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The Cereals Sub-Sector in the Senegal River Valley:
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THE CEREALS SUB-SECTOR IN THE SENEGAL RIVER VALLEY: A MARKETING POLICY ANALYSIS

By

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ABSTRACT

THE CEREALS SUB-SECTOR IN THE SENEGAL RIVER VALLEY: A MARKETING POLICY ANALYSIS

By

Michael Lewis Morris

As plans proceed to develop the Senegal river valley for irrigated agriculture, marketing policy questions are assuming increasing importance. This dissertation examines the cereals sub-sector, using elements of the structure-conduct-performance paradigm of industrial organization theory. Particular attention is directed at assembly, processing, wholesaling, and retailing activities, as well as the vertical coordination mechanisms linking them. The performance of the official marketing channel is compared with that of the parallel channel.

Official food and agriculture policies have been instrumental in establishing irrigated crop production in the Senegal river valley and in ensuring the widespread availability of food grains, but the cost has been high. Public-sector marketing organizations are inflexible, sluggish, and generally inefficient in carrying out cereals assembly and processing activities. At the same time, official marketing regulations hamper private-sector distribution activities by erecting barriers to entry into the industry, by preventing merchants from responding to

changing market conditions, and by creating opportunities for corruption.

Dissatisfaction with the performance of the official channel has led to the emergence of an extensive parallel marketing channel for cereals. A census of parallel-channel rice hullers operating in the Senegal river valley turned up 122 functioning machines, with a combined throughput 2.5 times greater than that of the government rice mills. These hullers operate profitably at a wide range of capacity utilization rates, generating returns of 35-46% on the owner's investment. Itinerant traders who patronize these hullers buy paddy at prices often exceeding the official producer price and sell milled rice at prices often lower than official consumer prices, contrary to the conventional wisdom that the parallel channel exploits producers and consumers.

Trend projections confirm the high level of uncertainty associated with irrigated agriculture. Under a plausible range of supply and demand parameters, the Senegal river valley could remain a net food importer or become an important exporter. Marketing policy alternatives are discussed in the context of this uncertainty, and their likely performance consequences are projected. Particular attention is directed toward the question of altering the role of public-sector marketing institutions to enhance their complementarity with private-sector capabilities.

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Finally, hundreds of market participants -- farmers, traders, transporters, processors, consumers, development agency representatives, civil servants, and government officials -- took the time to answer questions and to share their knowledge. Their graciousness, patience, and unflagging hospitality in the face of constant interruptions by the research team were inspiring. Without their collaboration, the research could not have been completed.

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ABBREVIATIONS

BAME	Bureau d'Analyses Macro-economiques
CPSP	Caisse de Perequation et de Stabilisation des Prix
CSA	Commissariat a la Securite Alimentaire
ISRA	Institut Senegalais de Recherches Agricoles
MA	Ministere d'Agriculture
MCI	Ministere du Commerce Interieur
MSU	Michigan State University
OMVS	Organisation de la Mise en Valeur du Senegal
ONCAD	Organisation Nationale de Commercialisation et d'Assistance au Developpement
PAMLT	Programme d'Ajustement a Moyenne et Long Terme
PVO	Private Voluntary Organization
SAED	Societe d'Amenagement et d'Exploitation des Terres du Delta
SONADIS	Societe Nationale de Distribution
SONED	Societe Nationale d'Etudes pour le Developpement
URIC	Unites Rizeries, Intendances, Commercialisation
USAID	U.S. Agency for International Development

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Chapter 1

INTRODUCTION

1.1 The Importance of Cereals Marketing Research in the Senegal River Valley

The Senegal river cannot accurately be described as one of the great rivers of the world; both its length (1700 km) and its flow rate (averaging well under 1000 m^3/s) are dwarfed by numerous other rivers, including in Africa alone the Nile, the Congo or Zaire, and the Niger. Yet the Senegal is still a very big river by normal standards, with tremendous economic, political, and social importance to the more than two million people estimated to inhabit its 289,000 km^2 drainage basin. Transecting a vast region which includes portions of the present-day West African nations of Guinea, Mali, Mauritania, and Senegal, the river has grown in strategic importance during recent years as a prolonged drought has increased the dependence of the riverine populations on its life-giving waters. Today, considerable attention is being focused on harnessing the Senegal's largely untapped hydraulic potential to help achieve the social and economic development objectives of the nations through which it flows.

Although it is often said that the key to developing the Senegal river valley will lie in the successful introduction of irrigated agriculture, the sweeping changes currently underway are certain to affect more than just agricultural production technologies. In order for long-term food and agriculture policy goals to be achieved, not only will food production have to increase dramatically, but the future marketing system will have to assume a new and different role. Whereas today's system is oriented toward procuring and distributing imported cereals (which have been necessary to overcome the region's continuing food deficit), tomorrow's system will be more oriented toward assembling, processing, and distributing locally produced cereals. The dissimilarity between these two sets of activities calls into question the appropriateness of current marketing policies and suggest that new solutions will have to be found to achieve government policy objectives during the coming years.

The importance of an effective cereals marketing system cannot be overstated. Despite all the effort that has been concentrated on increasing production of food grains in the Senegal river valley, relatively little has been done in the way of anticipating future marketing needs, as if marketing will take care of itself once dams are erected, irrigation systems constructed, and crops planted and harvested. This view is short-sighted, because the projected increases in cereals production are not likely to materialize unless the

marketing system proves 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, at least 300,000 tons of paddy will have to be assembled, processed, stored, and distributed each year. This greatly exceeds current capacity, which suggests that the existing marketing system will have to undergo extensive changes within a relatively short period.

Government policies inevitably will have an important influence in shaping the marketing system as it evolves and changes. The government of Senegal has declared its firm commitment to supporting the process of change in the agricultural sector. Particular attention is being focused on the question of the appropriate mix of public-sector and private-sector involvement in the agricultural economy. Although the Senegalese government traditionally has assumed a direct participatory role in the food system, dissatisfaction with various aspects of the system's performance has led decision-makers to re-evaluate many of the institutions and policies which have tended to confer broad powers to the state. Direct public-sector participation in agriculture, once considered necessary for strategic political reasons, is increasingly viewed as costly and ineffective. Recent statements of official agriculture policy have emphasized the importance of disengaging the state from many of its present functions and

increasing the role of the government in facilitating private-sector marketing activities.[1]

The calls for policy reform have been particularly vocal in the case of cereals marketing. The state plays a dual participatory/regulatory role in cereals marketing; government-run parastatals exercise legal monopolies over the assembly and processing of the most important commercial crops, and government regulators enforce strict controls on the distribution of all important food staples, including cereals. Although public-sector involvement has always been justified in Senegal as a means of ensuring orderly marketing conditions while protecting vulnerable interest groups from exploitation by unscrupulous middlemen, the perception is now widespread that many marketing institutions and regulations have come to be more of a hindrance than a help. Consequently, agricultural policy makers have begun considering whether marketing policies should be revised to scale back the degree of direct state participation.

Before any reforms to the cereals marketing system can be designed and implemented, however, existing cereals markets must be closely examined. Despite widespread allegations that many public marketing organizations are inefficient and costly, and that official policies --

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[1]. See for example the VIeme Plan Quadrennial de Developpement Economique et Social (1981-1985), the Nouvelle Politique Agricole, and Deuxieme Lettre de Mission de la SAED.

including price policies -- create disincentives which actually discourage productive participation by private-sector marketing agents, very little empirical research has been conducted to corroborate or to refute these claims. This is particularly true in the Senegal river valley, where research has tended to focus on immediate technical problems, for example, problems related to hydraulic engineering and irrigated crop production. The organization and performance of the existing marketing system have gone largely unstudied, as has the relationship between national commodity pricing policies and the economic behavior of food system participants -- producers, marketing agents, consumers, and others. The scarcity of reliable information complicates evaluation of existing cereals markets and severely constrains the process of designing new policies to ensure improved performance of the future marketing system. Clearly, research can contribute to the policy process by facilitating the description of existing cereals markets, the diagnosis of current as well as future marketing problems, and the evaluation of alternative policy options, along with their expected performance consequences.

1.2 Objectives of the Study

This dissertation is one of three regional studies of cereals markets conducted in 1984-1985 within ISRA's Bureau of Macro-economic Research (BAME).[2] The Fleuve study covered the left bank of the Senegal river valley from Saint Louis to Kidira, including the administrative Region de Saint Louis and the Departement de Bakel.

Given the macro-economic orientation of the BAME, the overall focus of the study is the cereals sub-sector, defined as the set of vertically related economic activities including production, 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 coordinating mechanisms which link together successive stages of economic activity. By examining not only each horizontal slice of economic activity, but also the vertical coordinating mechanisms which join 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. An important goal of the study is to provide insights into the

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[2]. The studies included: 1) The Fleuve Cereals Marketing Study; 2) The Peanut Basin Cereals Marketing Study; and 3) The Casamance Cereals Marketing Study.

way the market <u>really</u> works, with the hope that such insights can contribute in a practical way to the design and implementation of improved marketing policies.

The objectives of the study include:

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 the 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 describe possible policy reforms to consider for improving the performance of the future cereals marketing system; and

5) to explore the likely effects of those policy reforms under a range of alternative development scenarios.

The research was conceived and designed as subject-matter research. Subject-matter research (as distinguished from disciplinary research and problem-solving research) is defined as multidisciplinary research on a subject of

interest to a set of decision-makers dealing with a set of practical problems about which they must make decisions. The body of knowledge generated by subject-matter research, which typically involves contributions from different disciplines, is seldom adequate to solve a specific problem facing a specific decision maker. Rather, the practical strength of subject-matter research is that it generates knowledge useful to a number of decision makers, although they must frequently add knowledge derived through use of their own resources in order to solve their own particular problems.[3]

This study falls squarely into the category of subject-matter research. It is multi-disciplinary in nature, drawing on knowledge of the technical aspects of irrigated crop production and marketing, of the economics of various production and marketing technologies, of social and cultural influences shaping the evolution of the farm and food system, of political forces affecting the policy process, etc. The research findings provide important insights into the performance of the existing cereals marketing system and into the likely performance of the future system under a range of alternative development scenarios.

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[3]. For a more complete discussion of the differences between disciplinary, subject-matter, and problem-solving research, see Johnson (1986, forthcoming): Chapter 2.

In places like Senegal where policy decisions are sometimes taken without the benefit of a clear understanding of the situation "out there in the real world", subject-matter research can play a vital role in confirming or refuting the conventional wisdom which so often exercises an inordinate influence over policy decision-making. This is particularly true in the case of marketing, since the well-known bias against middlemen tends to contribute to a lack of understanding of the problems facing marketing agents. The importance of exploding the old myths cannot be overstated. In Senegal as elsewhere, cereals traders continue to be maligned in the eyes 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 official price levels and by charging usurious rates of interest. These deeply held ideological convictions, although frequently exaggerated and rarely substantiated by empirical evidence, exert considerable influence on the policy process. Consequently, there is a strong need for the kind of subject-matter research described in this dissertation, because it can help raise the level of policy discussion by shedding new light on the way the market really works.

1.3 Setting for the Study: The Senegal River Valley

The river known as the Senegal bears this name beginning in the Bafoulabe region of Mali, at the point of convergence of its two main tributaries, the Bafing (or "Black River") and the Bakoye (or "White River"). (See Figure 1). Both of these tributaries have their sources in the chain of mountains in northern Guinea known as the Fouta Djalon, in an area sometimes referred to as "the water tower of West Africa" because so many of the region's major rivers originate there.[4] From Bafoulabe, the Senegal flows north and west through Mali, crossing regions of steadily decreasing rainfall as it traverses the wooded savannah. Along the way, it is joined by several major tributaries, notably the Kolimbine and the Karakoro. The last major tributary, the Faleme, flows in at the point where Mali, Mauritania, and Senegal converge, not far from the Senegalese town of Bakel. The confluence with the Faleme, occurring approximately 825 km from the river's outlet near Saint Louis, is generally considered the dividing line between the Senegal's upper basin and valley. Downstream from Bakel, the river flattens and slows, falling only ten additional meters over the course of a lazy, meandering journey to the Atlantic. Along this stretch, the river serves as the border between Mauritania and Senegal.

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[4]. Platon (1981):4.

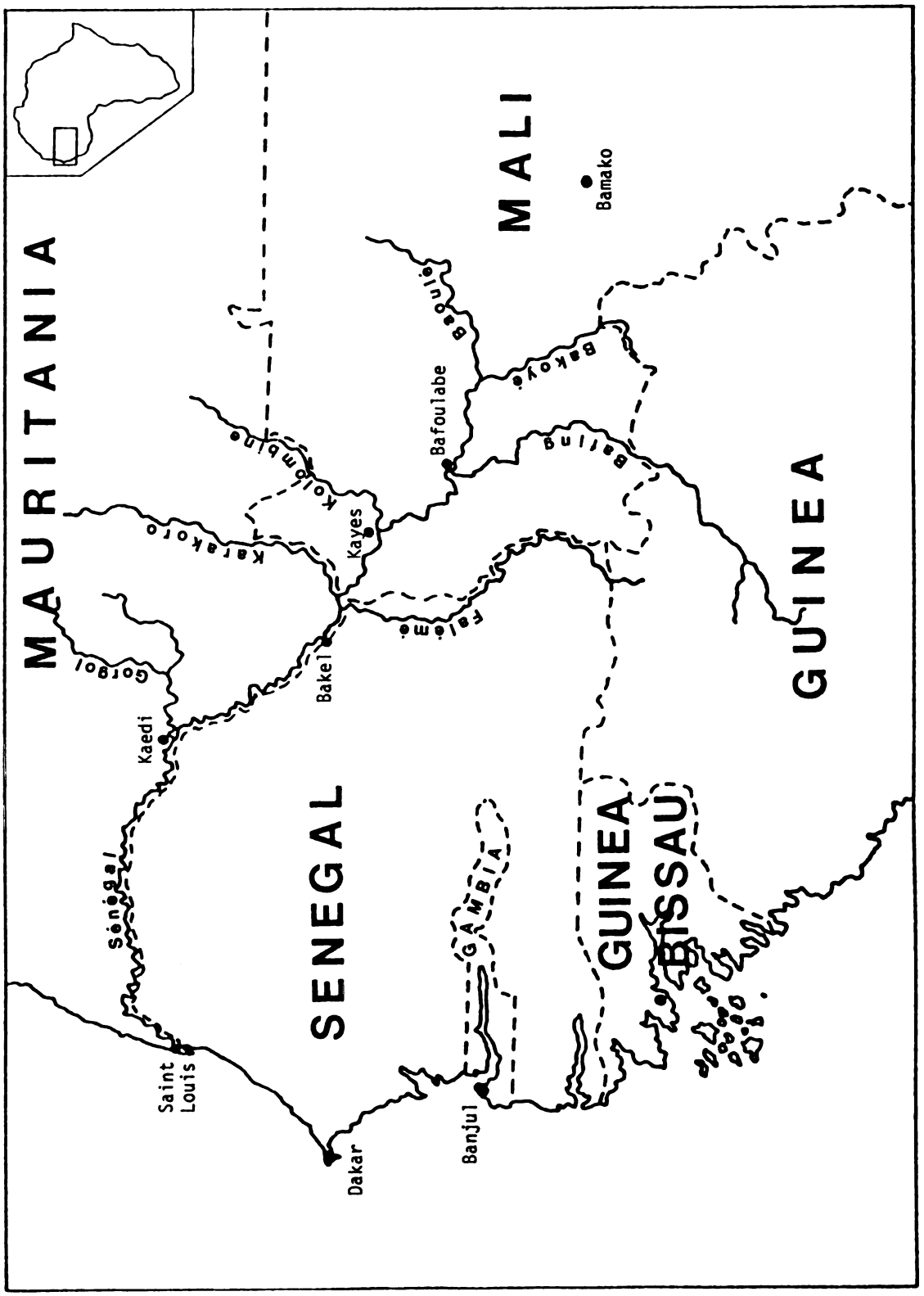

Figure 1: The Senegal River

The rain waters which feed the Senegal are distributed unequally through time and space, with the result that the river's rate of flow is characteristically erratic. Mean annual precipitation in the Senegal's drainage basin ranges from as high as 2,000 mm in the Fouta Djalon highlands near the source of the river to as low as 350 mm in the delta region near its mouth, with tremendous variability from year to year around these long-run averages.[5] (During this century, total annual flow measured at Bakel has varied from a high of over 39,000 million cubic meters in 1924 to a low of less than 7,500 million cubic meters in 1984.)[6] The flow varies throughout the course of each year, due to the marked seasonal distribution of rainfall. Typically, most rain falls during the wet season (June-October), resulting in an annual period of flooding during which the normally placid river climbs its banks and inundates low-lying flood plains along its lower reaches. During the cold dry season (November-February) and hot dry season (March-May) that follow the rains, the flood waters gradually recede, eventually reducing the main river channel to a sluggish, muddy trickle that in recent particularly dry years has dried up completely in some places.

The Senegalese portion of the river valley, where the field work for the present study was conducted, comprises

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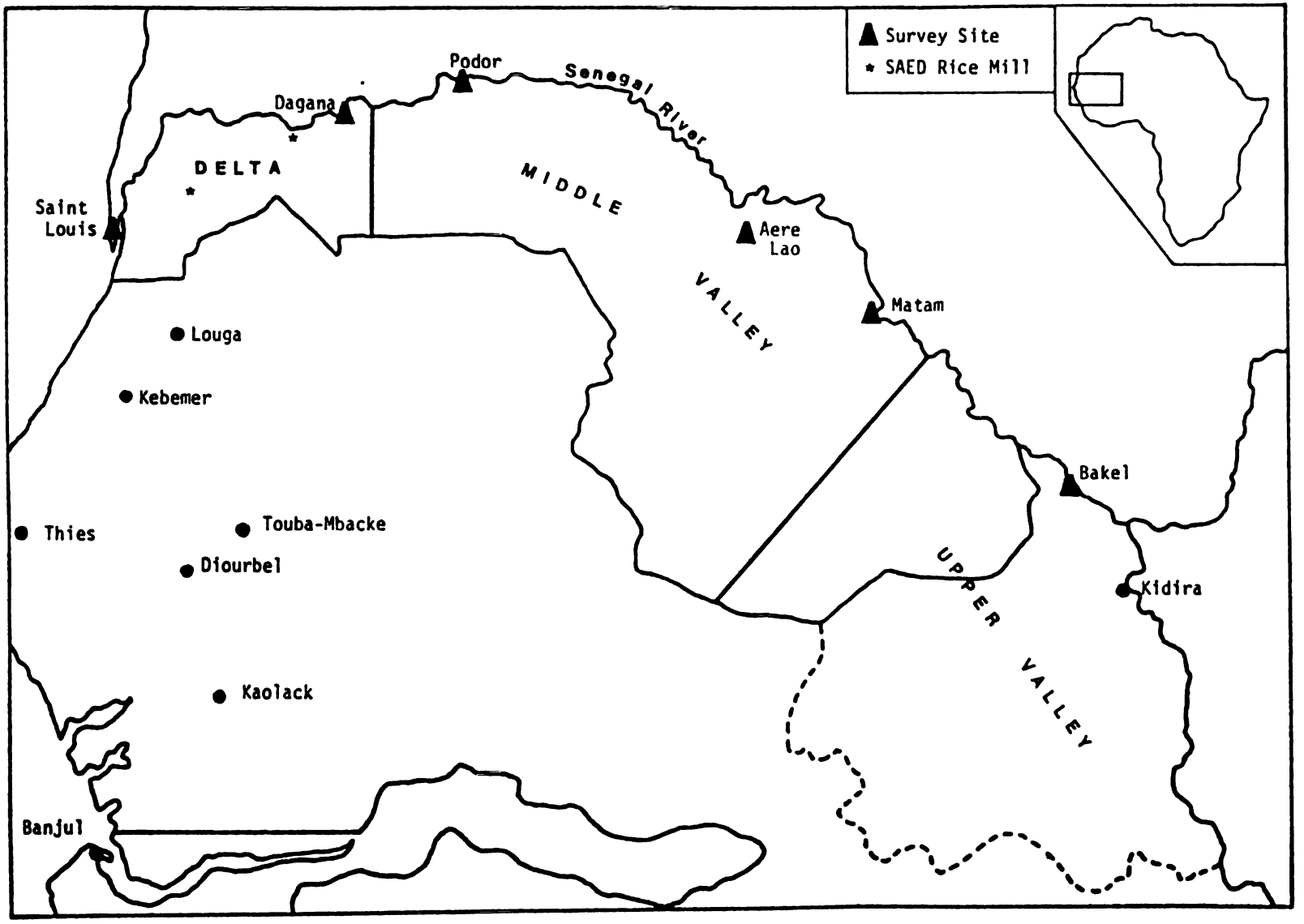
5. OMVS (1980a):AI-35.

6. ISRA meteorological records, Saint Louis.

three distinct socio-ecological zones, each associated with a unique and specialized agrarian economy. (See Figure 2). The Upper Valley, extending downstream from the confluence of the Faleme to just below Bakel, is populated primarily by Soninke and Bambara farmers who traditionally have subsisted by cultivating rainfed crops of millet and sorghum on the sandy hillsides bordering the river valley. The Middle Valley, extending nearly 350 km from below Bakel to Dagana, is home to nomadic Peul herders and to their sedentary cousins the Tukulor, who raise livestock and cultivate flood-recessional crops of sorghum, millet, and maize in the rich alluvial soils along the river's flood plain. The Lower Valley or Delta, extending downstream from Dagana, has traditionally been lightly populated due to its harsh and arid climate, serving mostly as a seasonal migration route for nomadic Peul and Maure pastoralists.

These present inhabitants are but the latest in a long series of peoples who have been attracted to the relative agricultural wealth of the Senegal river valley. Throughout recorded history, the region has been populated by successive waves of settlers cast loose during periodic expansions and consolidations of the nation states of the West African interior, with occasional arabo-berber encroachment from the north. Combining nomadic and sedentary pastoralism with food crop cultivation, the peoples of the river valley over time developed locally specific subsistence economies characterized by relatively

Figure 2: Socio-economic Zones of the Senegal River Valley



high levels of agricultural productivity and long-run sustainability.[7]

Colonial expansion into Senegal beginning in the 16th century disrupted the historical pattern. Although early French explorers of the river valley remarked upon the fertile soils and the well-developed farming practices of local populations, their primary interests were commercial rather than agricultural.[8] The Senegal river provided a means of access into the interior, and throughout much of the 18th century it served as an important conduit for trade in gold, gum arabic, and slaves. The river's strategic importance to the French was confirmed by the establishment of Saint Louis as the administrative capital of all French West Africa, a vast territory which included portions of present-day Senegal, Mali, Mauritania, Guinea, Bourkina Faso, Niger, Ivory Coast, and Benin.

The official abolishment of the export slave trade in the early 19th century, along with a simultaneous decline in the importance of gum arabic, signalled the beginning of a period of economic stagnation for the Senegal river valley. French commercial activity gradually shifted further to the south toward the groundnut economy, and although the river itself remained of some interest until the end of the century as the axis of military penetration into the Western

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7. Meillassoux (1975):59.

8. Adams (1977):36.

Sudan, the region as a whole became increasingly marginal in the eyes of the colonial administration.[9] Finally, in 1902 Saint Louis was stripped of its title as administrative center of French West Africa, and the new capital was established in Dakar.

Following the decline of colonial trading activity, the indigenous populations continued to practice traditional subsistence agriculture. But it soon became apparent that an important change had taken place which was to have a profound effect on the regional economy. Colonialism had opened important avenues to the exterior, and many residents of the river valley soon found themselves exposed to alternative employment opportunities in the groundnut basin, in Senegalese urban centers, in neighboring African countries, and overseas. A pattern rapidly developed of seasonal and long-term outmigration from the region, with remittances being sent back in the form of cash or material goods to help raise and stabilize the revenues of family members remaining behind. Although outmigration helped to stimulate the economy of the river valley by leading to infusions of outside capital, it also had the effect of drawing off a large portion of the agricultural labor force. As a result, food production began to lag behind demand, and the region became increasingly dependent on external assistance to feed itself.

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9. Adams (1977):37.

During the 1960's and 1970's, this dependency assumed crisis proportions. Successive years of below-average precipitation -- part of a severe and prolonged drought affecting much of sub-Saharan Africa -- devastated traditional farming systems throughout the river valley, precipitating massive perennial food deficits. Even though commercial food imports and foreign assistance prevented the kind of mass starvation seen elsewhere in Africa, it became increasingly apparent that decisive action would be needed to restore regional food self-sufficiency. Consequently, the government of Senegal, assisted by a number of foreign donors, stepped up its efforts to revitalize agriculture in the river valley.

1.4 Development Schemes: Past, Present, and Future

Current efforts to introduce "modern", "scientific" agriculture into the Senegal river valley represent the latest in a long series of similar attempts dating back well into the 19th century. Although the earliest colonial explorers were interested in agriculture only insofar as it affected the availability of food supplies for trading posts, the abolishment of the slave trade (which reduced the river's importance as a commercial artery) and the

emancipation of the former French colony of Saint Dominique, now Haiti (which drastically reduced the need for slave labor while at the same time depriving France of an important source of agricultural commodities) led to a re-evaluation of the river valley's agricultural potential.[10]

Around 1820, French colonial administrators conceived a plan to establish irrigated plantations on the banks of the river for the production of sugar, cotton, and other export crops destined for Europe. The Agricultural Colonization Scheme, launched in 1822, in effect represented the first formal agricultural development project introduced into the Senegal river valley. Like many of it successors, it turned out to be a dismal failure. Technical factors (e.g., excessive soil salinity, ineffective irrigation techniques, inappropriate crop varieties) as well as sociological factors (e.g., labor shortages, conflicts over land use rights) conspired to frustrate the scheme, and it was terminated in 1831.[11]

The next major attempt to develop the potential of the river valley occurred over 100 years later, when an economic crisis once again revived French interest in new sources of supply for agricultural commodities. Following the Second World War, which had impressed upon colonial administrators

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[10]. Patterson (1984), cited in Ndiame (1985):20.

[11]. See Adams (1977):36; Barry (1972):250-256; Miller (1984):50; Ndiame (1985):21.

the extent of Senegal's growing dependence on imported rice, the Mission d'Amenagement du Senegal was founded to establish large-scale rice cultivation in the upper Delta region. An ambitious 6,000 ha scheme was launched at Richard Toll in 1949. The plan called for irrigation by means of "controlled submersion", a technique borrowed from the Mekong delta in Vietnam, with eventual transition to full-scale pump irrigation. Although the project achieved limited technical success (yearly production of paddy between 1953 and 1960 averaged 15,000 tons, approximately 10% of the country's annual consumption), it proved extremely expensive, and state subsidies were required every year to cover operating deficits ranging from 8 to 50 million FCFA.[12]

After Senegalese Independence in 1960, efforts continued to establish irrigated agriculture in the Senegal river valley. Several government agencies were created toward this end, including the Societe de Developpement Rizicole du Senegal, the Organisation Autonome de la Vallee, and the Organisation Autonome du Delta. All of these proved ineffectual, however, and they were subsequently dismantled and replaced in 1965 with a new organization, the Societe d'Amenagement et d'Exploitation des Terres du Delta et de la Faleme (SAED).

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12. Adams (1977):40.

When SAED was created as a regional development agency, it was entrusted with a broad range of activities by no means restricted to the technical aspects of irrigated crop production. The idea was to use SAED to help foster indigenous African development -- economic, cultural, and political -- by encouraging the participation of the rural masses, using irrigation technology as the engine of growth. Yet the original vision was never realized. Instead of encouraging a dialogue with the peasantry, SAED in practice tended to be extremely authoritarian, highly centralized, and primarily concerned with imposing its own master plan, which called for the complete transformation of agriculture in the river valley. Whereas earlier efforts to introduce irrigation technology had sought compromise with the river's annual recessional cycle, SAED engineers decided that the natural irrigation function could be completely supplanted by the widespread introduction of pump irrigation. During the late 1960's, work was initiated in the Delta and in the lower Middle Valley on a number of pilot schemes featuring irrigation infrastructure on a scale never before seen in the river valley (including diesel-powered pumping stations, concrete water-control structures, reinforced earthen levees, and concrete-lined irrigation canals). Not surprisingly, the local farmers who had been displaced by these schemes had a hard time believing that SAED was acting in the interest of the rural populations. They put up firm resistance to the SAED master plan, and pump irrigation

technology spread more slowly than had been anticipated.

SAED's efforts to develop the left bank of the river valley were considerably affected in 1972 by the formation of the Organisation de la Mise en Valeur du Fleuve Senegal (OMVS), an inter-state organization linking Senegal, Mali, and Mauritania for the expressed purpose of fostering joint development of the Senegal river valley. The broad objectives of the OMVS plan of action included: (1) to raise and stabilize incomes of the riverine populations; (2) to reduce the vulnerability of local economies to climatic and other external factors; (3) to achieve a stable balance between man and his environment, not only within the river valley, but throughout the three member-states; (4) to improve the quality of life in the river valley, particularly in rural areas, thereby reducing rural-urban migration; (5) to accelerate the economic development of the three member-states; and (6) to assure inter-state cooperation.[13]

The OMVS plan of action was unabashedly ambitious, revolving around a proposal to construct two large dams on the Senegal river at a total cost approaching $1 billion (U.S.).[14] The upper dam, to be situated at Manantali in southeastern Mali, would create a reservoir with a capacity

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[13]. Gannett Fleming (1980):1-2, cited in Miller (1984):65. See also Platon (1981).

