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Rice Marketing in Senegal River Valley: Research Findings and Policy Reform Options

by

Michael L. Morris

MSU International Development
Paper No. 8
1987

Department of Agricultural Economics
Michigan State University
East Lansing, Michigan 48824

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RICE MARKETING IN THE SENEGAL RIVER VALLEY: RESEARCH FINDINGS AND POLICY REFORM OPTIONS

By Michael L. Morris

EXECUTIVE SUMMARY

Since 1983, the Bureau of Macro-Economic Analysis (BAME) of the Senegal Agricultural Research Institute (ISRA) has supported a comprehensive research program focused on agricultural product marketing in Senegal. This paper presents the results of the Fleuve Cereals Marketing Study, one of three regional BAME studies of cereals markets. Based on field research carried out between February 1984 and October 1985, the Fleuve study examines the organization and performance of rice markets in the Senegal river valley (Fleuve region) and explores possible policy reform options to improve future performance.

Policy Environment

The cereals policy environment in Senegal is rapidly evolving. Prolonged drought, stagnating food production technology, and rising input costs have buffeted the agricultural sector of the economy in recent years. Average annual food production has declined, while the demand for food has risen under a 3% annual population growth rate. Because of these divergent trends, the nation's cereals self-sufficiency ratio has fallen from an average of 61% over the period 1973-79 to an average of 51% over the period 1980-85.

Confronted with a widening food deficit, Senegalese policy makers are seeking strategies to increase domestic cereals production. One such strategy involves the ambitious plan to develop the Senegal river valley for irrigated rice production. The government of Senegal has joined with those of Mali and Mauritania to construct two dams on the Senegal river which theoretically will permit irrigation of 240,000 ha in Senegal alone. If current projections are correct, Senegal's rice marketing system will soon have to handle major increases in domestic production. This raises the question of whether existing rice marketing policies are sufficiently flexible to accommodate the possible transformation of the rice sub-sector.

Rice currently moves through two related but distinct marketing channels in the Senegal river valley. The official marketing channel comprises a network of government agencies, parastatals, and licenced private traders who are authorized to trade rice in accordance with official regulations and policies. The parallel marketing channel consists of unauthorized marketing agents who trade rice illegally.

Both channels were investigated as part of the Fleuve study. Primary data collection activities included a multi-visit survey of 122 licenced grain distributors, a census of parallel channel rice hullers, a costs-and-returns survey of a sample of 26 rice hullers, and an informal survey of parallel channel marketing agents. Additional data were obtained from secondary sources, notably the internal records of the major government marketing organizations and official statistics.

Empirical Findings

Government rice marketing policies have achieved mixed results in northern Senegal. Official marketing organizations such as SAED, CPSP, and SONADIS have ensured adequate food supplies while helping irrigation become established in the Senegal river valley, but the cost of these achievements has been high. The state-controlled marketing organizations lack the technical expertise, management capacity, financial resources, and institutional flexibility to respond rapidly and effectively to changing market conditions. Official rice marketing operations therefore tend to be sluggish, unreliable and inefficient. Regulations designed to lend order to private-sector marketing often have just the opposite effect, introducing unnecessary barriers to entry into the industry, imposing regulatory compliance costs, and creating numerous opportunities for corruption.

Dissatisfaction with the performance of the official channel has contributed to the rapid and extensive growth of a thriving parallel marketing channel for rice. The February 1985 census of village rice hullers performed as part of this study identified 122 operating hullers, of which 65% had been purchased during the previous 18 months. Monthly throughput on these machines during the 1985 marketing season was estimated at 5,500 tons paddy, over 2.5 times the amount processed by SAED's industrial mills.

How has the parallel channel performed from an economic point of view? This research fails to substantiate the popular belief that private grain traders are inefficient, incompetent, and exploitative. Itinerant assembly traders respond quickly and effectively to changes in market conditions, adjusting their offer prices in response to local supply and demand forces, taking immediate delivery of the commodity, and offering farmers on-the-spot cash payment. Prototypical operating budgets indicate that village rice hullers provide attractive investment opportunities for rural entrepreneurs, generating returns of 35-46% on the owner's initial investment. Costs-and-returns analysis reveals that small-scale processing technologies compare favorably with industrial technologies, especially when forward and backward transportation linkages are taken into account. Analysis of marketing margins furthermore makes clear that parallel channel traders can earn positive net returns to their marketing activities while benefiting producers and consumers through more favorable prices and improved marketing services.

Trend Projections

Supply and demand trend projections have been used to generate forecasts of the likely long-term evolution of regional cereals balances in the Senegal river valley. In view of the uncertainty surrounding future events, sensitivity analysis was introduced to test the likely effects of changes in the rates of: 1) population growth, 2) expansion in irrigated area, 3) increase in cropping intensity, and 4) improvement in yields. Three main conclusions can be drawn from these trend projections. First, the demand side of the food balance equation must not be overlooked by policy makers. Second, the rate of expansion in irrigated area and the rate of increase in cropping intensity will be more important in influencing total cereals production than the rate of improvement in average yields. Third, relatively small changes in key parameters, both on the demand side and on the supply side, could lead to quite different degrees of regional self-sufficiency in cereals production.

Policy Reform Options

Four key areas are targeted for policy reform. Specific reform proposals prescribe an expanded role for private firms and individuals, while recognizing that government involvement in rice marketing serves real economic and political needs in Senegal. Thus, the reform proposals are designed to bring about improvements within the framework of existing policies.

1. Market Organization and Licencing Requirements

Parallel channel grain traders can provide timely and cost-effective marketing services at low levels of remuneration. Yet many potential market participants are discouraged from engaging in rice marketing activities because of barriers to entry, high regulatory compliance costs, expenses involved in avoiding detection by government regulators, or the threat of financial penalties for violating the government's legal marketing monopoly. Performance of the rice marketing system would improve if private firms and individuals could be induced to participate more productively in a wide range of marketing activities. This could be accomplished by eliminating the ineffective government marketing monopolies, removing unnecessary licencing requirements for private traders, clarifying the rules of the game, and more consistently enforcing marketing regulations.

2. Pricing Mechanisms and Levels of Prices

Changes in the cereals pricing structure will be necessary to provide private firms and individuals with economic incentives to expand their marketing activities. Fixed panterritorial and panseasonal prices could be replaced by a more flexible pricing structure incorporating seasonal and regional variability. This would allow private traders to adjust buying and selling prices in response to variable market conditions. At the same time, the

government could introduce a limit pricing system that sets upper limits (ceilings) and/or lower limits (floors) on certain key prices, while allowing actual market prices to vary through time and across space in response to changing market conditions. Government control of prices would be assured by an import management policy based on variable-levy tariffs, rather than the present import quotas.

3. The Role of Government Marketing Organizations

Despite their shortcomings, government cereals marketing organizations do produce some system-wide benefits. Calls for the complete "privatization" of cereals markets are therefore unjustified. But government marketing organizations could operate alongside authorized private traders, complementing the private grain trade rather than attempting to supplant it. Government investment patterns could be shifted from regulatory and policing activities towards the provision of a greater range of facilitative goods and services (e.g., infrastructural development, dissemination of market information, technology research and development).

4. Choice of Technique in Rice Processing

Rice processing operations in the official marketing channel continue at the two government-managed industrial mills despite clear evidence that the mills perform poorly. Meanwhile, village rice hullers operating in the parallel channel adequately serve the needs of local producers, marketing agents, and consumers while providing an attractive investment opportunity for local entrepreneurs. From an economic point of view, decentralized village-level processing compares favorably with centralized industrial-scale processing, especially when forward and backward transportation linkages are taken into account. Future expansion in processing capacity therefore should be based on the flexible, small-scale processing technology embodied in village hullers, at least until production increases are realized which will justify the construction of additional industrial processing facilities. In the short run, the performance of the government mills could be improved by shifting management responsibilities to profit-conscious private firms.

**RICE MARKETING IN THE SENEGAL RIVER VALLEY:
RESEARCH FINDINGS AND POLICY REFORM OPTIONS**

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PREFACE

The research discussed in this paper has emerged from a long-term collaborative research project between the Senegal Agricultural Research Institute (ISRA, Institut Senegalais de Recherches Agricoles) and the Department of Agricultural Economics at Michigan State University. The project has been financed by the U.S. Agency for International Development, Dakar, Senegal.

The author, Dr. Michael Morris, recently completed his Ph.D. in agricultural economics at Michigan State University and is employed in the Economics Program at the International Maize and Wheat Improvement Center (CIMMYT) in Mexico. During the period March 1984 through August 1985, Dr. Morris worked in Senegal under the collaborative ISRA/MSU project as a Research Associate. Readers interested in topics covered in this paper are encouraged to submit comments directly to Dr. Morris (Economics Program, CIMMYT, Apartado Postal 6-641, 06600 Londres, Mexico D.F.) or to Dr. R. James Bingen (Associate Director, Senegal Agricultural Research and Planning Project, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan 48824-1039).

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Editors

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RICE MARKETING IN THE SENEGAL RIVER VALLEY: RESEARCH FINDINGS AND POLICY REFORM OPTIONS

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1. INTRODUCTION

1.1 Objectives of The Paper

Since its creation in 1983, the Bureau of Macro-Economic Analysis (BAME) of the Senegal Agricultural Research Institute (ISRA) has supported a comprehensive research program focused on the marketing of agricultural products in Senegal.¹ An important component of this research program has been a series of three regional studies of cereals markets, undertaken in the Senegal river valley (Fleuve region), in the Peanut Basin, and in the Casamance. The broad objectives of these three studies are to shed light on the performance of regional cereals markets, to identify current and potential future marketing problems, and to provide input into the design of government cereals policies.

This paper reviews and extends previously published findings of the Fleuve Cereals Marketing Study and discusses their policy implications.² The objectives of the paper include:

- 1) to describe the organization of cereals markets in the Senegal river valley;

¹For a description of BAME research programs, see Newman, Crawford, and Faye (1984); and Newman, N'Doye, and Faye (1984).

²Preliminary findings of the Fleuve Study appeared in four BAME Working Papers (Morris 1985a, 1985b, 1985c, 1985d). Additional results appeared in the author's Ph.D. dissertation (Morris 1986).

- 2) to assess the performance of current marketing policies, based on the findings of the BAME study;
- 3) to analyze selected policy reform options and their expected performance consequences; and
- 4) to identify likely barriers to reform and to discuss possible actions to bring about desired change.

Note: Although the BAME marketing studies originally were designed to encompass all cereals, geographical differences in production and consumption patterns eventually produced different regional foci. During 1984 and 1985 when the Fleuve study was in progress, extreme drought conditions depressed rainfed cultivation of millet, sorghum, and maize, with the result that irrigated rice was the only cereal produced in any quantity in the river valley. Since agricultural production was similarly affected throughout the country, the regional deficit could not be made up from domestic supplies, and the shortfall had to be overcome with imported rice, as well as lesser quantities of imported sorghum. Rice was thus the only cereal produced and consumed in any quantity in the Senegal river valley during the period of the study, so that the Fleuve Cereals Marketing Study de facto ended up as a rice marketing study.

1.2 Context of the Study: Senegal's Widening Food Deficit

Senegal appears to be losing ground in the Malthusian race to feed itself. Prolonged drought, stagnating food production technology, and spiralling input costs have buffeted the agricultural sector of the economy, causing it to contract over the 1973-85 period. Meanwhile, population has grown by nearly 3% per year, steadily increasing the demand for food even as the domestic supply has dwindled. Because of these divergent trends,

the nation's cereals self-sufficiency ratio has decreased. Expressed as a percentage of total supply (domestic production + commercial imports + food aid), domestic cereals production has fallen from an average of 61% over the period 1973-79 to an average of 51% over the period 1980-85.³

Senegal's widening food deficit has been overcome with the help of commercial cereals imports. Despite the government's desire to reduce dependence on foreign supply sources, commercial imports have increased as the nation has increasingly resorted to world grain markets to make up chronic production shortfalls. Currently, cereals imports are at an all-time high. During each of the past three years, over 500,000 metric tons of rice, wheat, sorghum, and maize have been purchased on world markets to meet domestic consumption needs.⁴

Reliance on commercial food imports is not necessarily undesirable. Senegal has traditionally attempted to capitalize on its comparative advantage in peanut production by using peanut exports to generate the foreign exchange needed to finance food purchases. But while commercial food imports have increased, the nation's ability to pay for them out of peanut earnings has decreased. Inclement weather, declining soil fertility, and the ineffectiveness of state-run production support programs have cut into peanut production, while world prices for oilseeds have fallen. As a result of these twin pressures, the value of Senegal's peanut exports declined from an average annual value of 46,102 million FCFA during 1975-80 to an average annual value of 33,937 million FCFA during 1980-84.⁵ This decline in food purchasing power was further eroded by unfavorable exchange rate

³Martin (1986).

⁴Martin (1986).

⁵Martin and Dieng (1986).

movements, which effectively increased the cost to Senegal of dollar-denominated purchases on world grain markets.

Food aid has also been instrumental in meeting Senegal's cereals consumption requirements. As in the case of commercial food imports, levels of food aid have risen in recent years, increasing from an average of 50,574 metric tons annually during 1974-79 to an average of 137,408 metric tons annually during 1980-85.⁶

Senegal's food deficit is rapidly reaching crisis proportions. With domestic cereals production now satisfying barely one half of total consumption requirements and the peanut sub-sector in disarray, the Senegalese economy has become dangerously vulnerable to external forces. Falling demand for oilseed products, rising input costs, uncertain world grain prices, and fluctuating exchange rates threaten the nation's ability to produce and/or to purchase enough food for the burgeoning population. Repeated infusions of foreign aid thus far have averted widespread hunger, but there has been little progress in arresting the steady decline of the agricultural economy and alleviating the nation's massive food deficit.

1.3 Senegal's Agricultural Development Strategy

Although policy makers disagree over the degree of food self-sufficiency that Senegal can and should seek, all concede that solving the nation's food problems will require a revitalization of the agricultural economy. An important component of the government's strategy is the plan to develop the Senegal river valley for irrigated crop production. (Figure 1) Once renowned for its high agricultural potential, the Senegal

⁶Martin (1986).

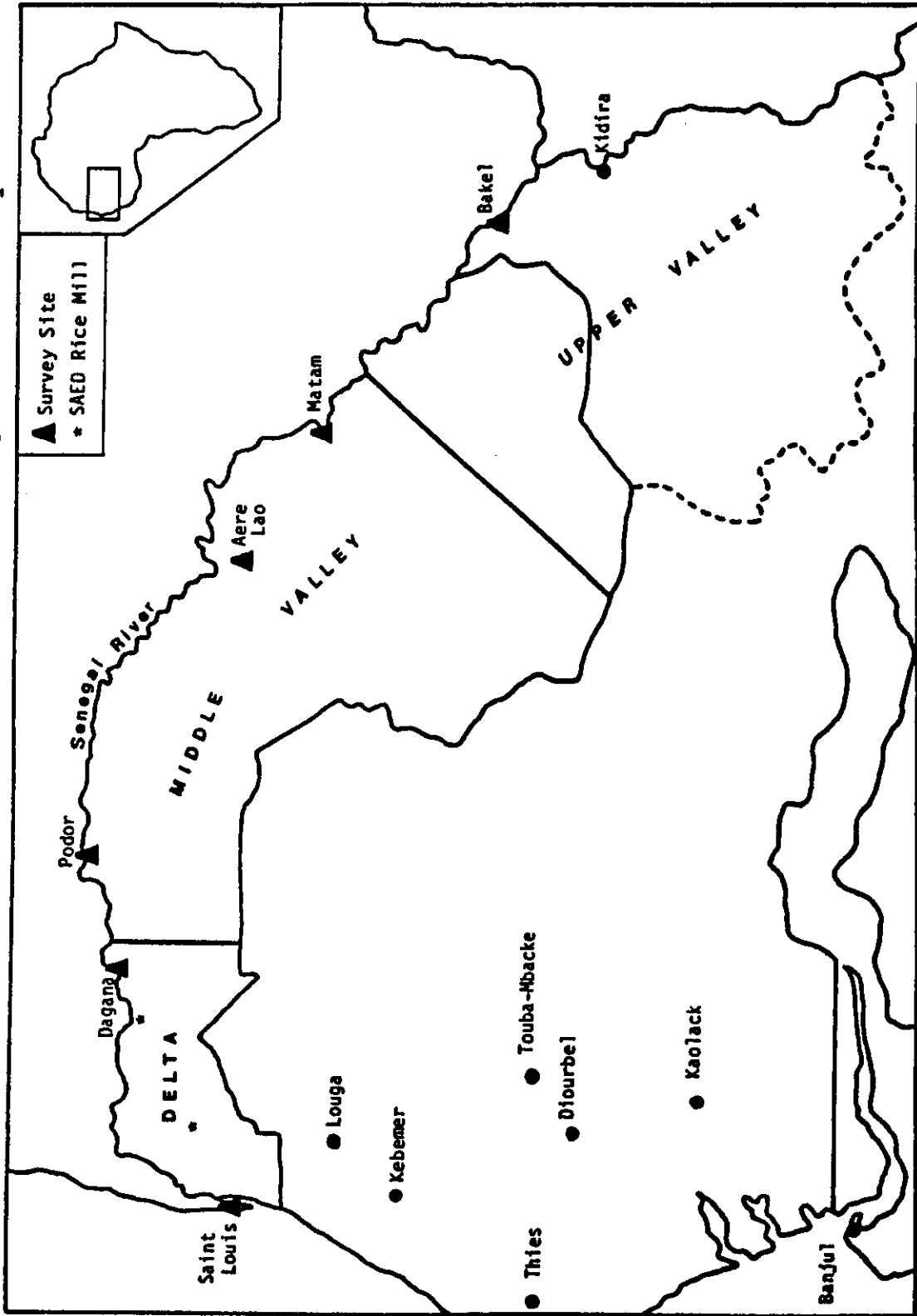
river valley during the past few decades has suffered a gradual economic decline. In the hope of revitalizing the region, Senegal, Mauritania, and Mali in 1972 formed the Organisation de la Mise en Valeur du Senegal (OMVS), a confederation committed to the economic and social development of the river valley. Work was initiated on the construction of two dams which theoretically will make possible irrigation of 370,000 ha, of which 200,000 ha are in Senegal. The hope is that the Fleuve region will eventually be able to produce a cereals surplus to help stem the rising flow of grain imports.

Agricultural development efforts in the Senegalese portion of the river valley have been entrusted to a regional development agency, the Societe d'Amenagement et d'Exploitation des Terres du Delta (SAED). Nominally responsible for a wide range of development activities, SAED in practice has concentrated on promoting intensive rice production. SAED initially exercised control over the entire rice economy, but responsibility for selected production and marketing activities is increasingly being transferred to the private sector in order to reduce government support costs.

