

**Cereals Marketing in the Senegal  
River Valley (1985)**

by

**Michael L. Morris**

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## **SPECIAL NOTE FOR ISRA-MSU REPRINTS**

In 1982 the faculty and staff of the Department of Agricultural Economics at Michigan State University (MSU) began the first phase of a planned 10 to 15 year project to collaborate with the Senegal Agricultural Research Institute (ISRA, Institut Sénégalais de Recherches Agricoles) in the reorganization and reorientation of its research programs. The Senegal Agricultural Research and Planning Project (Contract 685-0223-C-00-1064-00), has been financed by the U.S. Agency for International Development, Dakar, Senegal.

As part of this project MSU managed the Master's degree programs for 21 ISRA scientists at 10 U.S. universities in 10 different fields, including agricultural economics, agricultural engineering, soil science, animal science, rural sociology, biometrics and computer science. Ten MSU researchers, on long-term assignment with ISRA's Department of Production Systems Research (PSR, Département de Recherches sur les Systèmes de Production et le Transfert de Technologies en Milieu Rural) or with the Macro-Economic Analysis Bureau (BAME, Bureau d'Analyses Macro-Economiques) have undertaken research in collaboration with ISRA scientists on the distribution of agricultural inputs, cereals marketing, food security, farm-level production strategies and agricultural research and extension. MSU faculty have also advised junior ISRA scientists on research in the areas of animal traction, livestock systems and farmer groups.

Additional MSU faculty members from the Department of Agricultural Economics, Sociology, Animal Science and the College of Veterinary Medicine have served as short-term consultants and professional advisors to several ISRA research programs.

The project has organized several short-term, in-country training programs in farming systems research, agronomic research at the farm-level and field-level livestock research. Special training and assistance has also been provided to expand the use of micro-computers in agricultural research, to improve English language skills, and to establish a documentation and publications program for PSR Department and BAME researchers.

Research publications from this collaborative project have been available only in French. Consequently, their distribution has been limited principally to West Africa.

In order to make relevant information available to a broader international audience, MSU and ISRA agreed in 1986 to publish selected reports as joint ISRA-MSU International Development Paper Reprints. These reports provide data and insights on critical issues in agricultural development which are common throughout Africa and the Third World. Most of the reprints in this series have been professionally edited for clarity; maps, figures and tables have been redrawn according to a standard format. All reprints are available in both French and English. A list of available reprints is provided at the end of this report. Readers interested in topics covered in the reports are encouraged to submit comments directly to the respective authors, or to Dr. R. James Bingen, Associate Director, Senegal Agricultural Research and Planning Project, Department of Agricultural Economics, Michigan State University, East Lansing, MI 48824-1039.

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## CEREALS MARKETING IN THE SENEGAL RIVER VALLEY (1985)

by

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1987

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## **1. INTRODUCTION AND OBJECTIVES**

The Fleuve Cereals Marketing Study was one of a series of coordinated regional studies undertaken as part of the BAME's national research program on cereals markets in Senegal. The regional studies in the Senegal river valley (Fleuve Region), in the Peanut Basin, and in the Casamance were conceived, designed, and carried out with the intent to generate results that would be useful for policy makers both at the regional and at the national levels. A similar research approach was adopted for all three studies, focusing on the organization of markets, the behavior of participants, the influence of regulations, and other determinants of market performance.

Given the macro-economic orientation of the BAME, the overall focus of the regional studies was on the cereals sub-sector, defined as the set of vertically related economic activities including production, assembly, processing, distribution, and consumption. Unlike more traditional approaches which tend to focus separately on individual industries, the sub-sector approach encompasses an entire set of industries, paying particular attention to the vertical coordination mechanisms which link together successive stages of economic activity. By examining not only each horizontal slice of economic activity but also the vertical coordination mechanisms which link it to related activities, the sub-sector approach provides insights into the dynamic interactions between related industries and leads to a better understanding of how the food system functions as an articulated whole.

The Fleuve Cereals Marketing Study was launched in 1983, following a series of discussions of marketing research priorities between ISRA researchers and representatives of SAED, the regional development agency charged with marketing rice in the Senegal river valley. These discussions highlighted the lack of knowledge about local grain marketing activities, and the decision was taken to base a researcher in Saint Louis for a study of cereals markets in the Fleuve region.

The objectives of the Fleuve Cereals Marketing Study included:

- 1) to review recent production and marketing developments affecting the cereals sub-sector in the Senegal river valley;
- 2) to describe the organization and performance of the existing cereals marketing system, including both official and unofficial or "parallel" channels;
- 3) to identify areas of unsatisfactory performance where current policies have been ineffective or threaten to become ineffective in achieving stated policy goals;
- 4) to propose possible policy reforms to consider for improving the performance of the future cereals marketing system; and
- 5) to identify key topics on the future research agenda.

The study covered the Senegalese portion of the river valley from Saint Louis to Kidira, including the administrative Region de Saint Louis and the Departement de Bakel (see map in Appendix B). The papers that this publication combines were prepared separately as intermediate outputs to disseminate preliminary research results that may be of immediate use to farmers, traders, government administrators, policy makers, and other participants in the cereals sub-sector.

## **2. CONTEXT OF THE FLEUVE CEREALS MARKETING STUDY**

The national agriculture and food policy goals of the government of Senegal, as expressed in development planning documents such as the VI Plan Quadrennial de Developpement Economique et Social (1981-1985) and the Nouvelle Politique Agricole (1984), include:

- ensuring an adequate and reliable food supply;
- achieving sustained growth in the level of per capita income;
- enhancing the quality of life in urban and rural areas;
- maintaining full employment;

- protecting the environment through judicious use of natural resources;
- safeguarding individual freedoms through political stability.

A number of instrumental policies have been introduced to achieve these goals.

Three of the most important that relate to the food grains sub-sector are the following:

- 1) the development of irrigated agriculture in the Senegal river valley;
- 2) the reliance on commercial imports of cereals (particularly rice and wheat) to satisfy demand which cannot be met by local production; and
- 3) the distribution of food aid to those who are unable to produce or to purchase enough cereals to maintain a certain minimum level of consumption.

Each of these policies has played an important role in the struggle to achieve national agriculture and food policy goals, and it is likely that each will continue to do so, since many of the goals are still far from being met. The recent history of these three policies in the Senegal river valley is briefly described in order to place the current situation in dynamic perspective.

### 2.1 Recent Developments in the Senegal River Valley

The introduction of irrigated agriculture in the Senegal river valley is an important component of the government's development strategy with implications for economic efficiency, social equity, and national food security goals. Work is well underway on the project: the OMVS member states of Senegal, Mauritania, and Mali are constructing dams at Diama (Senegal) and Manantali (Mali) which theoretically will make possible irrigation of approximately 370,000 ha, of which 200,000 ha are in Senegal. Agricultural development efforts in the Senegalese portion of the river valley have been entrusted to the regional development agency, SAED, a parastatal established in 1965 to construct irrigation systems (called "perimeters"), provide extension services, distribute production inputs, and market outputs. Nominally responsible for all crops, SAED in practice has concentrated on rice. Despite an uneven record, progress has been achieved in recent

years in expanding the area under irrigation and in increasing total production of paddy. (see Figure 1)

Despite the recent increases in the production of paddy, the Senegal river valley continues to have a cereals deficit. Years of drought have depressed overall cereals production by devastating traditional rainfed and flood recessional crops of millet and sorghum, while at the same time food grain consumption requirements have increased steadily under pressure from a 3% annual population growth rate. As a result, during the past ten years local cereals production has failed to keep pace with demand, and the region which according to planners will one day produce an important food grain surplus today remains in deficit. (see Figure 2)

The cereals deficit in the Senegal river valley has been overcome with the help of commercial imports of rice, sorghum, and wheat. Rice is by far the most important of the three. Once consumed primarily in the urban region of Dakar, imported rice in recent years has assumed an increasingly dominant role in rural areas as well. However, it is difficult to estimate with precision the quantities consumed in the Senegal river valley. CPSP (a government agency charged with stabilizing the prices of basic food staples) holds the legal monopoly on importation of rice, which it sells to licenced distributors at controlled prices. While CPSP publishes official regional sales figures, these understate the quantities consumed in rural areas because some of the grain sold in Dakar eventually makes its way inland. In 1984, the total quantity of imported rice sold in the Senegal river valley probably approached 20,000 tons, or approximately 30 kg per capita.

While the regional cereals deficit is partially overcome with the help of commercial imports, many residents of the river valley lack the resources either to produce or to purchase enough food grains to maintain a certain minimum level of consumption. Recognizing this, the government and foreign donors have distributed sorghum, rice, and maize in the form of food aid, which thus represents a third important



Figure 1: Evolution of Irrigated Area, Paddy Production (1973/74 - 84/85)

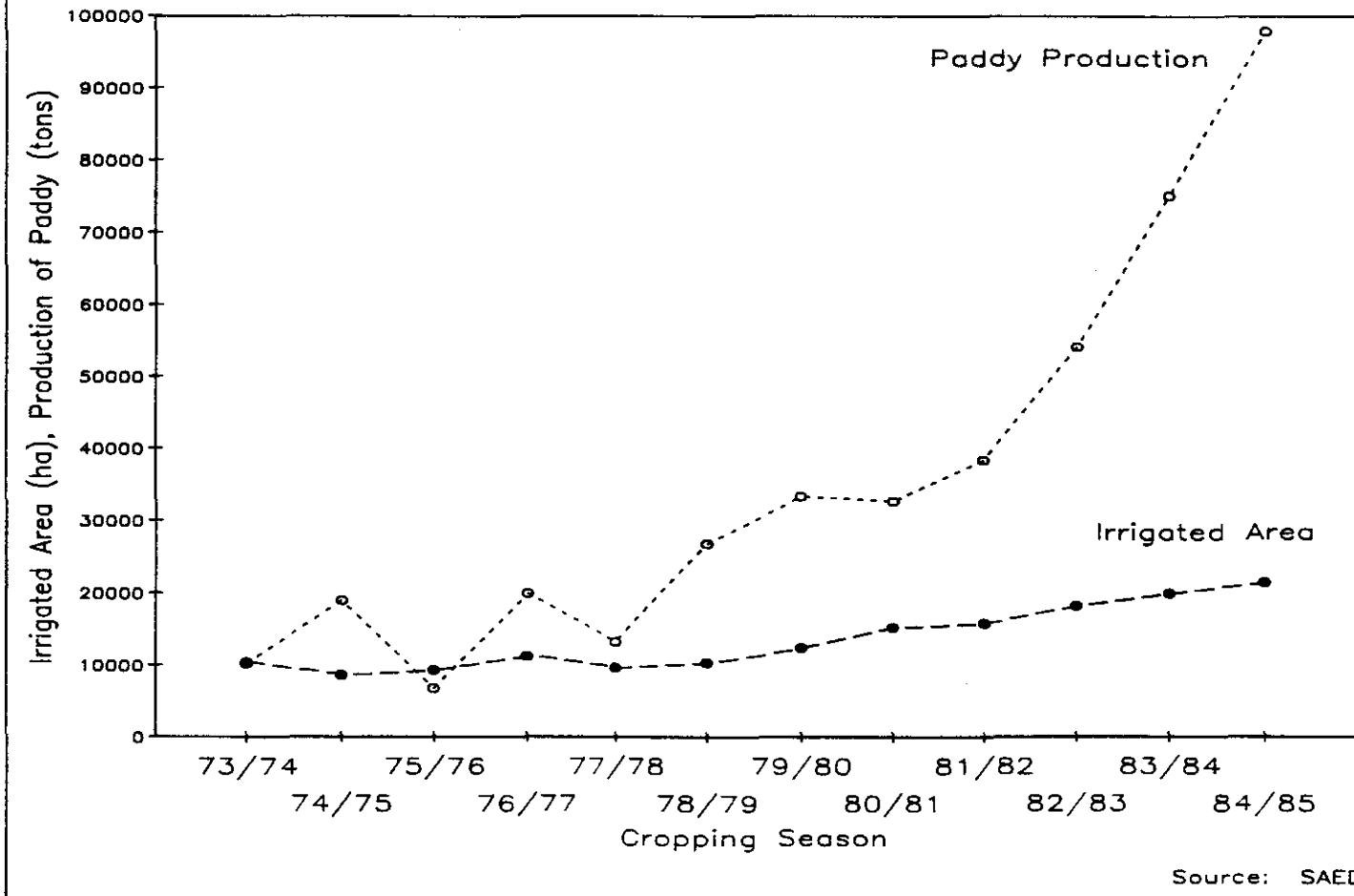
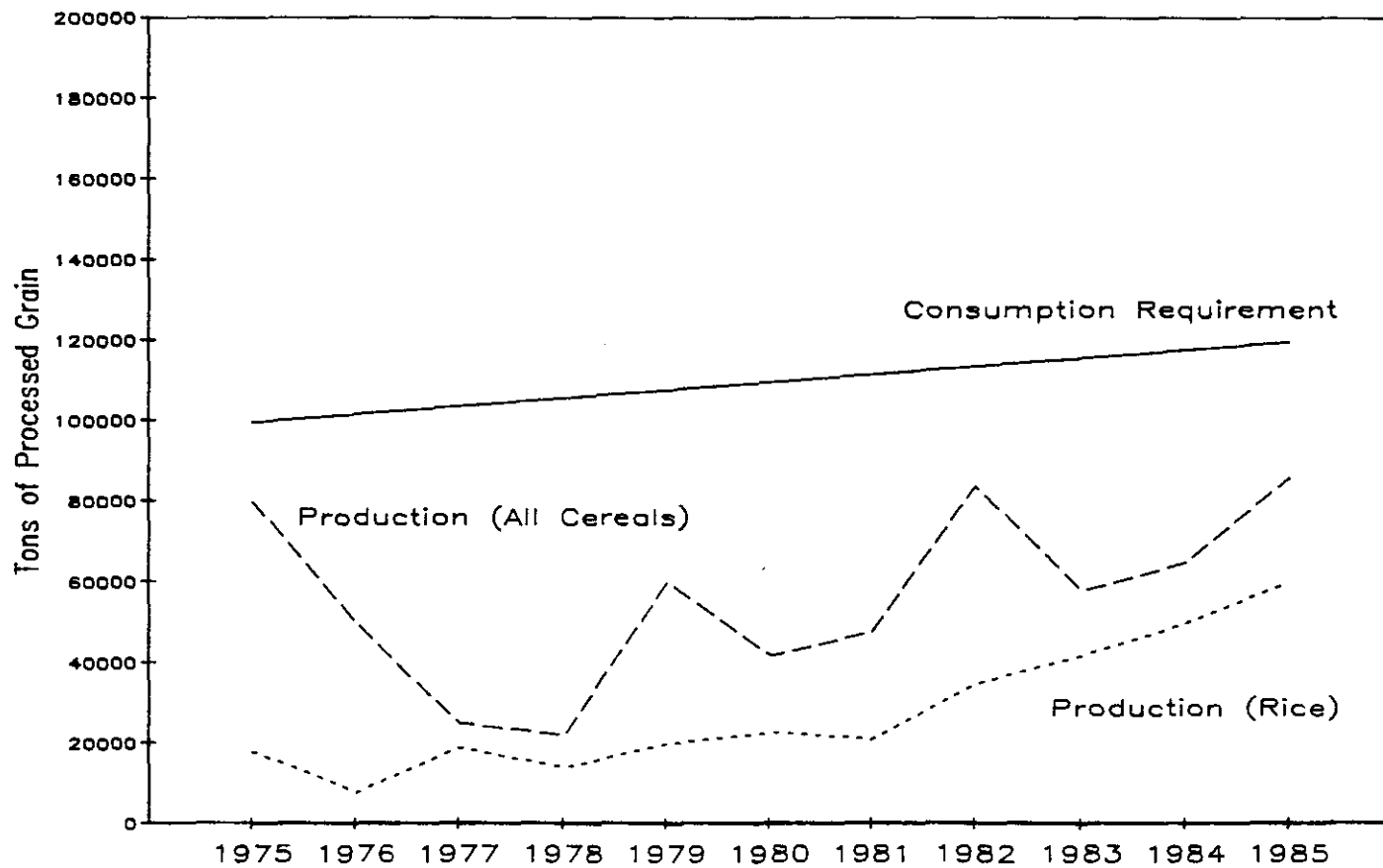


Figure 2: Supply and Demand of Cereals  
In The Senegal River Valley (1975 - 1985)



Source: SAED, USAID

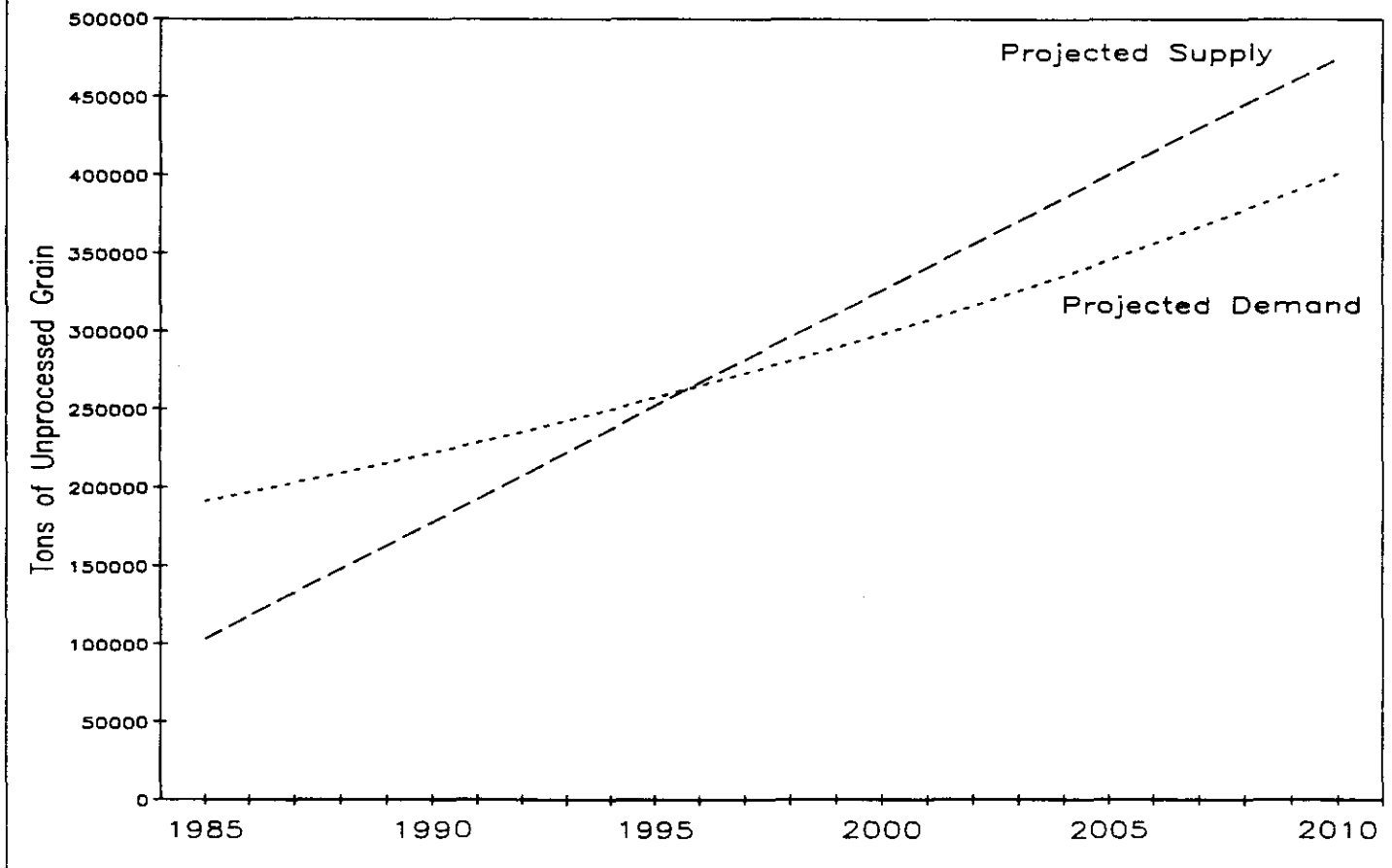
source of cereals. Since food aid is allocated nationally on the basis of perceived need, the drought-stricken Fleuve region has been the beneficiary of relatively large amounts. In 1984, CSA (the government agency in charge of official food aid) distributed 22,844 tons of cereals among the region's 607,000 rural residents, or nearly 38 kg of grain per capita. (CSA 1985)

Commercial imports and food aid have thus been instrumental in assuring an adequate and reliable food supply to urban as well as rural residents of the Senegal river valley during recent years. Despite their effectiveness, both commercial imports and food aid are viewed as necessary evils to be eliminated as soon as the regional cereals deficit can be overcome. And it is hoped that the deficit will not last. With the spread of irrigation technology, total production has begun to stabilize around a strong upward trend. Development planners expect the production increases to continue, fueled by increases in irrigated area, in yields, and in cropping intensity (area cultivated per year/area under irrigation). Although projection beyond the short-term time horizon is complicated by climatic, technical, economic, political, social, and other uncertainties, under a set of conservative assumptions the Senegal river valley should achieve self-sufficiency in cereals by the mid 1990's. (see Figure 3)

In summary, the cereals sub-sector in the Senegal river valley is undergoing an important series of changes. With the spread of irrigation technology, rice production has begun to trend strongly upward. Although the region continues to have a cereals deficit, commercial imports and food aid have assured an adequate and reliable food supply for urban as well as rural consumers. It is hoped that the reliance on imported food grains will prove to be temporary. If current projections are correct, local production will soon overtake local demand, and eventually the Senegal river valley could become an important exporter of surplus grain to other areas of the country.

Figure 3: Achievement of Cereals Self-Sufficiency  
In The Senegal River Valley (1985 - 2010)

(Area Expands 3000 ha/year, Cropping Intensity = 1.1, Yield = 4.5 tons/ha)  
(Population Grows 3%/year, Annual Consumption Requirement = 180 kg/person)



## 2.2 The Importance of Effective Marketing Policies

In order for long-term food and agriculture policy goals to be achieved in the Senegal river valley, the future cereals marketing system will have to assume a new and different role. Whereas today's marketing system is oriented toward the procurement and distribution of imported cereals, tomorrow's system will be more oriented toward the assembly, processing, and distribution of locally produced cereals. Because these two sets of activities are quite different, they call into question the appropriateness of current marketing policies and suggest that new solutions will have to be found to achieve government policy objectives in the future.

The importance of an effective food marketing system cannot be overstated. Despite all of the effort that has been concentrated on achieving production increases, relatively little has been done in the way of anticipating future marketing needs, as if marketing will "take care of itself" once the production problem is solved. This view is short-sighted, because the projected increases in cereals production are not likely to materialize unless the marketing system proves itself capable of handling additional quantities of grain. If current projections are correct and the Senegal river valley becomes self-sufficient in cereals sometime during the mid-1990's, over 300,000 tons of paddy will have to be assembled, processed, stored, and distributed each year. This amount greatly exceeds current capacity, which suggests that the existing marketing system will have to undergo extensive changes within a relatively short period.

Given the firm national commitment to changing the role of the state in the agricultural economy, future cereals marketing policies will almost certainly involve a reorientation of the mix between public-sector and private-sector responsibilities. But, before any such reorientation can be undertaken, the current marketing system must be closely examined, with an eye to identifying which activities might in the future best be performed by public institutions and which might best be delegated to the private sector (and under what conditions).