[14]. This figure has fluctuated considerably as a result of movements in the $:FCFA exchange rate.

of 11 billion m^3, permitting the irrigation of 370,000 ha, providing hydroelectric power to all three OMVS member-states, and improving river navigation by making possible regulation of the rate of flow. The lower dam, to be situated at Diama near the river's mouth, would serve as a salt-intrusion dam to prevent the flow of sea water over 200 km upstream during the dry season, thereby increasing the irrigation potential in the Delta by permitting double-cropping of over 50,000 ha. Funding for the project was provided by a wide range of donors.[15] Despite challenges to the technical feasibility of the dams and criticism of their predicted effects on the physical and social environment, construction at both sites was initiated in 1981 and has since proceeded uneventfully. The Diama dam is currently scheduled for completion in mid-1986, while the Manantali dam is slated to become operational in 1990.

During the period when the OMVS plan of action was being formulated and put into effect, SAED continued to pursue its heavy-handed efforts to foster the spread of irrigation technology throughout the Senegalese portion of the river valley. As the drought worsened, the region's food deficit widened, and criticism of SAED's performance

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15. Pledges were received from Saudi Arabia ($150 million), Kuwait ($100 million), West Germany ($98 million), France ($70 million), Abu Dhabi ($70 million), African Development Bank ($63.1 million), European Development Fund ($60.4 million), OMVS member-states ($40.3 million), Iraq ($40.6 million), Italy ($35.5 million), Islamic Bank ($20 million), Canada ($17.2 million), and Iran ($4 million). (See Platon (1981):33.)

mounted. Finally in 1981 the Senegalese government was forced to introduce a series of institutional reforms (known as the Plan de Redressement) designed to restructure SAED, to refine and focus its scope of work, and to revise its standard operating procedures. The reforms seemed to take effect. In the years immediately following their implementation, marked increases were achieved in what were widely considered to be the three most important performance indicators -- irrigated area, yields of rice, and total production of rice. Encouraged by these promising initial effects of the Plan de Redressement, and anticipating additional spurs to production expected to result from the completion of the two dams, SAED planners in the early 1980's began predicting that the Fleuve region would once again become self-sufficient in food grains production by the mid-1990's.[16]

1.5 Conduct of the Research

The field work for this study was conducted in Senegal, West Africa, between February 1984 and September 1985. During that period, the author was employed by Michigan State University as a member of a team of researchers

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[16]. SAED (1984b).

collaborating with the Senegalese Institut de Recherches Agricoles under the terms of the USAID-funded Senegal Agricultural Research and Planning Project. Assigned to the Bureau of Macroeconomic Analysis (BAME), the author was posted to Saint Louis and given the responsibility for conducting a regional study of cereals markets, known as the Fleuve Cereals Marketing Study.

The eighteen months of field work were divided more or less equally among three main types of research activity: six months of preparation and planning; six months of field data collection; and six months of analysis, report-writing, and dissemination of results.[17]

Preparation and planning activities were accomplished between March and August 1984. An extensive review of the literature available in local documentation centers (USAID, ISRA, SAED, OMVS) shed light on the historical evolution of agricultural development activities in the Senegal river valley and revealed prior research on issues related to cereals marketing. Introductory visits helped establish contact with government agencies (CPSP, CSA, MA, MCI), parastatals (SAED, SONADIS) and private firms (Matforce, Peyrissac) currently active in the food grains subsector. Reconnaissance surveys throughout the length of the river valley between Saint Louis and Kidira familiarized the

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17. For a more complete account of the research methodology, see Appendix. Also see Morris (1985d).

author with the study area and facilitated preliminary contacts with farmers, extension agents, grain traders, and other food system participants. The information gathered by means of these three sets of activities -- the literature review, the introductory visits,, and the reconnaissance surveys -- was used to develop an operational plan of work for the second phase of the study.

Field data collection activities were undertaken between September 1984 and March 1985. Primary data collection efforts extended the length of the Senegalese portion of the river valley and included: 1) a multi-visit formal survey of 122 licenced grain distributors; 2) a complete census of village rice hullers; 3) a single-visit in-depth survey of a sample of 26 village rice hullers; and 4) an informal survey of parallel market participants. In addition, secondary data relating to regional cereals marketing activities were obtained from documents made available by numerous public and private organizations, including SAED, CPSP, SONADIS, CSA, MCI, Peyrissac, and Matforce.

Data analysis, preparation of reports, and dissemination of preliminary research results were accomplished between April and September 1985. Primary and secondary data were analyzed using a hand-held calculator, as well as an IBM XT microcomputer equipped with commercial software (ABTAB, ABSTAT, LOTUS). Preliminary research

results were written up in the field and published for immediate distribution as a series of four ISRA/BAME "Working Papers".[18] In keeping with the BAME's mandate to produce timely information that can be of practical use to policy decision-makers, the findings of the study were further disseminated through several seminar presentations conducted for the benefit of Senegalese government officials, development agency planners, and other researchers.

The author departed from Senegal in October 1985 and the following month returned to Michigan State University for the dissertation write-up phase, which lasted from December 1985 until June 1986.

1.6 Organization of the Dissertation

This dissertation is organized as follows.

Chapter 1 reviews the importance of cereals marketing policy analysis and justifies the practical relevance of the present study, describes the research objectives, introduces the region in which the study was conducted, and summarizes the conduct of the research.

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[18]. See Morris (1985a, 1985b, 1985c, 1985d).

Chapter 2 discusses the concept of sub-sector analysis, briefly introduces the food grains sub-sector in the Senegal river valley (including participants, policies, and economic activities), makes an important distinction between the official and unofficial or "parallel" channels, and identifies the key marketing policy issues currently facing Senegalese decision-makers.

Chapter 3 examines the organization of the official marketing channel for cereals, using empirical findings generated through field research activities. Topics include assembly, processing, wholesaling, and retailing operations, with particular attention to the vertical coordination mechanisms linking together these successive stages of economic activity.

Chapter 4 examines the organization of the parallel marketing channel for cereals, once again using empirical findings generated through field research activities. As in the previous chapter, topics include assembly, processing, wholesaling, and retailing activities, as well as the vertical coordinating mechanisms which link them.

Chapter 5 defines a set of cereals marketing performance goals in the Senegal river valley, discusses the problems of measuring performance, and presents a qualified evaluation of the performance of the both the official and parallel channels based on the empirical research findings.

Chapter 6 forecasts several development scenarios for the Senegal river valley, outlines a number of possible cereals marketing policy reforms based on the research findings,and discusses the likely performance consequences of the reforms under the alternative development scenarios.

Chapter 7 summarizes the implications for policy of the research findings and touches upon the need for additional research.

In addition, Appendix A provides methodological detail on the field data collection activities, including: survey design; sample selection; questionnaire design and pre-testing; field interviewing techniques; and recruitment, training, and supervision of enumerators.

Chapter 2

THE CEREALS SUB-SECTOR IN THE SENEGAL RIVER VALLEY

2.1 On the Concept of Sub-sector Analysis

A sub-sector is an economic unit of analysis specific to a particular commodity or commodity group (e.g., cereals, livestock, vegetables, fruit). The overall focus of the present study is the cereals sub-sector in the Senegal river valley. The exact boundaries of the cereals sub-sector are somewhat arbitrary, their essential function being "to circumscribe a meaningful and manageable portion of the agricultural economy for comprehensive investigation."[1] The research agenda for this study originally included all activities pertaining to the production, assembly, processing, distribution, and consumption of food grains; however, following an initial decriptive/diagnostic exercise designed to identify issues of major policy importance, a select number of key activities was targeted for further in-depth examination.

Sub-sector analysis is a by-now familiar approach to the study of agricultural markets. Sub-sector analysis was pioneered during the 1960's and 1970's by a group of policy-oriented agricultural economists who were struggling to come to terms with a rapidly evolving U.S. farm and food system.

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[1]. Shaffer (1973):333.

Dissatisfied with the inability of conventional analytical techniques to address the complex and dynamic inter-relationships which characterize American agriculture, men such as Bruce Marion, Willard Mueller, Ben French, Gerald Campbell, Marvin Hayenga, James Shaffer, and others developed an expanded conceptual framework of analysis for organizing existing knowledge and specifying missing information about selected portions of the farm and food system.[2]

The sub-sector approach differs from traditional industry-oriented approaches to the study of the agricultural economy more in scope and comprehensiveness than in theoretical content. Whereas industry-oriented approaches tend to focus on discrete horizontal slices of economic activity (e.g., inputs supply, or production, or assembly, or processing, or distribution), the sub-sector approach considers a meaningful grouping of economic activities related horizontally and vertically by market relationships (e.g., inputs supply and production and assembly and processing and distribution). The inclusion of multiple industries within the same framework of analysis is vitally important, for the sub-sector approach is grounded in the assumption that many of the important questions for policy-relevant research concern economic organization,

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2. Much of the early work on sub-sector analysis was conducted by the NC-117 group, a congressionally-funded task force charged with studying ways to improve the organization and performance of the U.S. agricultural economy.

i.e., the coordination of sequential activities by which goods and services are produced and distributed. By expanding the scope of analysis to include vertical as well as horizontal market relationships, the sub-sector approach enables the researcher to examine the institutions and processes by which supply offerings are matched to demand preferences at each stage of the value-adding process (including the communication of quantity and quality information, the timing of exchanges, the prediction of prices, and the sharing of risks).

The sub-sector approach thus directs the researcher's attention to the interfaces between successive stages of economic activity, using a dynamic orientation to accommodate changing relationships of technology, preferences, and institutions.[3] The explicit focus on vertical coordination mechanisms can provide key insights into the degree to which the sub-sector functions -- or fails to function -- as an articulated whole. Policy analysis is improved whenever these insights can be used to explore the likely effects of alternative institutional arrangements on future performance.

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3. This emphasis on dynamic analysis bears a certain resemblence to systems analysis, which likewise takes into account feedback, sequences, and externalities (although in formal systems analysis the dynamic interactions tend to be described more specifically, i.e., mathematically).

The sub-sector approach is especially appropriate for studying the cereals economy in the Senegal river valley because of the obvious lack of coordination which currently exists between sequential stages of economic activity. Senegalese policies relating to inputs supply, production, marketing, imports, and consumption of cereals often seem to work at cross-purposes, with devastating effects on performance. Clearly, vertical coordination within the sub-sector must be improved if the necessary economic signals are to be transmitted to ensure a good fit between the quantity, quality, timing, and location of cereals supplied and those demanded.

The theoretical framework underlying many sub-sector studies is based on an extension and modification of the Structure-Conduct-Performance (S-C-P) paradigm originally popularized by industrial organization theorists.[4] The present study diverges from S-C-P orthodoxy, which over the years has undergone numerous modifications.[5] Nevertheless, one of the paradigm's central ideas is retained here, for it can contribute to the analysis of the cereals sub-sector even if other features of the paradigm are not adopted.

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4. See Henderson (1975) and Marion (1976) concerning the appropriateness of the S-C-P paradigm to sub-sector analysis.

5. For an exposition of the essential S-C-P paradigm, see Bain (1968) and Scherer (1970).

The central idea of the S-C-P paradigm is that the structural characteristics of an industry (e.g., the numbers of buyers and sellers, degree of product differentiation, conditions of entry into the market, degree of vertical integration) have a strong influence on conduct of market participants (e.g., pricing behavior, interaction between firms or individuals, coordination of policies, opportunism) and performance (e.g., product characteristics, technical and economic efficiency, achievement of welfare goals, progressiveness, externalities). This central idea -- that the structure of an industry or a market may influence the conduct of participants, with possible effects on economic performance -- retains its fundamental validity even if causal inter-relationships between structure, conduct, and performance are difficult to prove empirically.

Harriss, a critic of much cereals marketing research in West Africa, is correct in pointing out that conclusions drawn by some researchers have not always been justified by the data. However, she is overly harsh in unequivocally condemning the S-C-P framework.[6] Harriss fails to grasp an important feature of the S-C-P paradigm, namely, the multi-dimensional character of performance. Many of the studies which Harriss describes as based on the S-C-P paradigm are really nothing more than neoclassical price studies, since they use a one-dimensional performance measure (price

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6. Harriss (1982):27.

efficiency). Therefore, while Harriss may be justified in criticizing the way some cereals marketing research has been conducted, her attack on the S-C-P paradigm is misdirected.

For purposes of policy analysis, the S-C-P paradigm represents a valuable intellectual tool, because it draws attention to three potentially important sets of variables (structure, conduct, and performance) and encourages systematic consideration of the ways in which the variables might be interrelated. Certain features of the S-C-P paradigm are retained in the present study. Within the context of a sub-sector approach, the research considers how structural characteristics of cereals markets in the Senegal river valley are related to the observed behavior of participants and, in turn, how both structure and conduct affect sub-sector performance, broadly conceived.

2.2 Overview of the Cereals Sub-sector

The cereals sub-sector in the Senegal river valley is depicted in Figure 3. The successive stages of economic activity by which cereals are produced, assembled, processed, distributed, and finally consumed appear along the left side of the diagram. The labelled boxes represent different groups of sub-sector participants, including

public organizations, private firms, and individuals. These participants are linked by a complex network of regulated and unregulated channels, depicted in the diagram by three types of arrows denoting, respectively, official market transactions, parallel market transactions, and food aid flows. (See Figure 3)

Because the distinction between the "official" and "parallel" markets varies across the literature and among policy makers, it is useful briefly to review the meanings of the terms as they are used throughout this study.

In the present discussion, the official and parallel markets 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:

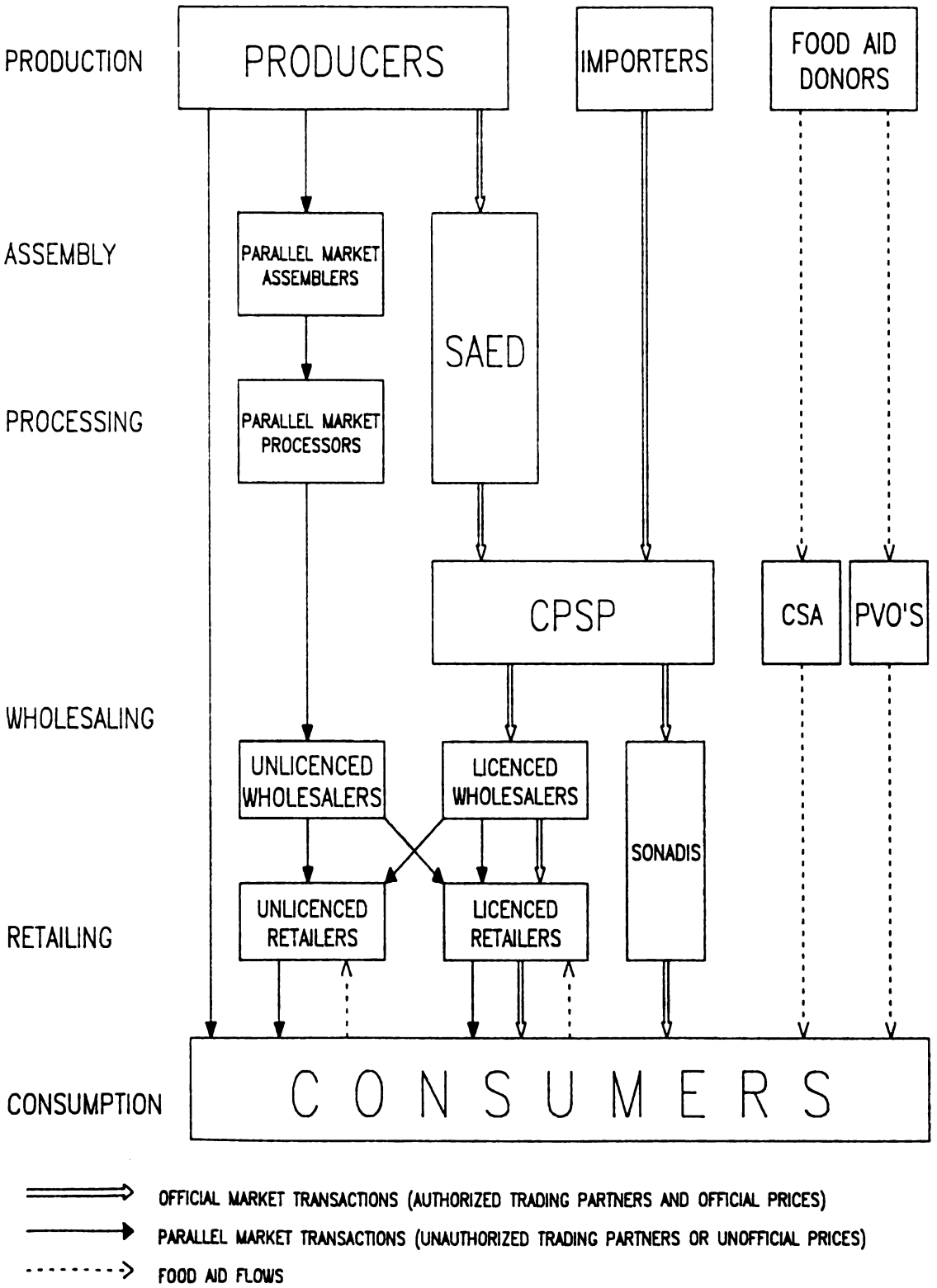
Official Market:

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

Parallel Market:

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

Figure 3: The Cereals Sub-sector in the Senegal River Valley



According to these definitions, the official market for cereals includes all of the public organizations, private-sector firms, and individuals who are authorized to engage in cereals marketing and who trade in general conformity with the official price structure. The parallel market, 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 market trading activity always involves a violation of official marketing regulations, in practice it is often difficult to distinguish between the official and parallel markets. Because unauthorized traders may at times trade at official prices, and because illegal trading may at times be done by licenced merchants, parallel market activity is not always readily apparent. To further complicate matters, the same trader may be active in both markets 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 markets.

In Senegal, the concept of the official market is commonly associated with public ownership and operation, while the parallel market is commonly associated with private-sector activity. This is both overly simplistic and incorrect. The official cereals market 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 markets rely largely on private-sector participation. The essential difference is not whether cereals trading is performed by public organizations or private merchants, but whether or not trading activity is carried out in compliance with the rules of the game established by the state.

Using Figure 3 as a guide, the rest of Chapter 2 presents a summary overview of the cereals sub-sector in the Senegal river valley. The chapter describes each major stage of economic activity, introduces key participants, and reviews government policies and regulations relating to the production, marketing, and consumption of cereals. The objectives of this summary overview are to take stock of the current situation in the cereals sub-sector and to identify gaps in the existing knowledge base which may hinder policy makers in diagnosing problems and implementing reforms. Following the summary overview, a list is elaborated of key topics where research is most urgently needed to generate

the additional information required for performance evaluation and, if necessary, for the design of policy reforms.

2.2.A Production

One of the most important policy goals of the government of Senegal is to increase national food security by improving the adequacy and the reliability of domestically produced food supplies, particularly cereals. Strategies to increase cereals production revolve around a fundamental choice concerning the optimal combination of investment in rainfed crop production vs. investment in irrigation technology -- a choice involving not only technical feasibility and cost considerations, but also social and political considerations because of the differential effects across interest groups and regions of the country associated with the two technologies.

With the adoption of the OMVS plan of action in 1972, the government of Senegal signalled its firm commitment to push ahead with irrigated agriculture in the Senegal river valley. This commitment does not seem to have wavered since the plan of action was initiated. Even though actual accomplishments have sometimes lagged behind expectations,

Senegalese policy makers continue to express confidence that irrigation technology will eventually spread throughout the Senegal river valley, over the long run transforming the region from a net importer of cereals into a net exporter. Meanwhile, the government has continued to pour vast amounts of money into regional development activities. Thus, the issue no longer seems to be whether or not to introduce irrigation technology into the river valley, but rather how fast to introduce it, and at what cost.

As the regional development agency, SAED plays a leading role in supporting irrigated crop production activities in the Senegal river valley. SAED's major production-support responsibilities include initial construction of water control systems (known as "irrigated perimeters"), allocation of production inputs (land, water, seed, fertilizer, agro-chemicals, labor services, credit), and provision of extension services.

Initial construction of water control systems involves clearing land, digging irrigation and drainage canals, erecting earthern dikes, and constructing pumping stations. Much of this work requires heavy earth-moving equipment unavailable to farmers. It is generally performed by SAED, with technical and financial support provided by foreign donors and channelled through bilateral aid projects. The economic cost of constructing a complete water control system is difficult to determine but is generally

acknowledged to be high. Published estimates range from 300,000 to 500,000 FCFA/ha for the small perimeters in the Middle and Upper Valleys to 1.5 to 2 million FCFA/ha for the large perimeters in the Delta,[7] but USAID officials privately acknowledge using much higher figures for planning purposes.[8]

In addition to constructing water control systems, SAED exercises varying degrees of influence over the allocation of critical production inputs -- land, water, seed, fertilizer, agro-chemicals, cultivation services, and credit.

Land availability has not usually been recognized as a problem in the Senegal river valley. Because the region is relatively sparsely populated, development planners have often assumed that vast areas of potentially irrigable land are currently being underutilized.[9] It is important to note, however, that in many areas the land immediately adjacent to the river is densely populated, and that in those areas the prime arable land is already being

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7. See Bonnefond et al. (1981):6; Dumont and Mottin (1982):41.

8. Project analysts working on the USAID Bakel Irrigation Project reported using the figure of $10,000/acre as a rule of thumb. At prevailing exchange rates, this was equivalent to over 10 million FCFA/ha. (Koi Le, personal communication.)

9. For example, see Abt (1984):C3/9 and Patterson (1984):51.

cultivated.[10] This implies that considerable attention must be directed to questions of access, location, and quality.

Irrigated agriculture in the river valley is expanding in the context of an established land tenure system which demands consideration. While in-migration of new settlers has understandably given rise to a set of problems never before encountered in the region, the traditional pattern of land use rights has not always been adequately considered by SAED planners in the construction of irrigated perimeters. Expedience has frequently taken precedence over equity. Land on the perimeters has sometimes been allocated to farmers on a "first come, first serve" basis, with the result that persons having no traditionally recognized claim to land have been ceded what in the eyes of SAED (and hence the government) amounts to permanent ownership. On other occasions, individual plots within perimeters have been assigned to farmers through a random draw system that has changed every year, thus effectively destroying any incentive for individual farmers to invest in long-term improvements to the water-control structures.[11] Although research has been conducted into traditional systems of land tenure and the projected distributional effects of irrigated agriculture, land disputes on existing perimeters indicate that policy makers in the future may need to devote more

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[10]. CCCE (1982).

[11]. Jamin (1984): .

attention to the avoidance and/or resolution of land use conflicts.[12]

Water represents a second important production input over which SAED exercises at least partial control. This is particularly true in the Delta, where large diesel- and electric-powered pumping stations are required to raise water into the central irrigation channels which feed the Delta's large-scale perimeters. (In contrast, farmers in the Middle and Upper Valleys are able to undertake their own irrigation without direct reliance on SAED, using small diesel pumps mounted on floating barges.) SAED charges a fee for providing irrigation water in the Delta; the fee has always involved a substantial subsidy, although a plan has been initiated to remove the subsidy.

Effective use of irrigation water depends on two factors: first, the sheer physical availability of water, and second, judicious management of the available water. Physical availability has clearly been a problem in the past, as low water levels in the river have temporarily rendered some pumps useless during the dry season. But the consensus among hydrologists and irrigation engineers is that the completion of the Diama and Manantali dams will ensure an adequate flow to meet the valley's total irrigation needs for the foreseeable future. Water

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12. For a discussion of land tenure issues in the Senegal river valley, see Bloch (1985).

management has also posed considerable problems in the past. In earlier years, SAED extension personnel exercised direct control over the management of irrigation water within individual perimeters. Conflicts proliferated over water use, however, and over time water management functions were transferred to the farmers themselves. While there are still minor conflicts, considerable progress has been achieved in working out satisfactory systems of allocating irrigation water to individual users. SAED representatives today express cautious optimism that water management issues will not pose a major obstacle to the continued spread of irrigation technology.

Seed, fertilizer, and agro-chemicals (herbicides and pesticides) are directly controlled by SAED, which exercises an effective monopoly in their provision. Of the three, by far the most important is fertilizer, which is indispensable to ensure high yields from the improved rice varieties grown on SAED perimeters. In contrast to other regions of the country, the Senegal river valley has generally not been plagued by problems of availability and timeliness of delivery of fertilizers, although shortages occasionally do occur.[13] Fertilizer is rationed to farmers according to SAED application rates, and in most years the recommended amounts have been delivered in time for optimal allocation on rice and maize. Major questions have been raised,

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[13]. ISRA recently conducted a national study of fertilizer distribution. See Crawford et al. (1985).

however, concerning the economic soundness of the nationwide subsidy on fertilizer prices. Under pressure from the IMF and foreign donors, the government in 1982 agreed to remove the subsidy and subsequently initiated steps to raise the retail price to more closely reflect actual procurement costs. In 1983, the price for all types of fertilizer was raised from 25 FCFA/kg to 45 FCFA/kg, and an additional increase implemented in 1984 brought the price of urea to 91 FCFA/kg and that of compound fertilizer (N-P-K 18-46-0) to 149 FCFA/kg. Critics of the price increases argued that they were implemented too rapidly and predicted that farmers would refuse to buy fertilizer. The response of farmers to the price increases remains the subject of much speculation. A major reason for the uncertainty is the lack of reliable data on how farmers actually use the fertilizer they receive. Apparently there is little correlation between the amounts of fertilizer delivered to each perimeter and yields, leading SAED representatives to surmise that a significant amount never makes it to the rice fields but instead is used for vegetable gardening or is sold across the river in Mauritania and Mali for a profit.[14]

Cultivation services -- plowing, harrowing, seeding, harvesting, and threshing -- are also provided by SAED in certain parts of the river valley, most notably on the large-scale, mechanized perimeters of the Delta. These

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[14]. R. Chateau (SAED technical advisor), personal communication.

services are offered to farmers at subsidized prices, with the amount of the subsidy accruing to SAED's operations budget.

Short-term credit is the final production input provided by SAED. Water, seed, fertilizer, agro-chemicals, and cultivation services are all made available to producers on credit. SAED does not allocate credit directly to individual farmers, preferring instead to work through a multi-tiered system of farmers' organizations which all participating farmers are required to join. Each farmer who wants to work on an irrigated perimeter signs a contract of allegiance to the leader of the local groupement de producteurs (itself a sub-division of a larger section villageoise), and the leader in turn signs a contract with SAED in the name of all the members. Since in any given growing season the groupement de producteurs is ineligible to receive production inputs until the outstanding debts of all members have been repaid, this system has proven extremely effective in ensuring a high rate of loan repayment.

SAED's absolute control over the allocation of most production inputs gives it considerable leverage over farmers.[15] One consequence of this leverage is a striking

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15. The relationship has been criticized by some as fundamentally exploitative. Waldstein (1984) has argued that SAED farmers are essentially little more than wage laborers, since they exercise limited control over the means of production, are told when and how to cultivate, and are

homogeneity in cropping patterns and farming practices throughout the river valley. During the wet season, rice is grown on every SAED perimeter. (The only other irrigated crop grown in the river valley during the wet season is sugar cane, produced by the national sugar company on 6,000 ha lying outside the SAED sphere of jurisdiction.) Land preparation generally begins with the onset of the rains (April or May in the Upper Valley, slightly later in the Middle Valley and Delta) and is followed by planting. Hand transplanting is the preferred method of stand establishment on the smaller perimeters of the Middle and Upper Valleys, while direct seeding predominates on the larger perimeters of the Delta. During the five-month growing season, weeding is generally performed by hand, although the use of herbicides has become prevalent in some parts of the Delta. Harvesting generally takes place during December and January. The crop is cut using sickles and stacked in the fields for subsequent threshing by hand or, more rarely, by machine. Average yields have increased significantly in recent years and currently stand around 4.5 tons/ha across the entire river valley.[16]

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required to sell the harvest back to SAED at a non-negotiable price. While it is beyond the scope of this paper to evaluate this assertion, clearly Waldstein is correct in pointing out that the vast majority of farmers growing irrigated crops in the river valley have little choice but to conform to SAED's directives.

16. R. Chateau (SAED technical advisor), personal communication.

During the dry season, a much smaller second crop of rice is grown throughout portions of the Middle and Upper Valleys, except in certain areas where maize is planted. Cultivation of a dry-season crop of rice in the Delta is precluded by the intrusion of the salt tongue into the river, although residual soil moisture does permit the cultivation of tomatoes, which can be marketed locally or sold to one of two industrial canneries. The relative unimportance of the dry-season cereals crop is expected to change with the impending completion of the Diama dam, which will boost rice production during the dry season by making possible double cropping of rice throughout virtually the entire Delta.

Despite an uneven record, considerable progress has been achieved in recent years in expanding the area under irrigation and in increasing production of paddy. With the spread of irrigation technology, paddy production has evidently begun to stabilize around a strong upward trend. The reforms introduced in 1981 under the Plan de Redressement seem to have had a particularly strong effect, as evidenced by sharp upturns in irrigated area and production. (See Figure 4).