1.4 The Importance of Marketing Policy Reforms

In Senegal as elsewhere, agricultural development planners have tended to concentrate on production issues while ignoring marketing and price policy problems. Production is undeniably critical, but the importance of an effective food marketing system cannot be underestimated. Despite the concentration on achieving rice production increases in the Senegal river valley, relatively little has been done to anticipate future marketing needs, as if marketing will take care of itself once the dams are completed, the irrigation systems constructed, the crops planted and harvested. This is short-sighted, because anticipated

Figure 1: Socio-economic Zones of the Senegal River Valley



production increases are not likely to materialize unless the rice marketing system proves capable of handling additional quantities of grain at reasonable costs. If current projections are correct and the Fleuve region becomes self-sufficient in rice during the early 1990's, at least 300,000 tons of paddy will have to be assembled, processed, stored, and distributed each year, over three times the amount currently produced. Such quantities would greatly exceed existing capacity, suggesting that the rice marketing system will have to undergo extensive changes.

Government policies will define the rules of the game under which these changes take place. Marketing regulations will establish who may participate in rice marketing activities, and pricing rules will influence the structure of economic incentives governing the behavior of market participants. In view of the government's firm commitment to enhancing the effectiveness of state interventions in the agricultural economy and reducing budgetary support costs, future rice marketing policies will likely involve a new mix of public-sector and private-sector responsibilities. But before policy reforms can be undertaken, the performance of the existing marketing system must be evaluated to help in identifying measures needed to improve future performance.

2. ORGANIZATION OF RICE MARKETS IN THE SENEGAL RIVER VALLEY

2.1 Justifications For Public Involvement in Food Grain Marketing

Paradoxically, even though many researchers have concluded that indigenous West African grain marketing systems perform traditional exchange functions surprisingly well in the face of imposing physical and social constraints, the common perception is quite different.⁷ In Senegal, cereals traders continue to be maligned in the eyes of many. Assembly traders are accused of taking advantage of farmers by buying crops at low prices following the harvest, when farmers' needs for cash are urgent, and then reselling them at a huge profit later in the season. Wholesalers are accused of hoarding grain in order to create artificial shortages to drive up prices. Retailers are accused of taking advantage of consumers by selling above official price levels and by charging usurious rates of interest. These common perceptions produce an unfavorable impression of marketing as an economic activity and help perpetuate a strong bias against the intermediaries or "middlemen" who perform trading operations.

Deeply held ideological convictions about the supposed unreliability, inefficiency, and unfairness of private traders, although frequently exaggerated and rarely substantiated by empirical evidence, exert considerable influence on the policy process in Senegal. The widespread public mistrust of grain traders eases the way for public-sector involvement in cereals marketing activities. Government authorities take advantage of the bias against traders to gain public acceptance of marketing policies which may in part be designed to curtail undesirable

⁷For a representative sampling of the literature on the relative efficiency of indigenous marketing systems, see Berg (1979), Gilbert (1969), Hays (1973), Jones (1972), and Meillassoux (1975).

activities but may also have quite different objectives (e.g., consolidation of economic power in the hands of the state).

Active public-sector participation in cereals marketing is justified in Senegal for numerous reasons. According to national planning documents, state intervention in cereals markets is necessary because the government is best able to serve the "public good". Most Senegalese appear to believe that state grain marketing organizations perform certain functions which would be performed poorly, if at all, by profit-oriented private traders. These include: guaranteeing a market outlet for producers; ensuring adequate supplies of basic food staples; supporting producer incomes; protecting consumer incomes; stabilizing prices; restricting marketing margins; managing cereals imports and exports; administering national cereals reserve stocks; preparing emergency food plans; and managing relief operations.

Functions such as these clearly involve matters of public concern. But just because the state has a legitimate role in safeguarding the public interest does not necessarily mean that it needs to monopolize cereals marketing activities. Many forms of market organization are possible, with differing degrees of state participation and control. The Senegalese government has chosen to implement cereals marketing regulations which extend sweeping authority to state grain marketing organizations while limiting the activities of private traders. The resulting centralization of power in the hands of the state shows the government's determination to retain control of the politically strategic food supply.

Recently, however, the traditional arguments in favor of centralizing market power have begun to ring hollow. The disappointing performance of public marketing organizations has caused the government to reconsider the wisdom of assuming

exclusive authority for many cereals marketing activities. Policy makers have started to look for a more cost-effective mix of public- and private-sector responsibilities that would expand the role of private market participants while enhancing the effectiveness of government investments.

2.2 Current Market Participants and Policies

Cereals policy in Senegal in the years since Independence has been characterized by a multiplicity of participants and a proliferation of marketing regulations. The turbulent history of cereals policy is not reviewed here.⁸ Instead, this section focuses on the main actors currently involved in the production and marketing of cereals in the Fleuve region, particularly rice. These include SAED, CPSP, MCI, licenced private traders, SONADIS, and CSA. Each is briefly described, with reference to its assigned role in the official marketing system.

2.2.1 SAED (Societe d'Amenagement et D'Exploitation des Terres du Delta)

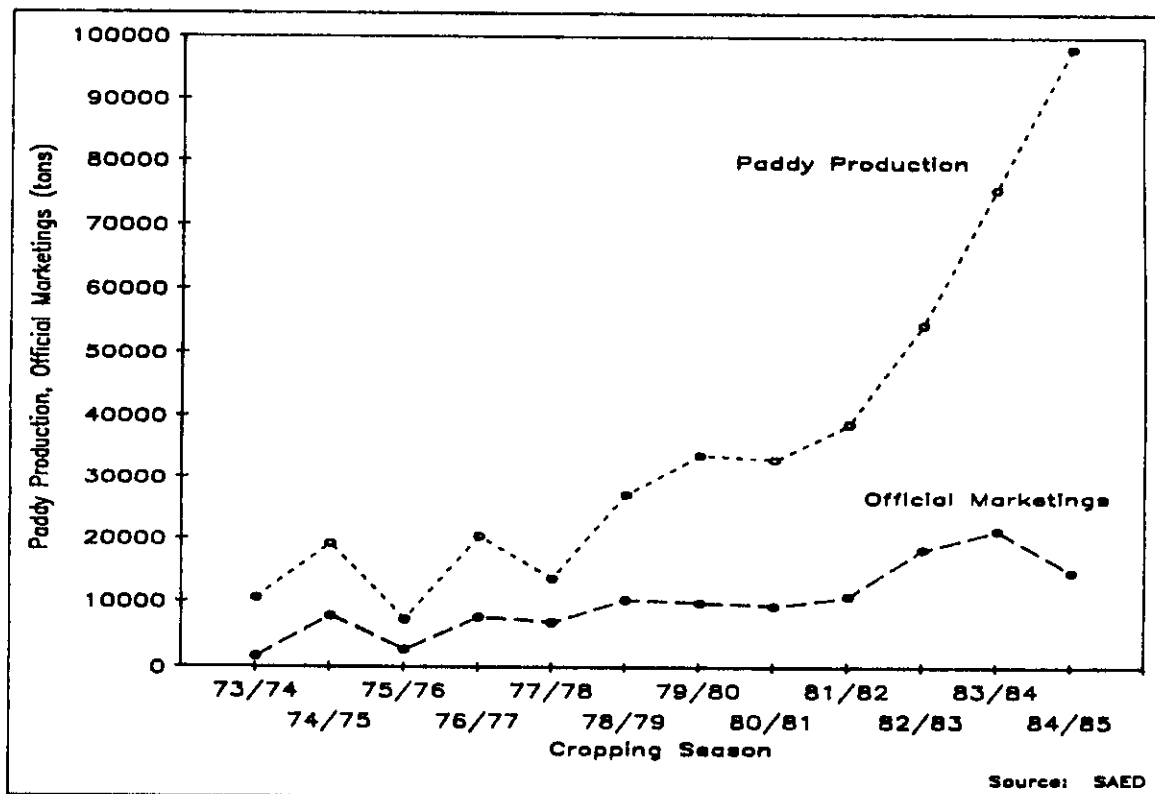
SAED is the regional development agency charged with developing the Senegalese portion of the river valley. Founded in 1965 as a public agency, SAED was reorganized in 1981 into a parastatal institution characterized by partial private ownership. Today, approximately 25% of SAED's annual operating budget is provided by the government of Senegal and approximately 75% by foreign donors. Ostensibly responsible for a wide range of agricultural as well as non-agricultural development activities, SAED in practice has concentrated on constructing

⁸Dembele (1984) describes the evolution of cereals policies in Senegal. Also see Newman et al. (1985) and CCCE (1983).

irrigation systems (known as "perimeters") and encouraging production of rice through the provision of subsidized inputs.

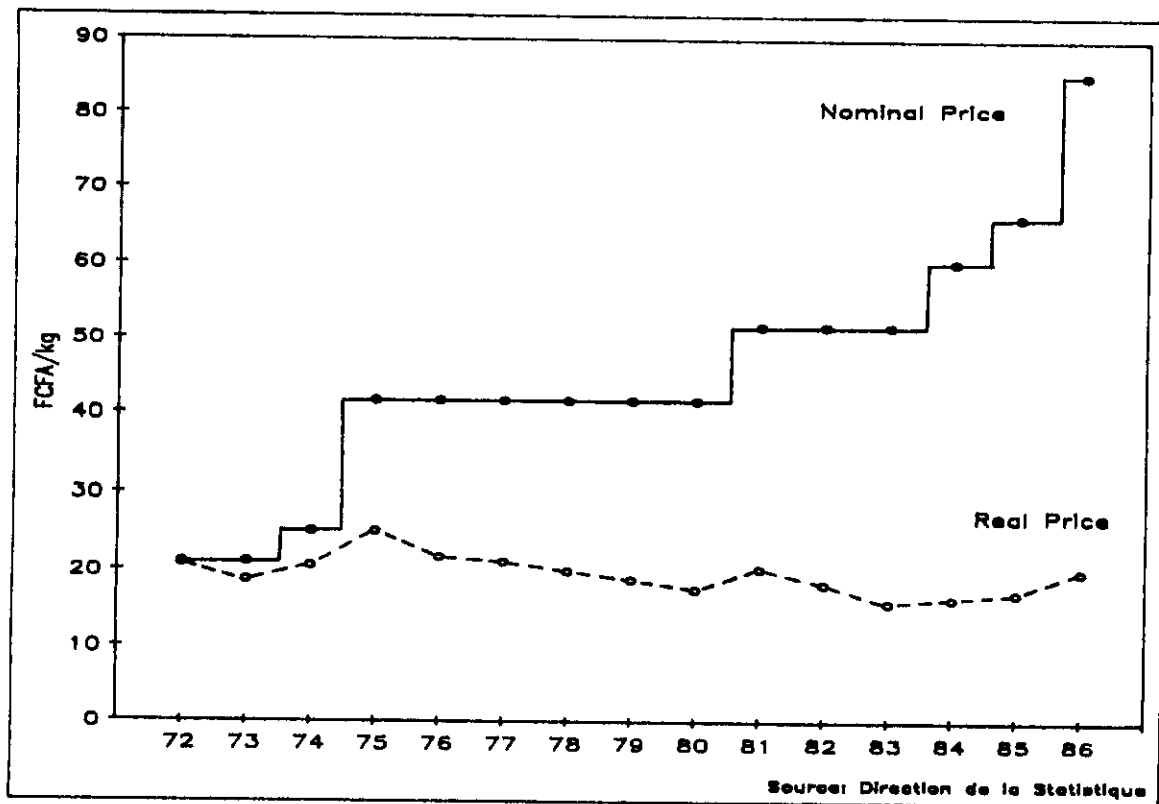
Most of the rice produced on SAED perimeters is consumed by farmers and their families or used to repay production loans. As landholdings expand and yields increase, however, surplus quantities of paddy are becoming available for commercial sale. By law this grain must be sold to SAED, which in the Senegal river valley holds a legal monopsony over purchases of paddy from farmers. Although production of paddy has increased in recent years, official marketings have lagged behind. (Figure 2)

Figure 2: Evolution of Paddy Production and Official Marketings In The Senegal River Valley (1973/74 - 1984/85)



The official producer price for paddy, which is set each year by the President's Council of Ministers, is panterritorial and panseasonal, remaining fixed throughout the Fleuve region during the course of each marketing season. Although the nominal producer price has risen over the past fifteen years, the real producer price (nominal price deflated by a general price index) has actually declined throughout much of this period.⁹ Only since 1982 has this decline been reversed as the result of four increases in five years to the (nominal) official producer price. (Figure 3)

Figure 3: Evolution of the Official Producer Price For Paddy In The Senegal River Valley (1972 - 1986)



⁹Use of a general price index is necessary because more appropriate indices are not published in Senegal.

All paddy purchased by SAED is delivered by the producer to a designated assembly point. After being weighed, it is loaded onto privately owned trucks under contract to SAED and delivered to one of two SAED rice mills. Following processing, rice is sold to the Caisse de Perequation et de Stabilisation des Prix (CPSP) at a price determined by a formula which takes into account all of the costs supposedly incurred by SAED's marketing unit. This price has always been higher than the cost of imported rice. For example, in 1984 CPSP paid 129 FCFA/kg for SAED rice (delivered at the two mills), at a time when imported rice cost 90 FCFA/kg (CIF Dakar). By-products are sold at the mills to local herders for use as animal feed.

2.2.2 CPSP (Caisse de Perequation et de Stabilisation des Prix)

CPSP is a government agency created in 1973 and charged with stabilizing prices of basic food staples (e.g., rice, flour, sugar, vegetable oil), as well as importing cereals, with the exception of wheat. Although the original charter did not confer responsibility for this latter function, CPSP inherited the cereals import business following the dissolution of ONCAD in 1979. Cereals imported for direct consumption have consisted primarily of broken rice (purchased from Thailand, China, Burma, Pakistan, and the United States), as well as smaller quantities of sorghum and maize. CPSP also handles monetized food aid.

The quantities of commercially imported cereals distributed in the Fleuve region are difficult to estimate with precision, since some of the grain sold through Dakar warehouses eventually makes its way inland. In recent years, the total quantity of commercially imported grain (i.e., exclusive of food aid) sold in the Senegal river valley probably approached 30,000 tons, comprising approximately 15,000 tons of rice, 9,000 tons of

wheat, 4,000 tons of sorghum, and 2,000 tons of maize.¹⁰ These quantities made up approximately 25% of total cereals consumption in the Fleuve region during this period.

2.2.3 MCI (Ministere du Commerce Interieur)

MCI through its several divisions is responsible for issuing and enforcing the laws regulating commerce in Senegal. MCI exerts an important influence on the rice trade by issuing the decrees which define the official rules of the game for private merchants. These rules determine, among other things, who is authorized to purchase rice from CPSP, what quantities may be purchased, and what prices must be charged. MCI's enforcement division, the Controle Economique, is responsible for enforcing marketing regulations.

Rice sold by CPSP may be purchased only by licenced quota-holders, known as "quotataires", whose quotas are allocated quarterly by MCI. Eligibility requirements include possession of an MCI permit to practice general wholesale trade, demonstrated liquid assets of at least 3 million FCFA, and access to an MCI-certified warehouse where grain can be stored. In addition, each quotataire must agree to take delivery of his monthly quota in person. The official CPSP price ("prix en gros") varies depending on the point of sale; the Dakar price is used as a base, with increments added for inland sale points to compensate CPSP for additional transport costs.¹¹

¹⁰Martin (1986).

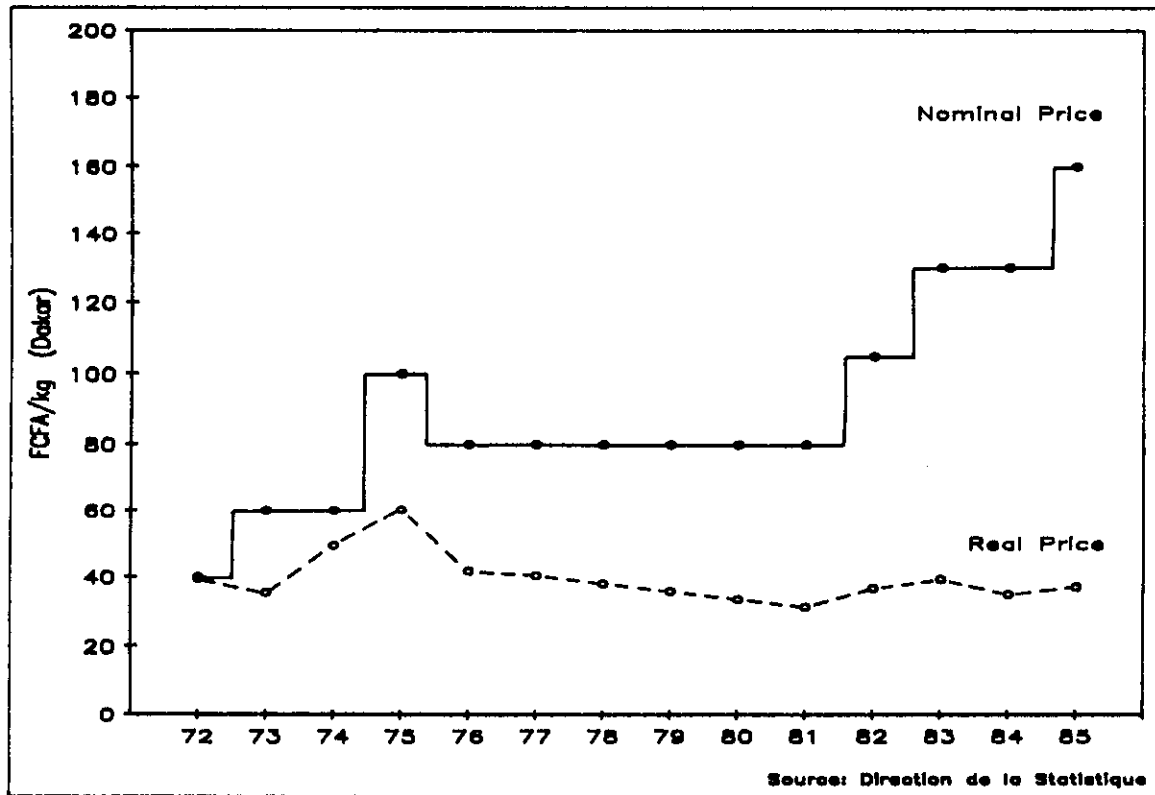
¹¹The increments added to the Dakar base price do not cover the full cost of transport. Thus, rice sold through CPSP inland warehouses receives a partial subsidy.

Quotataires take delivery of their allotted quantity of rice at the local CPSP warehouse, after pre-paying by certified check. Credit sales were largely suspended in 1984 because of chronic non-payment problems. The quotataires transport the bagged grain to their own warehouses for eventual resale to authorized retailers at the official wholesale price ("prix en demi-gros"). Like the CPSP price, the wholesale price varies by region, depending on the size of the official transport margin.

Retailers, officially defined as merchants trading in lots smaller than 100 kg, must also obtain a permit from MCI. This permit, which is easily obtainable upon payment of a small registration fee, is valid for general retail commerce, and indeed most retailers sell grain along with a wide range of consumer goods. Retailers generally purchase rice from a wholesaler a few sacks at a time and resell to consumers at the official retail price ("prix au detail"). Like the CPSP price and the wholesale price, the retail price varies by region depending on the size of the official transport margin.

