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A COMPARATIVE ANALYSIS OF GRAIN MARKETING AND PRICE POLICIES IN THREE SUB-SAHARAN AFRICAN COUNTRIES: IMPLICATIONS FOR FOOD SECURITY

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A COMPARATIVE ANALYSIS OF GRAIN MARKETING AND PRICE POLICIES IN THREE SUB-SAHARAN AFRICAN COUNTRIES: IMPLICATIONS FOR FOOD POLICY

By

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ABSTRACT

A COMPARATIVE ANALYSIS OF GRAIN MARKETING AND PRICE POLICIES IN THREE SUB-SAHARAN AFRICAN COUNTRIES: IMPLICATIONS FOR FOOD SECURITY

By

Thomas Stuart Jayne

One of the most debated issues related to African development centers on the appropriate roles of the public and private sectors in stimulating food production and supply. This study focuses on the role that price and marketing policies may play in promoting these objectives.

In particular, the study examines the role and effectiveness of price policy to stimulate marketed supply, and how price uncertainty and transaction costs can affect the micro decisions of producers and traders, and thus the macro performance of food grain subsectors.

After a theoretical review of constraints and coordination problems in both traditional and administered market systems, the study analyzes the effects of grain price and marketing policies in Mali, Zimbabwe, and Somalia since 1970. Techniques include econometric and descriptive analysis. Empirical evidence from these three cases studies is used to form conclusions and food security policy implications, which are discussed in the final chapter.

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INTRODUCTION

> "Governments everywhere have always been involved in agricultural markets, especially for staple foods, and undoubtedly always will be" (Berg, 1985).

1.1 GOVERNMENTS AND MARKETS IN AGRICULTURAL DEVELOPMENT

One of the most debated issues related to African development centers on the appropriate roles of the public and private sectors in agricultural markets. Although agricultural growth and food security (under various names) have remained the major development goals for the past two decades, the shrill tone of recent donor-government dialogue throughout Sub-Saharan Africa has highlighted the serious differences in perception concerning the means to achieve these goals. Much of the disagreement over the most effective public/private sector mix has focused on perceptions concerning (1) the ability of traditional markets to produce equitable, socially desirable distributions of income (Bromley, 1986; Timmer, 1985; Lele, 1976), (2) the ability of government--in particular, parastatals--to perform their various functions with reasonable efficiency (Berg, 1985; Abbott, 1985; Lal, 1985), and (3) the need for governments to assure cheap and adequate supplies of food for politically volatile groups (Bates, 1983; Hesp and van der Laan, 1985).

The policy debate has intensified since 1980 with heightened donor emphasis on "privatization," a view forcefully articulated in the well-known "Berg Report" (IBRD, 1981). Salient conclusions of the Report include (1) "the almost overriding importance of producer price levels in affecting production levels," and (2) the need for greater market liberalization to stimulate domestic food output and

supply. The policy recommendations flowing from these conclusions have clear implications for desirable public/private sector roles in agricultural markets.

A great deal of the current privatization emphasis appears well-founded. The historical record in Africa suggests that public sector efforts to deal with market failures in food grain distribution have often resulted in even more severe bureaucratic failures. Yet the neat link between market liberalization and accelerated agricultural growth has been challenged on a number of fronts.

Two questions immediately come to mind. First, what is the scope for policy reform? Notwithstanding the severe indebtedness of many governments, can donors force upon them policies that are economically sound but politically risky? Recent political instability in Zambia (1986), Sudan (1985), Ghana (1979, 1984), Tunisia (1983), and Morocco (1983) emphasize the finite flexibility in designing marketing/price policy reform.

Second, how will the incentives and behavior of market participants change under market liberalization? The current push for privatization appears predicated on important assumptions on which the empirical record is unclear. Of primary importance is the belief in a positive aggregate supply response by African farmers[1]. While the relationship between higher output prices and higher incentives is unquestioned, the magnitude of the response in the face of a myriad of environmental and infrastructural constraints is far from clear. A related question is whether market liberalization could significantly raise farm output and

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1 While admitting that aggregate supply response is highly constrained in the short run, the Berg Report contends "in the longer run, a more congenial set of marketing conditions will motivate African farmers to invest in equipment, to hire labor, to work harder, and to find other ways of breaking those 'constraints' which derive from inadequate motivation rather than from inadequate technology" (p. 55). By contrast, Shapiro (1984) states "the supply response literature does not provide any basis for believing that improved incentives will increase aggregate output" (p. 67). See also Mackintosh (1985) and Harriss (1979).

marketings even though parallel markets almost always exist alongside official market channels (Roemer, 1984). The rationale that transaction costs will be lower when trading can be performed legally is compelling, although the extent to which this will be translated into increased sales is unclear.

Moreover, the effects of price uncertainty on farmer/trader behavior is not clearly understood, even though traditional African "free markets" are often plagued by volatile inter- and intra-seasonal price fluctuations. Assumptions of accurate and swift information dissemination in African markets are also inadequately addressed (Harriss, 1979; Lele, 1977), although such assumptions are required for an open market system to provide efficient planning and allocation of agricultural resources.

The objectives of this thesis are to review selected evidence on these critical aspects of African market systems. How do alternative market structures affect the incentives and behavior of market participants in Africa? What preconditions are important to induce higher production and marketings from rural smallholders, and what forms of market organization and price determination might best elicit these conditions? Primary research questions of the study are:

RQ 1. What is the general magnitude of supply response in African smallholder environments, and what important non-price constraints influence farmers' ability to respond to higher prices? How does this relate to the design of effective marketing/price policies?

RQ 2. What difference does the magnitude of price uncertainty have on production and marketing patterns? Is there a relationship between the unpredictability of market prices, innovative behavior by market participants, and food production growth?

RQ 3. Do the transaction costs and risks of finding a market for surplus production at a satisfactory price affect farm incentives to produce for the market? Moreover, how do these costs affect traders? If such transaction costs are significant, then it may be insufficient to analyze policy options simply on the basis of changes in real producer price minus production costs. What implications may transaction costs have for the design of policies meant to stimulate smallholder marketings?

These research questions are discussed in greater detail below.

1.2 RESEARCH SCOPE

1.2.1 Focus of Study

The bearing that these research questions have on food security requires a definition of this broad term. Food security can be taken to mean "the ability of a country or region to assure on a long term basis that its food system provides the total population a timely, reliable, and nutritionally adequate supply of food" (Eicher and Staatz, 1985). While the term clearly has important effective demand dimensions, this study focuses primarily on the domestic supply expansion dimension of food security (Figure 1.1). To some extent, the two components overlap, since one of the most direct ways to increase the incomes (effective demand) of rural households is to increase the productivity of their marketable food crops (Eicher and Staatz, 1985).

The commodity focus is on major foodgrain crops. This is for two reasons. Since 1970, Africa's ability to feed itself has steadily declined (Eicher, 1984). It is the only region in the world where per capita food production has been falling. While export promotion is an important dimension in food security efforts, the need for countries' food production to keep pace with burgeoning population growth has been identified as an overarching priority of chronically food deficit African states. Moreover, it is questionable that African producers will risk the majority of their productive resources on export crops in the absence of reliable markets to provide for household consumption needs (deWilde, 1980; Staatz, 1986). For this reason, well functioning food marketing systems appear to be a necessary complement to export promotion.

FIGURE 1.1

Dimensions of Food Insecurity

PROBLEM AREA	FOOD SYSTEM	
	SUPPLY	EFFECTIVE DEMAND
SHORT-TERM FOOD INSECURITY (TRANSITORY)	Inadequate buffer stock management Inability to import Poor early warning system	Inadequate identification or ability to reach vulnerable groups Poor emergency income transfer scheme
LONG-TERM FOOD INSECURITY (CHRONIC)	Stagnant Agricultural Production/Marketing System	Low income generation and employment in both agricultural and non-agricultural sectors

adapted from J. Staatz (1986), figure 1.

Third, a micro and intra-firm perspective is taken, recognizing the critical relationship between activities within the foodgrain subsector and macro factors such as (1) exchange rate policy, (2) commercial trade policies, including import substitution or export promotion strategies, (3) monetary and fiscal policies, (5) urban wage rates, and (6) national debt status and balance of payments (Kreinin, 1986; Schuh, 1977; Timmer, 1985). Exploration of these macro factors is beyond the scope of this study.

1.2.2 Research Questions

With the boundaries of the study now clarified, the research questions presented earlier are elaborated upon to focus the subsequent analysis.

(RQ1): The first issue concerns the supply responsiveness of farmers to price incentives, and the major variables that influence the magnitude of this response. The belief that higher producer prices resulting from market liberalization will greatly increase production and marketed output rests on the assumption of significant --if not significant and high--supply responsiveness. Yet the empirical evidence from developing countries is far from convincing. The comprehensive survey compiled by Scandizzo and Bruce (1980) reveals a greater number of supply elasticity estimates below zero than above unity in both the short and long runs (Table 1.2). A similar picture emerges from Shapouri, Dommen and Rosen's (1986) survey of 11 Sub-Saharan African countries (Table 1.3). This mixed picture on supply response is largely what one might expect given the multivaried constraints on agricultural production in Sub-Saharan Africa (Mackintosh, 1985; Shapiro, 1984; Matlon and Spencer, 1984; Sanders et. al., 1985). Harriss, in her 1979 survey of grain markets in West Africa concludes:

> There is no research to show whether present stagnation is the result of a high response to low official prices...or a low response to high parallel market prices, or a high response to parallel market prices that are lower than official prices.

TABLE 1.2

Survey of Price Elasticities of Supply in Developing Countries; Estimates of 103 countries (primarily Asian and Middle-Eastern)

Short Run

Crop	elasticity range: below 0	0-.25	.26-.50	.51-.75	0.76-1	above 1
Rice	3	19	4	4	-	4
Wheat	5	8	2	2	1	3
Barley	4	7	1	2	1	2
Maize	6	4	-	1	1	2
Millet/ Sorghum	4	6	1	1	3	2
TOTAL (n=103)	22 (21%)	44 (43%)	8 (7%)	10 (10%)	6 (6%)	13 (13%)

Long Run

Crop	elasticity range: below 0	0-.25	.26-.50	.51-.75	0.76-1	above 1
Rice	2	4	2	3	3	7
Wheat	6	7	2	2	-	4
Barley	5	4	2	1	-	4
Maize	6	2	1	2	-	3
Millet/ Sorghum	4	2	3	1	-	2
TOTAL (n=84)	23 (27%)	19 (23%)	10 (12%)	9 (11%)	3 (4%)	20 (24%)

Source: Scandizzo and Bruce (1980), Appendix 2, pp. 72-74.

TABLE 1.3

Survey of Price Elasticities of Production in Sub-Saharan Africa; 27 Estimates of Food Grains from 10 countries

Short Run

Crop	elasticity range: below 0	0-.25	.26-.50	.51-.75	0.76-1	above 1
Maize	2	1	4	1	-	-
Rice	-	-	2	-	-	-
Teff	-	-	1	-	-	-
Barley	-	-	1	-	-	-
Wheat	-	-	3	1	-	-
Millet/ Sorghum	-	8	4	-	-	-
TOTAL (n=28)	2 (7%)	9 (32%)	15 (54%)	2 (7%)	-	-

Long Run

Crop	elasticity range: below 0	0-.25	.26-.50	.51-.75	0.76-1	above 1
Maize	1	1	1	2	1	1
Rice	-	-	2	-	-	-
Teff	-	-	1	-	-	-
Barley	-	-	1	-	-	-
Wheat	-	-	-	1	1	2
Millet/ Sorghum	-	6	5	1	-	-
TOTAL (n=27)	1 (4%)	7 (26%)	10 (37%)	4 (15%)	2 (7%)	3 (11%)

Source: Shapouri, Dommen, and Rosen (1986), Table 13, p.35.

RQ1 therefore addresses the role and effectiveness of price incentives, and more importantly what factors facilitate farmers' ability to respond to price incentives. Identification of these factors may promote the design of more effective market/price policies.

(RQ2): A second question concerns price instability and production. The Berg Report, consistent with much recent literature, recommends a shift from reliance on official prices to greater articulation of supply and demand forces in traditional markets. While fixed price schemes present a number of serious problems, they do (if maintained) provide farmers with greater certainty as to what minimum price they might receive at harvest time or beyond. On the other hand, price instability in traditional markets is pervasive; occurrence of seasonal price peaks and troughs is highly erratic (Table 1.4). An implicit assumption of the price-liberalization perspective is that reduced predictability of future prices will not appreciably impair farmer production decisions. Yet the negative relationship between price uncertainty and production is well established in the US risk literature (Johnson, 1947; Schultz, 1945; Just, 1974). Is it not realistic to expect that price risk may similarly affect subsistence production in Africa as well? If so, what mechanisms may be feasible to reduce price uncertainty without resorting to the inefficiencies of pan-seasonal pricing?

TABLE 1.4: STABILITY AND TIMING OF SEASONAL PRICE VARIATIONS

WHOLESALE

Frequency of high priced / low-priced month

COUNTRY	COMMODITY	YEARS	CV	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Brazil	millet	7	0.3	1	1	2	0	1	0	0	0	0	1	0	1	0	0	0	0	2	0	1	0	1	2	1	0
Brazil	rice	7	0.7	3	0	0	0	0	1	0	0	0	1	0	2	0	0	2	0	0	2	0	1	1	0	1	0
Korea	rice	5	0.5	1	1	0	0	0	1	0	1	0	1	0	0	1	0	0	0	0	0	0	1	1	0	0	2
Philippines	rice	3	0.2	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	1
Dom. Rep.	maize	12	0.3	1	0	0	1	4	4	0	1	0	0	0	1	0	2	0	0	0	0	0	0	3	3	3	1
Bangladesh	wheat	10	0.7	2	2	0	0	0	3	3	0	0	0	0	0	1	0	1	1	0	0	1	1	0	0	1	4
Philippines	wheat fl.	14	1.0	2	0	2	0	0	0	1	2	1	0	0	6	3	0	0	0	2	1	0	3	0	1	3	1
Tunisia	wheat fl.	8	0.6	7	0	0	0	1	0	0	0	0	0	0	0	4	1	0	0	0	0	1	0	0	0	0	2

RETAIL PRICES

COUNTRY	COMMODITY	YEARS	CV	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Ivory Coast	millet	12	1.1	3	1	0	0	1	1	2	2	1	0	1	0	4	2	2	0	0	2	1	1	0	0	0	0
Niger	millet	14	1.3	1	1	1	1	1	1	3	3	1	0	0	1	2	3	0	0	0	0	1	1	1	2	2	2
Niger	sorghum	?	0.6																								
Brazil	rice	7	0.3	3	1	0	0	0	1	0	0	0	0	1	1	0	2	0	0	0	1	0	1	2	0	0	1
Costa Rica	rice	7	1.3	2	0	0	0	0	0	1	1	0	1	1	1	1	1	0	1	0	1	0	1	1	0	1	0
Dom. Rep.	rice	6	0.6	1	0	1	1	0	1	1	1	0	0	0	0	1	1	0	2	1	0	1	0	0	0	0	0
Indonesia	rice	8	0.4	3	0	0	0	0	0	1	0	0	0	1	3	0	0	0	3	2	1	1	1	0	0	0	0
Ivory Coast	rice	11	0.6	2	4	0	0	2	1	0	0	0	1	0	1	4	0	0	1	0	1	0	1	1	1	1	1
Niger	rice	19	0.6	1	0	0	3	0	2	2	4	1	1	5	0	3	1	4	1	3	0	0	1	1	2	0	3
Philippines	rice	5	1.3																								
Sierra Leone	rice	15	0.6	1	0	0	0	1	3	1	1	4	2	1	1	1	3	5	3	0	0	0	0	0	0	2	1
Tunisia	rice	8	0.6	4	1	0	0	0	1	0	1	0	0	0	1	2	1	0	0	0	1	2	0	0	0	0	2
Costa Rica	maize	5	0.8	1	0	0	0	0	1	0	0	1	0	0	2	1	0	2	0	0	0	1	0	0	0	0	1
Indonesia	maize	8	0.4	3	0	0	0	0	0	0	0	0	3	2	0	0	0	1	0	5	1	0	1	0	0	0	0
Ivory Coast	maize	12	0.8	4	0	1	0	2	1	1	2	0	0	1	0	5	0	2	0	1	1	1	0	0	0	1	1
Brazil	wheat fl.	8	0.5	1	0	0	0	1	0	1	0	0	0	0	4	2	0	0	1	0	2	0	1	0	0	0	2
Ivory Coast	wheat fl.	11	1.1	7	0	0	0	0	2	0	1	1	0	0	0	3	0	2	1	2	0	0	1	0	0	0	2
Tunisia	wheat fl.	5	0.3	3	2	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	1	0	0	0	0	1

note: rather that using actual prices in this exercise, the matrix of prices was first converted into a matrix of price index numbers defined as follows:

$$S_{ijk} = \frac{M_{ijk}}{M_{ajk}} \times 100$$

where:

S_{ijk} = seasonal price index for month i, in year j, for commodity k;
M_{ijk} = price in month i, in year j, for commodity k;
a = the prices for commodity k during month i, the six months previous to and after it.

This procedure standardizes the data for comparisons across countries and reduces the inflationary component of the data.

Source: Sahn and Delgado, A Review of the Magnitude, Causes, and Implications of Seasonal Price Variability, 1985.

(RQ3): A third question concerns transaction costs, and is related to assumption one. Transaction cost analysis plays a peripheral role at best in current policy analysis (Jaffee, 1986); farmer incentives to produce a marketable surplus are analyzed primarily in the context of output prices, or in the difference between output prices and cost of production. The costs embedded in different forms of exchange arrangements are seldom explicitly considered in regard to their effect on overall production incentives. Yet transaction costs affect all participants in the marketing system, and include "the costs of identifying trading opportunities, of screening the available goods, services, and potential trading partners, of negotiating agreeable terms of trade, of monitoring compliance with agreed upon terms, of enforcing agreements, and of evaluating the results of transactions" (Jaffee, 1986). If such costs comprise a non-negligible portion of output price minus cost of production, and if such costs vary according to the particular type of exchange/pricing arrangement--two very plausible propositions-then it becomes difficult to truly evaluate how alternative market structures will affect production incentives and resource allocation without explicitly examining these costs. This issue, a priori, adds no weight either way to the contention that market liberalization is superior to government price and marketing schemes; it does say however that such contentions are premature without more explicit consideration of transaction costs. RQ3 thus examines factors that affect transaction costs incurred by market actors, and policy measures to reduce such costs.

1.3 ORGANIZATION OF STUDY

The remainder of the paper is organized along the following lines: Chapter 2 briefly describes the role of agricultural market systems in African economic development. It also examines past and present perceptions about the abilities and limitations of "administered" and "free" markets. Chapters 3 and 4 examine

how key environmental/institutional constraints in Sub-Saharan Africa affect farmer/trader behavior and performance in the polar extremes of traditional free markets and highly administered market systems.[2] Theoretical conclusions from these chapters are examined empirically in case studies of Mali, Zimbabwe, and Somalia in Chapters 5, 6, and 7. Country selection is based on association with MSU's Food Security Project. Finally, Chapter 8 concludes with a set of potentially useful policies by which private initiatives could be strengthened and complemented through positive support from the public sector. Important information needed for future research is identified where available secondary data are insufficient to adequately address particular questions. These issues and findings may help define useful roles for the public and private sectors to promote domestic food production and supply in Sub-Saharan Africa.

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2 In reality, all market exchange--free or administered--takes place within a set of institutional constraints imposed by governments (Shaffer et al., 1983).

Chapter 2

THE ROLE OF AGRICULTURAL MARKET SYSTEMS IN AFRICAN ECONOMIC DEVELOPMENT

2.1 INTRODUCTION

Because all economies require both private and public inputs in order to function, the distinction between "market-oriented" and "government-oriented" approaches to the organization of the food system is largely an abstraction. There is, nevertheless, heuristic value to classification, and thus a brief taxonomy is given for the following terms used frequently throughout the paper.

Exchange System: a social invention that provides the means for coordinating activities between actors involved in the transformation of good across space, time and form.

Market Exchange: decentralized, small-scale exchange typifying much of rural Africa; bargained exchange between private households, traders, and firms; lacking significant government participation in direct marketing activities. Used interchangeably with informal, or traditional markets.

Administered Exchange: exchange which, although retaining some degree of private informal trade, is associated with significant direct government participation in marketing activities. This may be characterized by various degrees of parastatal pricing, procurement, and distribution of agricultural commodities and inputs.

2.2 THE ROLE OF AGRICULTURAL MARKET SYSTEMS IN ECONOMIC DEVELOPMENT

The process of agricultural price formation cannot be divorced from a country's associated market institutions. The constellation of prices which shape individual incentives are a direct result of the type of agricultural marketing institutions through which economic activity operates (Shaffer et al, 1983). Since (1) all such marketing institutions throughout Africa involve varying degrees of

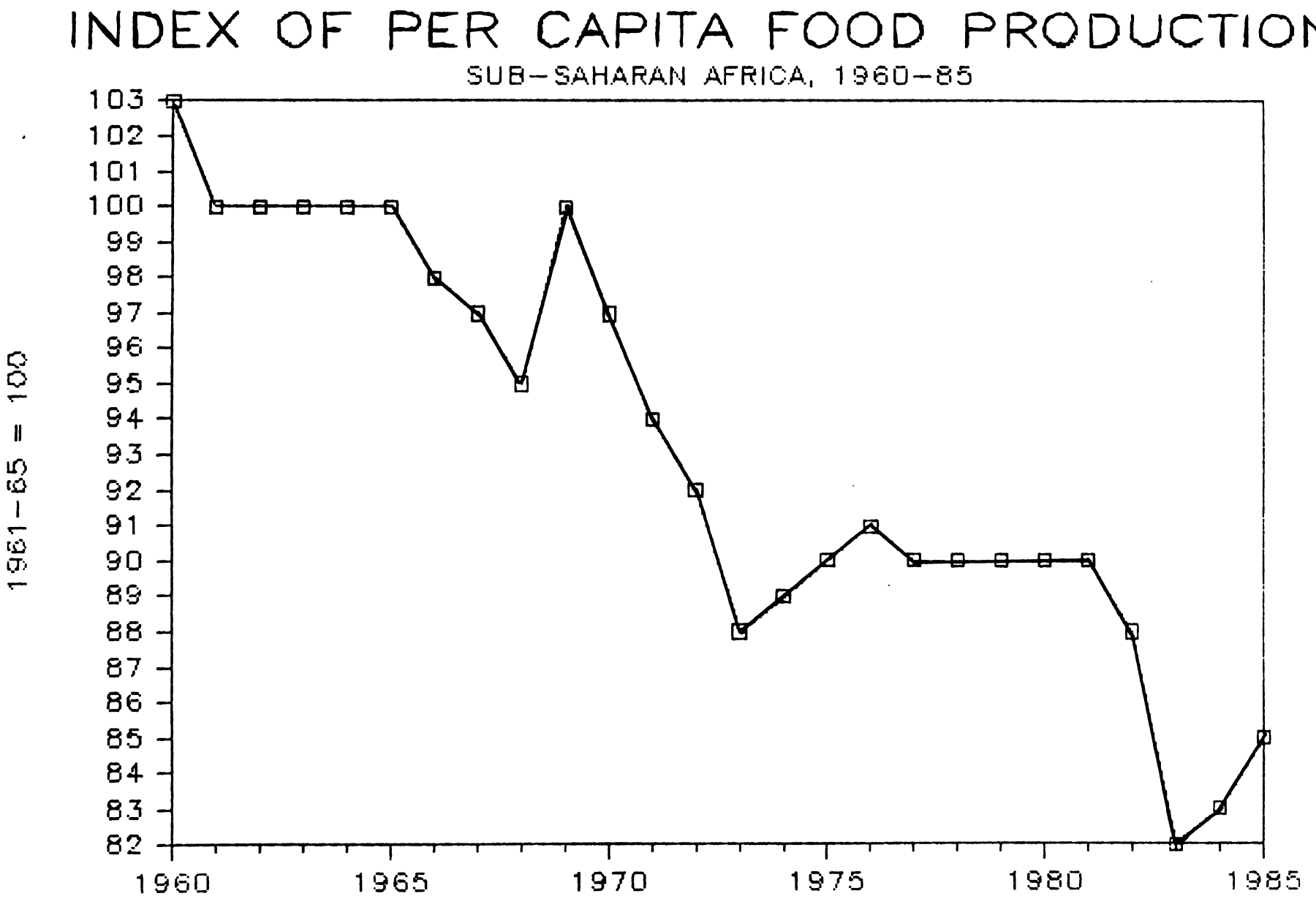
state and private participation, and (2) the structure of incentives and constraints flowing from such institutions influence aggregate performance outcomes, it becomes clear that for policy purposes the objective of promoting long term food security is intimately linked to the task of defining appropriate roles of the public and private sectors in agricultural markets.

The role of the marketing system in the structural transformation of African economies is clear. Historical analysis has supported the importance of a reliable agricultural surplus as a necessary precondition for the expansion of developing countries' nascent industrial sectors. The organization of the marketing system may profoundly influence the growth of this surplus, by affecting both (1) the set of prices that shape the incentives to produce, transport, process, store, and buy goods and inputs, and (2) the non-monetized risks and difficulties of exchange between actors.

The generation of such surpluses has been particularly problematic in Sub-Saharan Africa. Per capita food production has been declining by about 2% per year since 1970 (Figure 2.1). Increases in absolute food production have primarily come from area expansion and reduced length of fallow (Table 2.2). Continued reliance on such "extensive" means to keep food production growth even with burgeoning population growth is not a realistic option for the majority of Sub-Saharan Africa.

In this context, much weight has been put on the role of yield-increasing technologies as a means to create the agricultural surpluses necessary to provide intersectoral income transfers to Africa's industrial sectors (Krishna, 1968; Mellor, 1973). The recent "green revolution" experience of India clearly illustrates this point (Aboyade, 1985; Mellor, 1976). Yet the ability of, and incentives for, farmers to use improved technologies are greatly dependent on (1) access to these technologies and inputs, (2) prices of both technical inputs and farm output, and (3) the risks and transaction costs of obtaining inputs and in

INDEX OF PER CAPITA FOOD PRODUCTION



SOURCE: OTA, 1986

FIGURE 2.1

TABLE 2.2

Annual Growth Rates in Food Grain Area and Yield, 1966-68 to 1981-83

Country and Commodity	annual percent change area	yield
Ethiopia:		
Wheat	-3.17	4.81
Corn	-0.94	5.05
Sorghum	-0.58	3.74
Barley	0.5	5.04
Kenya:		
Wheat	0.97	0.45
Corn	2.08	0.34
Sorghum	-3.38	6.36
	-2.05	-0.29
Lesotho:		
Wheat	-8.78	6.36
Corn	-3.38	0.51
Sorghum	-2.05	-0.29
Mali:		
Corn	-1.01	-2.46
Rice	-0.27	0.32
Millet	0.28	-1.96
Mozambique:		
Corn	-0.94	-1.68
Sorghum	-1.1	-1.87
Niger:		
Rice	5.15	-1.38
Millet	3.51	-1.56
Sorghum	4.18	-1.89
Senegal:		
Corn	1.78	1.27
Rice	-1.83	-0.5
Millet	-0.85	1.67
Somalia:		
Corn	1.43	1.39
Sorghum	-1.01	0
Sudan:		
Wheat	4.39	0.69
Corn	5.92	-1.37
Millet	4.76	-1.84
Sorghum	5.37	-0.73
Zambia:		
Corn	1.45	0.2
Millet	0.3	-0.96
Sorghum	0.06	-1.6
Zimbabwe:		
Wheat	na	5
Corn	5.02	-2.05
Sorghum	1.24	1.02

Source: Shapouri, Dommen, and Rosen (1986), Table 7, p.17.

producing and selling a marketable surplus. All of these factors are in turn influenced by the relevant market rules and institutions through which economic activity operates. The fact that India had, "by the time of the green revolution, installed one of the most sophisticated food marketing and agricultural price-intervention systems in the developing world"[1] suggests that the country's agricultural progress was due not only to technology but a well-coordinated marketing system through which inputs, products, and incomes could be efficiently transferred.

In short, a symbiotic relationship exists between farm productivity and market coordination (Abbott, 1985; Antle, 1983). In some cases, changes in market rules and institutional arrangements may be necessary before production gains are possible (Lele, 1975; Bromley, 1986). The "multiplier effect" of an efficient marketing system thus appears to be critical for stimulating the intersectoral transfers which promote long-term food security (Drucker, 1958).

2.3 MARKET COORDINATION

Well-functioning markets must coordinate activities between the various participants/stages in the food system. Market coordination entails the "consistent matching of supplies of farm products with demand at prices which return to participants the cost of production, basing cost of production on the market value of the assets in alternative employment in the economy at the time of acquisition" (Shaffer, 1986). Markets are uncoordinated to the extent that the behavior of farmers, traders, processors, and consumers exacerbate price and quantity fluctuations, generating enough unpredictability and risk in the system as

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1 Ojetunji Aboyade, Administering Food Producer Prices in Africa: Lessons from International Experiences, IFPRI, 1986.

to depress innovation, rural incomes, and aggregate production in the medium and long run.

The coordination problem originates from various environmental, organizational, and policy constraints which prevent potential economic opportunities from being exploited. Well-coordinated markets facilitate reduction of such constraints by lowering the monetized and non-monetized costs of trading across markets, and more importantly by creating incentives to stimulate investments and innovations which result in agricultural growth. Dynamic market coordination involves two main functions (Shaffer et al., 1983):

(1) to promote harmonization and stability between the various participants/stages in the food system; and

(2) to induce more productive technical and institutional innovations which stimulate productivity in the food system.

In short, market coordination is largely an issue of institutional design: how may institutions be utilized--or restructured--to influence prices, technology adoption, and production incentives consistent with long-run food security objectives?

If markets are a powerful means of stimulating production, it is logical to ask how governments might enhance market coordination. Although much of the recent literature has tended to focus on the antagonistic relationship between governments and markets, the key issue is not whether economic activities will be organized either one way or another, but rather how can the conditions under which markets operate be enhanced by the public sector. "Viewed in this way, markets and governments are not considered as discrete alternatives but rather substitutes (or complements) that can be combined in numerous combinations over a very wide range" (Castle, 1983; parentheses mine).

Hence, defining appropriate roles for the public sector involves first identifying important conditions that promote farmer/trader incentives to stimulate productivity and food security, and second, establishing whether the public sector has a positive role to play in bringing about such conditions.

2.4 PAST PERCEPTIONS CONCERNING THE NEED FOR DIRECT GOVERNMENT ROLE IN FOODGRAIN MARKETS

Especially in prior decades, certain concepts common in the development literature have increasingly come to be viewed largely as misconceptions. These perceptions focused on (1) the shortcomings of markets and (2) assumptions concerning the capabilities of government.

Concerning the first point, it was widely held that private trade was distorted by the oligopolistic position of exploitative "middlemen". Their presence was believed to increase marketing costs and margins, and impede the critical price signalling function of markets. For this reason, markets were often thought to yield socially undesirable distributions of income, resulting in resource allocations inconsistent with economic growth (Scandizzo and Bruce, 1980; Schuh, 1983; Lal, 1985).

By contrast, governments were regarded as logical candidates to rectify--or replace--the inefficient workings of markets. Implicit in this belief is the assumption that government agencies possessed the logistical and managerial resources to execute the functions previously performed by thousands of individuals in the market. Scandizzo and Bruce (1980) likened this task to "a myriad of simultaneous equations, which are normally solved, however one may dislike the solutions, in the market place." Nevertheless, a strong government involvement in production, distribution, and allocation of resources was viewed as necessary to direct resources to their most socially desirable functions, although

local officials undoubtedly also recognized its potential for personal profit (Bhagwati et al., 1984).

Historical events in the past several decades have made donors and governments re-evaluate the assumptions made in earlier decades which motivated policies emphasizing greater central planning in agricultural markets (Ellsworth and Shapiro, 1985). Mounting empirical evidence (Blandford, 1979; Arhin et al., 1985; IBRD, 1981, 1983) has identified African parastatals as inefficient, growth-constraining actors in agricultural markets. Lal (1985), in his summary of public sector performance in developing countries, points to the prevalence of "bureaucratic failures" which frequently result from governments' attempts to correct less objectionable market failures.

Largely in response to these bureaucratic failures over the past decade, there appears to be growing emphasis on "privatization" and the development of markets as the primary "engines of growth" (Bremer, 1986; Abbott, 1985). Two frequently articulated advantages of markets are their ability to (1) motivate individual initiative and resourcefulness (Bromley, 1986), and (2) transmit valuable social information embodied in prices (Hayek, 1945; H.Johnson, 1962; Arrow, 1974). Indeed, in a world of perfect information, mobile resources, pure competition, and no opportunistic behavior, markets would offer the most effective and least-cost form of coordination of economic activity (Arrow, 1974; Behrman, 1979; Stiglitz, 1985).

Yet several points must be examined more carefully. First, it is clear that markets in the real world do not necessarily result in the global optima ascribed to them in standard economic models (Stiglitz, 1985; Shaffer, 1986). Uncertainty, transaction costs, thin markets, externalities, and opportunistic behavior are pervasive everywhere, no less in the market environments of Sub-Saharan Africa. Participants, in their efforts to mitigate exposure to such environmental

difficulties, devise various institutional and coordination arrangements. But there is no reason to believe that the institutions that evolve are somehow optimal. Especially when risk and uncertainty are high, individuals tend to adopt behavioral practices that limit personal exposure but produce undesirable consequences in the aggregate. Externalities arise when a set of incentives--molded by institutions--motivate individual behavior in ways not aligned with the larger societal welfare.[3] Schultz's "efficient but poor" observation may be used to illustrate that while markets may perform fairly well given the normal constraints present in African economies, they are clearly not optimal in a dynamic sense.[4] Simply allowing economic forces to develop whatever market outcomes will evolve given the distribution of rights and power could result in conditions quite inconsistent with the objectives of improved market coordination (Schrader et al., 1986).

"Getting prices right" is a popular perscription among donors. The Berg Report, for example, regards low official producer prices as the "almost overriding" cause of stagnant agriculture in Africa, a theme repeatedly voiced in the market liberalization statements of other prominent donors (USAID, 1984; IMF, 1985; CILSS, 1985). Is "getting prices right" thus synonomous with "letting markets work"? Most economists agree that long term development is promoted by letting participants respond to price signals reflecting the opportunity costs of resources. Yet market prices may be volatile and unrepresentative of underlying supply and demand conditions due to market thinness, poor information flows, and monopolistic practices (Shaffer et al., 1983). "The current enthusiasm for 'free markets' in Africa should not obscure the fact that markets in Africa are often

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3 A classic example of this is the "Tradgedy of the Commons" case (Lloyd, 1833). These occurrences are related to the notion of "social traps" (Platt, 1973).