SAED 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-

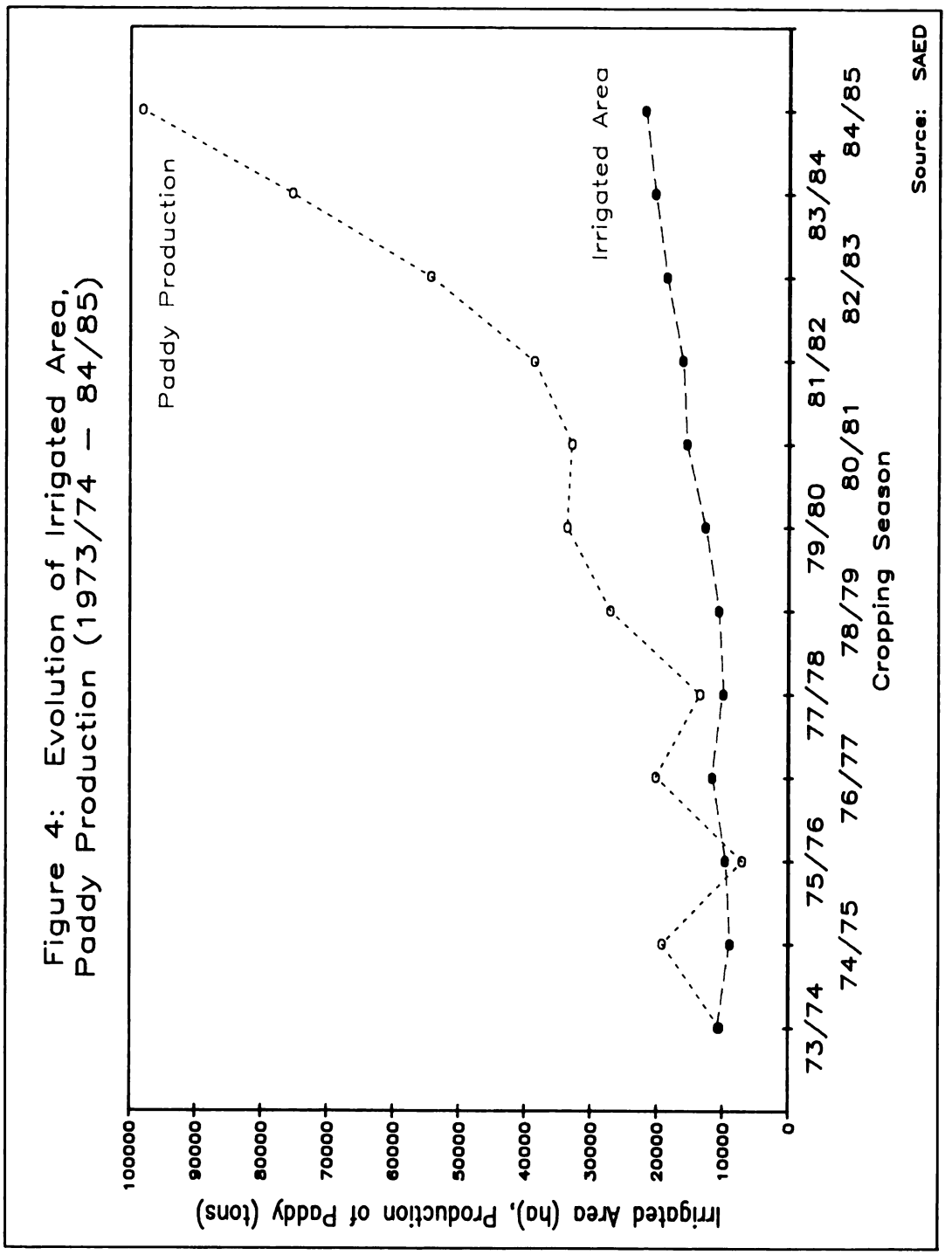
Figure 4: Evolution of Irrigated Area, Paddy Production (1973/74 - 84/85)
Paddy Production
Irrigated Area
Irrigated Area (ha), Production of Paddy (tons)
100000
90000
80000
70000
60000
50000
40000
30000
20000
10000
0
73/74
74/75
75/76
76/77
77/78
78/79
79/80
80/81
81/82
82/83
83/84
84/85
Cropping Season
Source: SAED

term time horizon is complicated by climatic, technical, economic, political, social, and other uncertainties, under what appear to be a set of conservative assumptions the Senegal river valley should achieve self-sufficiency in cereals by the mid 1990's. (See Figure 5)[17] This hypothetical scenario is conservative. Yields and cropping intensity are assumed to remain unchanged from present levels, and no production of rainfed crops has been considered. To the extent that irrigated area expands at a rate exceeding 3,000 ha per year, to the extent that yields and/or cropping intensity increase over time, and to the extent that some rainfed cereals production continues, the Senegal river valley could become self-sufficient in cereals sooner than indicated.

It is important to stress that all projections involving anticipated production increases have been made in spite of a lack of conclusive knowledge about the economics of irrigated crop production in the Senegal river valley. Even though policy makers have decided to push ahead with the development of irrigated agriculture, the critical question has not been resolved whether irrigated crop production is economically viable. Published estimates of the variable costs of producing one kg of rice (i.e., excluding initial land development charges) generally fall

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17. Additional projection scenarios are presented in Chapter 6 showing the likely effects on cereals balances of several plausible changes in supply and demand parameters.

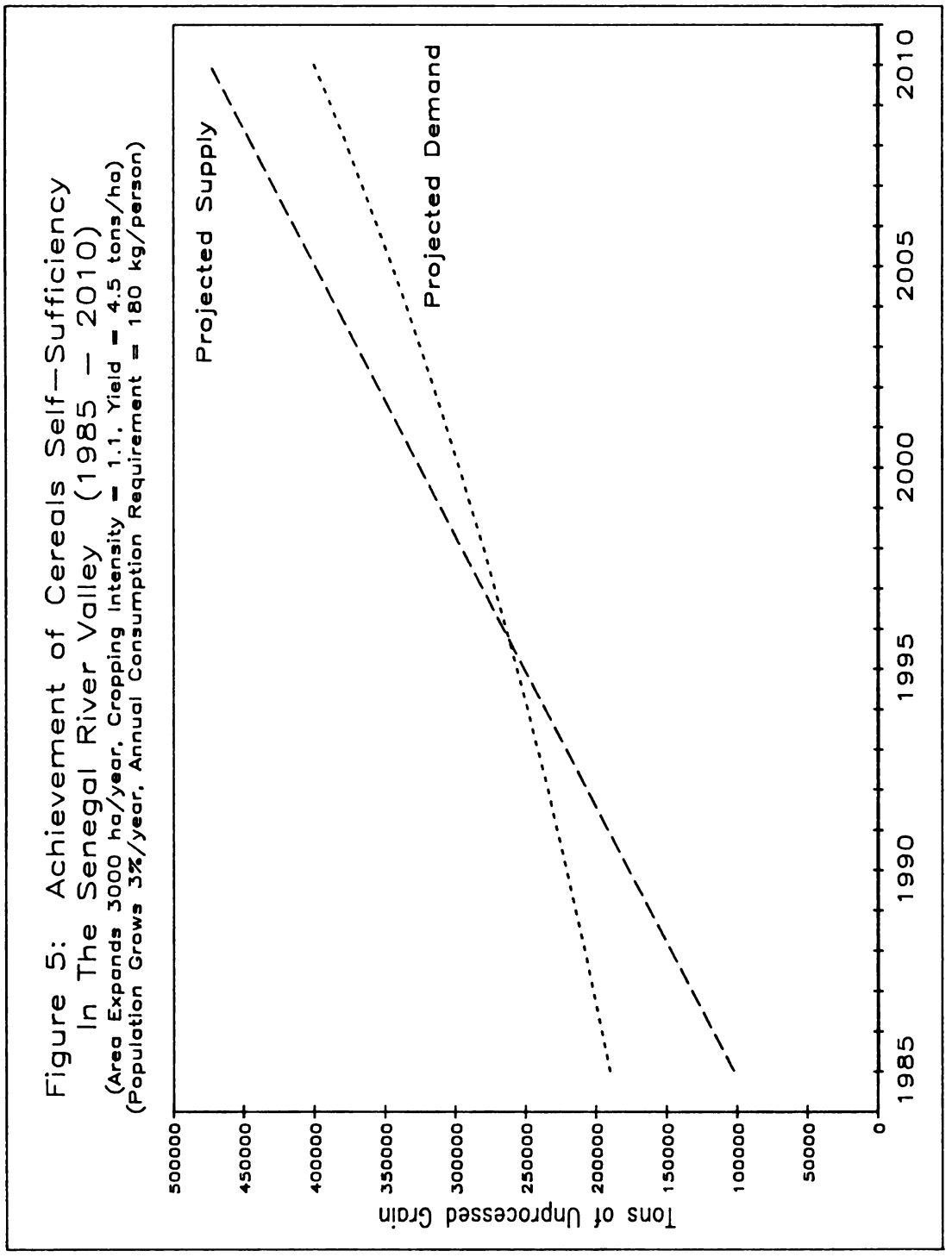
Figure 5: Achievement of Cereals Self-Sufficiency
In The Senegal River Valley (1985 - 2010)
(Area Expands 3000 ha/year, Cropping Intensity = 1.1, Yield = 4.5 tons/ha)
(Population Grows 3%/year, Annual Consumption Requirement = 180 kg/person)
Projected Supply
Projected Demand
Tons of Unprocessed Grain
500000
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
1985
1990
1995
2000
2005
2010

in the range of 150-200 FCFA/kg, well above the current import cost of about 100 FCFA/kg[18]. Many observers remain pessimistic that irrigated cereals crops produced in the Senegal river valley using current technologies will ever be able to compete with imported grains.[19]

2.2.B Assembly

Paddy grown by farmers on SAED perimeters 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. All paddy handled by SAED, whether official marketings or loan repayments, is bagged by the producer using bags furnished by SAED and delivered to a designated assembly point (called "secco"). After being weighed by a

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[18]. See Diallo (1980); Abt (1984):C3/90; Koita and Bernsten (1986); Dumont and Mottin (1982:41).

[19]. See Dumont and Mottin (1982):46.

representative of the groupement de producteurs, it is loaded onto privately owned trucks under contract to SAED and delivered to one of two SAED rice mills. Since a presidential decree grants SAED the legal monopoly over paddy purchases from farmers, this channel constitutes the "official channel". A third portion of the crop is either traded or sold outside the official channel, generally to neighbors in the village, to consumers or traders in the local market place, or to itinerant grain traders. Because technically these transactions involve non-authorized trading partners, and because official prices are not always respected, this channel constitutes the "parallel channel".

Farmers who sell paddy to SAED receive the official producer price for their grain. The official producer price for paddy is fixed each year by the President's council of ministers and announced shortly before the opening of the annual marketing campaign. Price fixing, for paddy as well as other important agricultural commodities, is justified by the government for several reasons: 1) to guarantee a fair price to producers; 2) to stabilize prices throughout the marketing channel, thus reducing the incentive for speculation by intermediaries; and 3) to encourage the production and consumption of local cereals over imports.[20]

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20. For a discussion of the ideological justification of Senegalese price policy, see Jammeh (1984) and Martin (1985).

Despite these stated objectives, it is difficult to see how official producer prices have benefited rice farmers. Although the nominal producer price of paddy has risen over the past fifteen years, the real producer price (nominal price deflated by a general price index)[21] has actually declined throughout much of this period. Only since 1982 has the decline been reversed as the result of four increases in five years to the (nominal) official producer price. (See Figure 6)

The producer price of paddy for many years was of little importance, since virtually the entire rice crop was retained by farmers for home consumption. But as the area under irrigation expands and yields rise, increasing surplus quantities of grain are becoming available for commercial sale -- and there are signs that the official producer price may be out of adjustment. Even though producers are legally required to sell through the official channel, they have not all been doing so. During the 1984/85 crop season, despite a significant increase in total production over the previous year, official marketings turned down sharply. The total quantity of paddy marketed by SAED during the 1984/85 campaign did not exceed 15,000 tons, less than two-thirds the quantity marketed the previous campaign and only 16% of total production, as compared with an average of 32%

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21. Use of a general price index to deflate producer prices is made necessary because other, more appropriate indices are not published in Senegal.

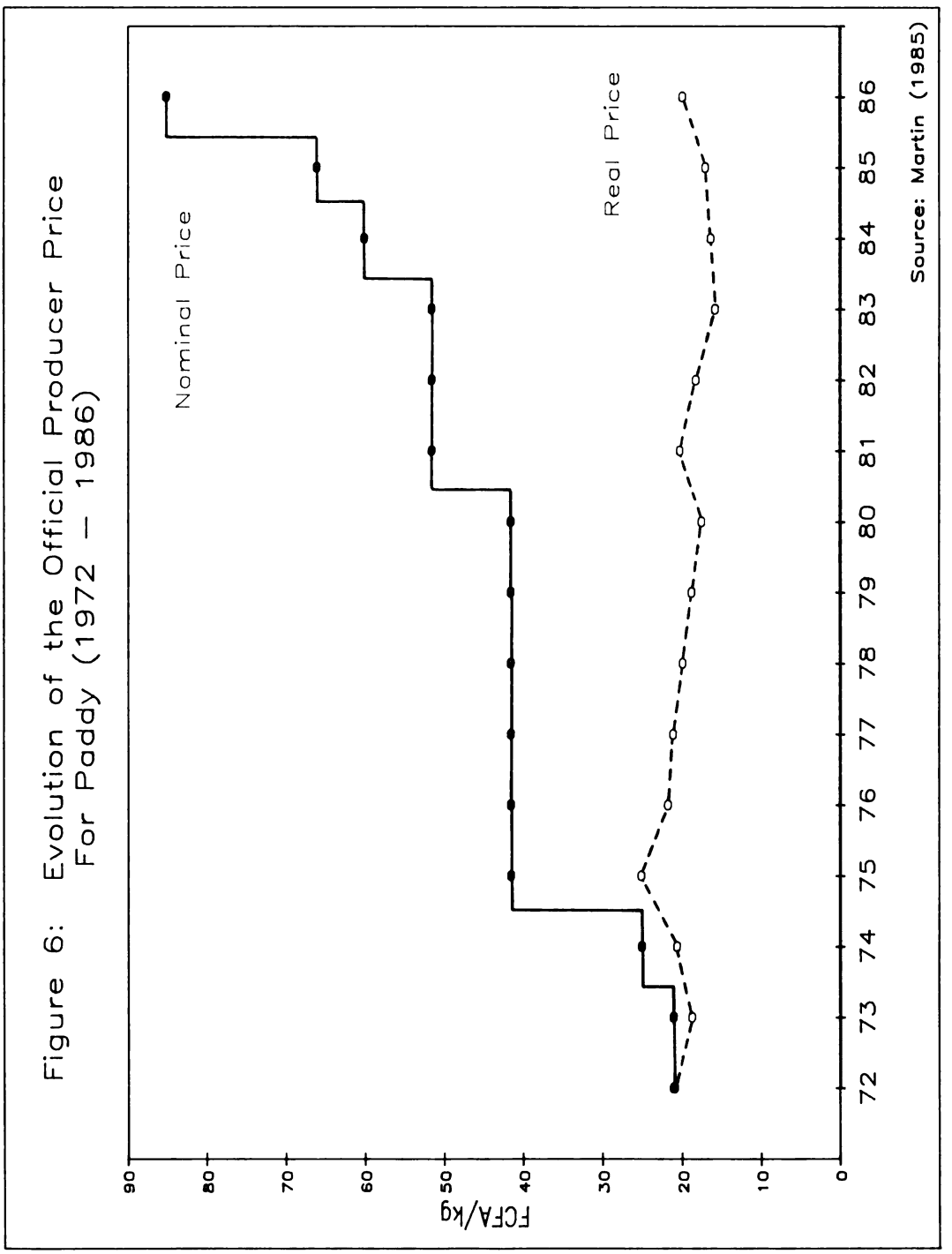
Figure 6: Evolution of the Official Producer Price
For Paddy (1972 – 1986)
Nominal Price
Real Price
FCFA/kg
90
80
70
60
50
40
30
20
10
0
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
Source: Martin (1985)

marketed during each of the previous five campaigns. (Low official producer prices may not have been the only cause of the downturn in official marketings. Non-price factors may also have played a role, e.g., farmer dissatisfaction with SAED assembly services.)

The marked decline in official marketings despite a rise in production implies a significant increase in home consumption and/or parallel market sales. While home consumption no doubt did increase as farmers reacted to higher prices for imported cereals by consuming more of their own production, evidence collected in the field suggests that there was a much greater increase in the flow of grain moving through the parallel channel. As will be shown, this evidence includes the presence throughout the river valley 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, Touba-Mbacke) of local rice.

2.2.C Processing

Paddy assembled through the official channel is trucked via hired transport from the seccos to one of two SAED rice

mills. Both mills are located in the Delta, where most large-scale commercial production of rice is expected. (See Figure 2) At Ross-Bethio, a 6 ton/hour capacity Schule mill (installed in 1971) currently operates at a rate of approximately 3.5 tons/hour. At Richard-Toll, another 6 ton/hour capacity Schule mill (installed in 1983) recently replaced an older Guidetti mill which had been in service since the early 1950's.

Processing operations at the two mills are similar. Paddy is weighed upon arrival to verify that there were no losses during transportation from the seccos. It is then offloaded and passed through an initial cleaning grate before being deposited into a bulk storage facility to await processing. From the bulk storage facility, the paddy is moved by conveyor to the mill. There, it undergoes a second, more thorough cleaning: gravity action is used to remove dirt, stones, and other heavy impurities, while vacuum action is used to draw off unfilled grains, chaff, straw, and dust. The cleaned paddy is next passed through hulling equipment, which separates the inedible husks from the grain. The husks have no commercial value at present and are discarded, although studies are underway to explore their potential as a source of thermal energy. The hulled grain is passed through abrasive stone polishers, which remove the bran. (The bran is sold directly from the mills to local herders, who value it as a feed supplement for cattle and horses.) The milled rice is bagged and deposited

into on-site warehouses to await disposal.

The quality of output from both SAED mills varies greatly, depending among other things on the quality of the paddy being processed, the condition of the machinery, and the level of management. SAED records indicate a conversion rate of 67%, which if accurate would be consistent with the technical specifications of the machinery.[22] Grain processed at the SAED mills typically shows an extremely high percentage of broken grains -- averaging 70% brokens, according to the director of the SAED processing division.[23] While this would be unacceptably high by world standards, it is not a problem in Senegal, since Senegalese consumers prefer broken rice. However, the lack of equipment with which to sort the brokens by size has forced SAED to market a mixed product which does not sell well.

Paddy assembled through the parallel channel is delivered by animal cart or motor vehicle to one of the many small rice hullers located throughout the river valley. The activities of these hullers were little known prior to the present study, although casual observation in the field had indicated that many of the machines are "Engelberg-type"

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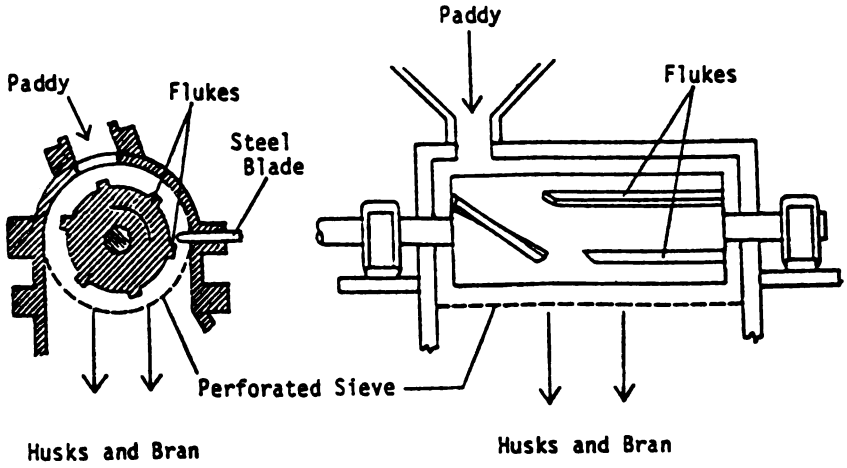
22. This figure could not be confirmed by field measurements of grain samples. One ISRA engineer has questioned the accuracy of the reported 67% rendement, given the habitual disrepair of the processing equipment and the highly variable quality of the paddy. (Courtessole, personal communication).

23. Amadou N'Diaye (Director, URIC), personal communication.

steel-cylinder hullers with a capacity of 120-240 kg/hour.

The Engelberg-type huller is a relatively simple machine. (Two cross-sectional views of the typical "Engelberg-type" machine appear in Figure 7.) 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.

Figure 7: The "Engelberg-type" Steel Huller



The performance of parallel market processing facilities varies depending on the condition of the equipment (particularly the condition of the perforated sieves), the operation of the equipment (blade settings and speed), and the quality of paddy. However, most technical and economic performance parameters (e.g., throughput, conversion rate, quality of output, profitability) remain poorly understood. This can be attributed to the fact that privately-owned paddy processing facilities were illegal in Senegal until very recently, so that the few machines present in the river valley were forced to operate clandestinely.

2.2.D Commercial Imports

Senegal's national food deficit is overcome with the help of commercial imports of food grains, which represent the second most important source of cereals after domestic production. (In 1984, a year of particularly severe drought, commercial imports actually surpassed total domestic production, but this must be considered atypical.) Among imported cereals, rice, red sorghum, and wheat predominate. Rice and red sorghum are used to prepare traditional Senegalese dishes, unlike wheat, which is ground

into flour and made into bread. Since the importation system, distribution channels, and consumption uses of wheat differ markedly from those of the other imported cereals, wheat is not discussed here.

Commercial imports of cereals are handled by the Caisse de Perequation et de Stabilisation des Prix (CPSP). The CPSP is a government agency created in 1973 (see Loi Nationale 73-39) and charged with stabilizing prices of basic food staples (e.g., rice, wheat flour, cooking oil, sugar, tea, coffee), as well as importing cereals (with the exception of wheat). Although the original charter did not confer responsibility for this latter function, the 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 United States), as well as smaller quantities of red sorghum and maize. Total commercial imports have increased steadily in recent years. (See Figure 8).

Cereal import operations are performed by the CPSP's 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

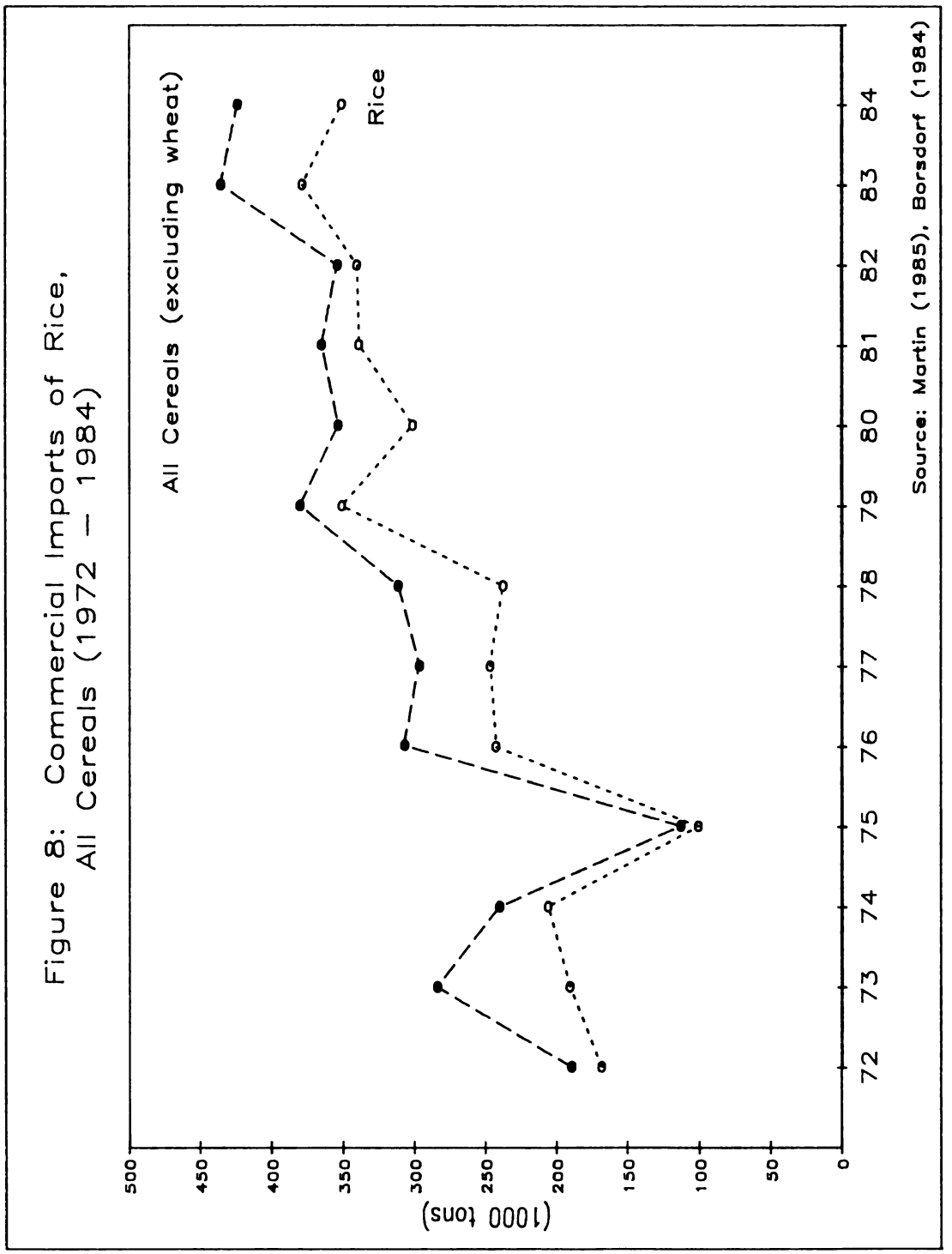


Figure 8: Commercial Imports of Rice, All Cereals (1972 – 1984)

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 regulations.[24]

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. Since some of the grain sold in Dakar eventually makes its way inland, however, the official CPSP regional sales figures understate the volumes of imported grain consumed outside Dakar. Consequently, in order to estimate the total quantity of imported rice distributed in the Senegal river valley during 1984, the 11,000 tons distributed through the Saint Louis CPSP warehouse must be added to the 7,500 tons distributed through Dakar warehouses to licenced wholesalers based in the departments of Matam and Bakel. 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 nation's total commercial rice imports in 1984.

The quantity of commercially imported sorghum distributed in the Senegal river valley is more difficult to

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24. For an evaluation of the CPSP import operation, see Borsdorf (1984).

estimate, since sorghum is not subject to the same strict controls as rice. CPSP sales in the river valley totalled 10,000 tons during 1984, but since inter-regional transfers of sorghum could be affected without a formal transfer permit, additional quantities were undoubtedly trucked in from outside.

2.2.E Distribution

Cereals distribution activities in the Senegal river valley involve numerous public- and private-sector participants operating through official as well as parallel marketing channels.

Official distribution activities are performed by the CPSP working in conjunction with licenced traders, both wholesalers and retailers. The cereals distributed through the official channel include both domestically-produced and imported rice, as well as imported red sorghum. The domestically-produced rice consists entirely of rice produced in the Senegal river valley and marketed through the official channel. This rice is purchased by the CPSP from SAED under terms of a formal agreement by which the CPSP is required to purchase all of SAED's production at a price determined by a formula designed to reimburse SAED its

actual procurement costs. The imported rice and red sorghum distributed through the official cereals distribution channel consist of the grain imported commercially by the CPSP.

Official cereals distribution activities are largely controlled by the Ministere du Commerce Interieur (MCI), which is responsible for enacting and enforcing the laws regulating commerce in Senegal. The 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 grain from the CPSP, what quantities may be purchased, and what prices must be charged. The MCI's Controle Economique is responsible for enforcement of marketing regulations.

Since 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, particularly the rice trade.

Rice sold by the CPSP may be purchased only by licenced quota-holders, known as "quotataires". All quotataires are classified as either wholesalers ("grossistes") or wholesaler-retailers ("demi-grossistes"). Their monthly quotas are reviewed quarterly by the MCI. Eligibilitiy

requirements include possession of an MCI permit to practice general wholesale trade ("carte de grossiste"), demonstrated liquid assets of at least 3 million FCFA, and access to an MCI-certified warehouse where grain can be stored. In addition, quotataires must agree to take delivery of their monthly quota in person, and they must agree to file monthly inventory statements with the Controle Economique. The official CPSP sale price charged to 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 the CPSP for additional transport and handling charges. Since the increments do not cover actual transport charges incurred by the CPSP, the CPSP ends up losing money on sales through inland warehouses. In this sense, sales through inland warehouses are subsidized.

Each month, quotataires take delivery of their allotted tonnage at the CPSP warehouse, after pre-paying by certified check. Credit sales were largely suspended in 1984, although a small number of buyers continues to receive credit.[25] The quotataires transport the bagged grain to their warehouses for eventual re-sale to authorized retailers ("detaillants") at the official wholesale price ("prix en demi-gros"). Like the CPSP sale price, the

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25. A 1982 audit of CPSP rice distribution activities revealed that the biggest recipients of credit were 1) the army, and 2) marabouts (religious leaders).

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 the MCI ("carte de detaillant"). 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 a few bags at a time and resell in lots of less than 5 kg to consumers at the official retail price ("prix au detail"). Like the CPSP sale price and the wholesale price, the official retail price varies by region depending on the size of the transport margin added to the Dakar base.