Although the official consumer price of rice over the years has risen in nominal terms, the real price actually declined throughout the late 1970's and early 1980's. Beginning in 1982, a series of sharp increases in the official price succeeded in reversing this trend, and the real price has since regained some of the ground it lost. (Figure 4)

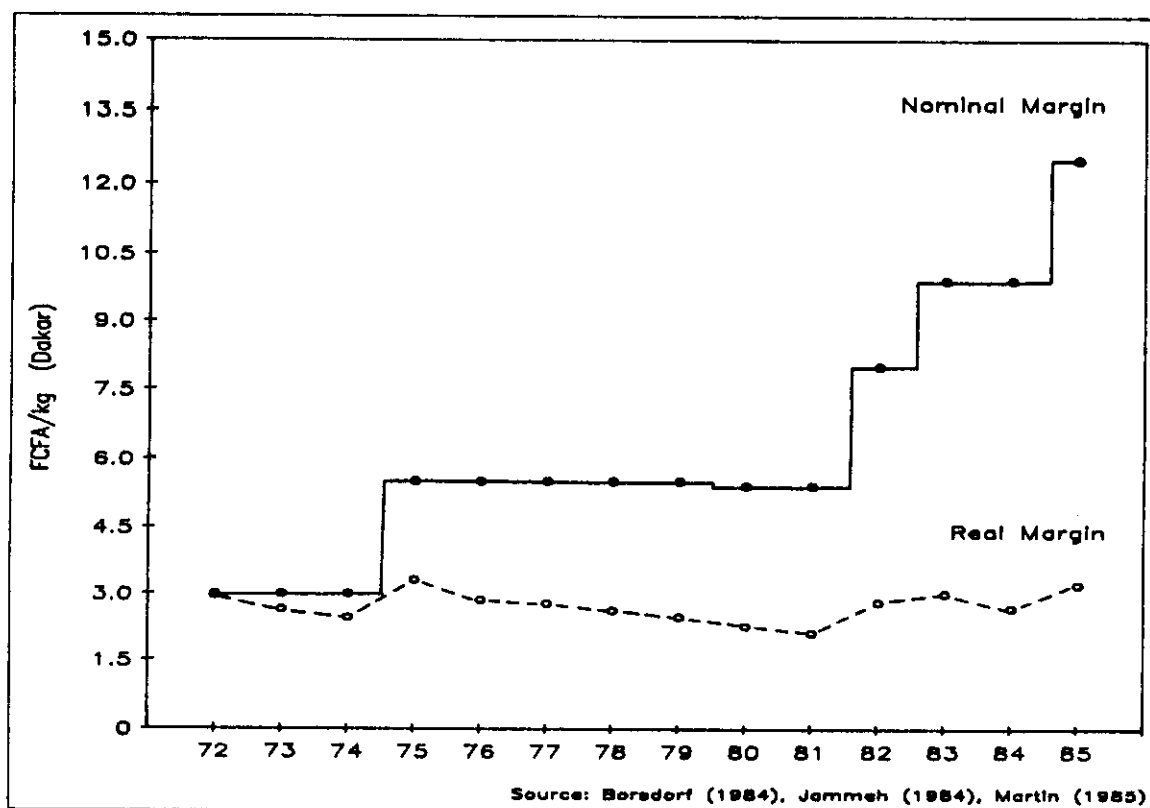
Figure 4: Evolution of the Official Consumer Price For Rice In Senegal (1972 - 1985)



The government's policy of fixing CPSP, wholesale, and retail prices effectively determines legal marketing margins. Official wholesale margins on rice can be calculated by taking the difference between the CPSP price and the wholesale price, while official retail margins can be calculated by taking the difference between the wholesale price and the retail price.¹² During the past fifteen years, official marketing margins on rice expressed in nominal terms have increased, but expressed in real terms they have changed very little. (Figure 5)

¹²As previously indicated, the official price structure makes some allowance for locational factors. Official wholesale margins are larger for traders located at greater distances from CPSP warehouses, ostensibly to compensate traders for additional transport costs. Retail margins are similar throughout the country, since retail traders presumably do little long-distance transporting.

Figure 5: Evolution of Official Wholesale and Retail Marketing Margins on Rice in Senegal (1972 - 1984)



Marketing regulations are enforced by the Controle Economique, whose agents make unannounced spot checks in market places to verify that official prices are being respected, that merchants are in possession of the requisite documentation, that weighing equipment is accurately calibrated, that the quality of goods conforms to official standards, and so on. Violators are summoned in writing to appear at the Controle Economique regional office, where they receive either a verbal warning or a fine.

2.2.4 SONADIS (Societe Nationale de Distribution)

SONADIS is a mixed public-private trading company which operates a national chain of distribution outlets for consumer goods, including foodstuffs. Each SONADIS store is run by a

manager who receives a base salary plus a commission based on volume of sales. The product mix in each store varies; in addition to a basic assortment of standard items, the store manager selects from a master list those products which he thinks will sell well locally. SONADIS is an important distributor of cereals in the Senegal river valley. In 1984, 17 SONADIS retail stores and 3 SONADIS wholesale outlets located between Saint Louis and Kidira sold 5,000 tons of imported cereals, including 2,000 tons of rice and 3,000 tons of sorghum.¹³ This represented approximately 10% of the rice and 75% of the sorghum distributed in the Senegal river valley through the official channel (i.e., exclusive of home-consumed grain and food aid).

The government believes that since SONADIS stores sell food staples at official prices, they introduce a level of competition into markets which because of isolation or other reasons might possibly be subject to exploitative pricing practices. Although no formal study has been done to determine whether or not the presence of a SONADIS store affects the cereals pricing behavior of other merchants in the same market area, many SONADIS stores are located in the larger towns already being served by more than just one or two grain traders. Consequently, it is not clear to what extent SONADIS stores succeed in introducing price competition into rural areas.

2.2.5 CSA (Commissariat a la Securite Alimentaire)

CSA is a public organization charged with a variety of functions, including official marketing of local millet, management of a national grain reserve, and distribution of food aid. Perennially handicapped by a lack of financing, CSA has

¹³M. Gueye (Director of SONADIS retail operations), personal communication.

rarely been able to intervene effectively in the millet market or to build up a significant grain reserve, with the result that it has acted primarily as a conduit for food aid.¹⁴

In recent years, CSA has been particularly active in the Senegal river valley. In 1984, for example, CSA distributed 22,844 tons of sorghum, rice, and maize among 607,000 rural residents, or nearly 38 kg of grain per capita.¹⁵ Distribution of official aid at the regional level is not subject to elaborate planning. Food supplies are routed via regional CSA warehouses to local distribution points for immediate delivery to community authorities. After a short delay, it is given to heads of household, who must show documentation for each eligible household member. No attempt is made to target the aid to the most needy; every Senegalese citizen who is an official resident of the Fleuve region is eligible to receive a share.

An unknown quantity of food aid enters commercial marketing channels. Food aid recipients faced with immediate cash needs frequently sell a portion of their aid allotment. While some of this commercialized food aid is sold to other consumers, some is also sold to traders, who later resell it.

¹⁴In 1985, CSA open-market purchases of millet appeared to affect market prices for the first time. Since it appears that CSA will incur substantial losses in disposing of its stocks, however, it is not clear that the experiment will be repeated in the near future. See Newman et al. (1985).

¹⁵M. Sene (Regional Director of CSA), personal communication.

3. PERFORMANCE OF RICE MARKETS IN THE SENEGAL RIVER VALLEY

3.1 Definitions: Official vs. Parallel Channels

The rice sub-sector in the Senegal river valley is depicted in Figure 6. The stages of economic activity by which rice is produced, assembled, processed, distributed, and consumed appear along the left side of the diagram. The labelled boxes represent different groups of sub-sector participants, including public organizations, private firms, and individuals. These participants are linked by a complex network of regulated and unregulated channels, depicted in the diagram by three types of arrows denoting: 1) official channel transactions, 2) parallel channel transactions, and 3) food aid flows.

Because the distinction between the "official" and "parallel" channels varies across the literature and among policy makers, it is useful briefly to review the meanings of the terms as they are used here. The official and parallel channels for rice consist neither of clearly definable physical settings nor of discrete and unchanging groups of participants. Rather, each must be conceived as a set of commercial activities characterized respectively by the following features:

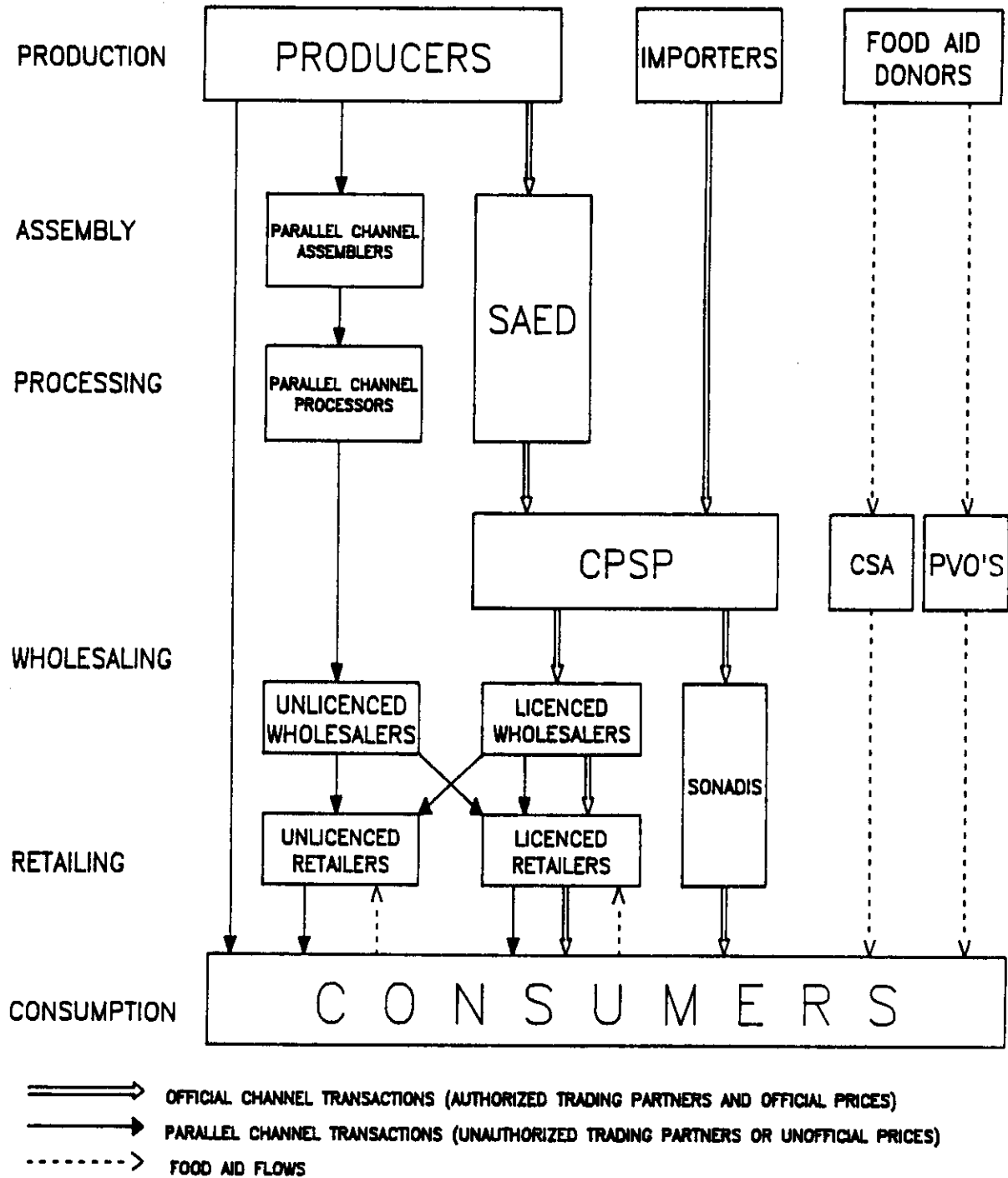
Official Channel:

- 1) trading by authorized (licenced) partners, and
- 2) general conformity to official prices.

Parallel Channel:

- 1) trading by unauthorized (unlicenced) partners, or
- 2) trading at non-official prices.

Figure 6: The Rice Sub-Sector in the Senegal River Valley



According to these definitions, the official channel for rice includes all of the public organizations, private-sector firms, and individuals who are authorized to engage in rice marketing and who trade in general conformity with the official price structure. The parallel channel, on the other hand, includes all of the private merchants who operate without official marketing licences, as well as those private-sector firms and individuals who are licenced to operate as part of the official market channel but who sometimes fail to respect the official price structure.

Even though parallel channel trading activity always involves a violation of official marketing regulations, in practice it is often difficult to distinguish between the official and parallel channels. Because unauthorized traders may at times trade at official prices, and because illegal trading may at times be done by licenced merchants, parallel channel activity is not always readily apparent. To further complicate matters, the same trader may be active in both channels at the same time. Also, certain minor deviations from the official price policy are tacitly accepted by regulators (e.g., rounding prices to the nearest 5 FCFA), which makes it difficult to determine whether a trader is conforming to the official price structure. Such practices blur the distinction between the official and parallel channels.

In Senegal, the concept of the official channel is commonly associated with public ownership and operation, while the parallel channel is commonly associated with private-sector activity. This is both overly simplistic and incorrect. The official rice marketing channel in Senegal does include a number of public organizations, but official distribution activities are handled by an extensive network of private merchants who are licenced to operate under government regulations and policies. Thus, both official and parallel channels rely largely on

private-sector participation. The essential difference is not whether trading is performed by public organizations or private merchants, but whether or not public and private trading activity is carried out in compliance with the rules of the game established by the state.

3.2 The Official Marketing Channel

Field research for the Fleuve Cereals Marketing Study was conducted between February 1984 and October 1985. During this period, information on the official rice marketing channel was collected from numerous sources. Data on official assembly and processing operations were obtained from SAED documents, including publications intended for external distribution as well as account books, memoranda, and other records intended primarily for internal use. Additional information was obtained through interviews with participants in the official channel -- upper-level SAED management, mill operators, warehouse supervisors, truck drivers, assembly point workers, extension agents, and farmers. Data on official distribution operations were collected from CPSP records, as well as through interviews of numerous market participants. These interviews included a formal survey of 122 licenced grain distributors, both wholesalers and retailers, located throughout the length of the river valley.¹⁶

3.2.1 Official Assembly Operations

Official assembly operations are performed by SAED's marketing division, known as URIC (Unite Rizeries Intendences Commercialisation). URIC's responsibilities include distributing

¹⁶For more detailed information concerning field data collection activities, see Morris (1985d), Morris (1986).

bags to farmers, taking delivery of bagged grain at assembly points, supervising weighing activities, and hiring private transporters to move bagged grain to the SAED mills.

Analysis of official cost data, supplemented with informal interviews of market participants, indicates that URIC is unable to perform timely, reliable, and cost-effective grain assembly operations.¹⁷ Overbureaucratized procedures, information bottlenecks, managerial difficulties, chronic liquidity problems, and other factors interact to disrupt assembly operations, thus raising marketing costs. For example, shortages of bags often delay delivery of paddy to the assembly points. Once grain is assembled, transport scheduling problems frequently disrupt its evacuation to the mills. Prolonged open-air storage exposes the grain to insect and pest attack, and additional losses typically occur en route to the mills as the result of careless handling.

Many of URIC's problems can be traced back to a single root cause, namely, SAED's organization as a public institution. Three major constraints are associated with SAED's public character: 1) SAED's obligation to implement official marketing policies regardless of the cost; 2) SAED's organization as a large, centrally managed parastatal institution; and, 3) SAED's financial insulation resulting from external funding sources and from protectionist legislation. These constraints impair performance by requiring SAED to undertake inherently unprofitable trade, by preventing management from responding quickly and effectively to changing market conditions, and by sheltering the organization from external pressure to reform. In addition, an inadequate accounting system compounds and perpetuates the problem of poor performance by preventing managers from forming an accurate picture of SAED's economic

¹⁷For detailed analysis of URIC assembly costs, see Morris (1985b, 1986).

health. This limits their ability to identify problem areas and to take corrective measures.

Evaluation of assembly operations is made difficult by the inadequacy of URIC's accounting system. In some instances the accounting system inflates marketing costs, thereby concealing waste and corruption. A typical example involves the cost of the bags which are distributed each year to SAED farmers. Although farmers are not charged for the bags at the time of distribution, they are required to return the bags or to reimburse URIC the value of non-returned bags. In recent URIC accounting documents, the cost of new bags is charged to the operations budget, but neither the value of recovered bags nor proceeds from the sale of non-recovered bags is credited. Based on the official records, it is therefore impossible to determine how many bags were recovered, how many were purchased by farmers, and/or how many simply "disappeared". Since charges for new bags appear in the records each year despite the fact that considerable numbers of old bags are recovered and re-used, the reported cost of bags is clearly excessive.

Alternately, the URIC accounting system sometimes understates actual marketing costs, making performance seem better than it really is. A typical example involves the opportunity cost of capital. Between the time paddy is first assembled at the assembly points and the time milled rice and by-products are sold, capital is tied up in inventory. An opportunity cost is associated with this capital. While this cost is well known to private-sector merchants who must find ways to raise the large amounts of capital necessary for grain trading, it is often overlooked in the case of publicly-owned grain marketing organizations which benefit from "free" funding. To the extent that SAED functions with public money or with other external sources of capital on which it pays no interest, it receives a concealed subsidy. If the economic performance of

URIC's marketing operation is to be evaluated objectively, this subsidy ought to be taken into account.

3.2.2 Official Processing Operations

Official processing operations are also performed by URIC, which is responsible for operating the two industrial rice mills located in the Senegal river valley. Analysis of official cost data, again supplemented with informal interviews of market participants, indicates that processing operations suffer from the same constraints as assembly operations.¹⁸ These constraints force the processing division to undertake unprofitable business (e.g., processing low-quality paddy), prevent mill management from responding quickly and effectively to changing market conditions (e.g., tailoring outputs of the mills to conform to consumer preferences), and insulate URIC from external pressure to reform.

The performance of URIC processing operations is particularly affected by chronic underutilization of the two mills, which have never operated at more than 40% of capacity and usually operate at far lower rates. Underutilization increases average processing costs by concentrating fixed costs over relatively small quantities of output. While URIC was unable to produce the disaggregated cost data required for precise calculation of the total savings per ton of paddy which might have been achieved had the mills been fully utilized, savings on depreciation costs alone would have exceeded 33% of average processing costs during the 1983/84 marketing season, the last year data are available.¹⁹

¹⁸For detailed analysis of URIC processing costs, see Morris (1985b, 1986).

¹⁹See Morris (1986).