4 G. Johnson's observation that "one could starve to death in a pareto-optimal world" more starkly elucidates this point.

fragmented and need substantial public investment in order to facilitate a well-functioning private trade" (Staatz, 1986).

Finally, are markets and government discrete alternatives? It is clear that experiments in central planning have failed in many cases; it is unclear that the correct procedure is thus to organize agriculture according to its polar opposite. To begin with, this is impossible since all market activity takes place within a legal and institutional framework imposed by governments (Bonnen, Eicher, and Schmid, 1962). Moreover, government pricing and procurement plays an important role in agricultural markets of virtually all developed and developing countries alike, primarily for reasons of political and economic stability.[5]

This leads us to the issues that comprise the remaining focus of the study: In debunking earlier perceptions regarding markets and state planning, have we really addressed the important questions? Will simply "letting markets work" provide the incentives and behavioral responses necessary to appreciably stimulate production and smallholder marketings? What market conditions must be in place to facilitate farmers' ability to respond to increased incentives, and what roles might the private and public sectors play to provide these conditions? The research questions presented in Chapter 1 serve to focus the subsequent analysis.

2.5 FRAMEWORK OF ANALYSIS

The research questions are explored largely within the context of a modified Industrial Organization framework, or Environment-Behavior- Performance model (Shaffer, 1973, 1980). The framework, briefly stated, contends that physical, organizational, and policy factors which make up the environment create a set of

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5 A recent survey of agricultural economists (Pope and Hallam, 1986) revealed that the majority polled felt that the primary justification for government intervention in agriculture was "to reduce instability". Political stability in developing countries is also perceived as an important rationale for government involvement in agricultural markets (Bates, 1981).

incentives and disincentives which circumscribe the decisions, or behavior of market participants. Individual behavior, taken in the aggregate, greatly influences overall performance, which includes such measures as the rate of growth in food production and real per capita incomes. The approach taken is to examine the above issues successively from the perspective of the following major market participants: (1) rural households as both producers and consumers; (2) private traders (primarily assemblers and wholesalers); (3) urban consumers; (4) the marketing board, or parastatal; and (5) national government.

CHAPTER 3

CONSTRAINTS AND COORDINATION PROBLEMS IN MARKET-ORIENTED EXCHANGE SYSTEMS IN SUB-SAHARAN AFRICA

3.1 INTRODUCTION

Traditional, small-scale agricultural markets form the backbone of economic exchange in rural Africa. This is so even in countries with heavily administered exchange systems, since governments are largely unable to control the bulk of food transactions and private marketing decisions within the food system (Lele and Candler, 1981).[1] Rural subsistence farmers and households form the foundation of this system.

3.2 RURAL HOUSEHOLDS

While a detailed examination of household decision behavior is beyond the scope of the study, the intent of this section is to identify major criteria which critically influence farmer production/marketing decisions.

Rural farm households constitute the large majority of the population in almost all African countries (FAO, 1984). Their source of income and food is predominantly from subsistence agricultural production characterized by small

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1 (Lele and Candler state that the percentage of production which is officially marketed is generally estimated between 10 to 30% even in such heavily administered markets as Tanzania, Zambia, and Kenya. CILSS (1985) contends that the figure is no more than 10% for the West African countries in the Sahel. Government attempts to stamp out illegal parallel markets have invariably proven cumbersome and ineffective.

farms and low cash input requirements. There can also be significant labor sales among small rural households.

The primary purpose for growing food is to feed the cultivators themselves (deWilde, 1980; Dupriez, 1979; Christensen et al., 1981). However, many smallholders, especially those living in more favorable agronomic environments, may sell or barter a portion of their crops to meet basic cash needs (Epstein, 1983; deWilde, 1980). Hence, most rural farmers are neither fully subsistence or cash crop oriented, though the emphasis appears weighted on the former.[2] Planting decisions (what and how much) depend on home consumption needs, soil and rainfall conditions, types of production resources available (land, labor, cash inputs, etc.), an assessment of the risks and difficulties of finding a market for surplus production, and the prices farmers expect to receive for what they grow. With the exception of rainfall and home food needs, these factors are largely endogenous to the production/marketing system, and are significantly affected by (1) the degree of uncertainty in the environment, (2) labor availability, (3) the volume or thinness of markets, (4) price instability, (5) the strength of rural financial markets, and (6) the organization of rural interests. Each of these issues are explored in turn.

3.2.1 Uncertainty

The pervading environmental characteristic of subsistence agriculture in Africa is uncertainty (Shaffer et al.,1983). From the perspective of rural households, uncertainty commonly takes the form of poor rains, pests, unpredictable price fluctuations of farm output, uncertainty regarding input availability, uncertainty in selling labor for those who are dependent on wages to

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2 For example, Sherman et al.,(1986) estimate that in surplus areas of Burkina Faso, only 20 percent of the harvested crop is sold. Lele and Candler (1981) estimate that roughly 80 percent of smallholder production in East Africa is grown for

generate cash income, sudden influx of food aid, and other vagaries of government policy.

Uncertainty has had the important effect of producing entrenched risk-averse behavior patterns in subsistence agriculture. The overriding objective of the majority of rural households is to minimize the risk of failure in a naturally difficult and unpredictable environment. Subsistence farmers cannot afford to make mistakes; doing so may place their very survival in jeopardy. In the face of uncertainty, incentives exist to follow safe, time tested, risk-averse behavior, based on meeting adequate home food needs for the year (Norman, 1979). Manifestations of such behavior include (1) the cultivation of small plots of diversified crops and a reluctance to specialize (Shaffer et al., 1983); (2) the reluctance to rely on markets as a primary source for household food consumption needs (Sahn and Delgado, 1985; Christensen et al.,1981); (3) large family size (assures minimum labor access) and (4) wariness to participate in new, even well-designed, government initiatives, especially if public policies have proven unreliable or unsustainable in the past (Berg and Belot, 1985; Lele, 1975)).

What implications does uncertainty have for farm productivity and food security? First, uncertainty tends to reduce the productivity of farm resources by compelling farmers to diversify cropping patterns, preventing gains to specialization in crops which are comparatively most advantageous for a given region (Shaffer et al.,1983; Raju and von Oppen, 1980). Moreover, the higher the price uncertainty, the more likely farm planting behavior is governed by past operating procedures (Heiner, 1983), i.e., the less likely resources will be allocated by price signals.

Uncertainty also increases the costs of trading. Participants need some minimum amount of information regarding expected market conditions to make production and marketing decisions. These information and search costs tend to

increase in environments of heightened uncertainty (Jaffee, 1986). Moreover, price uncertainty is likely to impede investment in improved farm technology for reasons that are described in Section 3.2.6.

3.2.2 Spatially Dispersed Production Units

A second major feature of rural agriculture is its dispersed, atomistic, small-scale structure. The unit of production--an individual household--typically produces a small and variable surplus of grain, if any, for market. Unreliable sources of supplies present a major disadvantage from the viewpoint of private traders. High transaction costs are incurred in traders' efforts to seek out and negotiate with the many individuals necessary to acquire a volume of grain suitable for economies of scale in assembly and transportation (Shapouri et al., 1986). The inevitable result is that farmers are offered a lower price than what they would otherwise receive if traders incurred less transaction costs in the course of their business.[3]

Another consequence of small, dispersed production units is that farmers must individually, or in small groups, procure needed inputs or arrange for farm services. Studies on rural farmer behavior have revealed that farmers travel frequently over short distances, using poor methods of transport to accomplish single purposes such as fertilizer procurement (Reynolds, 1981). The redundancy associated with individual farmers each having to expend their own time and effort performing the same tasks creates inefficiencies of two sorts: (1) less productive use of farm labor, with consequent effects on farm production, and (2) higher per unit input procurement costs. Labor is, of course, less productively

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3 Shapouri et al.,(1986) report that factors not reflected by commodity price may change true farmgate prices by as much as 20 percent. See also Reynolds (1981).

utilized under such traditional market arrangements than if economies of scale in village or individual input provision could be achieved.

These observations suggest, theoretically, the potential for efficiency gains by taking advantage of economies of scale in input procurement and product marketing, as well as centralizing negotiation and transactions with buyers. The issue is revisited later.

3.2.3 Scarce Labor

Evidence suggests that labor availability throughout Africa is frequently a greater constraint to increasing agricultural productivity than is land availability (deWilde, 1980; Eicher and Baker, 1982; Christensen et al., 1981). Even in areas of relatively high population density, seasonal labor bottlenecks are a salient feature of traditional agricultural systems (Norman, 1977; Roth and Sanders, 1985).[4] Two major reasons for this appear related to (1) the time specificity of labor functions, and (2) the interaction between technology, labor productivity and wage constraints.

For example, planting techniques in semi-arid areas often require planting directly after the first major rain. With many laborers working on their own plots at this time, peak period labor bottlenecks are often severe. After the critical period has passed, labor is in greater supply but is also in less demand. Critical time-specificity of functions prevents labor usage from being spread out more evenly; the result is that area planted is frequently limited by labor availability.

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[4] For example, studies in the heavily populated Central Plateau region in Burkina Faso and the Zaria region of Northern Nigeria found that area planted to millet was constrained not by land but by available labor during planting time (Roth and Sanders, 1985; Norman, 1977).

Second, given traditional dryland technology, it is questionable whether labor productivity is high enough to permit a wage level commensurate with non-farm employment opportunities. If the crop enterprise is only marginally or erratically profitable, then the development of viable agricultural labor markets may be impeded. This suggests an important relationship between farm technology, labor productivity, and wage levels.

Other related factors constraining labor availability include (1) extreme labor intensity of subsistence farming techniques; (2) rigid labor markets, in which wages do not appear to rise in relation to the estimated marginal productivity of labor during key bottleneck periods (Norman, 1977); (3) urban and foreign migration of working adults; (4) local non-farm employment opportunities; (5) increased school attendence; and (6) large amounts of leisure necessary, due partly to social/cultural factors and to low caloric intake (Lele, 1975).

Factors (2), (3), (4), (5) and (6) each contribute to a recognized inelastic labor supply function in African agriculture (Aboyade, 1985; Delgado and Mellor, 1984; Norman, 1977). Government wage policy and low agricultural labor productivity exacerbate the problem since rapid urban migration is largely the result of wide disparities in urban-rural incomes.[5] The important result is that farm households may not be able to appreciably increase labor input beyond their own internal supply--especially during peak periods (Roth and Sanders, 1985). This presents some important theoretical implications for expected overall production response to changes in agricultural terms of trade. Considering the magnitude of estimated urban-rural income disparities and an inelastic supply of labor, marginal

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[5] Lele (1984) estimates overall rural-urban income disparities to be on the order of 1:4 to 1:9.

improvements in returns to farm labor due to market liberalization may have little effect on the incentives to work in agriculture (Delgado and Mellor, 1984).

3.2.4 The Relationship Between Need for Food Self-Sufficiency and Thin Markets

The objective of household food self-sufficiency is extremely important in shaping farm production and marketing strategies. Rural households will insist on production strategies based on own consumption needs unless they are convinced that specialization in a cash crop will provide a steady and reliable income, and that they will be able to acquire in the market at tolerable prices the food that they will need because they have diverted part of their land and labor resources to cash crops (deWilde, 1980). The fact that most rural households still attempt to satisfy the bulk of their food needs from their own production is both cause and consequence of thin and irregular supplies of food crops in remote markets. Jones (1984) argues:

> If thinly dispersed populations could rely on the market for their staple food supply, they would be more likely to enlarge their production of crops for sale, a first step toward the development of specialized production areas and consequent decline in costs of moving produce to and from farms, thus raising the prices of what farmers want to sell and reducing the prices of what they want to buy (p.126).

This suggests the existence of a vicious cycle in rural agriculture. Thinly traded, volatile markets may entrench the need for household food self-sufficiency, while diversification and non-market oriented cultivation patterns reinforce thin markets. This cycle is particularly important considering the extent to which thin markets and lack of specialization tend to impede productivity and market growth (Raju and Bhatt, 1985).

3.2.5 Credit Constraints

Recent studies in Burkina Faso, Mali, Rwanda, and Zimbabwe (Ellsworth and Shapiro, 1985; Sherman, 1986; MSU-CESA, 1986; Stanning, 1986) indicate that on an annual basis, many rural households in Africa are net grain purchasers. Evidence suggests, furthermore, that the largest quantity of household grain sales--for those who do sell--occurs shortly after harvest when prices are often lowest, while purchases occur primarily during the pre-harvest months when prices are typically the highest. The pattern appears more pronounced for poorer, deficit households than for relatively wealthier surplus families. A significant portion of farm families appear to sell no grain at all, even in relatively good rainfall years. This disadvantageous buy/sell pattern among rural households may be linked to a weak cash flow situation commonly experienced after incurring that season's production costs, and brings into focus the importance of rural financial markets. The problem may be broken into two related components: (1) the ability of existing financial markets to increase agricultural productivity by facilitating credit availability for farmers to purchase inputs; and (2) the ability of farmers to acquire credit in order to avoid disadvantageous buy/sell patterns due to seasonal cash flow constraints.

Regarding the first point, it has been generally believed that traders supplied the bulk of farmer credit for inputs, which is consequently subtracted from the farm revenue upon sale. However, Ouedraogo's study in eastern Burkina Faso (1983) found that only 8% of farmers in a particular study received credit of any kind from traders. In Senegal, farmer access to credit was unavailable because the existing market arrangement had developed no mechanism for sharing risk. Lenders would not provide loans for fear of non-repayment in the event of

crop failure, even when farmers offered to pay back 150% of the original principal.[6]

It is not difficult to imagine how access to credit would be affected if creditors had no legal recourse to the capital of a borrower in event of default. Since lending under traditional market arrangements in Africa frequently puts the major risk burden on the trader, the origin of fragmented and poorly coordinated financial markets may be partially associated with the poor development of risk sharing mechanisms in existing market arrangements. Farmers may not be able to borrow against a project even with very high expected returns if creditors have no protection or recourse; as a result, missed opportunities abound. The consequence of such an institutional failure would be foregone agricultural productivity due to capital rationing not necessarily allocated to areas of highest return.

Concerning the second point, Ellsworth and Shapiro (1985) found that poorer, deficit-prone villages in Burkina were more likely to fit the "sell low, buy high" characterization than more well-off, grain surplus villages. This may suggest that (1) lenders are more willing to provide credit to less risky farmers who have the resources to repay, and/or (2) grain-surplus villages can afford to sell off small quantities of grain directly after harvest to alleviate cash flow constraints, allowing them to wait until prices rise before selling more grain. The poorer villages, on the other hand, represent higher risks of non-repayment and thus are denied credit that would allow them to pursue more profitable buy/sell patterns.

To the extent that these findings are consistent with other areas throughout Africa, grain price increases may have serious food security implications for the large portion of net deficit farmers throughout Sub-Saharan Africa. While it is usually considered that price increases work to the benefit of farmers, this is not

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6 Based on informal observation by Shaffer.

necessarily true for poorer farm households that are net purchasers of food on an annual basis.

What performance results should we theoretically expect from the existence of fragmented, poor risk-distributing traditional financial markets? The above anecdotal evidence would suggest (1) agricultural production patterns constrained by non-optimal capital usage; and (2) depressed rural household incomes due to adverse buy-sell behavior caused by seasonal cash flow constraints. The situation is characteristic of a "social trap": although individual traders and lenders behave rationally and in their best interests given the existing market mechanisms and rules, it produces consequences that constrain overall development objectives.

Yet the flow of causality between performance in rural capital markets and smallholder productivity is not uni-directional. The structure of incentives and constraints that influences the level and variability of rural profits greatly affects the strength and growth of rural financial institutions (Gonzalez-Vega, 1986). Where price uncertainty is high, we would expect the returns to investment in new technology to be quite uncertain as well. Low farm incentives to risk scarce capital on cash inputs with uncertain returns serve to reinforce a low-input, low productivity equilibrium inhibiting surplus production and income growth. Farmers in such an environment cannot be expected to contribute much to the growth of rural capital markets. They will be less willing to borrow and repay loans, and their small and uncertain cash earnings restrict the ability to mobilize a volume of funds necessary for viable financial markets.

3.2.6 Price Instability

Price instability can be considered both between and within years. Also, a distinction should be made between instability and unpredictability. The former includes price movements that are somewhat expected, reflecting, for example, storage costs and inflation. It is unexpected changes in price that cause

unpredictability. Weather, through its effect on production, is probably the greatest single cause of interyear price instability and unpredictability in Africa. Yet price instability is not simply an exogenous factor causing poor market performance; instability is partially a function of the ability of a particular institutional arrangement to transmit relevant information to market participants across different time periods.

Price instability is pervasive in traditional foodgrain markets, both between and within years (Lele, 1976). A large body of empirical data shows considerable variability in the pattern of seasonal price movements, and that this pattern is usually difficult to predict (Table 1.4; also see Lele, 1971; Cummings, 1967; Jones, 1972; Ejiga, 1972). Unpredictability between years is similarly great. Lele (1976) states:

> Even if the traditional markets are reasonably efficient, they may be unable to cope with, and may even exacerbate, the year-to-year instability and uncertainty in the marketed supplies and prices that often result from fluctuations in production....In situations of surpluses, left to themselves, the traditional markets are often unable to dispose of the market arrivals without a major price drop because of the poor transport, storage, and market intelligence facilities with which they operate (p. 490-491).

Although the negative relationship between price risk and agricultural growth is well established in the US (Gardner et al., 1984; Fleisher; 1986; D.G.Johnson, 1947), the impacts of traditional market price movements on farmer behavior in Sub-Saharan Africa are less well researched. Yet scattered empirical evidence does indicate that risk and uncertainty impedes adoption of new innovations among small LDC farmers, with negative implications for production growth (Schluter and Mellor, 1972; Delgado and McIntire, 1982). Lele (1976) points out that the effects of price instability on growth may be especially pronounced when demand elasticity and yield stability are also low--a common condition for staple grain crops throughout Africa. Scandizzo and Bruce's (1980)

survey of demand elasticities for foodgrains in LDCs showed that of 22 studies, estimates for 17 were below 0.5.

Let us examine the effect of price instability more closely from the perspective of the farmer. If price incentives play a role in influencing planting decisions, it is the expected future price--determined at planting time--that is the relevant price. If price expectations were perfect, that is, if the farmer's expected price was identical to the actual spot market price that obtained at harvest, then allocative efficiency is achieved. But in an environment of price unpredictability, the expected prices that motivated farm resource allocation decisions may diverge substantially from the prices that actually prevail several months later at harvest. What can be said about resource allocation in this case? Although the open market mechanism can effectively match supplies of already-produced goods with demand at a given price, it is less effective at guiding production decisions suitable to risk-averse farmers at unknown future prices. Pricing efficiency (as commonly defined) is unlikely to be a sufficient consolation to farmers who, at harvest, face prices below their production costs. The implications for food security are clear:

> Poor farmers cannot afford to invest and specialize when faced with the possibility of prices below their costs of production. Traditional markets do not coordinate production to match future demand at prices uniformly above costs of production....Price uncertainty increases the risks of commercial production and thus reinforces the incentives of subsistence agriculture and reliance on the customary system. It inhibits specialization, investment, and use of technological inputs (Shaffer et al.,1983, pp.8 and 14).

> The relatively low incomes of farmers seriously hamper their ability to shoulder much risk. This implies that adoption of new technology will be much greater if...the risk or standard deviation in returns of the improved technology is the same or preferably less than traditional technology (Norman, 1977, p.87).

These statements clarify the important link between price instability and technology adoption. Subsistence households may understandably commit scarce resources to other activities rather than invest in agricultural technologies with

potentially higher but less stable returns. In such cases it is not unviable technology that impedes productivity gains but rather the risky commodity prices! Again, while traditional markets may be "efficient" in that they equate supplies of already-produced goods with effective demand such that the market clears, they may be less successful at coordinating future supplies with demand at risk levels that provide incentives for farmers to invest in new technology.

In summary, unpredictable prices emit inconsistent and confusing signals to farmers, and increase the risks of producing a surplus for the market. This of course reinforces farmers' reluctance to rely on markets for income or consumption needs, and thus leads to continued reliance on diversification, the persistence of thinly traded markets (low market volume), and correspondingly low productivity at all levels in the production/marketing system.

These conclusions, of course, rest on the assumption that prices in traditional markets are indeed unpredictable. In Chapters 5-7, we attempt to discern to what extent this is true, and if so, what difference it makes for farmer supply responsiveness. Potential measures to deal with the uncertainty problem are suggested in Chapter 8.

3.2.7 Poor Organization of Rural Interests

A further salient feature of smallholder agriculture is the degree to which agricultural interests are unorganized and unconcentrated. To the extent that government policy is influenced by the strength and organization of various political groups (Bates, 1981), farm interests have been largely ignored in government policy formulation. Delgado and Mellor (1984) note that many successful examples of African agriculture (e.g., maize in Zimbabwe, cocoa in Ivory Coast, and tea in Kenya) share two common characteristics: (1) organization of politically powerful lobbies to secure resources and influence policy; and (2)

corresponding heavy state provision of research, extension, infrastructure, and an assured market. (Olson, Aboyade, Hirshman)

3.3 PRIVATE TRADERS

This group consists of the various participants in the distribution chain from rural input suppliers and product assemblers to bulk wholesalers to urban retailers. The following discussion focuses primarily on the first three types of traders, although many points are equally applicable to urban retailers.

Contrary to past stereotypes, numerous studies of grain markets in Sub-Saharan Africa indicate significant competition and relatively free entry (Anthonio, 1968; Bauer, 1963; Ejiga, 1977; Southworth, 1982; Hayes, 1974; Jones; 1984). Most rural traders operate "with small amounts of capital, on low margins, and earn a meager income" (Lele, 1976). Even where large traders do handle a significant share of the market volume, Jones (1970, 1972) found that they had little ability to influence prices unless serious infrastructural inadequacies existed.

Apart from their role of moving inputs and commodities, private traders perform a number of functions that cannot be replaced by governments without great cost. First, they may provide farmers with important credit needs for inputs and consumption. The fact that they can disburse credit in small amounts over wide distances is particularly important considering the substantial administrative costs that would be incurred if government agencies performed the task (Lele, 1976). Moreover, rural traders operate in remote and inaccessible regions again where governments could function only at high cost (Abbott, 1985). For these and other reasons, the question of appropriate roles of public and private sectors in the market system must examine issues wider than simply the physical distribution of goods.

As with rural households, uncertainty is of paramount importance in shaping trader behavior. Uncertainty in traditional agriculture commonly takes the form of unpredictable weather, future supply and demand conditions, opportunistic behavior of trading partners or local officials, parastatal buy/sell behavior, unexpected food imports or food aid, or government trade restrictions--all of which contribute to unpredictable price fluctuations. Other important issues affecting trader behavior include market rules and credit.

3.3.1 Price Unpredictability

Prices are not unpredictable in and of themselves; "unpredictability" implies a lack of knowledge of the multitude of factors that influence price movements. All market participants must deal with an information-uncertainty trade off. Participants need some minimum amount of information on market structure, current and expected supply, demand, and price levels, etc., in order to make production and marketing decisions. But such information is not costless. Arrow (1974) states "if we are going to take informational economy seriously, we have to add to our usual economic calculations an appropriate measure of the costs of information gathering and transmission." These are part of transaction costs.

It is often stated that a main virtue of markets is their ability to translate valuable information in the form of prices. However, in a changing world, such information will be obsolete moments later. Trading has an important temporal element, where what is really desired is a future market price (in relation to the present price) in which future supply and future demand are equated. Unfortunately such markets do not exist in rural Africa.

Due to high price unpredictability in traditional African grain markets, we can infer that information flows are weak and/or information is costly relative to

the marginal improvements in predictability that it provides. What are the sources of these information costs and blockages? Several factors include:

1. poor communication facilities that fail to effectively transmit knowledge of prices, supplies, and policy changes across time and space (Lele, 1976).

2. inadequate transport facilities that cannot prevent surpluses from accumulating in producing areas and shortages in consuming centers after the harvest (Lele, 1976).

3. lack of standard weights, measurements, and grading to facilitate trading by description instead of by inspection.

4. inability to obtain future information about the weather.

Although traders may profit from better-than-average information in uncertain environments, price volatility creates many of the same problems for them as it does for rural producers. Risks increase, and with them, the costs of trading.

For example, uncertainty regarding the future harvest creates incentives for farmers (who are able) to store grain supplies sufficient for household consumption needs, marketing the residual only when incoming information suggests that the harvest will be good enough to renew next year's household consumption requirements. The macro consequence of many small farmers selling off stocks due to anticipation of an abundant harvest has the effect of depressing prices before harvest, increasing both the riskiness of grain storage and the volatility of grain prices (Shaffer et al., 1983). Hence, even though households may behave rationally given the extent of available information concerning future supplies and prices, their behavior may produce externalities by shifting risks and costs onto those serving the socially valuable role of storage.

Such occurrences may help to explain the seemingly high profits of grain speculators given storage costs in normal years. High risk premiums may be necessary to compensate for the high incidence of loss incurred by traders

engaging in temporal arbitrage (Lele, 1971; Ejiga, 1977). It is assumed that the more unpredictable are prices, the higher will be the risk premiums that traders implicitly charge to cover the risks of grain storage. But risk premiums are a form of deadweight loss--they create an additional cost from which there is no return.

Price unpredictability affects market coordination and trader behavior in other related ways. Among them are:

1. "wrong" information: where market information is either costly or impacted, the probability increases that participants will make mistakes, i.e., allocate resources given expected future prices that do not actually occur. Price unpredictability, caused by both exogenous and endogenous factors, might be expected to increase the difference between expected and actual future prices, and thus distribute "wrong" information to other market participants. Viewed in this way, poor market information is an externality of the market process; it causes participants who base their own planning decisions on prevailing signals to make mistakes (Dalziell, 1985). Consequently, mistakes of market participants resulting from "wrong" price signals raise the potential for poor resource allocation and thus a loss of output from a given bundle of resources (D.G. Johnson, 1947).

2. depressed rural incomes: as shown above, there appears to be a positive correlation between the degree of price uncertainty and the risks of engaging in grain storage. If price unpredictability is too great, the risks of storage become so high as to prohibit grain storage, especially if the risk premium necessary to give incentives to speculate results in a price that shrinks quantity demanded. It is conditions such as these that cause markets to break down, or preclude markets from forming in the first place. Since viable markets are central to breaking out of subsistence patterns and generating an agricultural surplus, behavioral responses to price unpredictability have serious consequences for both production growth and rural incomes.

3.3.2 Market Rules

Many important subsidies (incentives) and tariffs (disincentives) in agriculture operate not by means of direct price manipulation but through more subtle changes in market rules and exchange arrangements that alter market prices. Yet little attention has been devoted to how production growth is affected by high transaction costs of exchange across traditional small-scale markets (Bromley, 1986). Such costs may take the form of (1) obtaining market

information to guide decision-making; (2) search and product screening costs; (3) bargaining costs; (4) costs of guarding oneself against potential opportunistic behavior of a trading partner; or (5) costs of taking recourse in event of contract violation (informal or formal)--all of which are associated with the degree of development of market rules.

The essence of market rules is to provide a predictable structure within which exchange activity may flourish (Bromley, 1986). Many of the costs listed above are inversely related to the degree of predictability regarding the actions of other market participants.[7] Market coordination thus depends on a set of well-defined rules and conventions which provide participants with reasonable assurances regarding the behavior of others (Bonnen, Eicher, and Schmid, 1962).

The void of critical market rules and institutions for providing such a stable business environment are very apparent in Africa. Lack of grades and standards raises transaction costs by forcing buying by inspection instead of by description (Shaffer, et al., 1983; Abbott, 1985). Rules governing risk sharing are frequently poorly developed, and may thus frustrate potential transactions. Poorly defined laws or the inability to enforce them increase participants' vulnerability to opportunistic behavior of others. This results in higher transaction costs and uncertainty, factors which have been shown above to contribute to market failures.

Market rules influence in a very significant way the costs incurred by participants engaging in market transactions. Therefore, the prospects for the growth of markets require the development of rules and arrangements which

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7 "Participants" here is defined broadly to include not only those participating directly in market transactions but also those affecting the opportunity sets of market actors, such as public administrators, the police, army, etc.).

provide a predictable market environment to reduce the costs of trade that currently frustrate market transactions.

3.3.3 Credit and Financial Constraints

The structure of rural economies presents a number of constraints impeding the development of viable financial institutions. First, potential depositors and borrowers are geographically dispersed. Second, to the extent that smallholder enterprises are subsistence rather than cash oriented, their potential for savings and investment are limited. Their financial transactions are numerous and small. These factors produce very high transaction costs that reduce both the demand for and supply of financial services (Gonzales-Vega, 1986).

> Potential depositers find that transaction costs reduce the net returns on financial savings, while potential borrowers find that the costs of loans are high when non-interest transaction expenses are added. Lenders perceive the costs of managing numerous small, diverse producers to be high, given the scarcity of information and the nature of the risks involved (p. 16).

Thus, the development of financial markets is impeded by high risks and transaction costs, failure to exploit economies of scale, poor information flows, and inadequate market rules and means of enforcement--all of which are pervasive in most areas of rural Africa.

3.4 URBAN CONSUMERS

This group is comprised of millions of geographically concentrated urban workers, government-employed cadres, private entrepreneurs and businessmen, military units, and the large minority of marginally or unemployed people in African cities. The urban sector presently accounts for about 20% of Africa's total population (IBRD, 1986) and, due to urban migration and growth, is expanding rapidly.

As with rural households, uncertainty pervades the environment of urban consumers. Studies of retail grain markets reveal a great deal of variation in the magnitude and timing of intra-seasonal price movements (Sahn and Delgado,

1985), which carries with it obvious food insecurity implications. The urban poor, whose food bill often accounts for 60-80% of total income (Luqmani and Quraeshi, 1984), are particularly vulnerable to supply shortages and price fluctuations. Lacking adequate storage facilities or the funds to accumulate yearly grain supplies, urban consumers are largely dependent on an unstable market for their food needs.

There are reasons to believe that rural and urban households are not affected equally during years of production shortfalls. If, for example, national grain production declined 5%, evidence suggests that the rural sector--which consumes 80% or its of theor own production--attempts to maintain normal consumption levels as far as possible (Lele and Candler, 1981). Thus a 5% drop in total production may induce a decline in quantity marketed on the order of 25% (Table 3.1). The impact of this event on urban consumption patterns would most likely be great. The urban sector normally carries a powerfully concentrated voice, and its dissatisfaction has often been a prelude to political instability. Considering the recent events in Tunisia (1984), Morrocco (1983), and Sudan (1985), it is understandable why so many African governments have become actively involved in food distribution to assure adequate, low-cost supplies for the urban sector.

Discussion of urban consumers will be reconsidered in more detail in the following chapter. This is due to the effect that government policies have on urban food security. Also, consideration of parastatals and direct national government involvement in agricultural markets implies, by definition, an administered market setting. Therefore, these participants are addressed within the context of administered markets in Chapter Four.

Table 3.1

Percent Changes in Annual Maize Production and Marketings

Kenya, Zambia, and Zimbabwe

	Kenya		Zambia		Zimbabwe	
	% change from previous year					
Year	prod	mkt'ings	prod	mkt'ings	prod	mkt'ings
1966	-	-	-	-	-	-
1967	14.2	69.9	-1.2	-1.5	68.7	66.9
1968	12.5	42.5	-8.2	-32.5	-47.4	51.6
1969	-2.0	-9.3	0	2.7	97	126.6
1970	-12.5	-33.6	-16.7	-50	-37.7	-34.6
1971	7.1	23.7	42.8	190.9	57.9	77.1
1972	-13.3	57.9	2.4	52.6	44.8	25.9
1973	30.8	20.8	-15.8	-31.9	-57.3	-60.7
1974	-5.9	-26.8	32.8	47.4	118.5	143.1
1975	0	34.5	-10.5	-4.9	-16.6	-24.7
1976	18.7	23.5	12.6	34.2	-1.9	-4.8
1977	15.5	-2.5	-8.4	-7.2	-3.0	-1.9
1978	.5	-21.7	-3.1	-16.4	-2.5	-6.8
1979	-14.4	-44.0	-26.3	-42.3	-28.2	-41.6
1980	-23.5	2.5	14.3	14.0	40.1	60.0
1981	20.7	79.5	50.7	80.9	70.3	145.8
1982	25.7	36.1	-19.1	-14.9	-35.4	-30.9
1983	6.4	4.4	3.6	-10.3	-42.7	-55.4

Source: Shapouri et.al., 1986, pg. 31.

3.5 SUMMARY

The preceding conceptual discussion has identified salient environmental constaints within traditional African market systems, as well as how these constraints affect behavior and, ultimately, market coordination in the aggregate. I have attempted to show how, given these environmental barriers, market participants may act rationally given the extent of available information, yet adopt behavioral patterns to deal with these constraints in such a way that can stunt investment, innovation, and growth in foodgrain production. A structure of incentives emerges in which participants limit their exposure to risk and uncertainty be attempting to reduce reliance on markets. This, however, perpetuates other undesirable conditions which further promote environmental uncertainty, in a mutually reinforcing pattern. Without viable mechanisms to shift or reduce risk between actors or across time periods, policies stressing a simple desire for "letting markets work" are likely to be inadequate (Newbery and Stiglistz, 1981). Moreover, uncertainty and environmental barriers create transaction costs that reduce incentives to trade, impeding the development of markets. The interrelationships between such environmental constraints and market outcomes are schematically depicted in Figure 3.2.

Loosely following the diagram, this chapter concludes with a summary of generalized observations regarding traditional market systems in Sub-Saharan Africa:

1. Substantial unpredictability and uncertainty regarding product and input prices, input availability, weather, etc., resulting in risk-averse, innovation-impeding behavior.

2. Such risk-averse behavior reinforces subsistence agricultural patterns and associated thin market problems. Thin markets, beside burdening economic exchange with high per unit marketing costs and poor information flows, perpetuate household efforts toward internal food self-sufficiency. In this way, thin markets and lack of specialization are mutally reinforcing.