The government's policy of fixing both wholesale and retail prices effectively determines legal marketing margins. Official wholesale margins on rice can be calculated by taking the difference between the CPSP sale price and the wholesale price, while official retail margins can be calculated by taking the difference between the wholesale price and the retail price. Official wholesale margins are larger for traders located at greater distances from the CPSP warehouses, ostensibly to compensate these traders for additional transport costs. Official retail margins are similar throughout the country. (See Table 1)

Table 1: Official Rice Prices and Margins (effective 1/15/85)

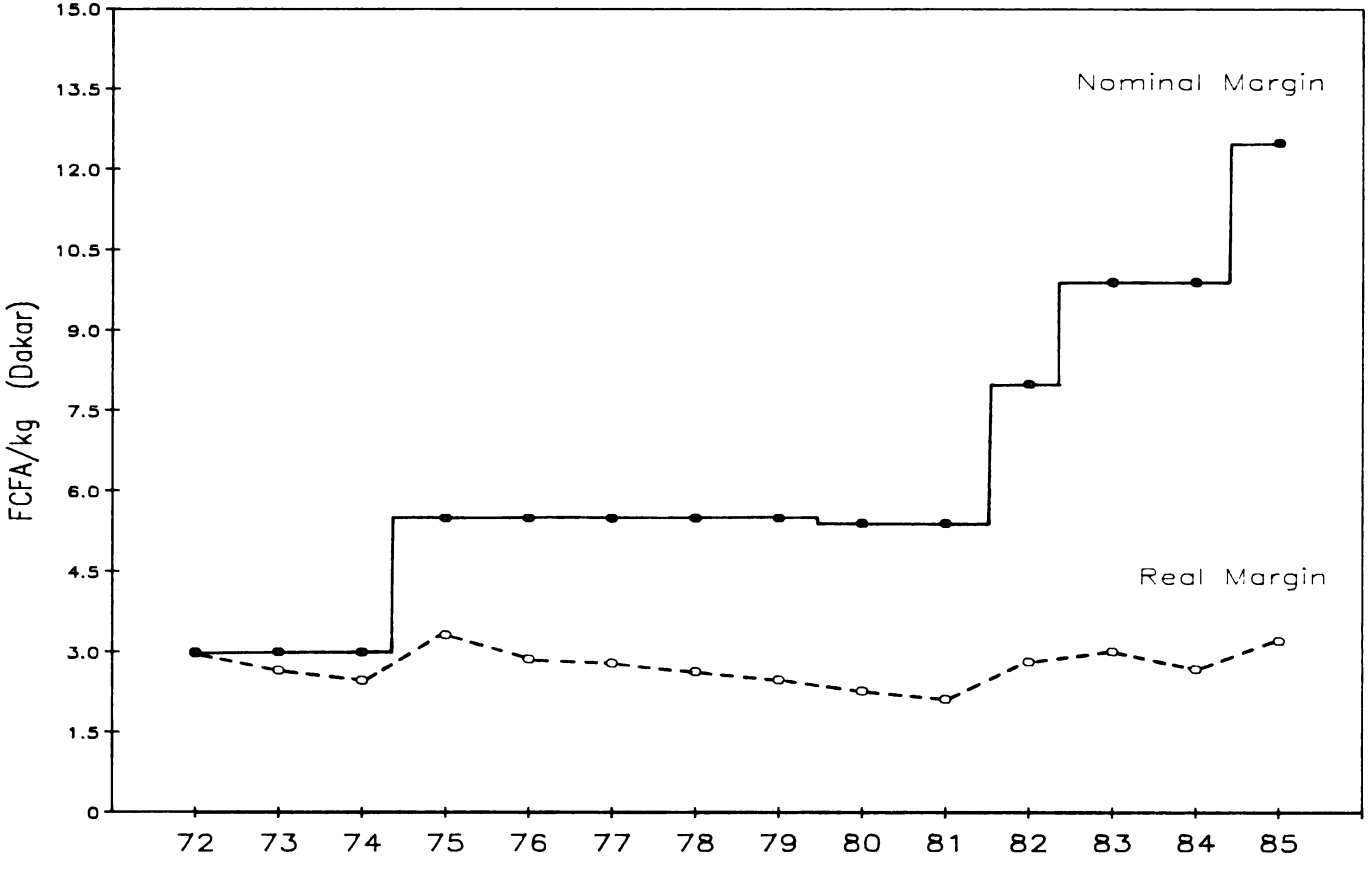
CRSP Warehouse Location	CRSP Sale Price (FCFA/kg)	Wholesaler Warehouse Location	Wholesale Price (FCFA/kg)	Wholesaler Gross Margin (FCFA/kg)	Retail Price (FCFA/kg)	Retailer Gross Margin (FCFA/kg)
Saint Louis	150.259	Saint Louis	156.055	5.796	163	6.945
	150.259	Dagana	157.255	6.996	164	6.745
	150.259	Podor	158.655	8.396	165	6.345
Dakar	147.859	Dakar	153.655	5.796	160	6.345
	147.859	Matam	160.055	12.196	167	6.945
	147.859	Bakel	162.155	14.296	169	6.845

Source: Le Soleil (January 13, 1985)

The official rice price structure is periodically adjusted. 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 9)

Marketing regulations are enforced by the Controle Economique, whose agents make unannounced spot checks in market places to verify that official prices are being respected, that merchants are in possession of the requisite documentation, that weighing equipment is accurately calibrated, that the quality of goods conforms to official standards, and so on. Violators are summoned in writing to

Figure 9: Evolution of Official Marketing Margins On Rice (1972 – 1985)



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

appear at the Controle Economique regional office, where they receive either a verbal warning or a fine. Not surprisingly, the relationship between traders and the Controle Economique is frequently adversarial. The Controle Economique claims that many traders systematically violate marketing regulations, while traders in return accuse Controle Economique agents of using the threat of fines to extort money from law-abiding merchants. It is difficult to say who is telling the truth, although casual observation suggests that both allegations may be at least partially correct.

One last player deserves mention in this brief overview of the official distribution channel. The Societe Nationale de Distribution (SONADIS) is a mixed public-private trading company which operates a national chain of distribution outlets for consumer goods, including foodstuffs 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 product 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 distrubutor of cereals in the Senegal river valley. In 1984, 17 SONADIS retail stores and three SONADIS wholesale outlets located between Saint Louis

and Kidira sold 5,000 tons of imported cereals, including 2,000 tons of rice and 3,000 tons of sorghum.[26] In addition to being the biggest distributor 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.[27] SONADIS' competitive position as a distributor of cereals is enhanced by the preferential treatment it receives from the CPSP. SONADIS is afforded two privileges not offered 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.

Distribution activities in the parallel channel include many different types of illegal transactions. As pointed out earlier, parallel market transactions are often difficult to identify, in part because the spirit and the letter of the law frequently diverge. (For example, the

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

27. Although no formal study has been done to determine whether or not the presence of a SONADIS store affects the cereals pricing behavior of other merchants in the same market area, many SONADIS stores are located in the larger towns already being served by more than just one or two grain traders. Consequently, it is not clear to what extent SONADIS stores succeed in introducing price competition into rural areas.

rice farmer who sells several kilograms of paddy to his neighbor in the village technically violates SAED's legal monopoly on purchases of paddy -- even though it seems inconceivable that the monopoly was granted to restrict such petty transactions.) The present discussion is restricted to a sub-set of all parallel market distribution activities, namely, transactions involving at least a bag or more of local rice sold outside of the producer's home village. These transactions comprise the growing long-distance trade in local rice, which increasingly appears to be competing with the official distribution system.

Thus defined, parallel market distribution activities are poorly understood. Although there is obviously a connection between the growing numbers of small hullers which have appeared in the Senegal river valley and the increasing quantities of local rice turning up in markets throughout northern Senegal, the market channel through which this grain moves has never been investigated. Much of the grain is handled by itinerant traders who travel throughout the river valley during the post-harvest months. These traders purchase grain from farmers, pay to have it processed on a village huller, and transport it to urban consumption centers for re-sale to retailers or directly to consumers. Allegations abound that the parallel channel trade victimizes farmers, who reputedly are forced to sell portions of their crop at exploitative prices in order to satisfy urgent needs for cash. Since the activities of

parallel channel participants have not been studied thoroughly, these and other allegations have neither been substantiated nor refuted.

2.2.F Food Aid

In addition to the cereals distributed through official and parallel marketing channels, a third flow of grain moves through the Senegal river valley in the form of food aid. With one minor exception (which is mentioned below), food aid does not officially enter commercial marketing channels; therefore, food aid is not included explicitly in this study of cereals markets. Yet during times of crisis considerable quantities of food aid are distributed throughout the river valley, which affects cereals markets indirectly by depressing demand for purchased food, including cereals. Consequently, it is appropriate here to include a brief description of the food aid distribution system.

Food aid includes two categories of assistance -- 1) official aid distributed by the government of Senegal, and 2) non-official aid distributed by private voluntary organizations such as the Red Cross, Catholic Relief Services, Church World Service, etc.

In theory, all official food aid is handled by a single public agency, the Commissariat a la Securite Alimentaire (CSA). In recent years, the CSA has been particularly active in the Senegal river valley. Since food aid is allocated on the basis of perceived need, the drought-stricken river valley has been a relatively large beneficiary. 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.[28] Distribution of official aid at the regional level is not subject to elaborate planning; supplies are generally distributed soon after their arrival from Dakar. The food 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 heads of household, who must show documentation for each eligible household member.

Non-official aid is distributed in the Senegal river valley by several private voluntary organizations (PVO's) engaged in community development projects and drought relief efforts. Because no official statistics are kept on this type of aid, it was not possible to obtain disaggregated data pertaining to the Senegal river valley from the PVO's themselves.

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

In addition to its indirect effects on demand, the distribution of food aid has at least one direct effect on commercial cereals markets in the Senegal river valley. Each time a significant quantity of free grain is distributed to the rural populations, a certain portion is sold by the recipients to local traders, who eventually re-sell it to consumers. While there are no precise estimates of the size of this flow, total quantities of aid commercialized this way are thought to be relatively small.

2.2.G Consumption

Consumption of cereals, in Senegal as a whole and in the Senegal river valley in particular, is subject to much misinterpretation. The entire demand side of the market for food is poorly understood due to a lack of knowledge about many critical variables. Kramer, in a recent review of the literature on food consumption and demand, writes, "Existing studies of food consumption, the factors that influence demand, and interrelationships between consumption, production and marketing decisions in rural areas are limited both in geographical coverage, disaggregation by income categories, and methodoligically."[29] National

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29. Kramer (1984):3.

demographic statistics and consumption data are generally missing, as are consumption data disaggregated by region, income class, and social group. Little is known about food demand elasticities -- price elasticities of demand, income elasticities of demand, and cross-price elasticities of demand. As a result, policy makers have no way of estimating the likely aggregate effects on consumption (and hence on nutrition levels) of changes in price policy variables, much less the distributional effects across particular consumer groups.

Given these data problems, policy makers in Senegal operate under a set of general assumptions about consumption patterns and the demand for cereals. Although the data are spotty, clearly the national trend in recent years has been toward increasing consumption of rice -- particularly imported rice -- and decreasing consumption of the traditional grain staples, millet and sorghum. This trend is widely attributed to several factors. Unreliability of supply, high price, and difficulty of preparation are said to have depressed demand for millet and sorghum, while widespread availability, affordable price, and ease of preparation are thought to have increased demand for rice.[30] Ironically, what has come to be the national dish (tieb ou diene, or "rice and fish") is prepared with a cereal that is

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30. The few existing consumer surveys, despite their limitations, seem to corroborate these explanations. For example, see Ross (1980) and N'Diaye and Chevassus-Agnes (1981).

largely imported.

Government price policies appear to play an important role in increasing the quantity demanded of rice. Although the official (retail) 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 thoughout the late 1970's and early 1980's. Only beginning in 1982 did a series of sharp increases in the official consumer price succeed in reversing this trend, enabling the real price to regain some of the ground it had lost since 1975. (See Figure 10.)

Published estimates of average national consumption of cereals range from 127 kg to 175 kg per capita per year, but these estimates are based on data collected at least ten years ago and therefore must be interpreted with caution.[31] Currently, average consumption in the Senegal river valley probably lies toward the low end of this range, given the widespread effects on the regional economy of recent years of drought (i.e., not only has the supply of local cereals diminished, but incomes -- and hence consumer purchasing power -- have been depressed). Thus it seems unlikely that average consumption in the river valley comes close the the 180 kg per capita per year figure cited by the FAO as necessary to meet an adequate nutritional standard.

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31. See the Veme Plan Quadrennial de Developpement Economique et Social (1977) and Ross (1977).

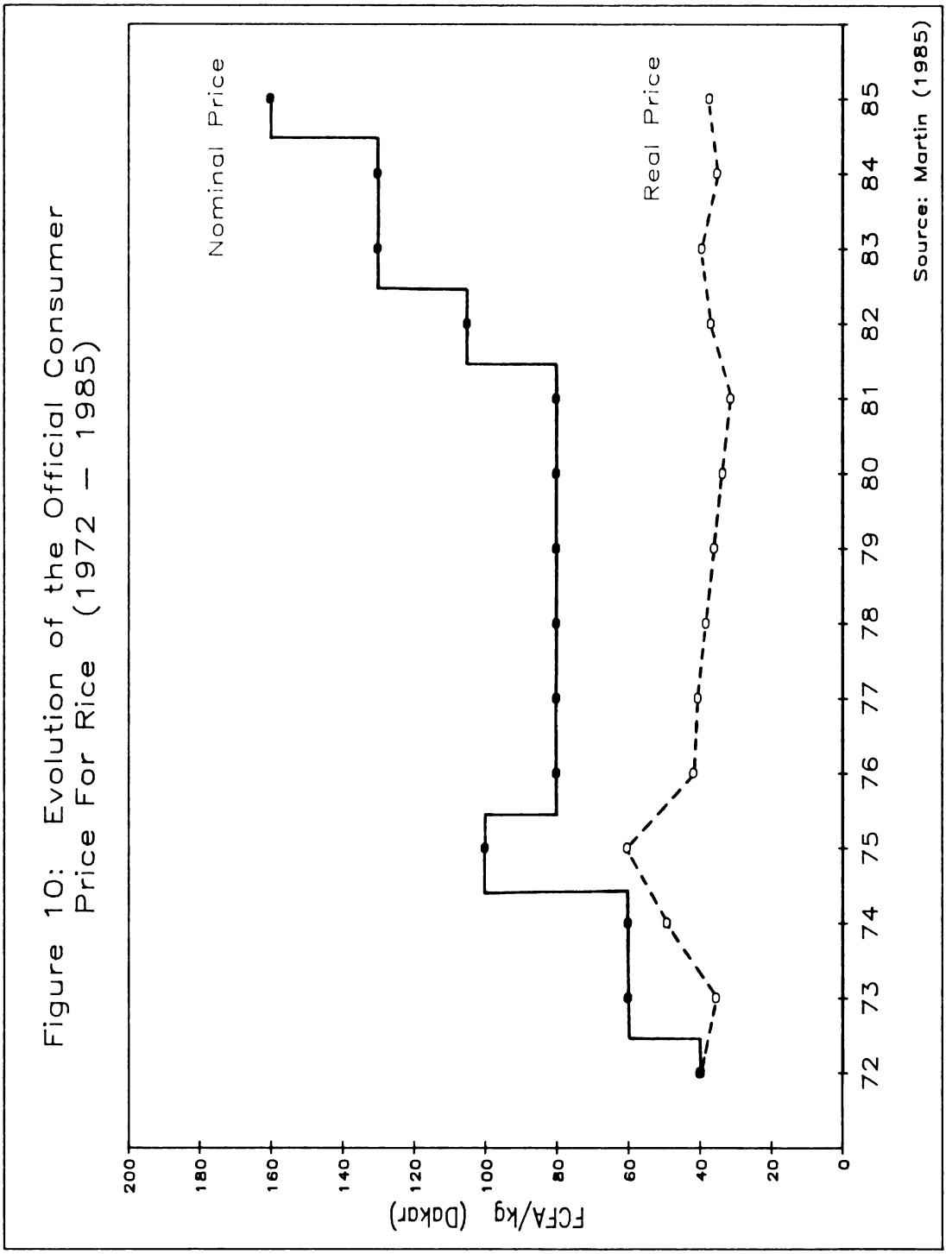

Figure 10: Evolution of the Official Consumer Price For Rice (1972 – 1985)

Furthermore, since the consumption of quantities and types of cereals clearly varies across consumer groups, depending on such factors as location (rural vs. urban), occupation (farming vs. non-farming), and source of income (civil service vs. private sector), many disadvantaged residents of the river valley undoubtedly suffer the effects of a dangerously deficient diet.

2.3 Key Policy Questions

The preceding overview of the cereals sub-sector in the Senegal river valley briefly summarizes existing knowledge about the economic activities involved in the production, marketing, and consumption of cereals. By distinguishing between what is presently known and what remains to be learned, the overview reveals that several key policy questions need to be addressed before steps can be taken to improve the performance of the sub-sector. These key questions include:

1) What is the organization of the parallel channel?
Evidently the rise in importance of the parallel market channel is a recent phenomenon. How exactly does the parallel channel function? Who are the major market participants, what do they do, and what are their problems and opportunities? What are standard operating procedures in the parallel channel? What quantities of grain are handled -- where do they come from, and where do they go?

2) What is the performance of the parallel channel?
How efficient is the parallel channel? What are the costs and returns to the various types of economic activities? What is the distribution of benefits across participant groups? To what extent does the parallel marketing channel contribute to or detract from the achievement of government policy objectives?

3) What is the performance of the official channel?
How efficient is the official channel? What are the costs and returns to economic activities undertaken by government marketing organizations? What are the costs and returns to economic activities undertaken by private agents authorized to participate in the official cereals trade? Who benefits from public-sector interventions? Who loses?

4) <u>How does the performance of the parallel channel compare to the performance of the official channel?</u> Evidence from the field suggests that the parallel channel has been gaining rapidly in importance at the expense of the official channel. Why has this been happening, and what are the likely consequences for performance? What are the alternative development paths for the parallel channel? For the official channel? What are the implications for agriculture and food policy in Senegal?

The following chapters report on field research undertaken to generate the information needed to address these critical policy questions. The basic objective of the field research was to examine and compare the organization and performance of the official and parallel marketing channels, with particular attention to questions of efficiency, the distribution of costs and benefits, and the contribution to government policy goals. The procedure followed is first, to examine separately the individual stages of economic activity (i.e., assembly, processing, wholesaling, retailing) in each marketing channel (official and parallel), and second, to consider the vertical coordinating mechanisms linking the sucessive stages into an

articulated system. Since the ultimate goal of the research is to facilitate the design of improved marketing policies, the emphasis is on tracing out the effects -- intended as well as unintended -- of existing policies and regulations on system-wide performance.

Chapter 3

ORGANIZATION OF THE OFFICIAL MARKETING CHANNEL

3.1 Introduction

This chapter examines the official marketing channel for cereals in the Senegal river valley. The official channel comprises four major stages of economic activity: 1) assembly, 2) processing, 3) wholesaling, and 4) retailing. These four horizontal slices of economic activity are examined in turn, as are the vertical coordination mechanisms linking them. Particular attention is directed toward the environment in which cereals marketing activities take place, structural characteristics within each industry, and the behavior of market participants.

The material contained in this chapter provides a view of the official marketing channel that is not always consistent with the abstract rules and regulations contained in government documents outlining the way the channel is supposed to function. Nor is it always consistent with the conventional wisdom and unsubstantiated beliefs about markets and middlemen that through endless repetition have come to be widely accepted as truth in Senegal. Rather, the view presented here is grounded in empirical evidence gathered carefully and systematically in the field in an

effort to shed new light on the crucial question of how the market *really* works.

Data on the organization of the official marketing channel were collected from numerous sources. Data on official assembly and processing operations were obtained from SAED documents, both publications intended for external distribution as well as account books, memoranda, and other records intended primarily for internal use. Additional information, both quantitative and qualitative, was obtained directly from participants in the official channel, from upper-level SAED management on down through mill operators, warehouse supervisors, truck drivers, secco workers, extension agents, and farmers. Data on official distribution operations were collected from CPSP records, as well as through interviews of numerous market participants. These interviews included a formal survey of 122 licenced grain distributors, both wholesalers and retailers, located throughout the length of the river valley.[1]

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[1]. For a description of field data collection activities, see *Appendix*. See also Morris (1985d).

3.2 Official Assembly Operations

In recent years, drought has severely limited rainfed production of millet and sorghum in the Senegal river valley. During the period of the study irrigated rice was the only locally-produced cereal handled by the official marketing system, with the result that official assembly operations were limited to the SAED rice marketing program, managed by a semi-autonomous unit within SAED known as URIC (Unite Autonome Rizeries Intendances Commercialisation).

URIC's assembly responsibilities include distributing bags to farmers, taking delivery of bagged grain at the seccos, supervising weighing activities, hiring private transporters to move bagged grain to the SAED mills, and directing transport operations. These tasks are complicated by the imposing physical environment. Paddy production is dispersed over a large area poorly served by roads and other forms of infrastructure. 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, and farmers tend to behave opportunistically. In light of these many obstacles, the URIC assembly operation has been plagued with difficulties, and questions have been raised about its performance. Criticism has tended to focus on the need to reduce overbureaucratized procedures in order to ensure more

timely, reliable, and cost-effective assembly operations.

The following discussion of the URIC assembly operation relies on cost analysis as the main diagnostic tool. Cost data pertaining to the URIC assembly operation were obtained from a series of internal audits commissioned in recent years by SAED management to provide cost breakdowns of the different components of the URIC marketing operation.[2] While these audits provide a rich source of information, unfortunately they are not published every year, and the figures they contain are often dated by the time of publication. (For example, the URIC cost data discussed below relate to the 1983/84 marketing campaign; more recent data had not been released when the field work for this study was being conducted.) Notwithstanding the delay in their appearance, the data are extremely valuable, because they contain important clues to the economic performance of the official marketing channel.

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

1) the cost of bags for paddy;

2) the cost of documentation (printed forms);

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2. See Chateau (1982) and Cisse (1984).

3) the cost of scales used to weigh paddy at the seccos;
4) the cost of temporary storage at the seccos;
5) bonuses paid to cooperative presidents and weighers;
6) the cost of transport to the mills;
7) fees paid to the Controle Economique; and
8) salaries of SAED personnel assigned to assembly operations.

These costs were reported as follows for the 1983/84 marketing campaign, averaged over the entire SAED operation.

Table 2: SAED Reported Assembly Costs (1983/84)

Assembly Cost Components	Cost/Ton Paddy (FCFA)	% of Total Assembly Cost
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 fees	112	1.19
SAED salaries	1,654	17.61
Total assembly costs	9,393	100.00

Source: Cisse 1984

Although it is not evident in the aggregated data presented in Table 2, a striking feature of the reported assembly costs is the tremendous variability between perimeters caused by differences in the scale of production

and in geographical location. For example, paddy produced in the perimeters of Bakel (which are located far from the two SAED mills and which marketed only 12.3 tons) cost nearly fourteen times as much per ton to assemble as paddy produced in the perimeter at Debi (which is located close to a mill and which marketed 5,719.3 tons).[3]

Among individual assembly 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 bags distributed (237,440). Since each bag holds 80 kg of paddy, enough bags were distributed for 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.[4] But neither 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 of non-recovered bags), and given that each bag can theoretically be used an average

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3. SAED (1984a):106.

4. Amadou N'Diaye (Director, URIC), personal communication.

of three rotations, the reported cost of bags for paddy seems excessive. Similar charges apparently have appeared each year in the URIC accounts.

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 costs in 1983/84. (This figure represents a mean calculated across the entire river valley; transport costs varied greatly between individual perimeters.[5]) Lacking the necessary trucks, SAED contracts out the transport operation. Although theoretically an open bidding system is used, the official policy of favoring local transport firms undermines its competitiveness. Local transport firms have formed a consortium and submit a single bid, which is accepted after some negotiation. The SAED transport rate schedule established for the 1983/84 marketing campaign appears in Table 3.

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5. SAED (1984a):119.

Table 3: SAED Transport Rate Schedule for Paddy (FCFA/ton/km)

Type of Road Surface	Transport 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 in the region on a large scale, it is not clear what to use as a basis for comparison in evaluating these transport rates. The SAED rates are clearly high compared to rates paid during the same period by grain distributors working in the river valley. For example, the CPSP paid 19 FCFA/ton/km over the paved road between Richard Toll and Saint Louis, and a sample of wholesalers 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.

3.3 Official Processing Operations

Like official assembly operations, official processing operations in the Senegal river valley are performed by SAED, and in particular by its marketing division URIC. Consequently, the approach used to examine assembly operations is also used to examine official processing activities -- i.e., analysis of SAED reported cost data, supported by formal and informal interviews with market participants.

Following SAED accounting practice, processing costs are divided into three categories: 1) the cost of operating the two SAED rice mills ("processing costs"); 2) the cost of storing processed grain at the mills before it is delivered to the CPSP ("storage costs"); and 3) general overhead charges ("overhead costs"). In addition, two important cost items which do not appear explicitly in SAED accounts are introduced: 4) the cost of capital tied up in inventory, and 5) physical grain losses.

Processing costs accounted for in 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 either collection by the CPSP (rice) or sale (by-products). These include:

1) the cost of energy to run the mills;
2) the cost of bags for milled rice;
3) maintenance and repair of the mills;
4) salaries of SAED personnel assigned to milling operations; and
5) depreciation on the mills.

These costs were reported as follows for the 1983/84 marketing campaign, which included five months of operations at the Ross-Bethio mill and seven months of operation at the Richard-Toll mill.

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

Processing Cost Components	Ross-Bethio		Richard Toll	
	FCFA/ton Paddy	% of Total	FCFA/ton Paddy	% 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

Processing costs varied considerably between the two mills in 1983/84; 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 components 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., processing machinery, 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 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, as compared to only 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 processing facilities, it is necessary to operate them at high rates of capacity utilization. If high rates of capacity utilization are not achieved, fixed costs (for example, 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 instructive to consider the size of the increase in average processing costs caused by the underutilization of the two mills. Based on theoretical processing capacity estimates provided by SAED engineers and actual throughput data obtained from mill records, during the 1983/84 marketing campaign the Richard Toll mill operated at 42% of capacity, while the Ross-Bethio mill operated at 31% of capacity.[6] In order to calculate precisely the total cost savings per ton of paddy which might have been achieved had the mills been fully utilized, additional fixed vs. variable costs information would be required. Because neither the

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6. For more information on the technical parameters used to derive these results, as well as the computations, see Morris (1985b):27.

URIC audits nor other SAED records contain the necessary breakdowns, the potential total cost savings cannot be calculated precisely. But because depreciation charges are known, the potential savings on average depreciation costs alone can be calculated. If the SAED mills had operated at full capacity during the 1983/84 season, the reduction per ton of paddy in depreciation costs alone would have lowered average processing costs by 5,058 FCFA in Richard Toll and by 929 FCFA in Ross-Bethio.[7] Additional cost savings would have been realized on other fixed cost components.

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

1) maintenance and protection materials;
2) the cost of documentation (printed forms); and
3) salaries of SAED personnel assigned to storage operations.

These costs were reported as follows for paddy processed and stored during the first seven months of 1984.

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7. See Morris (1985b):27.

Table 5: SAED Reported Storage Costs (1983/84)

Storage Cost Components	Ross-Bethio		Richard Toll	
	FCFA/ton rice	% of total	FCFA/ton rice	% of total
Maintenance,protection	27	3.81	26	1.68
Documentation	4	0.6	4	0.26
SAED salaries	683	95.59	1,514	98.06
Total storage costs	714	100.00	1,544	100.00

Source: Cisse 1984

Evaluation of the 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, building costs are not included, 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. Typically, this is the single most important cost category in grain storage operations, representing the interest foregone on capital tied up in the form of inventory.

Among the storage costs that do appear, the importance of labor is striking, particularly since storage is the

least labor-intensive of grain marketing activities. Labor costs appear high because building and inventory costs are missing; inclusion of these two cost categories would significantly reduce the relative share of labor. 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 is attributable to differences in management between the two mills.

Overhead costs are defined in SAED accounting documents as "costs which cannot be assigned specifically but which nevertheless result from the various agricultural production support programs within the SAED sphere of operations."[8] These include:

1) operating costs of SAED headquarters in Saint Louis and SAED regional offices throughout the river valley (including electricity, water, telephone, telex);
2) miscellaneous payments to personnel (including travel expenses, per diem, honoraria);
3) insurance;
4) taxes; and
5) miscellaneous financial charges.

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[8]. Cisse (1984):28.

During 1983/84, overhead costs totalled over 226 million FCFA. SAED accounting practice assigns overhead costs to the various crop production programs in proportion to the area planted to each crop. For 1983/84, this works out to 11,016 FCFA for every irrigated hectare, which given the average paddy yield of 4.8 tons/ha comes to 2,295 FCFA/ton of paddy produced. This represents approximately 10% of total reported SAED marketing costs (exclusive of the price of paddy).

From an analytic point of view, it is difficult to justify the practice of assigning general overhead costs entirely to the marketing operation, since the overhead charges support 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 the 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.

Before ending this review of SAED marketing costs, it must be noted that two extremely important cost items fail to appear in any SAED accounting documents: the cost of capital tied up in inventory, and the cost incurred because of physical grain losses. Each deserves brief mention.

Between the time paddy is first assembled at the seccos and the time milled 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 benefit from "free" funding. To the extent that SAED functions with public money or with other external sources of capital on which it pays no interest, it receives a concealed subsidy. If the economic performance of URIC's marketing operation is to be evaluated objectively, this subsidy ought to be taken into account.

Likewise, the cost associated with physical losses of grain ought to be taken into account. Physical losses are caused by insect or pest attack, grain deterioration, improper handling, or theft. Product can be lost at any point between the time paddy is purchased at the seccos and milled rice is delivered to the CPSP. Informal observation of SAED marketing operations suggests that grain is indeed lost. 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 account is made for grain losses in any of the URIC audits.

3.4 Official Wholesaling Operations

Official cereals distribution activities in the Senegal river valley are carried out by the CPSP working in collaboration with private-sector merchants operating under government regulations and policies. The cereals distribution activities of the CPSP have been studied elsewhere and are not examined here in detail.[9] Instead, the focus is on the private-sector merchants, about whom little is known.[10] Private-sector merchants play a leading role in the official distribution channel, and effective marketing policy analysis requires an understanding of their operating procedures and constraints. Consequently, a major field data collection effort was directed at licenced private-sector cereals merchants. Licenced grain traders operating the length of the river valley were surveyed, and frequent visits were made to cereals distribution centers, public and private warehouses, market places, and other points of grain marketing interest.[11]

Official wholesaling activities involve CPSP sales of grain to licenced wholesalers (or wholesaler-retailers) and

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9. See Arthur Anderson Gaye and Associates (1982) and Borsdorf (1984).

10. The recent SONED study of cereals marketing in Senegal failed to produce any data on distribution activities in the Senegal river valley. (SONED 1985:124).