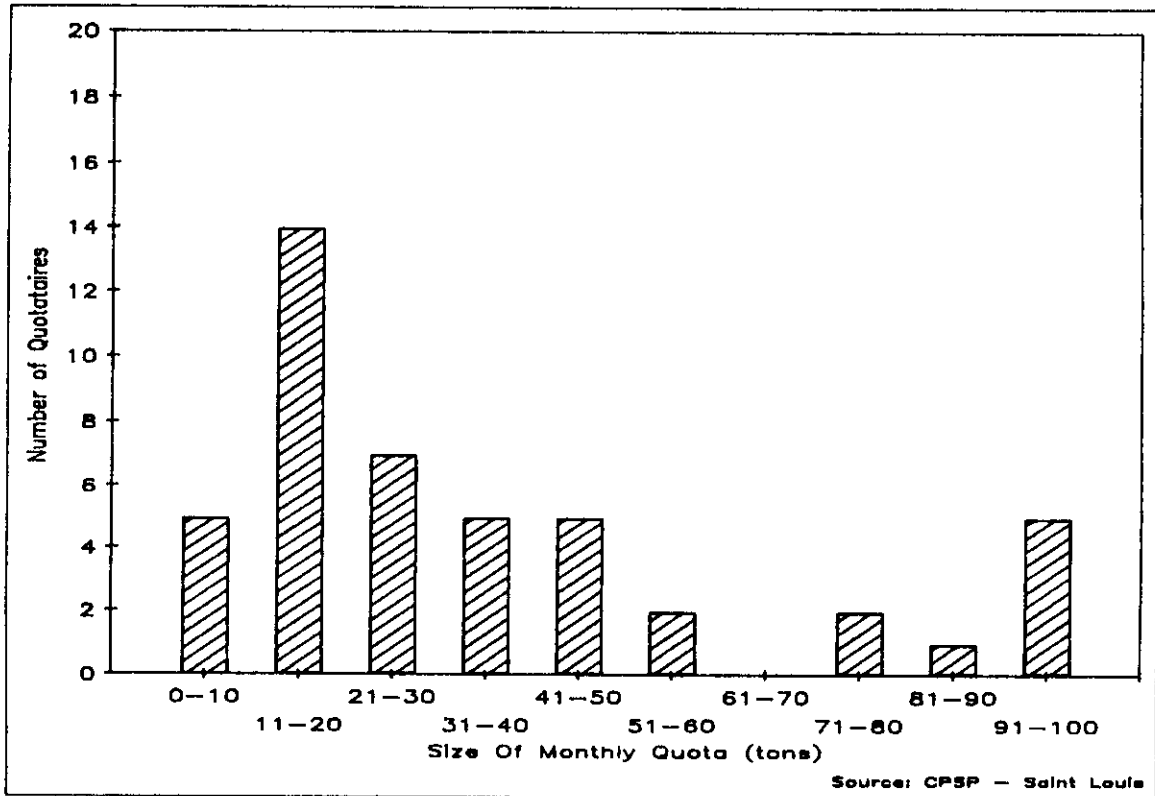
SAED officials are quick to point out that average processing costs are bound to come down as increases in production lead to fuller utilization of the mills. Average processing costs at the two mills would certainly decline if throughput rates were increased, but at the moment this can be achieved only by assembling paddy from distant parts of the river valley. In view of the long distances involved and the poor road system, increases in transport costs will tend to offset any decreases in average processing costs.

3.2.3 Official Distribution Operations

Official distribution operations in the Senegal river valley are carried out by CPSP, working in collaboration with private-sector merchants operating under government marketing regulations and policies. The activities of these merchants were studied using an analytical framework adapted from industrial organization theory (structure-conduct-performance) to gain insights into their operating procedures and constraints. Within the context of a sub-sector approach, the research considered how structural characteristics of rice markets in the Senegal river valley are related to the observed behavior of participants and, in turn, how both structure and conduct affect performance.

Important structural differences were found between the wholesaling and retailing industries. Access into rice wholesaling is restricted. Licencing requirements create an initial set of barriers to entry, and the quota system furthermore grants a relatively small number of merchants the exclusive right to distribute imported rice and sorghum. During 1984, only 45 quotataires were licenced to distribute imported rice and sorghum in the Senegal river valley. Because quota sizes were distributed asymmetrically, eight quotataires controlled 42% of the total tonnage allocated. (Figure 7)

Figure 7: Size Distribution of CPSP Rice Quotas in the Senegal River Valley (4th Quarter 1984)



In contrast to wholesaling, access into rice retailing is relatively unrestricted. Although merchants are required to obtain a permit to practice general retail trade, these permits are easily obtainable upon payment of a modest sum. The absence of barriers to entry ensures a large number of traders. During 1984, several hundred retailers were licenced to distribute rice and other food staples in the Senegal river valley.

Differences in the structural characteristics of the wholesaling and retailing industries are consistent with observed differences in behavior. Competition among wholesalers for the economically valuable quotas is intense. It is often alleged that political influence and considerable under-the-table payments are necessary to obtain a quota. While such charges are

difficult to substantiate, clearly many quotas are held by influential individuals who obviously do not make their living trading in rice. Once they have obtained a quota, most quotataires refrain from head-to-head price competition and collaborate formally and informally with other quotataires, for example by exchanging information and by formulating strategies for dealing with CPSP, the Controle Economique, and other government agencies. There is competition over market share, however, as quotataires extend subsidized credit in order to develop special working relationships with favored retailers.

Unlike wholesalers, retailers spend little time developing horizontal links with other retailers. The atomistic structure of the retail industry forces them to compete aggressively for customers, which they do through judicious use of location and credit.

Evaluation of the performance of the rice distribution industry is complicated by the sensitivity of market price data, which are difficult to collect due to the strict enforcement of official prices. Merchants receive stiff fines if they are caught selling at non-official prices and consequently go to great lengths to conceal their pricing behavior.

While the government has largely been able to enforce official prices at both wholesale and retail levels, merchants have devised a number of strategies to raise effective selling prices (e.g., charging different prices for cash and credit sales, selling underweight bags, rounding prices up to the nearest 5 FCFA). Merchants claim that violation of pricing regulations is necessary to recover costs not covered by official marketing margins. This claim is true, at least in some cases. For example, depending on their location in the river valley, some wholesalers would earn negative net returns by purchasing rice from CPSP at the official CPSP price, transporting it to

their own distribution warehouse at official transport rates, and selling it to retailers at the official wholesale price. (Table 1) In such instances, distributors are forced to violate official marketing regulations in order to avoid losses on their rice marketing activities.

Table 1: Official Wholesale Margins on Rice Net of Official Transport Costs in the Senegal River Valley (1984/85)

Location of Wholesaler	Official Gross Margin (FCFA/t)	Official Transport Cost ^a (FCFA/t)	Official "Net Margin" (FCFA/t)
Saint Louis	5,796	1,900	3,896
Dagana	6,996	3,906	3,090
Podor	8,396	6,975	1,421
Matam	12,196	21,700	-9,504
Bakel	14,296	31,500	-17,204

^a Official rate from CPSP warehouse to wholesaler's warehouse

Source: Ministère du Commerce Interieur, Le Soleil

Despite widespread bending of pricing rules, marketing margins on rice are generally modest. Assuming that most distributors do not deviate too far from the official price structure, gross marketing margins are restricted to a basic range. Instead of trying to stretch these margins by cheating flagrantly on the official price structure, most distributors rely on high sales volume and rapid turnover to increase profits.

This is not to deny that some traders take advantage of rice shortages to raise prices above official levels in order to increase margins. From time to time shortages cause prices to rise, and margins presumably go up. While it is true that certain traders, both wholesalers and retailers, are quick to take advantage of the upward pressure on prices produced by a supply disruption, they do not appear systematically to manipulate supplies in order to generate profit opportunities. More often than not, shortages result because traders themselves are unable to obtain rice from their only legal supplier, CPSP. No evidence was found to indicate that distributors were anywhere engaging in deliberate, systematic hoarding for purposes of manipulating prices, which is the "explanation" often put forward by concerned public officials and frustrated consumers.

3.3 The Parallel Marketing Channel

Information on the parallel marketing channel was collected somewhat indirectly because of its sensitivity. Following a series of reconnaissance surveys, the research team performed a complete census of rice hullers located in the river valley. Next, a cost-and-returns study was performed from a sample of 26 hullers. These activities provided an explanation for the presence in the field of the research team and facilitated contacts with parallel channel market participants -- assemblers, transporters, processors, distributors. Eventually, it was possible to interview several dozen respondents from each of these categories to obtain information about their rice marketing activities. In addition, weekly rice prices were collected in six regional markets between September 1984 and January 1985.²⁰

²⁰For more detailed information concerning field data collection activities, see Morris (1985d), Morris (1986).

3.3.1 Parallel Channel Assembly Operations

Itinerant traders play a central role in coordinating assembly activities in the parallel channel. Some itinerant traders are residents of the river valley, while others are non-resident entrepreneurs who engage in seasonal grain trading in order to supplement income from other sources. Travelling throughout rice-producing areas before and during the harvest, they establish contacts with farmers, either in person or through local buying agents such as shop owners and transporters.

Itinerant traders typically negotiate the purchase of several bags of paddy from each farmer. Negotiation and payment may take place while the crop is still in the ground or at any point during or after the harvest. Prices depend on the location and timing of the transaction. During the 1984/85 cropping season paddy prices observed in the Delta ranged from 3,000 - 5,000 FCFA for an 80 kg bag (equivalent to 37.5 - 43.75 FCFA/kg) during pre-harvest "green sales" to 7,500 - 8,000 FCFA for an 80 kg bag (equivalent to 93.75 - 100 FCFA/kg) several months after the harvest, when grain had become scarce. Transactions in remote villages at considerable distances from the paved road were generally at reduced prices, the discount reflecting the additional transport cost necessary to evacuate the grain, according to traders.

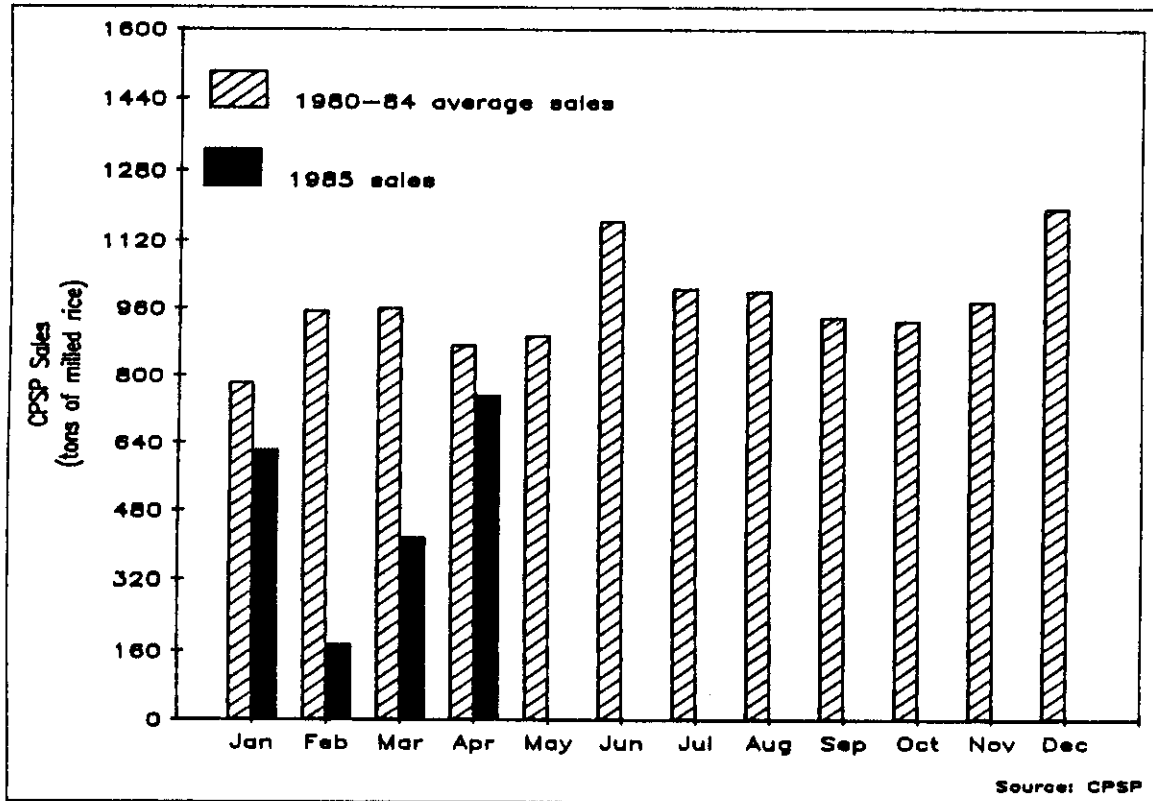
It is difficult to estimate the "average" price without more complete knowledge of the seasonal and locational variations in sale prices and quantities. Extreme prices (such as those quoted above) may give a misleading impression of the typical prices received by most farmers if the sales data are distributed asymmetrically. Despite the wide range of reported prices, most farmers and merchants contacted in the Delta indicated that much of the paddy sold into the parallel channel during the early months of 1985 was priced in the range of 70 - 75 FCFA/kg, or

somewhat higher than the official producer price of 66 FCFA/kg. This is an important finding, for it stands in sharp contrast with the commonly held view that the parallel channel trade victimizes farmers.

After paying for the paddy, the itinerant traders hire local laborers to load it into bags. The filled bags are transported from the place of purchase (either the field where the rice was grown or the farmer's storage facility) to a local rice huller for processing. Depending on the distance to the huller, the preferred means of transportation is either animal cart or rural taxi. Transport charges vary according to time of year, location in the river valley, distance covered, and road conditions.

Little is known about the size and scope of wholesale grain flows through the parallel channel. During the period of the study, parallel channel rice from the Senegal river valley was found in markets as far away as Louga, Touba-Mbacke, Thies, and even Dakar. Unfortunately, resource constraints made it impossible to design a systematic survey to determine exactly where grain went and what quantities were involved. Casual observation of Saint Louis markets during the post-harvest months of February and March 1985 suggested that between 25 and 30 tons of parallel-channel milled rice were arriving in the city every day. This rough estimate of parallel channel grain flows is consistent with the sharp decrease in official rice sales at that time. During February 1985, CPSP sales of rice through the Saint Louis warehouse fell nearly 800 tons below the five-year average for February sales, a drop of over 25 tons per day. (Figure 8) Since demand remained relatively constant, it is believed that the drop in CPSP sales was offset by an equivalent rise in parallel channel sales, which would correspond with the observed increase in the flow of grain through the parallel channel.

**Figure 8: CPSP Monthly Rice Sales to Saint Louis Quotataires
(1985 Sales Compared to 1980-84 Average Sales)**



3.3.2 Parallel Channel Processing Operations

Paddy moving through the parallel channel is for the most part processed on steel-cylinder hullers (sometimes known as Engelberg-type hullers). Farmers and itinerant traders bring paddy to the hullers, which perform custom processing services for a fixed fee per bag of paddy. By-products are returned to each customer. Village-level processing capacity has expanded considerably during recent years. Whereas Tuluy (1979) reported only 13 hullers in the Fleuve region in 1979, a February 1985 census performed for the present study identified 142 hullers between Saint Louis and Kidira (of which 20 were classified "non-

operational" because they had not processed grain during the previous month). The distribution by region and estimated peak-season throughput rates are shown in Table 2. The estimated monthly throughput of over 5,500 tons of paddy is impressive considering that the two SAED mills together averaged around 2,250 tons per month during the previous milling season.

Table 2: Estimated Peak-Season Monthly Throughput of Parallel Channel Rice Hullers in the Senegal River Valley (1985)

Location of Huller	Operating Hullers ^a	Paddy/Day per Huller (kg)	Total Paddy/Day (kg)	Total Paddy/Month ^b (kg)
Upper Valley	7	628	4,396	118,692
Middle Valley	18	1,235	22,230	600,210
Delta	97	1,836	178,092	4,808,484
Total Valley	122	1,681	204,718	5,527,386

^a Operating Huller = huller which processed paddy during the previous month.

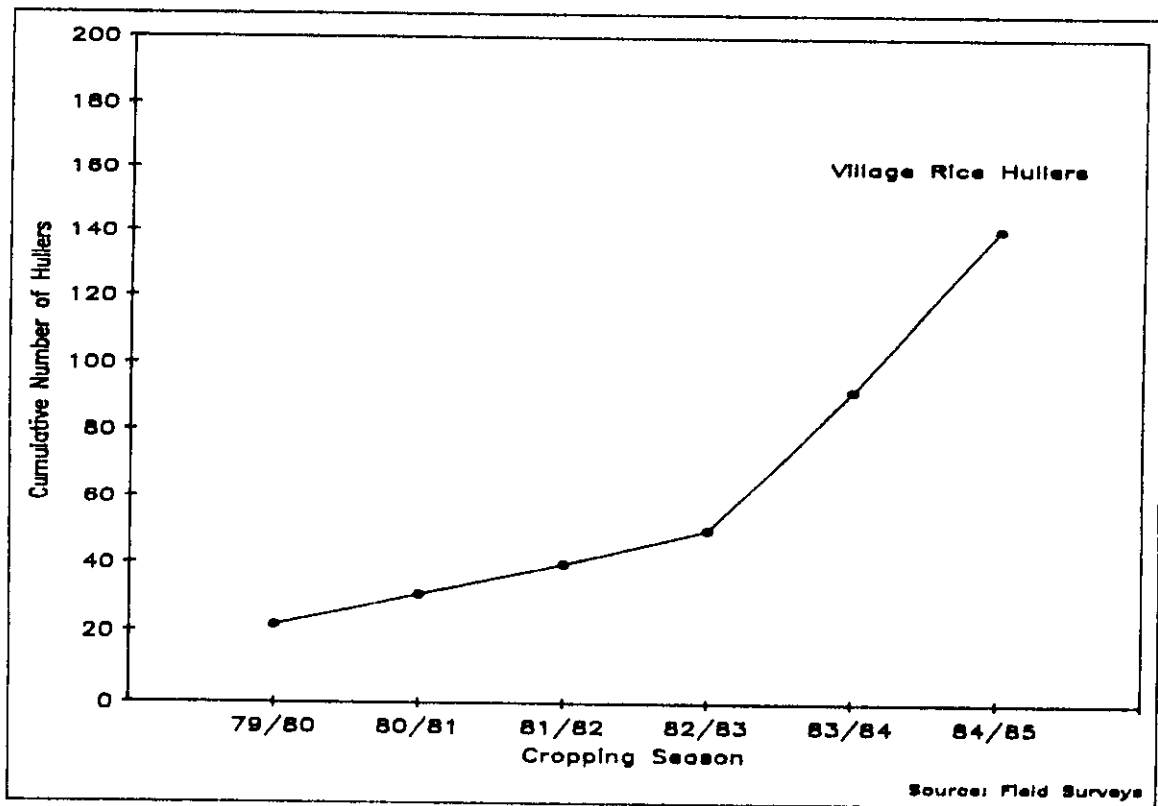
^b Monthly throughput figures based on assumption of 27 working days per month.