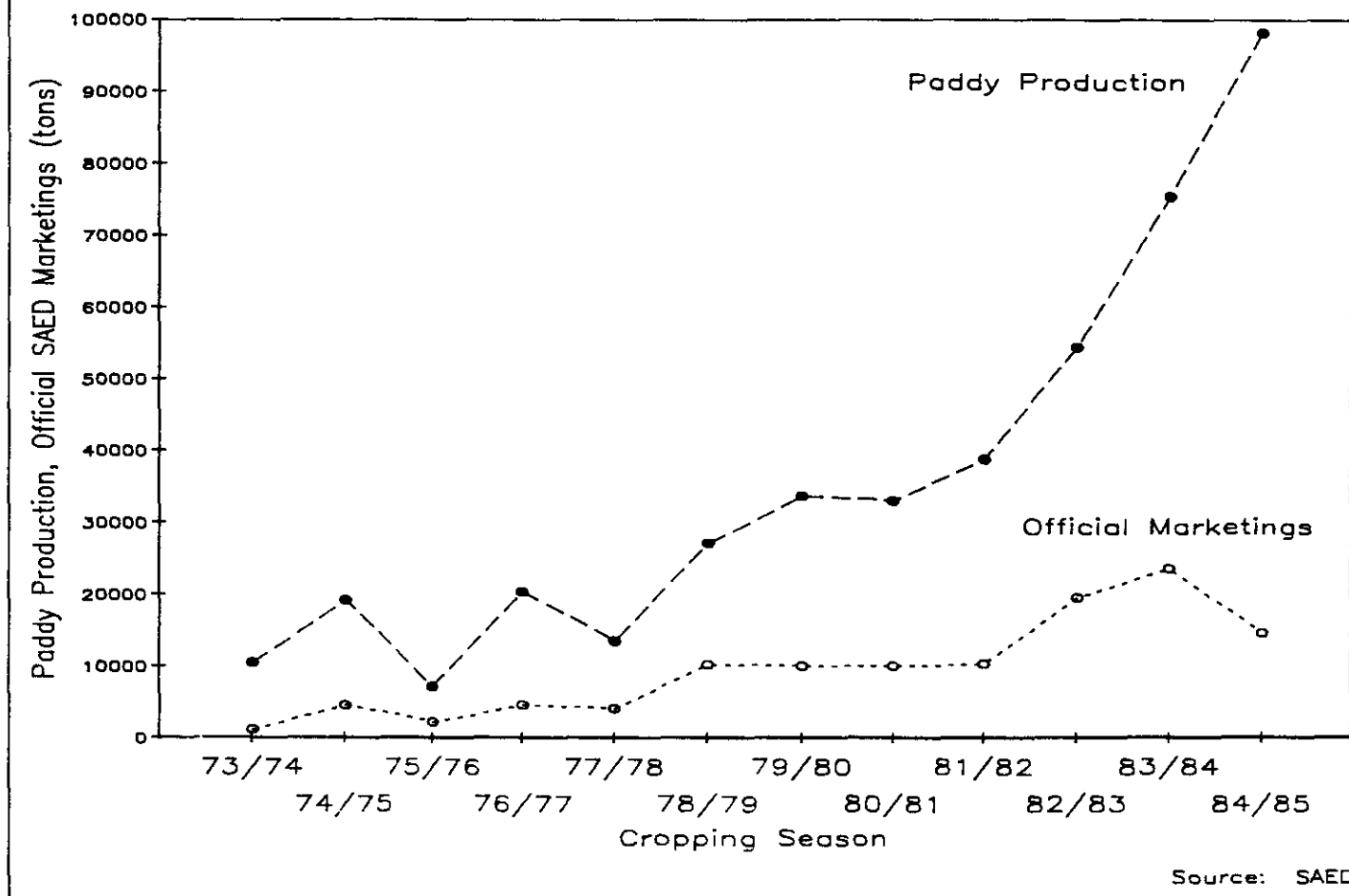
### 2.3 Current Marketing Practices in the Fleuve Region

Currently, paddy grown by farmers on SAED fields is disposed of in three ways. One portion of the harvest is retained by farmers for non-commercial uses, generally personal consumption, gifts to relatives, and religious tithes. Since most of this grain is consumed by farmers and their immediate families, these typically non-commercial uses are referred to collectively as "home consumption." A second portion of the crop is turned over to SAED, either as repayment in kind for production loans or as commercial sales at the official producer price. This grain is processed by SAED at one of its two mills and sold to CPSP, which in turn sells it to licenced private traders for distribution. Since a presidential decree grants SAED the legal monopoly over paddy purchases from farmers, this constitutes the "official channel." A third portion of the crop is traded or sold outside the official channel, generally to neighbors in the village, to consumers or traders in the local marketplace, or to itinerant grain traders. Because technically these sales involve non-authorized trading partners, and because official prices are not always respected, this constitutes the unofficial or "parallel channel."

Although the quantities of paddy marketed annually through the official channel can be determined from SAED records, grain flows through the two remaining disposal channels (home consumption and the parallel channel) cannot be disaggregated. SAED documents have tended to deal with this problem by ignoring the parallel channel and referring to all paddy not marketed via the official channel as "home consumption," but this is misleading because much of this grain apparently is sold rather than consumed. While home consumption and parallel channel sales cannot be disaggregated, even the partial record is interesting. (see Figure 4)

Despite a significant increase in total production of paddy during the 1984/85 crop season, official marketings of paddy experienced a sharp downturn. The total quantity of paddy marketed by SAED during the 1984/85 campaign is estimated at 14,300 tons (see Diop, 1985), less than two-thirds the quantity marketed the previous campaign and

Figure 4: Evolution of Paddy Production, Official SAED Marketings (1973/74 - 84/85)



approximately 16% of estimated total production, as compared with an average of 32% marketed during each of the previous five campaigns.

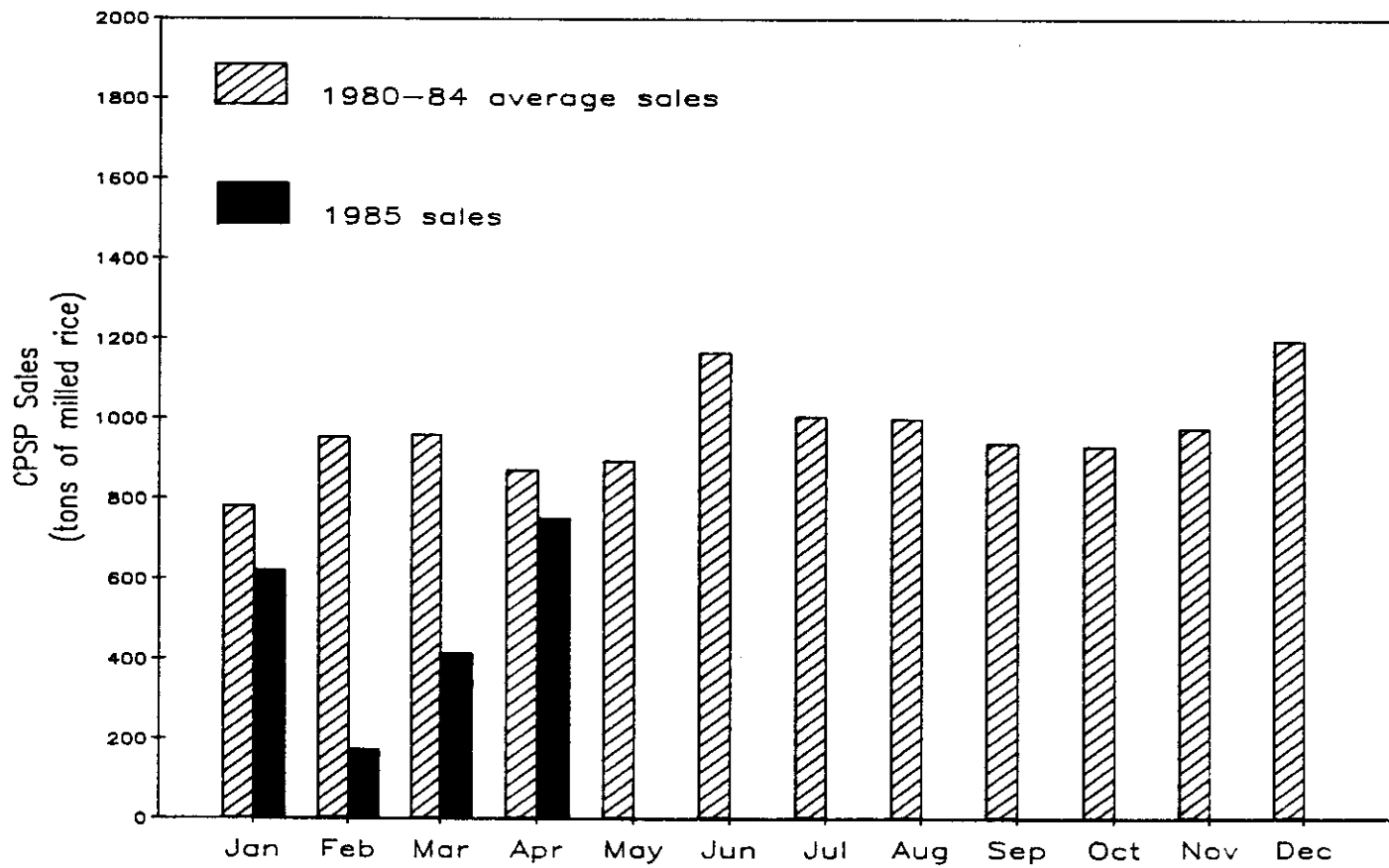
The marked decline in official marketings despite a rise in production implies a significant increase in home consumption and/or parallel channel sales. While home consumption no doubt did increase as SAED enrolled new farmers and as farmers reacted to higher prices for imported cereals, evidence from the field suggests that there was a much greater increase in the flow of grain moving through the parallel channel. This evidence includes the presence throughout the Fleuve region of large numbers of itinerant rice traders, a marked increase in the number of small rice hullers operating in the area, and the appearance in towns to the south (e.g., Saint Louis, Louga, Kebemer, Touba-Mbacke) of large quantities of local rice.

The marked increase in activity in the parallel channel affects the government's policy of controlling the rice trade and enforcing official prices at the producer, wholesale, and retail levels. The quantity of rice distributed through the CPSP warehouse in Saint Louis decreased considerably during the post-harvest months of January, February, March, and April 1985. While CPSP rice sales in Saint Louis historically have slowed during the first few months of the year, the slowdown in 1985 was much more pronounced than usual. (see Figure 5)

The sharp decline in the quantities of rice distributed by CPSP during the early months of 1985 can be attributed to two complementary influences. First, an increase in the official retail price of rice from 135 CFA/kg to 165 CFA/kg, announced in January 1985, no doubt depressed demand for rice, particularly rice distributed through the official channel. Second, the onset of the local harvest at the same time provided consumers with a less expensive source of rice, with the result that many consumers - even those purchasing less rice in response to the generally higher level of prices - abandoned the official channel in favor of the parallel channel. While it is difficult to know what portion of the decline in CPSP sales was due to a decrease in the overall



Figure 5: CPSP Monthly Rice Sales, Saint Louis  
(1985 Sales Compared to 1980-84 Average Sales)



Source: CPSP

demand for rice (the income effect) and what portion was due to a shift in buying activity from the official to the parallel channel (the substitution effect), the net result was a marked decrease in the volume of grain moving through the official channel. This had the effect of weakening the government's control over the rice price structure, and, indeed, market surveys indicated that during the post-harvest months actual rice prices throughout the region often diverged from official prices.

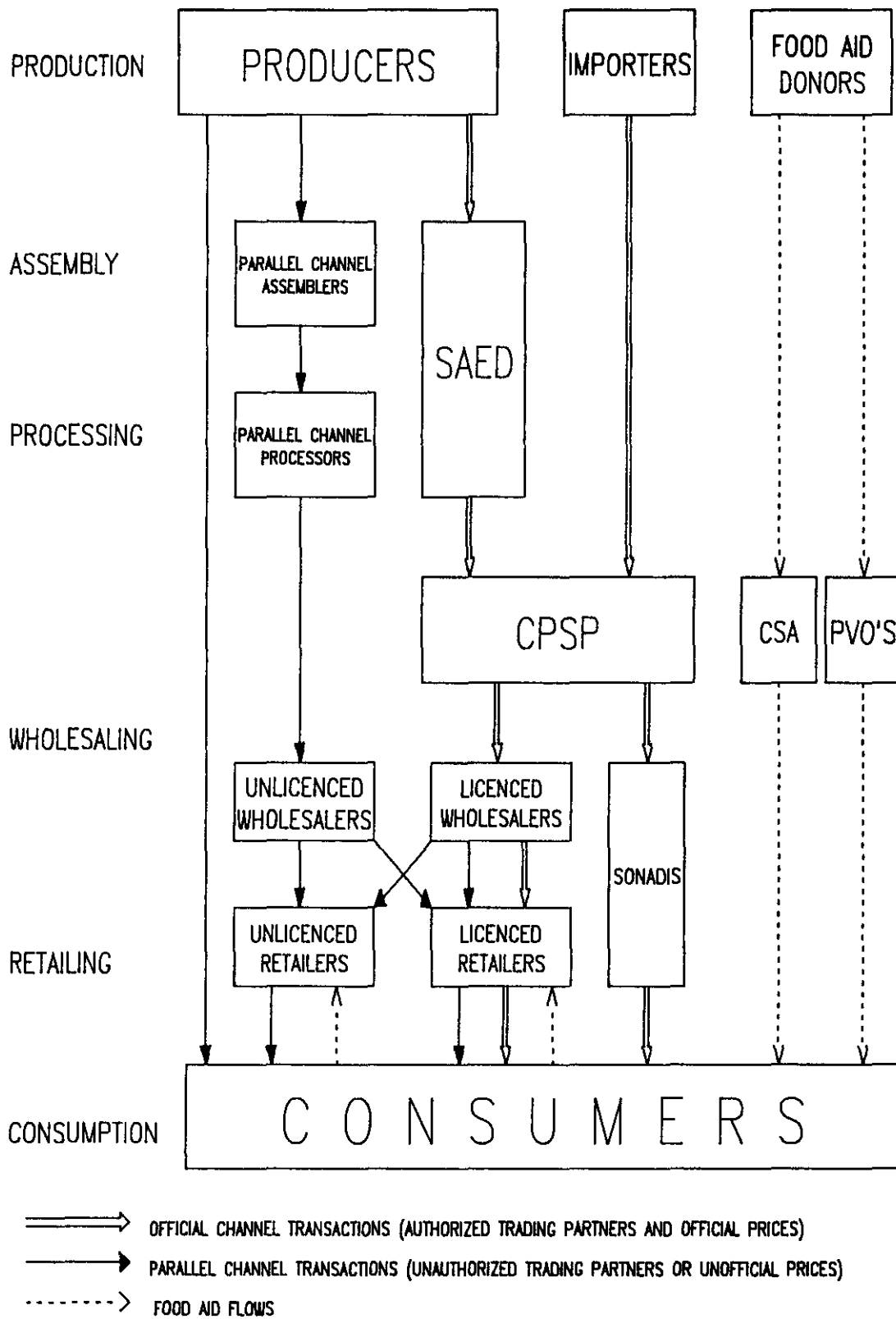
In addition to influencing the government's ability to implement official price policy, the increase in activity in the parallel channel affected official assembly operations. Large quantities of grain flowing through the parallel channel disrupted the regular flow of paddy to the SAED mills and eventually lowered their capacity utilization rate. A recent study estimated the actual combined operating capacity of the two SAED rice mills to be approximately 30,000 tons per year, more than double the quantity collected in 1984/85. (see SAED/Klockner, 1984) Since low capacity utilization rates increase operating costs by increasing fixed charges per unit of output, the SAED milling operation will continue to be affected as long as official marketings remain below the 30,000 tons needed to maintain full capacity utilization.

#### 2.4 Definitions: "Official" vs. "Parallel" Channels

The cereals marketing system participants and channels included in the overall study are shown in Figure 6. The participants include public organizations as well as private individuals and firms; they are linked by a complex network of regulated and unregulated channels.

Because the distinction between the "official" and "parallel" channels varies across the literature, it is useful briefly to review the meanings of the terms as they are used throughout this study. The official and parallel channels for cereals 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:

Figure 6: Cereals Marketing Channels in the Senegal River Valley



Official Channel:

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

Parallel Channel:

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

According to these definitions, the official channel for cereals includes all of the public organizations and private-sector firms and individuals who are authorized to engage in cereals marketing and who trade in general conformity with the official price structure. In the Senegal river valley, a parastatal agency holds the legal monopoly over paddy rice assembly operations; thus, the official assembly channel for paddy rice comprises a single authorized buyer. Other grains (for example, millet, sorghum, and maize) may legally be assembled by licenced private traders. The parallel channel, on the other hand, includes all of the private merchants who operate without official marketing licences, as well as a number of 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 the 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 has traditionally been associated with public ownership and operation, while the parallel channel has traditionally been associated with private-sector activity. This is both overly simplistic and incorrect. The official cereals 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 the official and parallel channels rely largely on private-sector participation. The essential difference is not whether grain trading is performed by public organizations or by private merchants, but whether or not trading activity is regulated by the rules of the game established by the state.

### **3. THE OFFICIAL MARKETING CHANNEL**

#### **3.1 Participants and Policies**

The official cereals marketing system in Senegal in the years since Independence has been characterized by a multiplicity of participants and a proliferation of marketing regulations. This paper will not attempt to review the turbulent history of cereals marketing policy, which has been described elsewhere. (see Sow and Newman 1985; Hirsch 1985). Instead, this brief introduction will focus on the main actors currently involved in the marketing of cereals in the Fleuve region. These include SAED, CPSP, MCI, licenced private traders, SONADIS, and CSA. Each of these market participants will be described briefly, with reference to their assigned roles in the official cereals marketing system.

##### **3.1.1 SAED (Societe d'Amenagement et d'Exploitation des Terres du Delta)**

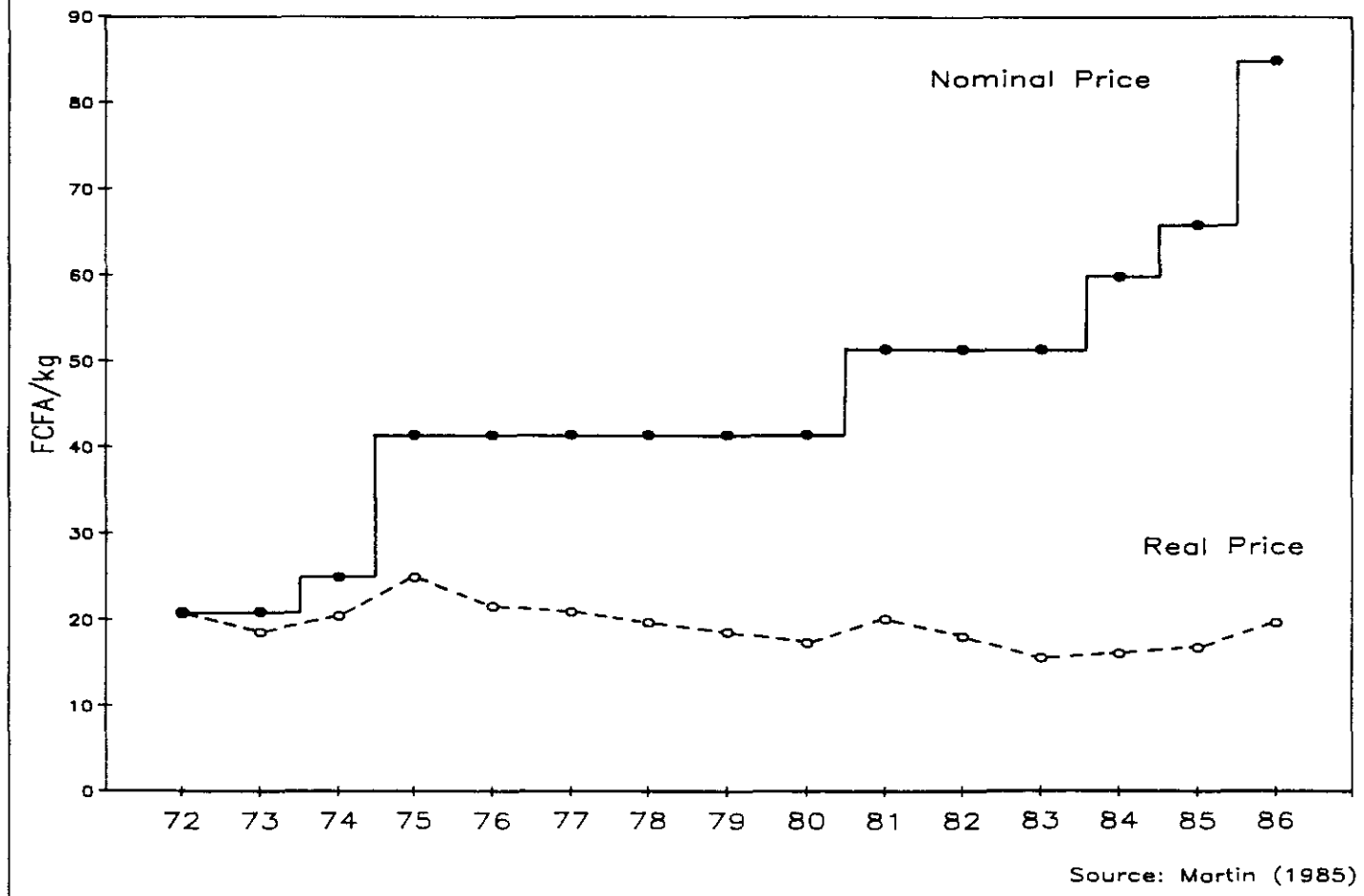
SAED is the regional development agency charged with developing the Senegalese portion of the Senegal river valley. Founded in 1965 as a public establishment (see Loi N 65-01), SAED was reorganized in 1981 into a parastatal agency characterized by partial private ownership (see Loi N 81-981). With headquarters in Saint Louis, SAED in

1983/84 numbered 1036 employees and had an annual operating budget of 5.4 billion FCFA, of which approximately 25% was provided by the government of Senegal and 75% by foreign donors. (SAED 1984) Nominally responsible for supporting a wide range of agricultural and non-agricultural activities, SAED in practice has concentrated on constructing irrigation systems (called "perimeters") and encouraging production of rice through the provision of subsidized inputs, including cultivation services, water, seed, and fertilizers.

Most of the rice produced on SAED perimeters has traditionally been consumed by farmers and their families or used to repay production loans. However, as landholdings expand and yields rise, increasing 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 the legal monopoly over purchases of paddy from producers (see Loi 84-1047). Official producer prices for paddy are fixed each year by the President's council of ministers and are readjusted periodically. 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. Only since 1982 has this decline been reversed as the result of four increases in five years to the (nominal) official producer price. (see Figure 7)

All paddy handled by SAED, whether official marketings or loan repayments, is bagged by the producer using SAED bags and delivered to a designated assembly point (called "secco"). After being weighed by a farmer's organization representative, the paddy is loaded onto privately owned trucks under contract to SAED and delivered to one of two SAED rice mills. After milling, rice is sold to CPSP at a price determined by a formula which takes into account all of the costs supposedly incurred by SAED's rice marketing unit. (This price has always been higher than the price of imported rice. For example, in 1984 CPSP paid 129 FCFA/kg for SAED rice, at a time when imported rice

Figure 7: Evolution of the Official Producer Price For Paddy (1972 - 1986)



cost 90 FCFA/kg.) By-products are sold at the mills to local herders as animal feed at prices determined by SAED.

### 3.1.2 CPSP (Caisse de Péréquation et de Stabilisation des Prix)

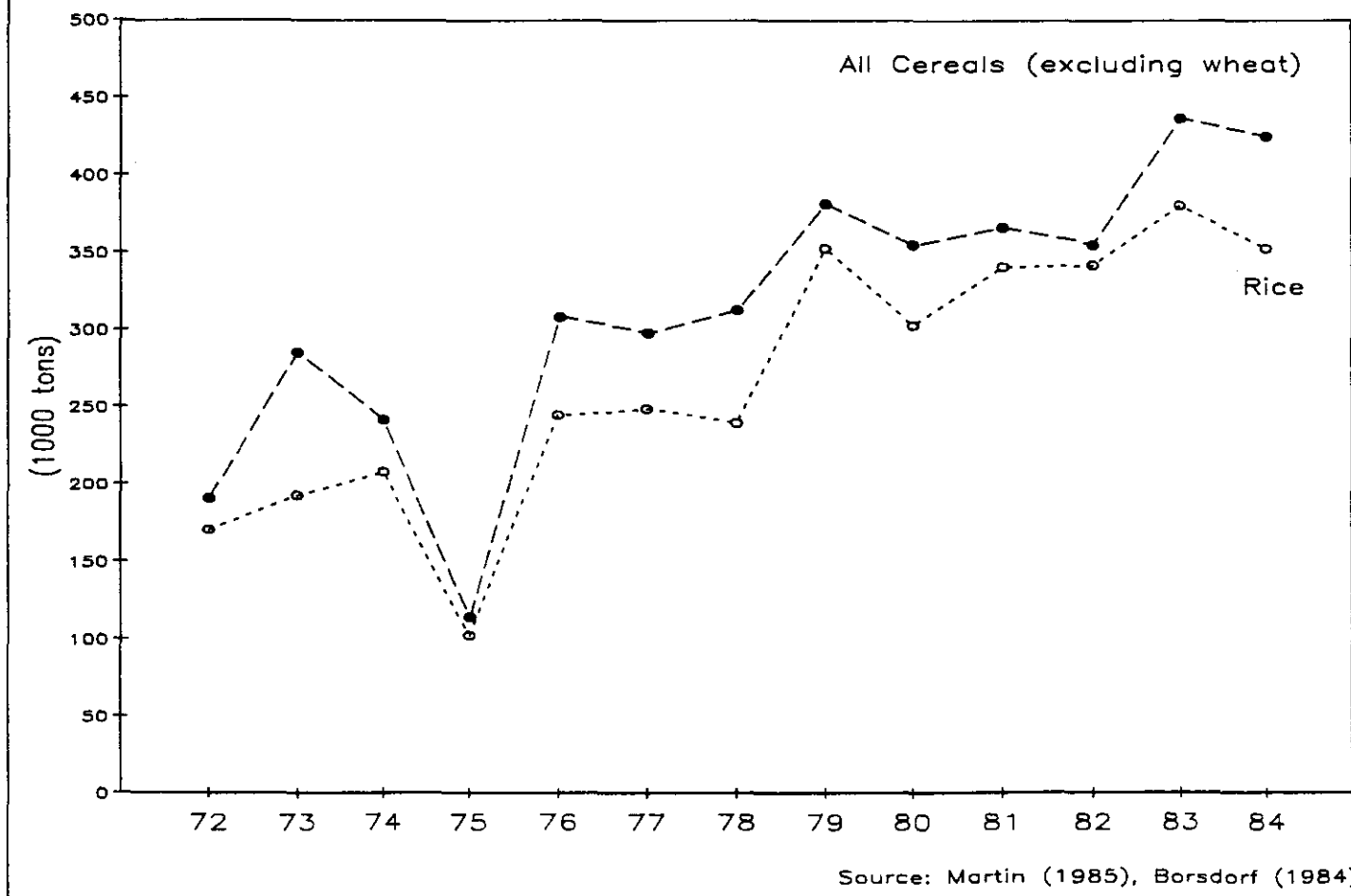
CPSP is a government agency created in 1973 (see Loi N 73-39) and charged, among other things, with stabilizing prices of basic food staples (e.g., rice, flour, sugar, vegetable oil), as well as importing cereals (with the exception of wheat). Although the original charter did not confer responsibility for this latter function, CPSP inherited the cereals import business following the dissolution of ONCAD in 1979. Cereals imported for direct distribution have consisted primarily of broken rice (purchased from Thailand, Pakistan, Burma, China, and the U.S.), as well as smaller quantities of sorghum and maize. Total commercial imports have increased steadily in recent years. (see Figure 8)

CPSP cereal import operations are performed by the Direction Commerciale, which is divided into three operating divisions: 1) Supply, 2) Port Operations, and 3) Distribution. The Supply division purchases grain on the world market and arranges its delivery to the Port of Dakar. The Port Operations division receives the grain and oversees its unloading. The Distribution division transports the grain to inland warehouses (using private transporters) and sells it to licenced wholesalers at controlled prices. All of these operations are performed according to a set of government guidelines.