11. See Appendix for a description of the field research activities.

subsequent re-sales of the same grain to licenced retailers. As explained earlier, the licenced merchants who buy from the CPSP are known as "quotataires" because they are assigned a monthly quota of rice. Most transactions in the official channel involve rice (imported rice and/or SAED rice), although small quantities of imported sorghum also are handled by the CPSP. While sales of sorghum are not subject to quantity restrictions, only rice quotataires may purchase sorghum from the CPSP.

It is instructive to begin this examination of official wholesaling activities by considering what appears to be a key structural characteristic of the market -- the relatively high degree of market concentration. During the period of the study, only 45 wholesalers ("grossistes") and wholesaler-retailers ("demi-grossistes") were authorized to purchase rice from the CPSP for distribution in the Senegal river valley. The sizes of their monthly quotas were distributed asymmetrically, with the result that a relatively large proportion of the total allocation was assigned to 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

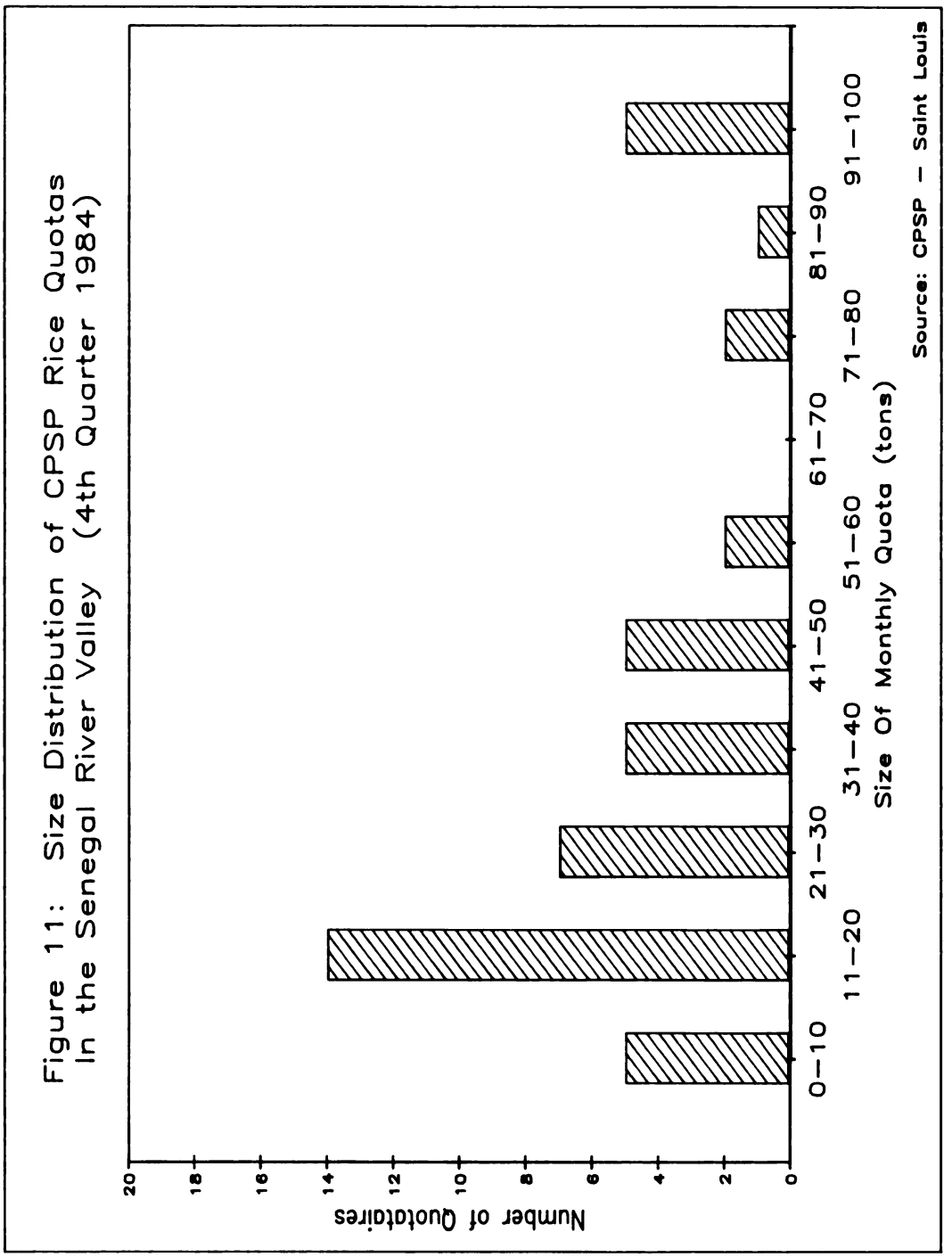
Figure 11: Size Distribution of CPSP Rice Quotas
In the Senegal River Valley (4th Quarter 1984)
Number of Quotataires
0
2
4
6
8
10
12
14
16
18
20
0-10
11-20
21-30
31-40
41-50
51-60
61-70
71-80
81-90
91-100
Size Of Monthly Quota (tons)
Source: CPSP - Saint Louis

1,061 tons, was divided among the other 37 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.

Why is the Senegal river valley, a vast geographic area, served by so few licenced cereals wholesalers? What factors explain the relative concentration of the wholesaling industry? These are important questions, because if it can be determined that the concentrated market structure is associated with undesirable behavior on the part of market participants, it may be desirable to consider policies to increase the numbers of wholesalers.

Clearly, one reason there are so few cereals wholesalers is that total demand for cereals is limited. Although the Senegal river valley is geographically vast, for the most part it remains sparsely populated. Saint Louis represents the one metropolitan center, and the only other towns exceeding several thousand inhabitants are Richard Toll, Dagana, Podor, Matam, and Bakel. Thus, there simply may not be enough demand in many areas within the river valley to support more than a single licenced wholesaler.

Yet it would be naive to imagine that the relatively small number of cereals wholesalers operating in the Senegal river valley results entirely from environmental conditions.

Institutional factors also play a role in limiting participation in the wholesaling industry. If the degree of market concentration is affected by entry conditions into the market, a restricted number of sellers would logically be associated with the presence of barriers to entry. Such barriers are present in the river valley. The total number of wholesalers 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 the quotas is the responsibility of the 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 while facilitating realization of potential economies of scale, but at the same time there is the danger of greater concentration of market power within the hands of a small group of traders, leading to possible monopolistic practices.

Because of their 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 religious or economic figures), who rented them illegally to non-quota-holding traders. While the MCI appears to have made progress in combating this practice, a number of quotas in the Senegal river valley continue to be held by individuals who obviously do not make their living trading cereals.

If the rice quota represents an explicit legal barrier into cereals wholesaling, a second less explicit barrier affecting wholesale commerce in general appears to be the lack of investment and operating capital. In Senegal, as in many developing countries, investment capital tends to be scarce, and commercial bank loans are not generally available for traders. Although the cereals wholesalers surveyed were nearly unanimous in identifying the lack of capital as one of the major problems encountered in their work, only 4% of the sample 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 specified that these loans serve to alleviate temporary cash flow problems and involve small amounts over short periods of time (one month or less).

Official marketing regulations increase the importance of credit by requiring applicants for wholesaling licences to provide proof of a bank account containing a minimum balance 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 3 million FCFA remain in the account after the licence is granted, prospective wholesalers nonetheless are forced to raise the money initially in order to obtain their licence. Thus, in addition to the formal quota requirement, government regulations introduce a second barrier to entry restricting access into cereals wholesaling.[12]

The incidence of kinship among wholesale traders is high in the Senegal river valley. Fully 54% of wholesalers and wholesaler-retailers surveyed reported being related by blood or by marriage to other cereals traders in the same town. It was initially hypothesized that an absence of kinship ties might represent a third barrier to entry into cereals wholesaling. Yet interviews with traders showed that kinship ties are not a necessary pre-condition for starting out in the business as much as they are a result of the tendency for wholesale commerce to absorb entire families. Over 81% of the wholesalers and wholesaler-

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12. Newman, N'Doye, and Sow (1985:11) suggest that the minimum balance requirement similarly poses an unnecessary barrier to entry into the millet trade. Citing data collected in the Peanut basin, they assert that most transactions made by millet traders involve less than 10,000 FCFA.

retailers stated that anybody with a quota and money can become a cereals trader, while only 15% indicated that it is necessary to have the support of an established trader, preferably a relative, to enter into business.

The most salient structural characteristics of the cereals wholesaling industry in the Senegal river valley are dispersed demand and barriers to entry. The only other structural characteristic of the market worth mentioning is the undifferentiated nature of the product. Since quotataires all purchase their grain from the CPSP, which carries a limited range of grades (and furthermore allows the quotataires no choice in selecting which grade they receive), at any given time all quotataires generally offer their customers the same few grades of rice and/or sorghum. While the survey showed that consumers do differentiate between grades of cereals and that retailers in turn are willing to make a special effort to stock those preferred grades, wholesalers generally do not exercise much discretion over which grades they carry. Product differentiation therefore is not a factor in the market at the wholesale level, and it does not appear to influence either structural characteristics of the industry (e.g., determination of market shares) or behavioral characteristics of participants (e.g., pricing practices, sales promotion, competition).

Following standard S-C-P methodology, data were collected to explore interrelationships between structural characteristics of the official wholesaling industry (such as those described above) and the behavior of market participants. Licenced wholesalers were asked to respond to formal survey questionnaires, to participate in informal interviews, and to allow direct observation of their activities. All three approaches were useful, because there is often a difference between what grain traders say they do and what they actually do.

Much of the interaction between quotataires and CPSP employees takes place behind closed doors and cannot be observed directly. In describing their dealings with the CPSP, many quotataires mention the basic imbalance in power resulting from the monopolistic position of the CPSP as the single legal supplier of rice and sorghum. CPSP employees exert their power by controlling the scheduling of deliveries and the selection of bags of grain. A number of quotataires reported that the 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. Several quotataires admitted paying CPSP warehouse staff in order to obtain preferential treatment. However, it was impossible to investigate this sensitive issue in depth.

Even though the CPSP enjoys a monopolistic position vis a vis the quotataires, the wholesaling industry is sufficiently concentrated to provide the quotataires with a certain amount 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. Only 21% of the wholesalers and wholesaler-retailers surveyed reported meeting formally with other traders on a regular basis to discuss business, but nearly all acknowledged informal contacts with other cereals traders in the same town. Many quotataires indicated that a common topic of conversation is the problem of dealing with the CPSP, adding that traders often share information to avoid being played off against one another for favors.

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

How might competition be manifested? A logical place to look is pricing behavior. Unfortunately, analysis of cereals prices as a measure of market competitiveness is complicated in the Senegal river valley for several reasons. To begin with, reliable long-term data on actual market prices are not available. An extensive search of the

literature (both government publications and published research results) turned up no time series data on actual market prices for cereals at any level -- producer, first-handler, wholesaler, or retailer. Official prices are of course available, but casual observation suggests that these bear little resemblance to the prices which actually prevail in the marketplace.

Even if reliable market price data were available, it is not clear whether or not they would provide an accurate indication of market competitiveness. Since traders caught buying or selling grain at any price other than the official price are routinely fined, prices do not move freely. When questioned, traders are generally reluctant even to discuss their pricing practices (other than to say that they <u>always</u> abide by the official regulations!)

If 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 on cereals are simply too small to permit discounting. Many wholesalers and wholesaler-retailers assert that the official wholesaling margins do not always cover actual marketing costs, and that merchants consequently cannot afford to engage in price competition.

Marketing margins earned by grain traders are difficult to estimate with precision. While official margins provide a general indication of the returns to cereals distribution activities, it must be kept in mind that traders do not always realize the official margins. According to many of those surveyed, two cost items regularly undermine the profitability of official distribution activities: transport costs, and physical grain losses.

Transport rates for cereals and other food staples supposedly are regulated by the MCI, which every year establishes an official transport rate schedule, or "bareme". Although this schedule serves as the basis for contractual agreements between government agencies and private trucking firms, it is generally ignored by quotataires in their negotiations with private truckers. Actual transport rates reported by cereals wholesalers deviate considerably from the official schedule and show economies associated with increasing distance.
(See Table 6)

Table 6: Official vs. Actual Reported Transport Rates

Origin of Grain	Destination of Grain	Distance (km)	Official Rate (FCFA/ton/km)	Actual Rate (FCFA/ton/km)
St. Louis	St. Louis	1	47.5 - 1900	300
	Dagana	126	31	24
	Podor	225	31	22
Dakar	Matam	700	31	10
	Bakel	750	42*	16

*2/3 of distance @ 31 FCFA/ton and 1/3 of distance @ 64 FCFA/ton.

It is interesting to consider how discrepencies between official transport rates and the rates actually paid by quotataires affect wholesale distribution margins. Table 7 shows official gross margins, official gross margins net of official transport charges, and official gross margins net of actual reported transport charges for quotataires located in Saint Louis, Dagana, Podor, Matam, and Bakel.

Table 7: Official Wholesale Margins on Rice Net of Official, Actual Reported Transport Costs

Location of Wholesaler	Official Gross Margin (FCFA/ton)	Official Transport Cost (FCFA/ton)	Official "Net" Margin (FCFA/ton)	Actual Transport Cost (FCFA/ton)	Actual "Net" Margin (FCFA/ton)
St. Louis	5,796	1,900	3,896	300	5,496
Dagana	6,996	3,906	3,090	3,024	3,973
Podor	8,396	6,975	1,421	4,950	3,446
Matam	12,196	21,700	-9,504	7,000	5,196
Bakel	14,296	31,500	-17,204	12,000	2,296

Source: MCI, Le Soleil, Field Surveys

These data show that compliance with official transport rate regulations would be prohibitively expensive for many private traders. Assuming quotataires purchase rice from the CPSP at the official CPSP sale price, transport it to their own distribution warehouse at official transport rates, and sell it to retailers at the official wholesale price, the resulting official gross margins net of transport costs range from 3,896 FCFA/ton for quotataires situated in Saint Louis to -17,204 FCFA/ton for quotataires situated in Bakel. Thus, in some parts of the river valley, quotataires who abide by the official price structure and who adhere to official transport rates cannot possibly earn positive returns to their rice marketing activities.

In order to stay in business, quotataires are forced to negotiate transport rates lower than those specified by the official rate schedule. According to most respondents, non-official rates are commonly negotiated between traders and private transporters, and government regulators make little effort to prevent the practice. Referring once again to Table 7, when actual reported transport rates are substituted for the official rates in the margins calculations, the net margins all become positive, ranging from 5,496 FCFA/ton for quotataires located in Saint Louis to 2,296 FCFA/ton for quotataires located in Bakel.

A second cost item undermining the profitability of official distribution activities is physical grain losses.

Many licenced distributors, both wholesalers and retailers, claim that official marketing margins are considerably reduced because the bags of grain sold by the CPSP are often underweight. This is denied by CPSP representatives, who counter that the bags are more often overweight than underweight. Random samples of three types of rice bags were weighed at the CPSP warehouse in Saint Louis during April 1985, with the following results:

Table 8: Measured Weights of Rice Bags (CPSP, St Louis)

Type of Rice	Theoretical Weight (kg)	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

These data suggest that the traders' 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 lie within a single standard deviation of the theoretical bag weights (which appeared to be distributed normally), the mean measured bag weight in one case exceeds, in one case equals, and in one case fails to reach the theoretical bag weight. Thus, a shipment can contain underweight bags, overweight bags, or both. (Although quotataires may ask to have individual sacks weighed at the time of purchase from the

CPSP, a supplementary handling fee effectively discourages them from exercising this right.) 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.

Transport charges and physical grain losses clearly do cut into the modest margins allowed by the official price structure, but without additional detail on other marketing costs, precise estimation of net margins is difficult. Some wholesalers claim they have to raise selling prices merely to break even on their grain trading operations. At first glance, this seems inconsistent with the earlier finding that quotas have great economic value. After all, why would a trader pay a bribe in order to obtain a quota giving him the right to sell a product at a loss? Two possible explanations come to mind. If the wholesalers who report losses on their grain trading operations are lying, then raising selling prices is simply a means of increasing profits. On the other hand, if the wholesalers are telling the truth, then why would they be interested in trading rice in the first place? When asked this question, several wholesalers described rice as a "loss leader" type of product which serves to draw in retailers for more profitable trade in other food and non-food products.

Whichever explanation is correct, retailers confirm that wholesalers tend to exert upward pressure on prices rather than downward pressure. Retailers identify three basic strategies used by wholesalers to increase prices: 1) charging the official price for cash sales but adding a substantial surcharge on credit sales; 2) selling underweight bags; and 3) selling at the retail price instead of at the wholesaler sale price as required by law. Many wholesalers confirm these practices, pointing out that they are necessary, respectively: 1) to reimburse the cost of credit (including a risk premium against non-repayment of bad loans); 2) to avoid losses on bags which were underweight when purchased from the CPSP; and 3) to cover the higher costs of retail transactions.

Overt pricing behavior on cereals thus does not reveal much about competition, at least not at the wholesale level. But this does not mean that there is no competition. Informal interviews with market participants, wholesalers as well as retailers, revealed that there is competition between wholesalers for market share. Since price competition is illegal (and therefore costly and risky), 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, tea, milk, and vegetable oil. Because many retailers depend on credit to maintain

inventory, the sponsoring wholesaler can effectively control them through advances of merchandise on credit. Whereas only 21% of the wholesalers and wholesaler-retailers surveyed buy cereals on credit, 92% regularly sell 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.[13]

Occasionally the competition between rival wholesalers over market share intensifies, and extraordinary measures are invoked. During the period of the survey, two wholesalers engaged in a struggle for control over the retail trade in Bakel. Larger and larger quantities of merchandise were distributed to retailers at increasingly favorable credit terms, and at one time a clandestine price war broke out as both wholesalers offered under-the-table discounts. Eventually, losses forced one of the two wholesalers to withdraw from the market, whereupon the second immediately restored credit terms and prices to their previous levels.

Cereals are not the only products offered on credit by competing wholesalers. Because the quota system imposes an upper limit on the quantity of rice that can legally be traded, rapid expansion in cereals market share is prevented

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[13]. The use of credit by cereals wholesalers as a basis for competition was similarly found in the Casamance region. (Jolly and Diop, 1985.)

by supply-side constraints.[14] Consequently, cereals traders who are easily moving their quotas of rice must look to other product lines if they are to expand their businesses. Not surprisingly, diversification has become extremely prevalent in wholesale commerce. Only 8% of the wholesalers and wholesaler-retailers surveyed trade exclusively in cereals; the vast majority trade cereals in addition to food staples and other dry goods.

The organization of the official distribution system for cereals thus encourages diversification by limiting the scope of individual involvement in rice trading. At least two other factors also discourage specialization in cereals. First, fixed official prices remove much of the seasonal and regional price variability that can provide profit opportunities for skilled managers. Second, exclusive reliance on cereals is risky because food aid can easily disrupt demand. Every time food aid is distributed, commercial sales of rice and sorghum drop precipitously. The trader who specializes in cereals thus faces irregular and unpredictable sales.

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[14]. While a quotataire can make application to the CPSP to have the size of his quota increased, such applications are granted infrequently. The official policy of the CPSP is to keep the total grain allotment distributed across a relatively large number of quotataires, ostensibly to prevent individual traders from wielding excessive influence over the market. However, many quotataires claim that quota increases can be negotiated "for a price".

3.5 Official Retailing Operations

Official retailing activities involve sales of grain by licenced retailers to consumers. Technically, official retail activities also include petty sales by unlicenced sellers in local markets; such transactions comprise part of the official marketing channel when the seller -- usually a producer or a member of his family -- pays a daily market-use fee to market authorities and when no official price policies are violated. Most retail transactions in the official channel involve rice (imported rice and/or SAED rice), as well as smaller quantities of imported sorghum.

Whereas wholesale distribution activities are dominated by a relatively small number of merchants, retail distribution activities in the Senegal river valley are performed by 17 SONADIS retail stores, several hundred licenced traders, and literally thousands of unlicenced market sellers. The licenced traders are of 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.

Why is the population of the Senegal river valley served by so many cereals retailers? What factors can be invoked to explain the relative lack of concentration in the retailing industry? Once again, these are important

questions, because if it can be determined that the degree of market concentration is associated with undesirable behavior on the part of market participants, it may be desirable to consider policies which would reduce the number of retailers.

Clearly, fragmented demand contributes to the large number of cereals retailers. Senegalese consumers tend not to travel large distances to make food purchases; housewives purchase most food from sources of supply located within easy walking distance of their homes. The importance of accessibility is heightened because many Senegalese consumers face chronic cash flow problems which prevent them from purchasing food staples in bulk. Forced to make their purchases as money becomes available, many housewives regularly frequent the local market or neighborhood shop, making small daily purchases. Thus, basic environmental factors are partly responsible for the relatively atomistic structure of the industry.

Yet environmental factors alone do not explain the relatively large numbers of cereals retailers operating in the Senegal river valley. As in the case of wholesaling, institutional factors also appear to play a role in determining participation in the retailing industry. If the degree of market concentration is affected by entry conditions into the market, a large number of sellers would logically be associated with the absence of barriers to

entry. No such barriers were discovered in the river valley. Because it is relatively easy to obtain a permit to practice general retail commerce, access to cereals retailing is not restricted in the same way that access to rice wholesaling is restricted by the quota requirement. As in the case of wholesaling, the lack of investment and operating capital appears to impose an implicit barrier to entry: 47% of the sample of licenced traders asserted that it is necessary to have material support from a sponsor in order to set up a retail business. On the other hand -- and this is important -- material support is much easier to obtain at the retail level. Whereas very few wholesalers and wholesaler-retailers acknowledge buying cereals on credit, the practice was reported by 50% of the licenced retailers. Thus, the credit barrier seems far less imposing in the case of retail trade than in the case of wholesale trade.

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, there is no evidence to suggest that kinship bonds are more important in retailing than in wholesaling, and the greater incidence is probably attributable to the fact that there are simply more retailers than wholesalers (and consequently a greater likelihood of being related to a retailer than to a wholesaler).

Fragmented demand and the absence of barriers to entry are the most salient structural characteristics of the cereals retailing industry in the Senegal river valley. The only other structural characteristic of the market (and it has already been mentioned) is the undifferentiated nature of the product. 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 affect retailing in the river valley. This is not surprising, since retailers all buy from the same wholesalers, who in turn all buy from the CPSP, which sells a limited range of grades. While consumers do distinguish between different grades of rice and sorghum, the products circulating in the market at any given time are almost always identical, and retailers are not generally categorized or otherwise distinguished according to the grades they sell.[15]

Following standard S-C-P methodology, field research activities looked for possible interrelationships between structural characteristics of the cereals retailing industry (such as those described above) and the behavior of market participants. Once again, behavior was studied by examining responses to formal survey questionnaires, as well as

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15. The only exception to this was found in several towns of the Delta and the Middle Valley, where a small number of unlicenced market sellers were selling local rice which had been sorted by size (i.e., whole grains, large brokens, small brokens).

through informal interviews and direct observation.

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 management efforts on vertical links: maintaining good relationships with their wholesale suppliers, and establishing firm bonds with customers.

The special relationship between some cereals wholesalers and some retailers was described earlier. Faced with 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 wholesale suppliers, selling these suppliers' 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.

If it is important for retailers to maintain a close working relationship with wholesale suppliers, then it is equally important for them to move the product. In the case of staple foodstuffs which are purchased by consumers 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 shop on foot and 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 involve credit.[16]

As in the case of the wholesaling industry, cereals retailing is not characterized by overt 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 to 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, traders justify these practices as necessary to recover marketing costs not covered by the official margins.

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16. This is an important finding, suggesting that the use of credit sales to "hook" consumers is not nearly as widespread as indicated by the conventional wisdom. Unfortunately, it was not possible to determine the percentage of total sales volume sold on credit.

In responding to questions about pricing practices, many retailers express 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 wholesalers and wholesaler-retailers (1.64 visits/month), the incidence of reported fines and/or informal "arrangements" is much higher among retailers (although the average sum paid is lower). (See Table 9)

Table 9: Regulatory Activities Reported By Traders

Category of Trader	Visits/Month by Controle Economique	% of Traders Who Pay Controle Economique	Average Monthly Payment (FCFA)
Wholesalers	1.64	57%	16,208
Retailers	0.77	86%	5,831

Source: Field Surveys

Table 9 shows that 86% of 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 than wholesalers and hence less able to resist regulatory pressure. In a number

of towns and villages, retailers reported that Controle Economique agents make regular monthly appearances, during which they systematically solicit a standardized payment (usually 5,000 FCFA) from every retailer in the market. Retailers claim they prefer to submit to this sort of extortion in order to avoid confrontations with the Controle Economique agents which are likely to result in more severe fines.

3.6 Vertical Coordination in the Official Channel

Before completing this discussion of the official marketing channel, it is useful to review the vertical coordination mechanisms linking successive stages of economic activity. As pointed out earlier, a particular strength of the sub-sector approach is that it helps focus attention on the interfaces between related industries. By exposing the mechanisms which serve to coordinate assembly, processing, wholesaling, and retailing activities (or by showing the lack of such mechanisms), the sub-sector approach can provide important insights into the performance of cereals markets in the Senegal river valley.

The interface between official assembly and processing is coordinated through integration: SAED has been assigned

legal authority over both assembly and processing activities and consequently coordinates transactions between the two industries by means of internal management decision-making. In theory, internal organization of this sort improves coordination by facilitating adaptive sequential decision-making, by curtailing opportunistic behavior of market participants, by economizing on bounded rationality, and by reducing uncertainty among trading partners.[17] In practice, it is not at all clear that these potential gains are being achieved by SAED. Despite the integrated management, assembly and processing operations appear to be plagued by a persistent lack of coordination. One symptom of this lack of coordination is the chronic underutilization of the two rice mills, which results in part because the assembly operation is unable to collect enough paddy to enable the mills to operate at optimal rates of capacity utilization. (A more fundamental reason for the underutilization of the mills is that they are simply too large, inaccurate predictions about the evolution of supply having led to inappropriate investments in industrial-scale facilities.)

The interface between official processing and wholesaling is coordinated by a contractual mechanism: the SAED-CPSP convention, by which the CPSP agrees to purchase all rice produced by SAED at a price determined by a "cost-plus" formula. This contractual mechanism has been

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17. For a discussion of the use of firms vs. the use of markets to execute transactions, see Williamson (1975).

introduced by the government to smooth over an obvious discontinuity between its production and consumption policies. These policies have kept consumer food prices low relative to actual production costs -- so low, in fact, that most domestically-produced rice would not be competitive without government subsidization. While the SAED-CPSP convention is effective in ensuring a market for rice produced in the Senegal river valley, the cost of coordination has been high for the government and threatens to become even higher as projected cereals production increases are realized.

The interface between imports and official wholesaling is coordinated by an instrument of central planning: the quota system. This instrument allows CPSP planners to allocate available quantities of imported rice and sorghum to licenced wholesalers in conformity with a national cereals distribution plan. According to statements of official policy, the major advantage of the quota system is that it ensures the widespread availability of a strategic food staple at affordable prices, but it is not clear the extent to which the quota system represents a cost-effective way of achieving this food security objective. Because the quota system is quite rigid, it lacks the flexibility to accomodate temporary imbalances between supply and demand. When the demand for cereals exceeds supply, quotataires are not allowed to increase their purchases from the CPSP, and shortages sometimes result. Alternately, when supply

exceeds demand, quotataires become reluctant to decrease their purchases from the CPSP (fearing a subsequent reduction in their quota), and they are forced to absorb losses by dumping grain at cost or below cost in order to reduce swelling inventories. Thus, one of the costs of coordinating imports and wholesaling activities has been a certain rigidity which at times affects both the cost and availability of cereals to consumers.

The interface between official wholesaling and retailing is coordinated by a set of market relationships: transactions are negotiated between wholesalers and retailers. Like any set of market relationships, these transactions are carried out in a playing field circumscribed by government marketing policies. In Senegal, the official rules and regulations pertain mostly to who is authorized to buy and sell cereals, and to what prices may be charged. Despite these regulations -- or perhaps because of them -- wholesalers and retailers appear to be quite effective in coordinating routine economic activites. Wholesalers and retailers develop stable working relationships based on established sets of standard operating procedures. These stable working relationships facilitate the rapid flow of market information and enable retailers to obtain the desired quantities and qualities of cereals from wholesalers' warehouses rapidly and efficiently. The only instance in which this coordination breaks down was suggested by certain retailers, who alleged

that wholesalers sometimes deliberately withhold grain from the market in anticipation of official price increases.

3.7 Conclusion

This chapter has described the organization of the official marketing channel for cereals in the Senegal river valley, including assembly and processing operations performed by SAED, as well as wholesaling and retailing operations performed by the CPSP working in collaboration with licenced private merchants. The focus has been on environmental conditions affecting cereals marketing, structural characteristics of the market, and the behavior of market participants. Particular attention has been directed toward vertical coordination mechanisms linking the successive stages of economic activity throughout the marketing channel.

This chapter serves as a basis for evaluating the performance of the official marketing channel so that problem areas may be identified and targeted for potential policy reforms. Before the difficult question of performance evaluation is addressed, however, the organization of the parallel marketing channel will similarly be examined. The analysis of the parallel channel

contained in Chapter 4 presents a more complete picture of the way the market <u>really</u> works, thus providing important insights into the forces shaping economic decision-making in the cereals markets of the Senegal river valley.

Chapter 4

ORGANIZATION OF THE PARALLEL MARKETING CHANNEL

4.1 Introduction

This chapter examines the parallel marketing channel for cereals in the Senegal river valley. Like the official channel, the parallel channel comprises four major stages of economic activity: 1) assembly, 2) processing, 3) wholesaling, and 4) retailing. These four stages of activity are organized quite differently in the parallel channel, however, as will become evident when each is examined in turn and the vertical coordination mechanisms linking them are reviewed.