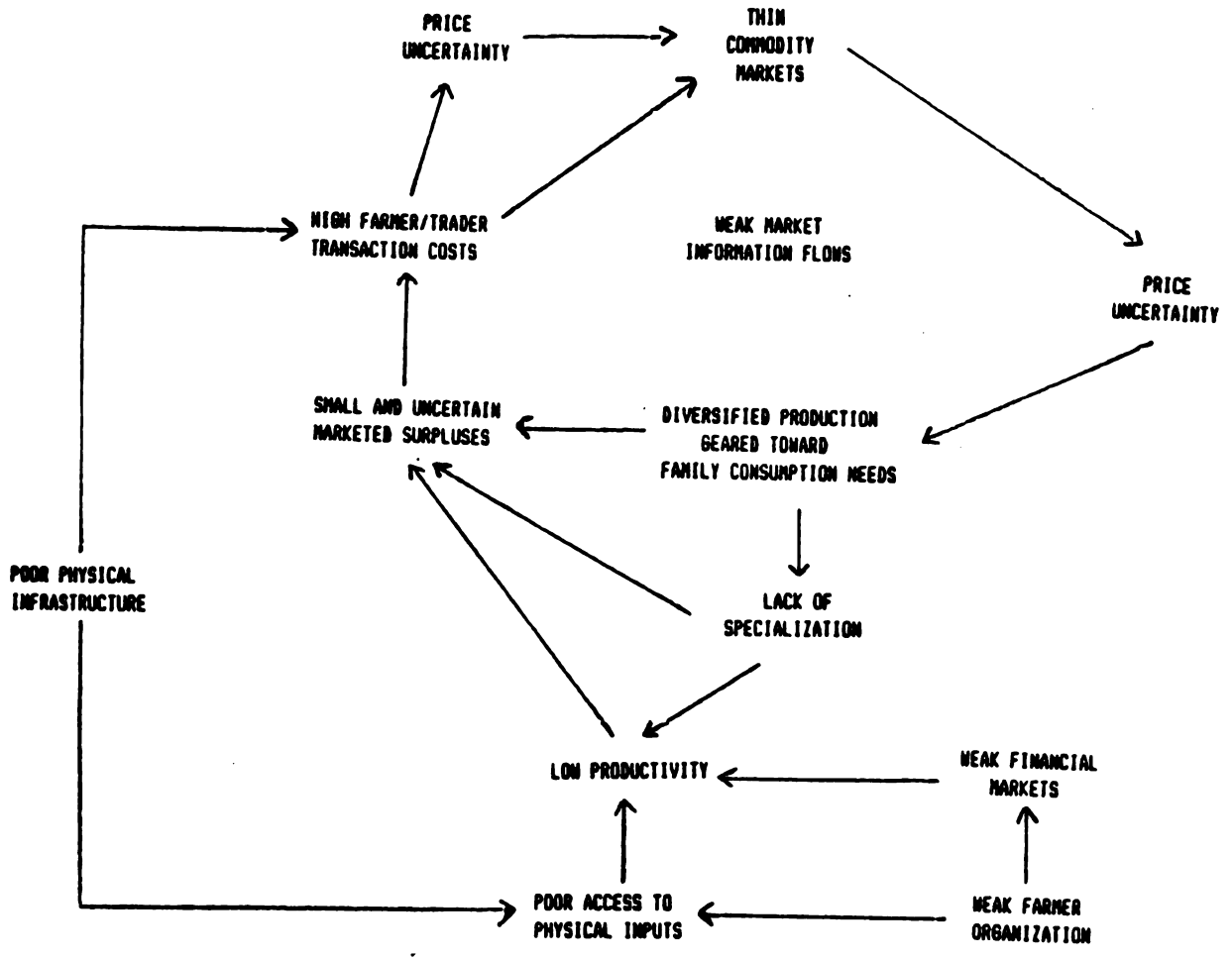

Figure 3.2

Relationship Between Environmental Constraints and Market Coordination

3. Dispersed and atomistic production units, which hinder market access and the achievement of economies of scale in search and negotiation costs that might otherwise reduce farm production costs and raise farm product prices. Atomistic farm organization also limits the potential to exploit efficiencies of scale in input procurement.

4. Identification of agricultural labor as an often limiting factor of production in African agriculture. In addition, it is generally recognized that the supply of farm labor is quite inelastic. These two factors, when considered in conjunction with a severe urban-rural income disparity, suggest the limitation of price liberalization policies to stimulate agricultural production.

5. Financial markets which do not necessarily allocate credit to their most productive uses, but rather on the basis of likelihood of repayment. Also, interest rates, although not producing excessive profits for lenders (due to high incidence of non-repayment), may be very high from the standpoint of individual farmers. Lack of adequate risk sharing mechanisms may be partially responsible for poor performance in rural financial markets.

6. Poorly developed system of market rules. Undeveloped rules heighten risk and unpredictability as to the behavior of trading partners. Such unpredictability greatly affects the cost of exchange across markets, and if prohibitively high, precludes markets from forming in the first place.

7. Seasonal cash flow constraints which force some households to sell grain during post-harvest periods characterized by low prices, and buy grain during the lean season when prices are high. This problem varies among farmers depending on farm size, weather region, production techniques used, degree of reliance on markets for food needs or cash income, etc.

8. Poor organization and bargaining power of rural farmers. Poor farmer organization leads to low-productivity agriculture for two reasons. First and most directly, access to inputs is more difficult without an effective farm voice; also, per unit costs are higher without a specialized input procurement channel that producer organizations may provide. Second, farmer organizations may facilitate the coordination of aggregate farm production and provide more certainty regarding future market conditions. Given the relationship between uncertainty, risk-averse subsistence farm patterns, and low-productivity, lack of effective farmer organization may significantly impede production growth.

Chapter 4

CONSTRAINTS AND COORDINATION PROBLEMS IN ADMINISTERED EXCHANGE SYSTEMS

4.1 INTRODUCTION

African governments participate extensively in agricultural markets; in this regard, they do not differ from their American, European, and Asian counterparts. Administered markets, as previously described, are characterized by some degree of direct public participation in the pricing and distribution of agricultural commodities. In Africa, the dominant vehicle through which governments conduct these activities is the parastatal.

Abbott and Creupelandt (1966) define parastatals (or marketing boards) as "public bodies set up by government action and delegated legal powers of compulsion over producers and handlers of primary or processed agricultural products." In the same paper, the authors distinguish between six different types of parastatals, although only two figure prominently in the landscape of African foodgrain markets. They are:

1. Boards stabilizing prices on domestic markets by trading alongside private enterprises; and
2. Monopoly trading and price stabilizing boards for domestic crops.

The distinction between these two types of parastatals is, in reality, less clear than implied above. This is because of the difficulty in preserving the statutory monopoly status of the latter type. Governments have had much trouble

suppressing existing parallel markets, although they have often increased the costs of such private trade. Therefore, in practice, parastatals must usually reckon with the existence of a competing informal distribution system (Mackintosh, 1985; Lele and Candler, 1981; Berg, 1986).

For the purposes of this analysis, these public trading enterprises are distinguished from national government in order to separate commercial marketing practices on the one hand from national politics and policies on the other. Although parastatal practices and national government policies are intimately linked, the distinction is analytically a step forward for clarifying participant objectives and the sources of coordination problems.

The remainder of this chapter explores the relationship between parastatal activity and the objectives and opportunity sets of major market participants, organized as follows:

-- Government objectives and the extent of parastatal commercial autonomy;

-- Effects of parastatal activity on farmer decision-making and welfare;

-- Effects of parastatal activity on trader decision-making and welfare;

-- Technical and logistical constraints associated with parastatal operation and management.

The chapter concludes with a summary of major constraints and coordination problems associated with administered exchange systems in Sub-Saharan Africa.

4.2 GOVERNMENT OBJECTIVES AND THE EXTENT OF PARASTATAL COMMERCIAL AUTONOMY

4.2.1. Government "Interference"

Parastatals "are subordinate organizations, and their top officials must accept instructions from above, that is from a minister, the cabinet or the president, depending on the political situation in the country concerned" (Hesp and van der Laan, 1985). Of course, ranking parastatal officials may have considerable influence in their own right, owing to close relations with key

government members. Still, in principle, the responsibility for national policies is borne by the government, and parastatal managers' tasks are confined to the implementation of these policies (Hesp and Van Der Laan, 1985).

This point must be kept in mind when evaluating the performance of parastatals. A great deal of the criticism vented toward parastatals is grounded in their frequent inability to perform functions and objectives as stated in their enabling legislation. It is questionable, however, whether such shortcomings are due mostly to the commercial failures of parastatals themselves or due to the overriding interference of national governments pursuing their own objectives, using the parastatal as an instrument. In such cases, the discussion can be greatly clarified by directing the criticism at the government and not at the parastatal (Hesp and Van Der Laan, op cit).

4.2.2 Government Price Determination

The prices at which foodgrain parastatals sell are usually set by the government.[1] The correlation between urban consumer welfare and political stability motivates governments to set a low consumer price, i.e., low in relation to unofficial market prices (Bates, 1981). This leaves the government with two possible options: (1) set an equally low producer price to allow a realistic trading margin for the parastatal; or (2) cover the parastatal's trading deficit from the national budget. The first option, ceteris paribus, usually reduces total official marketings, gives rise to heavier parallel market trading, increase grain outflows to neigboring countries, and reduces ability to maintain adequate supplies in urban areas at controlled prices. The ability of governments to maintain target consumer price levels is contingent on access to sufficient supplies; such access is

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1 A noteworthy exception is Zimbabwe, where strong producer lobbies, formed originally by white Rhodesian farmers, have some degree of influence over price setting. More on this in Chapter 6.

dampened by a low producer price policy (Hesp and Van Der Laan). Importation of grain is one alternative, but this also presents problems which are discussed in part 4.2.4 below.

The second option amounts to an income transfer to consumers of officially procured grain--predominantly urban dwellers. The ability of financially constrained African countries to sustain high deficit-generating parastatal operations is dependent on their ability to tax other groups (usually farmers) or on donor largess. Neither are regarded as particularly desirable means to promote agricultural development.

4.2.3 National Grain Reserve

Perhaps the greatest perceived imperative for direct public participation in foodgrain marketing revolves around the issue of a national grain reserve. Such reserves primarily address the issue of transitory food insecurity, yet their impact on market coordination requires attention here.

In most cases, official grain trade is only the visible portion of a much larger total trade (Lele and Candler, 1981). Despite the tendency for consumers to view governments as responsible for national food security, the public sector is unable to control large components of the food distribution system. Considering the supply and price fluctuations inherent in traditional informal markets, strong pressure exists for governments to assure adequate year round supplies of low-cost food, especially in urban areas (Bates, 1981). In such an environment, official food and/or financial reserves are probably necessary (Lele and Candler, 1981).

Moreover, the consumption of grain, which is presumably constant throughout the year, is temporally uncoordinated with production, concentrated during one or two annual harvest periods. Although private intra-seasonal storage will exist given the proper incentives, the manner in which stocks are released throughout the year may not be consistent with government objectives. This may

be illustrated by an example given previously: in the event of a drought year, evidence suggests that rural farm households attempt to maintain normal consumption levels by decreasing marketed grain sales (Lele and Candler, 1981; Shapouri et al.,1986). Because of this, a moderate decline in total production may likely cause a sharp drop in marketings to urban areas. Thus, the allocative patterns resulting from private spatial and temporal arbitrage may be at cross purposes with government objectives for urban food security.

Hence, the uncertainty regarding a potential shortage exerts strong contingencies upon governments to create an annual national reserve. The question is, should this be done by (1) directly participating in the pricing and distribution of foodgrains, with its attendant problems mentioned above, and/or (2) reliance on international markets for grain through importation to assure adequate urban and/or national supplies during periods of domestic shortfall. Coordination problems associated with the former option are discussed in detail in sections 4.3 through 4.5. The question of importation is briefly addressed here.

4.2.4 Grain Imports and Food Aid as Means to Maintain Low-Price Food Policy

The main rationale for importing grain is that the local supplies through official purchases are too small to match urban demand at the desired consumer price--generally a subsidized price (deWilde, 1980). Only through the supply management potential afforded by importation may governments hope to sustain artificially low consumer prices. However, an increasing number of African states, especially those in the Sahel, cannot afford the required quantities on a commercial basis, and thus become dependent on food aid (Shapouri et al.,1986).

This is where the long-term repercussions of short-term food security policy objectives come to the fore. Several scenarios are likely:

1. Low Consumer Price--Low Producer Price: Importations and food aid help preserve low retail prices. However, in the absence of a viable targeting mechanism, consumers of all income classes are subsidized, requiring large budget outlays to sustain such a policy. Injections of imported grain also

lead to depressed prices in the market (Fisher, 1963; Maxwell and Singer, 1979), depending on the proportion that such injections constitute in domestic market volume.

In fact, imports and food aid have assumed sizable proportions in recent years for many Sub-Saharan African countries (Table 4.1); annual growth rates of commercial food imports and food aid in a study of 11 countries from 1966-83 averaged 6.3% and 17.1% respectively. The ratio of cereal imports to domestic cereal production grew from 8.7% in the late 1960s to 18.7% in the early 1980s (Shapouri et al.,1986).

Yet these figures underestimate the impact that food aid may have on domestic prices since in primarily subsistence economies, prices are determined by marketed supplies, not total availability. Analysts generally agree that throughout Africa, smallholder marketings rarely exceed 20-25% of their own production, and are usually much less (Humphreys, 1986; Berg, 1986). Thus, imported food's share of total supply in these countries can be quite high. Since demand elasticities for staple grains appear to be quite low in most developing economies, small changes in supply caused by imports or food aid may greatly affect producer prices and cash incomes.

Long run consequences of subsidized urban food prices may be depressed agricultural incentives, increased disparity between rural and urban living standards, accelerated urban migration and budget deficits. Imports and food aid clearly serve important short term need, yet governments may find that without the stimulus of yield-increasing technologies, increasing reliance on food imports may be a cause as well as a result of a stagnant agriculture.

2. Low Consumer Price--High Producer Price: The main difference here is that the government alleviates the adverse impact on farmers resulting from food imports by offering a high producer price through the parastatal. This strategy protects both the producer and the consumer, but leaves the parastatal with an unreasonably small trading margin, with the government invariably shouldering the deficit. The small margin, furthermore, tends to squeeze the private sector out of the grain trade, since they cannot compete within the narrow price spread of the parastatal. This increases even further the burden of distribution on the public sector (Sahn and Delgado, 1985). The magnitude of subsidies required may be prohibitive in the long run.
3. Rationing of Low-Price Food: One method to minimize the drain on the treasury involves the rationing of low-priced grain. However, in most of Sub-Saharan Africa only simple forms of rationing are possible. The most common form amounts to allowing right of access to certain privileged groups (e.g., civil service, military, etc.). This effectively divides the urban population into two groups: those special interest groups who receive grain at controlled prices, and the others who must resort to higher priced goods in parallel markets for consumption needs (Hesp and Van Der Laan, 1985). The polarization of privileges often generates resentment with political repercussions (Bates, 1981).

In addition, each of these scenarios produce serious macro side-effects. First, the importation of subsidized rice, wheat, and maize into urban areas tends to shift consumption patterns toward these foods and away from non-subsidized, local crops such as cassava, millet, and sorghum. Where the latter is cheaper to

Table 4.1

Food Import Dependence Trends, Selected African Countries 1966-83

Country	annual growth rates of: food aid	annual growth rates of: commercial food imports — volume	annual growth rates of: commercial food imports — value	ratio of cereal imports to cereal production — 1966-68	ratio of cereal imports to cereal production — 1981-83
	percent			ratio	
Ethiopia	24.1	5.9	15.28	0.01	0.02
Kenya	6.5	13.8	9.67	0.01	0.08
Lesotho	8.7[a]	12.0	20.36[d]	0.14	1.18
Mali	9.5[b]	12.8	15.33	0.01	0.09
Mozambique	9.0[c]	7.3	na	0.08	0.37
Niger	8.3[b]	15.0	22.8[e]	0.01	0.07
Senegal	7.2	4.0	10.85	0.33	0.55
Somalia	34.2	10.8	19.46	0.14	0.65
Sudan	18.6	-1.6	13.19	0.1	0.04
Zambia	40.8	6.7	6.77[f]	0.07	0.16
Zimbabwe	na	-5.6	na	0.06	0.02

a 1972-83
b 1969-83
c 1976-83
d incomplete data series, 1966-80
e incomplete data series, 1968-80
f incomplete data series, 1969-81

Source: Shapouri, Dommen, and Rosen (1986), Tables 3, 15, and 16; pp. 8, 38.

produce, this "crowding-out effect" has an economic cost (Cleaver, 1985; OTA, 1986). Local producers are hurt to the extent that demand for local crops declines. Farmers' ability to shift production to reflect changes in consumer preferences is limited due to specific agronomic requirements of rice, maize and wheat. Worst of all, the country becomes more dependent on external sources of food and less able to feed itself through domestic production.[2]

Second, cheap urban food supplies coupled with depressed agriculture and high urban wages produce large disparities in rural-urban standards of living (Delgado and Mellor, 1984).[3] This tends to accelerate urban migration, pulling labor--often the key limiting resource in Sub-Saharan Africa--out of agriculture. As discussed in Section 3.3, seasonal labor shortages in many farming systems throughout Sub-Saharan Africa have proven a significant factor in the decline of food production (Delgado and Mellor, 1984; Eicher and Baker, 1982; Christensen et al., 1981).

Third, if government imports are poorly-timed, this adds confusion to market price movements, makes private storage more risky, and raises overall marketing costs. In order for government to effectively manage a low-price policy, importation must coincide with periods of low stocks, and in the right amounts. Since the level of stocks are partially a function of up-country parastatal purchases, a great deal of market intelligence gathering is required, as well as local ability to obtain and interpret the data. If constraints on government

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2 Per capita food production in Africa has been declining at an average annual rate of about 2% since 1970 (Aboyade, 1985), while food imports have been rising over 15% per year since the mid-1970s (Shapouri et al.,1986; Lele, 1984).

3 Lele (1984) estimates that rural-urban income differentials are on the order of 1:4 to 1:9 in Africa.

limit its ability to obtain and interpret market information for policy purposes, it could exacerbate coordination problems instead of reduce them.

Concluding remarks on this issue are forcefully put by Timmer (1985):

> Many countries start from an environment for food price policy that uses food imports and budget subsidies for across-the-board consumer protection, while a host of production-oriented government projects attempt to increase food output. Such a price policy/project orientation is backwards....Reforms come eventually because serious macro distortions bring enormous pressures for macro-policies more consistent with real scarcity values in the economy. Either external creditors--the I.M.F., World Bank, bilateral donor agencies, or the multilateral commercial banks--bring these pressures to bear and force the painful adjustment when a crisis is reached, or else a country's macro policy makers stay ahead of the situation and design new policies that avert a crisis (p.35,36).

4.3 EFFECT OF PARASTATAL ACTIVITY ON FARMER BEHAVIOR AND WELFARE

Numerous studies have made it abundantly clear that rural smallholders respond to incentives. Yet market prices are but one factor which influence farmer decision-making, such as the choice of distribution channel through which to sell his/her surplus. The amount sold through official channels is a function of:

1. accessibility of the official buying station: some studies have shown that farmers pay up to one-third of the producer price in order to deliver their goods to the buying station (Blackie, 1984; Reynolds, 1981; Shapouri et al.,1986). Licensed buying agents have been used in some countries to take this burden off farmers, but the service must still be borne out of farmers' revenues (Hesp and Van Der Laan, 1985). Some goverments such as Zimbabwe have attempted to improve market access to smallholders by expanding its buying station network into more remote areas. Unfortunately, the public costs of providing favorable market access throughout the country cannot be ignored. Improving equity of market access to farmers usually comes at the expense of higher budget outlays (Blackie, 1984).

2. Terms of payment used by the parastatal: more often than not, payment is delayed (Lele and Candler, 1981) and/or requires cumbersome procedures (Berg and Belot, 1985).

3. Grading and weighing procedures: farmers' vulnerability to parastatal employees' opportunistic behavior is great. Charges of dishonesty and cheating are repeatedly made (Hesp and Van Der Laan, 1985). Since farmers have usually spent a non-negligible amount of effort and money to bring their goods to the station and must incur more costs if no exchange is made, a position of unequal bargaining power results in favor of the buyer. Though parastatal management may take steps to alleviate this problem, up-country inspection and enforcement are difficult.

4. Quality of services given by the buyer: in some cases, parastatals make access to seed and inputs for the next season contingent on marketing farm output through official channels (Morris, 1986).

5. Relative prices in the official and unofficial market: Economists have tended to focus on this variable as the main determinant of smallholder sales behavior. Yet there is no clear correlation between changes in official prices and changes in production (Mackintosh, 1985). Increased official purchases in response to a raised producer price may simply indicate a shift in farmer marketings from informal to official channels. In cases where low producer prices prevail and the risks of trading on illegal informal markets are high, farmers may change production patterns to reduce their contacts with the parastatal. An interesting exception may occur if environmental or other reasons limit the ability to grow other crops; in such cases farmers may be forced to sell more to the parastatal despite depressed prices in an effort to maintain previous household cash income levels (deWilde, 1980).

6. Level of unpredictability in official and informal markets: traditional informal markets are characterized by price unpredictability. The logic of parastatals is to provide more certainty regarding planning and coordination. Government floor prices provide an advantage to farmers because they reduce price uncertainties. For this reason, producers have more knowledge on which to base production decisions. These results actually hold only if two conditions are met: (1) the parastatal announces prices before the planting season, and (2)the parastatal actually follows through with its commitment to honor all exchanges at the specified price. In years of bumper harvests corresponding with a fairly high producer price, governments may be unable or unwilling to buy all the grain offered to it (Lele and Candler, 1981).

4.4 IMPACT OF PARASTATAL ACTIVITY ON TRADER BEHAVIOR AND WELFARE

In the course of previous sections, some effects of administered market arrangements on trader decision making have been discussed. These are briefly reiterated within a more complete list here:

4.4.1 The Effect of High Government Subsidies on Private Trade

If governments set consumer prices too low and/or producer prices too high, trading margins for private merchants may become prohibitively small. This effectively squeezes private traders out of operation, and thus puts even greater marketing responsibilities and finanicial burdens on the government (Sahn and Delgado, 1985).

4.4.2 Pan Pricing

Pan-territorial pricing refers to the policy of standardizing prices throughout the country irrespective of market access or transport cost differences associated with different locations. In some ways, a uniform price may be politically appealing since it treats all farmers in all locations equally. It may contribute to nation-building objectives of a government. Parastatals may also favor pan-territorial pricing for logistical reasons, as it simplifies dealings with cooperatives, buying agents, and transporters (Hesp and Van Der Laan, 1985).

Yet pan-territorial pricing encourages production increases in remote regions relative to informal market arrangements by deliberately neglecting consideration of the increased transportation costs in these areas in the buying price (Mackintosh, 1985; deWilde, 1980). Consequently, private traders will reduce operations in these areas; the burden is transferred to the parastatal with associated increases in transport costs.

Pan-seasonal pricing, likewise, entails holding prices fixed throughout the year. Resulting price certainty can aid farmers' and consumers' planning decisions--if the scheme can actually be implemented. Again however, the costs to the national budget are much larger than if prices were allowed to vary according to spot market conditions. Without intraseasonal price rises, incentives for both farmers and merchants to store grain are dampened. Countless arbitragers are forced to seek other forms of livelihood. The whole burden of storage is borne by the government.

These results hold, of course, only if the government has adequate resources to maintain a pan-pricing policy. If it lacks the buffer stocks, the budget, or management capabilities to administer such a policy but tries anyway, the benefits of an effective market mechanism and greater price predictability afforded by stabilization policy are both destroyed. These implications suggest a

number of important prerequisites to an effective government stabilization policy: (1) market price gathering and forecasting must be timely and accurate; (2) procurement and sales operations must be well-timed; and (3) government's capacity to successfully moderate price swings must be high to establish credibility among market participants. Sahn and Delgado (1985) conclude that "in the absence of such conditions, government interference in markets will undoubtedly only increase speculative behavior and exacerbate abrupt seasonal price changes.

Even if the plan could actually be implemented, the question arises: are the political benefits and improved price certainty that result from pan pricing worth the added economic costs incurred? Many economists have given their opinions on this, but rarely has the evidence been so clear as to give them much weight. While information on the operating and investment costs of a pan-pricing scheme would be difficult but technically feasible to obtain, an assessment of the benefits would simply be guesswork since it requires knowledge of smallholder behavior that is presently unknown. Specifically, how will their production/marketing/technology investment decisions change over the medium and long terms in response to reduced price risk? How would this affect farm productivity, cash incomes, effective demand, prices, and--coming full circle--production and marketing decisions again?

4.4.3 Effect of Parastatal SOPs on Credit Repayment

Potential problems arise when farm credit disbursement and commodity sales are not coordinated through the same channels. For example, when grain export prices are relatively low, parastatals may not wish to store large quantities of grain above domestic consumption requirements. In such cases, the government may wish to close the markets when it has acquired enough stocks. Creditors however are particularly concerned about repayment, and may fear that late

sellers cannot market their crop except at distress prices. Default becomes more likely under these conditions (Lele, 1975).

This example illustrates that government efforts to reduce coordination problems among actors may actually exacerbate them without the administrative expertise necessary to carefully weigh the multifaceted effects of direct government involvement in agricultural marketing.

4.5 TECHNICAL AND ORGANIZATIONAL CONSTRAINTS

Administered marketing systems present policy makers with a broad set of problems performed automatically by informal market exchange. These "technical" constraints affect all market participants either directly or indirectly, and have been divided into the following components: (1) information requirements, (2) physical infrastructure/logistical constraints, and (3) organizational slack.

4.5.1 Information Requirements

Although imperfect, traditional markets provide a mechanism for clearing the supply of already-produced goods with prevailing demand. The process of spot trading between participants generates crucial knowledge in the form of prices. When such price discovery mechanisms are replaced by administered pricing arrangements, market clearing is no longer assured. Governments must acquire needed information on current and expected supplies, demand, prices, and quantity and location of surpluses and deficits in order to coordinate market activities and avert perpetual glut and shortage conditions.

There is much evidence indicating that many African governments in their present state lack the capacity to obtain and process market information sufficient for guiding centralized price policy that coordinates markets on a macro level (Jones, 1984). Local crop reporting services and donors often provide widely divergent production estimates (Lele and Candler, 1981; Jones, 1984),

producing potential problems for those using such information to guide decision-making.

4.5.2 Logistical Constraints

It is widely recognized that per unit marketing costs are higher in Africa than most Asian countries. In part, this is due to lower volumes of trade over longer distances (Ahmed and Rustagi, 1985). One would assume that these higher costs would apply equally to public and private sector alike. In fact, publicly procured grain is sometimes transported from rural areas to urban warehouses, and then distributed back to remote areas later in the season. This circuitous grain movement is often due to centralized processing and storage facilities, and has been shown to add significantly to overall marketing costs (Child, Muir, and Blackie, 1983).

The physical distribution of foodgrain and inputs to millions of geographically dispersed consumers and producers is an enormous task. Regional food security critically depends on viable distribution channels to all regions to provide profitable market access for surplus areas as well as to reliably supply food to remote deficit areas. Beyond the demanding management and analytical requirements, government transport, processing and procurement resources must be sufficient to adequately substitute for "the myriad of simultaneous equations" which are normally solved in the marketplace. Without such resources, government stabilization policy will be ineffective, increasing rather than reducing the risks and costs of trading and storage by the private sector.

4.5.3 Organizational Slack

Under the discipline of competitive private markets, the threat of failure generates strong incentives to streamline costs and develop market access. On the other hand, the government treasury generally supports its own bureaucracies no matter how they perform.

In large part, the origins of bureaucratic slack are due to an incomplete contractual relationship between individual and agency (Leibenstein, 1979). Although salaries of workers and administrators are specified, their expected "output" is not. This removes much of the motivation and commitment required of public administrators to successfully implement parastatal pricing and marketing operations. An environment of excessive organizational slack invariably hampers public sector performance.

Beyond lack of positive incentives, bureaucratic behavior can be strongly affected by well-established socially-negative incentives. If opportunism pays, opportunism will flourish. The typically high degree of corruption, diversion of goods meant for public distribution, nepotism, and other practices suggest that individual incentives and ostensible agency goals are somewhat inconsistent, and that sanctions against socially destructive behavior are weak and ineffective. This reflects shortcomings not only of intra-bureaucratic policing, but also a failure of institutional design.

4.6 SUMMARY

This chapter has highlighted several key constraints within the environment of administered exhange systems. The effects of these constraints on behavior and market coordination are summarized here:

1. Governments' desire for political stability often requires a price policy and distribution structure inconsistent with maximizing long-run agricultural production growth, at least in the short run. Some analysts use this as evidence of government inefficiency, calling for reduced intervention in agricultural markets. Yet political stability is part of any conducive market environment, and government's desire for stability must be regarded as a legitimate concern to be factored into any realistic policy perscription.

2. Grain marketing parastatals must invariably deal with the existence of parallel market channels. Because of this dual marketing structure, fluctuations in marketings are usually more severe than changes in production. For example, during food shortages informal market prices typically exceed the administered price. Consequently, public administrators must deal with simultaneously declining supplies and burgeoning demand. The reverse occurs during bumper harvests: informal market prices are usually depressed, and farmers shift sales to the parastatal. Governments lacking the flexibility or resources to handle and adjust to changing supply and demand conditions may be impotent in their efforts to maintain their own policies.
3. If the parastatal is unable to procure sufficient supplies, perhaps due to higher prices prevailing in informal markets, urban consumer price controls will break down unless the shortfall can be fully offset by imports. Again, maintenance of a cheap food price policy necessitates sufficiently large government financial, storage, and intelligence gathering capabilities.
4. An important side effect of the above is that, in the eyes of farmers, traders, and consumers, future credibility regarding government's ability to sustain policies or programs is eroded. A crucial potential advantage of administered exchange is that information regarding future market conditions can be known with more certainty in the present, compared with traditional market systems. Farmers who feel confident of future market access, commodity prices, and input availability operate in an environment of heightened predictability and stability; this is hypothesized to have a favorable impact on production and marketings. Yet when confidence in government's credibility is eroded, participation rates in government initiatives will be low. Skepticism will be high. Such failures have high

costs, especially for governments that insist on directly participating in markets to promote development objectives.

5. Sound parastatal performance requires a level of market intelligence and data analysis capabilities often absent in much of Sub-Saharan Africa and elsewhere.

6. If government, in its attempts to provide low-cost grain in urban areas as well as provide incentives to stimulate agricultural production, sets consumer prices too low and producer prices too high, trading margins for private merchants may become prohibitively small. This effectively squeezes private traders out of operation, putting even greater marketing and financial responsibilities on the government.

7. A host of factors often induce farmers to reduce their contacts with the parastatal. These include:

   a. degree of accessibility of official buying stations;

   b. terms of payment;

   c. opportunistic behavior of weighers, graders, or other parastatal officials;

   d. quality of service and input availability offered by the parastatal;

   e. official prices vis a vis informal market prices;

   f. level of price unpredictability in offical channel vis a vis unofficial channel.

This concludes the theoretical discussion of how administered and market-oriented exchange systems shape the the environment and behavior of market participants, and in turn how these affect performance within the food system. Chapters 5-7 examine the evidence behind these conceptual relationships in the context of three African case studies.

Chapter 5

MARKETING AND PRICE POLICY IN MALI

5.1 INTRODUCTION

In 1981, the Government of Mali (GRM) embarked on what many have called a bold initiative to reform its stagnating cereals subsector through marketing and price policy reforms (RTI, 1984; Zulu and Nsouli, 1985; USAID, 1984). However, an assessement of GRM liberalization efforts since 1981 reveals that actual measures have fallen somewhat short of donor expectations (Humphreys, 1986). This case study uses available secondary data to examine (1) conditions and policies pursued prior to 1981; (2) the objectives and expected results of the market system reforms; and (3) the actual results and achievements of the reform program up to 1986. The analysis is guided by the three research questions presented in Chapter 1. Specifically, how has farmer/trader production and marketing behavior changed in response to liberalization, and what factors have influenced their ability to respond to more favorable market conditions? Also, what constraints have grain price instability imposed on the opportunity sets of market participants, and how might this affect production and marketing decisions?

5.2 CONDITIONS AND POLICIES PRIOR TO 1981

Despite its generally dry and unpredictable climate, numerous studies have emphasized Mali's potential to be a regional grain exporter (USAID, 1984; Taylor and Yetley, 1985). In actuality, however, Mali had become a large net grain importer and chronic recipient of food aid since the early 1970s (USAID, 1984;

Bremer and Ellsworth, 1986). The food crisis in Mali had been largely attributed to excessive government involvement in market activities and low official prices which created disincentives and risks for farmers and traders (IBRD, 1981; Christensen et al.,1981; RTI, 1984; USAID, 1982). Figures 5.1 and 5.2 show the degree of segmentation between official and informal markets.

The state grain parastatal, OPAM[1], was established in 1964 as a successor to a similar entity set up by France during the colonial period. With the exception of a brief experiment with legalized private trade in 1968, OPAM operated under a statutory monopsony in grain procurement and distribution. However, this has not prevented the rise of a sizable parallel market through which the bulk of coarse grains produced in Mali were distributed (Figure 5.3). Private traders handled a lesser but significant portion of rice marketings. This dominance of the parallel market was especially interesting considering the measures that the GRM took to suppress it, including forced sales by farmers and the imposition of police roadblocks.