In recent years, approximately 60% of rice imports has been distributed through Dakar warehouses or directly from the port, with the remaining 40% distributed through inland warehouses. However, since some of the grain sold in Dakar eventually makes its way inland, the official CPSP regional sales figures understate the volumes of imported grain consumed outside Dakar. Consequently, in order to estimate the true quantity of imported rice distributed in the Senegal river valley during 1984, the 11,000 tons distributed through the Saint Louis warehouse must be added to the 7,500 tons distributed through Dakar warehouses to licenced wholesalers based in the departments of Matam



Figure 8: Commercial Imports of Rice,  
All Cereals (1972 - 1984)



and Bakel. Since additional quantities were furthermore trucked into the region without the required transfer documents, the total volume of imported rice (exclusive of food aid) distributed in the Senegal river valley probably approached 20,000 tons. This represented approximately 7% of the national's total commercial rice imports in 1984.

### 3.1.3 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 cereals trade by issuing the decrees which, following signature by the President, 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 Controle Economique is responsible for enforcement of marketing regulations.

Since the day-to-day marketing activities of most grain distributors are largely determined by the official regulations, it is appropriate at this point briefly to review several key features of the commercial code pertaining to the cereals trade.

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

The quotataires take delivery of their allotted quantity of grain at the CPSP warehouse, after pre-paying by certified check. Credit sales were largely suspended in 1984, although a small number of authorized and non-authorized buyers continues to

receive credit. The quotataires transport the bagged grain to their warehouses for eventual resale to authorized retailers ("detaillants") 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 transport margin added to the Dakar base.

Retailers, who for purposes of the grain trade are officially defined as merchants trading in lots smaller than 100 kg, must also obtain a permit from MCI ("carte de détaillant"). 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 and/or sorghum from a wholesaler a few sacks at a time and resell to consumers at the official retail price ("prix au détail"). Like the CPSP and wholesale prices, the retail price varies by region depending on the size of the transport margin added to the Dakar base.

Although the official consumer price of rice over the years has risen in nominal terms, the real price (nominal price deflated by a general price index) actually declined throughout the late 1970's and early 1980's. However, beginning in 1982 a series of sharp increases in the official consumer price succeeded in reversing this trend, and the real price has since regained much of the ground it had lost since 1975. (see Figure 9)

Official marketing margins on rice can be calculated by taking the difference between the CPSP price and the retail price (the resulting figure represents the combined margins for wholesalers and retailers). During the past fifteen years, official marketing margins expressed in nominal terms have increased, but expressed in real terms (nominal margins deflated by a general price index) they have changed very little. (see Figure 10)

Marketing regulations and official prices are enforced by the Controle Economique, which makes unannounced visits into 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

Figure 9: Evolution of the Official Consumer Price For Rice (1972 - 1985)

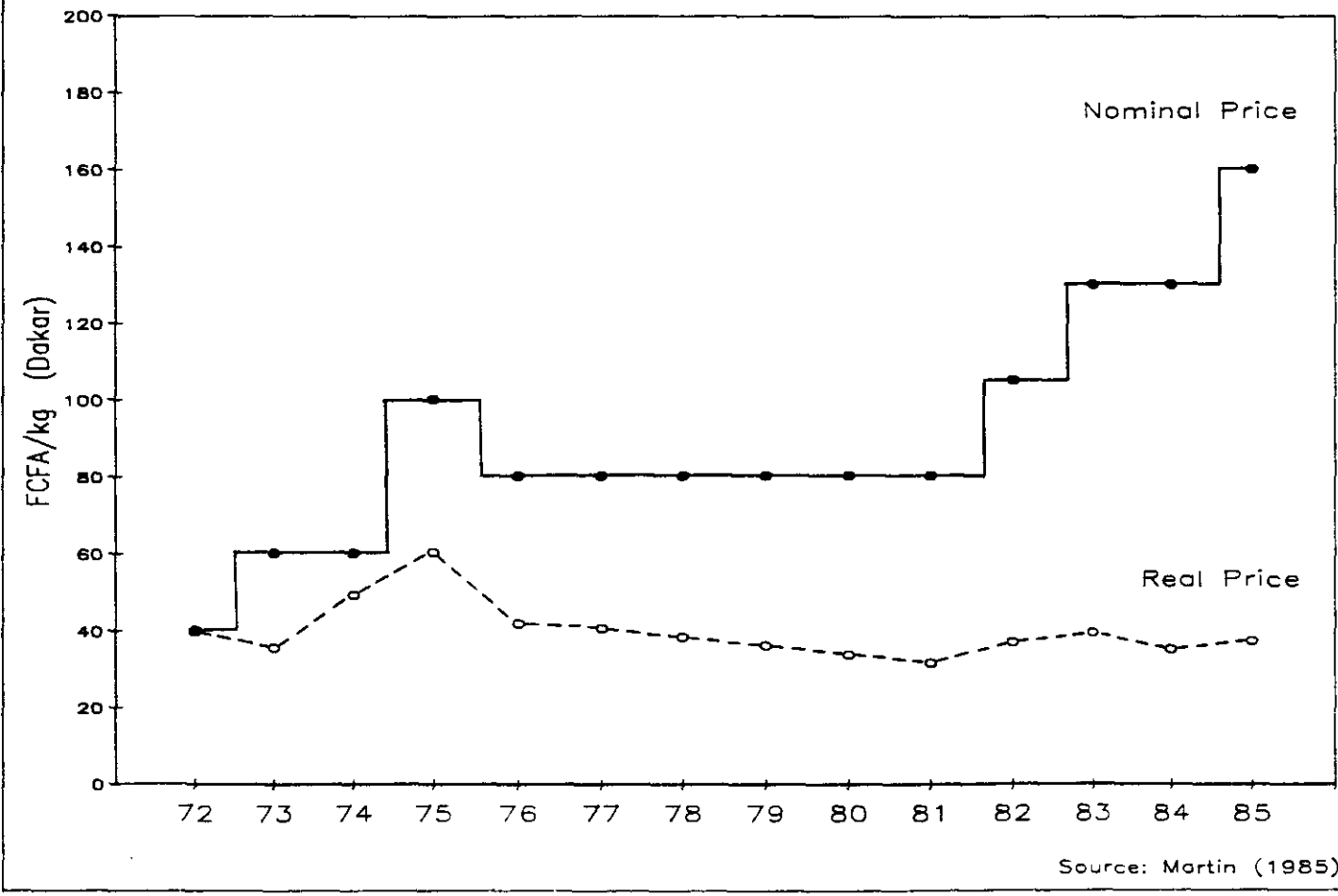
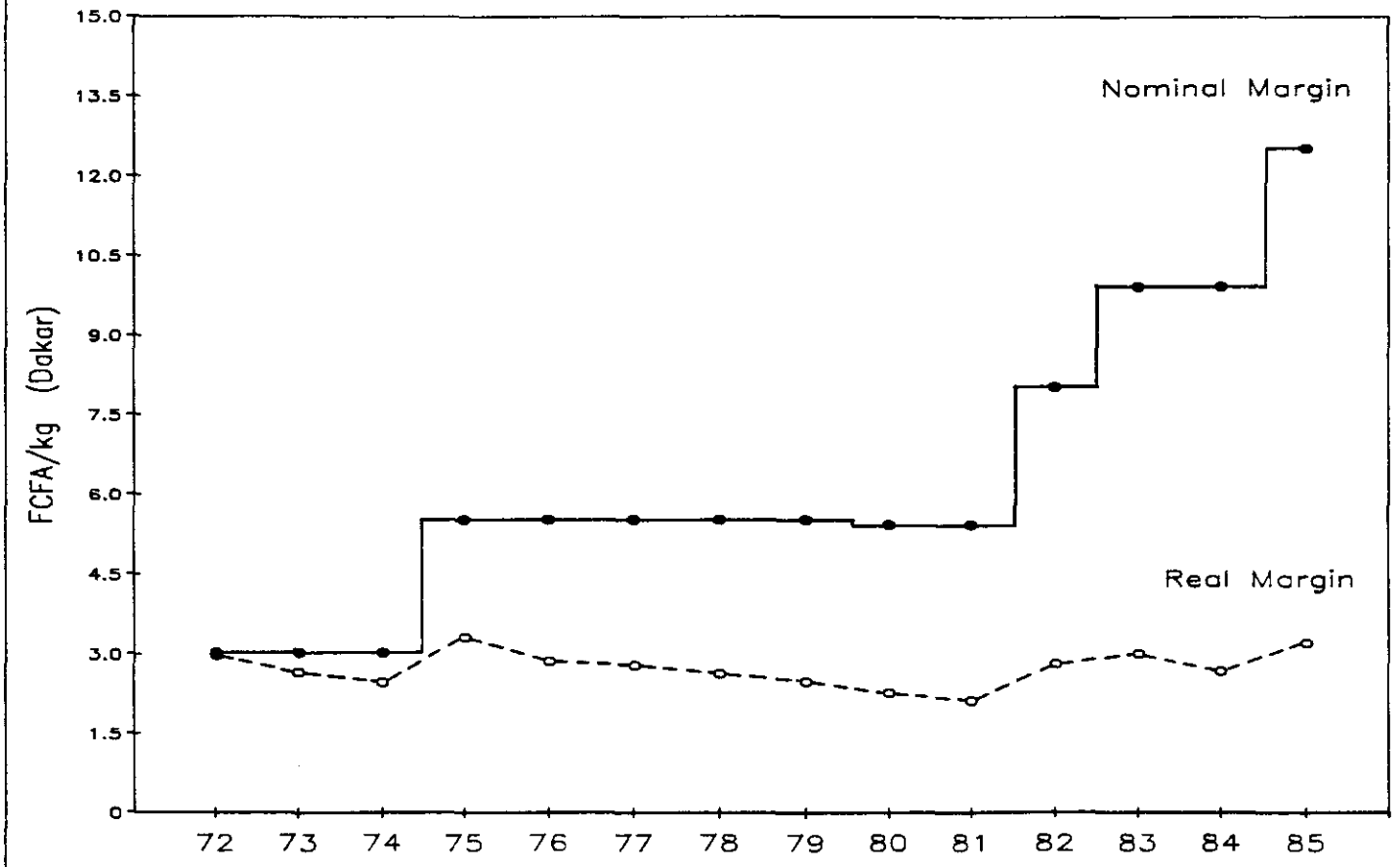


Figure 10: Evolution of Official Marketing Margins On Rice (1972 - 1985)



Source: Borsdorf (1984), Jammeh (1984), Martin (1985)

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.

#### 3.1.4 SONADIS (Societe Nationale de Distribution)

SONADIS is a mixed public-private trading company which operates a national chain of wholesale and retail distribution outlets for consumer goods, including foodstuffs and other products. Each SONADIS store is run by a manager who receives a base salary plus a commission based on volume of sales. The produce mix in each store varies; in addition to a basic assortment of standard items, the store manager, in collaboration with the regional representative, may select 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 stores located between Saint Louis and Kidira sold over 5,000 tons of imported cereals, including over 2,000 tons of rice and over 3,000 tons of sorghum. (SONADIS 1985) SONADIS's competitive position as a distributor of cereals is enhanced by the preferential treatment it receives from CPSP. SONADIS is afforded two privileges not afforded to regular quotataires: SONADIS may vary the size of its monthly grain purchases (i.e., it is not held to a strict quota), and SONADIS may buy on credit.

In addition to being the biggest retailer of imported cereals in Senegal, SONADIS derives importance through its ability to distribute food staples at standardized official prices. The government's expressed intention is that SONADIS stores will 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, many SONADIS stores in the Senegal river valley are located in the larger towns already being served by more than

just one or two grain traders. Consequently, it is uncertain to what extent SONADIS stores succeed in introducing price competition into rural areas.

### 3.1.5 CSA (Commissariat de la Securite Alimentaire)

CSA, which prior to its reorganization in 1983 was known as CAA (Commissariat de l'Aide Alimentaire), is a public organization charged with a variety of functions, including: reception and distribution of food aid; management of a national grain reserve; and official marketing of local millet (a function it inherited following the dissolution of ONCAD). Perennially handicapped by a lack of financing, CSA has never been able to purchase much millet or build up a significant grain reserve, with the result that it has acted primarily as a distributor of food aid. In this capacity, CSA has affected the market for cereals.

In recent years, CSA has been particularly active in the Senegal river valley. Since food aid is allocated on the basis of perceived need, the Fleuve region has been the beneficiary of relatively large amounts. In 1984, 22,844 tons of sorghum, rice, and maize were distributed among the region's 607,000 rural residents (exclusive of the community of Saint Louis), or nearly 38 kg of grain per capita. (CSA 1985)

Distribution of food aid at the regional level is not subject to elaborate planning and generally occurs soon after its arrival from Dakar. Food aid is transported to approximately 20 distribution points and delivered to local community authorities charged with its distribution. After a short delay, it is given to local heads of household showing documentation for every eligible household member.

(It should be noted that not all food aid passes through CSA. An assortment of foreign donors, private organizations, and Senegalese public agencies distributes food aid of various types, including cereals, which fails to appear in the official CSA records. The precise quantity of such food aid distributed in the Senegal river valley during 1984 is unknown.)

### 3.2 Assembly and Processing Operations

Because drought has severely limited rainfed production in the Senegal river valley, the only locally-produced cereal handled by the official marketing system is irrigated rice. Official assembly and processing operations therefore consist of the SAED rice marketing program, which is carried out by a semi-autonomous unit within SAED known as URIC (Unite Autonome Rizeries Intendance Commercialisation).

SAED's involvement in rice marketing activities traditionally has been justified in terms of:

- 1) assuring a market outlet for producers;
- 2) supporting the official producer price of paddy;
- 3) providing a mechanism for collection of production loans;
- 4) introducing economies of scale in processing; and
- 5) supplying rice to CPSP for distribution to other areas of the country.

While SAED has been able to achieve these goals to varying degrees, questions have been raised concerning its performance. Criticism has tended to focus on the need to reduce overbureaucratized procedures in order to ensure more timely, reliable, and cost-effective marketing operations. Although most policy makers agree on the need for reforms, few concrete proposals have been put forward to revise current marketing procedures.

#### Analysis of the Costs of Official Assembly and Processing Operations

One important objective of the research is to diagnose problems within the existing marketing system, with an eye to identifying which economic activities might in the future best be performed by public institutions and which might best be delegated to the private sector (and under what conditions). In this section, official assembly and processing operations are examined using cost analysis as the main diagnostic tool, supported by interviews with SAED employees as well as informal surveys of participants in the official marketing channel. By exposing economic inefficiencies, cost analysis can



help in the identification of areas of unsatisfactory performance where policy reforms are urgently needed.

It is important to recognize, however, that problem diagnosis through cost analysis is complicated, because large marketing margins (or large individual cost components within marketing margins) per se do not necessarily indicate economic inefficiency. They may simply reflect marketing services or inputs which are expensive to provide. The most efficient cereals marketing system in the world might still be costly in northern Senegal, given the harsh physical environment, the dispersed nature of production, and the lack of existing infrastructure. Therefore, in evaluating SAED marketing operations, the distinction must be made between high costs which reflect expensive services or inputs and high costs which reflect problems in organization or management.

In recent years, SAED has published several documents containing cost breakdowns of the different components of the URIC marketing operation. (see Chateau 1982; Cisse 1984) Because these documents are based on accounting data obtained from official SAED records, they represent the most reliable source of published information on the costs of SAED assembly and processing activities. The discussion that follows is based on data obtained from these documents, as well as on information obtained directly from farmers, secco operators, mill managers, traders, and URIC management.

SAED documents distinguish between four categories of costs related to marketing: 1) assembly costs, 2) processing costs, 3) storage costs, and 4) overhead costs. Each of these four categories is described below, and official cost data are presented relating to the 1983/84 marketing campaign. (Data relating to the 1984/85 campaign were not yet available when this paper was written.) Certain components of these data are analyzed in detail for clues to the organization and performance of the URIC marketing operation. This analysis provides the basis for a discussion of the strengths and weaknesses of the official assembly and processing system.

### 3.2.1 Assembly Costs

Assembly costs accounted for in the SAED documents include all costs incurred between the time paddy is purchased from the producer at the secco and the time it is delivered to one of the two mills (exclusive of the purchase price). These include:

- the cost of bags for paddy
- the cost of documentation (printed forms)
- the cost of the scales used to weigh paddy at the seccos
- the cost of temporary storage at the seccos
- bonuses paid to cooperative presidents and weighers
- bonuses paid to producers
- the cost of transport to the mills
- fees paid to the Controle Economique
- salaries of SAED personnel assigned to assembly operations.

Table 1 shows these costs as reported for the 1983/84 marketing campaign, averaged over the entire SAED operation.

Although it is not evident in the highly aggregated data presented in Table 1, a striking feature of the reported assembly costs is their variability between perimeters. This variability is caused by differences between perimeters in the scale of production and in geographical location. For example, paddy produced on the perimeters of Bakel (which are located far from the two mills and which marketed only 12.3 tons) cost nearly 14 times as much per ton to assemble as paddy produced on the perimeter at Deby (which is located close to a mill and which marketed 5,719.3 tons).

Among individual cost components, two seem high: the cost of bags for paddy, and the cost of transport.

The cost of bags for paddy was reported as 4,648 FCFA/ton, or nearly 50% of total reported assembly costs in 1983/84. This included the unit purchase price (375 FCFA) plus transport from the supplier (12.38 FCFA/bag), multiplied by the total number of

Table 1: SAED Reported Assembly Costs (1983/84)

	Cost/Ton Paddy (FCFA)	% of Total Assembly Costs
Bags for paddy	4,648	49.48
Documentation	127	1.35
Scales	63	0.67
Temporary storage	27	0.29
Bonuses (presidents, weighers)	318	3.39
Transport to mill	2,444	26.02
Controle Economique	112	1.19
SAED salaries	1,654	17.61
Total Assembly Costs	9,393	100.00

Source: Cisse, 1984

bags distributed (237,440). Since each bag holds 80 kg of paddy, enough bags were distributed for approximately 19,000 tons of paddy, close to the quantity actually marketed in 1983/84. According to the then-Director of URIC, approximately 150,000 bags were recovered by SAED, and those which were not recovered were paid for by farmers. However, neither the value of the recovered bags nor proceeds from the sale of non-recovered bags was credited back to the assembly operation. Given the near-total recovery rate (bags plus cash value), and given that each bag can theoretically be used an average of three rotations, the reported cost of bags for paddy seems excessive. Since similar charges apparently have appeared each year, the cost of bags appears to be a real cost and not merely the result of a bookkeeping practice.

The cost of transport of paddy from the seccos to the mills was reported at 2,444 FCFA/ton on average, or 26% of total reported assembly cost in 1983/84. (This figure

represents a mean calculated across the entire river valley; transport costs varied greatly between individual perimeters.) Lacking the necessary trucks, SAED contracted out the transport operation. Although theoretically an open bidding system was used, the official policy of favoring local transport firms undermined its competitiveness. Local transport firms formed a consortium and submitted a single bid, which was accepted after some negotiation. The SAED transport rate schedule established for the 1983/84 marketing campaign appears below. (see Table 2)

Table 2: SAED Transport Rate Schedule for Paddy (FCFA/ton/km)

Type of Surface	Rate (FCFA/ton/km)
Paved road	31
Improved dirt road	39
Ordinary dirt road	46
Poor dirt road	64
Sandy road	89
Fixed rate for all distances under 40 km	1,900

Source: Cisse, 1984

Since no other public agency or private firm assembles grain on a large scale, it is not clear what to use as a basis for comparison in evaluating these transport rates. The rates are clearly high in comparison to rates paid during the same period by grain distributors working in the Fleuve region. For example, CPSP paid only 19 FCFA/ton/km over the paved road between Richard Toll and Saint Louis, and a sample of quotataires paid an average of 14.2 FCFA/ton/km over the paved road between Saint Louis and Matam. While the relatively high rates paid by SAED suggest an inability to bargain

effectively with transporters, at the same time it is important to recognize that the cost structure of grain assembly differs from that of grain distribution. Distances travelled during assembly are often short, loading and unloading times are frequently slow, and the possibilities for backhaul tend to be limited. Since all of these factors drive up average costs, the transporters who contract with SAED for grain assembly services may be justified in demanding higher rates.

### 3.2.2 Processing Costs

Processing costs accounted for in the SAED documents include all costs incurred between the time paddy is unloaded at the mills and the time rice and salable by-products are delivered to on-site storage warehouses to await collection by CPSP (rice) or sale (by-products). These include:

- the cost of energy
- the cost of bags for milled rice
- maintenance and repair of the mills
- salaries of SAED personnel assigned to processing operations
- depreciation of the mills

Table 3 shows these costs as reported for the 1983/84 marketing campaign, which included five months of operations at the Ross-Bethio mill and seven months of operations at the Richard Toll mill.

Processing costs varied considerably between the two mills in 1983/84. Processing costs per ton of paddy totalled 14,558 FCFA at Richard Toll, nearly 50% higher than the 9,795 FCFA reported at Ross-Bethio. Examination of the individual cost items reveals that the difference in total processing costs between the two mills was largely the result of unequal depreciation charges. Because of the SAED accounting practice of depreciating most of the capital items (e.g., milling equipment, conveyors, vehicles) at a rate of 20% over five years, the recently overhauled mill at Richard Toll incurred a substantial depreciation charge (over 117 million FCFA), while the older mill at

Table 3: SAED Reported Processing Costs (1983/84)

	Ross-Bethio		Richard Toll	
	FCFA/ton	% of Total	FCFA/ton	% of Total
Energy	1,274	13	1,380	9
Bags for milled rice	2,298	23	2,332	16
Maintenance, repairs	1,339	14	111	1
SAED salaries	3,169	32	1,845	13
Depreciation	1,349	14	8,659	59
Miscellaneous	366	4	231	2
Total Processing Costs	9,795	100	14,558	100

Source: Cisse, 1984

Ross-Bethio, much of whose capital had already been written off, incurred a much smaller depreciation charge (7.5 million FCFA). These total depreciation charges worked out to 8,659 FCFA for each of the 13,513 tons of paddy processed at Richard Toll and 1,349 FCFA for each of the 5,600 tons of paddy processed at Ross-Bethio.

Was the cost of processing paddy too high? In order to realize the economies of scale offered by industrial-scale rice mills, it is necessary to operate them at high rates of capacity utilization. If high rates of capacity utilization are not achieved, fixed costs (e.g., depreciation charges) become concentrated on relatively small quantities of output, and average processing costs rise. Neither of the two SAED mills operated near its capacity in 1983/84, which increased the cost per ton of paddy of depreciation charges and other fixed costs.

It is interesting to consider the size of this increase in average processing costs caused by the underutilization of the two mills. Based on technical parameters

estimated by SAED engineers, the annual processing capacity of the two mills can be calculated as follows:

Annual processing capacity = hourly processing capacity x 24 hours/day x "coefficient of activity" (percentage of the time the mill actually functions during periods of operation) x 330 working days.

Richard Toll mill annual capacity = 5.5 tons/hour x 24 hours/day x .75 coefficient of activity x 330 days = 32,500 tons of paddy.

Ross-Bethio mill annual capacity = 3.5 tons/hour x 24 hours/day x .65 coefficient of activity x 330 days 18,000 tons of paddy.

The actual capacity utilization rates achieved during 1983/84 can be calculated by dividing the quantities of paddy processed by these theoretical capacities:

Richard Toll mill:  $\frac{13,513}{32,500}$  = 42% capacity utilization rate.

Ross-Bethio mill:  $\frac{5,600}{18,000}$  = 31% capacity utilization rate.

In order to calculate precisely the total cost savings per ton of paddy which might have been achieved had the SAED mills been fully utilized, additional information would be required on fixed and variable costs. Since no additional information is available, the potential total cost savings cannot be calculated precisely. However, since depreciation charges at least are known, the potential savings on average depreciation charges alone can be calculated according to the following formula:

Potential reduction in average processing cost per ton of paddy = current (partial-capacity-utilization) depreciation charge per ton of paddy - minimum (full-capacity-utilization) depreciation charge per ton of paddy.