In accordance with the definitions given in Chapter 2, parallel channel transactions differ from official channel transactions by involving unauthorized trading partners and/or illegal prices. These two criteria are not always easy to apply, however, since the Senegalese government does not enforce certain marketing regulations. This blurs the distinction between the official and parallel channels by sometimes leaving unclear who is actually authorized to trade in which cereals and what prices may or may not be charged.[1]

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[1]. Regulatory uncertainty seems to be a common feature of cereals markets in Senegal. In discussing government regulation of the millet trade, Newman, Sow, and N'Doye

The discussion that follows relates only to those parallel channel transactions involving a bag or more of local rice (either paddy or milled rice) sold outside of the producer's home village to someone other than an authorized SAED buying agent. This particular subset of transactions is singled out for study because it is perceived by Senegalese policy makers as threatening government control over the rice trade. Although certain other types of transactions taking place in the Senegal river valley technically also constitute parallel market transactions (e.g., purchases of local millet, sorghum, and/or maize by unlicenced traders), the others involve small quantities of grain and consequently are of little importance in terms of overall cereals policy.

The findings in this chapter provide new insights into the organization and performance of the parallel marketing channel for rice. As far as can be determined, no previous research has been done on the parallel channel. Two factors apparently explain the dearth of previous research. First, until recently there has never been a compelling reason to study the parallel channel. The parallel channel has become important only during the past two or three years, when producers seeking alternative market outlets have begun to divert large quantities of grain away from the official channel. Second, research has been discouraged because

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(1985:6) describe similar confusion about who is authorized to buy millet and what is meant by the term "official prices".

parallel channel marketing activity is extremely difficult to study. Since the parallel channel is technically illegal, market participants often go to great lengths to avoid detection, and when questioned directly about their involvement in cereals marketing activities are generally reluctant to divulge information.

For this study, data on the organization of the parallel marketing channel were collected from numerous sources. Because of the sensitivity of many research topics, an indirect approach was used to gain access to the key players in the parallel channel. The field research team began by focusing on processing, the least sensitive marketing activity. Since parallel channel processors rarely engage in rice 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 contact farmers, traders, and consumers who patronize processing facilities, and the study then proceeded upstream into assembly functions and downstream into wholesaling and retailing functions.[2]

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[2]. For a description of field data collection activities, see Appendix. See also Morris (1985d).

4.2 Parallel Channel Assembly Operations

The precise quantities of paddy assembled each year through the parallel marketing channel are not known with any degree of certainty. Although official SAED marketings can be subtracted from estimated total production to derive a figure representing combined parallel channel sales and home consumption, in order to disaggregate the latter two flows it is necessary to have detailed information on producer grain transactions. Such data are currently unavailable.[3]

SAED analysts tend to deal with the problem by ignoring the parallel channel and referring to all paddy not marketed via the official channel as "home consumption". This has led SAED publications to attribute the recent sharp downturn in official marketings to an increase in home consumption. However, this "explanation" is incorrect. While it is likely that producers have reacted to rises in the prices of imported cereals by consuming more of their own grain, they do not actually consume all of the rice withheld from the official channel. A lot of the rice which does not go to SAED nevertheless ends up being sold outside the home. Evidence from the field indicates that there has been a

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3. It is hoped that this critical data deficiency will soon be alleviated. An ISRA farming systems research (FSR) team based in Saint Louis is currently collecting data on producer grain transactions in the Delta and lower Middle Valley.

significant increase in the flow of rice moving through the parallel marketing channel. This evidence includes the presence throughout the river valley of large numbers of itinerant rice traders, a marked increase in the number of small rice hullers operating in high-production areas, and the appearance in urban consumption centers of large quantities of local rice processed by machinery other than the SAED mills.

How are assembly activities organized in the parallel channel? Who are the key market participants, and how do they operate? What environmental factors affect the structure of the market, and how do both of these influence the behavior of market participants?

These are important questions, most obviously because they relate to politically sensitive welfare issues concerning the prices and marketing services received by producers. In Senegal, as in many countries, stories abound concerning the purported opportunism of parallel market traders. It is commonly alleged that many farmers are forced by economic necessity to engage in "distress sales" on the parallel market. According to this view, farmers needing cash to satisfy credit obligations and other liquidity needs sell much of their production at harvest at extremely low prices to unscrupulous parallel market traders

bent on making excessive profits.[4]

But this allegation tends to be almost completely unsupported by empirical evidence. One reason for this, at least in the case of paddy in the Senegal river valley, is that parallel market transactions are extraordinarily difficult to observe directly. Informal conversations with farmers, traders, SAED representatives, and other market participants confirmed that parallel market traders habitually engage in evasive behavior in order to avoid detection by the Controle Economique, which is responsible for enforcing SAED's legal monopoly over the purchase of paddy from producers. Examples of evasive behavior include dealing only in small lots (several bags of grain at a time), enlisting accomplices to conduct transactions, and lying about the sources and destinations of grain.

Notwithstanding these practices, it is possible to collect data pertaining to parallel channel assembly operations. Based on informal interviews (involving no formal questionnaire) with several dozen respondents, a composite description was pieced together of the interactions and exchanges which typically characterize assembly activities in the parallel channel. While the data collected through these informal interviews cannot be used

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4. This impression is continuously reinforced by the state-run newspaper, Le Soleil, which often runs stories describing the alleged exploitation of defenseless farmers by opportunistic middlemen.

to derive statistically valid generalizations about the behavior of the entire population of market participants, they nevertheless provide important insights into the standard operating procedures of parallel market assemblers.

Nearly all respondents agreed that itinerant traders play a central role in coordinating assembly activities in the parallel channel. The exact identities of these itinerant traders are difficult to establish. While some are clearly residents of the river valley, many appear to be non-resident entrepreneurs and small businessmen who engage in seasonal grain trading in order to supplement income from other sources. Travelling throughout the rice-producing regions during the pre-harvest months, itinerant traders establish contacts with farmers, either in person or through local buying agents, such as shop owners. The traders typically negotiate the purchase of several bags of paddy from each farmer. Negotiation and payment may take place while the crop is still in the ground or at any point during or after the harvest. Prices depend on the location and timing of the transaction. Both farmers and traders indicated that during the 1984/85 cropping season paddy prices in the Delta ranged from as low as 3,000 - 5,000 FCFA for an 80 kg bag (equivalent to 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 (equivalent to 93.75 - 100 FCFA/kg) several months after the harvest, when grain had become scarce. Transactions in remote villages at considerable distances

from the paved road were generally at reduced prices, the discount reflecting the additional transport cost necessary to evacuate the grain, according to traders.

It is difficult to estimate the "average" price without more complete knowledge of the seasonal and locational variations in sale prices and quantities. Extreme prices (such as those quoted above) may give a misleading impression of the typical prices received by most farmers if the sales data are distributed asymmetrically. Despite the wide range of reported prices, most farmers and merchants contacted in the Delta indicated that much of the paddy sold into the parallel channel during the early months of 1985 was priced in the range of 70 - 75 FCFA/kg, or somewhat higher than the official producer price of 66 FCFA/kg. This is an important finding, for it stands in sharp contrast with the commonly held view that the parallel market trade victimizes farmers.

After paying for the paddy, the traders hire local laborers to load it into bags. A standard bagging fee of 100 FCFA/80 kg bag was reported by the vast majority of respondents. Bags are readily available in most village marketplaces for 200 - 500 FCFA, depending on the condition; an undamaged bag (often a recycled food aid bag) generally sells for 400 FCFA and can be used several times.

The filled bags are then transported from the place of purchase (either the field where the rice was grown or the

farmer's storage facility) to a local rice huller for processing. Depending on the distance to the huller, the preferred means of transportation is either animal cart or rural taxi. Transport charges vary according to numerous factors, including among other things time of year, location in the river valley, distance covered, and condition of the roads. Since transport is relatively abundant and the distances covered are generally short, charges rarely exceed 100 FCFA/80 kg bag according to most traders.

4.3 Parallel Channel Processing Operations

Grain moving through the parallel channel is for the most part processed on small hullers. (A small portion of the parallel channel flow is processed by hand-pounding -- probably less than 5%.) Although rice hullers have not always been present in large numbers in the Senegal river valley, considerable expansion in village-level processing capacity has occurred over the past few years.[5] To develop a current estimate of village-level processing capacity, a census was completed during February 1985 of rice hullers located on the left bank of the river between Saint Louis

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[5]. Tuluy reported 13 hullers in the Fleuve region in 1979. (See Tuluy, 1979:273).

and Kidira. Hullers 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 machine, based on interviews with the operator and, if present, the owner.[6]

The census found 142 hullers in the river valley, of which twenty were classified "non-operational" because they had not processed grain during the preceding month. The vast majority are "Engelberg-type" hullers with a capacity of 120-240 kg paddy/hour. The most common manufacturers are German (Billbrook-Hanseata, Schule: 60%), Italian (Colombini, Lombardini: 20%), and Senegalese (Sismar, local manufacturers: 11%). Most hullers are powered by small (12 horsepower) diesel motors, although electric motors predominate in towns served by electricity. Four hullers are powered by gasoline motors.

The distribution by region and estimated peak-season throughput rates (where peak season is defined as the post-harvest months of January, February, and March) are shown in Table 10.

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6. For a description of the field data collection activities, see Appendix.

Table 10: Rice Huller Numbers, Distribution by Region, Estimated Throughput.

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

Source: Field Surveys

(Monthly throughput based on assumption of 27 working days.)

The data presented in Table 10 (which must be viewed as conservative in that an unknown number of hullers may have been missed) confirm that the total amount of paddy processed during the 1984/85 cropping season on small hullers was 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 during the previous milling season. In other words, monthly throughput during the peak-season months

immediately following the harvest was approximately 2.5 times greater for small hullers than for the SAED mills.

If these are surprising figures, 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.[7] Fully 60% of all hullers (64% of all operating hullers) were acquired during the preceding 12 months. This finding was corroborated by sales data obtained 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 combined. While no records are kept concerning the destination of hullers, MATFORCE sales personnel stated that many purchasers indicated the hullers were going to be used in the Senegal river valley.

The frequency distribution of the reported length of ownership can be broken down into periods corresponding to annual paddy marketing campaigns in order to provide an historical perspective to the rise of village-level processing capacity. Since the census was performed in February 1985, all hullers acquired during the previous six

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7. The median age of the hullers was no doubt slightly higher, since some present owners acquired their hullers second-hand.

months are allocated to the 1984/85 marketing campaign, those acquired during the preceding twelve months to the 1983/84 campaign, and so on back. (See Table 11)

Table 11: Frequency Distribution of Reported Length of Ownership of Rice Hullers

Location of Rice Hullers:	Length of Ownership in Months						
	1-6	7-18	19-30	31-42	43-54	>54	Total
Upper Valley	0	5	0	1	1	1	8
Middle Valley	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

(Note: Length of ownership of one huller unknown.)

These data can be used to plot the cumulative increase in the number of small hullers located in the Senegal river valley during the past five marketing campaigns. (See Figure 12) The data are consistent with the hypothesis that rice marketing patterns have changed radically in the Senegal river valley. While the slow growth in the number of small hullers up through the 1982/83 campaign can be attributed to a gradual increase in home consumption, the sharp jump in the number of hullers during the past two seasons provides evidence of a rapid transformation in the dominant processing technology in conjunction with a sudden

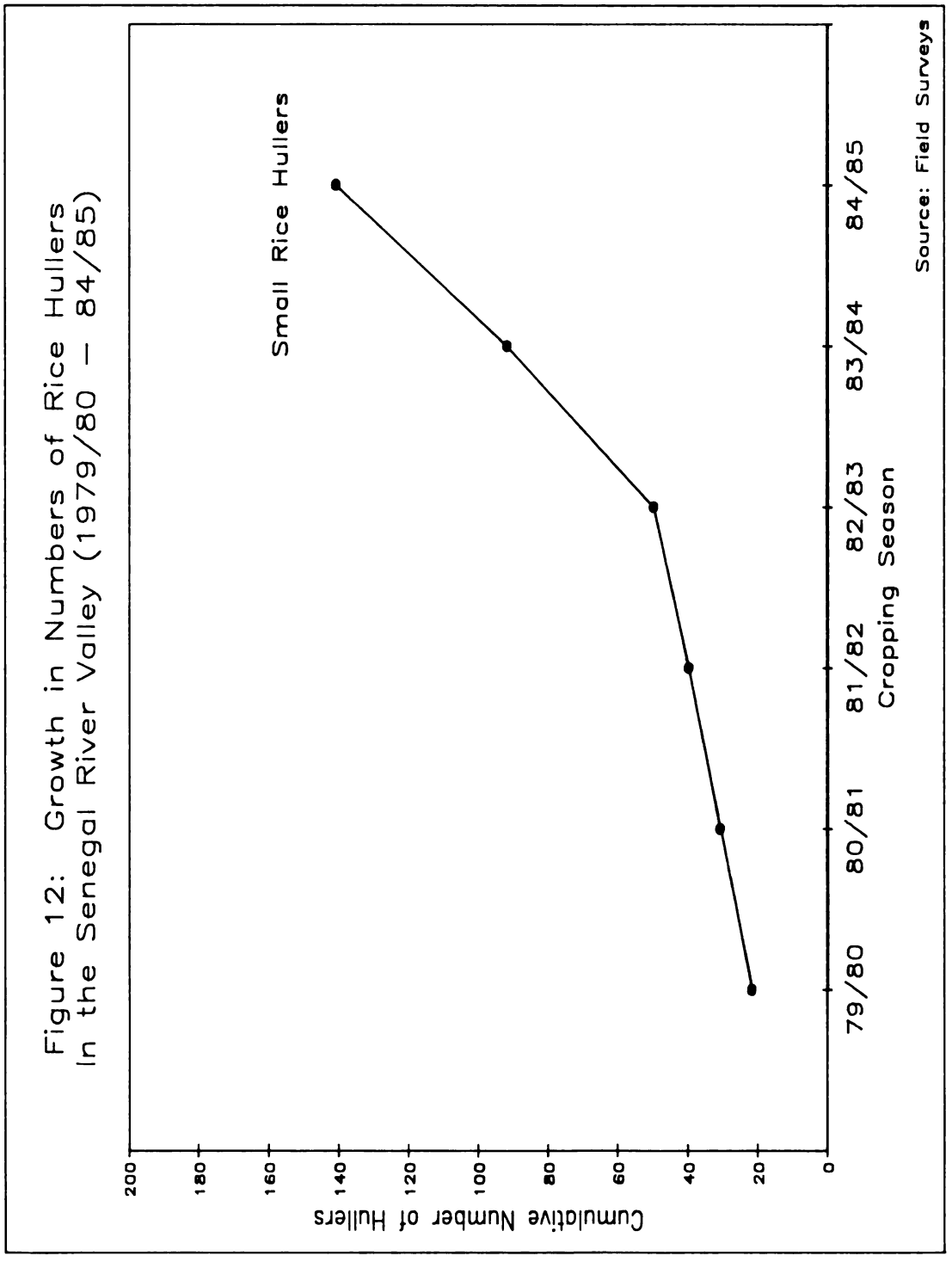
Figure 12: Growth in Numbers of Rice Hullers
In the Senegal River Valley (1979/80 - 84/85)
Small Rice Hullers
Cumulative Number of Hullers
0
20
40
60
80
100
120
140
160
180
200
79/80
80/81
81/82
82/83
83/84
84/85
Cropping Season
Source: Field Surveys

acceleration in marketing activity in the parallel channel.

It is interesting to note that the rapid technological change which has transformed the rice processing industry in the Senegal river valley has previously been observed elsewhere in the developing world. Early research on the choice of technique in rice processing included well-known studies by Lele (1971) in India and by Timmer (1973) in Indonesia. Both authors examined technological, economic, and social factors contributing to the rise in small-scale, labor-intensive mechanical hulling technologies. In what has become a classic piece of applied analysis, Timmer constructed a production isoquant relating investment and labor costs needed to produce value-added in Indonesian rice processing and demonstrated that village-level hullers were socially and economically optimal at prevailing factor prices. Timmer's results have been corroborated by researchers working in other countries where the prevalent rice processing technology was observed to undergo similar transformation.

In addition to generating data on the evolution of processing capacity, the census of rice hullers also provided information on huller ownership, manufacturer, energy source, periods of operation, and clientele. Some of these data appear in Table 12.

Table 12: Regional Characteristics of Operating Hullers

	Delta (n = 98)	Middle Valley (n = 18)	Upper Valley (n = 7)
Huller Owner:			
Resident	60.2%	38.9%	28.6%
Non-resident	19.4%	5.6%	0.0%
Association	20.4%	55.6%	71.4%
	100.0%	100.0%	100.0%
Acquisition Method:			
Purchase	84.7%	44.4%	28.6%
Gift	15.3%	55.6%	71.4%
	100.0%	100.0%	100.0%
Installation Type:			
Permanent	42.0%	83.0%	100.0%
Temporary	58.0%	17.0%	0.0%
	100.0%	100.0%	100.0%
Clientele:			
Local Farmers	12.2%	38.9%	100.0%
Farmers and Traders	88.7%	61.1%	0.0%
	100.0%	100.0%	100.0%

Source: Field Surveys

Interesting regional differences can be observed:

In the Upper and Middle Valleys:

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

In the Delta:

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

The observed regional variations in operating characteristics are consistent with well-known regional differences in production patterns.[8] 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 hullers located in the upper 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 often belong to village associations, which cater to 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 into the parallel marketing channel is processed locally using small hullers before being shipped out to urban consumption centers within the region and in adjoining regions. In recent years, increasing numbers of small 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 of them are installed in villages

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8. For a discussion of rice production systems in the Senegal river valley, see Bonnefond et al. (1980) and CCCE (1982).

along the main paved road which transects the Delta, since the milled rice can then easily be loaded into trucks for rapid distribution.

Given the large number of recently installed hullers, at present levels of production the supply of paddy does not provide year-round work for all. Many of the huller operators stated that they operate only during the peak-season months following the harvest; as soon as the flow of paddy diminishes, they withdraw their hullers from the field and place them into storage until the following marketing campaign.

The census of small hullers provided empirical confirmation that considerable processing capacity has recently appeared in the Senegal river valley at the village level. A subsequent phase of the field research into parallel channel processing operations involved a survey of a sample of hullers. The survey was designed to shed light on technical, economic, and social parameters of a typical village processing operation and to make possible estimation of annual operating budgets for a set of prototypical hullers.

Twenty six 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 nonetheless possible to cost out the two representative types of operation found in all three

regions within the river valley. 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 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, conversion rate, and quality of output (% brokens).[9]

Based on the data collected, prototypical annual operating budgets have been constructed. In the absence of reliable longitudinal data on seasonal capacity utilization rates (which operators were generally reluctant to estimate due to their great variability), two assumptions have been used concerning month-by-month capacity utilization. One budget has been constructed for 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, and at 10% capacity (1 hour/day) during three months of the year. This

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9. For a description of the field data collection activities, see Appendix.

pattern is intended to approximate the capacity-utilization rate of a permanently installed "village huller" used to process paddy for the parallel channel during and after the harvest and to process paddy for local consumers during the remainder of the year. (See Table 13) 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. (See Table 14) Both scenarios are based on information provided by huller operators and can be considered conservative relative to observed operating schedules.

Table 13: 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
TOTAL FIXED COSTS	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	52,378	628,536
Fuel	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
TOTAL VARIABLE COSTS	252,450	252,450	252,450	63,113	63,113	63,113	63,113	63,113	63,113	25,245	25,245	25,245	1,211,760
TOTAL COSTS	304,828	304,828	304,828	115,491	115,491	115,491	115,491	115,491	115,491	77,623	77,623	77,623	1,840,296
GROSS RECEIPTS	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
NET RECEIPTS	201,422	201,422	201,422	11,072	11,072	11,072	11,072	11,072	11,072	(26,998)	(26,998)	(26,998)	589,704

Table 14: 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
TOTAL FIXED COSTS	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	44,201	530,412
Fuel	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
TOTAL VARIABLE COSTS	252,450	252,450	252,450	63,113	63,113	63,113	0	0	0	0	0	0	946,688
TOTAL COSTS	296,651	296,651	296,651	107,314	107,314	107,314	44,201	44,201	44,201	44,201	44,201	44,201	1,477,100
GROSS RECEIPTS	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:

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 (sum of monthly hours) = useful life in years.
Village huller: 10,000 h /1 296 h = 7.7 years.
Commercial huller: 10,000 h /1 012.5 h = 9.9 years.

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

Useful life calculated as follows:
5,000 hours of operation (engineer's estimate) / annual hours of operation (sum of monthly hours) = useful life in years.
Village huller: 5,000 h / 1,296 h = 3.85 years.
Commercial huller: 5,000 h / 1,012.5 h = 4.95 years.

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

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

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

3) Variable Costs

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

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

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

h) Labor: Average reported monthly expenditures on labor, with family labor valued at the average rate of hired labor, converted to 292 FCFA/hour of operation. (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 a function of 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 sacks of paddy/hour of operation (average reported throughput) x 750 FCFA processing charge/sack.

Several interesting results emerge from these budgets:

1) Small 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 considerably more profitable (due to lower investment costs, lower energy costs, lower oil and grease costs, and lower parts and repairs costs), while gasoline-powered hullers are considerably less profitable (due to higher fuel costs).[10]

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

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[10]. Separate budgets were not calculated for electrically-powered and gasoline-powered hullers because of the small number of cases corresponding to each of these two categories (two cases and seven cases, respectively). This resulted in high variances of many reported cost figures, making problematic the use of averages in budget analysis.

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

where:
- NPV = net present value of huller investment
- NCF = annual net cash flow (no charge included for opportunity cost of investment capital)
- PCH = purchase cost huller
- PCM = purchase cost motor
- CH = cost of housing (assumed to fall in year 1)
- RCM = replacement cost of motor = $PCM/(1+r)^{t*}$
- r = real rate of interest
- n = useful life of most durable piece of equipment (rice huller)
- t = year t
- t* = year in which replacement motor is purchased

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

It is difficult to say whether or not the estimated percentage rates of return to investment in small hullers compare favorably to rates of return generated by alternative investment opportunities. Casual observation suggests that public transport and rental housing represent favorite investment options for rural entrepreneurs in the Senegal river valley, but as far as can be determined, neither has been studied. Yet given the high accident risk associated with vehicle ownership and the long payback period associated with rental housing, small hullers appear to provide a relatively attractive investment opportunity.

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

The prototypical budgets indicate that the break-even rates of capacity utilization are very low. The "village huller" begins to show positive net returns with only 56 hours/month of operation, while the "commercial huller" begins to show positive net returns with only 47 hours/month of operation.[11] The low break-even rates of capacity utilization can be attributed to the fact that variable costs of operating a huller far outweigh fixed costs in the total cost schedule. Since variable costs form a large

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

proportion of the total costs, declines in average costs as a result of increases in capacity utilization are quite small and therefore do not provide a strong incentive for extending capacity utilization. In other words, once a huller has been purchased and installed in the field, it can be operated profitably at almost any level of capacity utilization. This finding apparently explains why so many small hullers continue to operate throughout the year at extremely low rates of capacity utilization.

4.4 Parallel Channel Wholesaling Operations

Parallel channel wholesaling operations comprise the set of physical transformation activities and exchange coordination activities by which outputs from the small hullers (milled rice and by-products) are moved from the huller site to the retail outlet where they are sold to the final consumer. In considering wholesaling, it is important to keep in mind that the parallel channel tends to be highly integrated, so that the distinctions between successive stages of economic activity are often blurred. Frequently, the same itinerant trader who purchases paddy from farmers also negotiates its processing, oversees the transportation of milled rice and by-products to an urban consumption

center, and supervises their final sale. Since the trader may negotiate a future wholesale or retail transaction while the paddy is still being assembled or processed, it is misleading to think of the stages of economic activity as happening sequentially. Although the physical transformation processes (e.g., assembly, processing, wholesaling, retailing) must necessarily take place in a particular order, the same is not true for the exchange transactions through which the physical transformation processes are coordinated.

Examination of parallel channel wholesaling operations is further complicated by the fact that it is technically illegal in Senegal to transport more than 200 kg of cereals without written authorization from the Controle Economique. This prohibition, which is intended to curtail inter-regional flows of grain, is enforced at roadblocks throughout the river valley. Persons found to be transporting grain without the requisite documentation risk its confiscation (although many traders reported that they prefer to work out an "arrangement" with the Controle Economique agents to avoid losing grain). Because of the high cost of these "arrangements", traders are careful to conceal their marketing activities, often by breaking down loads into small lots for separate shipment. If questioned about the sources, destinations, and intended uses of any local rice found in their possession, they almost invariably claim that they are transporting the grain home for personal

consumption.

Data pertaining to parallel channel wholesaling operations were obtained in much the same way as data on parallel channel assembly operations. Even though the sensitivity of the research issues precluded the use of formal questionnaires, it was possible to obtain information by engaging in casual conversation with parallel channel participants, including wholesalers, transporters, retailers, and Controle Economique agents. Most of this interaction took place around hullers, at roadblocks, and in the central market places of larger towns and villages.

Nearly all respondents agreed that rice wholesaling is not a specialized activity. The same itinerant trader who assembles grain and pays for processing generally also handles distribution at least as far as the retail level. After paddy is processed, milled grain and by-products are loaded into bags provided by the trader. Depending on the condition of the huller and the skill of the huller operator, it is sometimes necessary to winnow the milled rice after it emerges from the huller. Winnowing is performed by women who congregate at village huller sites in search of seasonal employment. The work is slow and tedious and involves repeatedly pouring the processed grain through the air from large enamel basins until the action of the wind has separated out the chaff and bran. Spot sampling throughout the river valley during February 1985 indicated

that the rate charged for winnowing during the 1984/85 marketing campaign averaged 125 FCFA/100 kg processed rice.

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

Little is known about the size and scope of wholesale grain flows through the parallel channel. During the period of the study, parallel market rice from the Senegal river valley was found in markets as far away as Louga, Touba-Mbacke, Thies, and even Dakar. Resource constraints unfortunately precluded a systematic survey to determine exactly where grain went and what quantities were involved. Casual observation of Saint Louis markets during the post-harvest months of February and March 1985 suggested that between 25 and 30 tons of milled rice were arriving in the city every day. Some of this grain was no doubt sold in Saint Louis, and some continued south toward other metropolitan areas.

This rough estimate of parallel market grain flows is consistent with the sharp decrease in official rice sales which occurred at that time. During February 1985, CPSP sales of rice through the Saint Louis warehouse fell nearly 800 tons below the five-year average for February sales, a drop of over 25 tons per day. (See Figure 13) Assuming demand remained constant, the drop in CPSP sales must have been offset by a more or less equivalent rise in parallel market sales, which would be consistent with the observed increase in the flow of grain through the parallel channel.

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

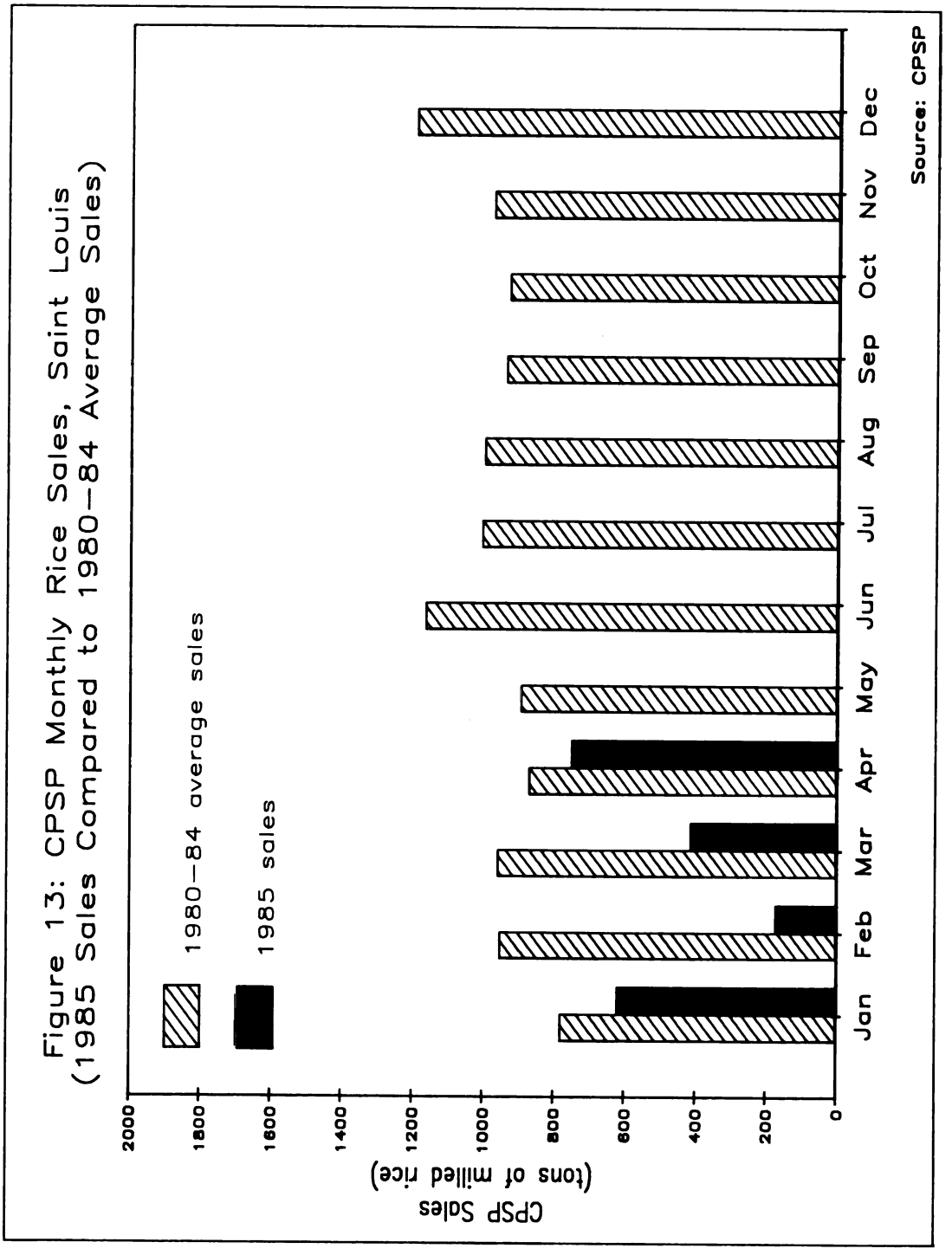
Figure 13: CPSP Monthly Rice Sales, Saint Louis
(1985 Sales Compared to 1980–84 Average Sales)
1980–84 average sales
1985 sales
CPSP Sales
(tons of milled rice)
2000
1800
1600
1400
1200
1000
800
600
400
200
0
Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
Source: CPSP

channel.[12]

The first level at which a market price appears is when the milled grain is sold by the itinerant trader to a retailer. Spot sampling in Saint Louis markets revealed that parallel channel rice frequently wholesales at a lower price than the official wholesale price. For example, during February and March 1985, Saint Louis retailers reported that parallel channel rice was available for around 14,000 FCFA/100kg, or 140 FCFA/kg. During this period, the official wholesale price for CPSP rice distributed through the quotataires was 150.259 FCFA/kg. The price in the parallel channel was described as highly variable, however, depending on the amounts of grain available in the market on a given day and the strength of demand.