The parallel market's primary raison d'etre was due to a government pricing policy out of sync with supply and demand conditions. Low official consumer prices generated a demand that could not be met by official marketings; available supplies were thus rationed. Unmet effective demand created mutual incentives for private traders and farmers to exchange grain at prices above correspondingly low official producer prices. The bypassing of official channels might not have been so bad were it not for (1) the heightened risks and transaction costs imposed on private illegal trade resulting from government attempts to suppress it; (2) reduced farm revenue to the extent that producers were forced to sell to OPAM; and (3) the huge budget deficits incurred by a poorly-managed OPAM. By the late

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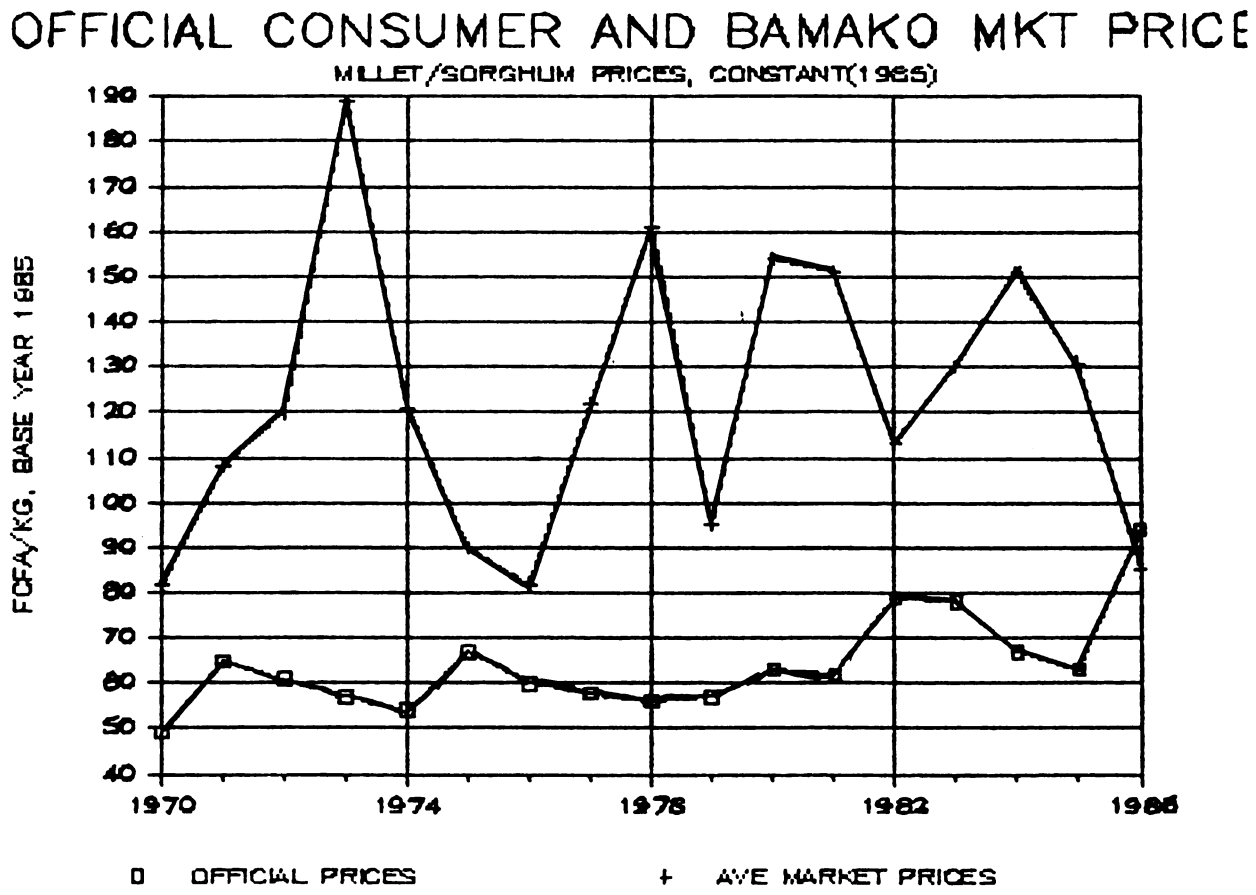
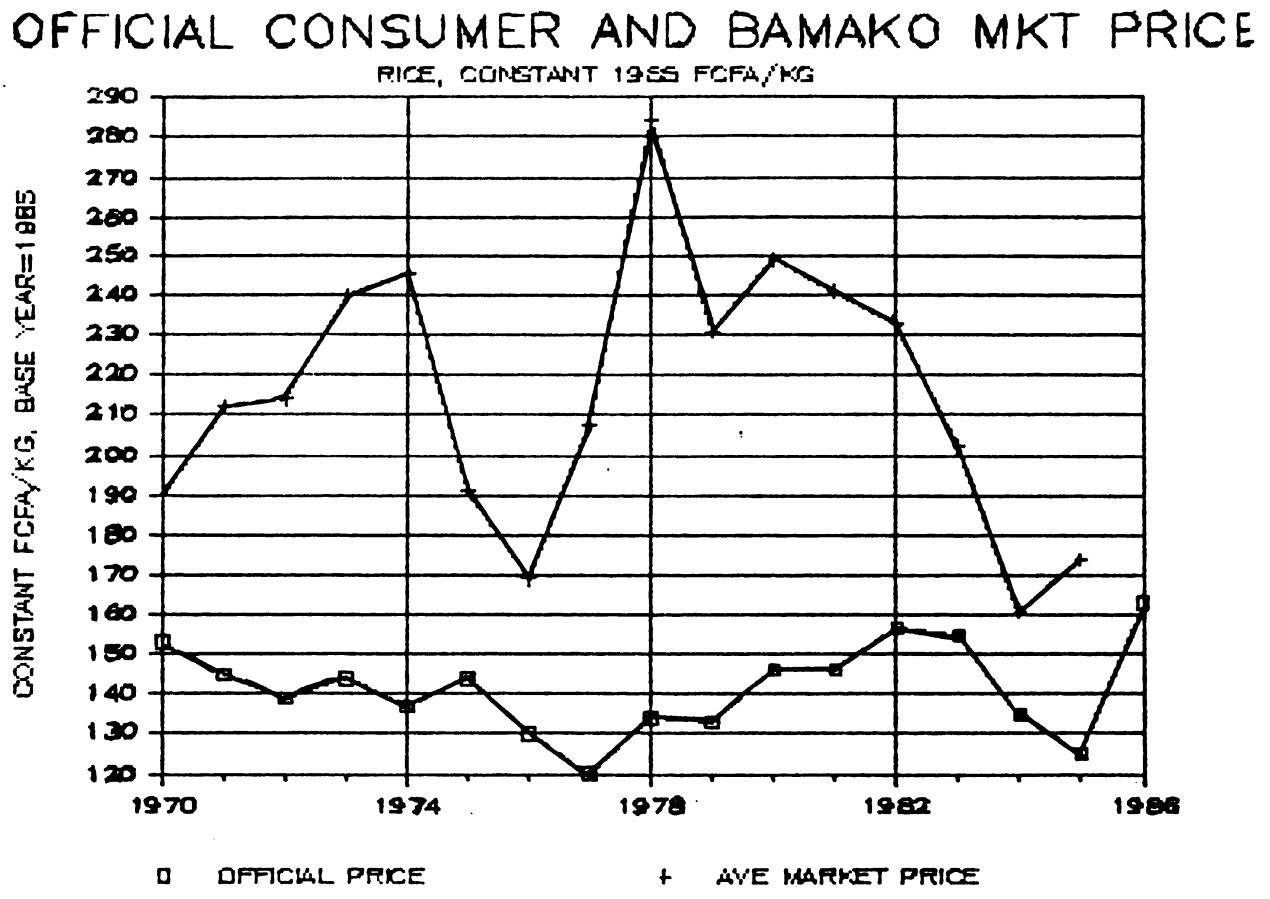
1 Office des Produits Agricoles du Mali.



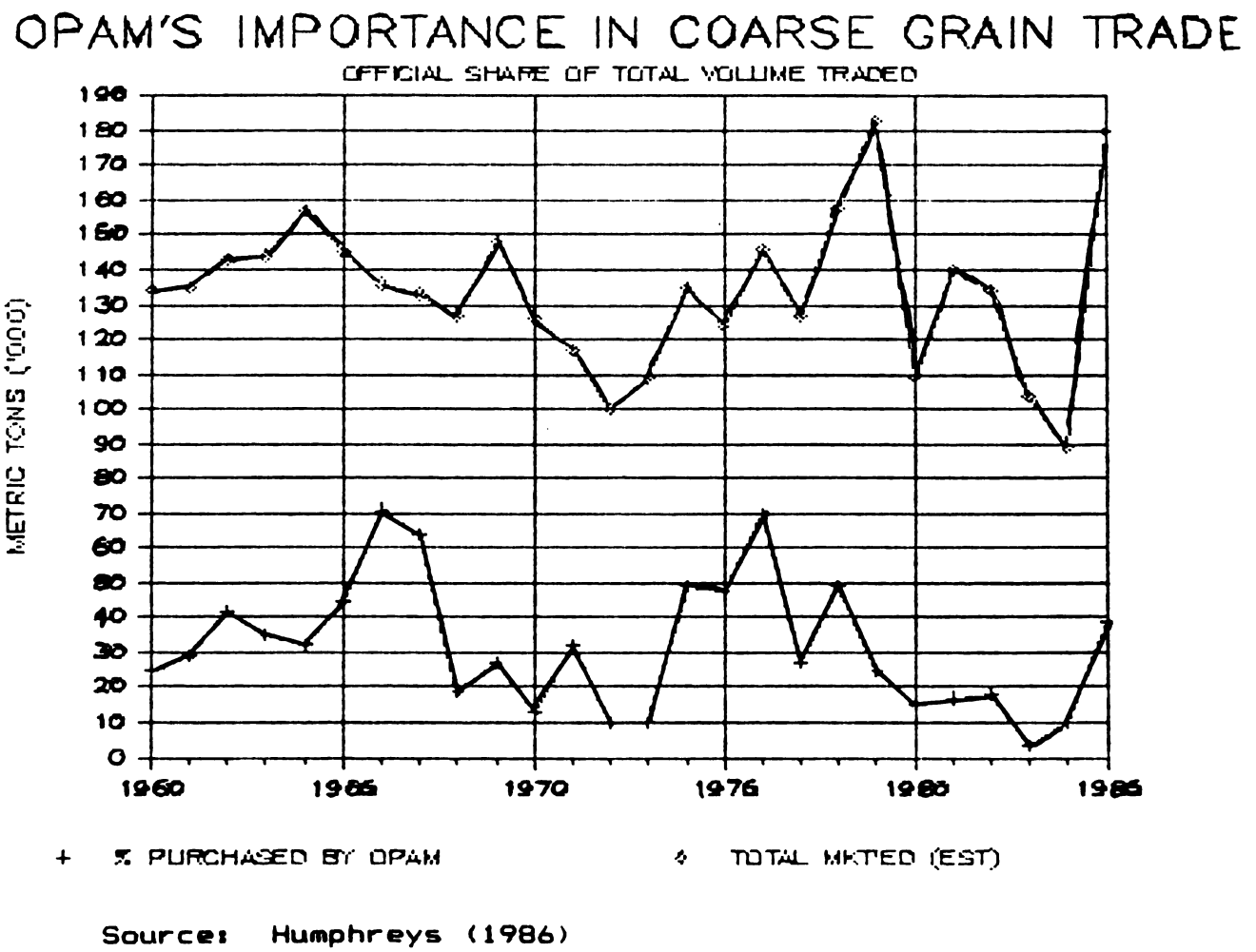
Source: Humphreys (1986) and Dione and Dembele (1987)

Figure 5.1



Source: Humphreys (1986) and Dione and Dembele (1987)

Figure 5.2



Source: Humphreys (1986)

Figure 5.3

1970s, donors increasingly associated these factors with Mali's agricultural and economic stagnation.

The motives behind GRM's grain marketing policy had their origin less in economic naivete than in short-term political rationality. Although food self-sufficiency was always an important stated objective, GRM activities may be best understood in the context of an incomes policy, with the grain parastatal being used as an instrument (Humphreys, 1986; Bremer and Ellsworth, 1986). Several analysts have identified foodgrains as an important "wage good" in Africa (Bates, 1981; Hesp and van der Laan, 1985; Humphreys, 1986), an observation with several important ramifications:

1. The guaranteed supply of cheap food to civil servants and military personnel may reduce demands for salary and wage increases that would increase state budget outlays and contribute to cost-push inflation. Humphreys estimates that the 40 to 50 percent of OPAM grain sold to civil servants may have reduced annual budgetary costs by as much as 5 percent of total government expenditures. Considering that external pressure to control the national deficit is imposed by France[2], the important wage good aspects of foodgrains are even more pronounced.

2. Inability to secure low-priced food for urban consumers is often associated with political instability, a perception supported by recent events in Zambia (1986), Sudan (1984), Tunisia (1983), and Morocco (1983). The importance that the GRM attaches to supplying low-priced rice and coarse grains to politically powerful urban groups can be seen by examining OPAM's Bamako clientele (Table 5.4). Aside from the composition of recipients, the fact that 35 to 45 percent of total OPAM sales is directed to Bamako, a relatively affluent market, "is additional evidence that the government is using grains marketing to implement its incomes policy" (Humphreys, 1986).

3. Government distribution of cheap uniformly-priced grain was also perceived to promote regional equity and induce greater willingness on the part of state officials to accept posts in grain-deficit areas (Hesp and van der Laan, 1985; Humphreys, 1986).

Thus the rationale for GRM grain policy may be seen as a way to adapt to and cope with food scarcity and insecurity as well as being a cause of it. Low-price

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2 France has indicated it will support the Mali Franc only if the GRM controls its budget deficit within specified limits.

Table 5.4

OPAM's Bamako Clientele

(percent)

Group	1982/3	1983/4	1984/5
Co-ops	50	52	51
Army and Police	26	18	22
Public Service Agencies and Employees	20	24	20
Hospitals, Schools	1	2	1
OPAM Staff	1	2	2
High Authorities	1	3	4
Diplomatic Representation	-	-	-
TOTAL BAMAKO GRAIN VOLUME:	30,082	43,449	39,538
% of National OPAM Sales:	31	35	28

Source: Bremer (1986), Table I-1

policy and the supply management potential of OPAM illustrated the GRM's desperate short-run attempts to satisfy politically volatile groups while mitigating budget losses (Humphreys, 1986).

Yet GRM's incomes policy objective and food self-sufficiency objective were inconsistent. Even with low official producer prices, OPAM could not sell at government mandated consumer prices without a loss; the parastatal's overdraft reached CFAF 20 billion by the late 1970s (Humphreys, 1986). Mounting inability to finance such deficits, combined with agricultural stagnation, growing dependence on imported food, and pressure from donors created the confluence of events that motivated grain marketing reform.

5.3 THE REFORM PROGRAM

In March of 1981, the GRM and a group of ten donors including the United States reached agreement on a series of proposals under the Cereals Market Restructuring Project (PRMC). The objectives of the PRMC were threefold: (1) to liberalize grain marketing by legalizing private trade; (2) to stimulate production incentives by raising official producer prices; and (3) to improve OPAM's operating efficiency, and provide the agency with a reasonable trading margin by raising official consumer prices. To facilitate these reforms, the donors were to provide a sizeable amount of food aid (250,000 tons) over a five-year period to be sold at official consumer prices. The food aid would help guarantee adequate supplies for official distribution to preferred customers during the transition period, and the revenue would help finance OPAM's operating losses.

Several points concerning what was not included in the reforms are noteworthy. First, the continuing need for OPAM was not questioned; its function as a price regulator, supplier of grain to preferred customers, and the manager of a national grain reserve was considered essential. Second, the policy of pan-seasonal and pan-territorial pricing was maintained. But instead of setting a

mandated price to which all exchange should conform (as in the past), now OPAM was to set a floor and ceiling price, entering the market to maintain prices within this designated range. While this scheme is theoretically appealing (Abbott, 1985; Child et al.,1983), it was in fact never implemented. OPAM simply lacked sufficient stocks to release onto the market when prices were high, and sufficient funds to procure grain throughout the year when prices are low.

Third, the targets and timetables for realigning official and market prices were indicative rather than binding (Humphreys, 1986). Although specific consumer and producer price increases were proposed, the actual rate of adjustment was left to the GRM.[3]

Predicted effects of the PRMC were as follows. Most donor groups contended that a more efficient OPAM could lower marketing margins to the benefit of both consumers and producers, and conserve scarce national revenue in the process. Also, market liberalization would reduce the risks and transaction costs of trading surrepticiously. Market integration was expected to improve. Most importantly, liberalization was anticipated to raise farmer incentives through more remunerative prices and thus stimulate production and supply. These predicted results can be seen to rest on several critical assumptions discussed earlier. First, the liberalization of grain markets was expected to enhance production incentives, even though the vast bulk of the grain trade had been handled by private traders at "market prices" all along. To some, market liberalization and remunerative farm prices were seen as corollaries. Second, farmers were assumed to be able to respond to these production incentives by increasing farm output. Constraints on marketed supply were assumed to be

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3 Yet the consequences of GRM decisions were considered in annual evaluations by USAID regarding continued United States participation in the PRMC program.

associated mainly with government intervention, and that removal of such constraints could call forth a significant increase in supply.

A second tacit assumption is that greater reliance on traditional market forces would not increase price uncertainty in ways that might impede output. In this case, the assumption was probably correct since in the past, OPAM could not in many instances honor the government decreed prices, let alone force private traders to comply with them also. Thus, the potential benefits of a stable price known with certainty in the future were negated to begin with, and the transition to an equally uncertain range of intra-seasonal future market prices would not appreciably alter the situation.

One concern about the program was the effect of massive food aid inflows to "cushion" the effects of the transitions under PRMC and to allow OPAM to influence market prices. From 1983 to 1985, annual food aid shipments surpassed OPAM's coarse grain procurements in 9 of the previous 10 years.

5.4 RESULTS OF THE PRMC

The most visible and immediate reform of the PRMC was the liberalization of the coarse grains market: Within the first year, roadblocks and raids on traders were terminated, private trade was sanctioned, and grain imports by private traders were legalized and no longer subject to taxes or quotas.[4]

While this was hailed as a major change, the actual substantive effects thus far appear to be minimal. Because the private sector dominated coarse grain trade to begin with, the perceived production incentives resulting from market liberalization was probably overestimated (Humphreys, 1986). Yet reduced risk of

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[4] Rice markets, on the other hand, were not actually opened to private trade until 1985, four years after the initiation of the PRMC. Due to lack of information concerning the effects of such recent changes on rice subsector performance, analysis is confined to the coarse grains subsector (primarily millet and sorghum).

government harassment or confiscation of private property may stimulate investment in the system with benefits observable in the long run.

Also, the costs of private trade were most likely reduced. Previously, the riskiness of private trading encouraged trading in small lots, hindering the exploitation of scale economies in bargaining, transport, storage, etc. To the extent that the reduction of these risks and costs reduced trading margins, both farmers and consumers appear to have benefitted. For example, prior to PRMC, grain was frequently transported surrepticiously in small vehicles to avoid detection. The per unit transportation costs have been estimated at five times the cost of transport via bulk loads on a 30-ton truck (Staatz, 1986). Newman (1980) also observed reduced costs of private trade after recent liberalization efforts in Senegal. These examples bear directly on RQ3, i.e., the role of transaction costs in affecting trading incentives. Still, it is very difficult to isolate the extent to which reduced transaction costs in these cases have changed farmer production and marketing decisions. In order to sell more, the farmer must be able to grow more. Farm marketing behavior is circumscribed by production and environmental constraints.

RQ1, which relates to the supply responsiveness of farmers to changes in Bamako market grain prices, is addressed in Table 5.5.[5] Several models have been fitted (using OLS), representing different potential ways in which price expectations could be formed--none of which indicate that price is a very

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5 It is clear that the relevant price used for this analysis should be the expected producer price in the farmer's locale. For this reason, the results should be interpreted cautiously. However, to the extent that Bamako price movements are correlated with price movements in other farming areas, the former can be a useful proxy in the absence of the latter. Dione and Dembele (1986) found fairly high price correlations between areas in Southern Mali, where most surplus coarse grain is produced. Market integration was found to be much poorer in the North (Mopti, Timboctou, Gao, and Kayes).

Table 5.5

Area Response Estimations for Millet/Sorghum: Mali, 1960-80.

Regression Results on Area Planted to Millet/Sorghum (AMS)

Equation	Estimation Technique	C	PMS(-1)	PMS(-2)	PMS(-3)	AMS(-1)	R2	DW	F
1	OLS	1634	-0.66	-0.11	0.51	-0.19	.09	2.11	0.25
		(482)	(1.68)	(1.48)	(1.62)	(0.31)			
2	OLS	1638	-0.97	0.12		-0.20	.08	2.11	0.33
		(488)	(1.29)	(1.23)		(0.29)			
3	OLS	1700	-0.95			-0.20	.08	2.09	0.53
		(389)	(1.23)			(0.27)			

Parentheses Contain Standard Errors

important factor in influencing area devoted to millet and sorghum. These results are consistent with Levine's econometric study for the World Bank (1983), which concludes that "price policy is unimportant for millet/sorghum" (p. 1). This statement might be more accurately modified with the addition "given the current production and marketing constraints facing Malian producers." Shapouri et al. (1986), find that lagged official price is an important variable in influencing millet/sorghum area, but the elasticity is very low (.20).

These results are largely what one would expect given the severe agronomic, labor, and technical constraints in dryland millet and sorghum production in the Sahel (Matlon and Spencer, 1984; Roth and Sanders, 1985; Delgado and McIntire, 1982). The fact that these two primary foodcrops account for between 80-90 percent of total area cultivated in Mali may have implications for the ability of price policy to stimulate aggregate production without simultaneous efforts to deal with other production and marketing constraints. These results suggest that the assumption of discernible area response to changes in output price cannot be supported by the millet/sorghum data in Mali. This does not infer that price incentives are not a necessary condition for stimulating production growth, only that they are clearly not sufficient.

It is also noteworthy to examine the incidence of the marketed surplus. Ongoing MSU-CESA research in Mali has found that almost all market sales of coarse grain are provided by approximately 20% of Malian producers. These are usually the more highly equipped, larger farmers in surplus areas. A large proportion of rural farm households surveyed were net buyers of food on an annual basis. This result is also consistent with Ellsworth and Shapiro's study in Burkina Faso (1985). These findings suggest that it is by no means clear that higher food grain prices are necessarily advantageous for the majority in the agricultural

sector. It also raises important questions concerning who benefits from policies designed to raise farmgate prices.

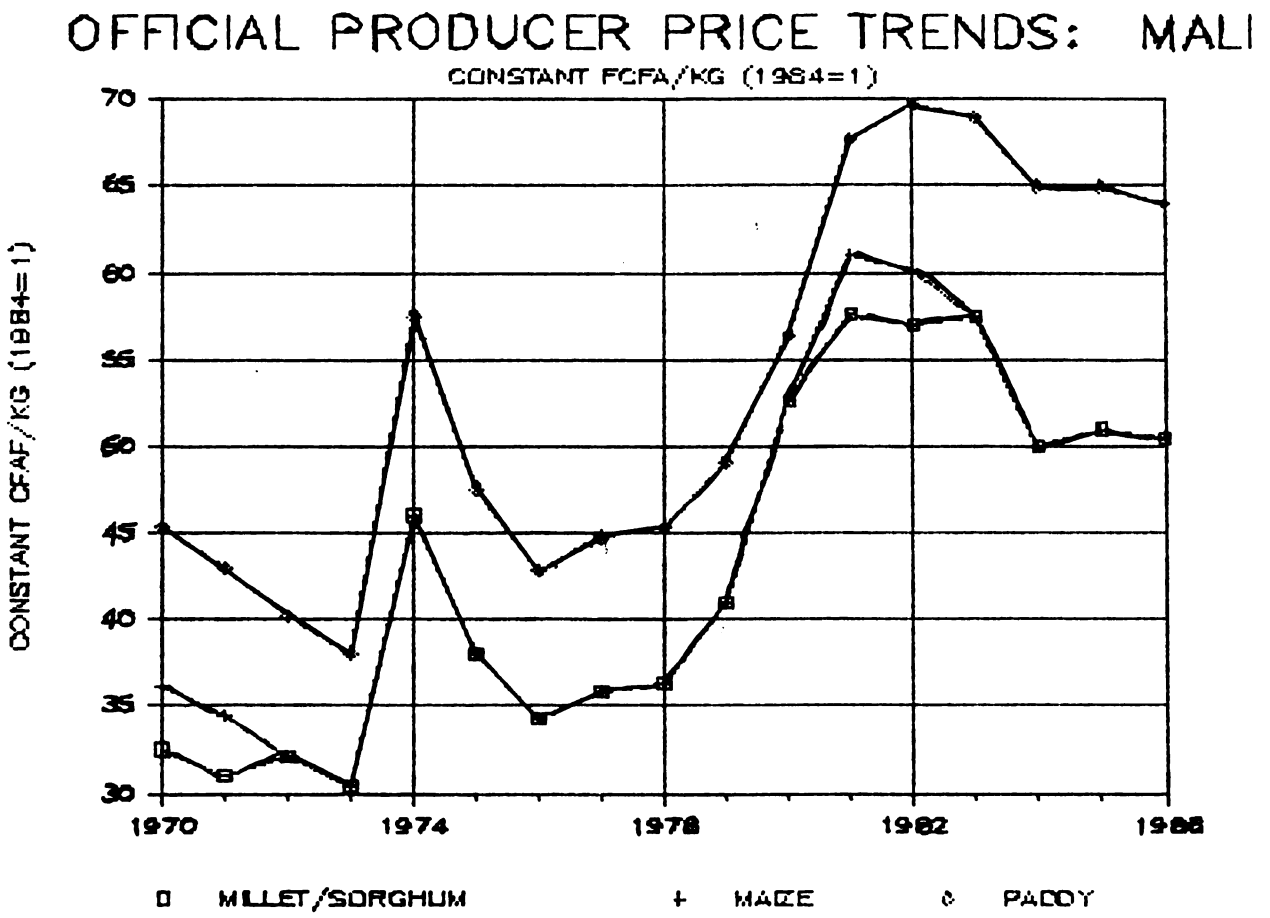
Regarding official prices, the annual rate of increase during the PRMC was below that of the previous four-year period. Furthermore, while official consumer prices rose slightly in real terms from 1980/81 to 1985/86, real official producer prices actually fell (Figure 5.6).

The PRMC was also expected to moderate intra-year price instability. Again however, the converse is true: Humphreys calculates that the dispersion about annual mean market prices for millet/sorghum were higher during the PRMC than during the 1970-75 and 1976-80 periods. Dione and Dembele also conclude that intra-year price instability was higher during 1982-85 than during the previous four years, although between-year price variation may have been reduced under the PRMC.

Several studies have associated part of this instability with the insufficient resources with which OPAM has had to execute the tasks delegated to it (Bremer and Ellsworth, 1986). The divergence between market and official prices left OPAM with insufficient resources to consistently support either its stated producer or consumer prices. Yet a distinction should be made between OPAM performance and GRM decision making. OPAM had no authority to adjust official prices as a function of prevailing market conditions, its buffer supplies, or its financial resources. Thus prices set by the government have often made it impossible for OPAM to operate effectively. In such situations, the cause of poor performance should not be blamed on the parastatal but rather on the government.

5.5 EVENTS SINCE 1986

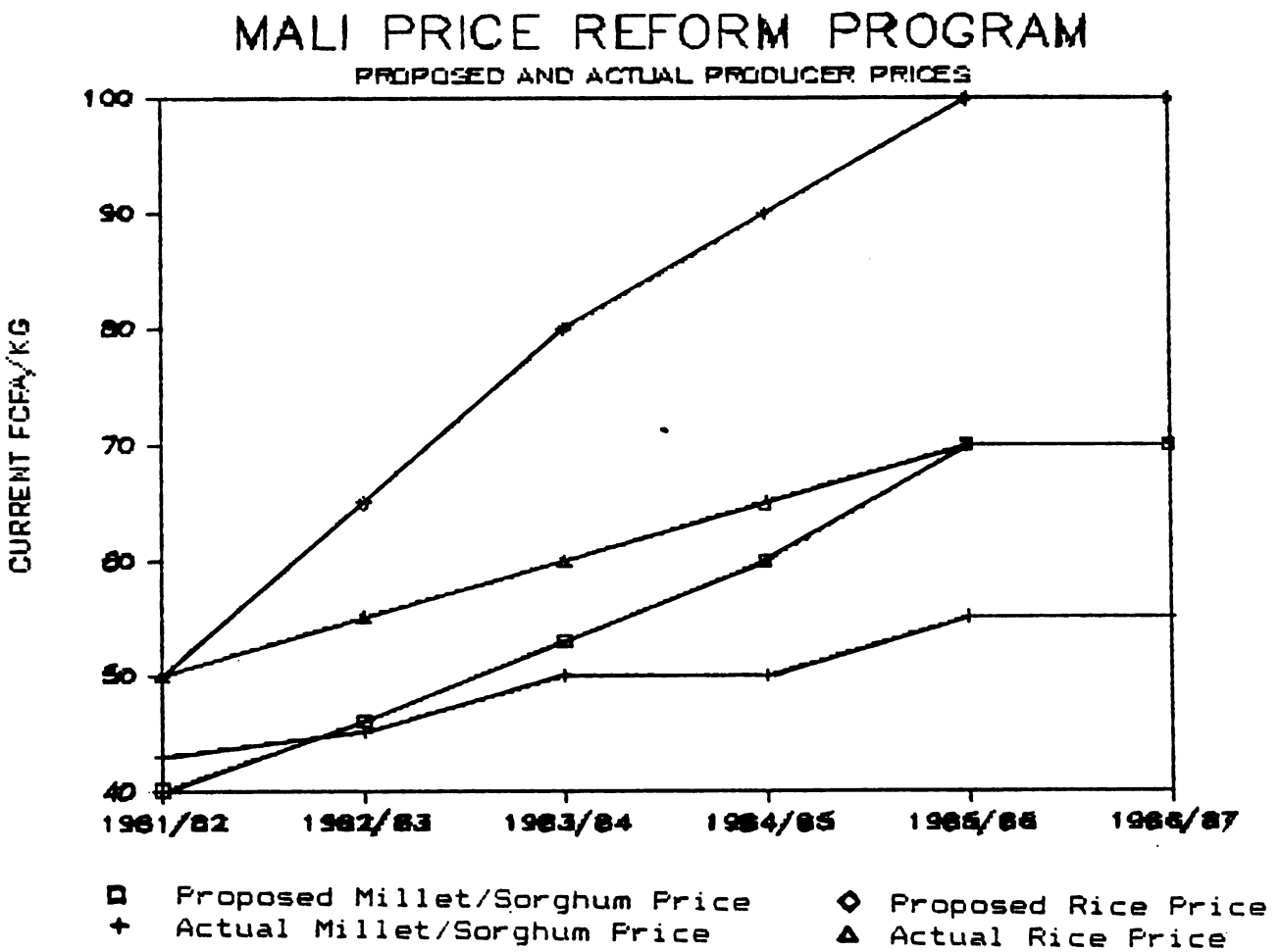
Prior to 1986, the implementation of the PRMC had produced little success in realigning official and market prices (Figure 5.1). Official producer and consumer prices were consistently set below target levels proposed under the PRMC



Source: Humphreys (1986)

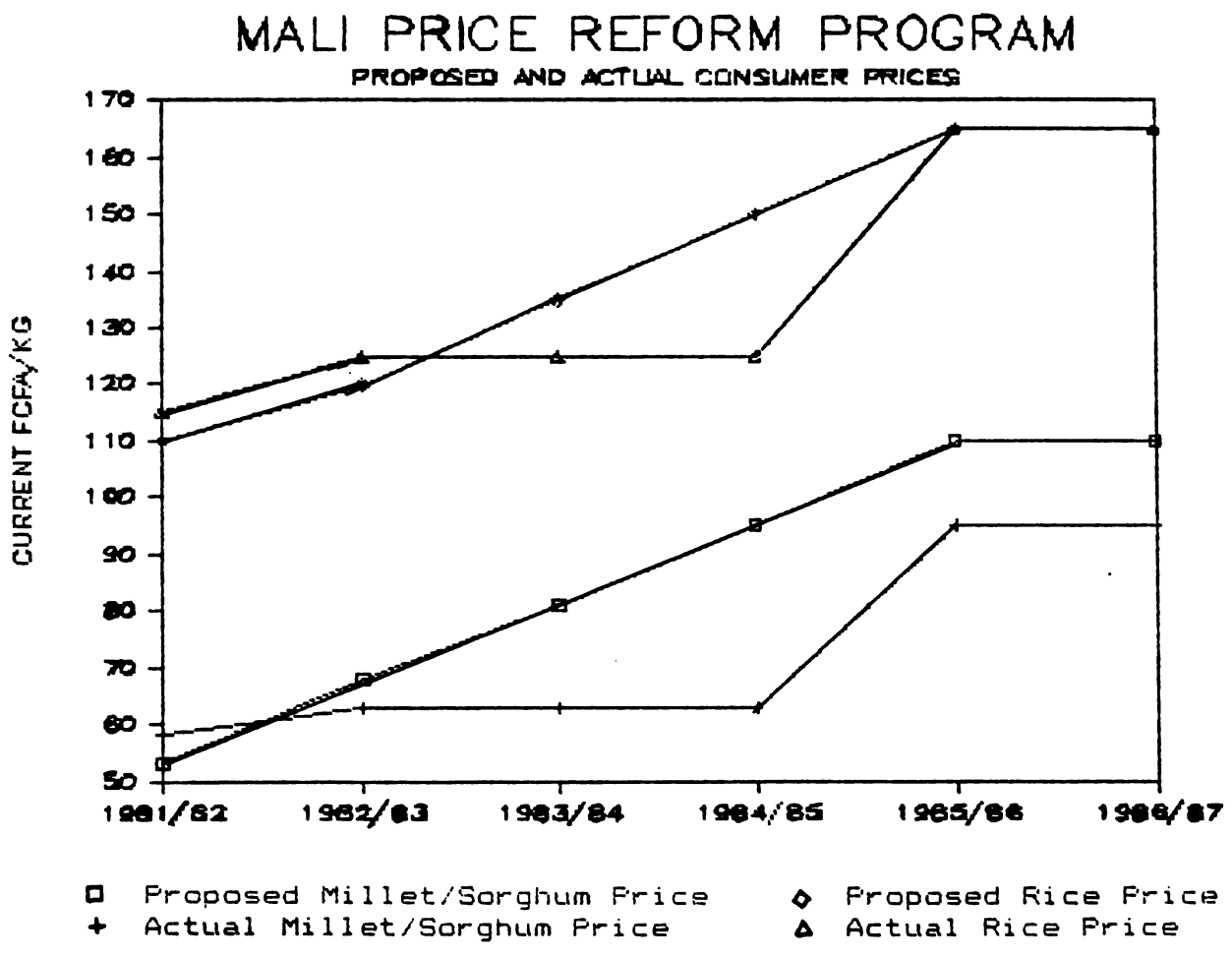
Dione and Dembele (1987)

Figure 5.6



Source: Dione and Dembele (1987)

Figure 5.7



Source: Dione and Dembele (1987)

Figure 5.8

(Figures 5.7 and 5.8). Although the consequences of segmented markets were well understood by the GRM, its apparent objectives were to lower informal market prices to official levels rather than raise official prices to market levels (Humphreys, 1987). Massive amounts of food aid were used to pursue this objective, but the gap between high market prices and low official prices was not fully erased until the abundant harvest of 1986.

From 1985 to 1986, coarse grain prices in the Bamako market fell over 35%. OPAM's purchase price, apparently set without regard to anticipated market conditions, now exceeded parallel market prices. This made the agency the preferred market outlet for farmers, yet it lacked the financial capacity to deal with this contingency. By mid-season, OPAM was forced to suspend buying. The agency was doubly burdened since official consumer prices, usually far below parallel market levels, were now well above them and thus were not competitive. Faced with soaring supplies and curtailed demand, vast inventories accumulated in OPAM warehouses.

Several conclusions may be drawn from the 1986 events. First, without the financial and infrastructural capacity to implement its own price and marketing policies, the parastatal simply adds confusion and uncertainty into the environment of market participants. OPAM's function as a price stabilizer or buyer of last resort serves a crucial purpose, yet its finite budget and stocks limits the extent to which it can set prices divorced from prevailing supply and demand conditions. Sporadic and abrupt entry into or exit from the market increases the risks of private trade and storage. This usually causes a deadweight loss in the form of higher marketing costs from which there is no return.

A second implication is that liberalization does not necessarily imply remunerative incentives, prices, or incomes, especially in the absence of viable contingency markets. Because demand elasticities for staple grains are commonly

very low in developing countries (Scandizzo and Bruce, 1980), the effect of supply shocks induced by weather can cause variability in rural cash income generation. The direction of the effect may differ by farm strata. A large proportion of Malian farmers sell either little or no grain annually (MSU-CESA, 1986). Abundant harvests may thus be beneficial to them, reducing their need to purchase in the market to fulfill family consumption needs. Yet better-equipped farmers typically producing grain for the market could easily be faced with prices below cost of production. The results may be reversed in poor harvest years.