According to this formula, if the SAED rice mills had operated at full capacity during the 1983/84 season, the reduction per ton of paddy in depreciation charges alone would have lowered average processing costs by 5,058 FCFA in Richard Toll and by 929

FCFA in Ross-Bethio. (Additional cost savings would have been realized on other fixed cost components, such as the salaries of permanent staff at the mills, but these have not been calculated.)

### 3.2.3 Storage Costs

Storage costs accounted for in the SAED documents include all costs incurred between the time milled rice and by-products are delivered to on-site storage warehouses and the time they are collected by CPSP (rice) or sold (by-products). These include:

- maintenance and protection materials
- the cost of documentation
- salaries of SAED personnel assigned to storage operations.

Table 4 shows these costs as reported for paddy processed and stored during the first seven months of 1984. The data are disaggregated by mill.

Table 4: SAED Reported Storage Costs (1983/84)

	Ross-Bethio		Richard Toll	
	FCFA/ton rice	% of total	FCFA/ton rice	% of total
Maintenance, protection	27	3.81	26	1.68
Documentation	4	0.60	4	0.26
SAED salaries	683	95.59	1,514	98.06
Total Storage Costs	714	100.00	1,514	100.00

Source: Cisse, 1984

Evaluation of reported storage costs is difficult because the data are incomplete.

First, there is no mention of the average duration of storage of each ton of rice produced by the mills. Without this information, it is impossible to judge whether the reported average storage costs are reasonable.



Second, no building cost is included in the list of storage costs, it being reported that the storage warehouses had already been written off by 1983/84. It would be interesting to know when and how the warehouses were depreciated, and at what cost to the storage operation.

Third, the cost of carrying inventory is not included in the list of charges. Typically, this cost is the single most important cost incurred in private-sector grain storage operations, representing the interest foregone on capital tied up in the form of inventory.

Among the storage cost items that do appear, the importance of labor costs is striking (all the more so because storage is the least labor-intensive of grain marketing activities). Presumably the large relative size of labor costs results from the absence of building and inventory costs, whose inclusion would have significantly reduced the relative size of labor costs. Even so, it is not clear why average labor costs were more than twice as high at Richard Toll than at Ross-Bethio. Presumably the difference can be attributed to differences in management between the two mills.

#### 3.2.4 Overhead Costs

Overhead costs are described as "costs which cannot be assigned specifically but which nevertheless occur as the result of the various agricultural production support programs within the SAED sphere of operations." (Cisse 1984, p. 28) These include:

- operating costs of SAED headquarters and regional offices (including electricity, water, telephone, telex)
- miscellaneous payments to personnel (including travel expenses, per diem, honoraria)
- insurance
- taxes
- miscellaneous financial charges

During 1983/84, overhead costs amounted to over 226 million FCFA. The SAED accounting procedure calls for overhead costs to be attributed to the various crop production programs in proportion to the area planted to each crop. In 1983/84, this worked out to 11,016 FCFA for every irrigated ha, which given the average paddy yield of 4.8 tons/ha came to 2,295 FCFA/ton of paddy produced. This figure represents approximately 10% of total reported SAED marketing costs (exclusive of the price of paddy).

From an economic point of view, it is difficult to justify the practice of attributing general overhead costs entirely to the marketing operation, since the overhead charges supported not only marketing activities, but also production, extension, and research. Although SAED can increase its revenues by classifying general overhead expenses as "marketing costs" (since the price paid by CPSP for SAED rice is calculated so as to reimburse SAED its marketing costs), this accounting practice complicates evaluation of the URIC marketing operation by artificially inflating its cost structure.

### 3.2.5 Miscellaneous Costs

Two extremely important cost items fail to appear explicitly among the reported SAED marketing costs: the cost of capital tied up in inventory, and the cost incurred because of grain losses. Each deserves a brief mention.

Between the time paddy is purchased at the farm gate and the time processed rice is sold to consumers, capital is tied up in inventory. 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 operate with "free" government funding. To the extent that SAED operates on government funding or other external sources of revenue on which it pays no interest, it receives a concealed subsidy. If SAED's marketing costs are to be calculated accurately, this subsidy ought to be included.

The second cost item absent from the SAED accounts is the cost due to grain losses. Grain losses can be caused by insect or pest attack, grain deterioration, improper handling, or theft. Grain losses can occur at any point between the time paddy is purchased at the seccos and the time milled rice is delivered to CPSP. Informal observation of SAED marketing operations suggests that losses do occur. Open-air storage at the seccos and at the mills exposes paddy to bird and insect attack, transportation and handling take an additional toll, and petty theft by employees is acknowledged to be a constant problem. Inexplicably, no attempt is made to account for grain losses in any of the SAED documents.

#### Performance Dimensions of Official Assembly and Processing Operations

In assessing the performance of official assembly and processing operations in the Senegal river valley, it is useful to begin by recalling the objectives of SAED's involvement in marketing:

- 1) assuring a market outlet for producers;
- 2) supporting the official producer price of paddy;
- 3) providing a mechanism for collection of production loans;
- 4) introducing economies of scale in processing; and
- 5) supplying rice to CPSP for distribution to other areas of the country.

Although it is often criticized, the SAED rice marketing operation in recent years has made considerable progress toward achieving these goals. This progress should be kept in mind when the official marketing system is being evaluated, for SAED's successes are not always recognized in the debate over the need for marketing policy reforms.

Yet despite its considerable achievements, the official cereals marketing system has admittedly been plagued by a number of very serious problems. In the preceding pages, an effort was made to diagnose the most salient of these problems through analysis of marketing cost data reported by SAED. The data were examined for signs of excessive costs, indicating areas of performance where reforms may be needed.

What conclusions can be drawn from this diagnostic exercise? In a general sense, many of the problems identified apparently trace back to the fact that SAED basically functions as a public institution rather than a private company. The public nature of SAED imposes certain constraints on the way that it is organized and operated, and those constraints affect the economic performance of the official cereals marketing channel. Three basic constraints resulting from SAED's public character have the greatest influence on performance:

1. SAED's obligation to implement official cereals marketing policies regardless of the cost of implementation;
2. SAED's organization as a large, centrally managed parastatal institution; and
3. SAED's financial insulation resulting from a reliance on external funding sources and from protectionist legislation.

Each of these three constraints is discussed below. The intention is to demonstrate how SAED's public character contributes to the problems previously diagnosed.

Constraint 1: SAED's obligation to implement official cereals marketing policies regardless of the cost of implementation.

As a parastatal institution charged with the implementation of official marketing policies, SAED has less discretion over its commercial activities than many private-sector grain trading firms and individuals. Since official marketing policies may have decidedly non-economic goals, their implementation can at times be very costly. This has considerable implications for the profitability of the official marketing channel.

Consider for example the government's twin policies of guaranteeing a market outlet for paddy and of supporting the producer price above a certain minimum level. In order to implement these two policies, which are designed to stimulate production while protecting producers' incomes, SAED has proclaimed its readiness to purchase all of the paddy produced in the Senegal river valley at the official producer price. But if the goals of the two policies are unobjectionable, their implementation causes considerable

problems. Although SAED may be legally obligated to purchase all of the paddy offered for sale by farmers and to pay the official producer price, it is in direct competition with parallel market traders who are under no such obligation. Consequently, parallel market traders can purchase grain at times and in places where it is profitable to do so (as they did in the Delta region throughout much of the 1984/85 season), while leaving for the official marketing agency the unprofitable trade in more remote regions. Analysis of SAED reported marketing costs revealed that paddy produced in the department of Bakel cost nearly 14 times as much to assemble as some of the paddy purchased in the Delta region. A private trader operating around Bakel either could have attempted to recover the higher transport costs by adjusting the purchase and/or sale prices, or he could have abandoned the trade as unprofitable. SAED could do neither, and eventually it was obligated to market paddy from around Bakel at a loss.

The obligation to purchase all paddy offered for sale by farmers, regardless of its origin, is but one of the restrictions imposed on the official marketing system. A second restriction is the obligation always to pay the official producer price. The rigidity of the official price structure, which stipulates a single price for each marketing season, prevents SAED from competing effectively with the parallel channel trade. In years when consumer prices are high (such as 1985, following the increase in the official consumer price), parallel channel traders can bid up the price of paddy above the official producer price. Farmers are eventually enticed to sell outside the official channel, where the price remains fixed. (This is what happened during 1984/85, when the flow of grain moving through the parallel channel increased dramatically while official marketings plummeted.)

A final restriction imposed on SAED by its obligation to implement official marketing policies is reduced bargaining power in its dealings with contractors. The case of transporters was cited above. In theory, SAED should wield considerable power over transporters by virtue of its monopsonistic position as the single legal purchaser of paddy

transportation services. In practice, however, SAED's power is eroded by the transporters' knowledge that SAED must negotiate a contract in order for the official marketing campaign to start on schedule. This knowledge gives the transporters tremendous bargaining power, particularly since they are able to bargain collectively. This bargaining power is reflected in the levels of the negotiated transport rates, which appear to be well above the levels prevailing in the private sector. Presumably SAED is similarly constrained in bargaining with other contractual suppliers of goods and services, with the result that operating costs are further increased.

Constraint 2: SAED's organization as a large, centrally-managed parastatal institution.

Because SAED is a large, centrally-managed parastatal institution, it suffers from the usual array of institutional problems: poor internal communications; diffusion of responsibility; slowness in making decisions; factionalism; lack of freedom to hire and dismiss; etc. These problems contribute to general administrative sluggishness and a lack of operational flexibility. The frequent disruptions and delays in marketing operations are symptoms of this sluggishness and lack of flexibility, since even the most minor problem can immobilize the trucks or idle the mills while the SAED bureaucracy grinds slowly toward a solution. The lengthy administrative procedures have contributed to farmer disillusionment with the official marketing channel and thus have accelerated the flight of paddy onto the parallel market.

SAED's administrative sluggishness and lack of operational flexibility affect not only day-to-day management activities, but also strategic planning and policy formulation. SAED is unable to react quickly to changes in market conditions. Any significant revision in official policies or procedures must be negotiated through a slow interministerial policy review process which is likely to prevent reforms from being implemented in time to do much good. For example, the 1984/85 producer price of paddy was announced on September 18, 1984, well in advance of the marketing campaign. Once announced, the price could not be adjusted during the course of the campaign. By the

time most paddy came onto the market, market conditions had changed considerably. Eventually, another iteration of the interministerial policy review process produced a new producer price for 1985/86 (announced April 5, 1985), but in the meantime much of the 1984/85 crop was purchased by parallel market traders who had the flexibility to change their offer prices instantaneously in response to the changing market conditions.

Constraint 3: SAED's financial insulation resulting from a reliance on external funding sources and from protectionist legislation.

As a parastatal institution operating primarily on external funds and sheltered by protectionist legislation, SAED enjoys a certain financial insulation which has enabled it to continue to function in spite of recurrent operating losses. Despite frequent government resolutions to reduce the subsidies to SAED, external funding and favorable legislation continue to keep it operating (at a loss) year after year.

Given SAED's multiple objectives, particularly its land development operations and its extension activities, it is unlikely that the organization as a whole will ever be able to operate at a profit. However, certain activities within SAED should be able to generate income to help offset the losses on other less profitable activities. URIC was set up precisely for this reason, since rice marketing was considered potentially profitable in the long run. In order to protect URIC in the short run, when the quantities of rice marketed were expected to be small and per-unit costs high, a "cost-plus" formula was negotiated with CPSP. Under the terms of an official agreement, CPSP agreed to purchase all rice produced by SAED at a price determined by the "cost-plus" formula. Since this formula takes into account all marketing costs incurred by SAED (including purchase of paddy, assembly, processing, storage, and overhead), theoretically SAED can not lose money on its marketing operation, regardless of costs.

Despite the protection afforded by the "cost-plus" formula, URIC has consistently lost money (the exact amounts are unknown, according to SAED accountants). Why has this happened? SAED's financial insulation is a contributing factor. As a result of the

external funding and the "cost-plus" formula, SAED management has not come under serious pressure to identify inefficiencies and to take steps to correct them. For example, SAED has continued to operate with an ineffective accounting system, which has prevented management from monitoring and evaluating economic performance. Analysis of SAED reported marketing costs revealed examples of inadequate accounting practices. Bags for paddy apparently were purchased during 1983/84 only to disappear from the books without trace. Costs were attributed to the URIC marketing operation which apparently had little to do with marketing activities (e.g., "overhead costs"), while other real costs were not accounted for (e.g., the cost of carrying inventory, grain losses).

Such inadequate accounting practices not only hinder SAED management from identifying problems and taking steps to correct them, but they also prevent development planners and government policy makers from forming a clear picture of SAED's economic health. This decreases the likelihood of external pressure for reform. The organization and performance of the cereals subsector in general and of SAED's role in particular have been subject to periodic review and discussion in recent years. (see CCCE 1983; MRECD 1983; Arthur Anderson 1984) While these reviews have helped launch a series of positive reforms, all of the studies encountered the same problems: inadequate SAED accounting records and lack of viable data. These problems could persist as long as SAED remains financially insulated and the need for reforms is not felt with any degree of urgency.

### 3.3 Distribution Operations

Official cereals distribution activities in the Senegal river valley are carried out by CPSP, working in conjunction with private-sector merchants operating under government regulations and policies. The cereals distribution activities of CPSP have been studied elsewhere and are not examined here. (See Arthur Anderson 1982; Borsdorf 1984) Rather, the present focus is on the private-sector merchants, about whom little is known. (The recent SONED study of cereals marketing in Senegal failed to produce any



data on distribution activities in the Fleuve region. See SONED 1984, p. 124)

Private-sector merchants play a vital role in cereals distribution, and effective marketing policy analysis requires a solid understanding of their operating procedures and constraints. Consequently, an important field data collection effort was directed at the private merchants who comprise a large part of the official cereals distribution system.

The conceptual framework underlying the study of cereals distribution is derived from the Structure-Conduct-Performance (S-C-P) paradigm of industrial organization theory. The central idea of this paradigm is that the structural characteristics of an industry (e.g., the numbers of buyers and sellers, barriers to entry, degree of vertical integration) can under certain circumstances influence the conduct of market participants (e.g., pricing behavior, coordination between traders, opportunism, innovativeness), and the interaction between the two affects the performance of the industry (e.g., technical and economic efficiency, achievement of welfare goals). Field data collection activities were designed with the assumption that the official cereals distribution system can be understood on the basis of knowledge of these three aspects of the system.

A formal survey of licenced private-sector cereals distributors working in the Senegal river valley was performed during the six-month period from August 1984 to January 1985. In August 1984, six enumerators were recruited, trained, and placed in towns throughout the region. The sites, which were selected on the basis of population, location, commercial importance, and type of local agriculture, included Saint Louis, Dagana, Podor, Aere Lao, Matam, and Bakel. Each enumerator was based in one of these six primary sites, but data collection responsibilities included the surrounding area.

### 3.3.1 Structural Characteristics of Cereals Distribution

#### a) Official Wholesaling

During the period of the survey, approximately 45 wholesalers ("grossistes") and wholesaler-retailers ("demi-grossistes") registered in the Senegal river valley were

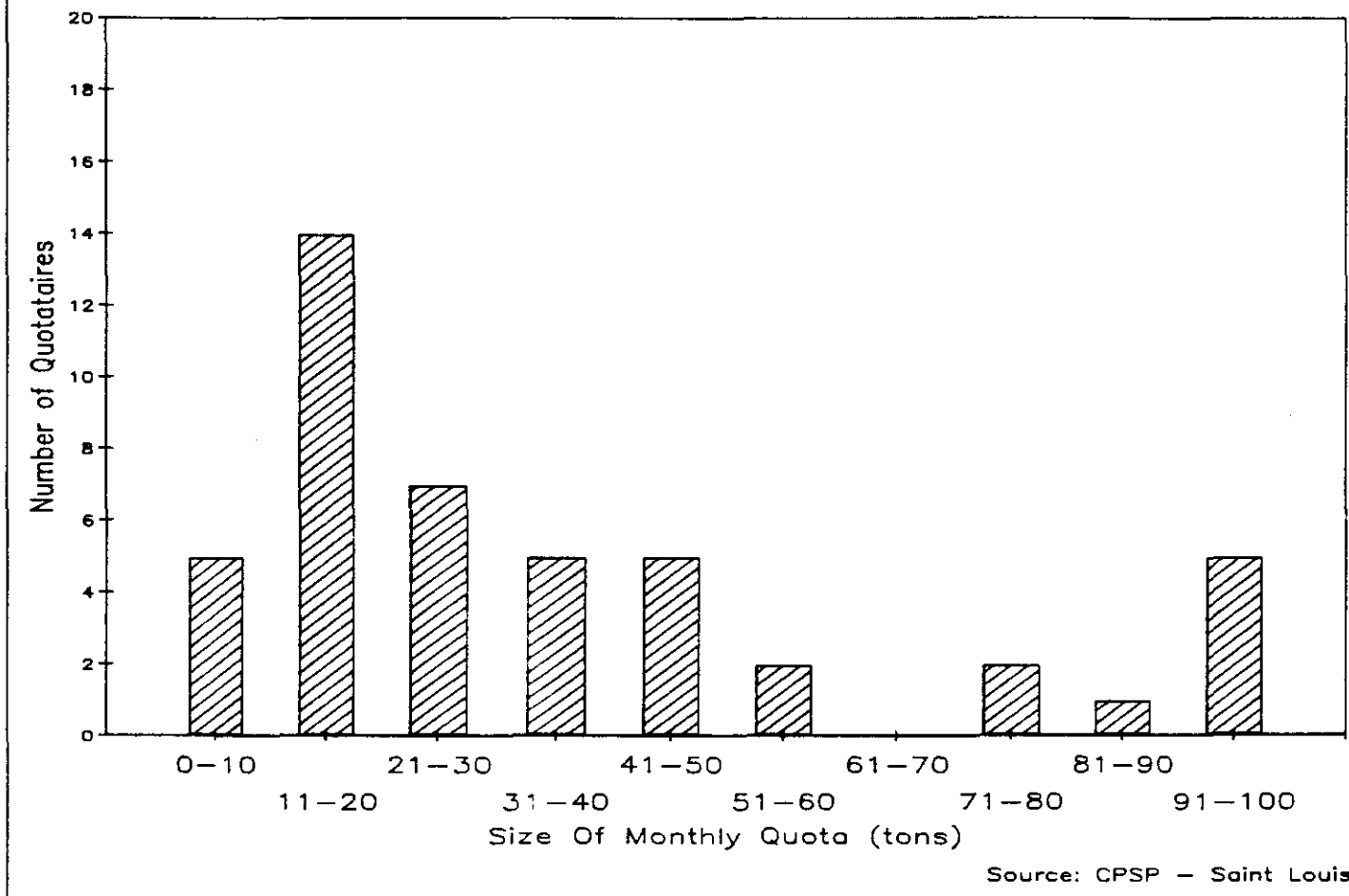
licenced quotataires authorized to purchase rice from CPSP. The size of their monthly quotas were distributed asymmetrically, with the result that a relatively large proportion of the total allocation was controlled by a small number of merchants. (see Figure 11)

Eight quotataires (six in Saint Louis, one in Matam, and one in Bakel) held quotas totalling 754 tons of rice/month, or 42% of the tonnage allocated to private merchants (exclusive of consumer cooperatives and SONADIS stores). The remaining 58% of the tonnage allocated, or 1061 tons, was divided among the other 37 quotataires. In comparison, total 1984 sales of rice by the 20 SONADIS stores located between Saint Louis and Kidira totalled just over 2,000 tons, or approximately 170 tons/month. Thus, SONADIS' sales volume amounted to approximately 10% of the volume allocated to the quotataires.

Within individual towns, concentration was sometimes pronounced. Six towns were served by only one quotataire, and two additional towns were served by only two quotataires each.

The total number of quotataires is limited because access to the industry is limited: only by obtaining a quota can a private merchant become an official rice wholesaler. Allocation of quotas is the responsibility of MCI, which is confronted with the difficult problem of determining their number and sizes. Increasing the number of quotas and decreasing their average size is desirable in that it dissipates market power and distributes economic benefits over a larger number of merchants, but at the same time administrative and enforcement costs increase, and potential economies of scale in distribution may be lost. Conversely, decreasing the number of quotas and increasing their average size reduces paperwork and policing activities and facilitates realization of potential economies of scale, but there is a danger of greater concentration of market power within the hands of a small group of traders, leading to possible monopolistic practices.

Figure 11: Size Distribution of CPSP Rice Quotas  
In the Senegal River Valley (4th Quarter 1984)



Because a quota has great economic value, competition for quotas is intense. Informal interviews with traders, CPSP representatives, and agents of the Controle Economique revealed that political influence is often required to obtain a quota, and that substantial under-the-table payments are common. In the past, quotas have sometimes been held by non-merchants (often powerful political or religious figures), who rented them illegally to non-quota-holding traders. While MCI appears to have made progress in combating this practice, a number of quotas in the Fleuve region continue to be held by individuals who obviously do not make a living trading cereals.

If quotas represent an explicit legal barrier into rice wholesaling, a second less explicit barrier affecting wholesale commerce in general (i.e., cereals as well as other goods) is the lack of credit. In Senegal, as in many developing countries, investment capital is scarce. Commercial bank loans are generally not available for traders. Although the cereals distributors surveyed were nearly unanimous in identifying the lack of capital as one of the major problems encountered in their work, only 4% of the wholesalers and wholesale-retailers surveyed reported ever having obtained a bank loan. Informal lending, while more common, does not usually involve the large cash sums required to launch a cereals wholesale distribution business. While 33% of the wholesalers and wholesaler-retailers surveyed reported borrowing money from relatives and/or other traders, nearly all of these specified that these loans serve to alleviate temporary cash flow problems and involve small amounts over short periods of time (one month or less).

It is important to recognize that official marketing regulations increase the importance of credit by requiring applicants for wholesaling licences to provide proof of a bank account containing a minimum of 3 million FCFA. While this one-time requirement in no way assures that the trader will remain solvent, since there is no stipulation that the funds remain in the account after the licence is granted, prospective wholesalers nonetheless are forced to raise the money somehow in order to gain entry.

An interesting structural feature of wholesale distributing is the high incidence of kinship among traders: 54% of the wholesalers and wholesaler-retailers surveyed reported being related by blood or by marriage to other traders in the same town. (Four of the largest wholesalers in Saint Louis are Maures with the same last name.) While it was at first hypothesized that an absence of kinship ties might represent a third barrier to entry into cereals wholesaling, interviews with traders revealed that kinship ties are not a necessary precondition for becoming a cereals wholesaler so much as a result of the tendency for commerce to absorb entire families. When questioned, 81% of the wholesalers and wholesaler-retailers stated that anybody could become a cereals trader, while only 15% asserted that it is necessary to have the support of an established trader, preferably a relative.

In summary, official cereals wholesaling in the Senegal river valley is characterized by a relatively concentrated market structure. Access into the industry is impeded by two barriers to entry: the quota requirement, and the lack of credit. Kinship ties, while common, do not appear to be necessary to engage in trading and therefore do not represent an additional barrier to entry.

#### b) Official Retailing

Whereas wholesale distribution activities are dominated by a relatively small number of merchants, retail distribution activities in the Senegal river valley involve 17 SONADIS retail stores, several hundred licenced traders, and literally thousands of unlicenced market sellers. The licenced traders include two primary types: market-stall operators who are concentrated in the central marketplaces of the larger towns, and shopkeepers scattered throughout the residential districts of towns and villages. Unlicenced market sellers tend to be seasonal traders, often women farmers, who engage in petty trading during several months of the year to supplement a farming income. (Since unlicenced market sellers technically are part of the parallel market, they were not included in the sample.)

Because it is relatively easy to obtain a permit to practice general retail commerce, access to cereals retailing is not restricted by an explicit legal barrier in the same way that access to rice wholesaling is restricted by the quota requirement. However, as in the case of wholesaling, the lack of credit imposes an implicit barrier to entry: 47% of the licenced retailers surveyed asserted that it is necessary to have material support from a sponsor in order to set up a retail business. On the other hand, material support is easier to obtain at the retail level. Whereas very few wholesalers and wholesaler-retailers acknowledged buying cereals on credit, the practice was reported by 50% of the licenced retailers.

The high incidence of kinship bonds which characterizes wholesaling is even more pronounced at the retail level. Fully 66% of the licenced retailers surveyed reported being related to another trader in the same town. However, no evidence was found to suggest that kinship bonds are more important in retailing than in wholesaling, and the greater incidence can probably be attributed to the fact that there are simply many more retailers than wholesalers (and consequently a greater likelihood of being related to a retailer than to a wholesaler).

Product differentiation (in the sense of different grades of cereals), which can be an important determinant of market structure at the retail level, does not appear to have a strong influence on cereals distribution in the Senegal river valley. This is not surprising, since retailers buy from the same wholesalers, who in turn buy primarily from CPSP, which sells a limited range of grades. While consumers clearly do distinguish between different grades of rice and sorghum, the products circulating in the market at any given point in time are almost always identical, and cereals retailers generally are not categorized or otherwise distinguished according to the grades they sell. The only exception to this occurred in several towns in the Delta region and in the lower Middle Valley, where unlicenced market sellers were discovered selling local rice which had been sorted by size (i.e., whole grains, large brokens, small brokens).