Source: Field Surveys

The expansion in village-level processing capacity is a recent phenomenon. The frequency distribution of the reported length of ownership of the hullers can be broken down into periods corresponding to annual paddy marketing campaigns to

provide an historical perspective to the rise in village-level processing capacity. The cumulative increase in the number of hullers is consistent with the observation that rice marketing patterns have changed drastically in recent years. (Figure 9) While the slow growth in the numbers of hullers up to the 1982/83 campaign can be attributed to the gradual increase in capacity needed to process small quantities of grain for home consumption, the sharp jump in the number of hullers during the past two seasons provides evidence of a rapid transformation in the dominant processing technology in conjunction with a sudden acceleration of marketing activity in the parallel channel.

Figure 9: Growth in Numbers of Rice Hullers in the Senegal River Valley (1979/80 - 84/85)



Detailed costs-and-returns data were collected from a sample of 26 hullers in order to permit estimation of prototypical yearly operating budgets. (Results of the analysis of these data appear in Tables 3 and 4.) Since longitudinal survey data on seasonal capacity utilization rates were not available, huller operators were questioned informally about seasonal use patterns, and two scenarios were developed concerning month-by-month capacity utilization. One set of budgets was estimated for a machine used part-time throughout the year ("village huller"), while another set was estimated for a machine used heavily for several months after the harvest and then idled ("commercial huller").

Table 3: Annual Operating Budget of a "Village" Rice Huller
In the Senegal River Valley (Estimated for 1985)
(FCFA)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hours of Operation (1)	270	270	270	68	68	68	68	68	68	27	27	27	1,296
Purchase (Huller) (2a)	5,411	5,411	5,411	5,411	5,411	5,411	5,411	5,411	5,411	5,411	5,411	5,411	64,935
Purchase (Motor) (2b)	31,385	31,385	31,385	31,385	31,385	31,385	31,385	31,385	31,385	31,385	31,385	31,385	376,623
Cost of Capital (2c)	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	146,250
Housing Cost (2d)	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	40,728
TOTAL FIXED COSTS	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	628,536
Fuel (3e)	59,400	59,400	59,400	14,850	14,850	14,850	14,850	14,850	14,850	5,940	5,940	5,940	285,120
Oil and Grease (3f)	10,800	10,800	10,800	2,700	2,700	2,700	2,700	2,700	2,700	1,080	1,080	1,080	51,840
Parts and Repairs (3g)	103,410	103,410	103,410	25,853	25,853	25,853	25,853	25,853	25,853	10,341	10,341	10,341	496,368
Labor (3h)	78,840	78,840	78,840	19,710	19,710	19,710	19,710	19,710	19,710	7,884	7,884	7,884	378,432
TOTAL VARIABLE COSTS	252,450	252,450	252,450	63,113	63,113	63,113	63,113	63,113	63,113	25,245	25,245	25,245	1,211,760
TOTAL FIXED + VARIABLE COSTS	304,828	304,828	304,828	115,491	115,491	115,491	115,491	115,491	115,491	77,623	77,623	77,623	1,840,296
GROSS RECEIPTS (4)	506,250	506,250	506,250	126,563	126,563	126,563	126,563	126,563	126,563	50,625	50,625	50,625	2,430,000
MINUS TOTAL FIXED + VARIABLE COSTS	304,828	304,828	304,828	115,491	115,491	115,491	115,491	115,491	115,491	77,623	77,623	77,623	1,840,296
NET RECEIPTS	201,422	201,422	201,422	11,072	11,072	11,072	11,072	11,072	11,072	(26,998)	(26,998)	(26,998)	589,704

Note: Numbers in parentheses refer to costs and returns categories. See pp. 40-41 for derivations.

Source: Field surveys

Table 4: Annual Operating Budget of a "Commercial" Rice Miller
In the Senegal River Valley (Estimated for 1985)
(FCFA)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hours of Operation (1)	270	270	270	68	68	68	0	0	0	0	0	0	1,013
Purchase (Miller) (2a)	4,209	4,209	4,209	4,209	4,209	4,209	4,209	4,209	4,209	4,209	4,209	4,209	50,505
Purchase (Motor) (2b)	24,411	24,411	24,411	24,411	24,411	24,411	24,411	24,411	24,411	24,411	24,411	24,411	292,929
Cost of Capital (2c)	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	12,188	146,250
Housing Cost (2d)	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	3,394	40,728
TOTAL FIXED COSTS	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	530,412
Fuel (3e)	59,400	59,400	59,400	14,850	14,850	14,850	0	0	0	0	0	0	222,750
Oil and Grease (3f)	10,800	10,800	10,800	2,700	2,700	2,700	0	0	0	0	0	0	40,500
Parts and Repairs (3g)	103,410	103,410	103,410	25,853	25,853	25,853	0	0	0	0	0	0	387,788
Labor (3h)	78,840	78,840	78,840	19,710	19,710	19,710	0	0	0	0	0	0	295,650
TOTAL VARIABLE COSTS	252,450	252,450	252,450	63,113	63,113	63,113	0	0	0	0	0	0	946,688
TOTAL FIXED + VARIABLE COSTS	296,651	296,651	296,651	107,314	107,314	107,314	44,201	44,201	44,201	44,201	44,201	44,201	1,477,100
GROSS RECEIPTS (4)	506,250	506,250	506,250	126,563	126,563	126,563	0	0	0	0	0	0	1,898,438
MINUS TOTAL FIXED + VARIABLE COSTS	296,651	296,651	296,651	107,314	107,314	107,314	44,201	44,201	44,201	44,201	44,201	44,201	1,477,100
NET RECEIPTS	209,599	209,599	209,599	19,249	19,249	19,249	(44,201)	(44,201)	(44,201)	(44,201)	(44,201)	(44,201)	421,338

Note: Numbers in parentheses refer to costs and returns categories. See pp. 40-41 for derivations.

Source: Field surveys

Estimation procedure:

1) **Monthly hours of operation:**

Number of operating hours/day (depends on assumption about capacity utilization) x 27 days (30 days/month - 3 days down time) = monthly hours of operation.

2) **Fixed Costs:**

- a) Purchase price - huller: 500,000 FCFA (1985 price of a Billbrook huller, inclusive of import duties) / useful life in years = annual depreciation charge.

Useful life calculated as follows:

10,000 hours of operation (engineer's estimate) / annual hours of operation (sum of monthly hours) = useful life in years.

Village huller: 10,000 h / 1 296 h = 7.7 years.

Commercial huller: 10,000 h / 1 012.5 h = 9.9 years.

- b) Purchase price - diesel motor: 1,450,000 FCFA (1985 price of a Hatz E79 diesel motor, inclusive of import duties) / useful life in years = annual depreciation charge.

Useful life calculated as follows:

5,000 hours of operation (engineer's estimate) / annual hours of operation (sum of monthly hours) = useful life in years.

Village huller: 5,000 h / 1,296 h = 3.85 years.

Commercial huller: 5,000 h / 1,012.5 h = 4.95 years.

(Since salvage values of both the huller and the motor could not be determined, they have conservatively been assumed to be 0.)

c) Cost of capital: Annual opportunity cost of capital = 15% (approximately the commercial loan rate) x average invested value [(purchase price + salvage value)/2].

d) Housing: Average monthly cost of housing charges reported by huller operators = 3,394 FCFA.

3) **Variable Costs:**

e) Fuel: Average measured hourly fuel consumption of diesel motors (1.1 liter diesel fuel) x 200 FCFA/l = 220 FCFA/hour of operation.

f) Oil and grease: Average reported monthly expenditures on oil and grease for diesel motors converted to 40 FCFA/hour of operation.

g) Parts and repairs: Average reported monthly expenditures on parts and repairs for hullers and diesel motors converted to 383 FCFA/hour of operation.

h) Labor: Average reported monthly expenditures on labor, with family labor valued at the average rate of hired labor, converted to 292 FCFA/hour of operation. (Labor costs are considered variable because even though salaries are reported as fixed monthly salaries, huller operators indicated that wages are almost always a function of gross revenues.)

4) **Gross receipts:**

Monthly gross receipts = monthly hours of operation x 2.5 sacks of paddy/hour of operation (average reported throughput) x 750 FCFA processing charge/sack (average reported processing charge).

Several interesting results emerge from this analysis:

1) **Hullers have the potential to be very profitable.**

The prototypical diesel-powered "village huller" operating twelve months of the year and processing approximately 260 tons of paddy shows an estimated annual net return of 589,704 FCFA. The prototypical diesel-powered "commercial huller" operating only six months of the year and processing approximately 200 tons of paddy shows an estimated annual net return of 421,338 FCFA. Electric-powered hullers are more profitable (due to lower investment costs, lower energy costs, lower oil and grease costs, and lower parts and repairs costs), while gasoline-powered hullers are less profitable (due to higher fuel costs).

In addition to providing information on net returns, the budgets can also be used to generate a standard measure of profitability. The percentage return to the huller owner's capital (and management) is determined by solving the following equation for the interest rate which drives the net present value of the stream of costs and benefits incurred during the useful life of a huller to zero:

$$NPV = \sum_{t=1}^n \frac{NCF_t}{(1+r)^t} - PCH - PCM - CH - RCM$$

where: NPV = net present value of huller investment
 NCF = annual net cash flow (annual gross receipts - annual variable costs)
 PCH = purchase cost huller
 PCM = purchase cost motor
 CH = cost of housing (assumed to fall in year 1)
 RCM = replacement cost of motor = $PCM/(1+r)^{t^*}$
 r = real rate of interest
 n = useful life of most durable piece of equipment (rice huller)
 t = year t
 t* = year in which replacement motor is purchased

Based on the reported costs and returns estimates, the "village huller" generates a return of 46% on the owner's investment and management, while the "commercial huller" generates a return of 34%. Although these rates of return appear high by conventional standards, they are not uncommon in developing countries where investment is inherently risky. Given the uncertain future of irrigated agriculture in the Senegal river valley, as well as the overall climate of regulatory uncertainty, Senegalese investors may be unwilling to commit funds to a venture unless they think they will be able to recover their capital in a relatively short period, for example 2-3 years. The high rates of return to investment in hullers thus may reflect the presence of a substantial risk premium.

2) Hullers can operate profitably under a wide range of capacity utilization.

The prototypical budgets indicate that break-even rates of capacity utilization are very low. The "village huller" begins to show positive net returns with only 56 hours/month of operation, while the "commercial huller" begins to show positive net returns with only 47 hours/month of operation.²¹ The low break-even rates can be attributed to the fact that variable costs of operating a huller far outweigh fixed costs in the total cost schedule. Since variable costs form a large proportion of the total costs, declines in average costs as a result of increases in capacity utilization are quite small. In other words, once a huller has been purchased and installed, it can be operated profitably at almost any level of use. This finding explains why so many hullers continue to operate part-time throughout the year.

²¹The difference between these two figures results from the different assumptions made about annual use patterns, which affect the fixed cost schedules.

3) **Processing fees are still relatively high in the Senegal river valley.**

The prototypical budgets indicate that break-even processing fees are considerably below the rates currently charged by most huller operators. The "village huller" shows positive net returns as soon as processing fees surpass 568 FCFA/80 kg bag of paddy, while the "commercial huller" shows positive net returns as soon as processing fees surpass 584 FCFA/80 kg bag of paddy.²² Actual fees charged throughout much of the Delta currently range from 600 FCFA to 1000 FCFA/80 kg sack, averaging 750 FCFA/80 kg sack. Rather than indicating inefficiency in village-level processing, these high processing fees may simply reflect the risk premium referred to earlier. Alternatively, the high fees may be due to continuing underinvestment in village-level processing capacity; with the recent rapid expansion in parallel channel marketing activity, the supply of processing services is probably still catching up to demand. If this is the case, the fact that actual processing fees are still considerably above break-even fees suggests that hullers will remain profitable even as increased competition drives down fees (assuming other costs and returns remain constant).

3.3.3 Parallel Channel Distribution Operations

Distribution is not a specialized activity in the parallel channel. The same itinerant trader who assembles grain and pays for processing generally also handles distribution. After paddy is processed, milled grain and by-products are loaded into bags provided by the trader. Depending on the condition of the huller and the skill of the huller operator, it is sometimes necessary

²²The difference between these two figures results from the different assumptions made about annual use patterns, which affect the fixed cost schedules.

to winnow the milled rice after it emerges from the huller. Winnowing is performed by women who congregate at village huller sites in search of seasonal employment.

Processed rice is transported via truck or rural taxi to an urban consumption center. To avoid problems with the Controle Economique, most traders ship 200 kg or less at a time, although occasionally a well-financed trader will ship by the truckload in order to capitalize on the economies of scale available through bulk transport rates. But since bulk shipping entails a much higher risk of being caught in possession of an illegal quantity of grain, this practice does not appear to be widespread.

Most itinerant traders favor one of two main retailing strategies. Rice may be given to relatives or business associates to be sold, often in the open-air portion of the market place where seasonal market sellers are concentrated. Alternatively, rice may be sold to the diversified wholesaler-retailers found in every major market place. These wholesaler-retailers are peripheral participants in the parallel channel grain trade, which they may enter on a seasonal basis to take advantage of temporary profit opportunities.

Because of the integrated nature of the parallel channel, it is difficult to speak of prices at each stage of economic activity corresponding to the prices observed in the official channel (e.g., CPSP price, wholesale price, retail price). Since grain does not usually change ownership between the time it is purchased from the farmer until the time it is sold to the retailer (and sometimes not until it is actually sold to the final consumer), separate market prices do not appear at the levels of processing and wholesaling. Although implicit prices at each level can be deduced by computing marketing costs and returns (including risk premiums where applicable, returns to labor and management, and imputed profits), many assumptions are

involved in this sort of exercise. It is questionable whether the resulting prices can really be compared to actual prices prevailing in the official channel.

The first level at which a market price appears is when the processed rice is sold by the itinerant trader to a retailer. Spot sampling in Saint Louis markets revealed that parallel channel rice frequently wholesales at a lower price than the official wholesale price. For example, during February and March 1985, Saint Louis retailers reported that parallel channel rice was available wholesale for around 140 FCFA/kg. During this period, the official wholesale price for CPSP rice distributed through the quotataires was just over 150 FCFA/kg. The price in the parallel channel was described as highly variable, however, depending on the amounts of grain available in the market on a given day and the strength of demand.

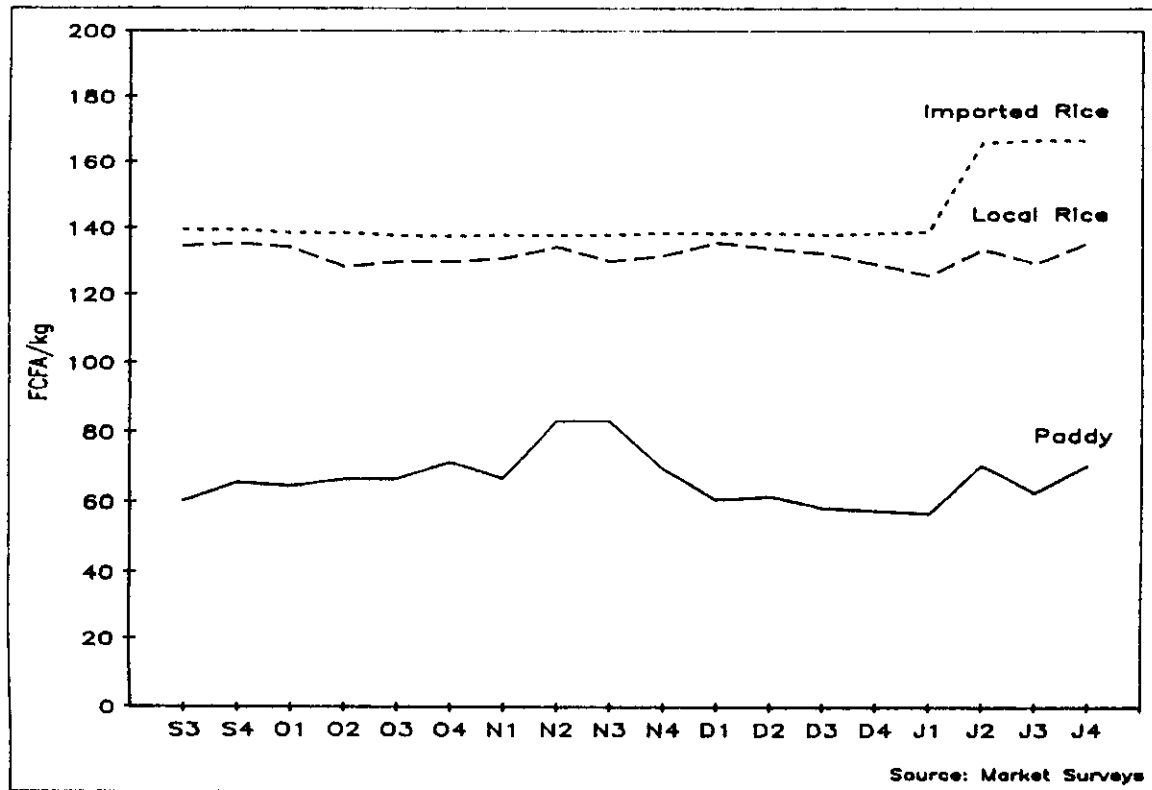
Unlike the processed rice, the husks-and-bran by-product is generally sold at the huller site. During February and March 1985, husks-and-bran prices were found to vary across time and space depending on supply and demand conditions. On average, at the huller sites bags of husks-and-bran sold for about 1,500 FCFA, although prices were sometimes lower in more remote production areas. In urban markets, prices were considerably higher, averaging around 2,000 FCFA per bag. (Since a sample of bag weights varied between 48.5 and 64 kg, these figures are not easily converted to a per-kg basis.)

The economic importance of the husks-and-bran by-product should not be underestimated. Many residents of the Senegal river valley still keep livestock; in fact, most rice farmers are traditional pastoralists who only recently have begun to take up sedentary farming. In view of the critical shortage of forage, the husks-and-bran by-product represents a valuable feed supplement without which herd sizes would have to be reduced

drastically. Many farmers prefer to have their grain processed by hullers because this permits them to retain ownership of the husks-and-bran. (Farmers who sell paddy to SAED do not retain ownership of by-products.)

Retail rice prices in the parallel channel are subject to considerable dispute. Although government officials frequently express strong opinions about the behavior of market prices, these opinions do not seem to be based on empirical evidence: an extensive search of the literature found no evidence that market rice prices have ever been collected systematically in the Senegal river valley. While it was not possible to undertake a comprehensive, long-term price collection effort, weekly spot samples were collected during a four-month period in six major markets between Saint Louis and Bakel. (Figure 10)

Figure 10: Weekly Retail Rice Prices in Fleuve Region Markets (September 1984 - January 1985)



The spot samples confirmed that rice prices in the parallel channel fluctuate depending on supply and demand conditions. During the pre-harvest months, little parallel channel rice was to be found in the markets; when present, it generally sold at approximately the official retail price. During the post-harvest months when local rice was abundant, however, retail prices were observed to dip considerably below the price of imported rice distributed through the official channel, particularly in the major production areas.

In spite of the reported variability in costs and prices, an indicative set of marketing costs and returns for parallel channel trading has been estimated. The point estimates used for purchasing, assembly, and processing activities reflect typical costs and prices which prevailed in the Delta during the post-harvest months of January and February 1985, when the parallel channel was most active.