If price uncertainty influences farm production and marketing behavior, there appears to be a need for institutional mechanisms to shift or absorb risk. With a guaranteed minimum return, farmers may more safely devote scarce productive resources into agriculture rather than diversifying income portfolios via less-risky, non-farm activities. Yet it is still unclear whether this scheme would benefit a wide cross-section of Malian farmers or mainly just the larger, better equipped producers who consistently sell in the market. Equally unclear is the effects of a floor price program on those households who consistently buy in the market.

5.6 SUMMARY

The PRMC program does appear to have created several important changes in the coarse grain subsector, although they have been somewhat different than donor expectations. Up to the end of 1986--five years since the inception of the PRMC--the following observations can be made:

1. The coarse grains market has been fully opened to the private sector. Many gains that may potentially result from increased private initiative and innovation in the grains subsector may not occur except in the medium to long run, if/when trust in public policies and a more predictable and stable market environment are perceived to exist. Short-run impacts of the PRMC on market access for farmers, marketing margins of traders, and transaction costs of exchange appear to be favorable. The extent to which this has induced greater production for the market is unclear.

2. Contrary to de Meel (1978), Zulu and Nsouli (1985), and other donor predictions, the PRMC has tended to depress market cereal prices

probably due to a large influx of food aid and good weather in 1986. Official producer and consumer prices have also increased more slowly under the PRMC than before it.

3. Available data indicates that annual Bamako coarse grain prices do not appreciably affect farm production behavior, given current environmental and institutional constraints facing the Malian producer. This result is consistent with Levine's (1983) supply response study in Mali.

4. Prior to 1986, little progress had been made to align official and market prices, and the extent of market segmentation was still large (Figures 5.7 and 5.8). But favorable weather and the abundant harvest in 1986 has reversed the situation. In late 1986, official producer prices exceeded market prices, and OPAM's concessional sales dropped sharply, even by its traditional clients, since market prices were lower.

5. Inter-year price variability appears to be lower since the inception of the PRMC, although the reasons for this are unclear. By contrast, within-year price instability has been greater under the PRMC (Humphreys, 1986; Dione and Dembele, 1986). This may in part be due to irregular and unpredictable actions taken by OPAM (Bremer and Ellsworth, 1986).

6. While market liberalization was a central feature of the PRMC, very few measures were taken to directly foster development of traditional markets. Improvement of physical infrastructure, market information flows, and weight and quality standardization were for the most part neglected (Humphreys, 1986). However, increased awareness of this shortcoming has spurred recent change in this area.

Chapter 6

MARKETING AND PRICE POLICY IN ZIMBABWE

6.1 INTRODUCTION

This case study focuses on Zimbabwe's maize subsector. Maize is the single most important food crop in the country, supplying 70 percent of the average Zimbabwean's caloric intake (FAO, 1984). It also accounts for over 70 percent of the country's cereal production. Moreover, Zimbabwe's economy often benefits from foreign exchange earnings generated from maize exports.

The discussion and analysis in this chapter are also broadly guided by the three research questions presented in Chapter 1. First, a brief overview of Zimbabwe's agricultural marketing institutions related to the maize subsector is presented. Next, we consider major policy changes since independence in 1980 and their effects on participant behavior and subsector performance. The analysis focuses particularly on (1) the supply responiveness of commercial and communal farmers, and how the magnitude of this parameter may be affected by other variables such as the extent of physical or institutional infrastructure in a particular area; (2) the effects of different pricing policies on risk, resource allocation, and supply responsiveness; and (3) the relationship between transaction costs, improved input and product marketing channels, and farmer incentives to produce a marketable surplus.

6.2 OVERVIEW OF ZIMBABWEAN AGRICULTURE

Known as Southern Rhodesia before achieving independence in 1980, Zimbabwe possesses a highly dualistic agricultural structure, characterized by a

large-scale, input-intensive commercial sector and a small-scale, mainly subsistence-oriented communal sector. The commercial farms are generally located on better lands and owned by white families. The sector has historically had an important voice in the country's political process. Maize accounts for about 70 percent of cultivated land on commercial farms.

By contrast, the communal sector[1] is composed of predominantly black households located mainly in Zimbabwe's poorer climate regions.[2] These households grow crops with the primary objective of meeting consumption needs; an important subordinate objective is to generate cash income (Stanning, 1986). Maize accounts for about 90 percent of all cultivated land in the communal sector, although sorghum and millet are quite important in marginal areas receiving little rainfall.

Salient characteristics of the two sectors are illustrated by the figures below:[3]

	COMMERCIAL SECTOR	COMMUNAL SECTOR
POPULATION (000's)	na	4,016
ARABLE LAND (000 ha)	15,000	18,572
FARMING UNITS (households)	4,800	716,500
AVERAGE CROPPED (ha) AREA PER FARM	na	2-6

---

1 Includes small-scale commercial and resettlement areas established under limited land tenure reforms since independence.

2 Three-fourths of communal land is in ecological zones considered unsuitable for intensive cultivation (USAID, 1985).

3 Source: World Bank, 1983.

6.2.1 Agricultural Marketing and Price Policies Related to the Maize Subsector

Maize marketing and price formulation in Zimbabwe are for the most part highly centralized and non-competitive. Most prices are administered. Both commercial and communal sector maize production and marketing are greatly influenced by the following factors:

(1) Government Regulation: the distribution of most major food commodities, including maize is characterized by single-channel marketing systems controlled by parastatals. For the commercial sector, the Grain Marketing Board (GMB) is the sole legal buyer of maize. In communal areas, local trade is allowed within a given district, yet all sales between districts must be marketed through the GMB. Retail prices are also set by the government. In addition, pan-territorial and pan-seasonal prices prevail, thus dampening incentives for private storage.

Goverment arguments for maintaining statutory control of marketing include: (1) more assured market access than a private agency may offer; (2) the advantages of a single credit-input-product marketing channel, making repayment more assured and thus facilitating the continuity of a viable input delivery system to farmers; (3) price stability through maintainance of controlled prices; (4) lower marketing costs due to economies of scale and operations on a non-profit basis; and (5) the strategic importance of staple cereals, which require Government control over stocks and distribution (Riley, 1982; Muchero, 1986).

(2) Price determination and the timing of price announcements: Prices of all major food commodities are government-administered. Prices are formulated through a drawn-out, highly politicized process involving farmer interest groups, the Ministries of Agriculture and Finance, the Economic Coordinating Committee, the coordinating government parastatal, and the Cabinet (Riley, 1982).

Prior to 1976, prices were officially set after planting time, based on the following criteria: (a) cost of production estimates, for means of establishing adequate producer returns; (b) level of inventories; and (c) expected supply and demand estimates for the current season (based on farm surveys and rainfall).

Starting in 1976, a major pricing change occured. Producer groups were successful in lobbying for price announcements before planting time, which was seen as a great boon to farmers because it allowed them to allocate resources with near perfect knowledge concerning what minimum prices they would face at harvest time. The disadvantages of this system was that it greatly reduced the ability of the government to set prices that would clear the market. For example, the substantial maize price increase in 1981 coincided with a season of abundant rainfall, and the government was locked into buying a record amount of maize far above the would-be market clearing price. This presented a serious financial drain on the national budget. Largely for these reasons, a new system was instituted in 1983 whereby all major crop prices are again announced

after planting time. However, the implication of the current system is that the previous year's price will be the new minimum, or in effect a floor price (Mbwanda, 1987; Mudimu, 1984).

One may expect, therefore, that these changes in the timing of price announcements would affect farmer risks and production incentives, and thus the supply response effect. This hypothesis is explored below.

(3) Input prices including fertilizer and fuel are also fixed by the government. However, private businesses are extensively involved in fertilizer, seed, and agro-chemical manufacture and distribution, mainly servicing the commercial sector. Input availability in the communal sector has been historically weak.

6.2.2 Agricultural Subsidies

As is common throughout Africa, the Zimbabwean government has subsidized retail food prices for the benefit of urban consumers. Yet unlike many African states, Zimbabwe has generally not taxed agriculture by setting correspondingly low producer prices. In fact, maize producer prices since independence have been consistently above world prices, conferring a subsidy to maize farmers (Riley, 1982). The unfortunate result of subsidized consumer and producer prices is marketing board operating losses. Muir and Stanning (1983) estimate that total government subsidization of agricultural goods exceeded Z$100 million annually during the early 1980s. While donors generally criticize such policies, no systematic analysis has yet determined whether or not such budget costs outweigh the potential benefits of increased agricultural production and/or productivity that such subsidies may generate. The costs and benefits of this and related "infant industry" strategies are a crucial subject for further research.

In summary, many analysts have concluded that Zimbabwe's controlled marketing system has performed quite well for the commmercial sector (Riley, 1982; Child et.al., 1983; Homewood and Blackie, 1984; USAID, 1985; Muchero, 1986). GMB support for the communal areas has been less impressive, largely reflecting pre-independence government priorities.

6.2.3 Marketing and Price Policy Initiatives Since Independence

Since independence in 1980, Zimbabwe's agricultural policy has focused on raising output and welfare in the communal sector while maintaining commercial sector productivity. This objective appears imperative for several reasons. First, given an annual population growth rate of 3.3 percent and the limits to continued expansion onto new productive land, it is questionable whether Zimbabwe can maintain its present level of food self-sufficiency without tapping the productive potential of its 17 million arable hectares in communal lands. Especially considering the political pressures for land redistribution, continued reliance on the commercial sector alone to provide adequate grain supplies is unrealistic. Secondly, the symbiotic relationship between agricultural productivity and economic development is well documented (Johnston and Mellor, 1962; Timmer, Falcon and Pearson, 1983). The demand for industrial goods and services is significantly fueled by rising rural incomes that generally accompany agricultural productivity gains. Seventy-five percent of Zimbabwe's population reside in the communal sector, and overall economic development will be difficult if not impossible without raising incomes and purchansing power in this peasant sector (Blackie, 1986; USAID, 1985).

For these reasons, specific agricultural priorities since independence have included:

1. extension of GMB buying stations into communal areas;
2. addition of new smallholder crops to the list of controlled commodities, providing communal farmers with a guaranteed market;
3. greater attention to research on communal farming systems and crops prevalent in lower potential areas;
4. adequate price incentives;
5. improved extension services to communal areas;
6. resettlement schemes.

The major challenge facing the government is whether it can translate its successes in stimulating output, productivity, and incomes in the commercial sector to communal areas as well. Although the GMB and overall government marketing and price policy have been regarded as quite successful vis a vis the commercial sector (Riley, 1982; Child et al., 1983; Blackie, 1984), it is doubtful whether simply expanding operations and services into communal areas represents the wisest use of scarce resources as a means to promote smallholder development. There are a number of important features that distinguish production and marketing in the commercial sector from that of the communal sector. In the former, production units are large-scale, geographically concentrated, and relatively few in number. Transaction costs per unit of volume traded is thus low for both the farmer and the GMB. In addition, substantial market volume was almost assured by commercial farms due to their large-scale, cash crop orientation. GMB overhead costs can be spread out over larger volumes per buying station. Moreover, the limited number of producers and the large scale of their production dampens the potential for illicit market sales. Finally, commercial sector marketing is characterized by a one-way flow from rural to urban areas. Commercial sector food security depends very little on regional grain imports.

By contrast, in communal areas the GMB must collect small, variable quantities of grain from large numbers of geographic-dispersed producers. Per unit marketing costs rise dramatically in such a setting. Moreover, varying rainfall distributions from year to year cause shifts in surplus production areas (Blackie, 1984). The marketing system must be able to distribute grain to deficit areas in addition to provide a reliable outlet for surplus production. Furthermore, pan-seasonal prices put a further burden on the GMB since producers naturally will sell their crops as soon after harvest as possible. This concentrates demand for

GMB transport and storage activities into a short post-harvest period, after which such resources may be underutilized. This clearly reduces efficiency of resource utilization and increases marketing costs (Blackie, 1984).

The cost effectiveness of simply extending GMB buying stations into communal areas has not been fully examined, but the above concerns indicate that such a policy would be less successful than in commercial areas. In order to adequately address the viability of this scheme, the following must be quantified: (1) buying station overhead and operating costs; (2) effects of geographical proximity on smallholder production and marketing behavior; (3) increased yields that may be attributable to the GMB through greater input and credit availability; (4) long term economic benefits of rising rural incomes (intersectoral linkage effect argument) attributable to greater GMB extension into communal areas.

Of course such costs and benefits must be compared with alternative uses of government resources to accomplish the same objectives.

6.3 THE IMPORTANCE OF ENHANCED YIELDS IN COMMUNAL AREAS

Long-term food security and economic development in Zimbabwe will involve the achievement of both per capita and per hectare increases in agricultural productivity. Yield-increasing technology is central to this process (Blackie, 1986; Rohrbach, 1986). Due to the rapid closing of the land frontier, continued reliance on area expansion to increase output is not a realistic long-term option in Zimbabwe. To sustain per capita consumption levels given the realities of rapid population growth and limited slack land, increased yields in communal areas take on critical importance.

A second, and perhaps even more pressing need for greater productivity in communal areas concerns agriculture's historical role in fueling economic growth. The close linkages between agricultural productivity and industrial growth in Zimbabwe are suggested by Table 6.1. Reasons for this link include the following (Blackie, 1986):

Table 6.1

GROWTH RATES OF AGRICULTURAL OUTPUT AND GNP

YEAR	AGRICULTURAL OUTPUT	GDP
1980	3.1	11.3
1981	8.3	13.0
1982	1.0	0.0
1983	-6.4	-3.4
1984	12.8	1.0
1985	25.0	6.0

source: Blackie, 1986.

1. Seventy-five percent of Zimbabwe's communal sector population is either directly or indirectly involved in agriculture; one fourth of the country's total workforce is directly employed in agricultural production. This group comprises the largest source of demand for industrial consumer goods.

2. Agriculture is the main supplier of raw inputs for the industrial sector.

3. Agriculture provides 40 percent of total annual exports.

Not coincidentally, the economic transformations of both Europe and Asia coincided with periods of rapid productivity gains in agriculture -- resulting from interrelated technological and institutional breakthroughs -- that provided both (1) higher incomes and purchasing power in rural areas, and (2) cheap food and thus higher disposable incomes in urban areas (Mellor, 1973). Blackie (1986) identifies yield improvements as the primary means to stimulate this economic transformation in Zimbabwe.

But what are the sources of improved yield in Zimbabwe, especially in the communal areas? This question is addressed by examining communal sector production and marketing data in the maize subsector over the past decade. Particular focus is given to the effects of post-independence government policy on output and productivity in communal areas.

6.4 EFFECTS OF GOVERNMENT POLICY IN COMMUNAL AREAS SINCE INDEPENDENCE

Several important trends have taken place in communal sector maize production and marketing since 1980. First, area cultivated to maize has increased dramatically (Figure 6.2). The increase does not appear to be at the expense of other crops; area devoted to substitute crops seems to have remained relatively constant over the past decade, at least for the several crops for which survey data is available (Figure 6.3). Expanding maize cultivation appears to be due primarily to increasing farm size and an expanding number of cultivators.

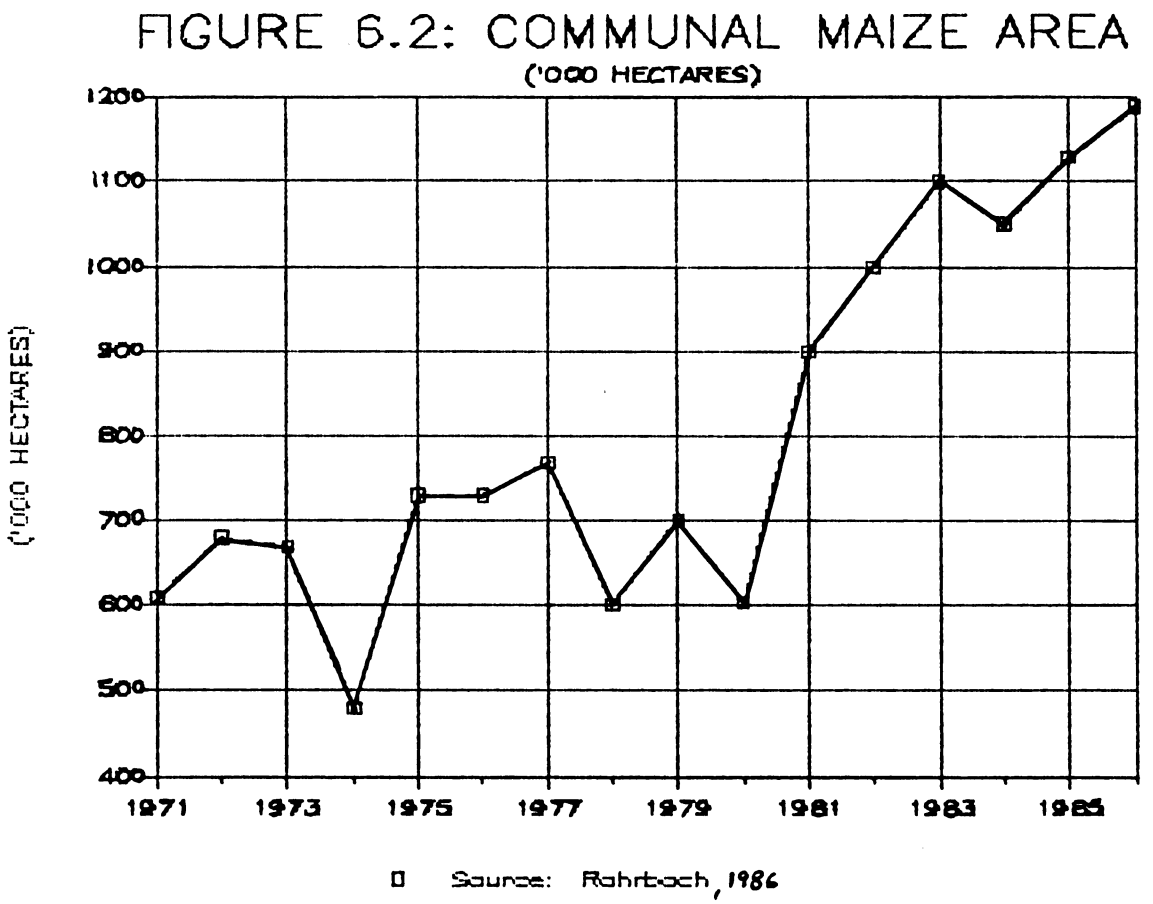
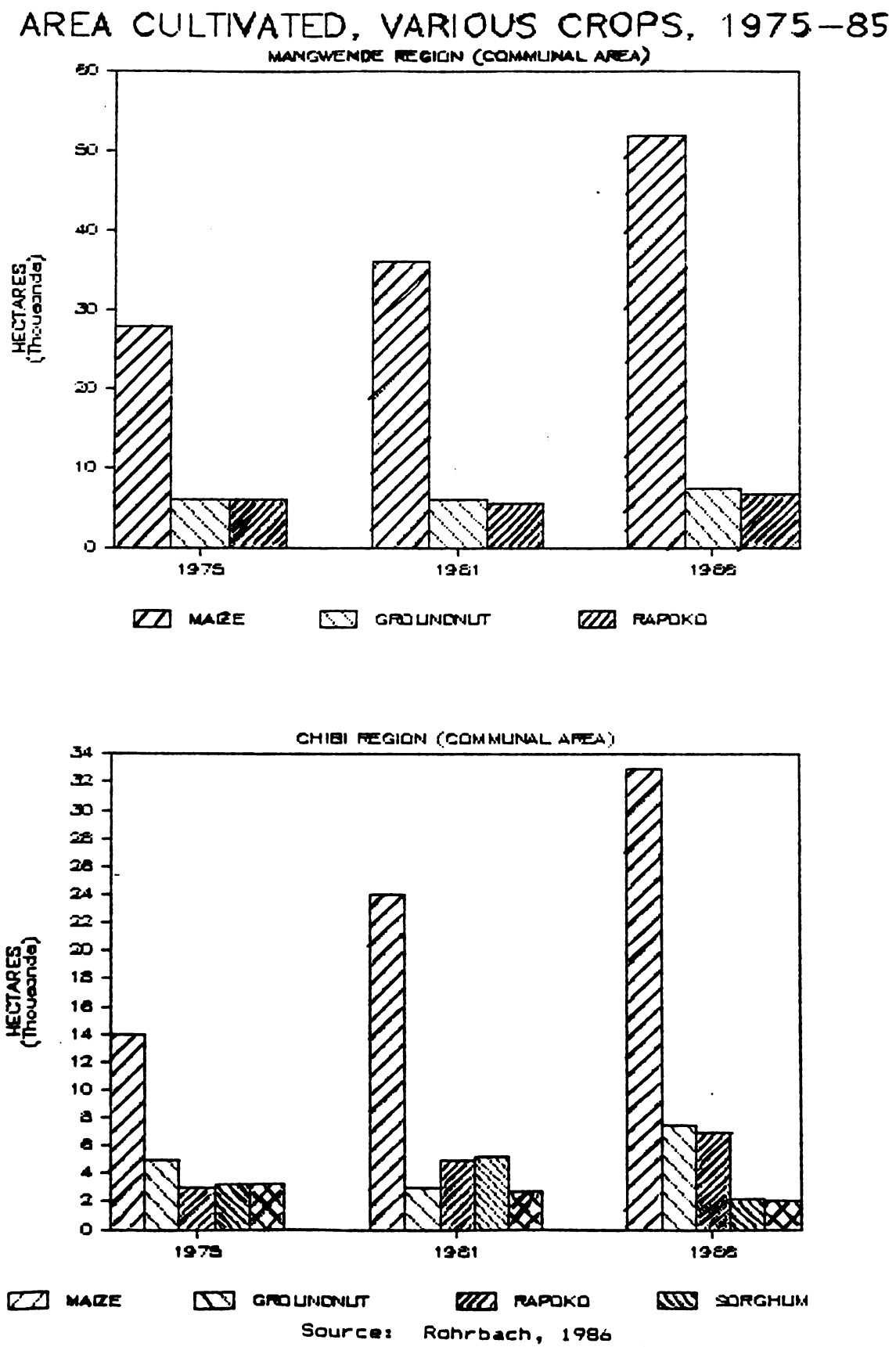


FIGURE 6.2: COMMUNAL MAIZE AREA
('000 HECTARES)
('000 HECTARES)
1200
1100
1000
900
800
700
600
500
400
1971
1973
1975
1977
1979
1981
1983
1985
Source: Rohrbach, 1986

Figure 6.2

Figure 6.3



Source: Rohrbach, 1986

Second, although yields have always been highly correlated with rainfall, there is some evidence that they appear somewhat higher in the post-independence period (Figure 6.4; see also Rohrbach, 1986). Available survey data also indicate that input adoption has risen markedly over the past six years (Figures 6.5 and 6.6).

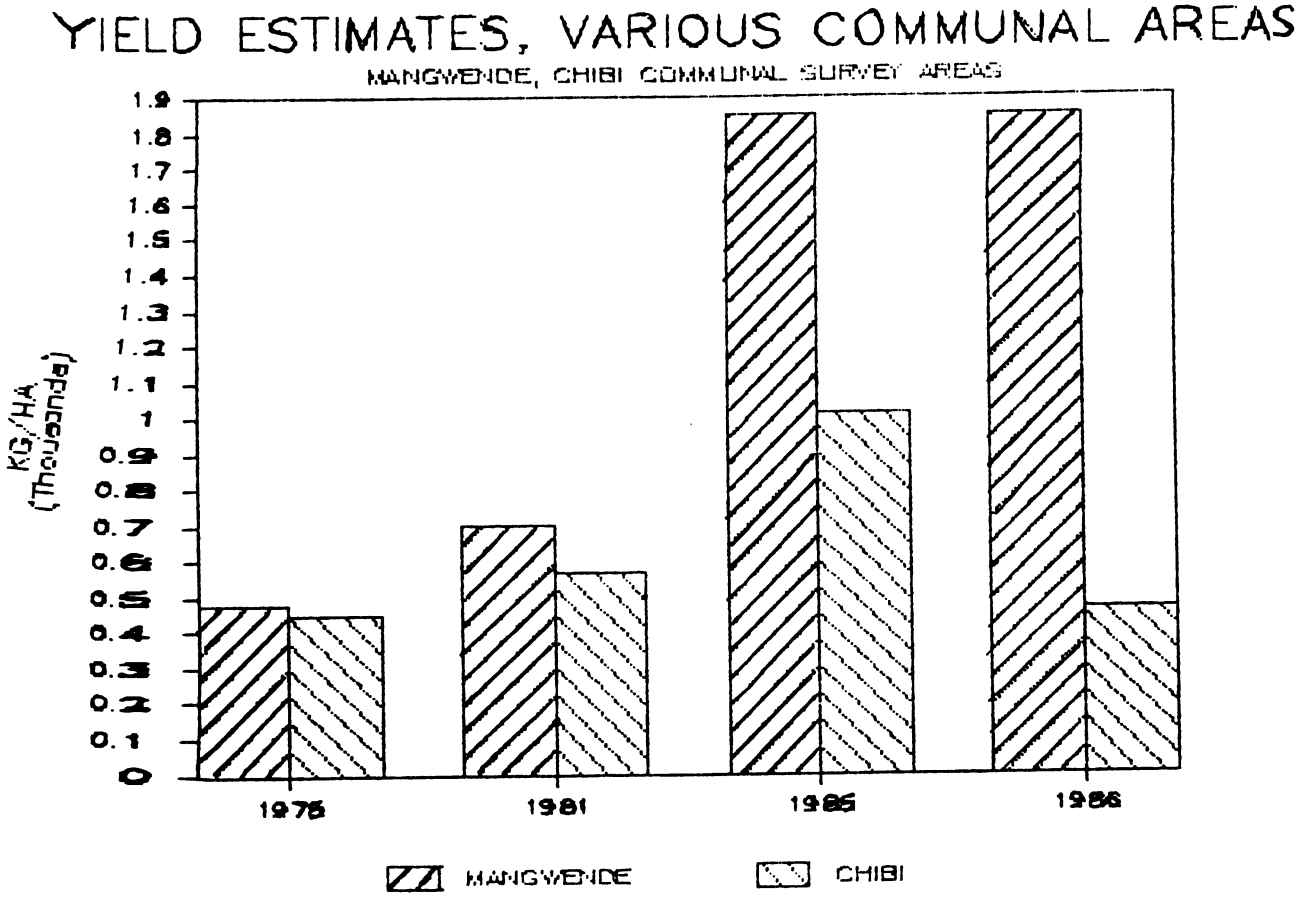
Third, average maize marketings to the GMB appear to have increased dramatically since 1980 (Rohrbach, 1986; Stanning, 1986). Average communal sector marketings during the 1980-85 period were five times higher than their 1975-80 average (Figure 6.7). This is especially significant considering that 1982-84 were all relatively poor rainfall years. Communal maize marketings in 1985 were almost 10 times their 1980 level. It does not appear that this increase represents a shift in sales from parallel to official channels, since participation in local markets has been very limited, at least in the past decade.[4]

What effect has price incentives played in this process? The real maize price rose sharply in 1980 and 1981 but has fallen below that level since then and has lost 25 percent of its value by 1986 (Figure 6.8). The maize-sorghum ratio also increased during 1979-81, but has remained almost constant since then. Both Rohrbach (1986) and Stanning (1986) conclude that there is little evidence that price incentives played a significant role in the post-independence output or productivity trends. This does not refute the link between price changes and output, but simply indicates that other factors were largely responsible for the communal sector yield and production gains.

---

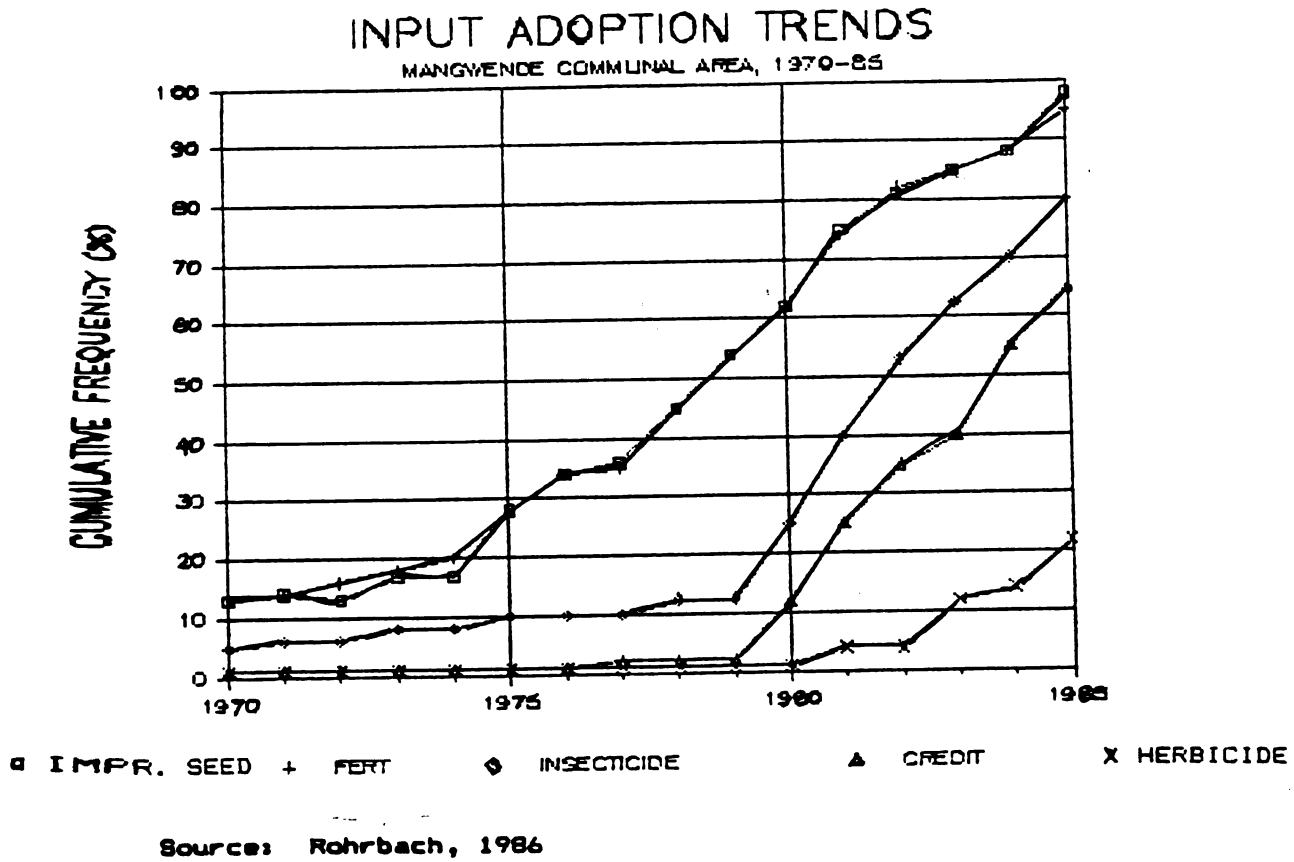
[4] Stanning, 1986. Survey data in several regions by Stanning reveal that the majority of producers had marketed maize to the GMB every or most every year. By contrast, less than 12 percent of farmers in any of the three regions surveyed said they marketed maize through informal channels.

Data from communal areas surveyed by Rohrbach (1986) indicate that little maize was marketed through either official or parallel markets prior to independence. Most sales that did take place were between neighbors.