In summary, official cereals retailing in the Senegal river valley is characterized by an atomistic market structure. Access into the market is relatively unrestricted; although the lack of credit poses a barrier to entry, an initial working inventory can often be obtained on credit. Kinship bonds, while common, do not appear to affect access. Product differentiation does not have a strong influence on market structure.

### 3.3.2 Behavior of Market Participants

The behavior of official cereals distributors was studied by referring to the formal survey questionnaires as well as through informal interviews and direct observation. Both approaches were useful, because there is often a difference between what traders say they do and what they actually do.

#### a) Official Wholesaling

Much of the interaction between wholesalers (quotataires) and CPSP employees takes place behind closed doors and cannot be observed directly. Nevertheless, when asked to describe their dealings with CPSP, many quotataires stressed the basic imbalance in power which characterizes the relationship because of the monopolistic position of CPSP as the single legal supplier of imported rice and sorghum. CPSP employees can exert their power by controlling the scheduling of deliveries and the selection of bags of grain. A number of quotataires alleged that CPSP management favors certain customers by serving them first, by selling them only undamaged bags, and on those infrequent occasions when different grades of rice are available, by selecting the preferred grades. Since several quotataires admitted paying warehouse staff in order to obtain preferential treatment, there would appear to be some truth in the allegations. However, it was not possible to investigate this sensitive issue in depth.

While CPSP does enjoy a monopolistic position vis a vis the quotataires, apparently the wholesaling industry is concentrated enough to provide the quotataires with a limited degree of countervailing power. Cereals wholesalers within the same town or region

often know one another personally, which makes it easy for them to meet to discuss business. While only 21% of the wholesalers and wholesaler-retailers surveyed reported meeting formally with other traders on a regular basis to discuss business, nearly all acknowledged having informal contacts with other cereals traders in the same town. Several quotataires indicated that a common topic of conversation is the problem of dealing with CPSP, and they added that traders often share information to avoid being played off against one another for favors.

This discovery of information-sharing among wholesalers was consistent with the conventional wisdom that traders collude so as to exploit others in the market place. Because this belief is widespread in Senegal, the behavior of wholesalers was examined very closely in an attempt to establish the degree of competition (or the lack thereof) prevailing in the marketplace.

How might competition be manifested? A logical place to look was pricing behavior. Unfortunately, the government's policy of fixing cereals prices diminishes their value as an indicator of market competitiveness. Since any deviation from the official price structure could result in a severe fine, traders were generally reluctant to discuss their pricing practices (other than to say that they always abide by the official regulations!).

If cereals wholesalers are partly correct in claiming that they refrain from price competition out of fear of being fined for violating pricing regulations, a more fundamental reason may be that the official marketing margins are simply too small to permit discounting. Many wholesalers and wholesaler-retailers alleged that the official wholesaling margins do not always cover marketing costs, and that merchants consequently cannot afford to engage in price competition. Several wholesalers admitted that they are forced to seek ways to raise selling prices merely to break even on their grain trading operations. Interviews with retailers confirmed that wholesalers tend to exert upward pressure on prices rather than downward pressure. Retailers identified



three basic strategies used by wholesalers to increase prices: 1) charging the official price for cash sales but adding a substantial surcharge for credit sales; 2) selling underweight sacks; and 3) selling at the retail price instead of at the wholesale price as required by law. These practices were confirmed by a number of wholesalers, who pointed out that they are necessary, respectively: 1) to reimburse the cost of credit (including a risk premium against non-repayment of some loans); 2) to avoid losses on sacks which were underweight when purchased from CPSP; and 3) to cover the higher costs of retail transactions.

On the whole, pricing behavior on cereals thus did not reveal any signs of overt competition among wholesalers. However, the absence of competitive pricing behavior does not necessarily mean that competition does not occur. Informal interviews with market participants, retailers as well as wholesalers, revealed that competition does characterize the relationships between cereals wholesalers, and that often it takes the form of a struggle over market share. Since price competition is risky and expensive, an alternative strategy for wholesalers to increase profits is to expand market share. The larger wholesalers accomplish this by setting up favored retailers to sell their merchandise, not only cereals, but also other common staples such as coffee, sugar, milk, tea, and vegetable oil. Since many retailers depend on credit to maintain inventory, the sponsoring wholesaler effectively controls them through his ability to advance merchandise on credit. Whereas only 21% of the wholesalers and wholesaler-retailers reported buying cereals on credit, fully 92% reported selling cereals on credit. Many of the credit sales are made to favored retailers who have been set up in business specifically to move the merchandise of a single sponsoring wholesaler. (The use of credit by cereals wholesalers as a basis for competition was similarly found to occur in the Casamance region. See Jolly and Diop 1985.)

Occasionally the competition between rival wholesalers over market share intensifies, and extraordinary measures are invoked. During the period of the survey,

wholesalers engaged in a struggle for control over the retail trade in Bakel. Larger and larger quantities of merchandise were distributed to retailers on increasingly favorable credit terms, and at one point a clandestine price war broke out as both wholesalers offered under-the-table discounts. Eventually one of the two wholesalers withdrew from the market, whereupon the second immediately restored prices to their previous levels.

A final noteworthy characteristic of the behavior of cereals wholesalers is their tendency to diversify. Only 8% of the wholesalers and wholesaler-retailers surveyed traded exclusively in cereals; the vast majority traded cereals in addition to other food staples and dry goods. This diversification is not surprising, given the organization of the official distribution system for cereals. Because the quota system limits the scope of individual involvement in rice trading, and because fixed official prices remove the price variability that can provide profit opportunities for skilled managers, there is little incentive for specialization in cereals trading. Furthermore, many traders pointed out that an exclusive reliance on cereals would be risky because of the disruptive influence of food aid on demand. According to these traders, every time sorghum, rice, or maize is distributed as food aid, commercial sales of cereals drop precipitously, sometimes remaining sluggish for months.

In summary, the behavior of cereals wholesalers was found to be consistent with what might be expected in a highly-regulated industry with restricted access. While the relatively concentrated market structure perhaps facilitates certain forms of collective action (e.g., the sharing of information), relationships between wholesalers were nevertheless found to be characterized by competition. Since price competition is discouraged by the official price structure, credit is used as a means to increase market share. No evidence was found to support the conventional wisdom that grain wholesalers engage in systematic collusion in order to exploit other groups of market participants.

#### b) Official Retailing

Because retailing is so atomistic, individual retailers have little influence over the market. Consequently, they do not spend much time on developing horizontal links with

other retailers and instead concentrate most of their efforts on vertical links: maintaining good relationships with their wholesale suppliers, and establishing firm bonds with their customers.

The special relationship between some cereals wholesalers and some retailers has been described above. Constrained by a perpetual lack of cash, retailers depend on merchandise purchased on credit to acquire an initial stock and to maintain working inventory. Many retailers work with one or two regular suppliers, selling their merchandise in return for credit and occasional cash loans. According to several respondents, as many as a dozen retailers may be sponsored in this way by a single wholesaler.

Maintaining a close working relationship with wholesale suppliers is important in cereals retailing. Equally important is the ability to move merchandise. In the case of staple foodstuffs which are purchased on a regular basis, even daily (such as cereals), a common strategy used by retailers is to develop a pool of regular customers. This can be accomplished through judicious use of two factors: location and credit. Location is particularly important for retailers operating neighborhood shops, since Senegalese consumers generally do their shopping on foot and for convenience tend to patronize local traders. Credit is important both for neighborhood shopkeepers and for market stall operators, since housewives often lack the cash necessary for daily food purchases and rely on traders whom they patronize on a regular basis for occasional short-term credit. Fully 76% of the retailers surveyed reported selling cereals on credit to their regular customers, although most indicated that considerably less than half of their transactions involved credit. (It was not possible to determine the percentage of total sales volume sold on credit.)

As in the case of the wholesale industry, cereals retailing is not characterized by price competition. Faced with small official margins, many retailers find ways to raise selling prices above official retail levels, for example by charging different prices for

cash and credit sales, by rounding the price per kg up the nearest 5 FCFA, or by adding a small margin for transport in the case of grain sold in rural villages. As in the case of wholesaling, these practices were justified by traders as necessary in order to permit recovery of marketing costs not covered by the official margins.

In responding to questions about pricing practices, many retailers expressed a fear of being fined for deviating from the official price structure. The Controle Economique is generally quite active at the retail level. Although retailers reported fewer visits by Controle Economique agents (0.77 visits/month) than did wholesalers and wholesaler-retailers (1.64 visits/month), the incidence of reported fines and/or informal "arrangements" was much higher among retailers. Fully 86% of the retailers reported having paid money to regulatory agents during the previous year, as opposed to only 57% of the wholesalers and wholesaler-retailers. Rather than indicating a higher incidence of violations among retailers, this difference may simply arise because retailers are less powerful and consequently less able to resist regulatory pressure.

In summary, cereals retailers were found to engage in behavior consistent with the atomistic structure of the industry. Often relying on credit from a sponsoring wholesaler or wholesalers, retailers compete to develop pools of regular customers in order to move their merchandise. Location and credit are used by many retailers to attract and keep clients, since price competition is risky and expensive.

### 3.3.3 Market Performance

Since there is no such thing as a set of universally valid market performance criteria, the performance of a particular market can be evaluated only in relation to specific performance goals which have been established previously. According to the Nouvelle Politique Agricole, the policy goals for Senegal's cereals distribution system include:

- a) ensuring the widespread availability to consumers of staple food grains at official prices;

- b) maintaining orderly marketing conditions which allow intermediaries to make a fair return on their economic activities;
- c) increasing productivity at all levels of the marketing system; and
- d) reducing the cost of the government of market support programs.

How well are these performance goals being achieved in the Senegal river valley? To the extent that they are not being met, what diagnostic insights can be gained from the S-C-P framework of analysis? Based on the survey findings, how do the structural characteristics of the market and/or the behavior of market participants influence the performance of the official cereals distribution system?

Let us examine the four performance goals one by one.

In the absence of reliable long-term data on actual market prices for cereals in the Senegal river valley, it is not possible to calculate quantitative measures of pricing performance. Nevertheless, there can be little doubt that the first performance goal was largely being achieved: during the period of the study, imported rice, SAED rice, and imported sorghum were generally available throughout the region, both at the wholesale and at the retail level, at prices equal to or close to official prices. Although weekly spot samples taken in the six primary sites where enumerators were placed indicated that retail prices did sometimes diverge from official levels, the discrepancies generally could be explained as cost-recovery mechanisms designed to compensate traders for additional marketing services (e.g., credit, transport).

This is not to deny that shortages of rice occasionally occur, nor that some traders take advantage of shortages to raise prices above official levels. Shortages clearly do occur from time to time. However, it is important to recognize that almost invariably they result from a supply disruption at the source, i.e., at the level of CPSP (for example, due to the late arrival of a supply ship). This is quite different from deliberate hoarding by traders for the expressed purpose of creating an artificial shortage, which is the "explanation" often put forward by frustrated consumers and concerned public

officials. While it is probably true that certain traders are quick to take advantage of the upward pressure on prices produced by a supply disruption, it is misleading to blame traders in general for the shortages themselves. It is a fundamental tenet of economics that prices will rise when supplies decrease and demand is inelastic, ceteris paribus. However, the fact that supplies decrease does not necessarily mean that traders have colluded to create a shortage. In the case of rice in Senegal, more often than not decreases in supply occur because traders themselves are unable to obtain rice from their only legal supplier, CPSP. No evidence was found during this study to indicate that cereals distributors, neither wholesalers nor retailers, were anywhere engaging in deliberate, systematic hoarding for purposes of manipulating prices.

It is difficult to determine whether or not the second performance goal is being achieved, i.e., to determine whether or not intermediaries were making a fair return on their marketing activities. Since most grain traders also carry a broad assortment of staple foods and dry goods, returns to cereals distribution activities alone are difficult to calculate without the detailed financial information necessary to allocate overhead costs to the various components of a diversified enterprise. Traders were generally reluctant to divulge their business records, and when pressed for financial data on their cereals distribution activities often cited official price guidelines rather than actual market figures. (Several wholesalers admitted to double-bookkeeping practices, disclosing that false records are kept for the benefit of regulators - and researchers!)

Nevertheless, assuming that most distributors more or less adhere to the official price structure, gross marketing margins are restricted to a basic range - around 6 FCFA/kg for wholesalers and 7 FCFA/kg for retailers based in Saint Louis, and slightly more elsewhere in the river valley. These margins are small compared to the margins earned in the parallel channel on locally-produced rice. On the other hand, the buying and selling activities of official distributors are limited compared to the vertically integrated operations of parallel channel traders. Marketing costs are considerably lower

in the official channel, consisting essentially of transport, labor, housing, and the opportunity cost of capital tied up in inventory. Furthermore, official distributors are exposed to very little price risk, since the official price structure ensures a high degree of stability.

If official margins provide a general indication of the returns to cereals distribution, it must be kept in mind that traders do not always realize the official margins. Many distributors, both wholesalers and retailers, claimed that the profitability of cereals trading is greatly reduced because the sacks of grain sold by CPSP are often underweight. This was denied by CPSP representatives, who stated that the sacks are more often overweight than underweight. Random samples of three types of rice bags were weighed at the CPSP warehouse in April 1985, with the following results:

Table 5: Measured Weights of Rice Bags (CPSP Warehouse, Saint Louis)

Type of Rice	Theoretical weight (kg)	Number of bags weighed	Mean weight (kg)	Standard deviation
China	50	100	49.715	1.162
Burma	50	100	50.065	1.342
SAED	100	100	101.053	1.080

Source: Field Surveys

These data suggest that the trader's claims and the CPSP representatives' counterclaims may both be correct, depending on the type of rice and the selection of bags. While all three of the mean measured weights lay within a single standard deviation from the theoretical bag weights (which appeared to be distributed normally), the mean measured bag weight in one case exceeded, in one case equalled, and in one case failed to reach the theoretical bag weight. Thus, it is quite possible that a shipment

could contain underweight bags, overweight bags, or both. (Although quotataires may ask to have individual sacks weighed at the time of purchase from CPSP, they are effectively discouraged from exercising this right by having to pay a supplementary handling fee.)

This variability in bag weights can be costly for traders, because many customers are adept at visually estimating weights and refuse to accept underweight bags. Eventually, such bags must be opened by the trader and filled to their stated capacity, or the contents must be sold retail. In either case, the trader incurs a loss.

Despite the modest official margins (which in some cases may well be reduced by losses on underweight bags), little evidence was found to suggest that cereals distributors were actively seeking ways to modify standard operating procedures in order to reduce costs. One must therefore question whether progress is being made toward achieving the third performance goal of raising productivity in cereals marketing. Persisting inefficiencies can be attributed largely to the sheltered nature of the industry, particularly at the wholesale level. Because the quota system gives a relatively small group of traders the exclusive right to buy rice and imported sorghum, these traders have little incentive to improve their performance. As a result, the official distribution channel is characterized by a certain lack of progressiveness. The large-volume traders who dominate official wholesaling continue to practice commerce in the traditional fashion, manipulating economic and political power to obtain preferential treatment from government officials, protecting their portion of the market by cultivating special relationships with favored retailers, keeping accounts largely in their heads, and working out informal "arrangements" with regulators to avoid close scrutiny. To the extent that many of these large-volume traders are content to keep things the way they are, protected by formal and informal barriers to entry from competitive pressure to improve their performance, official cereals distribution remains static and devoid of innovation. This is in stark contrast to the parallel channel, where private-sector merchants have demonstrated the ability to respond swiftly and decisively to changing market conditions.



The fourth performance goal is reducing the cost of the government of market support programs. At present, many of the direct costs incurred by the government in conjunction with cereals distribution activities result from the strong national commitment to ensure the permanent availability throughout the country of staple food grains at near-uniform prices. In order to achieve this policy objective, the government subsidizes stock management, transport, and storage costs (through CPSP), and it pays for regulation of private-sector marketing activities (through MCI). While government expenditures could be reduced by transferring some or all of these functions to the private sector, existing policies would have to be revised to restructure the incentives for private traders. At the same time, there is a need to reconsider the cost-effectiveness of existing regulations governing private-sector commercial activities. Many current marketing regulations are designed to discourage grain traders from engaging in what are thought to be undesirable practices. Such regulations tend to be expensive to enforce, and they often lead to evasive behavior which raises the cost of doing business (e.g., double-bookkeeping, "arrangements"). If government programs are to achieve marketing policy objectives at reduced costs, regulations must be introduced which would make it in the self-interest of private traders to act in accordance with policy goals.

#### **4. THE PARALLEL MARKETING CHANNEL**

Because buying and selling rice outside the official channel is technically illegal, the parallel channel is difficult to study. The itinerant traders who play a central role generally take care to conceal their activities, for example by conducting transactions through intermediaries, by dealing only in small lots, and often by misrepresenting the sources and destinations of grain. In order to gain access to parallel channel participants, the field research team began by focusing on the least sensitive activity in the channel: processing. Since huller operators rarely engage in trading, they tend to be

less suspicious of researchers and in fact proved to be willing and knowledgeable informants. Once a presence was established in the field, it was possible to make contacts with the farmers, traders, and consumers who patronize the hullers, and the study then proceeded upstream into assembly functions and downstream into distribution functions.

The field data collection activities were conducted in three phases:

- Phase I: the census of rice hullers
- Phase II: the costs and returns study of rice hullers
- Phase III: the parallel market participants survey

Each phase is described below, and preliminary results are presented. Summary conclusions concerning the parallel channel follow.

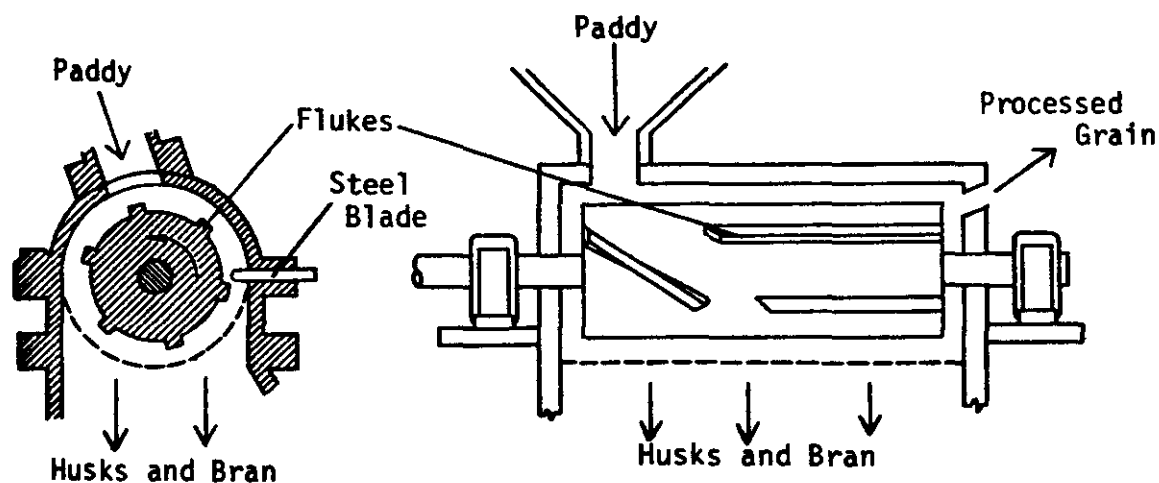
#### 4.1 Phase I: The Census of Rice Hullers

During the month of February 1985, a complete census was performed of rice hullers operating on the left bank of the Senegal river valley between Saint Louis and Kidira. The 142 hullers identified were located by visiting all villages situated on or near major roads and asking where hullers were located. While it is unlikely that any hullers in permanent installations were overlooked, a small number of mobile hullers may have been missed, as these were sometimes difficult to find. A questionnaire on huller type, ownership, and operations was completed for each huller, based on interviews with the manager and, if he was present, the owner.

The vast majority of hullers surveyed were "Engelberg-type" hullers with a capacity of 120-240 kg paddy/hour. The most common manufacturers were German (Billbrook-Hanseata, Schule: 60%), Italian (Colombini, Lombardini: 20%) and Senegalese (Sismar, local manufacturers: 11%). Most were powered by small (12 hp) diesel motors, although electric motors predominated in towns served by electricity. Four hullers were powered by gasoline motors.

Two cross-sectional views of the typical machine appear below. (see Figure 12)

Figure 12. The Engelberg-Type Steel Huller



Paddy is hand-fed into the hopper and is forced by the rotational flukes on the revolving cylinder to move around the cylinder and along toward the outlet. Friction between the grain and the steel parts of the huller (the internally projecting blades and perforated sieves) causes the husk and bran to be scraped off and pulverized. The husk and bran is forced out through the sieve and emerges from beneath the machine, while the grain issues from an outlet at the end of the cylinder casing. Depending on the speed at which the cylinder is rotated and the condition of the sieves, varying amounts of husk and bran are emitted mixed in with the grain. A number of the hullers surveyed were additionally equipped with separate grain polishers, but with a few exceptions these were disconnected because of the extra energy required to operate them.

The census revealed the following numbers of operating hullers (defined as hullers which had processed grain during the preceding month), distribution by region, and estimated peak-season throughput rates (where peak-season is defined as the post-harvest months of January, February, and March).

Table 6: Huller Numbers, Distribution by Region, and Estimated Throughput

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

Source: Field Surveys

These figures (which must be viewed as conservative in that an unknown number of hullers undoubtedly was missed) confirms that the total amount of paddy processed on hullers is considerable. The estimated peak-season 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 1984 marketing season. In other words, monthly throughput during the peak-season months immediately following the harvest is approximately 2 1/2 times greater on hullers than on the SAED mills.

If these figures are surprising, it is important to recognize that the expansion of village-level processing capacity is a recent phenomenon. The median length of ownership reported for the 142 hullers surveyed (of which 20 were non-operational) was 12 months, or exactly one year. The median age of the hullers was no doubt slightly higher, since some present owners acquired their hullers second-hand. Fully 60% of all hullers (64% of all operating hullers) were acquired during the preceding 12 months. This finding was corroborated by sales data from MATFORCE, the largest agricultural implements dealer in Dakar. During the last six months of 1984 and the first three months of 1985, MATFORCE sold approximately 50 Billbrook hullers, nearly double the number sold during the preceding three years.

The frequency distribution of reported length of ownership was broken down into periods corresponding to annual paddy marketing campaigns in order to provide an historical perspective to the rise in village-level processing capacity. (see Table 7) Since the census was performed in February 1985, all hullers acquired during the previous six months were considered to have been purchased for the 1984/85 campaign; those acquired during the preceding twelve months were considered to have been purchased for the 1983/84 campaign; and so on back.

Table 7: Frequency Distribution of Reported Length of Ownership of Hullers

	1-6 months	7-18 months	19-30 months	31-42 months	43-54 months	54 months	Total
Upper Valley	0	5	0	1	1	1	8
Middle Valley <sup>a</sup>	5	5	4	0	2	4	20
Delta	44	32	6	8	6	17	113
Total Valley	49	42	10	9	9	22	141

Source: Field Surveys

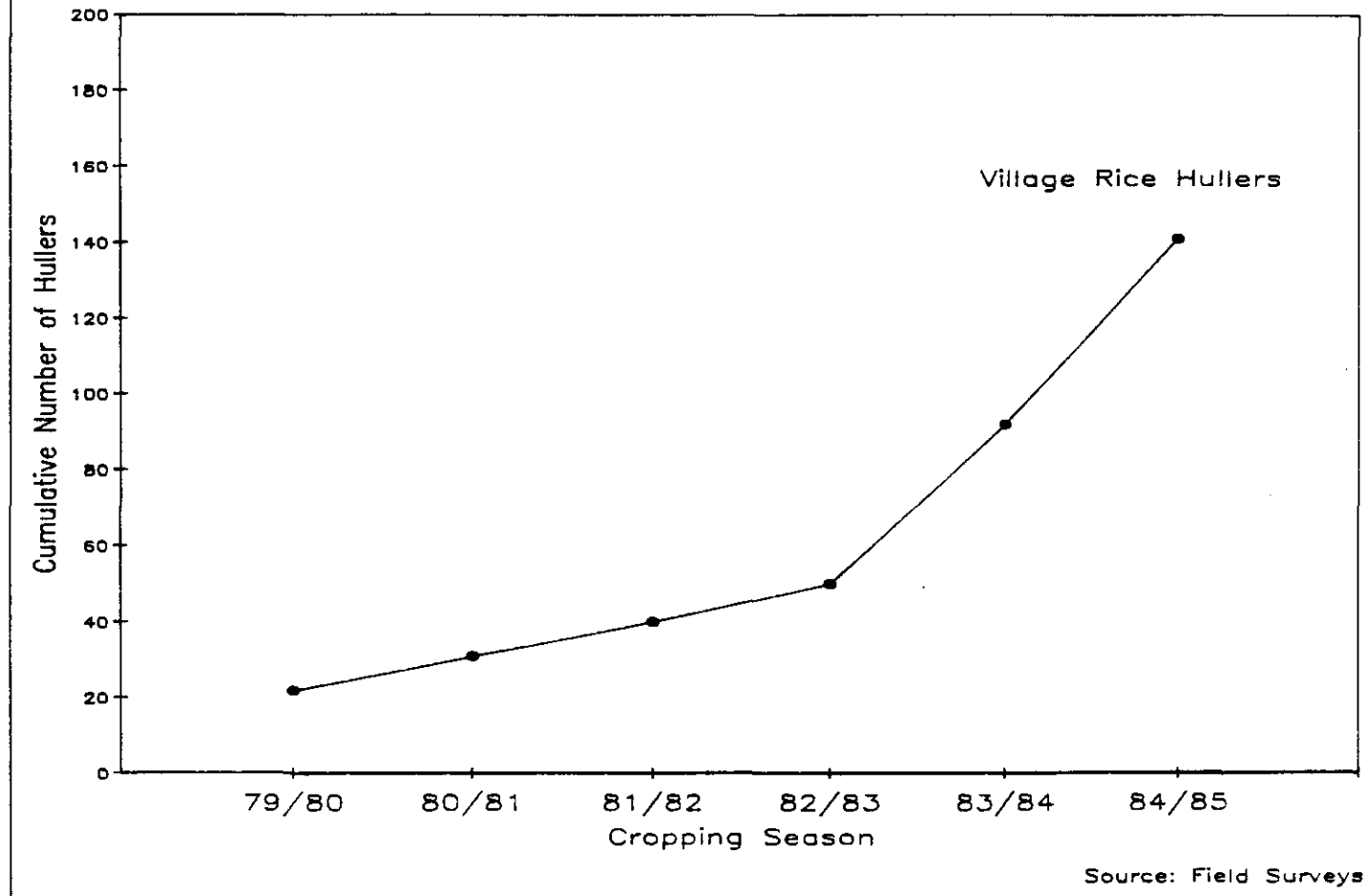
<sup>a</sup>Length of ownership of one huller unknown.

