Cooperatives database for 1992/93 data. South Africa: Maize Board (1992), **Maize Board Annual Report 1991/92**; Arcadia, Pretoria, and US Embassy unpublished data for 1992/93 - 1993/94. Mozambique (1982/3 - 1989/90) FAO Agrostat 2.0 (1993) computer database, provisional data. Mozambique (1990/91 - 1992/3: Ministry of Commerce, DSA Bulletins, 1992/93. Zimbabwe: Agritex/FAO Early Warning Unit, Ministry of Land, Agriculture, and Water Development, Government of Zimbabwe, Harare for the production data 1985-1992, Commercial Farmers Union data files, Harare. for the yellow maize production data, Central Statistics Office, Ministry of Finance, data files, Harare for the yellow maize production 1982-1985, and Grain Marketing Board, 1993, **Annual Report 1992**, Harare for import and export data.

ANNEX E

A STATIC CONCEPTUAL ANALYSIS OF THE PRODUCER PRICE EFFECTS OF YELLOW MAIZE FOOD AID

I. INTRODUCTION

This annex presents a static conceptual analysis of the effects of yellow maize food aid on the prices of white maize in Mozambique. In each case, the country is divided into two regions. Region 1 produces white maize, while region 2 does not produce. Region 2 is meant to represent the major urban areas of the country. Region 1 represents rural Mozambique.

Region 1 may or may not export to region 2, depending on the level of outside supply of white and yellow maize available to region 2. The models consider two sources of supply from outside: white maize imported commercially from Swaziland and Zimbabwe (the relevant "world market" for Mozambique), and yellow maize donated as food aid and then sold commercially. White maize from Swaziland and Zimbabwe is considered to be identical to that from rural Mozambique. Yellow maize is modelled as a substitute. We present two cases, one in which supply from Swaziland and Zimbabwe is highly elastic, and one in which it is quite inelastic relative to supply from rural Mozambique. In each case, we assume an increase in the amount of yellow maize food aid arriving in the urban region, which causes a backwards shift in demand for white maize in this region. We then examine the effect of this change on prices, production, and consumption of white maize in rural and urban regions, on exports of white maize from rural to urban Mozambique, and on imports of white maize from the world market (Swaziland and Zimbabwe). We show that the key determinants of the effect of yellow maize food aid are the elasticity of supply in the world and domestic markets, and the cross-price elasticity of demand between yellow and white maize.

Figure E1. Effects of a demand shift on white maize prices within and outside Maputo

In Figure E1, Scenario 1 has elastic world market supply. Scenario 2 shows inelastic world market supply. Domestic supply and demand are identical in the two scenarios. Each scenario is depicted with three panels. The far left panels contain the supply and demand schedules in region 1, the rural producing region, and depict the effects of the yellow maize food aid on total production and consumption in the rural area. The far right panels contain the supply and demand schedules for region 2, the urban non-producing region, and depict the effect of increases in the volume of yellow maize food aid on total consumption in the urban area. The center panels contain supply schedules to the urban area from the world market and from the rural area, along with total supply to the urban area (the sum of the first two supplies). These panels depict effects of the increased food aid on exports from the rural to the urban area, and imports by the urban area from the world market. Stated differently, they show the relative effects of the yellow maize food aid on domestic white maize production and white maize imports.

Notation is as follows:

S_1	is the supply schedule in region 1, the producing region,
D_1	is the demand schedule for region 1,
D_2	is the demand schedule for region 2, the urban region, prior to an increase in the amount of food aid,
ES_1	is the excess supply curve in region 1,
ES_1+M	is the excess supply curve in region 1 plus a constant marketing margin between region 1 and region 2; this represents supply in region 2 from region 1,
S_w	is the world market (Swaziland and Zimbabwe) supply schedule,
S_t	is the total supply schedule to region 1, derived from the horizontal summation of ES_1+M and S_w,
P_1	is the market clearing price in region 1 prior to the increase in yellow maize food aid,
P_2	is the market clearing price in region 2 prior to the food aid increase,
Q_{1x}	is the amount exported out of region 1 to region 2,
Q_{1c}	is consumption in region 1,
Q_{1t}	is production in region 1,
Q_{2m}	is imports to region 2 from the world market,
Q_{2t}	is consumption in region 2, and
*	indicates after the arrival of food aid (for example, D^*_2 is the demand schedule in region 2 after the arrival of food aid).

When supplies of white maize from Swaziland and Zimbabwe are highly elastic (Scenario 1), an increase in the amount of yellow maize arriving in urban areas has a large negative impact on the quantity of white maize consumed in the urban area, but most of this reduction is absorbed by imports. White maize production in rural Mozambique falls slightly and consumption increases (both in response to a slightly lower price), so that exports from rural to urban areas decrease. Imports to the urban area from neighboring countries, however, decrease more.

When white maize supply from the world market is inelastic (Scenario 2), the increased amount of yellow maize food aid has a somewhat smaller effect on total white maize consumption in region 2, but now domestic production and rural exports to urban areas absorb nearly all the effect. Both production and marketings from rural areas fall more than if world market supply of white maize is elastic.

IV. CONCLUSIONS

This analysis shows that the elasticity of supply of white maize from Swaziland and Zimbabwe is a key determinant of the effects of yellow maize food aid on domestic white maize production. The less elastic is this supply, the greater is the negative effect on domestic production of increased food aid arrivals. Two other parameters are also important: the elasticity of supply of white maize from rural Mozambique, and the cross-price elasticity of demand between yellow and white maize. A more elastic supply of white maize in rural Mozambique will make domestic production more sensitive to increased food aid supplies of yellow maize: a given price decrease will reduce domestic production more if domestic supply is more elastic. Finally, a strong cross-price elasticity of demand between yellow and white maize will lead to a larger decrease in the demand for white maize in response to a yellow maize food aid arrival. As a result, domestic prices and production of white maize will be more adversely affected by food aid. If yellow and white maize are close substitutes in consumption, they will have a relatively high cross-price elasticity of demand.

Empirical assessment of the effects of yellow maize food aid on production of white maize in Mozambique must assess current **and likely future values** of these three parameters: the elasticity of supply out of Swaziland and Zimbabwe, the elasticity of domestic supply, and the cross-price elasticity of demand (degree of substitutability) between yellow and white maize. It is especially important to assess the probable future evolution of these parameters, given the rapid change taking place in the region. The ending of the war in Mozambique has lead to important changes in food marketing, and is expected to affect food production as well. In South Africa, the forthcoming political changes might bring important changes in economic policy.

In addition to these parameters, a comprehensive assessment of the issue must evaluate the performance of food markets in Mozambique in two key respects. First, are spatially separate food markets integrated through the flow of product in response to price incentives? The analysis in this annex assumed, for ease of exposition, that they are. In fact, markets may be more or less integrated, and the degree of integration will determine to what extent changes in the urban price of white maize, induced by yellow maize food aid arrivals, are passed-on to rural areas. Second, are markets in a given geographical area well connected across levels in the system? In other words, will fluctuations in price at the retail or wholesale level be transmitted to the producer level? To the extent that they are not, producers will be insulated from the potentially negative effects of food aid. This is the issue of "price transmission".

In Chapter Four, Section IV, we discuss these issues. See also Annex D for a discussion of price policy in Swaziland and South Africa.

ANNEX F

FOOD AID CHARTER TO THE COUNTRIES OF THE SAHEL

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