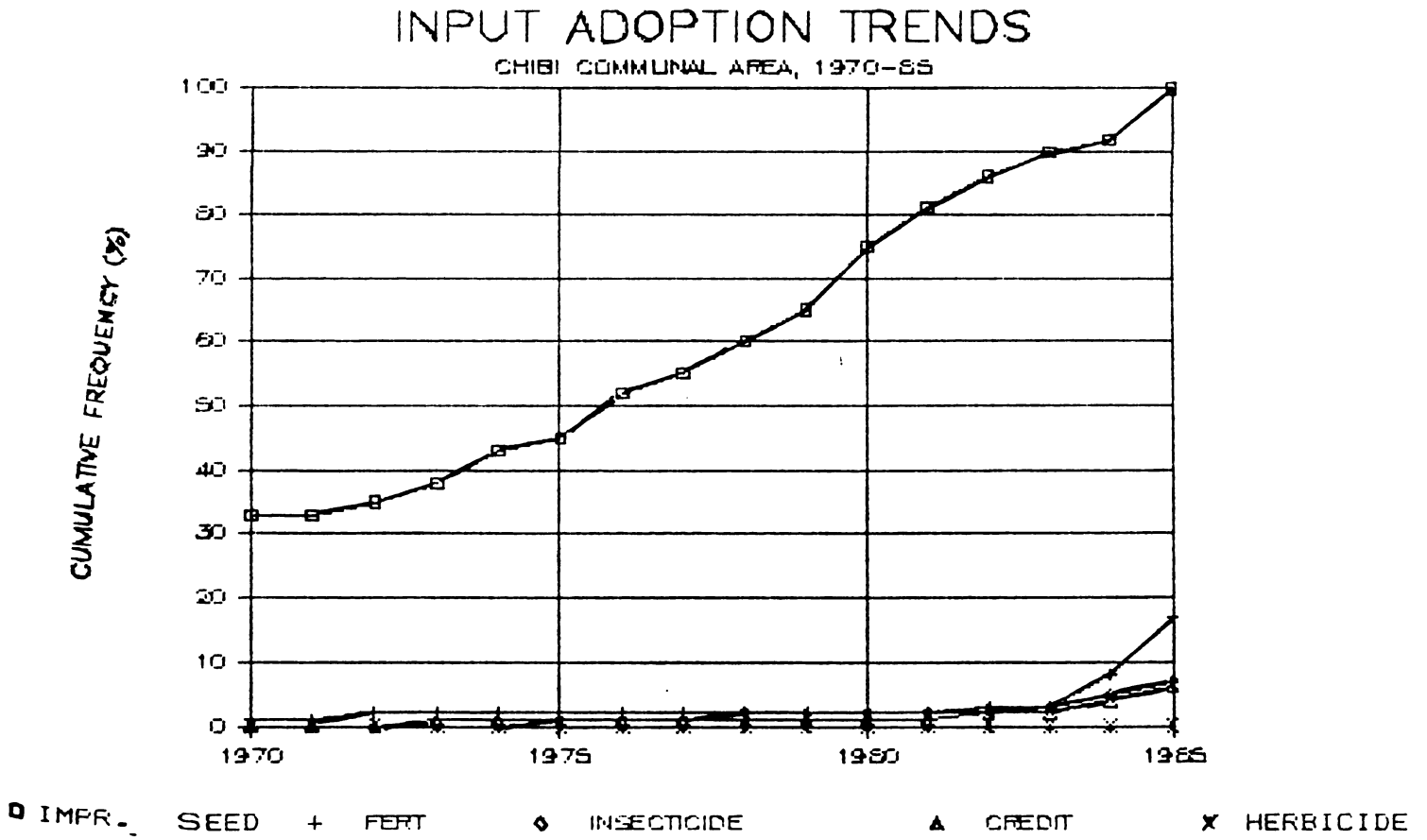
Source: Rohrbach, 1986

Figure 6.4



Source: Rohrbach, 1986

Figure 6.5



Source: Rohrbach, 1986

Figure 6.6

FIGURE 6.7: OFFICIAL MAIZE MARKETINGS

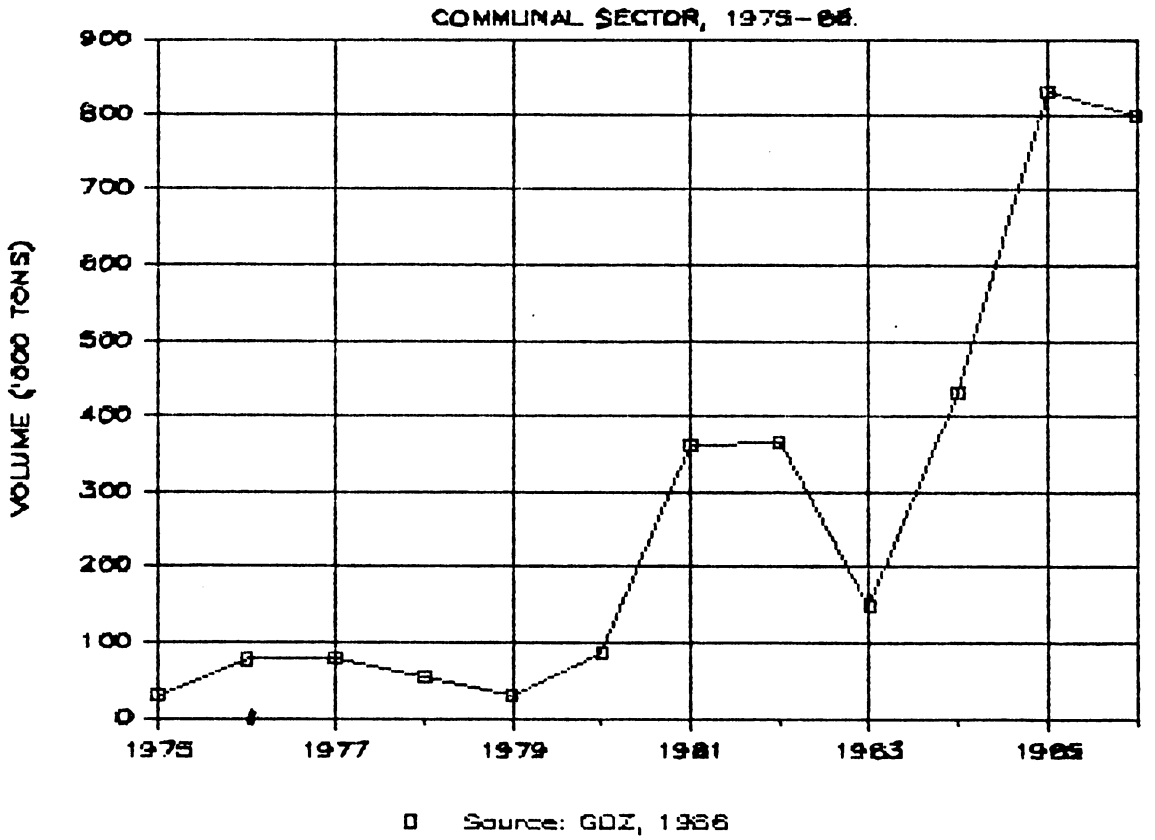


Figure 6.7

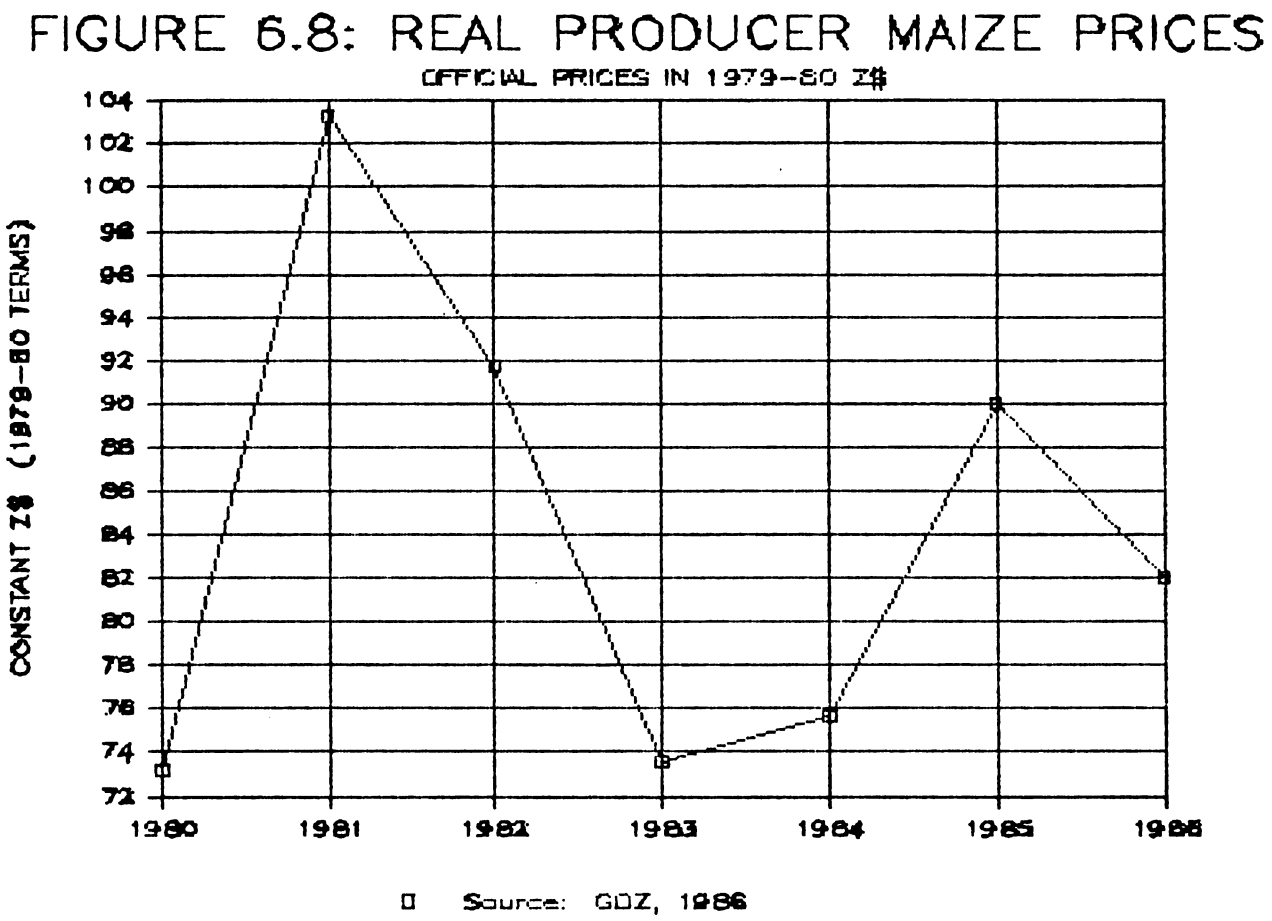


FIGURE 6.8: REAL PRODUCER MAIZE PRICES
OFFICIAL PRICES IN 1979-80 Z$
CONSTANT Z$ (1979-80 TERMS)
104
102
100
98
96
94
92
90
88
86
84
82
80
78
76
74
72
1980
1981
1982
1983
1984
1985
1986
Source: GOZ, 1986

Figure 6.8

Farmer ability to respond to market incentives has been clearly influenced by the extent of marketing infrastructure and transport availability in a particular area (Rohrbach, 1986). Those communal areas showing the greatest leaps in market sales were also the areas possessing relatively more developed physical infrastructure (Stanning, 1986).

The growth of producer participation in official maize markets coincides with government initiatives to extend GMB activities into communal areas (Table 6.9). Since 1980, ten GMB buying stations have been established in communal areas. Input and credit availability and extension support have also improved significantly since 1980 (Table 6.10). The expansion of market infrastructure has also corresponded with a rapid growth in the number of local transporters operating in various communal areas (Rohrbach, 1986).

These developments have obvious implications for RQ3. Prior to the government initiatives, farmers could either transport their grain to distant depots, incurring higher transport costs, or sell their crops through marketing cooperatives. Yet high cooperative handling costs discouraged sales through these channels. Also, evidence suggests that the transaction costs of obtaining inputs, credit, and extension advice were much higher before the government initiatives in communal areas (Rohrbach, 1986). Search, screening, bargaining and transport costs of procuring these goods and services in risky, unreliable or distant markets were in many cases too expensive to make such efforts worth the trouble. The magnitude of these transaction costs probably had a significant effect on profit margins and thus incentives to produce a surplus for the market.

Table 6.9

RELATIONSHIP BETWEEN GMB BUYING STATIONS
AND NUMBER OF REGISTERED PRODUCERS IN COMMUNAL AREAS.

	1980	1981	1982	1983	1984	1985
GMB BUYING STATIONS IN COMMUNAL AREAS:	3	6	10	12	13	13
NUMBER OF REGISTRATIONS WITH GMB IN COMMUNAL AREAS:	na	65,399	127,023	164,480	192,898	246,763

source: Stanning, 1985.

Table 6.10

CREDIT AND FERTILIZER AVAILABILITY IN COMMUNAL AREAS

1976/77 TO 1984/85

SEASON	NUMBER OF LOANS ('000s) **	LOAN VALUE (Z$ MILL)	FERTILIZER SALES ('000 MT)
1976/77	na	na	20
1977/78	"	"	25
1978/79	"	"	25
1979/80	"	"	27
1980/81	"	"	90
1981/82	34.6	14.1	96
1982/83	46.1	19.2	98
1983/84	70.8	37.8	109
1984/85	96.2	56.4	115

(**): Short-term credit extended to communal farmers by Agricultural Marketing Authority

Source: Stanning, 1985

The expansion of GMB activities affected transaction costs incurred by farmers in at least two important ways. First, closer market location and guaranteed outlet for surplus maize production dramatically reduced transportation costs. Available survey data on Z$/bag transport costs indicate that farmers lost approximately 10 percent of the maize producer price for every 19 kilometers they had to pay to transport a bag of maize for sale. If implicit and explicit production costs were subtracted from the producer price, transport costs would account for an even higher fraction of the farmer profit margin. For these reasons, reduced costs as a result of closer GMB buying stations probably provided a strong market incentive to local producers.

In addition, closer and more reliable input market channels may have reduced the transaction costs borne by farmers of obtaining inputs and credit. Most importantly, greater input use has provided farmers with increased profit incentives through enhanced yields and thus higher returns per acre (Rohrbach, 1986). Such incentives appear to have occurred even though real maize prices have declined by 25 percent since 1981. Thus, this preliminary evidence from the maize subsector suggests that the dramatic market growth, yield and production gains in communal areas since 1980 are intimately associated with reduced costs of transport, market search, input provision, and extension advice.

A question for further research is whether government may employ more cost-effective means to stimulate market growth and input use. We have not discussed the opportunity costs of the resources used by government to achieve these same results. This issue is discussed further in Chapter 8.2.

6.5 THE RELATIONSHIP BETWEEN PRICE UNPREDICTABILITY AND SUPPLY RESPONSE

The relationship between price uncertainty and farm supply response is well established in the risk literature (Johnson, 1947; Schultz, 1945; Just, 1974; Newbery and Stiglitz, 1981) yet it has received little empirical treatment. This is

especially true in Sub-Saharan Africa where price instability and its effects on aggregate production growth appear particularly acute. Government price policy changes in Zimbabwe offer an opportunity to examine the effects of improved future market information on supply response. This section examines RQ2, in this particular case whether area responsiveness of farmers to maize prices is both higher and less variable when floor prices are known before planting (certainty) as opposed to after planting (uncertainty).

Prior to 1976, maize prices were announced after planting. From 1976 to 1982, maize prices were announced before planting, and thus were known with certainty at planting time. Prices were again announced subsequent to planting after 1982, but the implication of this system is that the previous year's price will be the new minimum, or in effect a floor price (Mbwanda, 1987; Mudimu, 1984). Hence, minimum maize prices prevailing from 1976 to the present are assumed to be known with greater certainty than before 1976.

Annual data for the 1962-84 period were provided by the Agricultural Marketing Authority of Zimbabwe. In this analysis, only commercial sector data are used. Because the communal sector was the object of considerable post-independence infrastructural changes, the effects of these changes would be hard to disaggregate from the impact of price policy changes alone. For this reason, analysis is confined to the commercial sector. How results may differ from those in the communal sector are discussed below.

The most important substitute crop in the commercial sector over the estimation period is tobacco. Tobacco is bought and sold via an auction market mechanism, which remained in effect over the two periods. With current tobacco prices not known with certainty at planting time, expected prices are approximated by the previous year's price.

Both maize and tobacco price data were combined with the nitrogen fertilizer price series (the largest cash input expense) to generate a gross margin variable.

This gross margin is a proxy for profitability which serves to more accurately reflect production incentives than output prices alone.

The dependent variable used in the analysis is area cultivated to maize. This was chosen over total output since area is not greatly affected by changes in weather, and thus provides a more accurate representation of farmer production decisions. The results, however, may underestimate supply response somewhat due to a potential yield response to price incentives.

Four regressions are estimated:

Area Response in the 1964-1975 period:

(1) $AREA = a_0 + a_1 * \hat{GMM} + a_2 * GMT(-1) + a_3 * AREA(-1)$

where:

AREA = maize area cultivated, commercial sector;

$\hat{GMM}$ = expected gross margin on maize, i.e., the difference between expected maize floor prices (Z$/ton) and current nitrogen fertilizer prices (a proxy for cost of production, converted into Z$/ton of maize);[5] and,

---

5 Margin construction: $\frac{Z\$}{\text{ton of maize}} - \frac{\text{fertilizer cost (Z\$)}}{\text{ton of maize}}$

The first term is simply the price series for maize. The second term is derived from the product of:

$\frac{\text{ton of fert}}{\text{hectares of maize}}$ * $\frac{Z\$}{\text{ton of fert}}$ * $\frac{\text{hectares of maize}}{\text{ton of maize}}$

(application rate) (N fert price series) (inverse of yield)

When multiplied, the units cancel to obtain nitrogen fertilizer costs in terms of Z$/ton of maize. Application rates were obtained from Zimbabwe Ministry of Agriculture (1982). Although actual application rates and yields increased over the test period, these trends tend to offset themselves in the above equation. Thus, average application rates and yields are used to construct the margin. An analogous procedure is used to construct tobacco margins.

GMT = gross margin on tobacco, the difference between average annual tobacco prices (Z$/ton) and fertilizer prices (converted in terms of Z$/ton of tobacco).

Since official maize prices and thus margins are not known at planting time during this period, producers must form an expectation of price. As market participants do not possess information on the current values of exogenous variables when forming expectations, only lagged exogenous variables are included on the list of first-state regressors. These regressors are: GMM(-1), GMM(-2), GMT(-1) and AREA(-1).

Area Response in the 1976-84 Period

(2) $AREA + b_0 + b_1 * GMM + b_2 + GMT(-1) + b_3 + AREA(-1)$

Since maize floor prices are now known with reasonable certainty, expected maize margin is simply the known preplanting price minus current fertilizer price (GMM). Tobacco prices are determined by auction mechanism as discussed earlier.

The parameter estimates of equations 1 and 2 are shown in Table 6.11. The calculated price elasticity of maize area is different between the two periods. During the 1964-75 period, the short-run elasticity estimate was 0.21 and not significantly different from zero at the 5 percent level; the long-run estimate was 0.66. By contrast, during the 1976-84 period the short-run elasticity was 0.45 and highly significant; the long-run estimate was 0.81. The elasticities for both periods were calculated at the price and quantity means during their respective periods.

TABLE 6.11

Regression Results on Maize Area Planted

Equation	Estimation Period	Estimation Technique	C	AREA(-1)	GMT(-1)	$\widehat{GMM}$	GMM	GMM^{Δ}	D	DGMM	R^2	Durbin's h Statistic
1	1964-85	TSLS	96.02	0.69	-6.71	26.09					.88	-0.97
			(96.02)	(0.14)	(2.90)	(43.82)						
2	1976-84	OLS	74.57	0.44	-5.30		51.22				.89	0.14
			(37.31)	(0.27)	(3.45)		(10.03)					
3	1964-84	OLS	77.23	0.68	-7.29			37.56			.86	0.64
			(32.79)	(0.08)	(1.58)			(10.82)				
4	1964-84	OLS	116.29	0.65	-7.17			22.61	-65.68	25.67	.91	-1.40
			(65.55)	(0.09)	(1.52)			(31.02)	(61.83)	(33.22)		

Standard Errors are in Parentheses

A further distinction between these two periods can be seen by looking at the importance of the lagged area planted variable (AREA(-1)). During the first period (equation 1), the impact of the lagged dependent variable is considerably greater than during the second period (equation 2). An independent equation regressing AREA on AREA(-1) indicates a very strong relationship during the first period (Table 6.12). This may imply that during this period of greater uncertainty, maize planting decisions were based largely on past operating procedures. By contrast, the contribution of lagged area planted to the explanatory power of equation 2 is minimal.

When the equations are estimated again without AREA(-1), the explanatory power of equation 1 drops sharply, while equation 2 is largely unaffected (Table 6.13). R^2 in equation 1 drops from .88 to .49 when AREA(-1) is removed. In equation 2, R^2 falls from .89 to .83. This again supports the impression that when prices were not known at planting time, maize area decisions were based to a great extent on past planting behavior.

Despite these apparent differences, the hypothesis that $a_1 = b_1$ could not be rejected at the 5 percent level of significance. This is understandable due to the high standard error on GMM in the period of relative price uncertainty. In fact, a Wald test of the joint hypothesis of equal coefficients between the two equations also could not be rejected. In addition, a Goldfeld-Quandt test for heteroscedasticity between the two periods was performed, the results of which indicated that the hypothesis of homocedasticity could not be rejected.

These test results, while not a justification for pooling, indicate that the data for the two periods may be legitimately pooled to estimate a single regression. This has the advantage of both increasing degrees of freedom and reducing considerable multicollinearity which was introduced in equation 1 through the use of TSLS. Equations 3 and 4 were estiamted over the entire sample period.

Table 6.12

Relationship Between Current and Past Maize Planting Decisions By Zimbabwean Commercial Sector Producers

Dependent Variable is Maize Area (Current)

Period	Estimation Technique	C	AREA(-1)	R2	F
1964-75	OLS	52.0	0.8	.84	53.3
		(25.4)	(0.1)		
1976-84	OLS	147.3	0.3	.12	1.0
		(81.4)	(0.3)		

Parentheses contain standard errors

Table 6.13

Regression Results Without AREA(-1) as an Explanatory Variable

Regression Results on Maize Area Planted (using OLS)

Equation	C	GMT(-1)	$\widehat{GMM}$	GMM	R2	SSE
1	337.13	-13.98	19.8		.49	11512
	(205.9)	(8.5)	(148.75)			
2	118.93	-.58		57.2	.83	1189
	(30.15)	(2.28)		(10.69)		

Parentheses Contain Standard Errors

Area Response in the 1964-84 Period

(3) $AREA = c_0 + c_1 * GMM^{\Delta} + c_2 * GMT(-1) + c_3 * AREA(-1)$

Area Response in the 1964-84 Period with Intercept and Slope Shifter

(4) $AREA = d_0 + d_1 * GMM^{\Delta} + d_2 * GMT(-1) + d_3 * AREA(-1) + d_4 * D + d_5 * DGMM$

where:

GMM^{Δ} = $\hat{GMM}$ from 1964-75; GMM from 1976-84. This procedure maintains consistency with regressions 1 and 2 regarding how farmers formed price expectations.

D = 0 from 1964-75; 1 from 1976-84.

DGMM = 0 from 1964-75; GMM from 1976-84.

Equations 3 and 4 were specified to examine whether the government price policy of announcing official prices before planting time had an impact on area responsiveness, i.e., $d_4 = d_5 = 0$. Results are shown in Table 6.11. Since the calculated F statistic of 4.77 exceeds the critical value of 3.68 (5 percent level), the hypothesis that $d_4 = d_5 = 0$ was rejected. Based on equation 4, the estimated short-run price elasticity of maize area is 0.18 during the 1964-75 period and 0.43 from 1976-84. The calculated long-run elasticities are 0.56 and 1.22. Clearly, during the period of pre-planting announced prices, maize plantings appeared more price sensitive.

Implications: These regression results relate directly to RQ2. They indicate that government policy of setting a price floor prior to planting appears to have enable commercial farmers to respond more strongly to price incentives. Conversely, the data suggest that price uncertainty led farmers to base current planting decisions largely on past standard operating procedures. This result is consistent with the

work of Heiner (1983, 1986) which predicts an inverse relationship between the predictability of future prices and predictability in the decisions of economic actors.

The results also have implications for farm resource allocation and incomes. To the extent that farm planning decisions are guided by expected prices, the closer the match between expected and actual prices, the higher the value of marketed output and cash income. In other words, greater price predictability may enhance agricultural productivity by allowing farmers to generate a higher value of output from a given bundle of production resources (Johnson, 1947).

By constrast, inaccurate price expectations lead to "much misdirection in the uses to which farm land, capital, and labor engaged in farming are put" (Schultz, 1945, p. 262-3).

At first glance, one might expect that improved maize price certainty would simply shift resources into maize production at the expense of other crops. Yet this does not appear to be the case. The proportion of commercial sector farmland devoted to maize has actually declined slightly since the early 1970s, due in part to dramatic acreage increases in cotton and soybeans.

How do these results relate to the Zimbabwean smallholder? Several factors suggest that the degree of price responsiveness to improved price certainty will not be as high in the peasant sector as in the commercial sector. First, smallholders face a number of environmental constraints not found in the relatively better-endowed commercial lands. Market infra-structure in most rural areas in Sub-Saharan Africa is seldom as developed as in Zimbabwe's commercial sector. Therefore, it may be expected that the more commercialized communal producers with less binding constraints on land, labor, transportation, and productive inputs will benefit from greater price predictability more than those smallholders with limited ability to expand or reallocate production activities.

Also, to the extent that smallholder behavior is guided by subsistence needs in addition to income generation, one would expect supply responsiveness to a particular crop to be somewhat reduced. Smallholders who consistently and intentionally devote farm resources for cash generation will benefit from greater price predictability moreso than deficit farmers who produce exclusively for subsistence needs. These differences might be expected to change the magnitude of the above conclusions, but probably not the conclusions themselves.

6.6 SUMMARY

Salient points resulting from the study of Zimbabwe's maize subsector include the following:

1. It is difficult to assess smallholder responsiveness to price changes due to the substantial institutional and infrastructural changes that have occurred in communal areas since independence. Yet evidence does suggest that smallholder behavior has been greatly influenced by the extent and proximity of market infrastructure (Stanning, 1986; Rohrbach, 1986).

2. Related to the above point, transaction costs may play an important role in shaping production and marketing incentives. Rohrbach identifies the sources of increased maize production in communal areas as closer market outlets, increased credit and input availability, and more accessible extension services, all of which have transaction cost dimensions. While these conclusions are largely inferential, the data has implications regarding RQ3. Further research is necessary to explore this issue more fully (see 8.2).

3. Communal sector maize marketings increased ninefold between 1980 and 1985. Marketings in 1981, a good rainfall year, were surpassed in all subsequent years except 1983, a drought year; this occured even though real maize prices have fallen by 25 percent since 1981.

4. Supply response in the commercial sector appears positively related to future price predictability. This may have important food security implications concerning the role governments may play to stimulate foodgrain output, rural incomes, and agricultural productivity. This issue is explored further in Chapter 8.

   The results may also be important for designing strategies to promote adoption of yield-increasing technology. As found by Norman (1973), stability of returns is a critical factor influencing subsistence farmers' decisions to adopt new technology. Volatile and unpredictable market prices, regardless of their ability to efficiently allocate already-produced goods, may hamper long run productivity and international competitiveness. This is also revisited in Chapter 8.

5. Generalizations to other African countries must be made with caution because Zimbabwe's institutional system is somewhat unique in Africa. It is unknown whether many African governments have the resources to administer and maintain such a controlled marketing and price system. Furthermore, it has been beyond the scope of this study to consider the opportunity cost of the resources spent by the GMB in fulfilling its price stabilization role. Does such a scheme represent the most cost-effective means to obtain the benefits of price predictability? This question is discussed in Chapter 8.

Chapter 7

MARKETING AND PRICE POLICY IN SOMALIA

7.1 INTRODUCTION

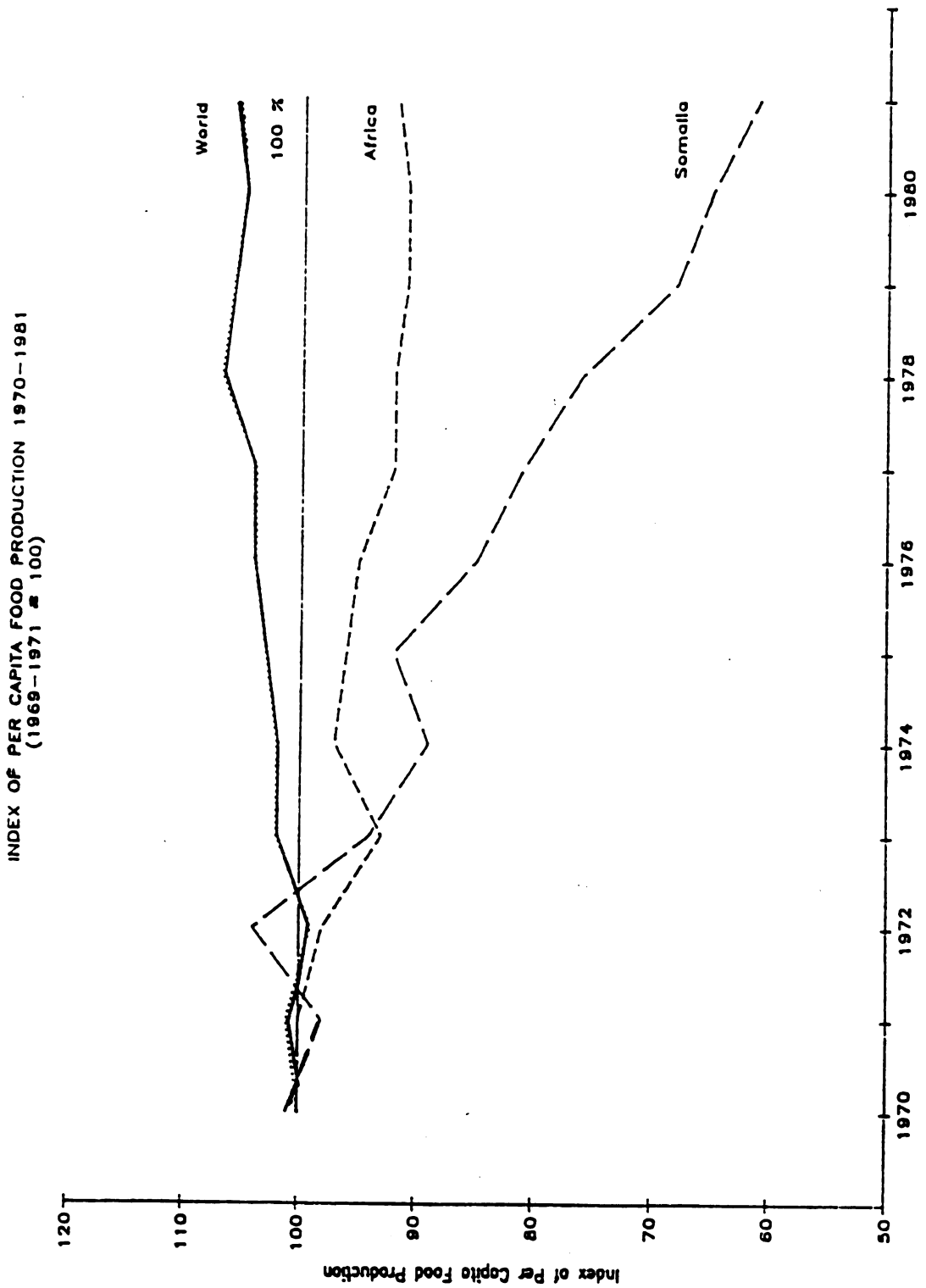
Somalia's grain subsector has been the object of considerable policy attention in recent years. After registering one of the world's slowest food production growth rates in the 1970s, it became increasingly clear that the Somali government's cereals policies were inconsistent with its stated food security objectives. These recognitions culminated in 1984 (tacitly in 1982) with the legalization of private grain trading, and a reduced government role in grain procurement and pricing.

This chapter focuses on the effects of recent policy reforms on the environment and behavior of market participants in the food system. The chapter begins with a brief overview of the food grain system and salient trends affecting performance since 1970. This is followed by an analysis of the recent liberalization efforts, considered in the context of the major research questions outlined in Chapter 1. Specifically, what effect have the reforms had on production and marketed supply, and what non-price factors have affected the magnitude of producers' responses? Second, what have been the causes of grain price volatility, both inter- and intra- seasonal, and how has price volatility affected the production, marketing, and investment decisions of market participants? Third, in the wake of significant market liberalization, what major constraints and risks do farmers and traders still face in traditional markets in

Somalia and what does this imply for cereals policies beyond simply "letting markets work".

7.2 SALIENT FEATURES AND TRENDS IN SOMALIA'S FOOD GRAIN SYSTEM

Twenty percent of Somalia's population derives its livelihood from crop production (World Bank, 1986), a relatively small proportion by African standards. Yet food marketing and price policy are of critical concern in Somalia, because of their important political and income distribution dimensions. In Mogadishu, an average of 60% of monthly household expenditures is spent on food (USAID, 1984). As in many African countries, the importance of food prices in affecting urban consumer incomes has been a compelling incentive for the government to exercise substantial control over food grain distribution and pricing. From its inception in 1971 until 1982, the Agricultural Development Corporation (ADC) was the sole legal buyer of sorghum and maize, the primary food crops in Somalia. Seventy-five percent of ADC grain sales were made to other government agencies (e.g. the military, police, civil servants) at subsidized prices (GSDR/World Bank, 1984; USAID, 1984). A second state agency, the National Trading Corporation (ENC) is responsible for commercial and concessional imports of rice, wheat, and pasta products. These state monopolies were established "to protect...the producer and consumer and eradicate the deplorable system of exploitation" (Wehelie, 1985). Despite these aims, food production growth was among the slowest in the world during the decade of the 1970s (Figure 7.1). A central cause was that grain prices offered to producers by the ADC failed to keep pace with inflation over time (Table 7.2). In the government's efforts to offer low-priced grain to its urban constituents, it had to offer correspondingly low producer prices to cover ADC marketing costs (GSDR/World Bank, 1984). But declining real producer prices and forced sale laws



SOURCE: FAO Production Yearbook 1981.

FIGURE 7.1

TABLE 7.2

NOMINAL AND REAL ADC PURCHASE PRICES FOR MAIZE AND SORGHUM, 1971-1986

(in So. Sh. per quintal)

	MAIZE		WHITE SORGHUM		RED SORGHUM		CPI
Year	NOMINAL PURCHASE PRICE	REAL PURCHASE PRICE	NOMINAL PURCHASE PRICE	REAL PURCHASE PRICE	NOMINAL PURCHASE PRICE	REAL PURCHASE PRICE	1986= 100.0
1971	35	1213	40	1387	40	1387	2.9
1972	35	1251	40	1429	40	1429	2.8
1973	45	1510	45	1510	45	1510	3.0
1974	50	1419	50	1419	50	1419	3.5
1975	55	1307	55	1307	55	1307	4.2
1976	60	1250	60	1250	60	1250	4.8
1977	75	1413	75	1413	75	1413	5.3
1978	75	1284	75	1284	75	1284	5.8
1979	75	1038	75	1038	75	1038	7.2
1980	120	1042	120	1042	120	1042	11.5
1981	180	1083	160	963	150	903	16.6
1982	180	883	160	785	150	736	20.4
1983	220	791	180	647	160	575	27.8
1984	360	673	220	412	180	337	53.5
1985	1500	2037	1300	1765	1100	1494	73.7
1986	1500	1500	1300	1300	1100	1100	100.0

Source: Somalia Ministry of Agriculture, in Holtzman, 1987.

Note: Real purchase prices are constant prices, which are calculated by reflating nominal prices by the CPI, where 1986=100.0.

served to depress farm production incentives.[1] A World Bank team (1983) estimated that during the late 1970s, farmer production costs exceeded average ADC producer prices from 20% to 150%, depending on region, yields, size of farm, etc.

Low official prices progressively inconsistent with supply and demand conditions provided incentives for both farmers and traders to develop parallel market channels. By 1980, an active parallel market had been established (GSDR/World Bank, 1984). But the full potential of these markets was restricted by the high costs and risks of illicit trade. Fines and confiscation of privately traded grain (Jaffee, 1985) undoubtedly raised marketing costs, restricted volume traded, and indirectly depressed production and investment in the grain subsector.

Concurrent with, or perhaps because of these trends in the grain subsector, food imports rose dramatically into the early 1980s. Data inconsistencies make it hard to assess present trends (Holtzman, 1987; Jaffee, 1985; FAO, 1986). Jaffee estimates that grain imports[2] as a percentage of total grain availability rose from 22% in the 1970-74 period to 38% from 1975-79 and to 48% from 1980-84. But since only a fraction of domestic production is actually marketed, imported grain as a percentage of marketed supply has been estimated at approximately 60% from 1980-84.[3] The effects of such large grain inflows on market price movements and farmer incentives are probably acute, especially considering that

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1 ADC requested to the GOS to be allowed to raise producer prices in the 1970s, but was compelled by the GOS to keep prices low. Thus, a distinction should be made between parastatal performance and government policy when identifying the causes of poor public sector performance in cereals marketing.

2 including concessional imports and estimated leakages from refugee aid back into the informal market system (20%).

3 Both the World Bank/Government of Somalia Report (1984) and Jaffee (1985) arrived at this figure using 45% as an estimate of the average percentage of farm production that is marketed.

the timing of release by ADC and ENC has been unpredictable and has often occurred during harvest time, thus exacerbating seasonal price volatility (FAO, 1986; GSDR/World Bank, 1984).

An important implication of Somalia's heavy dependence on imported grain is that urban/urban and urban/rural grain flows may be more important than rural/urban grain flows (Jaffee, 1985). Because Mogadishu is the port of entry for over 85% of imported grain, distribution flows may not conform to typical rural/urban patterns. Spatial price relationships vary according to season and timing of imports, and may be highly unpredictable. At certain points in the year, Mogadishu has been a grain surplus area.