To facilitate interpretation, the analysis is presented in Table 5 in three equivalent forms. The first column contains costs and returns data associated with the assembly, processing, and sale of two 80 kg bags of paddy (transformed into 100 kg of milled rice and 60 kg of husks-and-bran). The second column contains the same data converted to a per-kg-paddy equivalent. The third column contains the same data converted to a per-kg-rice-plus-0.6-kg-husks-and-bran equivalent. (The unusual units of measure of the third column serve as a reminder that milled rice and husks-and-bran are joint products of the processing activity.)

Table 5: Estimated Costs and Returns to Labor and Management
of a Parallel Channel Rice Trader in the Senegal
River Valley (January 1985)

	Column 1	Column 2	Column 3
	FCFA per 160 kg Paddy	FCFA per 1 kg Paddy	FCFA per 1 kg Rice + 0.6 kg Husk/Bran
Returns:			
Sales of Milled Rice (140 FCFA/kg)	14,000	87.50	140.00
Sales of Husks-and-Bran (33.3 FCFA/kg)	2,000	12.50	20.00
Total Returns	16,000	100.00	160.00
Purchase Price of Paddy (75 FCFA/kg)	12,000	75.00	120.00
GROSS MARGIN	4,000	25.00	40.00
Costs:			
Bagging Fee (100 FCFA/80 kg paddy)	200	1.25	2.00
Paddy Bags (400 FCFA/80 kg sack/4 rotations)	200	1.25	2.00
Transport to Mill (100 FCFA/80 kg paddy)	200	1.25	2.00
Milling Fee (750 FCFA/80 kg paddy)	1,500	9.40	15.00
Winnowing Fee (125 FCFA/100 kg rice)	125	0.78	1.25
Rice Bags (400 FCFA/100 kg bag/4 rotations)	100	0.63	1.00
Husks-and-Bran Bags (400 FCFA/60 kg bag/4 rotations)	100	0.63	1.00
Transport of Rice (200 FCFA/100 kg)	200	1.25	2.00
Transport of Husks-and-Bran (100 FCFA/60 kg)	100	0.63	1.00
Opportunity Cost of Capital (15% per annum)	91	0.58	0.91
Total Costs	2,816	17.61	28.16
NET MARGIN^a	1,184	7.39	11.84

^aDoes not include a charge for the trader's labor and management, nor for a risk premium.

Source: Field Surveys

These results indicate that a trader who bought two bags of paddy for eventual resale as milled rice and husks-and-bran could expect to realize a return to his labor and management of approximately 1,200 FCFA. This corresponds to a net marketing margin of approximately 7 FCFA/kg paddy, or 12 FCFA/kg rice and 0.6 kg husks-and-bran. It is important to recognize the economic value of the husks-and-bran, which at the representative 1985 prices accounted for 12.5% of total revenues from parallel channel sales (processed rice and by-products). In a sense, parallel channel rice trading was made profitable only because of the economic value of the so-called "by-product"; without the revenue generated by the sale of husks-and-bran, net margins on rice alone often would have been negative.

The analysis reflected in Table 5 suggests that during early 1985 the gap between the official producer price for paddy and the official consumer price for rice provided enough of a margin to cover the costs of assembly, processing, transport, and financing for the typical parallel channel trader, provided the animal feed by-product was sold. The representative costs and returns data indicate that the typical parallel channel trader was able to earn a positive return to his labor and management while offering both producers and consumers more attractive prices than were then available on the official market. These findings provide a convincing explanation for the rising numbers of itinerant traders and for the increasing flows of locally-produced rice moving through the parallel channel.

3.4 Performance of the Rice Marketing System As A Whole

What do these findings indicate about the performance of rice markets in the Senegal river valley? In what respects does the existing marketing system contribute to national food and agriculture policy objectives, and in what respects do current

policies and regulations fail to achieve satisfactory performance? What is to be made of the relatively recent emergence of the thriving parallel channel, and what are the implications of this phenomenon?

First, it is important to acknowledge that cereals policies in the Senegal river valley have enjoyed some successes. On the supply side, SAED has been able to introduce irrigation technology into the river valley, which has led to a slow increase in rice production. Despite criticism of the ineffectiveness and costliness of SAED's production support programs, the fact remains that Senegalese rice farmers are today averaging yields of nearly 5 tons/ha on over 20,000 ha of what otherwise would be desert. Meanwhile, on the demand side, CPSP, MCI, and CSA have been able to satisfy local consumption requirements by ensuring the widespread availability of food staples. Despite criticism of the high cost of commercial imports and the unreliability of food aid, most residents of the Fleuve region have had access to adequate amounts of food grains, during a period when many others have been less fortunate.

Despite these modest successes, however, it is not easy to be optimistic about the future of irrigated agriculture in the Senegal river valley. Agricultural policies remain mired in red ink. Massive infusions of development assistance funds and food aid have bought precious time, but production continues to increase very slowly even as program support costs have spiralled.

Official rice marketing policies, while ostensibly designed to encourage commercial production and to reduce marketing costs, often fail to achieve these goals. The main problem with the official policies is their tendency to centralize authority by assigning extensive responsibility to public-sector organizations and agencies. Unfortunately, the empirical evidence indicates

that centralization of authority is not working. The government organizations and agencies in charge of rice marketing activities lack the technical expertise, management capacity, financial resources, and institutional flexibility to respond quickly and effectively to changing market conditions. Their efforts to make marketing "cost-effective", "orderly", "secure", and "fair" often impede rather than facilitate marketing activities. Inconsistent enforcement of marketing regulations fosters a climate of regulatory uncertainty, raising costs and distorting economic incentives by forcing private traders to conceal their marketing activities.

Many public-sector interventions are ineffective and costly. At one end of the official marketing channel, SAED has performed poorly. A relatively small portion of the local rice harvest now moves through the official assembly channel (only 10-15% in most years), weakening the government's ability to enforce the official producer price. What little paddy is purchased by SAED tends to have been rejected by parallel channel traders as too costly to assemble and process, so that the official channel ends up with the least profitable trade. Delays in assembling paddy are a constant problem, and payments to farmers is often held up for months while SAED struggles to resolve cash flow problems. At the other end of the official marketing channel, CPSP, MCI, and CSA have also performed poorly. Quotataires spend heavily to obtain and keep commercial licences which give them the dubious privilege of trading imported rice at negative official margins. Forced to violate the official price structure in order to make a profit, traders must choose between paying fines or paying bribes to induce regulators to look the other way.

The appearance in recent years of a thriving parallel channel testifies to the unworkability of official marketing policies. Relatively unencumbered by the bureaucratic procedures and institutional rigidities which plague public marketing

organizations, parallel channel traders are able to respond quickly and effectively to changes in marketing conditions. They have demonstrated the ability to provide assembly services throughout much of the river valley, to process grain rapidly and inexpensively using technology which is appropriate for local conditions, and to distribute milled rice and by-products to areas where demand is highest. Despite much conventional wisdom to the contrary, they have been able to benefit both producers and consumers by providing timely marketing services at attractive prices. Remarkably, they have been able to do all this in spite of the government's efforts to suppress their activities, which has created a climate of risk and uncertainty and forced them to engage in evasive behavior to avoid detection.

3.5 Similarities With Other West African Marketing Systems

These findings reveal that rice markets in northern Senegal suffer from the same problems found in other West African countries. A recent set of papers on cereals marketing in the Sahel (CILSS 1986) provides an excellent macro-level overview of recent developments in Burkina Faso, Gambia, Mali, Mauritania, Niger, and Senegal. The experiences of the various countries show strong similarities.

Nearly everywhere in the Sahel, government intervention in cereals markets has been ineffective. Public and parapublic marketing organizations have rarely been able to establish effective control over cereals markets (in the sense of regulating flows of grain and setting prices). According to the CILSS authors, the generally poor performance of Sahelian cereals policies can be attributed to a number of causes. The official cereals marketing organizations frequently do not receive adequate financing to intervene in the market on a sufficiently large scale. In addition, they often are required to follow

rigidly defined operating procedures, which cuts down on their operational flexibility. Also, overstaffing is endemic, with the result that administration costs remain unnecessarily high.

The ineffectiveness of official cereals marketing organizations is not the only thing Senegal has in common with other Sahelian states. Parallel marketing channels are ubiquitous as well. According to the CILSS authors, every Sahelian country which has tried to control cereals prices has experienced problems with illegal markets. The volume of grain moving through non-official channels tends to be large, often much more substantial than the volume handled by official marketing agencies or licenced traders. Economic incentives are needed to keep these flows moving, which explains why a considerable discrepancy often arises between official prices and actual market prices. This discrepancy usually proves difficult to overcome. Many Sahelian countries have attempted to eradicate the parallel channel grain trade, but to date none has succeeded. Sanctions do not stop the parallel channel trade; they merely drive it underground where it is difficult to see and impossible to influence. At the same time, efforts to suppress the parallel channel increase the cost of doing business for private traders by forcing them to engage in evasive behavior.

The strong parallels between the Senegalese experience and the experiences of other Sahelian countries is noteworthy because it suggests that Senegalese policy makers have much to learn from reforms which have been or are being instituted elsewhere.

4. POLICY REFORM PROPOSALS

4.1 Assumptions Underlying the Policy Analysis

This paper does not address a question of critical policy importance, namely, to what extent should the Senegalese rice industry be protected from outside competition while it achieves higher levels of output and productivity? If the government decided to stop restricting commercial rice imports and to stop subsidizing production inputs, a drastic reduction in rice production would presumably follow, since rice is still much cheaper to import than to produce domestically.²³ But such a course of events seems unlikely, at least for the foreseeable future; the Senegalese government appears firmly committed to preserving the current protectionist policies as a way of achieving long-run food security objectives.

The economic soundness of the strategy to protect the "infant" rice industry is not at issue here. It is important to keep in mind, however, that the ability of the Senegalese government to implement protectionist rice policies depends on the ability of the public treasury to support the cost of maintaining domestic rice prices at desired target levels. The official consumer price of rice in Senegal is currently being maintained above the level of the world price. This is being done for several reasons: 1) to protect the domestic rice industry (ostensibly until it becomes sufficiently productive to fend off foreign competition); 2) to encourage consumers to switch from rice to less expensive cereals such as millet and sorghum; and 3) to generate revenue for CPSP.

²³The fact that imported rice currently retails at a higher price than domestic rice can be attributed to two factors: 1) subsidies on production inputs enable farmers to sell domestic rice below the true cost of production, and 2) official marketing margins on imported rice are excessive in some cases.

The net cost of maintaining domestic rice prices above the level of world prices is difficult to estimate with precision. In addition to the direct revenue-enhancing effect on the public treasury, several distributional effects must be distinguished, including a gain in producer surplus and a loss in consumer surplus. These are difficult to quantify. Although the price of imports and the official consumer price are easily determined, the domestic cost of production continues to change with the expansion of irrigation agriculture and the evolution of rice production technologies. Furthermore, supply response and demand elasticities in the Senegal river valley are unknown. Thus, the empirical data are not yet available to assess the cost either of current protectionist policies or of alternative long-run food security strategies.²⁴

The analysis which follows is based on the assumption that the domestic rice industry will for the time being be protected by a combination of import restrictions and production subsidies. The relevant short-run marketing policy issue is therefore how to achieve food security, equity, and growth objectives in disposing of rice which by assumption will be produced. The long-term issue of whether or not irrigated rice can and should be produced in the Senegal river valley is left to other studies, which will require further evidence concerning the domestic cost of production.

The assumption that the Senegalese government will for the foreseeable future protect the rice industry by maintaining domestic rice prices above world prices has an important corollary. The level at which domestic rice prices are set, both producer prices for paddy and consumer prices for processed rice, establish important boundaries which effectively delineate the

²⁴BAME economists are currently performing research on this issue. See Martin (1985).

scope of potential private-sector marketing activity. Private traders, whether licenced or not, are motivated by the desire for profits; when profit opportunities disappear, private traders cease to operate. Since profit opportunities for rice traders are largely determined by rice prices, the levels at which rice prices are maintained play a crucial role in determining the degree of private-sector involvement in rice marketing activities. This leads to an obvious but nonetheless important point: the policy analysis which follows is based on the implicit assumption that in pursuing its food policy objectives, the government of Senegal will maintain rice prices at levels which will both ensure continued domestic production and provide incentives for private traders to engage in rice marketing activities.

4.2 Predicting Alternative Development Scenarios

What will the Senegal river valley look like by the year 2025? Specifically, what is likely to happen to the rice sub-sector? Will the government succeed in transforming the Fleuve region into a surplus-producing area capable of exporting large quantities of grain to urban consumption centers in other regions of Senegal? Or will most farmers continue to produce primarily for home consumption?

Trend projections have been used to generate forecasts of the likely long-run evolution of regional cereals balances in the Senegal river valley.²⁵ The projections are based on the following supply (S) and demand (D) relationships:

²⁵For additional information about the trend projection methodology and results, see Morris (1986).

$$S = f(\text{irrigated area, yield, cropping intensity})$$

$$D = f(\text{population, annual per capita cereals consumption requirement})$$

Future supply (regional production) is estimated by multiplying projected irrigated area times projected cropping intensity times projected yield. Future demand (regional consumption requirements) is estimated by multiplying the projected population of the river valley times per capita annual food grains consumption requirements (180 kg), expressed in terms of unprocessed grain.²⁶

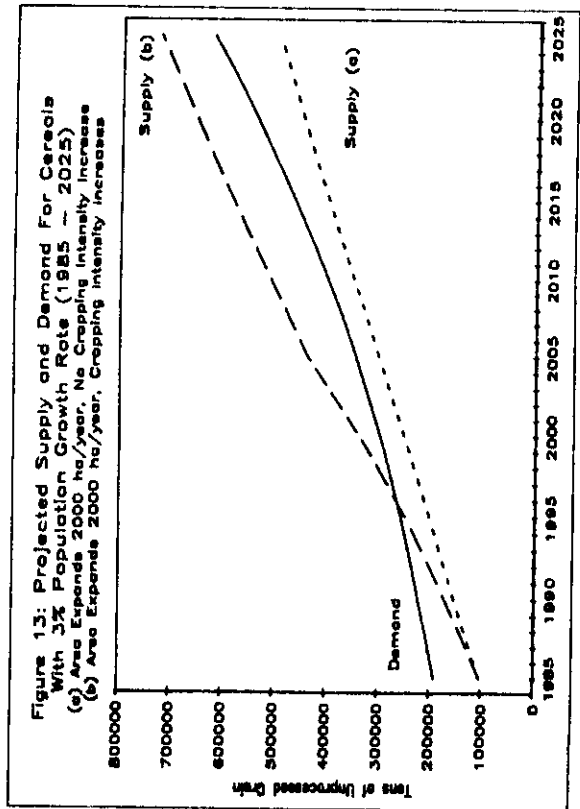
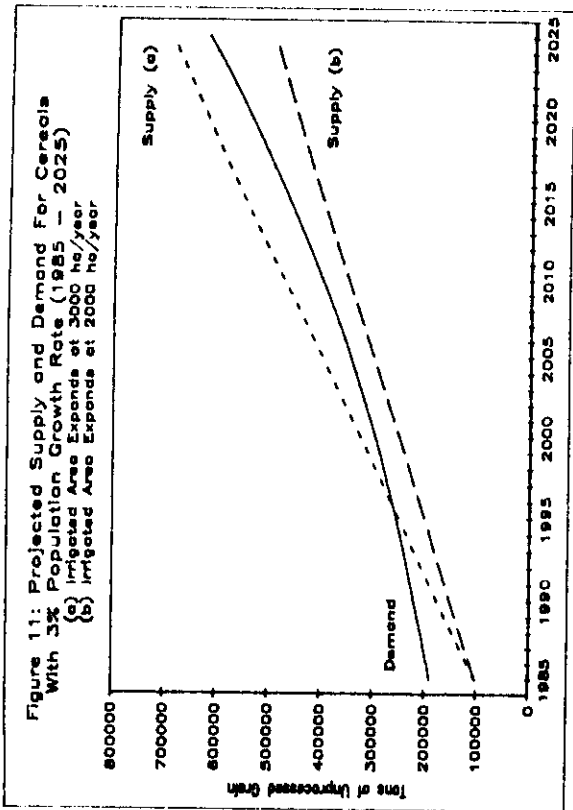
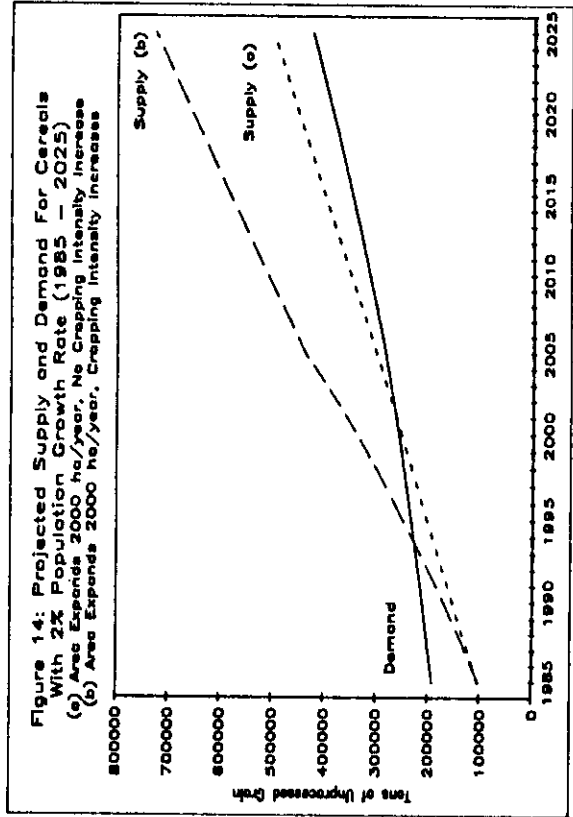
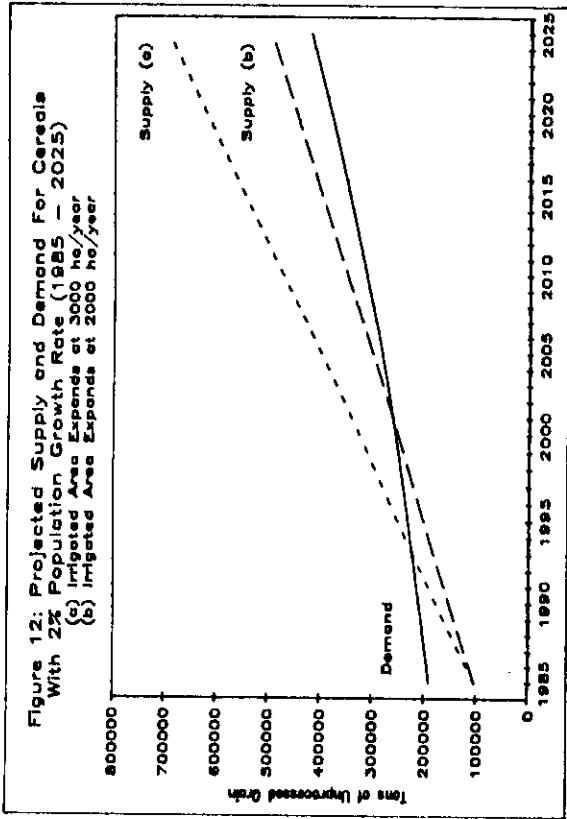
The results of the trend projection exercise appear in Figures 11-16. Because of the uncertainty surrounding future events, sensitivity analysis has been used to test the effects of changes in the ancillary forecasts. On the demand side, rice consumption requirements have been calculated using two annual population growth rates (3% and 2%), and on the supply side, regional production has been calculated using two rates of expansion in irrigated area (2000 ha/year and 3000 ha/year), two levels of cropping intensity (1.1 and 1.6), and two levels of yield (4.5 tons/ha and 5.5 tons/ha). Although conservative by SAED standards, these parameter values were selected based on current conditions in the river valley and recent rates of change.