These data can be used to plot the cumulative increase in the number of hullers located in the Senegal river valley during the past five campaigns. (see Figure 13)

These data are consistent with the hypothesis that rice marketing patterns have changed radically. While the slow growth in the number of hullers up through the 1982/83 campaign can be attributed to the gradual increase in home consumption, the sharp jump in numbers which occurred during the past two campaigns provides further evidence of a sudden increase in parallel channel activity.

In addition to generating data on the evolution of processing capacity, the census also provided information on huller ownership, manufacturer, energy source, periods of

Figure 13: Growth in Numbers of Rice Hullers  
In the Senegal River Valley (1979/80 - 84/85)



operation, and clientele. Interesting regional differences were observed:

In the Upper and Middle Valleys:

- a greater percentage of hullers was owned by organizations (e.g., village cooperatives, women's associations, youth groups);
- a greater percentage of hullers was located in permanent installations;
- hullers were being used primarily to process rice destined for local consumption; and
- most hullers were underutilized throughout the year.

In the Delta:

- a greater percentage of hullers was owned by people who were non-residents of the village in which the huller was located;
- a greater percentage of hullers was located in temporary installations and moved frequently during the post-harvest months;
- hullers were being used primarily to process rice destined for consumption elsewhere; and
- most hullers were operated at full capacity (up to 20 hours per day) during the post-harvest months.

The observed regional variations in operating characteristics are entirely consistent with well-known regional differences in production patterns. (see CCCE 1982; Bonnefond et al. 1980).

Much of the rice grown in the Upper and Middle Valleys is retained for home consumption. Stored by producers in paddy form, it is processed little by little throughout the year, either by hand-pounding or using one of the relatively scarce village hullers located in this portion of the river valley. Many of these hullers were received as gifts from the government or were obtained through integrated rural development projects; such machines belong to village organizations which serve the consumption

needs of their membership by operating them throughout the year at low rates of capacity utilization.

Much of the rice grown in the Delta, on the other hand, is produced as a cash crop. The portion sold on the parallel market is processed locally using hullers before being shipped out to urban consumption centers within the region (e.g., Saint Louis) and in adjoining regions (e.g., Louga, Kebemer, Touba-Mbacke). In recent years, increasing numbers of hullers have been introduced into the Delta by entrepreneurial non-residents who operate them as commercial enterprises. These hullers tend to be mobile, moving from village to village as the harvest proceeds. Many are installed in villages along the main paved road which transects the Delta, since the processed rice can then easily be loaded into trucks for rapid distribution. Given the large number of recently installed hullers, it is unlikely that the currently available supply of paddy will be able to provide enough work for all the hullers throughout the year. Many of the huller operators surveyed stated that they expected to remain in operation only during the peak-season months following the harvest; as soon as the flow of paddy diminishes, their hullers will be withdrawn from the field and put into storage until the following campaign.

#### 4.2 Phase II: The Costs and Returns Study of Rice Hullers

The census of hullers confirmed that considerable processing capacity at the village level has recently appeared in the Senegal river valley, particularly in the Delta, in conjunction with increasing flows of grain moving through the parallel channel. Given current projections of anticipated production increases, which imply the need for future expansion in processing capacity, Senegalese policy-makers contemplating future marketing strategies must consider the potential for additional increases in processing capacity at the village level. An improved understanding of the typical village huller operation thus becomes essential. Key parameters of interest include technical parameters (e.g., capacity, conversion rate, quality of output), economic parameters



(e.g., cost and returns, profitability), and social parameters (e.g., distribution of benefits, employment effects, conformity with socio-political goals).

The second phase of the field data collection activities involved a costs-and-returns study of a sample of hullers. The study was designed to shed light on technical, economic, and social parameters of a typical village processing operation by making possible estimation of annual operating budgets for a set of prototypical hullers. Twenty five hullers were selected for study. Logistical considerations restricted the choice of hullers to those located in the Delta, but this was not thought to pose a problem because it was possible to cost out the two representative types of operation found in all three regions. The sample included several different manufactures, a range of ages, and all three possible power sources. Since it was not always possible to include enough observations from each category to permit statistically valid cross-group comparisons, it was necessary to assume that certain data are distributed in such a way that the mean is a good indicator. Standard deviations were generally small, however, and informal observations made by the author confirmed that operating characteristics are similar across the vast majority of machines. Huller operators (and whenever possible huller owners) were interviewed in March 1985 using a standard questionnaire, and measurements were taken of fuel consumption, rendement (output; input ratio), and quality of output (% broken).

Based on the data collected, prototypical annual operating budgets were constructed. (see Tables 8 and 9) In the absence of reliable longitudinal data on seasonal capacity utilization rates (which operators were reluctant to estimate due to their great variability), two assumptions were used concerning month-by-month capacity utilization. One budget represents a huller which hypothetically is used at 100% capacity (10 hours/day) during three months of the year, at 25% capacity (2.5 hours/day) during six months of the year, at 10% capacity (1 hour/day) during three months of the year. This pattern is intended to approximate the capacity-utilization rate of a permanently

installed village huller used to process paddy for the parallel market during and after the harvest and to process rice for local consumers during the remainder of the year. The second budget represents a huller which hypothetically is used at 100% capacity (10 hours/day) during three months of the year, at 25% capacity (2.5 hours/day) during three additional months, and at 0% capacity (0 hours/day) during the remaining six months. This pattern is intended to approximate the capacity-utilization rate of a mobile commercial huller operated for six months during and after the harvest and later put into storage. Both scenarios were based on information provided by huller operators and can be considered conservative relative to observed operating schedules.

Table 8: Operating Budget ("Village Huller")

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hours of Operation	270	270	270	68	68	68	68	68	68	27	27	27	1,296
Purchase (Huller)	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)	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	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	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
<b>TOTAL FIXED COSTS</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>52,378</b>	<b>628,536</b>
Fuel	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	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	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	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
<b>TOTAL VARIABLE COSTS</b>	<b>252,450</b>	<b>252,450</b>	<b>252,450</b>	<b>63,113</b>	<b>63,113</b>	<b>63,113</b>	<b>63,113</b>	<b>63,113</b>	<b>63,113</b>	<b>25,245</b>	<b>25,245</b>	<b>25,245</b>	<b>1,211,760</b>
<b>TOTAL COSTS</b>	<b>304,828</b>	<b>304,828</b>	<b>304,828</b>	<b>115,491</b>	<b>115,491</b>	<b>115,491</b>	<b>115,491</b>	<b>115,491</b>	<b>115,491</b>	<b>77,623</b>	<b>77,623</b>	<b>77,623</b>	<b>1,840,296</b>
GROSS RECEIPTS	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
MET 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

**Table 9: Operating Budget ("Commercial Huller")**

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Hours of Operation	270	270	270	68	68	68	0	0	0	0	0	0	1,013
Purchase (Huller)	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)	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	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	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
<b>TOTAL FIXED COSTS</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>530,412</b>
Fuel	59,400	59,400	59,400	14,850	14,850	14,850	0	0	0	0	0	0	222,750
Oil and Grease	10,800	10,800	10,800	2,700	2,700	2,700	0	0	0	0	0	0	40,500
Parts and Repairs	103,410	103,410	103,410	25,853	25,853	25,853	0	0	0	0	0	0	387,788
Labor	78,840	78,840	78,840	19,710	19,710	19,710	0	0	0	0	0	0	295,650
<b>TOTAL VARIABLE COSTS</b>	<b>252,450</b>	<b>252,450</b>	<b>252,450</b>	<b>63,113</b>	<b>63,113</b>	<b>63,113</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>946,688</b>
<b>TOTAL COSTS</b>	<b>296,651</b>	<b>296,651</b>	<b>296,651</b>	<b>107,314</b>	<b>107,314</b>	<b>107,314</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>44,201</b>	<b>1,477,100</b>
GROSS RECEIPTS	506,250	506,250	506,250	126,563	126,563	126,563	0	0	0	0	0	0	1,898,438
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

Derivation of figures used:<sup>1</sup>

1. Monthly hours of operation:

Number of operating hours/day (dependent 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 = useful life in years.

Village huller:  $\frac{10,000 \text{ hours}}{1,296 \text{ hours}} = 7.7 \text{ years}$

Commercial huller:  $\frac{10,000 \text{ hours}}{1,012.5 \text{ hours}} = 9.9 \text{ years}$

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 = useful life in years.

Village huller:  $\frac{5,000 \text{ hours}}{1,296 \text{ hours}} = 3.85 \text{ years}$

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<sup>1</sup>Preliminary figures reported in the original BAME Working Papers have in some cases been updated.

Commercial huller:  $\frac{5,000 \text{ hours}}{1,012.5 \text{ hours}} = 4.95 \text{ years}$

(Since salvage values both of the huller and of 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  
 $\frac{(\text{cost} + \text{salvage value})}{2}$

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 (1.1  
liter) x 200 FCFA/liter = 220 FCFA/hour of  
operation.

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

g) Parts and repairs: Average reported monthly expenditure on parts  
and repairs converted to 383 FCFA/hour of  
operation.

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

revenues. Also, since the number of operators tends to increase as throughput increases, total labor costs vary directly as a function of the number of hours of operation.)

4) Gross Receipts

Monthly gross receipts = monthly hours of operation x 2.5 bags of paddy/hour of operation x 750 FCFA average processing charge/bag.

Several interesting results emerge from these budgets:

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 fuel costs, and lower repair costs), while gasoline-powered hullers are less profitable (due to higher fuel costs).

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

The budgets indicate that the break-even rates of capacity utilization are very low. The "village huller" begins to show positive returns with only 56 hours/month of operation, while the "commercial huller" begins to show positive returns with only 47 hours/month of operation (the difference being due to the different assumptions made about annual use patterns, which affect the fixed cost schedules). This explains why so many hullers continue to operate throughout the year at extremely low rates of capacity utilization.

3) Hullers appear to be very competitive with the SAED mills at current rates of operation.

Custom processing rates charged by huller operators vary between 7.5-10 FCFA/kg paddy, of which the resource cost (net of the huller owner's profit) is approximately 6-8.5 FCFA/kg. The SAED mills currently process paddy at a much higher cost. During the 1983/84 campaign (the last year figures are available), the Ross-Bethio mill processed grain at a cost of 9.9 FCFA/kg paddy, while the older Richard-Toll mill operated at 14.6 FCFA/kg paddy. (While the Richard-Toll mill has since been overhauled and now operates more efficiently, on the other hand the relatively small amount of paddy collected in 1984/85 will depress the capacity-utilization rate and thus drive up the processing cost per kg of paddy at both mills.) (Cisse, 1984)

These comparative cost figures must be interpreted with care, however, because the processing operations do not produce identical outputs. Hullers produce two basic products: unpolished, largely broken rice (used for human consumption), and a powder composed of pulverized husk and bran (used as animal feed). The SAED mills produce four products: polished rice (used for human consumption), rice flour and rice bran (used as animal feed), and husks (no commercial use at present, although their potential as a source of thermal energy is under investigation).

While it is often asserted that SAED rice is of superior quality because of the lower percentage of broken grains (approximately 70% broken, as compared to the measured average of 82% broken for small hullers), this difference would have economic impact only if whole-grain rice were preferred by consumers and commanded a market premium. At present, this is not the case. On the contrary, Senegalese consumers have a strong preference for broken rice. A recent attempt by SAED to sort its product into two grades, broken and unbroken, had to be abandoned when CPSP had problems selling the



unbroken grade. Furthermore, the survey of hullers revealed that operators frequently are instructed by clients to set the blades of their machines so as to break all of the grains.

Under present market conditions, it is therefore misleading to characterize the broken product produced by hullers as an inferior grade. On the other hand, should SAED begin to penetrate the specialized domestic market for long-grain rices, or should Senegal begin to export rice, the quality difference between the SAED product and that produced by hullers could conceivably become important economically.

#### 4.3 Phase III: The Parallel Market Participants Survey

The survey of hullers provided an explanation for the presence of the research team in the field and facilitated contacts with participants in the parallel channel: farmers, itinerant traders, transporters, huller operators, grain distributors, and consumers. Based on informal interviews with 20 or more respondents from each of these categories, it was possible to piece together a description of the operations and economic transactions which comprise the parallel market channel. The composite description presented below does not necessarily depict a particular set of events which actually took place; rather, it is intended to illustrate the process by which paddy produced in the Delta typically moves through the parallel channel to urban consumption centers within the region and in adjoining regions.

- 1) A farmer working on a SAED perimeter in the Delta grows rice using subsidized inputs and services (e.g., seed, fertilizer, water, cultivation services). The crop is harvested in December and is hand-threshed in the field using hired labor. A portion of the harvest is used to repay production loans, leaving a portion for personal use.
- 2) An itinerant trader ("bana-bana") contacts the farmer in the village, either in person or through a local buying agent (such as a resident shop owner). The

trader negotiates the purchase of several bags of paddy. 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. Interviews with farmers and itinerant traders indicated that in 1984/85 paddy prices in the Delta ranged from as low as 3,000-3,500 FCFA for an 80 kg bag (37.5-43.75 FCFA/kg) during pre-harvest "green sales" to as high as 7,500-8,000 FCFA for an 80 kg bag (93.75-100 FCFA/kg) several months after the harvest, when grain had become scarce. Transactions occurring 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 prices reported by the respondents, most of the paddy sold on the parallel market in 1984/85 seems to have been priced in the range of 70-75 FCFA/kg, or somewhat higher than the official producer price of 66 FCFA/kg.

- 3) The itinerant trader pays to have the paddy bagged (using his own bags) and transported by animal cart or rural taxi to a local huller for hulling and, if necessary, for additional hand winnowing.
- 4) The itinerant trader pays to have the processed rice transported to an urban consumption center. While a few traders reported owning vehicles (usually pickup trucks), more frequently the rice is transported by hired trucks or rural taxis. Husks-and-bran are either sold at the huller to local herders or transported along with the processed rice for sale to urban owners of livestock.

- 5) Urban grain distributors (wholesaler/retailers as well as retailers) purchase the rice at prices equal to or more often inferior to the official rice price. Prices vary seasonally and regionally and appear to depend on the quality of the product and on local market conditions (especially the grades of rice currently available on the official market). Occasionally the itinerant trader himself, or an immediate relative, operates a shop through which the rice is sold.

Nearly all of the market participants interviewed reported a considerable variability in prices at each intermediate transaction point. The market appears to be quite sensitive to supply and demand conditions, with prices both of commodities (paddy, milled rice, husks-and-bran) and of services (threshing, transport, milling, winnowing) responding to surpluses and shortages.

In spite of the reported variability in prices, an indicative set of marketing costs and returns was estimated. (see Table 10) The figures used for purchasing, assembly, and processing activities are intended to reflect typical prices which prevailed throughout the Delta during the post-harvest months of January, February, and March 1985, when the parallel market was most active. Transport cost figures correspond to the rates charged by private transporters during the same period for hauling bags of grain between Ross-Bethio and Saint Louis, and sale prices correspond to the mean wholesale prices for local rice and husks-and-bran recorded during spot surveys in the markets of Saint Louis.

In interpreting the estimated marketing margins, it is important to keep in mind that many of the costs and returns data are subject to variability. As indicated earlier, the purchase price of paddy and the sale prices of processed rice and husks-and-bran varied seasonally and regionally, and the costs of marketing services fluctuated according to supply and demand conditions. In addition, transport rates were a function of the distance between the buying and selling points. Consequently, while the figures appearing in Table 10 are representative of costs and returns for paddy purchased in the

Table 10: Estimated Costs and Returns of a Parallel Market Trader

	<u>Column 1</u>	<u>Column 2</u>	<u>Column 3</u>
	Per 160 kg Paddy (FCFA)	Per 1 kg Paddy (FCFA)	Per kg Rice and 0.6 kg H/B (FCFA)
Purchase Price of Paddy (75 FCFA/kg)	12,000	75.00	120.00
Sales:			
Processed Rice (140 FCFA/kg)	14,000	87.50	140.00
Husks-and-Bran (33.3 FCFA/kg)	2,000	12.50	20.00
Total Revenues	16,000	100.00	160.00
Gross Margin	4,000	25.00	40.00
Bagging Fee (100 FCFA/80 kg paddy)	200	1.25	2.00
Paddy Bags (400 FCFA/80 kg bag/4 rotations)	200	1.25	2.00
Transport to Huller (100 FCFA/80 kg paddy)	200	1.25	2.00
Processing 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/4 rotations)	100	0.63	1.00
Husks-and-Bran Bags (400 FCFA/60 kg/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	1,184	7.39	11.84

Source: Field Surveys

central Delta during early 1985 and sold in Saint Louis as processed rice and husks-and-bran, they may not be as representative for paddy marketed during other periods and/or in different places. Nevertheless, informal interviews with over 50 traders suggested that the estimated net margins are representative of the net margins earned by the majority of parallel market traders operating in the Delta during the 1985 marketing season.

To facilitate interpretation, the data are presented 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 processed rice and 60 kg of husks-and-bran). The second column contains the same data converted to a per-1 kg-paddy equivalent. The third column contains the same data converted to a per-1 kg-rice-plus-0.6 kg-husks-and-bran equivalent. (The unusual units of measure of the third column serve as a reminder that processed rice and husks-and-bran are joint products of processing, both of which have considerable economic value.) The cost of capital has been explicitly included in the calculations. This cost, often neglected in discussions about cereals marketing policy, represents the opportunity cost incurred by a trader when his capital is immobilized during the course of a transaction. At present, the cost of capital is quite modest in parallel market rice trading, since turnover is rapid - generally two weeks or less, according to traders. However, should rice traders in future years begin to engage in long-term storage activities, the cost of capital could increase significantly.

The data appearing in Table 10 indicate that a trader who bought two bags of paddy for eventual resale as processed 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 sales

of the outputs of hullers. In a sense, parallel channel rice trading was made profitable only because of the economic value of the so-called "by-products;" without the revenue generated by the sale of husks-and-bran, net margins on processed rice alone would often have been negative.

Since costs were estimated liberally and returns conservatively, these margins must be considered minimal. Parallel channel traders were found to be adept at taking advantage of opportunities to reduce costs (for example, requiring buyers to furnish their own bags) and to increase returns (for example, convincing a friend or relative to sell rice for them at retail prices). Depending on a trader's ability to capitalize on such opportunities, margins may often have been higher than estimated in Table 10.

In evaluating these findings, it is not clear what to use as a basis for comparison. The official margins for licenced rice distributors (approximately 6 FCFA/kg for wholesalers and 7 FCFA/kg for retailers) are not strictly equivalent, since the buying and selling activities of licenced rice distributors are quite limited compared to the vertically integrated operations of parallel channel traders. Furthermore, licenced distributors often trade in large volumes - up to hundreds of tons per month for the larger wholesalers. Parallel channel traders typically trade in small quantities, which may explain the need for larger margins in order to ensure a certain minimum level of income.

Preliminary findings from the Peanut Basin Cereals Marketing Study suggest that the returns to millet trading (calculated using January 1985 prices and the same 15% annum cost of capital) were on the same order of magnitude as these estimated returns to parallel channel rice trading. (see Newman, Ndoye, Sow 1985) In some ways, millet marketing is appropriate as a basis for comparison, since it, too, involves rural assembly, transport, and distribution activities in an environment characterized by price risk and regulatory uncertainty. However, despite these similarities, millet trading differs from parallel channel rice trading in that it does not involve processing. Consequently, even

though millet trading and parallel channel rice trading were both found to generate net margins of 7-8 FCFA/kg (unprocessed grain), the figures are not strictly comparable because they represent returns to quite different value-adding activities.

Overall, the data presented in Table 10 suggest 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 produced during processing could also be sold. The representative costs and returns data indicate that the typical parallel channel rice 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.

What can be said about the distribution of benefits generated by parallel channel trading activities? In other words, when rice is marketed outside the official channel, who gains and who loses?

In brief, the effects on market participants are as follows:

- 1) Rice farmers benefit from more timely sales, from higher prices (at least during certain periods of the year and in certain regions), and from the possibility of pre-financing.
- 2) Parallel channel traders earn approximately 7 FCFA on every kilogram of paddy handled (this figure includes returns to labor and management).
- 3) Mill owners operate profitable village-level enterprises (which additionally generate local employment for mill operators, transporters, winnowers, etc.).
- 4) Transporters gain the parallel channel business but lose the SAED contract business. (This shift probably benefits small local transporters at the expense

of the large commercial trucking businesses which usually acquire the SAED contracts.)

- 5) Distributors of local rice benefit by obtaining rice at prices equal to or lower than the official price. However, licenced distributors selling CPSP rice suffer increased competition and potential loss of sales.
- 6) Consumers benefit by obtaining rice at prices equal to or lower than the official price.
- 7) Livestock owners benefit from the increased availability of an animal feed (husks-and-bran) not produced by the SAED mills.
- 8) SAED suffers a diversion of paddy from its mills, leading to possible losses in scale economies and probable increases in average marketing costs due to the loss of business in the more accessible regions of the river valley.
- 9) CPSP suffers increased difficulty in forecasting the quantity of rice available through SAED, which complicates the planning of import needs.

## **5. SUMMARY REVIEW OF PRINCIPAL RESEARCH FINDINGS**

The principal research findings concerning the organization and performance of the cereals marketing system in the Senegal river valley are summarized below.

### **5.1 Assembly and Processing Activities**

How well are assembly and processing activities being performed in the official channel? While the SAED rice marketing operation in recent years has made considerable progress toward achieving many of its goals, it has been plagued by a number of very serious problems which trace back to the fact that SAED basically functions as a public institution rather than as a private company. Analysis of SAED marketing costs data revealed that the public nature of SAED imposes certain constraints on the way that it is organized and operated, and that those constraints have had a negative effect on economic performance. Three basic constraints were identified:



- 1) SAED's obligation to implement official cereals marketing policies regardless of the cost of implementation;
- 2) SAED's organization as a large, centrally-managed parastatal; and
- 3) SAED's financial insulation resulting from a reliance on external funding sources and from protectionist legislation.

These constraints have increased the costs incurred by SAED in carrying out assembly and processing activities, have impaired SAED's operational flexibility (leading to frequent disruptions and delays), and have protected SAED from internal as well as external pressure for reform.

The erratic performance of the official assembly and processing channel has contributed to the emergence of a thriving parallel channel for rice in the Senegal river valley. This previously unstudied parallel channel was examined in order to describe and analyze: market participants and their roles; volumes of grain handled; costs and returns of marketing activities; and the distribution of benefits among market participants. Field surveys revealed that many farmers have been pushed away from the official channel by low producer prices, delays in the evacuation of paddy from designated collection points, and delays in payment by SAED, while at the same time they have been attracted to the parallel channel by higher prices, rapid evacuation of grain, and immediate payment. These two sets of forces have induced many farmers to sell their grain illegally on the parallel market. As a result, official SAED marketings have lagged, while there has been a marked increase in the quantities of grain purchased by unauthorized private traders and processed locally on rice hullers.

A February 1985 census of rice hullers operating throughout the river valley revealed that the growth of the parallel channel has been rapid and extensive. Of the 142 hullers located, nearly 65% had been acquired by their owners during the preceding 18 months, and peak-season monthly throughput during the 1985 marketing season was estimated to be over 2 1/2 times greater on small hullers than on the SAED mills.

Analysis of prototypical operating budgets indicated that hullers have the potential to be profitable at a wide range of capacity utilization rates and that they are competitive economically with the SAED mills (although the outputs are not strictly comparable). Estimated marketing margins suggested that at 1985 prices parallel market traders were able to earn positive returns to their labor and management while offering both producers and consumers more attractive prices than were currently available on the official market. (An interesting finding of the margins analysis was the economic importance of the husks-and-bran "by-product" produced by hullers. In a sense, parallel market rice trading was made profitable only because of the economic value of the husks-and-bran, which is sold locally as animal feed.) These findings together provide a convincing explanation for the rising numbers of unauthorized traders observed during recent years in the Senegal river valley, as well as for the increasing flows of locally produced rice moving through the parallel channel.