In the early 1980s, the combination of erratic export earnings, burgeoning food import demands, stagnant grain production, and rapidly growing population drove home the need to develop the domestic grain subsector as a conserver of scarce foreign exchange via import substitution (Ag. Sector Survey, 1986). The GOS became increasingly aware that its marketing and pricing policies were out of sync with its stated food self-sufficiency goals. In 1982, an informal and vague government statement was issued that indirectly sanctioned private grain trade (GSDR/World Bank, 1984). In 1984, a clearer government decree implied that private grain sales would no longer be illegal, but that 5% of farmer production must still be sold to ADC. These steps toward liberalization have coincided with favorable rains in 1985 and 1986 and dramatic increases in domestic grain production. Data inconsistencies obscure a clear understanding of the magnitude of farmer responsiveness to market liberalization, although the prevailing belief is that it has been strongly positive. An analysis of the effects of liberalization on farmer production decisions is deferred until the next section.

After the tacit legalization of private grain trade in 1984, the Somali Government has redefined ADC's role in the market. Its ostensible functions are

now threefold: (1) to compete with the private sector in purchasing cereals; (2) to distribute food to deficit areas not serviced by the private sector; and (3) to maintain a national food security reserve (FAO, 1986). Yet donors have frequently pointed out the vagueness of function (1), and the poorly guided implementation of (2) and (3).

For example, good rains and substantial releases of imported grain by ADC during the 1985 and 1986 harvest periods depressed maize prices in the market. Concurrently, the GOS decided to raise official producer maize prices 400% over the 1984 level, with the result that official prices exceeded market prices in the immediate post-harvest period. Farmers' willingness to sell to ADC soon exhausted the agency's budget of Sh. 400 million to finance grain purchases. Within several months after the 1985 harvest, ADC was forced to suspend procurement (FAO, 1986). Additional funds were later provided to ADC in 1985 (but not in 1986) to resume its buying operations until post-harvest market prices eventually rose above the support price. The government's sporadic and selective price supports--caused in part by its own import policies -- appears to have accentuated the volatility and unpredictability of maize prices. It is doubtful that these actions have contributed to a market environment conducive to increased investment, innovation, or production in the grain subsector.

7.3 CEREALS POLICY REFORM AND AFTERMATH: CHANGES IN MARKET ENVIROMNENT, BEHAVIOR AND PERFORMANCE

7.3.1 Factors Responsible For Expanded Grain Production

Policy analysis in Somalia is highly constrained by unreliable, and in several cases, conflicting data series (Holtzman, 1987). Analysis in this section is based on data provided by the Somalia Ministry of Agriculture. Yet discrepancies with alternate sources suggest that the conclusions drawn from the MOA data should be viewed as tentative.

The first problem in discerning the effects of market liberalization is to determine when liberalization actually started. While private trade was officially illegal until 1984, vague governmental statements in 1982 suggested that informal sales would be tolerated. Even since the late 1970s, reports indicate that police obstruction of private trade had diminished somewhat (Ag. Sector Study, 1986). Progressive government toleration of private trade gave rise to a vibrant parallel market, intact by no later than 1980. Farmer and trader behavior was at least partially influenced by the price signals of these markets. This is evident from Table 7.3, which shows that by 1980, official maize and sorghum purchases by ADC dropped off considerably from their levels in the early 1970s. If the percent of total coarse grain marketed by Somali producers is approximately 40%--the figure used by both the GSDR/World Bank (1984) and Jaffee (1985)-- then it is evident that unofficial markets distributed the bulk of domestically marketed grain since 1980. While not attempting at this point to address the causes of these shifts, the discussion is intended to illustrate the difficulty in determining when liberalization -- in a de facto sense -- actually began. The issue is not an empty one, since the magnitude of producer response to liberalization is clearly contingent on when it is considered to have started.

The paucity of weather data in Somalia presents additional difficulties. Lacking information on rainfall, it is difficult to accurately disaggregate grain production increases in recent years into policy and weather effects. For this reason, the analysis focuses primarily on crop area data. Area data may provide a more accurate representation of farm behavior than production data since the former is not influenced by weather variation (Askari and Cummings, 1977). This is especially true if modern inputs are not widely available to effect a yield response, as is the case in Somalia (FAO, 1986).

Maize and sorghum account for over 95% of total grain area cultivated in Somalia (FAO, 1985). Figure 7.4 indicates that total area devoted to these crops increased somewhat since 1980, especially for maize. To some extent, rising acreage trends are to be expected in extensive agricultural systems with expanding populations. To see whether cropped area of maize and sorghum have risen above earlier trend rates in response to liberalization, a simple statistical analysis may be useful.

By regressing time on area cropped to maize and sorghum over the 1970-85 period, rough estimates of annual area growth rates can be obtained for these two crops. These are reported in Table 7.5. Unsuprisingly, area devoted to both crops appear to have risen modestly over the 1970-85 period; aggregate coarse grain area is estimated to have increased by approximately 14,000 hectares per year on average. Of this, maize is estimated as providing close to 5,000 hectares on average, with sorghum providing the rest. Equations were also formed for the 1970-79, 1970-81, and 1970-83 periods, representing alternative pre-liberalization growth rate estimates. These will be important to compare with post-liberalization area levels to evaluate farm planting responses to the reforms.

Next, dummy variables are introduced into the equations representing alternative times in which liberalization was considered to have been implemented. These are specified as follows:

D1: 0 from 1970-79; 1 from 1980-85

D2: 0 from 1970-81; 1 from 1982-85

D3: 0 from 1970-83; 1 from 1984-85

The following equations were specified:

(1a) MAIZE AREA = $a_0 + a_1*TIME + a_2*D_1$

(1b) SORGHUM AREA = $b_0 + b_1*TIME + B_2*D_1$

(1c) TOTAL AREA = $c_0 + c_1*TIME + c_2*D_1$

(2a) MAIZE AREA = $d_0 + d_1*TIME + d_2*D_2$

(2b) SORGHUM AREA = $e_0 + e_1*TIME + e_2*D_2$

(2c) TOTAL AREA = $f_0 + f_1*TIME + f_2*D_2$

(3a) MAIZE AREA = $g_0 + g_1*TIME + g_2*D_3$

(3b) SORGHUM AREA = $h_0 + h_1*TIME + h_2*D_3$

(3c) TOTAL AREA = $i_0 + i_1*TIME + i_2*D_3$

TABLE 7.3

ADC Maize and Sorghum Purchases and Aggregate Production, 1970 - 1986 (in '000 Metric Tons)

Year	MAIZE			SORGHUM		
	Maize Purchases	Maize Production	Purchases/ Production	Sorghum Purchases	Sorghum Production	Purchases/ Production
1970	55	122	45%			
1971	60	129	47%	29	95	31%
1972	37	153	24%	38	165	23%
1973	33	164	20%	15	153	10%
1974	20	150	13%	17	137	12%
1975	30	92	33%	13	148	9%
1976	22	90	24%	20	130	15%
1977	31	111	28%	52	145	36%
1978	22	108	20%	61	141	43%
1979	31	108	29%	56	140	40%
1980	4	111	3%	12	140	9%
1981	6	157	4%	23	222	10%
1982	2	150	1%	8	235	3%
1983	0	236	0%	9	120	8%
1984	1	270	0%	12	221	5%
1985	12	382	3%	14	226	6%
1986**	40	302	13%	35	246	14%

** Planned purchases and maize production during the Gu rains only. Actual purchases are unlikely to match planned purchases.

Source: Holtzman, 1987

FIGURE 7.4
AREA PLANTED TRENDS FOR MAIZE AND SORGHUM: SOMALIA, 1970-86

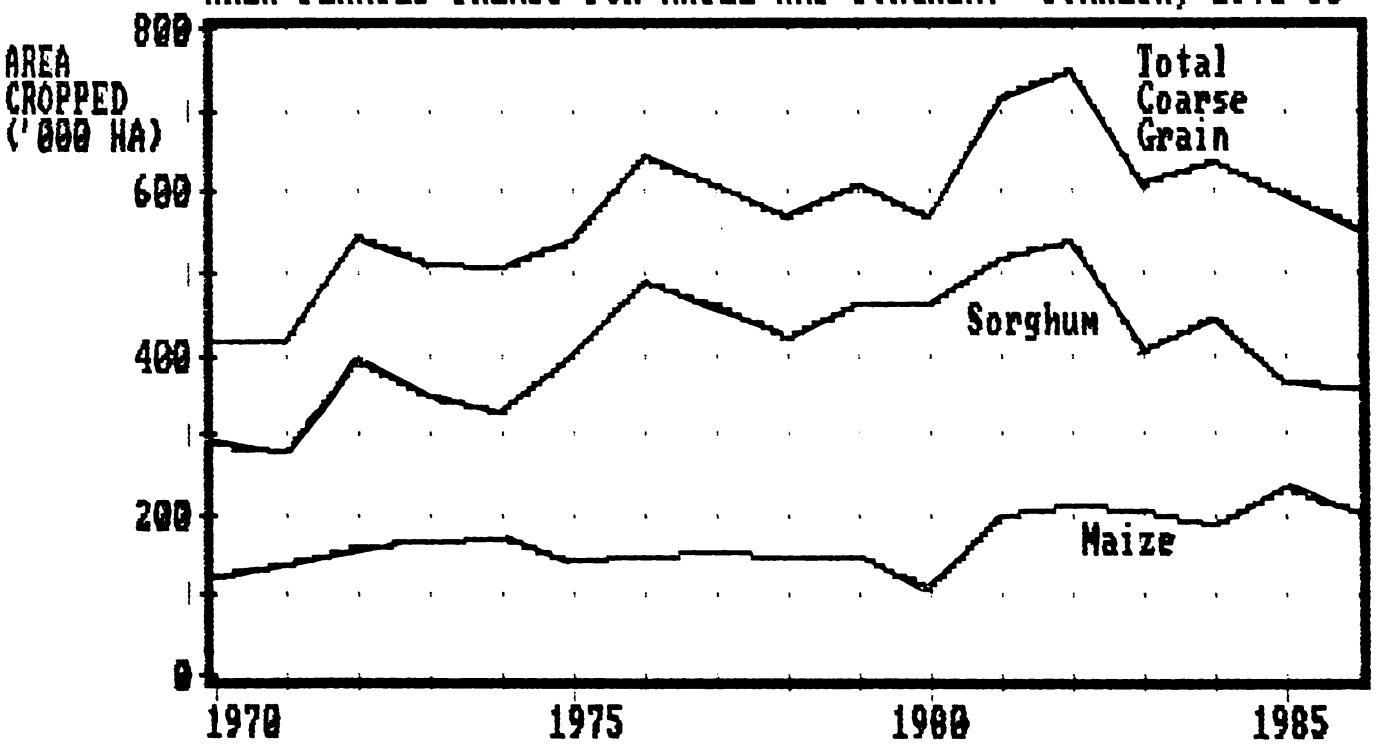


FIGURE 7.4

Figure 7.5:

Regression Results on Grain Area Under Alternative Time Periods

Period	Dependent Variable	Intercept	Time (Annual)	R2
1970-85	Maize Area	123 *	4.8 *	.45
	Sorghum Area	329 *	9.7 *	.37
	Total Area	452 *	14.5 *	.57
1970-83	Maize Area	128 *	3.8	.29
	Sorghum Area	298 *	15.2 *	.63
	Total Area	428 *	19.1 *	.68
1970-81	Maize Area	140 *	1.3	.04
	Sorghum Area	279 *	19.1 *	.77
	Total Area	420 *	20.4 *	.71
1970-79	Maize Area	142 *	1.3	.07
	Sorghum Area	274 *	20.4 *	.71
	Total Area	415 *	21.7 *	.71

* = significantly different from zero at 5%.

The use of equation (1), for example, assumes that de facto liberalization efforts began to affect farmer/trader incentives and behavior as early as 1980. Equation (2) represents the scenario that farmer/trader behavior changed with the first government liberalization announcements in 1982. The use of (3) assumes that liberalization reforms began with the formal 1984 announcement. These three equations are estimated to assess the changes in area planted to coarse grains that may have occured as a response to liberalization reforms, using alternative assumptions about when liberalization actually began to affect producer behavior.

Results are shown in Table 7.6. In equations (1a), (2a) and (3a), the coefficients on all three dummy variables were positive, although highly so in only one case. This indicates a positive maize area response during the 1980s above the trend line for the entire period (Figure 7.7).

In contrast to the strong maize expansion, sorghum area in the 1980s has fallen significantly below the trend line over the entire period. This is true for each of the alternative equations (Figure 7.8). Furthermore, the negative sorghum area trend has outweighed the maize trend, with the result that average total annual grain area in the 1980s has been below the overall trend line. The same result also occurs for equations (2c) and (3c), i.e. average annual coarse grain area in the 1982-85 and 1984-85 years were also below the 1970-85 trend lines (Figure 7.9).

In sum, contrary to common perceptions, the notion of a positive aggregate area response to grain market liberalization in the 1980s cannot be inferred by the data. Although maize area, when compared against the growth rate in the 1970s, has expanded during the period of liberalization, sorghum area has declined precipitously.

Figure 7.6

Regression Results on Grain Area Using Alternative Policy Dummies

Equation	Dependent Variable	Intercept	Time (Annual)	----intercept shifters---- D1	D2	D3	R2
1a	Maize Area	126 *	4.1	9.1	-	-	.46
1b	Sorghum Area	316 *	12.7 *	-34.0	-	-	.38
1c	Total Area	442 *	16.8 *	-24.9	-	-	.58
2a	Maize Area	139 *	1.5	-	47 *	-	.62
2b	Sorghum Area	294 *	16.7 *	-	-99 *	-	.51
2c	Total Area	434 *	18.2 *	-	-52	-	.61
3a	Maize Area	128 *	3.9 *	-	-	22	.49
3b	Sorghum Area	300 *	15.0 *	-	-	-128 *	.59
3c	Total Area	428 *	18.9 *	-	-	-106 *	.68

* = significantly different from zero at 10%

FIGURE 7.7
MAIZE AREA CULTIVATED AND TREND LINES: SOMALIA, 1970-85

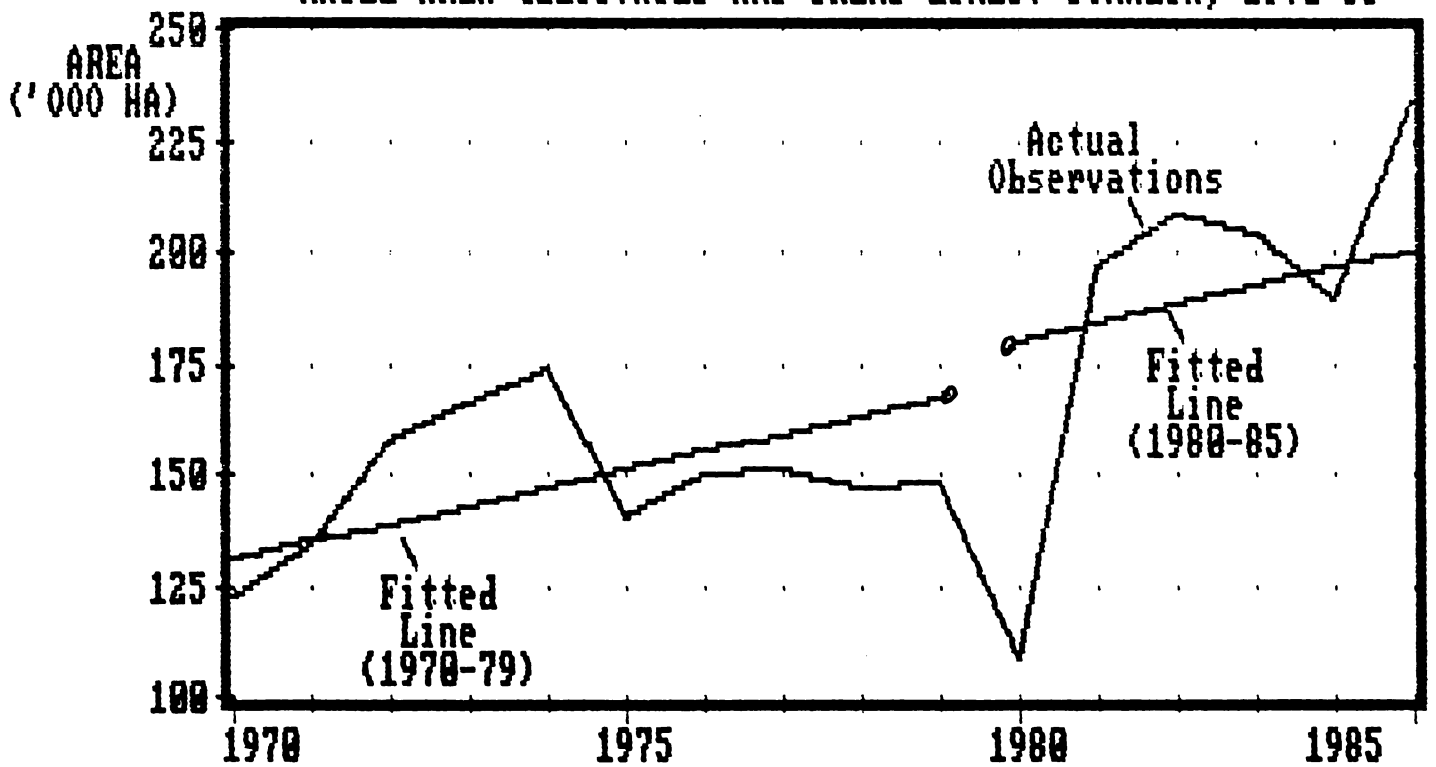


Figure 7.7

FIGURE 7.8
SORGHUM AREA CULTIVATED AND TREND LINES: SOMALIA, 1970-85

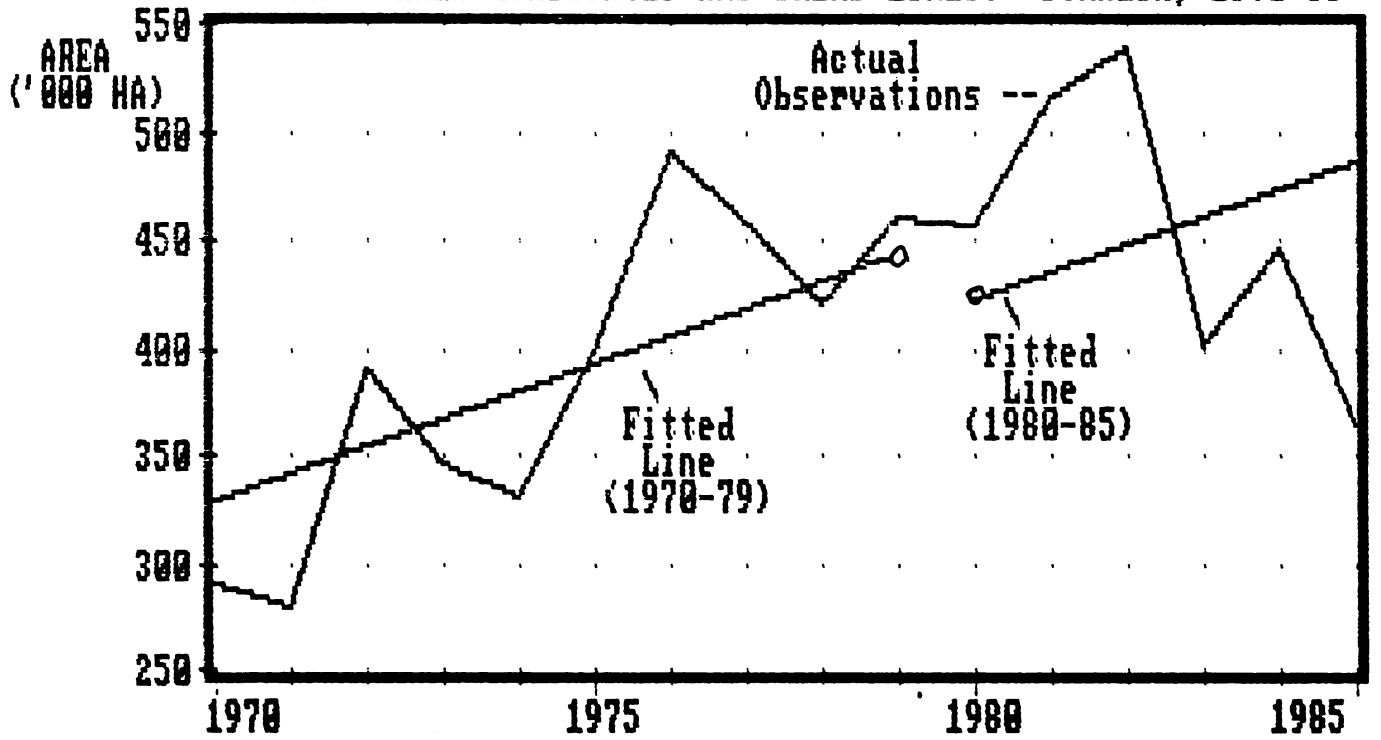


Figure 7.8

FIGURE 7.9
TOTAL COARSE GRAIN AREA AND TREND LINES: SOMALIA, 1970-85

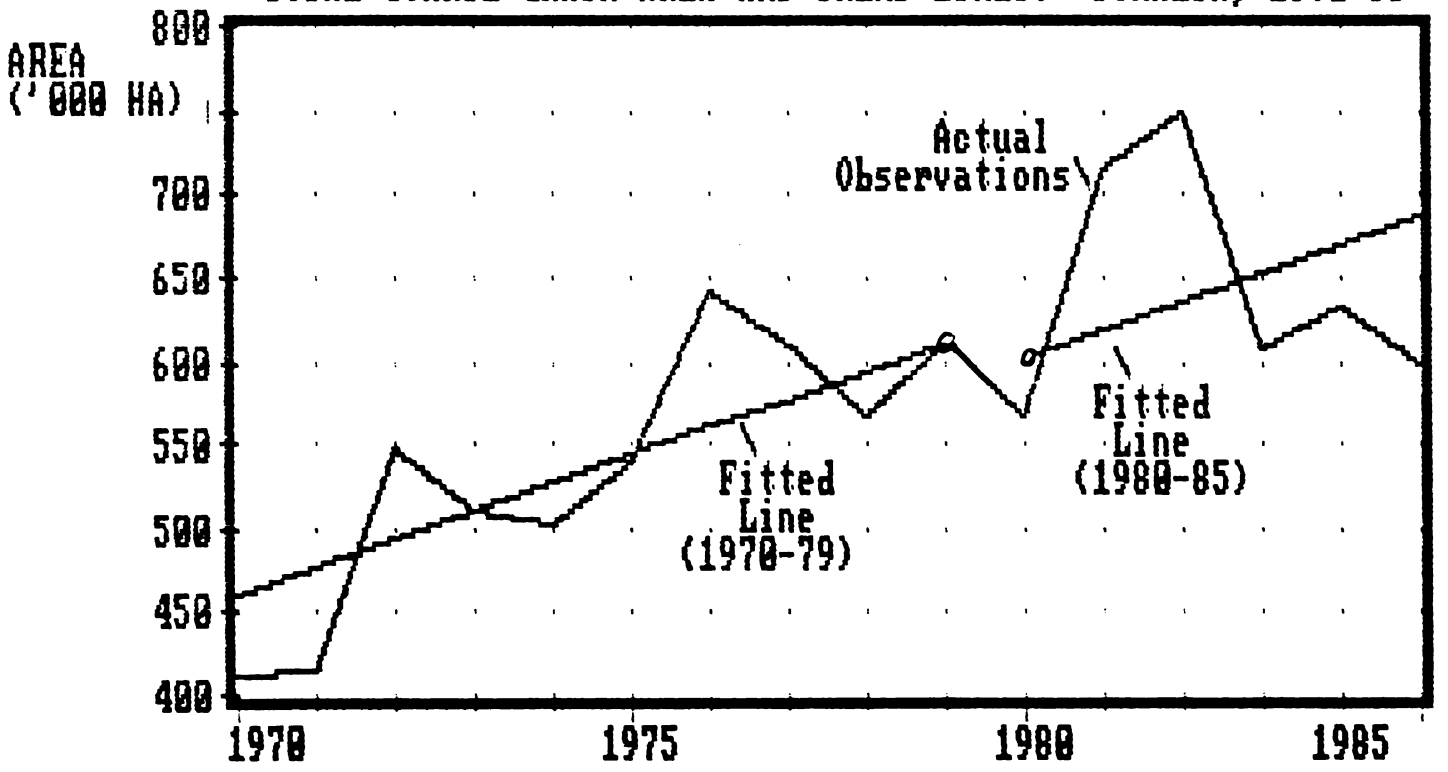


Figure 7.9

There are several alternative explanations for this outcome. First, if production and marketing constraints are less limiting for maize than for sorghum, it is natural that maize farmers will be able to exploit price incentives more successfully than producers on poorer and more remote lands devoted to sorghum. In fact, the prime irrigated lands in Somalia's grain surplus regions are primarily devoted to maize. They are also linked to Mogadishu, the major urban consumtion center, by relatively good roads. Moreover, recent surveys indicate that fallows in the primary maize producing areas have either been reduced or eliminated, representing an extensification of land use (Holtzman, 1987). Land values and aquisitions are also rising in these areas. By contrast, area expansion may be achieved at higher cost on more marginal and remote lands that can support only sorghum and that are poorly connected by market infrastructure.

Although this may be the case to some extent, it is probably unreasonable to assume that maize and sorghum croplands are mutually exclusive. In part, the rise in maize area and the corresponding drop in sorghum area may reflect a shifting of resources from the former to the latter. If not, we must ask what happened to over 50,000 hectares of land devoted to sorghum in the early 1980s that are no longer devoted to the crop in recent years (see Figure 7.4).

A third explanation posits that the degree of participation in agriculture is influenced by the expected returns from activities in other sectors. Alarmingly high rural-urban migration rates suggest that resources may be shifting out of relatively unprofitable rural production systems into urban sectors. This would suggest that sorghum production, grown on relatively poorer quality and remote lands would be affected much more than maize production.

A fourth possibility for the decline of sorghum production despite liberalization concerns demand considerations. Recent consumption surveys have documented changing urban grain preferences, in which low-maintenance and

higher-status grains such as rice, pasta, and flour are gaining higher shares of urban consumer food expenditures (Wehelie and Wehelie, 1987; FAO, 1986; Jaffee, 1985). Sorghum, possibly an inferior good in urban areas, is progressively less popular. These changing tastes are undoubtedly reinforced by massive inflows of "preferred" grain imports. These trends have quite likely exerted downward movement over time in real sorghum prices in Somali informal markets. To the extent that changing urban consumption patterns are driving the food system, such reductions in annual sorghum acreage would be expected.

A balanced approach suggests that each of these explanations are probably true to some extent. In sum, the reduced risks and costs of private trade resulting from market liberalization appear to have induced a positive maize area response, and that this response has come from both new investment in the maize subsector, reduced fallows, and a limited transfer of resources from sorghum to maize production. Falling sorghum acreage is probably due to a combination of resource transfers from sorghum to other agricultural and non-agricultural sectors, and changing demand patterns.

Thus far, the analysis has neglected consideration of yield effects in response to improved market conditions. This is because smallholder input use has been, and remains, very low even by African standards (Ag. Sector Survey, 1986). Reasons for this are discussed in Section 7.3.3. The main point here is that it does not appear that market liberalization has had an appreciable effect on farm input availability or use (Holtzman, 1987; FAO, 1986; Ag. Sector Survey, 1986). On the other hand, Somalia has been favored by comparatively good rains in the 1980s, particularly in 1985 and 1986 (Gu). It is likely that good weather is largely responsible for improved grain yields in recent years.

In conclusion, annual coarse grain area since 1982 has been approximately 10% higher than during the 1975-81 period, but this is below the trend growth rate

of area cropped during the 1970s. Aided by favorable weather, this 10% increase in cropped area has translated into a 70% increase in grain production over the same period. While market liberalization clearly appears to have expanded farmer/trader opportunity sets, other constraints and events in the food system have hampered farmers' ability to exploit the improved incentives to their full potential. The aspect of liberalization most responsible for expanding market actors' opportunities is probably related to reduced transaction costs; liberalization has made it easier for traders to trade in larger, more "transparent" lots, thus spreading costs over larger volumes. Thus, greater scale economies allowed by newly-legalized private grain trade may have stimulated market sales more than increased commodity prices per se. This is because more lucrative parallel market channels were available to and used by farmers long before private trade was legalized.

Finally, much of the private investment induced by a more conducive entrepreneurial environment has primarily long-term payoffs. Therefore, reference to current production and area data may underestimate the total private sector response to improved market incentives. The empirical record generally supports the contention that long-run production and supply elasticities are higher than in the short-run (Table 1.1)..

7.3.2 Grain Price Instability

A multitude of supply shocks affect grain price stability in Somali informal markets. These shocks originate from both poor coordination between private market actors (Section 7.3.3) and ill-planned government policies, which are addressed here. Both create unpredictable fluctuations in domestic market prices and thus present critical problems for Somali farmers and traders (Ag. Sector Study, 1986; FAO, 1986).

Although grain market liberalization has enhanced grain production, storage, and transport incentives, unpredictable government behavior continues to increase the risks and costs of private trade. This includes:

1. Decisions regarding quantities and prices of concessional imports. As reported earlier, the percentage of imported grain in total marketed supply is alarmingly high. Because Mogadishu is the port of entry for 85% of all grain imports, it is possible that urban-urban, or even urban-rural trade flows dominate traditional rural-urban patterns during periods of significant import releases (Jaffee, 1985).

2. Determination of refugee populations, food requirements, and distribution schemes. The refugee food distribution network is not divorced from the larger grain distribution system in Somalia. Grain movements out of the refugee sector are reported to be substantial (Ag. Sector Survey, 1986).

3. The ADC's frequent inability to accept grain at the officially established price. One of the intended benefits of the government pricing scheme was to provide farmers with a floor price and thus a guaranteed minimum return. Yet insufficient funding of ADC often resulted in sporadic and selective purchases.

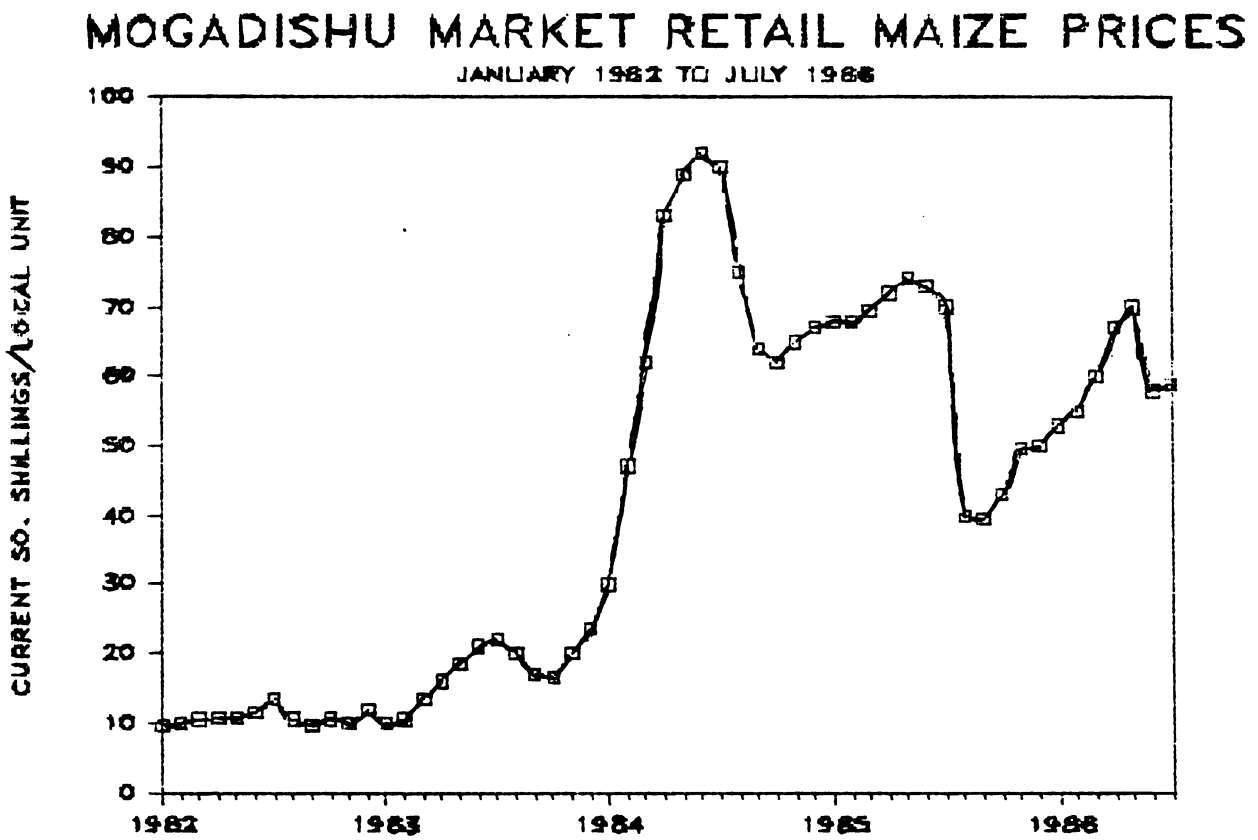
4. Uncoordinated and ill-timed grain releases by ENC and ADC, the two government marketing agencies. There appears to be no clear policy governing timing of grain sales. An example of poorly timed stock releases is apparent in Figure 7.10. In 1983, rather than release limited reserves later in the season, ADC held market prices steady via stock releases during the beginning of 1983 only to run out of stocks in mid-year. This, along with poor 1983 rains, caused market prices to soar (GSDR/World Bank, 1984). The policy clearly exacerbated risk and instability in the entire grain subsector.

5. Regulation of the livestock export trade. Livestock exporters are responsible for a significant portion of Somalia's grain imports, thus influencing domestic market volume and prices (Ag. Sector Study, 1986).

To this list must be added the most important non-governmental source of price instability:

6. Weather. Somalia's food system is highly subject to weather-induced supply shocks; crop failures occur once every five major rainy seasons and once every three minor rainy seasons on average.

Figure 7.10



Source: Holtzman, 1987

To the extent that grain prices are unpredictable, and thus directly affect the income stability of market participants, there will be efforts to diversify cash income portfolios, reducing investments and specialization in the food system (GSDR/World Bank, 1984). While little data is available for substantiation, high price uncertainty has probably depressed the magnitude of farm area and supply responsiveness to market signals. This is precisely because with high price uncertainty, little confidence can be put in the duration of such signals.