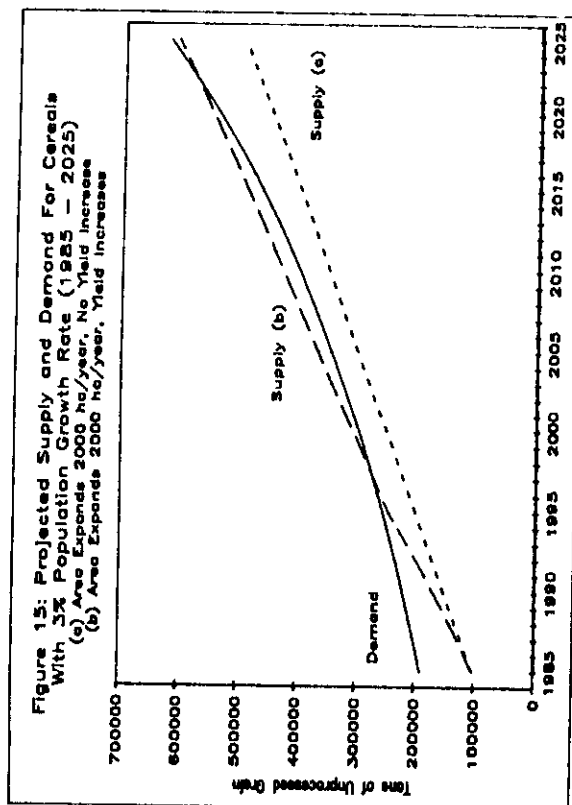
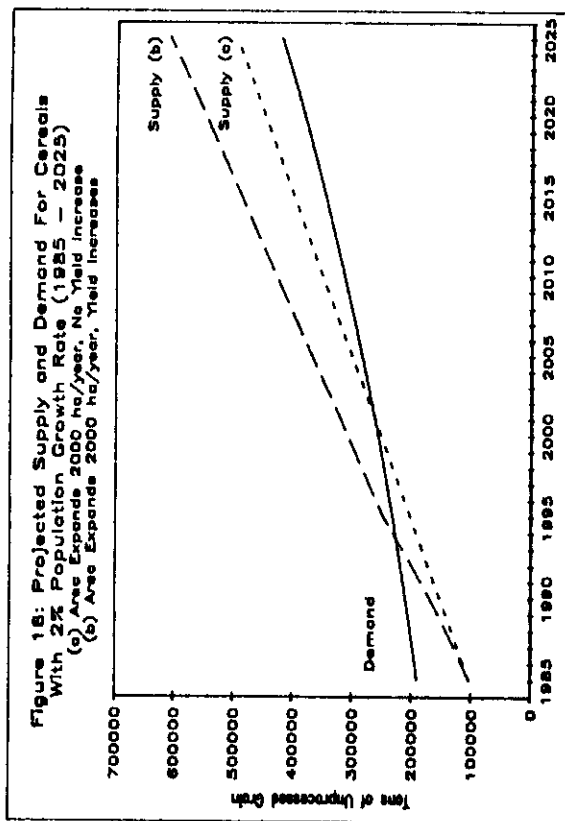
The simple trend projections depicted in Figures 11-16 are only rough forecasts of what could happen to rice balances in the Senegal river valley. The projections ignore many important determinants of supply and demand (such as prices and incomes),

²⁶The figure of 180 kg corresponds to the standard FAO "rule of thumb" estimate of the amount of processed grain needed to satisfy annual human nutritional requirements. The simplifying assumption is made that rice will be the only grain produced and consumed in significant amounts.

and they fail to accommodate interactions between parameters (such as the relationship between area and yields). But despite these obvious limitations, the trend projections illustrate the relative importance of several policy-influenced parameters in determining regional cereals balances, and they indicate a range of outcomes under several plausible sets of circumstances.

Under more optimistic assumptions (low population growth and rapid expansion in irrigated area, high cropping intensity, or improved yields), a regional surplus is projected beginning in the early or mid 1990's, ceteris paribus. On the other hand, under more pessimistic assumptions (high population growth and slow expansion in irrigated area, low cropping intensity or levelling off of yields), a continuing deficit is projected, ceteris paribus. Various intermediate outcomes are also possible, depending on the assumptions made concerning supply and demand parameters; in several scenarios the river valley barely achieves self-sufficiency, while in other scenarios a temporary surplus emerges, only to disappear. The difference between the "best-case" and "worst-case" scenarios is particularly striking: when all the optimistic assumptions are combined, an annual regional surplus of approximately 450,000 tons is projected by the year 2025; when all the pessimistic assumptions are combined, an annual regional deficit of approximately 125,000 tons is projected.





Three main conclusions can be drawn from these projections:

First, the demand side of the food balance equation must not be overlooked by policy makers. The voluminous literature on the future of irrigated agriculture in the Senegal river valley tends to focus on the region's vast production potential while more or less ignoring the likely evolution of regional consumption requirements. The trend projections reveal that if the population of the river valley continues to grow at its present rate of 3% per annum, rice production will have to expand at a healthy clip just to keep pace with regional consumption needs (not to mention meeting any additional demand resulting from income or taste changes). This implies that demographic analysis should be incorporated more explicitly into development planning exercises.

Second, the rate of expansion in irrigated area and the rate of increase in cropping intensity will be more important in influencing total rice production than the rate of increase in average yields. While there is certainly room for improvement in increasing yield levels, average yields are already relatively high by world standards, so that significant increases in total rice production will almost certainly have to come through expansion in irrigated area and/or cropping intensity. This implies that agricultural policy makers should reconsider whether production-support resources are being allocated appropriately among land development activities, water management training activities, and varietal improvement activities.

Third, relatively small changes in key parameters, both on the demand side and on the supply side, could lead to quite different degrees of regional self-sufficiency in cereals production. Sensitivity analysis indicates that under several entirely plausible scenarios, the Senegal river valley could either: a) remain a net importer of cereals, b) barely achieve

cereals self-sufficiency, or c) become an important exporter of cereals. This implies that the rice marketing system -- both the infrastructure used to perform physical marketing activities and the policies and institutions used to accomplish coordinating functions -- must remain sufficiently flexible to accommodate a wide range of diverse marketing situations. It also implies that premature investment in large-scale assembly, processing, storage, and distribution facilities is risky, since large volumes of grain may not be available to ensure their cost-effective utilization.

4.3 Rice Policy Reform Options

Cereals policy reform proposals are often described as either "public-sector solutions" or "private-sector solutions". Participants in the policy dialogue sometimes really do see policy options in terms of such mutually-incompatible choices, but more often than not the dichotomy results when competing interest groups adopt deliberately exaggerated positions in an attempt to shift the mix of public-sector and private-sector responsibilities more toward one end or the other of what is generally acknowledged to be a continuous spectrum. This sort of strategic position-taking can obscure the fact that the relationship between government and private sector is nearly always complementary, so that the critical policy question is not how the one can supplant the other, but rather how the two can complement one another.

In order to ensure that cereals markets perform well, the state does not have to assume direct responsibility for carrying out marketing activities. In recent years, policy thinking in Senegal has been characterized by the prevailing view that if the state is to influence rice markets, it must monopolize many marketing functions while severely restricting the private trade.

Such an approach tends to be futile. The evidence makes clear that public marketing organizations have been costly and ineffective, while parallel marketing channels stubbornly have resisted eradication. The lesson is that government policy goals can best be achieved by targeting state interventions at strategic points in the marketing system in ways that will encourage private traders voluntarily to engage in desirable behavior. This does not mean a reduction in the role of the public sector as much as a reorientation. The cost savings achieved by decreasing direct government participation in marketing activities can be used to finance new investments in transportation and communications infrastructure, in market information programs, in research and development activities, and in other market-support activities designed to increase productivity among private-sector marketing agents.

In the discussion that follows, four key areas are targeted for policy reform, and specific proposals are presented. In each case, the state would play a vital role in establishing and enforcing the rules of the game, in coordinating marketing activities, and in developing competitive mechanisms which will discourage undesirable behavior by market participants. At the same time, the proposals generally imply an expanded role for private traders. This reorientation in the mix of public-sector and private-sector responsibilities will help reduce government expenditures on direct participation in marketing programs while protecting the national policy objectives of growth and equity.

4.3.1 Market Organization and Licencing Requirements

Fundamental changes in market organization will be necessary to improve the performance of rice markets in the Senegal river valley. In particular, direct state participation in assembly,

processing, and distribution activities will have to be scaled back, and private-sector participation will have to be expanded.

The rationale for such a reorientation stems in large part from basic environmental conditions. This research has confirmed what some policy analysts have been asserting for years: rice trading in the Senegal river valley is more effectively performed by private firms and individuals than by the state. On the supply side, the market structure does not lend itself to state monopolization. Paddy production is dispersed over a large area poorly served by roads. Marketable surpluses are typically a small proportion of the harvest and may fluctuate greatly depending on weather, disease, and/or pests. Lots offered for sale are frequently small. Market conditions vary seasonally and regionally, and farmers may behave opportunistically. On the demand side, market conditions similarly mandate against centralized control. Transport from supply points to consumption centers is complicated by poor roads, a lack of vehicles, and limited opportunities for backhaul. Pilferage is a constant problem and necessitates close surveillance of shipments. Effective demand is highly variable, fluctuating with unannounced distributions of food aid. The constant lack of cash on the part of consumers forces traders to extend credit in order to move merchandise, resulting in losses on unpaid accounts.

Structural features thus favor a marketing system which has the flexibility to respond quickly to small changes in market conditions, i.e., a system in which the supply of marketing services is highly elastic at relatively low levels of remuneration. Above all, they favor a system which has the ability to collect, assimilate, and act upon an enormous amount of information which is scattered in bits and pieces over a wide area and a large number of participants. A market system based on flexible prices and involving large numbers of private buyers and sellers constitutes such a system. The market provides a

mechanism for collecting and summarizing a large amount of idiosyncratic information about supply and demand conditions in the easily understandable form of prices, and it introduces incentives to produce, to conserve, and to consume.²⁷ Policy makers, public officials, program administrators, and interministerial councils cannot easily acquire the same amount of knowledge held collectively by farmers, traders, and consumers throughout the Senegal river valley. For this reason, centrally managed organizations such as SAED, MCI, and CPSP cannot easily coordinate rice marketing activities as rapidly, flexibly, and cost-effectively as a well-functioning market system.

An immediate first step to increase private-sector participation in rice marketing would be to eliminate government monopolies on assembly, processing, importing, and wholesaling activities. This would mean granting private firms and individuals legal access to a number of activities from which they are now explicitly or implicitly barred. To protect against undesirable performance consequences, the state could maintain a scaled back presence at several key stages of activity to back up private-sector initiatives and, if necessary, to provide a standard of competition. For example, an official assembly channel could be maintained to assure a market outlet for producers and to guarantee the official producer price. Similarly, an official imports program could be maintained to assure that sufficient quantities of rice are imported to overcome domestic production shortfalls. In addition, SONADIS stores could continue to distribute rice (and sorghum) at administered prices in order to assure the widespread availability of basic food staples at affordable prices.

While elimination of the official government marketing monopolies constitutes an important first step toward the

²⁷Shaffer (1973).

reorganization of rice markets, liberalization of licencing requirements will also be necessary. Some existing licencing requirements pose barriers to entry into rice marketing without contributing appreciably to performance. The quota system is a case in point. Although it is supposed to lend order to the distribution of imported rice, the quota system provides a certain group of privileged individuals access to imported grain at preferential prices. This creates opportunities for some government officials to extract bribes, a marketing cost which must eventually be passed on to consumers in the form of higher prices. Suspension of the quota system would allow distributors to purchase grain directly from producers, assemblers, processors, and/or importers. Analysis of parallel channel trading activities suggests that as long as access into rice trading remains unrestricted, competitive pressure will keep marketing margins small and will ensure favorable prices for both producers and consumers. Free access could be ensured by making commercial permits readily available upon payment of a small registration fee. Formal requirements that traders should demonstrate a certain bank balance or possess a certified storage warehouse are unnecessary and should be eliminated.

4.3.2 Levels of Prices and Pricing Mechanisms

Removing legal barriers to increased private-sector participation in rice marketing will accomplish little unless the pricing system provides economic incentives to induce private firms and individuals to take advantage of new business opportunities. Senegal's current practice of centrally administering rice prices does not work well from an economic point of view. Rice prices are set with political objectives in mind, e.g., supporting producer incomes, limiting the size of marketing margins, and protecting consumer incomes. Although strict enforcement of the official price structure has allowed

these political objectives to be achieved to a greater or lesser extent, the cost has been high -- both directly in terms of government budgetary support costs and indirectly in terms of the stagnating rice economy.

Senegalese policy-makers cannot be faulted for recognizing that food prices represent an effective mechanism for redistributing income in line with national policy objectives. But in manipulating rice prices to serve political ends, they neglect the vital signalling function performed by prices in a market economy. Prices do not merely redistribute income by increasing or decreasing the amounts of money exchanged between buyers and sellers of goods and services; prices also influence the behavior of market participants by structuring the climate of economic incentives. Consequently, a pricing structure which may be quite successful from a redistributive point of view may be unsuccessful in encouraging socially desirable patterns of production, consumption, savings, investment, and growth.

Rice prices in the Senegal river valley are a case in point. Official cereals prices at all levels -- producer, wholesale, and retail -- contribute to redistributive goals at the expense of economic efficiency and growth. Panterritorial and panseasonal producer prices for paddy are established in order to guarantee all farmers a fair price for their crops. While some farmers unquestionably benefit, the official producer price structure distorts production and marketing patterns throughout the river valley, inducing parallel channel traders to skim off the profitable trade while leaving the rest to SAED. Similarly, quasi-panterritorial and panseasonal wholesale and retail distribution prices for rice and sorghum are established to limit gross margins for intermediaries and to provide consumers access to food at fair prices. Again, while some consumers benefit, the lack of territorial and seasonal variability in official prices discourages private traders from transporting and storing grain,

forcing CPSP to perform these activities at high cost and discouraging the movement of grain from surplus areas to deficit areas. Private traders who attempt to defy the official price structure are forced to engage in costly evasive behavior to avoid detection.

Market performance would be improved significantly if the present system of fixed producer and consumer prices were replaced by a more refined and flexible pricing structure. Senegal's experience parallels the experience of the other Sahelian countries: centrally administering cereals prices is unwieldy and expensive. Structural conditions complicate the task of gathering adequate information on which to base intelligent pricing decisions, and institutional rigidities prevent centralized price-setting authorities from responding quickly and effectively to changing market conditions. When prices are determined administratively, a set of signals goes out from policy makers to producers, intermediaries, consumers, and other market participants. Because prices are fixed, however, no good mechanism exists to transmit prices back in the other direction, i.e., back to the policy makers. Deprived of this feedback, which embodies vital information on factors affecting economic activity, policy makers are prevented from reacting to changes in market conditions and cannot know how to reallocate resources from low-productivity to high-productivity uses. Policies become static, and over time they become increasingly costly as the state is forced to support larger and larger subsidies.

The best way to restore the vital signalling function to rice prices will be to return some degree of price-setting authority to the market participants. While the government can pursue redistributive goals by influencing market prices through targeted interventions, it cannot continue to fix all prices by Presidential decree as it has attempted to do in the past.

An immediate first step toward reforming the pricing mechanism would be to abandon the present system of fixing prices by administrative fiat in favor of a limit pricing system. Under a limit pricing system, the government would set upper limits (ceilings) or lower limits (floors) on certain key prices, while allowing actual market prices to vary through time and across space according to economic conditions. Only if and when a price threatens to exceed a limit would the government intervene through open market operations (i.e., buying or selling actions) to protect the limit.²⁸

A limit pricing system would offer two main improvements over the current fixed pricing system. First, seasonal and regional price variability would become an accepted part of the system, since prices would be free to vary through time and across space. Responsibility for setting prices would be shifted away from government authorities, and with prices free to rise or fall in response to market forces, their signalling function would be restored. Second, as long as the upper and lower limits are set at realistic levels and the government is able to protect these limits through open-market operations, market participants would no longer have to engage in costly evasive behavior to conceal illegal pricing activities. This would lower the cost of providing marketing services and at the same time would reduce government administration costs by eliminating the need for price enforcement.

Limit prices would not (and should not) have to be established at every level of the marketing system. Once certain upper and lower bounds are established, the determination of intermediate prices could be left to the competitive market. For example, in the case of rice, limits would have to be established

²⁸If both an upper and a lower limit are established, the system becomes indistinguishable from a band pricing system.

for only three strategic prices: the producer price, the import price, and the consumer (retail) price. Intermediate prices such as the CPSP price and the wholesale price would not have to be administered as long as free access into grain trading ensures a competitive market structure.

4.3.3 Role of Public-Sector Marketing Organizations

To complement the market liberalization measures described above, additional policy reforms are needed to improve the performance of government marketing organizations, particularly SAED and CPSP. These organizations have been ineffective in performing rice marketing functions; certainly their limited successes do not justify the high budgetary support costs.

The most pragmatic approach to improving the performance of the government marketing organizations is simply to redefine their role so as to minimize the adverse effects of their most obvious shortcomings. In the case of SAED, a redefinition of the agency's role is already underway. Beginning in 1981, reforms were initiated to spin off a number of functions to the private sector. Among other things, the reforms called for paddy marketing activities to be relinquished, although no definite timetable was set for the changeover. In addition, the reforms called for streamlining of standard operating procedures and for reductions in personnel. Since their implementation, the reforms have succeeded in reducing SAED's involvement in certain production-support activities and in slowing the growth of the agency's payroll. But while they represent a positive first step, the reforms do not go far enough toward extricating SAED from marketing activities. SAED has retained ownership of the two rice mills, and the legal monopoly on purchases of paddy from farmers has been maintained. SAED officials continue to claim a firm commitment to the "privatization" of marketing functions,

but their behavior does not indicate any hurry to back up the words with actions. Political factors may be involved; the SAED marketing operation generates a great deal of public-sector employment, and the authorities undoubtedly worry about having to take jobs from so many workers.