Except for grain retained by producers for personal consumption needs, rice processed by small hullers is transported out of the production area. The same cannot be said of the husks-and-bran by-product, a portion of which is sometimes sold at the huller site to local herders. While traders stated that there is usually a market for the by-product in urban areas (since many city dwellers raise small ruminants and poultry in confinement), some claimed that the incremental returns to transporting the husks-and-bran by-

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12. A more reasonable approach is to examine costs and returns to the entire (integrated) collection of parallel channel marketing activities -- i.e., assembly, processing, wholesaling, and retailing. This approach is adopted in Chapter 5.

product do not always justify the additional expense and risk involved. As a result, a portion of the by-product produced by small hullers is sold locally.

Prices of the husks-and-bran by-product were spot sampled at huller sites and in markets throughout the river valley. During February and March 1985, prices were found to vary across time and space depending on supply and demand conditions. On average, at the huller sites bags of husks-and-bran sold for about 1,500 FCFA, although prices were sometimes lower in more remote production areas. In urban markets, prices were considerably higher, averaging around 2,000 FCFA per bag. (Since a sample of bag weights varied between 48.5 and 64 kg, these figures are not easily converted to a per-kg basis.[13])

4.5 Parallel Channel Retailing Operations

After being assembled by the itinerant trader, processed on a village huller, and transported to an urban consumption center, parallel channel rice is sold to the final consumer. While retailing apparently takes many

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[13]. In the costs and returns analysis presented in Chapter 5, a retail price is used of 2,000 FCFA/60 kg bag. This works out to 33.3 FCFA/kg.

possible forms, most itinerant traders seem to favor two main strategies. Some rice is given to relatives or business associates to be sold, often in the open-air portion of the market place where seasonal petty traders are concentrated. Individual bags of milled rice are brought to the market place early in the morning along with a balance or a set of volumetric measures, and retail sales are made directly from the bag. Typically, the customers involved in these transactions are housewives purchasing small quantities of grain for immediate consumption. The main advantage to the itinerant trader of this marketing strategy is that it enables him to capture the full retail price and eliminates the need for coordinating an additional exchange with another retail-level intermediary.

A second strategy adopted by itinerant traders to dispose of their rice is to concede retailing functions to the diversified wholesaler-retailers found in every major market place. These wholesaler-retailers, who generally possess a permit to practice general wholesale-retail trade (although they are usually not licenced quotataires), are peripheral participants in the parallel channel for grain, which they may enter on a seasonal basis to take advantage of temporary profit opportunities. The itinerant trader sells lots consisting of several bags of rice to a wholesaler-retailer; the wholesaler-retailer subsequently re-sells to the final consumer by the bag or in smaller lots. Typically, the customers involved in this sort of

transaction are family heads purchasing the monthly supply of rice for an entire household. The main advantage to the itinerant trader of this marketing strategy is that it enables him to avoid having to conduct actual retail-level selling operations, which are time-consuming and costly.

Retail prices in the parallel channel are subject to considerable dispute. Although government officials frequently express strong opinions about the behavior of market prices, these opinions do not seem to be based on empirical evidence: an extensive search of the literature revealed that market prices have never been collected systematically in the Senegal river valley. While it was not possible to undertake a comprehensive, long-term price collection effort as part of the present study, weekly spot samples were collected during a four-month period in six major markets between Saint Louis and Bakel. (See Figure 14) The spot samples confirmed that rice prices in the parallel channel fluctuate depending on supply and demand conditions. During the pre-harvest months, little parallel channel rice was to be found in the markets; when present, it generally sold at approximately the official retail price. However, during the post-harvest months when local rice was abundant, retail prices were observed to dip considerably below the price of imported rice distributed through the official channel, particularly in the major production areas. For example, during February and March 1985, local rice could be purchased for 140-150 FCFA/kg in

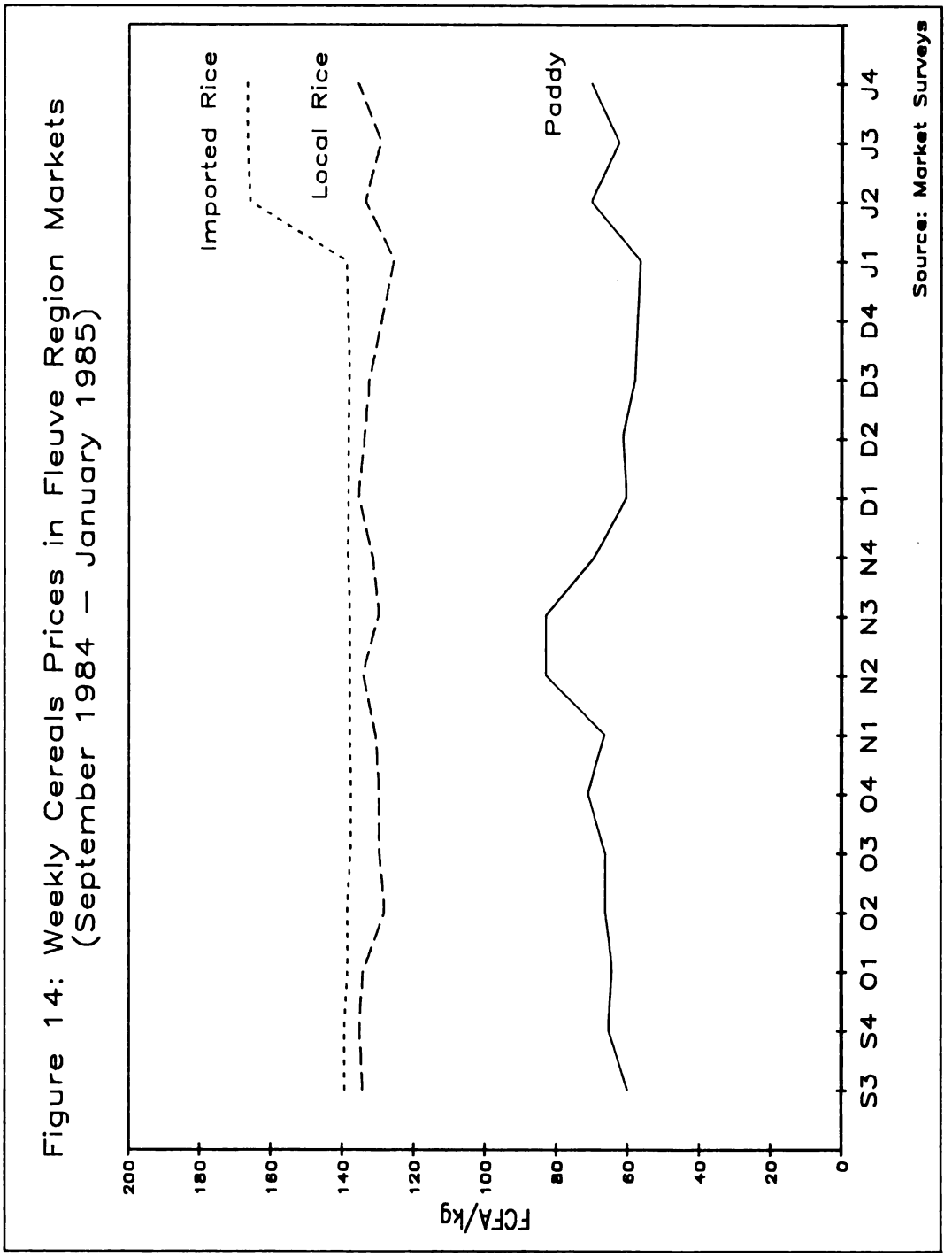
Figure 14: Weekly Cereals Prices in Fleuve Region Markets
(September 1984 – January 1985)
Imported Rice
Local Rice
Paddy
FCFA/kg
200
180
160
140
120
100
80
60
40
20
0
S3 S4 O1 O2 O3 O4 N1 N2 N3 N4 D1 D2 D3 D4 J1 J2 J3 J4
Source: Market Surveys

the markets of Dagana, Aere Lao, and Matam, at a time when imported rice was selling at 165 FCFA/kg or more in those same markets.[14] It is important to recognize, that the prices cited here should be considered merely indicative, since they are based on data collected from a small sample. Further research is clearly needed to shed additional light on the behavior of retail prices prevailing in the parallel channel, both the levels of prices and the variability.

4.6 Vertical Coordination in the Parallel Channel

Economic activities in the parallel channel are coordinated quite differently than in the official channel. The difference is due in large part to differences in the degree of integration. In the official channel, only assembly and processing operations are integrated (under SAED); wholesaling and retailing activities are owned and managed separately. Consequently, in the official channel it has been necessary to introduce coordination mechanisms such as the SAED-CPSP convention and the quota system in order to help achieve coordination across some of the

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14. Comparison of rice prices between the parallel and official channels should be undertaken with caution, however, because the quality of the grain is not always identical between the two channels. (See Chapter 5 for further discussion of this important point.)

interfaces between successive stages of economic activity. These coordination mechanisms do not always work particularly well, as discussed in Chapter 3.

In the parallel channel, on the other hand, virtually all marketing activities from assembly through processing, wholesaling, and sometimes retailing are frequently performed by the same itinerant trader, so that key decision-making processes are internally organized. (Processors actually maintain independent ownership and control of their hullers, but there are so many independent processors vying for the parallel market business that itinerant traders do not seem to experience difficulties in arranging for processing services.) The theoretical benefits of internal organization -- e.g., facilitated adaptive sequential decision-making, curtailed opportunistic behavior, diminished bounded rationality, reduced uncertainty -- seem to be reflected in the observed behavior of market participants. Itinerant traders are able to take decisions about when and where to market grain based on their personal knowledge of sources of supply, the availability of processing and transportation services, and demand conditions in consumption centers. Because the itinerant traders themselves manage every stage of the marketing process, vertical coordination problems are much less likely. Indeed, the parallel channel does not seem to suffer nearly as much from the physical bottlenecks and pecuniary disarticulations observed in the official

marketing channel.

In spite of the reported variability in costs and prices, an indicative set of marketing costs and returns has been estimated. (See Table 15) The estimates used for purchasing, assembly, and processing activities reflect typical costs and prices which prevailed throughout the Delta during the post-harvest months of January, February, and March 1985, when the parallel channel was most active. Transport rates 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 rice and husks-and-bran recorded during the same period in the markets of Saint Louis.

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 milled 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 milled rice and husks-and-bran are joint products of the processing activity, both of which have considerable economic value.)

Table 15: Estimated Costs and Returns to Labor and Management of a Parallel Market Rice Trader

	Column 1 FCFA per 160 kg Paddy	Column 2 FCFA per 1 kg Paddy	Column 3 FCFA per 1 kg Rice + 0.6 kg Husk/Bran
Purchase Price of Paddy (75 FCFA/kg)	12,000	75	120
Sales:			
Milled Rice (140 FCFA/kg)	14,000	87.5	140
Husks-and-bran (33.3 FCFA/kg)	2,000	12.5	20
Total Revenues	16,000	100	160
Gross Margin	4,000	25	40
Bagging Fee (100 FCFA/80 kg paddy)	200	1.25	2
Paddy Bags (400 FCFA/80 kg sack/4 rotations)	200	1.25	2
Transport to Mill (100 FCFA/80 kg paddy)	200	1.25	2
Milling Fee (750 FCFA/80 kg paddy)	1,500	9.4	15
Winnowing Fee (125 FCFA/100 kg rice)	125	0.78	1.25
Rice Bags (400 FCFA/100 kg bag/4 rotations)	100	0.63	1
Husks-and-bran Bags (400 FCFA/60 kg bag/4 rotations)	100	0.63	1
Transport of Rice (200 FCFA/100 kg)	200	1.25	2
Transport of Husks-and-bran (100 FCFA/60 kg)	100	0.63	1
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

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

Source: Field Surveys

The data in Table 15 indicate that a trader who bought two bags of paddy for eventual resale as milled rice and husks-and-bran could expect to realize a return to his labor and management of approximately 1,200 FCFA. This corresponds to a net marketing margin of approximately 7 FCFA/kg paddy, or 12 FCFA/kg rice and 0.6 kg husks-and-bran. It is important to recognize the economic value of the husks-and-bran, which at the representative 1985 prices accounted for 12.5% of total revenues from sales of outputs of the small hullers. In a sense, parallel channel rice trading was made profitable only because of the economic value of the so-called "by-product"; without the revenue generated by the sale of husks-and-bran, net margins on rice alone often would have been negative.

The data presented in Table 15 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 market trader, provided the animal feed by-product could be sold. The representative costs and returns data indicate that the typical parallel market 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.

Since costs were estimated liberally and returns conservatively, the margins shown in Table 15 must be considered minimal. Parallel channel traders are adept at taking advantage of opportunities to reduce costs (for example, requiring buyers to furnish their own bags) and to increase returns (for example, selling directly to consumers at retail prices). Depending on a trader's ability to capitalize on such opportunities, margins may often be higher than estimated in Table 15.

4.7 Conclusion

This chapter has described the organization of the parallel marketing channel for cereals in the Senegal river valley, including assembly, processing, wholesaling, and retailing operations. The rapid growth in importance of the parallel channel has been evidenced by a sudden increase during the past few years in the numbers of small rice hullers operating throughout the river valley. A census of these hullers performed in February 1985 turned up 142 machines between Saint Louis and Kidira, over two thirds of which are located in the Delta. Total throughput on these machines is estimated to be 2.5 times as great as the

combined throughput of the SAED rice mills.

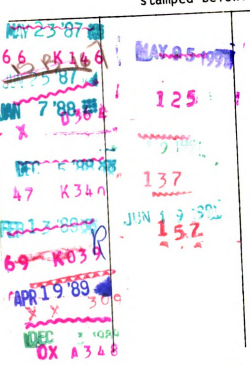
An in-depth survey of a sample of these hullers has made possible construction of prototypical operating budgets for two representative types of huller operation. The budgets suggest that small hullers generate attractive returns and furthermore remain profitable even at extremely low rates of capacity utilization. This finding explains the observed excess processing capacity present in many areas.

Interviews with market participants have confirmed the central role played by itinerant traders in parallel channel marketing operations. Travelling from village to village throughout the major rice production during the post-harvest months, these traders purchase paddy from farmers, pay to have it processed by small hullers, transport milled rice (and sometimes by-products) to small towns and areas, and arrange for its sale to consumers. The near-complete integration prevailing in the parallel channel (only processing activities are separately owned and managed) facilitates vertical coordination across the successive stages of economic activity.

The evidence presented in this chapter and in the previous chapter provides a comprehensive description of the organization of cereals markets in the Senegal river valley, including both the official and parallel marketing channels. The performance of these two channels is compared in Chapter

5, and the difficult question of performance evaluation is addressed. The objective is to identify the relative strengths and weaknesses of the official and parallel channels in achieving the government's stated cereals marketing policy goals, with implications for policy reform.

pt.2



Chapter 5

MARKET PERFORMANCE

5.1 Problems of Evaluating Market Performance

The evaluation of market performance is one of the most difficult conceptual tasks facing applied economists.[1] Performance evaluation is a complicated undertaking -- many would characterize it as an art rather than a science -- involving theoretically troubling attempts to measure essentially unmeasurable phenomena and necessitating frequent recourse to normative judgement. In the words of George Brandow,

> Economists asked to appraise the economic performance of an industry have a difficult task. If they confine themselves to the elegant abstractions of rigorous general theory, they find few handles by which to grasp the inelegant real world and are wholly unprepared for some of the institutional and dynamic characteristics of the industry. If they adopt the approach of industrial organization economics, they find standards imprecise, measurement, both conceptually and empirically, difficult, and judgements usually necessary to reach conclusions. Yet to insist on elegantly derived results that are fully conclusive and leave no room for judgement is to require the impossible. The facts are that <u>good performance</u> is a set of sometimes conflicting goals; the economic world is complex, changing, and never really knowable; and the economic results of interest range along continuous scales from good to bad rather than

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[1]. Since much of the work on performance evaluation originated in industrial organization theory, the emphasis in the literature is usually on industry performance. One can just as easily talk of evaluating market performance and/or sub-sector performance.

> being clearly one or the other. Economists must accept this if they are to produce valid information, and the public must accept it if valid use is to be made of such information for policy purposes.[2]

Brandow's observation touches on at least four major problems involved in the evaluation of market performance. It is worth briefly reviewing these problems before assessing the performance of cereals markets in the Senegal river valley.

The first problem is that of establishing a set of relevant performance criteria. Performance criteria consist of particular characteristics or dimensions in terms of which the market is to be evaluated. Many theorists have attempted to elaborate lists of performance criteria, most notably Bain (1959), Sosnick (1964), Marion and Handy (1973), Brandow (1977), Shaffer (1980), and Scherer (1980). Although the lists differ, the overlap is nevertheless considerable. A number of performance criteria reappear consistently, although not always in precisely the same form: product characteristics, technical efficiency, economic efficiency, exchange (or pricing) efficiency, profits, promotion costs, progressiveness, employment, participant rationality, distribution of income and power, ethical practices, and conservation.

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2. Brandow (1977:81).

While many of these performance criteria are unobjectionable, a problem arises if general applicability is attributed to any particular set. The theory of economics does not indicate which features of a market should serve as universal barometers of performance, which means that any choice of performance criteria necessarily reflects subjective perceptions as to what is important in a given situation. Inevitably, such perceptions differ through time, across space, and between interest groups. Applied economists often deal with this problem by adopting an approach known as "conditional normativism": they select a particular set of performance criteria which are presumed to reflect the prevailing societal consensus about what is important, and then they proceed to evaluate performance given the selected set of performance criteria. While this approach has been used with success, it is important to keep in mind that selection of a set of performance criteria is a difficult, often controversial undertaking.

The second problem involved in the evaluation of market performance is that of prioritizing performance criteria once they have been selected. As Brandow points out, "good performance" almost invariably comprises a set of conflicting goals, so that "good performance" according to one criterion often implies "bad performance" according to another. Whenever there is such a tradeoff, the economist must devise some procedure for weighing the relative importance of the conflicting performance dimensions. But

any such procedure is essentially subjective, embodying conceptions about the legitimate distribution of rights and privileges and reflecting implicit assumptions about whose interests count. The necessity of choice poses a problem for the economist: it requires normative decision-making lying outside the realm of economics, strictly defined. Thus, not only does the theory provide no firm guidelines for selecting universal performance criteria, it furthermore provides no non-normative means of prioritizing among criteria once they are chosen.

A third problem is one of empirical measurement. Once a set of performance criteria has been selected and, if necessary, prioritized, the next step logically must be to compare the designated criteria with values obtained by measuring actual market phenomena. But there is a catch: designating criteria as norms for evaluation implies that performance can be measured with respect to some continuous or discontinuous scale. Clearly, this is not always the case. Many dimensions of performance defy easy quantification. For example, how does one measure progressiveness? Participant rationality? Distributions of income and power? Conservation?

Marketing economists engaged in performance evaluation conventionally try to get around the measurement problem by selecting quantifiable "proxy indicators" to serve as barometers of actual market performance. For example, they

commonly analyze price correlations across time, space, and product form, since price correlations are thought to indicate the prevailing degree of exchange efficiency. Alternately, economists frequently estimate costs and returns to marketing activities in order to derive estimates of net margins (profits), which are thought to indicate the prevailing degree of competition. In addition, they often examine input-output relationships associated with physical transformation processes, since such relationships are thought to reflect the prevailing level of technical efficiency.

Unfortunately, these traditional approaches to empirical performance measurement sometimes give rise to misleading conclusions. Proxy indicators often represent imperfect measures of the performance dimension of interest; when exogenous influences affect a proxy, spurious or erroneous causal relationships may be specified. While there is a natural tendency among economists to measure the easily measurable, sometimes there is an inverse relationship between ease of measurement and indicativeness. When this happens, empirical measurements of performance frequently end up revealing very little about the actual performance dimensions of interest.

The fourth and final problem involved in the evaluation of market performance is the problem of interpreting empirical measurements once they have been made. Even if a

set of performance criteria is designated and prioritized, and even if accurate empirical measurements are made which enable actual market performance to be compared with the designated criteria, interpretation of the findings is necessarily subjective. For example, it may be possible to determine with a high degree of certainty that the average paddy:milled rice conversion rate across the processing industry in the Senegal river valley stands at 67%. But what is to be made of this finding? Does it denote a high degree of technical efficiency, a moderate degree, or a low degree? In an absolute sense, it is impossible to say. While many analysts try to get around this problem by engaging in relative evaluation (for example, comparing the observed conversion rate to industry standards), even relative evaluation frequently involves subjective interpretation.

The purpose of this brief review of the problems inherent in evaluating market performance is not to suggest that performance evaluation is impossible. Rather, it is simply to underline a number of conceptual and empirical difficulties which are sometimes neglected in applied marketing research. While the four problems described above are not easily resolved, their explicit acknowledgement can contribute to the evaluation of the performance of cereals markets in the Senegal river valley by recalling the limitations of conventional methods of analysis and by encouraging consideration of alternative approaches.

5.2 Performance Evaluation: An Eclectic Approach

The approach used in this study to evaluate the performance of cereals markets in the Senegal river valley is described below. The approach is eclectic, reflecting the conceptual and empirical problems inherent in performance evaluation, the limitations in the available data, and the particular interests of the researcher. In these respects, it does not differ appreciably from the approaches used elsewhere in studies of agricultural marketing systems.

As indicated earlier, the evaluation of market performance necessarily begins with the designation of a list of performance criteria. The criteria used in this study are based on performance objectives described in the current two most influential statements of official food and agriculture policy in Senegal, the VIeme Plan Quadrenniel de Developpement Economique et Social (1981-85) and the Nouvelle Politique Agricole (1984). These performance objectives are summarized in Table 16. Five general performance categories are distinguished, and three or more specific performance objectives are detailed within each category. While the list should not be considered exhaustive, it is thought to include most if not all of the government's priority performance objectives.

Table 16: Performance Objectives in the Cereals Sub-sector

GENERAL PERFORMANCE CATEGORIES	SPECIFIC PERFORMANCE OBJECTIVES
1) Product Characteristics	a) adequate supplies of cereals (particularly millet and rice) for all consumers. b) assured availability of the grades of cereals preferred by consumers (particularly various grades of rice, e.g., brokers, medium grain, long grain). c) affordable prices of cereals. d) stable prices of cereals.
2) Technical and Economic Efficiency	a) use of efficient technologies in the production, harvesting, processing, transportation, storage, and distribution of cereals. b) use of technologies that are appropriate for Senegal (e.g., local management, manufacturing, and repair capability). c) minimization of unnecessary costs (e.g., costs of regulatory compliance).
3) Exchange Efficiency	a) maximization of spatial utility of cereals (i.e., availability of cereals where most needed). b) maximization of temporal utility of cereals (i.e., availability of cereals when most needed). c) maximization of form utility of cereals in the form most needed). d) rapid transmission of market information to all concerned participants.

Table 16 (continued): Performance Objectives in the Cereals Sub-sector

GENERAL PERFORMANCE CATEGORIES	SPECIFIC PERFORMANCE OBJECTIVES
4) Distribution of Benefits	a) support and stabilization of producer incomes. b) protection and stabilization of consumer incomes. c) reasonable returns (profits) to intermediaries. d) low administrative support costs to the government. e) distribution of benefits across different societal interest groups.
5) Growth and Progressiveness	a) increasing production of cereals. b) sustained growth in rural incomes. c) progressiveness. d) institutional flexibility.

With the set of performance objectives thus designated, evaluation of the performance of cereals markets in the Senegal river valley can proceed. In the remainder of this chapter, the empirical research findings described in Chapters 3 and 4 are reviewed as they relate to the set of performance objectives presented in Table 16. Although the lack of extensive price data precludes conventional price analysis, other indicators of actual market performance are examined and discussed. These include measurements of market structure and participant behavior; of technical, economic, and exchange efficiency; of marketing margins; of the distribution of benefits across various interest groups; and of the dynamics of change.

In considering the empirical research findings, observed performance in the official channel at each stage of economic activity is compared and contrasted to observed performance in the parallel channel. Differences in observed performance between the two channels are related to differences in basic conditions, in structural characteristics of markets, in participant behavior, and in prevailing institutional arrangements.

The advantage of this comparative approach is that it sometimes facilitates performance evaluation by making possible relative evaluation. In the absence of specific performance norms, it is not possible to assign a performance index to either marketing channel, but this does

not preclude evaluation of performance in the two channels in a relative sense. While precise performance norms are notoriously difficult to specify, it is often possible to achieve agreement on what is particularly good or bad with respect to particular performance dimensions. Consequently, where performance in the official and parallel channels is observed to differ, it may be possible to conclude which channel performs "better" with respect to a particular performance dimension even if it is not possible to specify an "acceptable", "proper", or "good" level of performance in an absolute sense. For example, if it is observed that only a single grade of rice is usually available in the official channel, whereas three or four grades are generally available in the parallel channel, it is possible to say that the parallel channel performs better than the official channel in offering a choice of grades to consumers. (However, this does not mean that the number of grades offered in the parallel channel is necessarily a "good" number; depending on the way policy objectives are prioritized, the minimum "acceptable" number may be as high as ten or even more.)

Unfortunately, relative performance evaluation is not always possible. The available data do not always permit comparison between the official and parallel marketing channels, and even when comparisons can be made, observed performance does not always differ significantly between the two channels. In these instances, it becomes necessary to

make judgements as to whether the observed performance can and ought to be improved. Some such judgements are made in the present paper: these judgements are not only inevitable but necessary in policy-relevant research. The important thing is that they be made explicit and left open to revision.

One important dimension of performance concerns the distribution of benefits across interest groups in the cereals sub-sector. Many conventional measures of market performance do not contain the information needed to provide answers to the sorts of questions frequently raised by public choice economists, such as "Who benefits?" and "Who bears the cost?". Awareness of the distribution of costs and benefits of economic activities is critically important in policy-relevant research, since decision-makers need to know not only about the performance of the economy as a whole, but also about the welfare of the various interest groups within the economy. Brandow argues that performance can be defined from the standpoint of society, but this view is perhaps naive.[3] Society is finally not so much a homogeneous entity as a heterogeneous collection of diverse interest groups -- producers, marketing agents, consumers, government officials, and so forth -- and what is good for some of these groups may be bad for others. This needs to be acknowledged by economists. While it is often difficult

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[3]. Brandow (1977).

to quantify the gains and/or losses accruing to particular interest groups (especially since those gains and losses may not be entirely economic in nature, but may include such things as power, social status, physical and emotional well-being), an effort should be made to describe the distribution across interest groups of the benefits and costs associated with economic activities.

Finally, the approach used in the present study to evaluate cereals markets in the Senegal river valley focuses on the effects of institutions on performance. The term "institutions" includes both the formal (i.e., official) set of rules and regulations governing the grain trade, as well as the informal forces and constraints which shape individual participants' opportunity sets and influence their economic decision-making. Any legitimate assessment of the performance of cereals markets in the Senegal river valley -- certainly one which contributes significantly to the ongoing policy dialogue -- must be grounded in an understanding not only of the formal rules of the game, but also of the informal rules and procedures which determine how the market really works.

The performance of cereals markets in the Senegal river valley is evaluated below. To facilitate interpretation, the material is organized into four sections, corresponding to the four major stages of economic activity: 1) Assembly Functions; 2) Processing Functions; 3) Wholesaling

Functions; and 4) Retailing Functions. Each of these four sections is furthermore sub-divided into two parts, corresponding to the two major marketing channels: a) the official marketing channel, and b) the parallel marketing channel.

5.3 Performance of Assembly Functions

a) Official Marketing Channel

How well are assembly functions being performed in the official marketing channel?

It is important to acknowledge that despite frequent criticism the SAED paddy assembly operation in recent years has largely achieved two important objectives. These include: 1) assuring a market outlet for all rice producers; and 2) supporting the official producer price for paddy. The importance of these achievements should not be overlooked, given the fact that the government's plan to develop the Senegal river valley has required the cooperation of a large number of farmers to whom irrigation technology was more or less unknown. During the late 1960's and early 1970's, many farmers might not have agreed to grow irrigated rice, a non-traditional crop, without the knowledge that the government stood prepared to supply

production inputs on credit, to purchase all paddy offered for sale, and to support the official producer price. The SAED assembly operation thus may have played a crucial role in assuming much of the risk associated with the transition to a new technology.

Yet despite this considerable achievement, official assembly operations have been plagued by serious problems. The most salient of these problems were diagnosed in Chapter 3, primarily through analysis of marketing cost data reported by SAED. The data were examined for signs of excessive costs, indicating areas of poor performance where reforms may be needed.