7.3.3 Transaction Costs and Performance of the Private Grain Market System

Past studies of Somalia's grain marketing system have often focused predominantly on the detrimental effects of public sector activity and food imports.[4] While policy rcommendations stressing privatization are currently popular, there has been little research or understanding of the structure, conduct, or limitations of Somalia's private grain trade. The prevailing enthusiasm for "free markets" in Africa should not obscure the existence of complex technological and institutional constraints faced by actors in traditional market systems. Many such constraints, unrelated to government policy per se, are due to environmental or institutional barriers inherent in knowledge-poor, risky, market systems emitting inconsistent information signals. Like poorly coordinated public sector activities, weak private sector coordination mechanisms also depress investment and innovation in the food system.

Based on available data, this section explores several major constraints in Somalia's private grain marketing system. Yet a full analysis is not possible due to the paucity of existing knowledge of traditional product, input, labor, and capital markets. This complicates efforts to discern the behavioral changes of

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[4] For example, see GOS/World Bank, (1984); USAID, (1984); ADC (1985); Thompson, (1983); Ag. Sector Study, (1986).

market participants in response to recent liberalization. Reliable market access appears to be a critical problem observed in many areas of Somalia. Jaffee (1985) notes that even in surplus areas, many farmers are not well served by private traders. Especially in more remote regions, farmer marketing options appear to be very limited. In some areas, it is not uncommon for farmers to travel over 60 km to sell grain (Jaffee, 1985). Studies have also made reference to the small quantities and frequent transactions made by producers; seldom do they market their surplus in one or two transactions. This reflects rational behavior in highly uncertain environments. The possibility of crop failure and high prices provides incentives for farmers to retain grain stocks at all times, selling off small quantities periodically to meet cash needs. While this is eminently practical from the farmer's standpoint, it creates disincentives for private traders. They must incur high transaction costs and negotiation costs in dealing with numerous dispersed producers, each selling small and uncertain quantities of grain. Marketing costs are consequently high because scale economies cannot be achieved.

Several studies suggest that Somali traders appear to be passive accepters of grain, servicing areas of established surpluses instead of identifying potential markets and having the inputs or credit to stimulate production there (Ag. Sector Study, 1986). Numerous studies have commented on the poor credit and input distribution systems in Somalia. For example, the non-availability of diesel fuel at crucial times in the planting season has been a major constraint on the acreage planted to maize (FAO, 1986). Neither liberalization of input marketing nor greater foreign exchange availability in recent years has led to much private sector response (Holtzman, 1987; Ag. Sector Study, 1986; FAO, 1986). As a result, potential surplus areas remain deficit areas. There is a critical need to develop institutions that have the financial means and incentives to improve input

availablility and thus yields of the Somali smallholder. These institutions do not appear to exist currently within the country's public or private sector.

Poor market information flows between market actors has also created additional encumbrances on the private marketing system. Jaffee observed that few farmers seemed to know market prices in areas beyond their immediate locale or perhaps in Mogadishu. Similar information gaps faced by rural wholesalers and assemblers have made them reluctant to by-pass other traders or travel to more distant areas to negotiate directly with farmers or retailers (Jaffee, 1985). Inability to identify opportunities for direct marketing in other regions has contributed to an unusually large number of participants in any one distribution channel.[5] Although a large number of participants may be a rational result of high uncertainty and poor information flows in the system, it undoubtedly results in higher marketing costs than if market information were more widely and quickly transmitted through the economy. Lack of coordination between market actors has also produced a near absence of specialization in grain marketing. Most grain wholesalers either carry rice, sugar, flour, and pasta, or a combination of maize, sorghum, and sesame. Wholesalers cannot specialize due to periodic shortages of all foodgrains (Jaffee, 1985). Coordination and informal contracts between market participants do not appear to be strong enough to assure continued access to supplies at reasonable prices. This reinforces the need to remain flexible by handling many commodities and inhibiting wholesaler specialization. It also reduces the level of agents' expertise in, and knowledge about, any one commmodity in addition to impeding stable trading relationships.

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5 These include farmers, rural assemblers, several levels of wholesalers, commission traders, importers of many types, retailers, donor agencies, and refugees.

Many of the above problems in traditional Somali grain markets are undoubtedly related to its recent reemergence after a decade of suppression by the government. Established trading relationships are still in the process of redevelopment. Current government policies have also added to the risks and costs incurred by market participants, as discussed above. But available evidence indicates that institutional and technological bottlenecks inherent in traditional market systems are also responsible for low input and credit availability, and limited farmer marketing options in many areas. The scope for alternative coordination mechanisms such as cooperatives, direct marketing, contracts, or contingency markets is unknown. Yet they present theoretical advantages that may be further explored to evaluate their practical application. Infrastructural development is also a clear means to promote better market access and information flows. Policy options to improve the market environment for private investment and innovation are explored in the final chapter.

7.4 SUMMARY

Regarding the three research questions, the following implications emerge from the admittedly weak empirical base on the Somali grain subsector:

1. Considering the constraints put on private incentives and trade during the era of state-controlled grain distribution, liberalization has clearly expanded the opportunity sets of market actors. Although parallel markets have probably existed for some time, their newly-legal status has probably reduced the risks and costs of private trade, permitted greater scale economies in transportation and storage, and thus indirectly raised farmgate prices, assuming relatively competitive markets. As long as government's sanctioning of private trade is viewed as long-term, this alone should stimulate future investment, production, and marketed supply in the cereals subsectors.

2. While domestic grain production during the 1980s -- aided by favorable weather -- increased 70% above average annual production in the mid to late 1970s, cropped area increased only 10%. This is actually below the area trend line established during the 1970s. Disaggregaing the data shows that maize area increased moderately in the 1980s while sorghum area has stagnated.

3. Thus, although liberalization may have raised incentives to grow and market grain, a variety of constraints have reduced area

responsiveness. These may include expected returns in other sectors, rural-urban migration, changing urban consumption patterns, grain price instability and risk, lack of proven technical packages to improve yields in dryland areas, inadequate infrastructure and information flows, and underdeveloped input and credit markets.

4. While ample attention has been focused on the limitations of government marketing and import policies, there is a comparative dearth of knowledge or understanding of the technological and institutional constraints faced by actors in traditional grain marketing system in Somalia. What little is known suggests that Somali grain markets diverge substantially from the perfectly competitive ideal. This implies that high payoffs may accompany liberalization if greater emphasis were put on ways to make traditional markets work better. This chapter has identified (1) information transmission, (2) market access in more remote but potentially surplus areas, (3) input availability, and (4) greater exploitation of scale economies through alternative exchange arrangements as starting points.

5. It should be mentioned that the private marketing system is gradually recovering after over a decade of suppression by the government. Naturally, marketing costs and risks should decline as contacts and relationships between actors are re-established and as learning takes place.

Chapter 8

SUMMARY AND POLICY IMPLICATIONS

8.1 INTRODUCTION

The final chapter is divided into six parts. Sections 8.2--8.4 summarize empirical findings and policy implications for each of the major research questions. The consistency between the empirical results and theoretical considerations in Chapters 3 and 4 are also discussed. Important dimensions of price incentives are summarized in Section 8.5. Because of data limitations and the research scope of this study, further information is needed in many cases to clarify meaningful public sector roles. Accordingly, Section 8.6 presents research issues needed to more convincingly support or reject the implications reached in this study. Section 8.7 provides a brief summary of the purpose and findings of the study.

8.2 FARM RESPONSE TO PRODUCER PRICE INCENTIVES

8.2.1 Summary of Case Studies

It is widely agreed that African farmers attempt to take advantage of favorable output prices if conditions permit. There is much evidence to suggest, however, that multivaried production and marketing constraints restrict most smallholders' ability to respond to these incentives.

In Somalia, public sector grain distribution monopolies and low official producer prices have been replaced by free private trading and more profitable official prices. This has coincided with a sizeable increase in maize area planted. Reports from Somalia indicate that both higher prices and reduced

transaction costs resulting from market liberalization are largely responsible for the maize area increases. Yields have also increased, but this is probably due more to favorable weather in recent years.

By contrast, sorghum area has stagnated since the early 1980s, despite liberalization and higher official producer prices. Moreover, total coarse grain area during the 1980s has been clearly below the trend line established during the 1970-79 period. This result also holds if the data is compared between the 1970-81 and 1982-85 periods, or between the 1970-83 and 1984-85 periods. Shifting demand patterns, poor market infrastructure, price unpredictability, and the primarily subsistence objectives for growing sorghum may help explain this phenomenon. In any case, the Somalia data indicates that more profitable prices thought to accompany market liberalization, while perhaps necessary, have been insufficient to stimulate area response in total coarse grains.

In Zimbabwe, communal sector maize area, production, and marketings have expanded dramatically during the 1980s despite several drought years and a 25% drop in real maize prices since 1981. While output prices clearly did not deter production for the market, price movements probably played a minor role in influencing smallholder behavior since 1980. More reliable market access and input availability appear to have accounted for the bulk of communal sector production increases. This is examined in section 8.3.

In Mali, a myriad of structural and environmental changes preclude a clear picture of farmers' responses to grain prices. Price uncertainty has been severe, due to variable weather, government import policy, and the unreliability of market access at official producer prices. The high degree of uncertainty in the opportunity sets of most rural producers suggests that area decisions were largely a function of past planting behavior, instead of short run market signals. This is supported by time series data analyzed in this study and by Levine (1983). Both

studies assumed price expectations were formed from past prices, under several alternative lag structures. This simplification, along with unreliable data, suggest that the results should be interpreted cautiously.

8.2.2 Policy Implications

The empirical evidence in the three case studies is largely supportive of the theoretical implications outlined in Chapter 3: While output prices must be profitable to stimulate smallholder production for the market, a variety of other environmental and marketing conditions must exist to enable farmers to exploit the opportunity. This is consistent with Cleaver's cross sectional analysis for the World Bank (1985), which indicates that only about 10% of the variation in agricultural growth in Sub-Saharan Africa is associated with the nominal protection coefficient.[1] Factors that appear to constrain farmers' ability to respond to price incentives include:

1. Labor constraints: Numerous studies throughout Africa have indicated that crop area planted is limited primarily by family size. During peak periods such as planting and weeding, the supply of agricultural labor is usually highly inelastic. Given traditional labor-intensive technology, peak period labor shortages limit the ability of smallholders to expand output in response to price incentives.

   This does not imply that larger families or higher population would promote per capita food production or food security. To do so, the marginal productivity of an additional person during the several weeks out of the year in which labor is scarce would have to surpass the amount of food he/she consumes in a full year.

   Agricultural labor bottlenecks may be viewed as a symptom of (1) the time-specificity of critical labor tasks in traditional agriculture, and (2) the interaction between crop profitability, labor productivity, production technology, and labor wages. If production technology limits the profitability of producing for the market, both labor productivity and thus labor wages are likely to be low, therefore impeding labor supply within the relevant range of wage levels (see Chapter 3.2.3).

2. Rural-urban income disparities: With urban incomes commonly 4 to 9 times higher than rural incomes (Lele, 1984), marginal increases in producer food prices cannot be expected to dramatically alter the

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1 The nominal protection coefficient is a long run concept measuring domestic producer prices relative to import parity prices.

incentives to seek urban employment. This may be one factor contributing to observed inelastic agricultural labor supplies in Africa.

3. Interaction between environment and farm objectives: Cropping patterns are conditioned by smallholders' primary objective of self-sufficiency in cereals. In dryland areas, this tends to result in sorghum and millet being grown in successive years, somewhat irrespective of relative price changes. In addition, crop rotation is often limited by soil type. Maize, for example, is not well suited to poorer bush soils common in much of Mali and Somalia, and is largely absent from crop rotation patterns in such environments. Furthermore, rotation in traditional agriculture is designed so that crops that make progressively fewer demands on the soil follow one another as soil fertility becomes depleted. Because shifting cultivation agriculture limits the flexibility of crop choice, government price policies may be of minor importance, at least in the short run.

4. Price uncertainty: The Zimbabwe results support Heiner's theoretical contention that farmers tend to respond to high price uncertainty by basing planting decisions largely on standard operating procedures learned from past experience rather than expected future market price signals. Commercial farm area response appeared to be highly sensitive to price uncertainty. Area response in the communal sector may be less affected by price uncertainty, because most smallholders grow grain for home consumption as well as for cash generation. Yet the inverse relationship between supply response and price uncertainty is still likely to hold throughout most of Sub-Saharan Africa. More on this in section 8.4.

   For farmers who typically sell little or no grain, the effect of price uncertainty on supply response is largely unknown. One may hypothesize that the higher the price variability of a certain staple crop, the greater the incentives for risk averse households to produce that crop to fulfill own consumption needs. More research is clearly needed in this area.

5. High transaction costs of trading: Despite favorable changes in output prices, farmer response may be impeded by high transaction costs of obtaining inputs and marketing their grain. This factor appeared to have much to do with depressed maize marketings in Zimbabwe's communal sector before independence. This is discussed further in section 8.3.

For these reasons, the relationship between higher producer prices and expanded output for the market can easily be overstated. The effectiveness of price policy to stimulate farm product marketings may thus hinge on corresponding measures to alleviate critical production and marketing constraints.

Apart from producers' response to price changes, the case studies provide insights on the limitations of governments to pursue price policy objectives. Both

ADC in Somalia and OPAM in Mali had frequently ceased purchasing grain in mid-year or even before the season started due to inadequate resources and poor planning (by both the governments and donors). While raising producer prices for the benefit of producers is often desirable, limited government resources and capabilities restrict the ability to set them irrespective of prevailing supply and demand conditions. Well-intentioned price policies probably created more confusion than benefit to Somali and Malian farmers since it was unclear whether OPAM and ADC would be in the market offering the official price at any given time. This subject is revisited in Section 8.4.

Lastly, food policy analysts must examine the incidence of costs and benefits associated with price policy. While many writers have emphasized the "food price dilemma", i.e. that food price levels involve welfare trade-offs between sellers and net buyers of food, it has often gone unnoticed that the latter group includes many rural farm households. Evidence from Mali shows that most of the domestic grain marketings are supplied from larger, wealthier farmers in surplus areas. By contrast, a large portion of farm households are net buyers of food. This finding is consistent with studies in many other developing countries (Sherman, 1985; Ellsworth and Shapiro, 1985; MSU-CESA, 1987; Mellor, 1978). Higher food prices cause the largest decline in the incomes of low-income consumers (including many small farm families) because food expenditures make up a larger proportion of their total expenditures; higher food prices cause the largest increase in the incomes of well-equipped producers having the means to produce large surpluses. Hence, there is a need to reconsider the distributional effects of policies designed to promote rural incentives by increasing food prices.

To conclude, four important lessons concerning price responsiveness and price policy are suggested from the case studies: First, due to major environmental, technical, and institutional constraints, the ability of price policy to stimulate

smallholder production for the market can easily be exaggerated. Second, the distributional effects of price policy must be closely examined. Higher prices may elicit a supply response mainly from larger, well-equipped producers, while deficit farm households may actually become more food insecure. Third, the differing cases of Mali and Somalia on the one hand and Zimbabwe on the other indicate that public sector efforts to influence agricultural prices are not inherently inimical to the welfare of producers. Performance depends on the resources and organization of the particular marketing institution, as well as the objectives and policies that the government has chosen for it to implement. Fourth, given the limited financial and infrastructural resources of most African parastatals, it appears that government price policies designed to raise producer incentives irrespective of prevailing market conditions can easily break down.

Obviously, food security would be impossible without profitable output prices. Yet this begs the question; what constitutes a profitable price? Cost of production plus cost of marketing the goods is one answer, but it obscures the fact that these costs are in turn influenced by transaction costs in farmer/trader and trader/trader relationships. In other words, the coordination mechanisms within the marketing system shape the costs, demand, and hence prices for inputs and goods. This suggests that output price and cost of production, the variables most often analyzed to determine farm incentives, have a number of underlying institutional determinants. Some of these are examined presently.

8.3 TRANSACTION COSTS

8.3.1 Summary of Case Studies

Unfortunately, much research on African marketing systems has dwelt on public sector inefficiencies and the existence or lack of competition in private trade. While these are clearly important, there has been a relative dearth of information concerning farmer/trader and trader/trader relationships. The way in

which risk is shared between actors, information is transmitted, and rules and contracts are enforced may affect profit incentives and even whether markets exist or not.

Although available secondary data from Mali, Somalia, and Zimbabwe shed little light on these issues, several inferences are suggested by the case studies. In both Somalia and Mali, market liberalization has appeared to reduce the risks and transaction costs of private trade. Individuals no longer have to trade in small lots to conceal goods. Per unit transport and negotiation costs have been reduced due to scale economies of larger transactions (Staatz, 1987). Risk premiums imputed into the margins of traders may be expected to have fallen. Yet it is unclear to what extent these factors have affected grain production or sales.

The Zimbabwe study illustrates the link between transaction costs, input availability, yields, and maize marketings. Since independence, more extensive market infrastructure in communal areas have reduced the search and transport costs of selling crops and obtaining inputs. This has coincided with increased input adoption, yields, and marketed supply, despite declining real prices since 1981. This illustrates the point that movements in producer prices alone do not adequately reflect incentives when viable yield-increasing inputs, technology, and reliable markets are more accessible to producers.

In Somalia, sorghum production and market sales have stagnated even though real sorghum prices have risen dramatically in the mid 1980s. One interpretation is that prices were so low in the past that not even a large increase in real prices could make sorghum production profitable. While this may be true, it obscures the fact that profitability of growing a crop for sale strongly depends on the costs of selling (or buying) it. In some cases, high transaction costs may be what causes the output price to be unprofitable. Poor infrastructural development and market

access in remote sorghum-producing areas suggest that high transaction costs are partly responsible for continued stagnation in the sorghum subsector.

Incentives to produce for the market are influenced by reliable market access, ease of obtaining credit, predictable behavior of trading partners, trust, etc. Yet the incentives for traders to provide these conditions are dependent on the ability of a region to produce reliable surpluses. Traders will be reluctant to provide credit or services to areas where surpluses are small and uncertain, and where farmers are geographically dispersed and costly to reach. But these services are exactly what farmers need before production for the market is to be profitable. Inability to overcome the risks and costs of exchange constitutes a missed opportunity, in which potential surplus areas remain deficit areas.

8.3.2 Policy Implications

The awareness of transaction costs requires a reinterpretation of the argument that the organization of food production and distribution is a consequence of the technical components of production and marketing activities (Jaffee, 1986). The uncertainties inherent in farm production and exchange and the information limitations concerning future market conditions causes actors to adopt risk-reducing strategies. While reducing personal vulnerability, such strategies may cause missed opportunities that impede production and market development. They are, in effect, second best solutions, i.e. they may not otherwise be individually or socially desirable if the risks and costs of exchange could be alleviated.

This suggests a potentially useful role for the public sector to alleviate these transaction costs and risks between the vertical stages in a subsector, rather than force institutions and behavior within the food system to be restricted by these encumbrances. This discussion falls broadly under the public finance literature related to public goods, externalities, and "social traps". Additional research in

traditional African food systems is needed to more clearly define government policies to reduce the costs of exchange between market actors.

8.4 PRICE UNCERTAINTY

8.4.1 Summary of Case Studies

Traditional markets in Somalia and Mali are characterized by volatile price fluctuations. During the 1980s in Mali, it has not been uncommon for average annual grain prices to vary 30% from one year to the next. In Somalia, price instability was even higher; retail maize prices rose over 400% in nominal terms from late 1983 to early 1984. In addition to the magnitude of annual fluctuation, the timing of seasonal price peaks and troughs has also been highly variable. Causes of inter- and intra-year price uncertainty include weather variability, poor information flows, market thinness, government import policies and the generally low price elasticities of demand and supply for staple foodgrains.

Price uncertainty in Zimbabwe appears to have been less of a problem, owing to the government's ability to maintain a minimum price throughout the year. Since 1976, these floor prices have been announced before planting time, to the benefit of both communal and commercial farmers.

Moreover, the Mali and Zimbabwe results indicate an inverse relationship between the level of price uncertainty and ability of farmers to respond to market signals. This is consistent with the theoretical work of Heiner (1983) which suggests that the greater the unpredictability in the environment, the more agents' behavior is based on past behavior. In Zimbabwe for example, during the period of greater price uncertainty (before 1976), commercial maize plantings were highly correlated with maize plantings in past years. Plantings were largely uncorrelated with changes in market prices. Yet in the period of greater price certainty (1976-84), maize area became highly correlated with prices and uncorrelated with last year's plantings. This indicates that high price uncertainty

hampers one of the most important functions of a market system, that of allocative efficiency. If price risk causes producers to base decisions primarily on past standard operating procedures rather than price signals, the allocative efficiency of a market is lost. In standard economic terms, marginal costs will not equal marginal revenues, at least in the short and intermediate runs. Resource misallocation is created, with adverse implications for farm income generation and food security. If an inverse relationship between supply response and price uncertainty holds for most of Africa, then price policy will be more effective if corresponding measures were taken to bring future price information into the present.

While these results should be viewed cautiously since they are drawn from the commercial sector, anecdotal evidence and other studies indicate that the results are largely applicable to the behavior of smallholders throughout much of Sub-Saharan Africa (Dupriez, 1979; Lele, 1975). More empirical work is needed to further clarify the effects of price uncertainty on smallholder production and marketing behavior.

8.4.2 Policy Implications

Price uncertainty may have two critical effects on food production and food security. It is clear that more productive farming techniques are imperative for long run food security in Africa. Yet because farm incentives to invest in new agronomic techniques are dependent on not only the cost of the inputs but on expected output prices, volatile price swings make technology adoption more risky. The vagaries of market price fluctuations present serious resource allocation difficulties for producers. Due to the observed risk-averse behavior of farmers throughout Africa, investments in new productive technologies may be somewhat impeded without more predictable and remunerative output prices. For example, even though investment in a new input package may appear profitable

given prices of the preceding few years, farmers may be unwilling to invest since good weather could easily depress prices enough to make the return to investment low or negative.

The effects of price uncertainty on producer behavior suggests a potentially critical role for the public sector. Because uncertainty may affect producers' willingness to produce for the market (and own consumption), the dimensions of price policies designed to enhance producer incentives must be addressed in more detail.

8.5 DIMENSIONS OF INCENTIVE PRICING

Market participants require price incentives for dynamic growth and investment in the food system. Yet there are at least two dimensions to the term "incentive price". One is the question of price level, as discussed in section 8.2.1. The "food price dilemma" issue illustrates that raising producer prices has a cost: higher consumer prices. Ultimately, lower consumer food prices are imperative to increase disposable income for the consumption of non-farm goods, thereby stimulating demand and growth in these sectors. At the same time, farm prices must be profitable to provide marketing incentives. But the case of Zimbabwe's communal sector since independence suggests that an increase in productivity and yields can make it possible for rural incomes and incentives to be growing at the same time that prices are declining. By improving market access and input availability to smallholders, the GMB reduced transaction costs and facilitated yield increases with the result that smallholder marketings rose steadily despite stagnant real output prices. The reverse case in Somalia's sorghum subsector illustrates the same point: Despite a 100% rise in real prices, sorghum marketings stagnated. This may be due in part to high transaction costs in remote sorghum producing areas with poor market access.

This suggests that price incentives are not simply a matter of raising output prices, but may be more importantly a function of the coordination mechanisms that influence input delivery, cost of producing and marketing crops, prices and thus demand. Therefore, the "food price dilemma" may involve less of a trade-off than it implies. Greater attention devoted to the methods of exchange within the vertical stages of a subsector may induce greater investment and production in the system without raising consumer prices.

The other dimension of "incentive pricing" concerns price uncertainty. This involves increasing the predictability of prices around a given mean. As discussed above, enhanced price predictability may stimulate production in two important ways. First, investment and innovation by risk-averse participants are likely to be affected by the stability of returns. Therefore, policies that reduce the range over which output prices fluctuate may encourage greater investment and specialization in production and marketing activities. By contrast, volatile and unpredictable market prices, regardless of their ability to efficiently allocate already-produced goods, may hamper long run productivity and international competitiveness.

Second, price predictablility may in some cases increase farmers' ability to respond to market signals. To the extent that farm planning decisions are guided by expected prices, the closer the match between expected output and actual prices, the higher the value of marketed output and cash income. In other words, greater price predictability may enhance farm productivity by allowing farmers to generate a higher value of output from a given bundle of production resources.

Farmers who typically purchase staple grain would have incentives to shift production to higher valued crops, where possible, if acquisition prices of staples were more certain and stable throughout the year. This may also permit greater product specialization to match environmental zones.

8.6 FUTURE RESEARCH ISSUES

Because certain issues related to grain marketing policy have been beyond the boundaries of this research paper, the policy implications on which this analysis is based are necessarily tentative. The research scope has not included important macro considerations (e.g. fiscal effects of government policies on subsector performance), budget outlays required to perform particular agency functions, etc. Even within the boundaries of micro-level subsector analysis, policy recommendations hinge to some extent on unanswered research issues, some of which are presented below.

Timing of Price Announcements: The Zimbabwe case study indicates that price predictability may affect both farm resource allocation and supply responsiveness. If, for whatever reasons, some form of floor price is deemed desirable, questions arise as to the appropriate timing of price announcements.

To effectively aid farmers in production planning, prices must be known before planting time. Otherwise, a forecasting error is introduced which may impair farm resource allocation. However, the case studies of Mali and Somalia show that prices set without regard to expected supply and demand conditions can exacerbate uncertainty. Since expected supply and demand conditions cannot be fully known before planting time, or even shortly thereafter, price announcements at this time create burdensome risks for the parastatal. During good harvest years, the parastatal is shouldered with the budget-draining and perhaps unfulfillable responsibility of buying huge amounts of grain to drive the price up to the relatively high floor price. During poor harvest years, the parastatal must have adequate forecasting capabilities and finances to import grain soon enough to maintain the desired ceiling price.

Therefore, the time at which the parastatal price band is announced reflects a trade-off between providing greater certainty for market participants and

increased demands on parastatal resources needed to keep prices within the price band. The same trade-off is reflected in the width of the band; a wide margin would minimize transactions and expenses to the parastatal yet would permit a wider range over which future prices may fluctuate. An intermediate plan involves announcing tentative ceiling and floor prices prior to planting, yet leaving government with the option to adjust the price band up or down by some specified amount, once knowledge of expected supply--based on crop surveys and rainfall conditions--is available.

Further examination of these issues may enable governments to better operationalize and implement buffer stock schemes while reducing parastatal outlays, risks, and allocative efficiencies that result from setting prices inconsistent with prevailing supply and demand conditions.

Price Elasticities: Another important question involves the price elasticities of supply and demand for the relevant commodities. The argument is frequently made that price stabilization is not income stabilizing. This is true under assumptions of near unit elasticity of the market supply and demand curves. But the empirical evidence for food grains in developing countries suggests these elasticities are usually quite low (Scandizzo and Bruce, 1980). In such cases, price stabilization can increase both the stability of producers' revenues as well as their average level (Behrman, 1979). Better knowledge of supply and demand elasticities for particular crops in particular countries are necessary to estimate the expected benefits and stockholding costs of a price band/buffer stock policy.

Dynamic Gains to Greater Price Predictability: Provided that demand and supply elasticities for staple grains are quite low, then truncating the range over which future market prices may vary will increase the stability of farm revenues. This may stimulate production, marketing, and investment activities within the subsector over time. However, little empirical work has addressed such potential

dynamic benefits to greater price predictability. What actully is the loss in output and market volume in the medium and long run from simply letting informal markets develop their own means to deal with price uncertainty? It is clear that risk markets are poorly developed in most parts of Sub-Saharan Africa. This means that the market mechanism cannot provide pareto-efficient conditions except under the most stringent conditions (Newbery and Stiglitz, 1981). Chapter 3 has examined how market participants take various actions to insulate themselves from risk in an uncertain market environment. Attempting to estimate the costs and foregone production caused by price uncertainty presents serious methodological problems. For example, reduced price risk affects farm production/marketing/technology investment, which affects farm productivity, cash incomes, effective demand for consumer and farm goods, prices, and thus production and marketing decisions again. Similar causal chains exist for traders and consumers as well. Although sorting out the effects of increased price certainty presents a methodological nightmare, some estimates, either explicit or implicit, are required before justifying direct public sector participation to reduce price uncertainty.

Budgetary Costs of Price Band/Buffer Stock Policy: This study has not attempted to estimate the budgetary costs associated with maintaining a buffer stock policy. The opportunity cost of resources spent--both financial and administrative--must be discerned to merit implementation. Many economists contend that other types of public investments may also promote domestic production and market incentives at less cost. Future research requires more comprehensive evaluations of the dynamic costs and benefits of this and alternative policies designed to reduce price risk.

Current Resources and Capacities of Governments: Do most African governments actually possess the resources to implement such a buffer stock program? Due to

large and frequent supply shocks caused by variable weather, price stabilization policies in Sub-Saharan Africa may be harder to implement than in other regions. Government credibility is a critical requisite. For instance, when the price approaches its floor, if traders and speculators doubt the government's ability to sustain the floor price, they might sell their stocks, making it indeed impossible for the government to maintain the floor (Stiglitz, 1987).

Relationship Between Price Uncertainty and Thin Markets: Might greater price predictability help address the thin market problem? The reluctance of rural households to rely on markets for their staple food needs may be partially due to wide price fluctuations caused by variable weather and low demand elasticities. In such an environment, risk-averse farmers with low savings have great incentives to pursue food self-sufficiency objectives. The interaction between price volatility and subsistence-oriented farming patterns may be both cause and consequence of thin markets in rural areas. In his review of market systems in Africa, Jones states:

> If thinly dispersed populations could rely more on the market for their staple food supply, they would be more likely to enlarge their production of crops for sale, a first step toward the development of specialized production areas and consequent decline in costs of moving produce to and from farms, thus raising the prices of what farmers want to sell and reducing the prices of what they want to buy (1984).

Although conceptually compelling, further empirical research is necessary to discern the strength of this relationship. If further research supports the existence of mutually reinforcing links between price uncertainty, self-sufficiency production patterns, low productivity, low incomes, and thin markets, then measures to reduce price unpredictability may have high payoffs. Such considerations must be included in the costs and benefits of government participation in agricultural markets.

Incidence of Costs and Benefits of Price Stability Policy: Lastly, what are the effects of alternative price policies on different types of producers? Policy analysis must consider the effects of changing both the level and degree of stability of market prices on various strata of farm households. As suggested by the Mali study, raising prices to stimulate production may simply induce higher production from larger farms that have better access to credit, inputs, land, and labor, and are thus better able to exploit price incentives. On the other hand, the fact that many rural farm households are net buyers of food suggests that important constraints already prevent them from achieving food self-sufficiency. Therefore, raising producer prices may not be an effective way to stimulate output from this strata of farmers.[2] Policy recommendations stressing the need for higher producer prices may well exacerbate food insecurity over a wide range of rural and urban households. What supply response does occur may come primarily from the larger, better-connected farmers, at least in the short run.

While these conclusions are supported by limited empirical evidence, more information is needed on the incidence of costs and benefits involved in changing the level of producer prices. Likewise, the effects of changing the variability of prices around a given mean on various strata of producers is poorly understood. While policy changes have, in the aggregate, produced discernable changes in production and marketed sales in Zimbabwe, Somalia, and Mali, initial evidence suggests that the incidence of costs and benefits differed widely among producers in different resource, environmental, and infrastructural classifications.

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2 This group is typically quite large. Over half of the farm households surveyed in rural Mali and Rwanda under a MSU-CESA project (1987) sold little or no grain at all during 1986, a good harvest year. Stanning's study in Zimbabwe (1986) identifies populated rural regions where no grain is typically sold. See also Ellsworth and Shapiro (1985).

8.7 SUMMARY

Appropriate roles of government in African food markets have been the subject of intense policy debate. All market activities take place within a set of institutional constraints defined by governments. Therefore, the question is more accurately phrased: Should government play a more direct or indirect role in the food system. Meaningful analysis to clarify the decision must include these central issues:

1. What are the constraints within traditional food systems that impede coordination between market participants? How do these constraints affect the production/marketing/investment behavior of market actors?

2. What role should governments play--if any--to alleviate these constraints that affect the production/marketing/investment behavior of market actors? How would the costs and benefits of direct government measures (e.g. infrastructure development, information dissemination) to facilitate the workings of traditional markets?

This study has used both theoretical considerations and empirical evidence from Mali, Zimbabwe, and Somalia to explore these questions. Particular attention has been given to the ways in which actors' behavior is affected by price level, price uncertainty, and the transaction costs of exchange.

Available data supports several important conclusions.

1. Although African farmers may attempt to exploit price incentives, their ability to do so varies according to the particular farm characteristics: farm size, labor availability, access to credit and inputs, market infrastrucutre, price unpredictability, soil and weather characteristics, technology, etc. Therefore, the use of price policy to stimulate production may elicit an output response from a narrow segment of producers--those for which the above factors are not binding constraints. These production and marketing constraints may be more or less binding across different strata of farmers (Chapters 5 and 7).

2. Because of this, food policy analysts must examine the incidence of alternative price policies. The so-called "food price dilemma," i.e. that food price levels involve a welfare trade-off between producers and consumers of food, may be quite misleading. In the countries examined, a significant portion of rural producers were actually net buyers of food. Although price policy may be effective in increasing food production in

the aggregate, food-deficit farm households may actually become more food insecure as a result (Chapter 5).

3. Price and environmental uncertainty may induce rural farmers to base production decisions largely on standard operating procedures learned from past experience rather than on future expected market signals (Chapters 5 and 6). The Mali and Zimbabwe data suggest a possible inverse relationship between price uncertainty and farmers' ability to respond to market signals. This indicates that high price uncertainty may hamper one of the most important functions of a market system, that of allocative efficiency. If price risk causes producers to base decisions primarily on past operating procedures rather than future expected price signals, the allocative efficiency of a market is impeded. Resource allocation is impaired, with adverse implications for farm income generation and food security. If an inverse relationship between supply response and price uncertainty holds for much of Africa, then price policy will be more effective if corresponding measures were taken to bring information on future prices into the present.

4. Limited government resources and capabilities restrict parastatals' ability to implement price stabilization or buffer stock policies (Chapters 5 and 7). Without adequate forcasting, budgetary, administrative, or infrastructural capacities, governments cannot credibly set or maintain prices irrespective of prevailing supply and demand conditions.

5. Market liberalization has, in Mali and Somalia, appeared to reduce the risks and transaction costs of private trade. Yet it is unclear to what extent this has affected grain production or sales (Chapters 5 and 7).

6. The Zimbabwe study illustrates the link between transaction costs, input availability, yields, and maize marketings (Chapter 6). More extensive market infrastructure may reduce search and transport costs of obtaining inputs and selling crops. This may increase input use, yields, and consequently marketed supply for a constant or even declining real price level (Chapter 6). This illustrates the point that movements in producer prices alone do not adequately measure incentives when yield-increasing inputs, technology and reliable markets are more accessible to producers.

These conclusions have been discussed in more depth in Sections 8.2--8.5. Policy implications flowing from this analysis must be viewed as somewhat tentative due to unanswered research questions that impinge on the conclusions, as well as the limited research scope of the study. Accordingly, important issues for further research have been identified in Section 8.6 to more accurately assess the costs and benefits of active government participation in African foodgrain markets.

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