In the case of CPSP, a redefinition of the agency's role has been proposed, but thus far few concrete actions have been taken. Government officials have on several occasions discussed abolishing the CPSP-managed quota system for imported rice, most recently in early 1986 as part of the proposed Medium-and Long-Term Adjustment Program (PAMLT), but the proposals have never progressed beyond the discussion stage. Apparently the feeling is that CPSP withdrawal from the market would give free rein to unscrupulous private importers. To allay this fear, a CPSP presence in the market could be maintained while the import industry is opened to private traders. This would assure the availability of rice at competitive prices while permitting private firms and individuals to become actively involved in importing and distributing grain. As private traders expand their market share, CPSP direct participation could gradually be reduced, until eventually CPSP would be trading in relatively small quantities, just enough to maintain a reserve stock and to provide leverage for targeted interventions in the market to protect price limits.

The cost-effectiveness of government expenditures on market support activities could be improved further if SAED and CPSP would stop trying to monopolize rice trading and would instead concentrate on supporting private-sector commerce through the provision of facilitative goods and services of a "public goods" nature. The resources saved by scaling back the degree of direct state participation could be used to provide facilitative goods and services which are unlikely to be produced by private firms. For example, public investment in transportation infrastructure

(e.g., roads and bridges) could reduce transport costs for private traders. Similarly, public investment in market information services (e.g., price and quantity reporting) could reduce private-sector information costs by improving communication between buyers and sellers of grain. In addition, public investment in the establishment of a system of grades and standards could reduce transactions costs for all market participants by eliminating the need for personal inspection of each lot of grain.

4.3.4 Choice of Technique in Rice Processing

A fourth area where policy reforms are urgently needed concerns rice processing. Processing operations in the official marketing channel continue to be carried out at the two SAED rice mills despite clear evidence that the mills are performing poorly. Although Senegalese authorities tacitly acknowledge the superiority of village-level processing technology by turning a blind eye to the activities of parallel channel processors, the SAED mills continue to receive subsidies, permitting them to remain in use despite perennial operating losses.

Two policy issues relate to processing: 1) choice of technique in processing, and 2) ownership and operation of the processing industry. The first issue has to do with what types of processing facilities should be built, while the second has to do with who should own and operate them.

The optimal choice of technique in rice processing depends on several factors, including the total quantity of paddy to be processed, the spatial distribution of supply and demand, and the appropriateness of alternative technologies for local conditions.

The critical importance of accounting for transport costs is demonstrated in Table 6, which summarizes selected marketing costs in the official and parallel channels under three alternative production and consumption scenarios. Column 1 summarizes assembly costs, processing costs, and the transport component of distribution costs for 1 kg of paddy produced in the Upper Valley, processed by the SAED rice mill at Richard Toll, and trucked back to Bakel for distribution. Column 2 summarizes the same costs for 1 kg of paddy produced in the Delta, processed by the SAED rice mill at Ross Bethio, and trucked to Saint Louis for distribution. Column 3 summarizes the same costs for 1 kg of paddy produced anywhere in the river valley, processed locally on a huller, and consumed within 100 km of the production zone.

Table 6: Comparison of Processing Costs with Forward and Backward Transportation Linkages in the Official and Parallel Marketing Channels (Senegal River Valley, 1983/84-1984/85)

Column 1 Official Channel (FCFA/kg paddy)		Column 2 Official Channel (FCFA/kg paddy)		Column 3 Parallel Channel (FCFA/kg paddy)	
SAED Assembly Costs (net of transport)	6.949	SAED Assembly Costs (net of transport)	6.949	Bagging Fee	1.25
Transport Component	15.204	Transport Component	1.880	Paddy Bags	1.25
ASSEMBLY SUB-TOTAL	22.153	ASSEMBLY SUB-TOTAL	8.829	Transport to Huller	1.25
SAED Processing Costs	14.558	SAED Processing Costs	9.795	ASSEMBLY SUB-TOTAL	3.75
SAED Storage Costs	1.304	SAED Storage Costs	0.478	Hulling Fee	9.40
SAED Overhead Costs	2.295	SAED Overhead Costs	2.295	Winnowing Fee	0.78
PROCESSING SUB-TOTAL	18.157	PROCESSING SUB-TOTAL	12.568	Rice Bags	0.63
CPSP Transport Costs	8.619	CPSP Transport Costs	1.273	Labor, Management	7.39
DISTRIBUTION SUB-TOTAL	8.619	DISTRIBUTION SUB-TOTAL	1.273	PROCESSING SUB-TOTAL	18.20
TOTAL COSTS	48.659	TOTAL COSTS	22.670	Transport	1.25
				DISTRIBUTION SUB-TOTAL	1.25
				TOTAL COSTS	23.20

(Notes: Columns 1 and 2 contain 1983/84 data, Column 3 contains 1984/85 data.)

Source: Cisse (1984), Field Surveys

The data in Table 6 show how the economic ranking of alternative processing technologies depends on whether or not forward and backward linkages are included in the calculations, as well as on what cost figures are used.²⁹ When assembly and distribution transport costs are not taken into account and processing costs alone are compared, the SAED mills appear to offer a cost advantage over hullers. But when different assembly and distribution costs linked to the alternative processing technologies are added in, the ranking may change. For example, if rice is produced and consumed far from the processing site (Column 1), higher assembly and distribution transport costs outweigh the scale economies achieved through the use of industrial-scale processing facilities, making local processing on hullers economically advantageous (Column 3). On the other hand, if rice is produced and consumed close to the processing site (Column 2), assembly and distribution transport costs remain small, and industrial-scale processing facilities represent the low-cost solution. These findings highlight the importance of accounting for backward and forward linkages in evaluating alternative processing technologies. The data reveal that the SAED mills do not enjoy an absolute cost advantage throughout the Senegal river valley. Rather, industrial mills represent the low-cost processing technology for some production/consumption combinations, while hullers represent the low-cost processing technology for other combinations.

²⁹The data in Table 6 do not precisely reflect actual costs; as pointed out earlier, official SAED records fail to account for all cost categories, and figures pertaining to the parallel channel were estimated on the basis of small samples. Nor do the data in Table 6 purport to represent likely future costs, since the economics of processing in both the official and parallel channels will depend on levels of competition and capacity utilization rates. Nevertheless, the data are on the correct order of magnitude for prevailing conditions, and they illustrate the importance of forward and backward linkages in determining the optimal choice of technique in rice processing.

Since the location of production relative to consumption influences the optimal choice of technique in processing, policy analysis must take into account the likely spatial evolution of supply and demand. Today, approximately 2/3 of total paddy production occurs in the Delta region, while only 1/3 occurs in the Middle and Upper Valleys combined. This relative concentration of cereals supply in the Delta differs from the physical distribution of demand; only 1/3 of the total population of the Senegal river valley lives in the Delta, while the remaining 2/3 live in the Middle and Upper Valleys. Considering this distribution of supply and demand, the present concentration of processing capacity in the Delta appears to make sense; most rice is processed in the Delta near the major production zones, before being transported to consumption centers elsewhere.

But SAED planners expect the distribution to change. According to official projections, most rice production growth will occur in the Middle Valley. By the mid 1990's, 2/3 of total paddy production is expected to occur in the Middle and Upper Valleys.³⁰ Future demand for processing services thus will be concentrated in the Middle and Upper Valleys. Official planning documents recognize this; one SAED study boldly calls for the construction of eight new industrial processing facilities by the mid-1990's, of which five would be located in the Middle Valley and one in the Upper Valley.³¹

The problem, of course, is that the projected production increases may not materialize. Past projections have frequently been incorrect. As has been pointed out, the long-term future of irrigated agriculture in the Senegal river valley remains an open

³⁰This projected growth pattern reflects the superior economic performance of the medium- and small-scale perimeters of the Middle and Upper Valleys.

³¹SAED (1984).

question because of technical, economic, and political uncertainties. In this context, building additional industrial rice mills in anticipation of future needs is risky. Industrial mills are lumpy inputs with little or no alternative uses and a low salvage value. In view of the scarcity of investment capital, a more gradual expansion in processing capacity involving flexible, small-scale processing technology is warranted until production increases are realized which will justify the construction of industrial processing facilities. The concern of some policy makers that enough processing capacity be maintained to handle the politically important rice crop should be allayed by the finding that existing processing capacity at the village level far exceeds current production levels. Furthermore, the finding that village-level processing capacity has expanded very rapidly in response to market incentives suggests that additional expansion to meet future needs will not be a problem.

While the available evidence suggests that it would be risky under current conditions to invest in industrial processing facilities, the situation could easily change. If and when projected production increases are achieved, additional processing capacity will be needed. Depending on a number of factors (e.g., the spatial distribution of supply and demand, labor availability, technological considerations), by then it may be cost-effective to expand capacity by building additional industrial facilities.

In addition to the question of how much total processing capacity will be needed, a second question concerns ownership and management of the processing industry. In light of what is now known about URIC operations, it is clear that the performance of the processing industry would improve if the industrial mills were not kept under SAED management. In order for the mills to be operated at a profit, attention will have to be focused on the

bottom line, which is not likely to happen as long as management is made up of salaried civil servants.

SAED divestment of the two rice mills could be accompanied by efforts to encourage private-sector participation in the processing industry. The first step could be explicitly to legalize the activities of village hullers. While the hullers themselves are not illegal, it is still technically illegal for them to process rice for any purpose other than home consumption. Even though the authorities rarely interfere with huller operations, explicit legalization of village processing activities would reduce the risk faced by private investors. The second step could be to reduce the cost of acquiring and maintaining hullers. Most hullers are imported from Europe, and like all imported machinery they are subject to stiff import duties. The same is true for spare parts, which are so expensive that many huller operators choose to substitute inferior-quality locally manufactured parts. Revision of the import tariff schedules would significantly lower the cost of processing (albeit at some loss of government revenues from foregone import duties).³² The third step could be to invest the resources presently being used to subsidize the SAED mills into the development of improved processing technologies. Currently the market will support only one or two agricultural implements dealers, so processors are offered a limited choice of processing technology. With so few firms dominating the market, improved technologies are sometimes slow to appear. (For example, the rubber-roller technology which now dominates the Asian processing industry is still unknown in Senegal.) Public investment in research and development of improved processing technologies, combined with an aggressive extension program, would increase awareness of new processing technologies.

³²In comparison, SAED processing equipment is imported duty-free according to the terms of bilateral aid agreements.

5. CONCLUSIONS AND IMPLICATIONS

5.1 Potential Barriers to Reform

No matter how desirable they may appear, policy reforms will not be easy to implement. Environmental, political, economic, and institutional constraints will restrict the government's ability to introduce effective reforms, and those who stand to lose out if the status quo is disrupted can be expected to offer stubborn resistance to changes in the prevailing rules of the game.

Government efforts to reform existing rice policies are likely to encounter the following barriers:

Unpredictability of the Physical Environment

The extreme climatic variability of the Senegal river valley introduces a formidable element of uncertainty into policy planning. Policy reforms which may be entirely appropriate for a given set of circumstances may turn out to be ineffective if those circumstances change unexpectedly between the time the reforms are designed and the time they are implemented. For example, some analysts have argued that rainfall has decreased so much since the original engineering feasibility studies for the two dams were carried out that there is now some question whether or not the reservoir above the Manantali dam will ever be filled.

Uncertainty about Technical Production Possibilities

Uncertainty about technical production possibilities additionally complicates policy planning. Since irrigation is relatively new in the Senegal river valley, improved technologies and management practices are still being developed to bring down production costs. At present, it is impossible to predict whether or not the cost of production can be reduced far enough to make domestically produced rice competitive with imported

rice. This lingering uncertainty about the long-run economic viability of irrigated crop production prevents policy analysts from mapping out a definitive long-run development strategy.

Underestimation of the Importance of Marketing Policy.

Many policy makers continue to believe that marketing policy will play a secondary role in solving Senegal's food problem. As the nation's food deficit continues to widen, attention remains focused on what are seen to be the priority issues -- production support programs and infrastructural development activities. Marketing issues are rarely elevated to the top of the policy agenda and in fact tend to get passed over in the policy debate.

Conflicting Policy Goals.

When policy goals conflict (as they nearly always do), reforms designed to contribute to one policy objective often detract from other objectives. A classic example involves the current debate in Senegal over rice prices: higher prices favor producers but harm consumers, and vice versa. When multiple policy goals are considered valid, policy reform is considerably complicated, and the decision-making process can easily become paralyzed.

Institutional Fragmentation.

If responsibility for policy decision-making is divided among multiple institutions, particularly institutions with different mandates and goals, it can be extremely difficult to reach a consensus on necessary reform measures. Rice policy in Senegal is determined by a proliferation of institutional actors, including the Presidency, the interministerial council, SAED, CPSP, MCI, CSA, SONADIS, and others. The difficulty of coordinating the activities of these diverse organizations and policy-making bodies imposes a substantial transactions cost on the reform process and in fact often brings the process to a virtual standstill.

Underinvestment in Policy Analysis Capacity.

Even if decision-makers and foreign aid donors are able to reach a consensus on the desirability of certain policy reforms, trained analysts frequently are lacking to help design and implement the reforms. For example, while decision-makers may agree that an increase in producer prices is necessary to stimulate production, trained analysts may not be available to calculate the exact size of the price rise needed to elicit a certain level of supply response.

Ready Availability of Foreign Aid.

Ironically, the ready availability of foreign aid can pose a barrier to policy reforms by relieving pressure to improve on current performance, however bad it may be. The case of URIC represents a case in point. Even though URIC consistently loses money, the Senegalese government has not come under any real pressure to reform URIC because foreign aid money has been readily available to subsidize the perennial operating losses. This is hardly an isolated example; numerous instances come to mind in which large infusions of foreign aid have reduced the pressure on the Senegalese government to institute painful policy reforms.

Lack of Coordination Among Aid Donors.

In recent years, the aid donors who underwrite the cost of many food and agriculture policies in Senegal have shown an increasing tendency to impose conditions regarding the use of the funding they provide. If the donor conditions are not met, the funding is withheld. But consensus among donors is unusual; rarely do the donors agree on the nature of the problems, much less on the appropriate solutions. Under these circumstances, the Senegalese government faces a difficult choice: either accept conditionality and risk having to implement conflicting policy reforms, or refuse conditionality and risk a cutoff in aid. In either case, implementation of coordinated reforms is difficult.

Ideology.

The traditional bias against middlemen poses an important barrier to policy reform. Despite mounting evidence that private traders generally perform well in carrying out rice marketing activities, many Senegalese continue to believe that market liberalization measures will simply give free rein to unscrupulous private traders to exploit vulnerable farmers and consumers. Despite widespread dissatisfaction with the performance of government marketing organizations, the traditional notion that the state is in a better position to look after the "public good" remains deeply ingrained. This undermines popular support for reforms designed to shift responsibility for carrying out marketing functions away from government organizations.

Political Sensitivity of Food Prices.

Finally, the political sensitivity of food prices, especially the price of rice, cannot be overemphasized. Senegalese leaders are acutely aware that food price increases have recently caused unrest in a number of African countries (e.g., Liberia, Egypt, Morocco, Zambia). Given the obvious relationship between food prices and real incomes (especially the real incomes of urban consumers), raising official cereals prices requires considerable political courage. While the President has demonstrated his willingness to raise consumer prices, there is probably a limit to the degree to which this particular policy lever can be put to use.

5.2 Increasing the Effectiveness of Policy Reforms

Several policy reform proposals have been presented based on the research findings, and their likely performance consequences have been discussed. In addition, potential barriers to reform have been reviewed. While these barriers could prevent

implementation of the reform proposals, they need not be insurmountable if decision-makers are prepared to take a series of steps to bring about real and meaningful change.

First, government decision-makers need to deal more effectively with the complexity of the policy process. Senegal's institutional fragmentation has fostered a piecemeal approach to policy reform which flies in the face of the complex interrelationships between macroeconomic forces. Because different public agencies are assigned responsibility for different economic activities, reforms are often introduced to solve immediate, narrowly defined problems, with little or no consideration of forward and backward linkages, externalities, and other secondary effects. While the overly simplistic nature of some recent policy reforms can in part be attributed to a lack of analytical capacity, a contributing factor has been the failure sufficiently to widen the scope of analysis to accommodate interrelationships in the economy. The creation of the BAME represents a positive step toward expanding the framework of policy analysis, but this expansion must continue.

Second, when policy objectives conflict, government decision-makers need to establish explicit priorities to avoid paralyzing the reform process. If it is not possible to prioritize conflicting policy objectives, the tradeoffs between the various objectives must be addressed directly. If food security is one valid goal and reducing the cost of agricultural support programs is another, which is more important? If both are important, to what extent can food security be sacrificed in order to reduce government expenditures on agriculture by a given amount? All too often, the reform process is immobilized because decision-makers attempt to accommodate conflicting policy goals without ranking them in order of importance or addressing the crucial questions of what would constitute an acceptable tradeoff.

Third, government decision-makers and policy analysts need to be more innovative in facing up to the distributional impacts of policy reforms. Reforming the rice sub-sector is not merely an economic problem; it is a political problem as well. The tendency for economic reform proposals to be couched in technical jargon having to do with such apparently non-normative concepts as "efficiency" and "productivity" does not alter the fact that any change in the status quo makes some people better off and some worse off. Policy decision-makers have to acknowledge the likely welfare effects of reform proposals, and they must be willing to discuss such welfare effects in the policy debate if the debate is to be meaningful and productive.

Fourth, policy reforms are most effective if they are directed at the climate of economic incentives governing the behavior of private sector market participants. Since unauthorized grain trading is virtually impossible to suppress, the government's current efforts to monopolize marketing activities merely serve to raise the cost of doing business in the parallel channel. Instead of casting a blind eye to the private grain trade, rice policies must take into account the way the market really works and must seek to channel private-sector marketing activity in socially desirable directions. The conventional wisdom notwithstanding, increasing the role of private merchants would probably improve market performance; the evidence suggests that private merchants frequently are able to perform grain marketing activities more quickly and more efficiently than the government marketing organizations.

Fifth, Senegalese policy analysts can benefit by studying the cereals policy reforms recently introduced in other West African countries, particularly Mali, Niger, and Burkina Faso. While circumstances differ between the various Sahelian states, their situations are similar enough in certain fundamental respects that each stands to learn from the experiences of the

others. As Senegalese policy analysts begin to consider such issues as flexible pricing, limit pricing, licencing of private assemblers, choice of technique in processing, liberalization of the import market, etc., they should familiarize themselves with recent policy reforms in neighboring states, where experiments with these and other interesting innovations are already underway.

The general recommendations outlined above are not meant to provide a "cookbook" prescription for policy reform. Rather, they attempt to address the difficult question of how empirical research findings can be put to use in bringing about desirable change. An essential first step must be to recognize that policy reform is as much a political problem as an economic one, and that when so-called "economic" reforms fail, it is often because of a lack of political will rather than because of inadequate policy analysis.

At the same time, the importance of sound policy analysis cannot be overemphasized. Political will is finally no substitute for incorrect or incomplete analysis. The key to successful policy reform will always be a thorough understanding of the way the market really works, as well as sound insights into ways that it might be helped to work better. Such knowledge requires a strong empirical data base and analytical competence, which can be assured only through continued investment in research activities and human capital development.

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