## 5.2 Distribution Activities

How well are distribution activities being performed in the official channel? In the absence of reliable long-term data on actual market prices, it was not possible to calculate quantitative measures of pricing performance. Nevertheless, there can be little doubt that one important government policy objective was largely being achieved during the period of the study: imported rice, SAED rice, and imported sorghum were generally available throughout the region at prices equal or close to the official prices. Although weekly spot samples taken in six towns along the river indicated that retail prices did sometimes diverge from official levels, the discrepancies generally could be explained as cost recovery mechanisms designed to compensate traders for additional marketing services (e.g., transport, credit).

It was difficult to determine what kinds of returns cereals distributors were making on their grain marketing activities. Returns to cereals distribution activities have to be separated out from the returns to other components of what are usually extremely

diversified enterprises, yet traders were often reluctant to divulge sensitive financial information. Nevertheless, assuming most distributors more or less adhere to the official price structure, gross marketing margins are restricted to a basic range - around 6 FCFA/kg for wholesalers and 7 FCFA/kg for retailers based in Saint Louis, and slightly higher elsewhere in the river valley. These gross margins are small compared to margins earned in the parallel channel on locally produced rice, but on the other hand marketing costs are considerably lower in the official distribution channel, and there is much less price risk.

Despite the modest official margins, little evidence was found to suggest that official cereals distributors were actively seeking ways to reduce costs. One must therefore question whether progress is being made toward increasing productivity in the distribution system. Persisting inefficiencies can be attributed largely to the sheltered nature of the industry, particularly at the wholesale level. Because the quota system gives a relatively small group of traders the exclusive right to buy rice and imported sorghum, these traders have little incentive to improve their performance. To the extent that many large-volume traders are content to keep things the way they are, protected by barriers to entry from external pressure, the official distribution channel remains static and devoid of innovation. This lack of progressiveness which characterizes the official channel is in stark contrast to the parallel channel, where private-sector merchants have demonstrated the ability to respond swiftly and decisively to changing market conditions. Other factors contributing to low productivity in official cereals wholesaling include the high cost of compliance with marketing regulations (including "arrangements" with regulators to avoid fines) and the high transactions costs resulting from widespread opportunism among market participants (which has fostered a general lack of trust).

Despite the barriers to entry existing at the wholesale level, on the whole cereals distribution was found to be quite competitive. Even though price competition is

discouraged by the government's policy of fixing prices and by the modest size of official marketing margins, both wholesalers and retailers must compete to expand and maintain market share. Credit often serves as a basis for competition. Wholesalers offer merchandise on credit to favored retailers, and retailers in turn offer merchandise on credit to regular customers. While necessary to attract and keep regular customers, these practices are costly for traders, who end up providing the financing for the marketing system.

## **6. IMPLICATIONS FOR POLICY**

### **6.1 Public-Sector vs. Private-Sector Considerations**

Why are the research findings summarized above important? Most fundamentally, the research has confirmed that there is a difference between the way Senegalese policy makers think the cereals marketing system functions and the way the market really works. This underscores the importance of studying the existing marketing system, so that effective policies can be designed based on accurate knowledge of actual market performance rather than on unfounded assertions, misconceptions, and half-truths.

The importance of exploding the old myths cannot be overstated. In Senegal as elsewhere, private grain traders continue to be maligned in the minds of many. Assembly traders are accused of taking advantage of farmers by buying their crops at very 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 the official price structure and by charging usurious rates of interest. These deeply held ideological convictions, although frequently exaggerated and rarely substantiated by empirical evidence, exert a strong influence on the policy process. Consequently, there is a need for studies such as the Fleuve Cereals Marketing Study, which can help raise the level of policy discussion by shedding new light on the way the market really works.

The research findings presented in earlier papers and summarized above suggest that cereals marketing policies in the Senegal river valley have achieved mixed results. Government intervention in the market originally appears to have been undertaken in response to real and pressing needs: SAED involvement in assembly and processing activities was apparently necessary to stimulate rice production in the newly-constructed irrigation zones, and CPSP involvement in import and distribution activities filled the role left vacant following the dissolution of ONCAD in 1979. The cereals marketing system built around these two public institutions (one a parastatal, the other a state agency) managed to achieve many important policy goals, albeit at the cost of continuous government subsidization.

Today, there are signs that extensive public-sector involvement in cereals marketing may have outlived its usefulness in the Senegal river valley. While redistributive price policies administered from Dakar have largely succeeded in protecting the short-run welfare of the population (both urban and rural), the long-run efficiency of resource allocation has been compromised because the scarcity of commodities and of factors of production have not been reflected in their prices. It is becoming increasingly clear that many of the problems plaguing the current cereals marketing system can be traced back to redistributive government policies and/or to ineffective interventions by the state. This research has confirmed that Senegalese public agencies and parastatals involved in cereals marketing have been handicapped by material, institutional, and political constraints which have prevented them from responding rapidly and appropriately to the changes taking place in the food grains subsector. In the meantime, the cost to the government of supporting the increasingly distortive price structure has grown rapidly.

The research findings furthermore support what many policy analysts have been asserting for years: that there are many reasons why grain trading is more effectively performed by the private sector. On the supply side, the market structure in the Senegal

river valley 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, pests, and the availability of imported food grains. 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 central supply points to rural consumption centers is complicated by poor roads, a lack of vehicles, and limited possibilities 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 clearly 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 traders' 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 private-sector 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 understood form of prices, and it introduces incentives to produce, to conserve, and to consume. (Shaffer 1983) Policy makers, program administrators, and interministerial councils cannot easily acquire the same amount of knowledge held collectively by the farmers, traders, and consumers throughout the Senegal river valley. For this reason, a centrally managed state trading monopoly cannot easily coordinate cereals marketing activities as rapidly, flexibly, and cost-effectively as a well-functioning market system.

An additional advantage of a market system with flexible prices is that it improves the two-way flow of information between policy-makers and market participants. When prices are determined administratively, as they are in Senegal for some cereals, a set of signals goes out from policy makers to producers, intermediaries, and consumers. However, because prices are fixed, no good mechanism exists to transmit signals in the other direction, i.e., back to the policy makers. Deprived of this feedback, which embodies vital information on factors affecting production, consumption, and marketing, 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 remain static, and over time they become increasingly costly as the state is forced to support larger and larger subsidies.

The findings of the Fleuve Cereals Marketing Study thus point to the conclusion that a reorientation of the mix between public-sector and private-sector responsibilities could improve the performance of the cereals marketing system in the Senegal river valley. An expanded role for the private sector is desirable, although the state should remain active in defining and enforcing the rules of the game for private merchants. Direct state participation in the market would ensure a standard of competition for private traders and would provide public goods and services to improve the coordination of the system (e.g., collection and dissemination of information, standardization of grades and measures, enforcement of contracts).

This policy recommendation to increase the role of the private sector in cereals marketing is not new. It is entirely consistent with many recent statements of agriculture and food policy which have called for the "disengagement" of the state from a wide range of marketing functions currently assumed by public agencies or parastatals and their "privatization" (see for example the Nouvelle Politique Agricole and SAED's Deuxieme Lettre de Mission). However, the critical issue - and one which has remained largely unresolved - is how to accomplish this reorientation. Despite the frequent broad

statements advocating marketing policy reform, very little attention has been directed to the nitty-gritty questions of institutional design and policy formulation. This is partly due to the lack of knowledge about how the market really works; after all, it is difficult to propose solutions to problems without concrete and reliable information about the nature and causes of the problems. This study has generated a body of empirically-derived knowledge, facilitating the diagnosis of problems affecting the current marketing system and providing an initial basis for selecting policy measures to overcome them.

## 6.2 Possible Cereals Marketing Policy Reforms

In considering possible policy reforms to improve the performance of the future cereals marketing system in the Senegal river valley, it is appropriate to recall two basic principles emphasized by Newman, Ndoye, and Sow (1985) in their discussion of policy reforms in the Peanut Basin. As a general rule, it is preferable to replace policy "sticks" with policy "carrots" - i.e., to eliminate policies which impose negative sanctions on underdesirable behavior and to replace them with policies which positively reinforce desirable behavior. At the same time, regulations must be simplified in order to free up market participants to respond to the changed set of incentives, so that compliance does not become so cumbersome and costly as to inhibit behavioral change. Despite regional differences in the organization and performance of markets, these two principles of policy design retain their validity in the Senegal river valley.

While the possible policy reforms discussed below generally imply an expanded role for private traders, it is important to reiterate at this point that the state will always continue to play a vital role in helping to coordinate marketing activities and in working to develop competitive mechanisms which will discourage undesirable behavior by market participants. In order to accomplish this, however, the state does not necessarily have to monopolize a wide range of marketing activities, as it has attempted to do in the past. Current policy thinking in Senegal is characterized by the prevailing view that if the state is to control ("maitriser") cereals markets, it must assume a monopoly position.



This research has shown that the assumption of a monopoly position by a state grain marketing agency can have the effect merely of driving the private trade underground, where it becomes difficult to monitor and impossible to control. A more cost-effective way for the state to achieve marketing policy objectives is to use a scalpel instead of a knife, i.e., to target specific interventions at strategic points in the marketing system in order to influence behavior throughout the system. For example, in order to control consumer prices it is not necessary to have a policeman standing behind every trader; conformity to official prices can be assured by offering the product at the official price through easily accessible government stores nearby. The advantage of strategically targeted interventions of this type are several: they reduce cumbersome regulations on private merchants, decrease the need for costly policing by the state, and eliminate many opportunities for graft and corruption.

Based on the research findings, the following cereals marketing policy reforms warrant consideration by policy-makers contemplating future strategies for the Senegal river valley:

#### 6.2.1 Assembly and Processing

##### - Elimination of the government monopoly on assembly and processing of paddy.

The evidence suggests that SAED has not been effective in assembling and processing paddy. SAED's legal monopoly on the purchase of paddy from producers, originally conferred in order to assure a steady flow of grain to the two rice mills, has proved unenforceable, and most of the harvest now moves outside the official channel. SAED's marketing operation remains costly, slow, and inefficient, even as parallel market traders have demonstrated the ability to perform assembly and processing operations at low cost. Although it may be desirable to keep open some form of official assembly channel (to assure a market outlet for producers and to support the official producer price), the private channel should be legitimized as well, and private traders should be

encouraged to assemble and process paddy. Banning private marketing activities does not improve the welfare of broad groups of either producers or consumers.

- Elimination of panterritorial and panseasonal producer prices.

Elimination of the government monopoly on assembly and processing will require that the present system of panterritorial and panseasonal producer prices be replaced by a more refined and flexible pricing structure. Seasonal and regional variations in supply and demand factors result in corresponding variations in marketing costs and returns. In this context, imposition of fixed producer prices creates economic distortions and leads to evasive behavior by parallel market traders. If incentives are to be maintained for private traders to buy, assemble, process, transport, store, and sell grain, some degree of seasonal and regional price variability will be necessary.

- Support of producer prices above a certain floor.

Although price supports in general are undesirable from a strict efficiency point of view in that they introduce economic distortions, particular circumstances (including equity goals) may warrant their use. Given the presence in Senegal of cheap grain imports, it may be necessary to support producer prices to ensure local production consistent with food security objectives. Also, given the use of producer price supports in Mauritania and Mali, it may be necessary to support producer prices in the Senegalese portion of the river valley to prevent smuggling of grain into those countries. Finally, given the government's commitment to improving the quality of life in rural areas, it may be desirable to support producer prices in order to increase rural incomes.

- Privatization of the SAED rice mills.

Analysis of the SAED processing operation revealed that SAED has not been able to manage the rice mills effectively. Private management would have greater incentives and more operational flexibility to run the mills efficiently. Nevertheless, the state may want to maintain guaranteed access to a certain specified level of processing capacity (for example, through a contractual arrangement with the private owner or through retention of a state-owned mill with expanded paddy storage capacity) in the event that intervention in the market becomes necessary in order to support the producer price.

- Development of appropriate processing technologies.

The economic advantages of small-scale, decentralized processing technology have been confirmed by the costs-and-returns study of hullers. Since Senegal continues to rely heavily on expensive imported machinery of relatively low technical efficiency (i.e., Engelberg-type steel hullers), research needs to be focused on the adaptation of more efficient processing technologies (i.e., rubber rollers) to local conditions, and machinery must be designed which can be manufactured and serviced in Senegal.

### 6.2.2 Distribution

- Revision of existing licencing requirements for cereals traders.

Existing licencing requirements appear to pose barriers to entry into cereals marketing without contributing appreciably to performance. The quota system for rice is a case in point. As the Senegal river valley approaches self-sufficiency in cereals production, the quota system might be suspended at the regional level, so that distributors could be allowed to purchase grain directly from farmers and/or assemblers. Analysis of parallel channel trading activities has revealed that as long as access is unrestricted, competitive pressure will keep marketing margins small and contribute to more favorable

prices for producers and consumers. Formal requirements that traders should demonstrate a minimum bank balance or possess a certified storage warehouse are unnecessary and should be eliminated.

- Elimination of fixed consumer prices.

As in the case of assembly and processing, increased participation by private merchants in distribution will require that the present system of fixed consumer prices be replaced by a more refined and flexible pricing structure. Seasonal and regional variability in prices are necessary to provide incentives to move grain from surplus to deficit regions and to store grain throughout the year. Allowing different prices for different grades will facilitate articulation of consumer preferences and help traders manage their stocks.

- Elimination of government subsidies on transport and storage.

The current consumer price structure results in partial subsidies on transport of grain between regions and in full subsidies on storage. This raises total marketing costs, because the state grain marketing organizations are unable to transport and to store grain as efficiently as private-sector participants. It also increases the proportion of total cereals marketing costs paid by the state. Replacement of the current system of fixed consumer prices by one in which prices are influenced by market forces will eliminate the need for government subsidization of transport and storage.

- Containment of consumer prices below a specified ceiling.

Given the government's policy objective of protecting the income of consumers (both urban and rural purchasers of food grains), it may be desirable to establish a ceiling on prices of strategic cereals such as rice. This ceiling could be imposed by making grain widely available at the ceiling price through government stores (e.g., SONADIS stores), which theoretically would make unnecessary costly policing of private traders. This would have the added

attraction of continuing the present policy of assuring the supply of staple food grains. It may be necessary, however, to increase the number of government stores to ensure access by rural consumers.

### 6.2.3 Coordinating Mechanisms

#### - Establishment of floor and ceiling prices.

While freeing cereals prices to move within a certain range or "band," the state could continue to set floor and ceiling prices consistent with equity and other goals. Ideally, the band would be wide enough to allow considerable seasonal and regional price movement, and the floor and/or ceiling would become effective only under very unusual circumstances. While a "sliding band" system might be desirable (i.e., a system in which the floor and ceiling prices differ seasonally and regionally), the price structure should be kept simple enough to remain intelligible to market participants and manageable by the state.

#### - Provision of credit to intermediaries.

The lack of credit poses a potential constraint to expanded participation by the private sector in cereals marketing. Volume traders necessarily tie up large amounts of capital in inventory; consequently, they must have access to large amounts of capital in order to do business. Since it is often difficult to raise capital in Senegal, private traders may be constrained from expanding their businesses to the point where economies of scale can be realized. In this event, a credit program (public or private) targeted at grain traders may prove indispensable to provide the cereals marketing system with liquidity.

#### - Investment in information dissemination activities.

Information impactedness continues to be a major problem in cereals markets in the Senegal river valley. Producers, intermediaries, and consumers all have difficulty finding out about market conditions elsewhere, particularly information on quantities available and prices. Although transporters are

widely used as information brokers, information flows could be improved with public support. Radio presents an ideal medium for publicizing market information, yet this potential remains completely untapped. Daily reports on market conditions in the major towns along the river could be of great value to producers, marketing agents, and consumers.

- Development of marketing infrastructure, particularly roads.

The cost of transport, a major component of marketing costs, is exacerbated by the poor condition of the roads in northern Senegal. At present, a single paved road transects the Senegal river valley, and few production zones are accessible even by upgraded dirt roads. The situation is bound to worsen as development of the region proceeds and the volume of traffic increases. Public investment in the road system could significantly reduce the cost to intermediaries of marketing grain. In a competitive market, the cost savings would be passed on to producers and consumers.

- Planning and publicizing food aid distributions.

Unannounced distributions of food aid disrupt grain trading in the Senegal river valley. Commercial sales drop off and sometimes remain depressed for a month or more following distributions of sorghum, maize, or rice. This increases costs for grain traders, who are forced to store unsold stocks until demand picks up again. It also increases uncertainty in grain distribution, thus discouraging specialization, which can lead to economies of scale. Advance publicizing of food aid distributions would help grain traders forecast demand and enable them to adjust their inventories accordingly. In a competitive market, the cost savings would be passed on to consumers in the form of lower prices.

### 6.3 Expected Performance Consequences

What are the expected performance consequences of these possible policy reforms? Given that any change from the status quo always implies some winners and

some losers, who would be most likely to benefit, and who would be most likely to pay, if these reforms were introduced?

Exact prediction of performance consequences is of course impossible, since there is often a difference between what a policy is designed to accomplish and what actually happens when it is implemented. The smallest details of institutional design (including the way regulations are worded) can have tremendous influence on substantive performance consequences. Furthermore, distributions of power and of rights and privileges can be crucial in determining whether a rule or regulation will have its intended effect. Thus, it is appropriate to speak here only of expected performance consequences, recognizing that a lot depends on the way the reforms are designed and implemented.

The policy reforms sketched out above would be expected to shift to the private sector a large number of cereals marketing activities now being performed primarily by state agencies or parastatals (including assembly, processing, transport, storage, distribution, and financing). An increased role for the private sector would be brought about in two ways. First, elimination of existing state monopolies on many cereals marketing activities and changes in licencing requirements governing commerce would remove the explicit barriers to entry which today limit private-sector participation. Second, major adjustments to the cereals price structure would free market forces to direct resource flows throughout the agricultural economy; the resulting changes in the prevailing set of economic incentives would induce private marketing agents to undertake many of the functions which today are performed exclusively by the state.

A reorientation of the mix between public-sector and private-sector involvement in cereals marketing would have important effects on employment and welfare. Jobs would be created in assembly, processing, transport, storage, financing, and other industries, both on a full-time and on a part-time basis. Significantly, the returns to these activities would accrue primarily to small-scale, local enterprises, thus raising incomes among the

rural population. Increasing private-sector participation in cereals marketing would raise productivity throughout the food grains subsector by improving management, reducing the incidence of non-productive behavior (e.g., evasion, risk aversion), and economizing on resources. Introducing a system of flexible prices (more precisely, legalizing the system which de facto already exists in many areas) would encourage the two-way flow of information and thereby improve vertical coordination, particularly coordination across the critical link between assembly and processing on the one hand and distribution on the other. Government expenditures on marketing programs would be considerably reduced, since the scope of SAED, CPSP, and MCI involvement would decrease. At the same time, targeted interventions would permit the state to provide a competitive standard, enabling it to protect vital producer and consumer interests without creating opportunities for graft and corruption.

These considerable improvements in system-wide performance would not, however, be achieved without cost. The increased price variability associated with a flexible pricing system would certainly increase uncertainty for market participants. This could force producers, marketing agents, and consumers to spend more on information-collection activities and perhaps to adopt costly risk-aversion strategies. Seasonal price changes would to some extent destabilize the real income of civil servants and others on fixed salaries who spend a relatively large proportion of their incomes on food grains. Regional price differences would disadvantage certain groups of producers and consumers who in the past have benefited from the cross-subsidization implicit in panterritorial prices (although, conversely, an equal number of producers and consumers would benefit). State control over the supply of strategic food staples would be somewhat reduced. Finally, some employees of the public agencies and parastatals currently involved in grain marketing would see their jobs eliminated.

While these expected costs raise legitimate concerns, they represent a small price to pay compared to the overall social benefits expected to accrue from the policy



reforms. Certain interest groups are bound to be disadvantaged, at least in the short run, but that is an unavoidable attribute of change. What is important is that the reforms have the potential significantly to increase productivity throughout the marketing system and to distribute the fruits across a large number of market participants.

It is important to recognize that the proposed reforms are not simply cosmetic. They imply a fundamental shift in thinking about the role of markets and of prices in the economy. Every country in the world is faced with a difficult problem: should food and agriculture policies be designed to meet distributional goals, or should they be designed to meet efficiency goals? In Senegal, a socialist democracy with strong commitments to social equity, distributional goals have traditionally been prioritized. Cereals prices have been used to redistribute income from producers to consumers, primarily urban consumers, but increasingly rural consumers as well. Yet, despite its short-run successes in protecting the interest of these important social groups, over the long run Senegal's cereals price policy is proving unacceptably expensive. Nowhere is this more apparent than in the Senegal river valley, where the spread of irrigation technology has initiated sweeping changes in the food grains subsector which threaten to overwhelm the existing marketing system and to bankrupt the government in the process.

Economic development implies a situation of continuing dynamic disequilibrium. If development is to occur, institutions and policies must be flexible and responsive to change. This research has confirmed that the existing centrally-directed marketing system based on state monopolies and fixed administered prices is neither flexible nor responsive to changing market conditions. Thus, it needs to be reformed. The policy recommendations presented above outline one possible approach to reform. They are intended to bring about a shift toward a more decentralized and flexible marketing system in which productive resources allocation would be achieved by freeing private-sector participants to be guided by the price mechanism, but in which key distributional goals would continue to be assured by targeted state interventions.

Implementation of the proposed reforms will not be easy. The perception of private traders as dishonest and exploitative is deeply ingrained in Senegal, and efforts to confer added responsibility to the private sector will undoubtedly encounter widespread resistance. Nevertheless, this research has revealed that private grain traders in the Senegal river valley have performed well compared to public and parapublic institutions, a fact attributable partly to the structure of cereals markets and partly to the constraints under which government marketing organizations are forced to operate. Given this finding, it is not only appropriate but necessary to stand up to the conventional wisdom. If the cereals marketing system is to contribute fully to the economic and social development of the Senegal river valley, the mix between public-sector and private-sector responsibilities must be adjusted in favor of an expanded role for private traders.

## **7. FUTURE RESEARCH PRIORITIES**

The Fleuve Cereals Marketing Study has generated valuable information on the organization and performance of cereals markets in the Senegal river valley. The research findings have important implications for policy, some of which have been sketched out here. However, before such general policy recommendations can be developed into workable rules and regulations, additional research is necessary. Many gaps remain in the knowledge base, with the result that policy decisions continue to be taken based on undocumented belief in the conventional wisdom, with little or no analysis of the likely performance consequences of alternative policy choices. If future cereals marketing policies are to be effective, they must be grounded in an understanding of the way in which the market really works. Carefully planned research can contribute to such an understanding.

From a policy design perspective, the highest priority topics on the future agenda include the following:

1. Economics of irrigated food grains production in the Senegal river valley vs. economics of importing cereals.

Despite extensive research on the cost of production, the economics of irrigated crop production in the Senegal river valley remain an open question. The cost-of-production issue is crucial, with important implications for production support programs (how much to subsidize? which crops to subsidize?), producer price policies (where to set floor prices?), and consumer price policies (how much to subsidize local cereals? how much to tax imported cereals?).

2. Producer grain transactions.

With the spread of irrigation technology in the Senegal river valley, production of cereals has begun to increase rapidly. Nevertheless, producer grain transactions are poorly understood. Very little is known about who sells grain, when they sell it, what quantities they sell, what prices they receive, whom they sell to, and why they sell. Producer decision-making remains largely unstudied, as does the production-marketing link. As a result, it is difficult to know much about supply response, which has important implications for producer price policies (where to set floor prices?) and food security policies (how much grain to import to make up for local deficits?).

3. Consumer grain transactions.

The demand for cereals in northern Senegal is still poorly understood. Although a number of consumption studies have focused on micro-level nutritional questions, little is known about who buys grain, when they buy it, what quantities they buy, what prices they pay, whom they buy from, and why they buy. Effective demand at the macro-level is unknown, as are price and income elasticities of demand for cereals. These issues have important implications for consumer price policies (where to set ceiling prices?) and for food security policies (how much food aid to distribute?).

4. Economics of marketing functions (e.g., assembly, processing, transport, storage, financing, distribution).

While this research has been able to provide information on certain marketing activities, more targeted studies are needed to analyze the economics of each industry in far greater depth than is currently possible given the imperfect data base. A conventional approach using costs and returns data to estimate net margins would yield extremely useful results, with implications for price policies (how to coordinate producer and consumer prices? how to ensure adequate incentives for intermediaries?), as well as for market support programs (what can the state do to ease bottlenecks? how to encourage the spread of efficient technologies?).

5. Prices of agricultural products.

Actual market prices across time and space of agricultural products, both inputs and outputs, remain largely unknown. Opinion differs as to whether prices actually received by farmers exceed the official producer prices or the reverse. The BAME marketing studies have revealed that both may occur, depending on the time and place. (see Morris 1985a; Newman, Ndoye, and Sow 1985.) Given this uncertainty, it is extremely difficult to design agriculture and food policies, or, for that matter, to determine whether existing policies are having any effect. Consequently, there exists a critical need for research involving the systematic collection of agricultural product prices.

These five topics head the future research agenda because of their immediate relevance to the policy process. While the Senegal river valley in recent years has been the focus of much socio-economic research, not enough emphasis has been placed on designing studies specifically to produce results that can be used easily by agriculture and food policy makers. As a result, influential government decision makers remain uninformed about the everyday workings of the agricultural economy. The work of the BAME represents an initial attempt to tailor socio-economic research to the particular

needs of policy makers and to present research findings in a way which can help to stimulate the policy dialogue. Hopefully work will continue in this direction, both within and without ISRA.

## APPENDIX A: THE RESEARCH METHODOLOGY

### 1. Introduction

The material presented in this appendix may be of interest to those who want to know more about how the research findings were obtained, as well as to those who are considering similar research, in Senegal or elsewhere. The intent is not to present a detailed guide for conducting marketing research, but to document the methodology of the Fleuve Cereals Marketing Study in the hope that future researchers may in some small way learn and profit from other's experiences.

### 2. Planning the Research

The process of translating broad research guidelines into a specific plan of work began in March 1984 with the researcher's arrival in Saint Louis.

Introductory visits were scheduled to establish contact with government agencies (CPSP, CSA, MA, MCI), parastatals (SAED, SONADIS), and private firms and individuals (MATFORCE, Peyrissac, grain traders). These visits were found to be extremely useful, because they succeeded in publicizing the study while at the same time uncovering many valuable sources of information.

During April and May, 1984, a literature review was conducted focusing on the cereals sub-sector. The obvious sources of documents were visited, for example, the ISRA documentation center (Saint Louis), the OMVS documentation center (Saint Louis), the SAED documentation center (Ndiaye), and the USAID documentation center (Dakar). While these centers yielded a number of useful documents, in general their collections were found to be incomplete, poorly referenced, and generally dated. Many documents were simply not available in Saint Louis, necessitating frequent trips to Dakar. A more productive source of documents turned out to be private collections both of participants in the cereal sub-sector and of researchers. Nevertheless, official government publications and reports were generally difficult to locate and even more difficult to consult; on a number of occasions, it was necessary to obtain letters signed

by the Director General of ISRA formally requesting permission to consult official documents.

While the literature review was in progress, a series of reconnaissance surveys was undertaken to help familiarize the researcher with the Senegal river valley. The Delta region was covered by a series of day trips, while longer missions were necessary to reach the Middle and Upper Valleys. Informal contact was established with representatives of public and parapublic agencies working within the region. Irrigated perimeters were visited throughout the various production zones, and farmers were interviewed informally about their production and marketing activities. Approximately twenty markets between Saint Louis and Bakel were also visited, and grain traders (both wholesalers and retailers) were interviewed using a pre-survey questionnaire designed to elicit basic information on types of cereals handled, quantities purchased and sold, prices paid and received, financing, etc.

The reconnaissance surveys proved to be invaluable in familiarizing the researcher with the region in general and the cereals sub-sector in particular, as well as in initiating contacts with market participants. Features of the food system described in documents located during the literature review were brought to life in discussions held in the field, and the researcher was able to develop a first-hand familiarity with the major policy issues. Furthermore, the time spent travelling throughout the region, interacting with people in their places of work and staying the night in their villages, greatly increased the credibility of the researcher.

During June and July, 1984, a working document was drafted, titled "The Food Grains Sub-Sector in the Senegal River Valley." The objectives of this document were to pull together the results of the literature review and the findings of the reconnaissance surveys in describing the cereals sub-sector and in diagnosing its major problems. The exercise of writing the draft document served to organize the vast amount of information collected and helped to identify gaps in the existing knowledge base.

Completion of the draft document represented the end of the first phase of the research planning process.

The next step involved the elaboration of an operational plan of work. This entailed the planning of data collection activities, the development of a detailed timetable, and the elaboration of a list of logistical support activities. Data collection activities were decided based on the gaps in the existing knowledge base. The cereals sub-sector was subdivided into a number of vertically-linked activities (e.g., production, assembly, transport, processing, storage, finance, distribution, consumption), and the following series of questions was asked for each activity:

- 1) What are the government's policy goals?
- 2) What are the critical issues involved in making a policy choice?
- 3) What data are required to resolve the critical issues?
- 4) Are the data already available?
- 5) If the data are not available, how can they be collected, and from whom?

When responses to these questions had been written out, it was possible to distinguish between data which were already available (from secondary sources) and data which would have to be collected directly from respondents (from primary sources). After weighing the relative importance of the various categories of data, and taking into account the resources available for field research, the decision was taken to direct primary data collection activities at the entire parallel market channel, as well as at official distribution activities, since neither had been studied extensively. Since reasonably good secondary data were available through SAED on official assembly and processing activities, no primary data collection efforts were planned in this area.

By mid-August, 1984, two formal surveys and a census had been proposed: a survey of officially licenced grain distributors; a survey of parallel channel assemblers, processors, and distributors; and a census of village rice hullers. A detailed timetable was drawn up, along with a budget, and sent to the Director of the BAME for approval.



It should be noted that within the timetable a relatively modest amount of time was devoted to actual data collection activities, in order to ensure sufficient time for analysis, report-writing, and dissemination of results. The eighteen month study eventually consisted of six months of preparation and planning, six months of data collection, and six months of analysis and report-writing.

### 3. Recruitment, Training, Supervision of Enumerators

Enumerators for the field surveys were recruited and trained during August and September, 1984. As a public institution, ISRA is required to hire through the national employment agency (inspection de travail). This can be frustrating, because not all of the candidates approved by the employment agency are properly qualified. An informal visit with the employment agency's Regional Director provided the opportunity to explain the desired qualifications and thereby ensured a better pool of candidates.

Most of the candidates who were proposed for the six positions with the Fleuve Cereals Marketing Study fell into one of two categories: high school diploma (Bac or DFEM) with no field experience, or field experience but no diploma. Although ISRA regulations now require that enumerators have the diploma, at the time this requirement could be waived for enumerators hired on temporary contracts.

Twenty-five candidates were given a written test designed primarily to test their ability to perform simple algebraic operations. In addition, all candidates were interviewed and questioned about their background, education, and work experience. An effort was made to determine whether each candidate carried any strong preconceptions about different participants in the food system, particularly intermediaries. Finally, a second set of interviews was conducted to evaluate the candidate's language abilities.

Based on the written test and interviews, eight candidates were invited to attend a four-day training program at ISRA expense. The training program began with an introduction to ISRA in general and to the BAME in particular, a description of the goals of the study, a discussion of the role of marketing intermediaries in the food system, and

lectures on interviewing techniques. Written tests were administered following several of these sessions to establish the candidates' ability to absorb and comprehend the material. The remainder of the training program was devoted to "hands on" learning, i.e., practice interviewing. Draft questionnaires were first discussed at length in the classroom, until every candidate understood the purpose of each question and was able to ask it in several ways. The candidates then took turns interviewing each other, while the rest of the group observed and criticized their performance. Once a familiarity had been developed with the questionnaire, practice interviews were conducted in the Saint Louis market with the help of a number of grain traders who had previously agreed to serve as subjects. Each of the candidates was observed closely during these practice interviews.

At the completion of the training program, six candidates were selected for the study, with the other two designated as alternates in case one of the original six was unable to complete the study. Selection criteria included performance on the preselection tests and interview, performance on classroom and field interviewing exercises, performance on written tests administered during the course of the training program, previous experience, education, and language skills. In addition, a subjective evaluation was made regarding each candidate's personality and motivation. One enumerator was appointed supervisor.

In mid-September, 1984, the six enumerators were posted to their sites along the river: Saint Louis, Dagana, Pador, Aere Lao, Matam, and Bakel. Since the assignments were permanent for the duration of the contract, each enumerator received a moving allowance in addition to his regular salary. Work-related supplies distributed to each enumerator included a briefcase, a daily journal, a notebook to record field notes, pens, pencils, erasers, file boxes, and a supply of questionnaires.

During the four months that the original six enumerators remained in the field, they were visited every two weeks by the researcher and the supervisor. Supervisory visits normally lasted approximately one day, although often the researcher and/or the

supervisor stayed in a site for several days at a time when special assistance was necessary. Completed questionnaires were carefully reviewed during each visit, and progress to date as well as future plans were discussed at length. The researcher and supervisor made a point of meeting all of the survey respondents and participated in as many interviews as time allowed.

In retrospect, the time, effort, and expense invested in selecting and training the enumerators was well spent. Since continuous supervision of the enumerators was not possible, it was essential that each enumerator have a solid understanding of the goals of the study and that each be familiar with the questionnaires. Despite the training they received, one or two enumerators encountered minor problems, but these were noticed during the supervisory missions and rectified. In one instance, however, it was necessary to post the supervisor temporarily to another site to work with an enumerator who was having problems.

The experience with this admittedly small group of enumerators was that prior level of education was not necessarily correlated with performance in the field. In fact, those enumerators with higher levels of education were generally less effective working with uneducated, often illiterate traders because their dress and comportment set them apart. Those enumerators with prior field experience were generally more successful, often because they understood that the most important qualities of a good enumerator are the ability to ask questions in precise terms and the ability to interpret responses accurately and without bias.

#### 4. Field Data Collection Activities

Field data collection activities consisted of: 1) a formal survey of licenced grain distributors, 2) a complete census of village rice hullers located in the Fleuve region, 3) an in-depth survey of a sub-sample of hullers, and 4) an informal survey of parallel channel participants. Scheduling of these various data collection activities was determined largely by the seasonal nature of grain marketing. Thus, distribution of

imported cereals was studied during October through January, when nearly all the grain found in the market was imported, and marketing of domestically produced cereals was studied during February through April following the local harvest.

Each of the survey instruments used in the field (with the exception of the questionnaire used during the reconnaissance surveys) underwent a lengthy process of design, pre-testing and revision. In most cases, several cycles of pre-testing and revision were necessary, since pre-testing repeatedly turned up new responses which had not previously been included in the lists of pre-coded answers. Certain questions were found to be unintelligible and had to be reworded, while others had to be dropped altogether because respondents could not or would not provide credible answers.

The importance of extensive pre-testing of questionnaires cannot be overemphasized. It was impossible to predict with complete accuracy how respondents would react to certain questions, and only by working with the survey instrument under actual field conditions could necessary revisions be worked out, often through an iterative process. Equally important, extensive pre-testing provided enumerators with the opportunity to familiarize themselves with the survey instrument and to develop strategies to elicit the desired information. This point should not be neglected: the enumerator who proceeds very slowly through an interview, painstakingly reading aloud each question as if seeing it for the first time, soon loses the interest of the respondent.

a) The Survey of Licenced Grain Distributors

The survey of licenced grain distributors proceeded in two stages. During their first month in the field, each enumerator contacted as many local grain traders as possible, particularly wholesalers and other volume traders, and then returned to interview them using Fiche I. The purpose of this first stage was to generate information on the numbers and types of grain distributors active in the Senegal river valley and to generate a frame from which a sample could be drawn for follow-up interviews. Over two hundred distributors were contacted and interviewed during this first stage.

The second stage of the distributors survey involved follow-up interviews with a sample of respondents. The sample selection for follow-up interviews was made at the beginning of October. Because the baseline questionnaire had revealed considerable variability in the operating characteristics of traders, the decision was taken to include as many respondents in the sample as could be handled comfortably within the allotted time frame, or approximately 25 respondents for each enumerator. Because volume traders clearly wielded tremendous power within the system, all of the wholesalers who had been contacted and interviewed were included in the final sample for follow-up interviews. In addition, enough retailers were added at each site to bring the enumerators' workloads up to the target figure of 25. Selection of these retailers was based primarily on their expressed willingness to participate. Any possible bias introduced by this selection procedure was deemed preferable to the bias which would have resulted from interviewing unwilling respondents.

Between October 1984 and January 1985, each respondent in the final sample was interviewed twice again using two additional questionnaires (Fiches II, III). During the course of the follow-up interviews, a number of respondents were dropped from the sample because of lack of cooperation, unavailability, retirement, or death. The final sample consequently ended up including 122 distributors, each of whom was interviewed a total of three times. This number is thought to include nearly the entire population of volume traders (wholesalers and wholesaler-retailers) working in the Senegal river valley, as well as a representative sample of retailers. (see Table 11)

While each of the six sites was represented in roughly equal proportions, the distribution of types of traders varied from site to site. This variance reflects differences between local populations of distributors. The larger market towns (e.g., Saint Louis and Matam) supported many more wholesalers and wholesaler-retailers than did the smaller towns and villages (e.g., Aere Lao and Bakel), where retailers predominated.

Table 11: Composition of the Sample of Grain Distributors

	Wholesalers	Wholesaler- Retailers	Retailers	Total (%)
Saint Louis	2	16	4	22 (18.0)
Dagana	0	5	13	18 (14.8)
Podor	1	7	4	12 (9.8)
Aere Lao	0	3	17	20 (16.4)
Matam	2	9	16	27 (22.1)
Bakel	2	1	20	23 (18.9)
Total Sample	7	41	74	122 (100.0)
(% of Total)	(5.7)	(33.6)	(60.7)	(100)

It is important to note that many of the questions asked of distributors involved sensitive subject matter. In order to estimate costs and returns to marketing activities, it was necessary to have access to traders' financial records. This is considered an invasion of privacy in Senegalese society, making commerce extremely difficult to study. To further complicate matters, cereals trading in general and rice trading in particular are heavily regulated by the state, with still fines imposed for illegal activities (e.g. failure to adhere to the official price structure, trading without a licence). As a result, many of the respondents were particularly reluctant to disclose information regarding their grain marketing activities, fearing that the information would somehow get back to regulatory enforcement agents. Many traders declined to respond to certain questions and some resorted to obvious lying. In an attempt to minimize such evasive behavior, enumerators were coached to establish personal relationships with their "problem" respondents, e.g., to stop by their homes after working hours to visit in a non-work environment. This type of informal socializing, very important in the

Senegalese society, helped overcome the fears of many traders that the enumerators were in reality working undercover for the Controle Economique or some other regulatory agency and appeared greatly to improve the quality of responses.

b) Census of Village Rice Hullers

During the month of February, 1985, a complete census was performed of village rice hullers operating on the left bank of the Senegal river valley between Saint Louis and Kidira. All villages situated on or near major roads were visited and local residents were asked where hullers were located. Since only a single vehicle was available on a full-time basis for the census, four of the six original enumerators were dismissed at the conclusion of the distributors survey, and subsequent field data collection activities were carried out by the researcher and the two remaining enumerators.

In general, village hullers proved relatively easy to find. Most inhabitants of the rice-producing areas of the Senegal river valley knew where nearby hullers were located, and many people knew the locations of a dozen or more machines. Mobile hullers were sometimes difficult to find, and alternatively, the same mobile huller sometimes re-appeared several times in different locations, but it is thought that very few hullers were overlooked.

A questionnaire on huller type, ownership, and operations was completed for each machine, based on interviews with the manager and, if he was present, the owner (Fiche IV). The information was non-sensitive in nature, and an interview could generally be completed in thirty minutes or less. This was an important consideration, because the census was conducted at the peak of the harvest, and huller operators had little free time to respond to questions.

c) Costs-and>Returns Study of Village Rice Hullers

Following the completion of the census of rice hullers, an in-depth survey was conducted of a sub-sample of hullers. The purpose of the survey was to collect data

necessary to construct prototypical operating budgets to determine the profitability of purchasing and operating a village-level machine. A second objective of the survey was to make possible comparison of the economic and technical performance of small hullers with the performance of the large industrial milling equipment operated by the grain marketing parastatal.

The decision was taken to select a sample of twenty-five hullers. This number was judged adequate to permit calculation of statistically significant performance measures, considering the similarity of operating characteristics which had been observed during the census. Since time and resource constraints did not permit inclusion of hullers located in the Middle and Upper Valleys, all were selected from the population of machines located in the Delta. While this non-random aspect of the sampling procedure may have introduced some bias, it is unlikely that the results were greatly affected, because it was possible to cost out the two representative types of operation ("village huller" and "commercial huller") found in all three regions of the valley. Each huller was visited by the enumeration team (one researcher and two enumerators), and costs and returns data were collected using a standard questionnaire (Fiche V). In addition, measurements were taken of fuel consumption, and samples of paddy and hulled rice were weighed to permit calculation of the rendement (input-output ratio). Finally, samples of hulled rice were collected at each site for subsequent determination of the percentage of broken grains present in the output.

#### d) Informal Survey of Parallel Channel Participants

One extremely important group of market participants was difficult to approach directly: parallel channel grain traders. Typically, parallel channel traders are small-scale operators who engage in seasonal commerce, entering the market after the harvest when grain is plentiful, travelling from village to village buying paddy from farmers as long as supplies last, and withdrawing from the market when grain becomes scarce. Because parallel channel trading is seasonal in nature and performed on a



part-time basis, it is not always easy to identify the traders. Furthermore, parallel channel trading is technically illegal, so that few traders are willing to discuss their activities, and many engage in evasive behavior to avoid detection.

The approach used to collect data from parallel channel traders was to contact them casually at the village hullers and to question them informally concerning their commercial activities. While it was often impossible to work openly with an actual questionnaire, a list of questions was devised to be asked of each respondent. The questions related to the physical flows of grain (sources and destinations, quantities traded), the marketing functions involved (e.g., production, transport, financing, milling, winnowing, bagging, distribution), costs and returns data (e.g., prices paid and/or received for goods and services), etc. These questions were committed to memory by the research team, as were the responses of each respondent. The responses were later recorded in field notebooks, after the interview had been completed.

In addition to the traders themselves, other parallel channel participants were interviewed in similar fashion: farmers, transporters, huller operators, and consumers. Altogether, 20 or more respondents from each of these categories were questioned. Based on these interviews, it was possible to piece together a description of the operations and economic transactions which comprise the parallel market channel. While the non-systematic sampling procedure did not permit estimation of a statistically significant set of marketing costs and returns (which would have required a large sample, given the enormous variability in the data), the resulting estimates were indicative of transactions occurring in the central Delta region during the post-harvest months when the parallel market is most active. These estimates were of great interest to Senegalese policy makers, because they were derived from the first empirical data collected on the parallel market.

## 5. Data Analysis

All questionnaires used during field data collection activities contained questions which were pre-coded, with a list of numerically coded responses accompanying each pre-coded question and a box left along the margin for recording the correct response code. Enumerators were instructed not to enter the response code into the box during the actual interview. Rather, they were instructed to circle the appropriate answer in the field, and then to sit down with the questionnaire later that evening to verify their work and to enter the codes into the boxes. This procedure reduced the enumerator's work during the actual interview and increased the legibility of the inscriptions in the boxes.

The original plan called for the data to be entered directly from the questionnaires into a project microcomputer for rapid analysis in the field. Unfortunately, the microcomputer intended for Saint Louis was late in arriving, so the decision was taken to tabulate and analyze some of the data manually, using a hand-held calculator. This procedure was followed in analyzing the data collected with Fiche IV (census of hullers) and Fiche V (survey of hullers). The data were first compiled on large, poster-sized sheets of paper and then punched into the calculator. Since the sample sizes were relatively small and the analysis quite simple, consisting primarily of summary statistics, the hand-held calculator proved quite adequate.

The survey of grain distributors, on the other hand, had generated a large quantity of data, and manual tabulation and analysis were deemed impractical. Consequently, permission was obtained to use an IBM-XT microcomputer located in Dakar at the USAID mission, and the researcher spent a week in Dakar entering some of the survey data and performing preliminary analysis. The ABTAB statistical package was used to calculate a range of descriptive statistics.

## 6. Presentation of Results

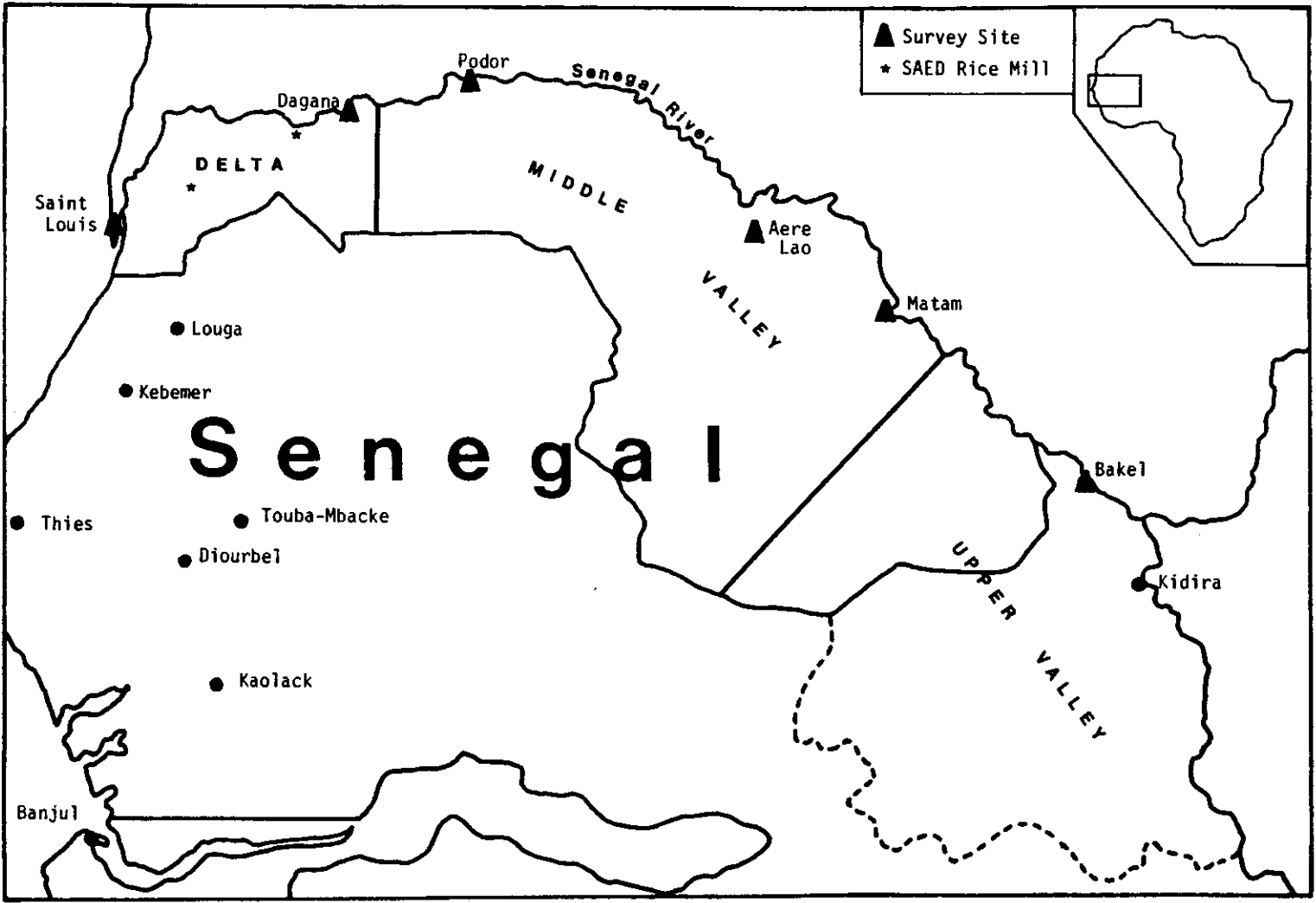
Because a primary objective in establishing the BAME had been to create a division within ISRA capable of producing research results that could be useful in policy-making, considerable effort was expended in devising a strategy for disseminating the results of the Fleuve study in a timely and effective manner. This included drawing up a list of proposed research publications early on during the study's planning stages, as well as detailing other activities through which the results could be publicized, such as seminars and other formal presentations.

The substantive research results were published as a series of BAME papers, rather than as a single comprehensive research report. This format offered two major advantages: 1) individual papers could be brought out quite rapidly, thus responding to policy makers' needs in a more timely fashion, and 2) individual papers could be targeted at specific areas of interest, thus addressing themselves to particular groups of readers. In retrospect, the strategy was extremely successful. Preliminary drafts of the first paper were circulating as early as June, 1985, only three months after field data collection activities were completed, and the final version of the paper appeared in July. The other papers followed shortly thereafter. This rapid turnaround time insured that preliminary results were available to policy makers and marketing system participants well before the beginning of the subsequent marketing season, thus increasing the potential utility of the findings for purposes of decision-making.

Research results were also disseminated orally, both through informal discussions with industry participants and through more formal presentations to representatives from government ministries and international development agencies. The importance of informal dissemination of results cannot be overemphasized. During the course of the fieldwork, contact had been established with a number of government officials, development agency representatives, private business interests, and other key participants in the food system. As preliminary research results became available, an

effort was made to share them with many such individuals for reactions and suggestions. Informal discussions--which often could be much more candid than formal interaction through official channels--were valuable in improving the interpretation of results while at the same time providing useful information to industry participants.

More formal dissemination of the research results included a presentation to Agriculture and Development Office (ADO) personnel at the USAID mission in Dakar, as well as a presentation to representatives of a number of government ministries most involved in the design, implementation, and enforcement of food and agricultural policy in Senegal. This latter presentation received extensive coverage in Le Soleil, the national daily newspaper, including a synthesis of the major research findings.



APPENDIX B: MAP OF THE SENEGAL RIVER VALLEY

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