What conclusions can be drawn from the 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 as a private firm. 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 official assembly operations. Three 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 and thus adversely affects the performance of assembly functions in the official marketing channel.

Constraint #1: SAED's obligation to implement official cereals marketing policies regardless of the cost of their 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. This can have considerable implications for the profitability of assembly operations in the official marketing channel. Since some official marketing policies have decidedly non-economic goals, their implementation can at times be very costly.

Consider for example the government's twin policies of guaranteeing a market outlet for paddy and of supporting the producer price. In order to implement these two policies,

which are designed to stimulate production while protecting producers' incomes, SAED has proclaimed its readiness to purchase at the official producer price all of the paddy produced in the Senegal river valley. But if the goals of these two instrumental policies are unobjectionable, their implementation causes considerable problems. Although SAED may be legally obligated to purchase all 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 have done throughout much of the Delta in recent years), while leaving to the official marketing channel the unprofitable trade in the more remote regions. Analysis of SAED cost data revealed that paddy produced in the department of Bakel cost nearly 14 times as much to assemble as some of the paddy produced in the Delta. A private trader operating around Bakel could have recovered the higher assembly costs by adjusting the purchase and/or sale prices of paddy, or he could simply have abandoned the trade as unprofitable. SAED could do neither, and consequently it was obligated to assemble paddy from portions of the Middle and Upper Valleys at a loss.

The obligation to purchase all paddy regardless of its origin is but one of the restrictions imposed on official assembly operations. A second restriction is the obligation always to pay the official producer price. The rigidity of

the official price structure, which establishes a single price for each marketing campaign, further prevents SAED from competing effectively with the parallel channel trade. In years when consumer prices of cereals are high (such as 1985, following the increase in official rice prices), 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 the 1984/85 marketing season, when the flow of grain moving through the parallel channel increased dramatically while official marketings plummeted.[4] As a result, the profitability of the official marketing channel was adversely affected because of underutilization of fixed investments.

A final restriction imposed on SAED because of its obligation to implement official marketing policies is reduced bargaining power in its dealings with contractors. The case of transporters was cited in Chapter 3. It would be reasonable to believe that SAED wields considerable power over private transporters by virtue of its monopsonistic position as the only legal purchaser of paddy transportation services. However, SAED's power is eroded by the transporters' knowledge that SAED must negotiate a contract in order for the official marketing campaign to begin on schedule. This knowledge gives the transporters

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[4]. See Morris (1985a).

considerable bargaining power, particularly since they are able to bargain collectively. This bargaining power is reflected in the transport rates paid by SAED, which appear to be significantly higher than those prevailing in the private sector. SAED may be 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 organization, it suffers from the usual array of institutional problems: poor internal communications; diffusion of responsibility; slowness in making decisions; factionalism among employees; 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 assembly operations are one symptom of this sluggishness and lack of flexibility. Seemingly minor management problems regularly immobilize personnel and/or equipment while the SAED bureaucracy grinds slowly toward a solution. The lengthy administrative procedures have contributed significantly to farmer disillusionment with the official marketing channel and have thus accelerated the flight of paddy into the parallel channel.

SAED's administrative sluggishness and lack of operational flexibility affect not only day-to-day management activities, but also strategic planning and long-term policy formulation. SAED is unable to react quickly to changes in market conditions. Any significant revision in official policies and 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.

The performance of SAED assembly operations is adversely affected by this institutional lethargy, which among other things undermines the competitiveness of the official marketing channel. 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 was harvested in December and January, market conditions had changed considerably, and the official producer price was too low to compete effectively with prices being offered by itinerant traders. SAED representatives petitioned the government for permission to raise the official producer price. Eventually, another iteration of the inter-ministerial policy review process resulted in a new producer price for 1985/86 (announced April 15, 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 in

response to the changing market conditions. As a result, the SAED assembly operation was able to purchase only 14,300 tons of paddy, barely 16% of estimated total production.[5]

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

As a parastatal institution operating primarily with 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 paid to SAED, external funding and favorable legislation continue to keep it operating (at a loss) year after year.

Given some of SAED's responsibilities, particularly in land development and extension, it is unlikely that the organization as a whole will ever operate at a profit. Yet certain activities within SAED should be able to generate income to help offset the losses on other less profitable activities. The URIC was set up precisely for this reason, since rice marketing was considered potentially profitable over the long run. In order to protect the URIC during an initial start-up phase, when the quantities handled of rice were expected to be small and per-unit marketing costs high,

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5. See Diop (1985).

a "cost-plus" formula was negotiated between SAED and the CPSP. Under the terms of a formal agreement, the CPSP agreed to purchase all rice produced by SAED at a price determined by the "cost-plus" formula. Since this formula takes into account actual marketing costs incurred by SAED (including purchase of paddy, assembly, processing, storage, and overhead), theoretically SAED could not lose money on its marketing operation, regardless of costs.

Despite the protection afforded by the "cost-plus" formula, the URIC has consistently lost money (the exact amount is unknown, according to SAED accountants). Why has this happened? SAED's financial insulation appears to be a contributing factor. As a result of external funding and of protectionist legislation such as the "cost-plus" formula specified in the SAED-CPSP convention, SAED management has never come under serious pressure to identify inefficiencies and to take firm 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. The analysis of SAED reported marketing costs revealed examples of inadequate accounting practices. Bags for paddy were apparently 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., the so-called "overhead costs"), while other real costs were not accounted for (e.g., the cost of

carrying inventory, the cost of physical grain losses).

Inadequate accounting practices not only hinder SAED management from identifying problems and taking corrective steps, but they also prevent government policy makers and foreign donors 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 sub-sector in general and of SAED's role in particular have been subject to periodic review and discussion in recent years.[6] While these reviews have helped launch a series of positive reforms, all of the studies encountered inadequate SAED accounting records and lack of viable performance 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.

b) Parallel Marketing Channel

How well are assembly functions being performed in the parallel marketing channel?

A noteworthy feature of the parallel channel assembly operation is its flexibility. The itinerant traders who assemble grain in the parallel channel have demonstrated an ability to respond quickly and efficiently to subtle changes

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6. See CCCE (1983); MRECD (1983); Arthur Anderson (1984).

in market conditions. This means that the supply of assembly services tends to be highly elastic at relatively low levels of remuneration: parallel channel traders, many of whom engage in cereals trading on a part-time basis, enter the market as profit opportunities arise during the post-harvest months, only to withdraw again when profit opportunities become scarce later in the year.

The flexibility of parallel channel assembly operations affects performance in a number of ways. On the positive side, two clear improvements should be noted relative to the performance achieved in the official channel. First, the parallel channel is more responsive to the needs of many producers. Whereas the farmer who delivers paddy to a local SAED secco for sale into the official marketing channel must often incur storage costs until the grain is evacuated and then wait months before receiving payment, the farmer who sells paddy to a parallel channel trader usually disposes of his grain as soon as threshing is completed (thereby avoiding storage costs), and frequently he receives immediate cash payment. Second, assembly costs in general are lower in the parallel channel because of more efficient use of resources. Itinerant traders have access to extensive sources of current market information and are adept at capitalizing quickly on profit opportunities. In addition, they carry very little overhead and consequently are able to accommodate large fluctuations in sales volume with little effect on average marketing costs. This means

that they can purchase, assemble, bag, and transport paddy at a lower cost than can SAED, as evidenced by the estimated costs and returns data presented in Chapter 4.

Although the flexibility of parallel channel assembly operations leads to improved responsiveness and lowered marketing costs, two other performance dimensions are more ambiguous in nature. First, there is the matter of price variability. Unlike SAED, which is legally obliged to pay farmers the official producer price for paddy, parallel channel traders vary their offer prices depending on market conditions. On the one hand, a certain amount of price variability across time and space is necessary if prices are to perform their signalling function. Where prices accurately reflect supply and demand conditions, price variability creates the profit opportunities which provide incentives for socially desirable production and exchange. On the other hand, excessive price variability is undesirable. From an efficiency point of view, a high degree of price variability in an industry can increase uncertainty and risk to the point that investment by individual firms will be reduced to below-optimal levels. In this event, interventions by the state aimed at stabilizing prices can shift risk away from private firms and encourage more desirable levels of private sector participation. As pointed out earlier, this has happened in the Senegal river valley: farmers who probably would not have been inclined to undertake irrigated crop production

may have been induced to grow rice because SAED supports and stabilizes the official producer price.

Excessive price variability can also be undesirable from a welfare point of view. Prices can serve as redistributive mechanisms, so that the socially optimal price structure in any given situation depends not only on economic efficiency considerations but also on welfare considerations. The government of Senegal has a strong political and ideological commitment to the concept of "equal prices for all producers". Given this commitment, price variability is inherently undesirable, and in this sense the parallel channel performs less well than the official channel.

Another problem with the parallel channel is that it does not guarantee a market outlet to all producers. Unlike SAED, parallel market traders buy only in times and places where it is profitable for them to do so. This may be desirable from a strict efficiency point of view, since guaranteeing a market outlet for all producers results in subsidies which can encourage the inefficient use of scarce resources. As in the case of price variability, however, certain reasons may argue in favor of guaranteeing market outlets for all producers, even at the expense of encouraging a certain amount of inefficiency. For example, the "infant industries" justification can be invoked for temporarily guaranteeing a market outlet in areas where

production is presently uneconomical but where it soon may become economical (for example, once road systems are sufficiently improved that private traders can evacuate grain at a less-than-prohibitive cost). Alternatively, guaranteeing a market outlet to all producers may be entirely consistent with redistributive policies intended to improve the quality of life for inhabitants of disadvantaged rural areas. Similarly, the subsidization of inefficient producers through guaranteed market outlets also may be justified if food self-sufficiency is an important policy objective.

The performance of parallel channel assembly operations is relatively bad in at least one respect: unnecessary costs have not been eliminated. The illegality of many parallel channel assembly activities forces traders to engage in evasive behavior, including trading and transporting in small lots, using numerous intermediaries, and paying off regulatory agents. Evasive behavior exacts two types of unnecessary costs. In addition to direct out-of-pocket costs (e.g., remuneration paid to additional intermediaries, fines and/or bribes paid to regulatory agents), there is the opportunity cost represented by the loss of scale economies. Because they must deal in small lots in order to evade detection, parallel channel traders are prevented from capturing potential economies of scale in negotiating transactions, assembling, bagging, transporting, and selling grain. These two types of unnecessary costs -- direct out-

of-pocket costs and indirect opportunity costs --partly offset the savings achieved by parallel channel assemblers through more efficient use of resources.

5.4 Performance of Processing Functions

a) Official Marketing Channel

How well are processing functions being performed in the official marketing channel?

The government of Senegal first became involved in grain processing activities in the Senegal river valley as far back as the early 1950's, when an industrial-scale rice mill was constructed at Richard Toll. At the time, public-sector participation in grain processing was justified in terms of an "infant industry" argument. Development planners predicted that given the high degree of uncertainty surrounding the government's plan to promote irrigated agriculture in the river valley, few private investors would have been willing to risk investing in processing facilities. The public sector therefore had a legitimate role to play in introducing and nurturing the nascent industry until irrigated agriculture became well established in the region. While it was conceded that the Richard-Toll

mill was likely to remain unprofitable during its early years of operation due to low capacity utilization, the hope was that increases in paddy production would eventually enable throughput to be raised to a profitable level.

In later years, a second justification emerged for direct government participation in grain processing: the "food security" argument. Alarmed by a drop in the national food self-sufficiency rate, policy makers during the late 1960's began to argue that it was strategically important for the state to retain control over the supply of basic food staples, particularly cereals. Consequently, even though rice production in the Senegal river valley was increasing far more slowly than had been projected, and even though the Richard-Toll mill had never achieved full use, in 1971 a second industrial-scale mill was constructed 60 km away at Ross-Bethio.

If political considerations motivated the government's decision to participate directly in the processing industry, economic considerations apparently influenced the choice of technique. The decisions to build industrial-scale mills and to locate them in the Delta apparently were based on SAED development plans, which were then projecting large increases in commercial rice production throughout the lower portion of the river valley. A series of feasibility studies conducted by outside consultants working in collaboration with SAED planners predicted that industrial-

scale mills would lead to economies of scale in processing. Furthermore, it was argued that the use of industrial-scale technology would facilitate production of high-quality unbroken rice of high economic value.

How have the SAED rice mills performed? From both the "nascent industry" and the "national food security" points of view, it might be argued that government ownership and operation of the two mills has been at least a partial success. Certainly, a high level of processing capacity has been maintained in the Senegal river valley during a period when profit opportunities for private investors were lacking, and the state has (at least until recently) maintained strategic control over what has probably been a considerable portion of marketed surplus. But it would be misleading to point to these two achievements and conclude that the policy of public-sector involvement in cereals processing can therefore be characterized as "successful". Careful examination of the record, including the analysis presented in Chapter 3, indicates that the SAED mills have not performed well in other respects.

The poor performance of official processing operations can be attributed to a number of factors. In a general sense, SAED processing activities are affected by the same three constraints identified earlier as adversely influencing SAED's other marketing operations: 1) SAED's obligation to implement official marketing policies

regardless of the cost of implementation; 2) SAED's organization as a large, centrally-managed institution; and 3) SAED's financial insulation resulting from its reliance on external funding sources and from protectionist legislation. As in the case of the other divisions of URIC, these constraints have forced the processing division to undertake unprofitable business, have prevented mill managers from responding quickly and decisively to changing market conditions, and have protected processing operations from strong pressure for reform. As a result, performance has been impaired. Although the data are incomplete, SAED records indicate that the industrial-scale mills have not been able to achieve a higher paddy:milled rice conversion rate than technologically primitive hullers operating in the parallel channel, nor have they been able to process paddy at a lower average per-unit processing cost.

Management problems have clearly plagued SAED processing operations. Although it is true that management decision-making both at the level of URIC headquarters and at the level of the individual mills is frequently constrained by bureaucratic procedures beyond the control of individual managers, it is also true that some of those who have held management posts within SAED have been inexperienced and sometimes incompetent and/or corrupt. The frequency and duration of work stoppages at both mills, excessive personnel and materials costs, continual labor disputes, and persistent unexplained grain losses attest to

the inability of URIC staff to manage the processing operation effectively. Part of the problem seems to lie in the general lack of experienced managers; the highest levels of URIC management are often Senegalese recruited directly out of graduate school or expatriate technical assistants with little or no local experience.

Lack of experience is not the only problem contributing to poor management of official processing operations. Because hiring decisions in SAED tend to be strongly influenced by external political considerations, most URIC staffers do not face an incentive structure which rewards individual accomplishment. Realistically, the only way for many URIC managers to increase their income is at the expense of the company. Knowledgeable sources inside and outside of SAED have pointed out that this may be the reason that unexplained losses of grain, gasoline, and other goods have persisted over the years.

The reliance on imported machinery has also had a negative effect on performance. The machinery installed in the Richard-Toll mill during the early 1950's was manufactured in Italy. When the Ross-Bethio mill was constructed in 1971, it was equipped with German processing machinery of a similar design. The same German machinery was later installed in the Richard-Toll mill as part of a major overhaul completed in 1983. The reliance on imported machinery has caused problems for SAED, which has had

trouble obtaining the spare parts required to keep the mills operational. While some of the work stoppages which have plagued both mills have been attributable to other causes, the lack of replacement parts has been responsible for a considerable portion of total down time. Once the decision had been made to build industrial-scale mills, the choice of Italian and German machinery is difficult to fault, since Senegal has no domestic manufacturing capability for anything other than small hullers. Yet the selection of industrial-scale technology could have been predicted to create a dependency on foreign technicians and imported machinery, and perhaps greater consideration should have been given to the possibility of developing the cereals processing industry around technology that could be manufactured and maintained locally using primarily domestic resources.

Finally, and perhaps most importantly, the disappointing performance of SAED processing operations can be attributed to poor strategic decisions taken many years ago concerning choice of technique. While it is always easy to be critical with the benefit of hindsight, it is difficult to see how planners could have placed such confidence in SAED projected production increases, considering that actual accomplishments have always fallen far short of official projections. Why didn't planners consider the possibility that the projected quantities of paddy might not materialize, and why didn't they consider

the implications of such an eventuality in selecting optimal plant sizes and locations?

In failing to raise questions about the optimistic SAED production forecasts, those responsible for the choice of processing technology evidently neglected to consider the potential effects of forward and backward linkages on economic performance. A narrow focus on processing costs alone may have led planners to an erroneous ranking of alternative processing technologies. Haggblade (1986) emphasizes the danger of comparing alternative technologies within an industry without taking into account forward and backward linkages which may affect the industry's overall cost structure. In the cereals sub-sector, evaluation of alternative processing technologies must logically take into account grain assembly and distribution costs, since these differ greatly depending on the scale of the technology. By neglecting (or perhaps simply underestimating) the cost of transporting paddy to the mills and the cost of transporting milled rice to consumption areas, SAED planners engaged in what Haggblade refers to as "vertically blindered choice of technique analysis," leading them to conclude (erroneously) that industrial milling facilities represent the most cost-effective processing technology. Yet the large, centrally-located processing facilities which were eventually chosen have consistently operated at low levels of capacity utilization, and efforts to raise the level of throughput have been costly. As indicated by the analysis presented in

Chapter 3, economic performance has been impaired by the poor choice of plant size and locations. Potential cost savings have not been realized because installed machinery has been underutilized, and total marketing costs have been driven up because it has been necessary to truck in paddy from remote regions of the river valley for processing and to truck milled rice back out to dispersed consumption centers.

The critical importance of accounting for assembly and distribution transport costs in the choice of technique in processing is demonstrated in Table 17, which summarizes selected marketing costs in the official and parallel channels under three alternative production and consumption scenarios. Column 1 summarizes assembly costs, processing costs, and the transport component of distribution costs for 1 kg of paddy produced in the Upper Valley, processed by the SAED rice mill at Richard Toll, and trucked back to Bakel for distribution through the official channel. Column 2 summarizes the same costs for 1 kg of paddy produced in the Delta, processed by the SAED rice mill at Ross Bethio, and trucked to Saint Louis for distribution through the CPSP warehouse. Column 3 summarizes them for 1 kg of paddy produced anywhere in the river valley, processed locally on a small huller, and consumed within 100 km of the production zone.

Table 17: Comparison of Processing Costs With Forward and Backward Linkages In the Official and Parallel Marketing Channels

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

Source: Cisse (1984), Field Surveys

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

The data in Table 17 show how the economic ranking of alternative processing technologies depends on whether or not forward and backward linkages (i.e., assembly and distribution transport costs) are included in the calculations, as well as on what cost figures are used. When assembly and distribution costs are not taken into account and processing costs alone are compared, the SAED

mills appear to offer a cost advantage over small hullers.[7] But when different assembly and distribution costs linked to the alternative processing technologies are taken into account, the ranking may change. For example, if rice is produced and consumed far from the processing site (Column 1), higher assembly and distribution transport costs outweigh the scale economies achieved through the use of industrial processing facilities, making local processing on small hullers economically advantageous (Column 3). On the other hand, if rice is produced and consumed close to the processing site (Column 2), assembly and distribution transport costs remain small, and industrial-scale processing facilities represent the low-cost solution. These findings highlight the importance of accounting for backward and forward linkages in evaluating alternative processing technologies. The data reveal that neither the SAED mills nor small hullers enjoy an absolute cost advantage throughout the Senegal river valley; on the contrary, the figures indicate that industrial mills represent the low-cost processing technology for some production/consumption combinations, while small hullers represent the low-cost processing technology for other combinations.

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7. In interpreting these figures, it is important to remember that the SAED reported cost data fail to include certain real costs, e.g., the cost of capital tied up inventory and the cost due to physical grain losses. Inclusion of these costs would presumably raise the cost of industrial processing, perhaps affecting the rankings.

b) Parallel Marketing Channel

How well are processing functions being performed in the parallel marketing channel?

Parallel channel processing capacity has increased rapidly and extensively throughout the Senegal river valley. The February 1985 survey turned up 142 hullers, nearly 65% of which had been acquired by their owners during the preceding 18 months. Interviews with huller operators revealed that peak-season monthly throughput during the 1985 marketing season was estimated to be over 2.5 times greater on small hullers than on the SAED mills.

The performance of small rice hullers was evaluated through careful study of a representative sample of 26 machines, culminating in the construction of prototypical operating budgets. Based on these budgets, as well as other empirical evidence, six dimensions of parallel channel processing activities can be singled out as particularly important in contributing to national policy goals.

First, small hullers represent a profitable investment opportunity for private entrepreneurs. Analysis of the prototypical operating budgets reveals that even with relatively large taxes on capital, fuel, oil and grease, small hullers can be operated profitably at prevailing factor prices and remuneration rates. The prototypical

"village mill" generates a return to the owner's capital (and management) of 46%, while the prototypical "commercial mill" generates a return of 34%.[8] Village-level processing thus appears to be a viable rural industry with the potential to increase local employment and to generate income for rural populations.

Second, the relatively low fixed-cost component of village-level processing (as compared, for example, to industrial-scale processing) enables small hullers to operate profitably at a wide range of capacity utilization. Once installed in the field, a huller generates positive net returns even at extremely low levels of use because installation expenses, depreciation charges, and other fixed costs represent a relatively modest portion of total operating costs. This means that small hullers are ideally suited to supply conditions in the Senegal river valley, where the homogeneity of cropping patterns results in a huge glut of paddy on the market during a relatively brief period following the harvest. Sufficient processing capacity can be installed to handle this peak-season glut without creating huge backlogs, and the capacity can be maintained during the remainder of the year when supplies of paddy dwindle.

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[8]. It is important to keep in mind that no risk premium has been included in the calculation of these estimated rates of return. Considering the prevailing climate of uncertainty, the risk premium may be quite high, implying that realistic (i.e., risk-compensated) rates of return may be considerably lower.

Third, small hullers produce a mix of outputs which conform closely to local demand preferences. Although it is often asserted that the outputs of industrial processing facilities are superior to those of small hullers, this argument does not hold up in light of Senegalese consumption patterns. SAED rice does have a lower percentage of broken grains than locally processed rice (approximately 70% brokens, as compared to the measured average of 82% brokens for small hullers), but the 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, most Senegalese consumers demonstrate a strong preference for broken rice. Parallel market traders are well aware of this and frequently instruct huller operators to set the blades of their machines to break a high proportion of the grains. A similar argument applies to processing by-products. While the SAED mills produce three grades of by-product (rice flour, pure bran, husks), only one of the three (pure bran) finds a ready market. Meanwhile, the husks-and-bran mixture produced by small hullers is sought out by local herders as a feed supplement. The costs-and-returns analysis in Chapter 4 reveals the economic importance of this by-product; in a very real sense, the profitability of parallel channel trading is ensured by the value of the husks-and-bran by-product.

Fourth, small hullers represent an appropriate technology in the Senegal river valley. Most of the equipment failures reported by huller operators can be repaired quickly and inexpensively by village blacksmiths using locally available materials. Although hullers and huller replacement parts traditionally have been manufactured overseas, the continuing deterioration of exchange rates has raised import costs to the extent that it is becoming more and more attractive to produce the machinery domestically. Significantly, the technology is simple enough that domestic production is possible. Several Senegalese firms have begun to produce hullers in commercial quantities, and even local blacksmiths have begun to experiment with the manufacture of crude machines.

Fifth, small hullers are easily transportable and can be moved around in the field according to the demand for processing services. This has important implications for system-wide assembly costs: instead of bringing paddy to the huller, the huller can be brought to the paddy. The lack of precise data on the sources of grain processed by village hullers precludes exact calculation of the total cost savings realized because of the decentralized nature of village-level processing technology. Nonetheless, a partial estimate of the potential system-wide cost savings can be deduced from SAED reported assembly cost data. In 1983/84, SAED spent nearly 47 million FCFA transporting

paddy from the seccos to the mills.[9] Given a conversion rate of 67%, this means that husks and bran made up approximately one third (by weight) of the grain assembled. In other words, SAED spent over 15 million FCFA transporting husks and bran. Had the grain processed by the SAED mills been processed in the field using mobile hullers, this cost would have been avoided. (A similar argument can be made for distribution costs. Some of the grain processed by the SAED mills is shipped back to the areas in which it was originally produced, resulting in a second set of avoidable transport charges.)

Sixth, small hullers provide a valuable service to rural communities by alleviating the workload of women. In the absence of small hullers, much of the rice retained by farmers for home consumption would have to be hand-pounded. Hand-pounding is strenuous and time-consuming work which is much disliked by the women who have to do it.[10] A recurring comment made by many customers of village hullers was that hullers greatly reduce the daily workload of women. The importance of this performance dimension is reflected in the social prestige acquired by whoever introduces a huller into a village.

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9. Cisse (1984:14).

10. Published estimates of the labor requirements for hand-pounding rice vary. The amount of paddy that can be hand-pounded per hour is generally estimated at 3-7 kg. For example, see Spencer, May-Parker, and Rose (1976:31); Timmer (1973:13).

In sum, the rapid growth in village-level processing technology has occurred because small hullers embody an appropriate technology of significant flexibility which offers attractive profit opportunities to private investors while providing a valuable service to rural communities.

Despite their many advantages, however, small hullers do have several disadvantages. Two problems in particular must be singled out in light of the government's expressed performance objectives for the cereals sub-sector.

First, steel-cylinder hullers represent a relatively crude level of technology. While easy to manufacture and to repair, the "Engelberg-type" machines used in the Senegal river valley operate at low levels of technical efficiency in comparison with the rubber-roller machines now used throughout much of the rice-growing world. Conversion rates on steel cylinder machines are relatively low, and energy consumption is relatively high. Although the widespread use in Senegal of steel-cylinder machines is hardly surprising (it reflects the normal first step in the transition from hand-pounding to mechanical processing), what is alarming is that there seems to be little or no movement toward the use of more efficient technologies. The problem can be attributed at least in part to the fact that processors' access to information about improved technologies appears restricted. No rubber-roller machines were found in the river valley, and not a single huller owner or operator

questioned during the field surveys indicated ever having seen one. Impetus for change does not seem to be forthcoming from agricultural machinery dealers. Representatives of MATFORCE, Senegal's leading importer of agricultural machinery, expressed no plans to begin importing rubber-roller machines, indicating that the company is more interested in consolidating its lead in sales of steel-cylinder hullers. While there do not appear to be formal legal barriers preventing other firms from importing superior processing technologies, scale considerations may be discouraging potential competitors from challenging MATFORCE's dominant market share, i.e., the total market may simply be too small to justify the initial investment of setting up a business to import small-scale processing technologies. Immediate prospects for further technological change in the parallel channel processing industry thus do not appear favorable, raising serious questions about the industry's progressiveness.

The second problem associated with the use of small hullers concerns the aggregate level of processing capacity at the village level. Given current production levels, there may be too many hullers operating in the Senegal river valley. The field surveys revealed that many hullers remain underutilized throughout much of the year. Although the prototypical operating budgets suggest why this can happen (small hullers generate high rates of return even at low levels of use), one must question whether it is socially

desirable to have capital unnecessarily tied up in underutilized machinery. Assuming paddy could be stored and processed gradually throughout the year, a small number of hullers working at high rates of capacity utilization could presumably achieve the same throughput as the present large number of hullers working at low rates of capacity utilization.

The presence of excess processing capacity at the village level suggests one of several possibilities. Perhaps huller owners expect considerable production increases and have acquired hullers in anticipation of future business. If this is the case, then the current level of capacity is probably desirable, since future bottlenecks in processing will be averted. However, two other possibilities are more problematic. Perhaps the current high level of processing capacity reflects a lack of alternative investment opportunities for persons in rural areas. Alternatively, perhaps the current high level of processing capacity is encouraged by the official pan-seasonal rice price structure, which creates a strong disincentive to store grain and therefore forces parallel channel traders to do as much business as possible immediately following the harvest, before storage costs begin to accumulate. If either of these latter explanations is correct, the current level of processing capacity must be considered too high compared to what it would be under rules of the game encouraging intersectoral flows of investment

capital and pricing products and services at market rates.

5.5 Performance of Wholesaling Functions

a) Official Marketing Channel

How well are wholesaling functions being performed in the official marketing channel?

Before the research findings are reviewed, it is important to recall that the present study concerns the performance of cereals markets in the Senegal river valley. Consequently, the evaluation of official wholesaling activities is restricted to wholesaling activities at the regional level. While regional operations of the CPSP are examined, no evaluation is made of the overall performance of the national CPSP cereals import and distribution operation.

Wholesale distribution activities in the official marketing channel were described in some detail in Chapter 3. In the absence of reliable long-term data on actual market prices, many of the traditional quantitative measures of market performance based on price analysis cannot be calculated. Nevertheless, other quantitative and

qualitative evidence suggests that the official cereals distribution system has been able to achieve three important performance objectives.

First, the government has been able to assure a fairly reliable supply of food grains to consumers in the Senegal river valley. During the period of the study, rice and sorghum were generally available through the quotataire-based CPSP distribution network.

Second, the government has largely been able to enforce official prices at the wholesale level (both CPSP sale prices and wholesale prices). Although the field surveys revealed that some quotataires have devised strategies to raise the effective wholesale price paid by retailers, the discrepancies between official prices and actual market prices generally can be explained as cost-recovery mechanisms designed to compensate quotataires for additional marketing services (e.g., transport, credit, underweight bags).

Third, the government has been able to keep marketing margins modest. Assuming that most wholesalers more or less adhere to the official price structure, gross marketing margins are restricted to a basic range -- around 6 FCFA/kg for wholesalers based in Saint Louis, and slightly higher

elsewhere in the river valley.[11] Instead of attempting to stretch these margins by cheating on the official price structure, most wholesalers apparently rely on high sales volume and rapid turnover to increase profits.

This is not to deny that there are occasional shortages, nor that some wholesalers take advantage of the shortages to raise prices above official levels in order to increase margins. From time to time there are shortages, prices do rise, and margins presumably do go up accordingly. But food grain shortages almost invariably result from supply disruptions at the source, i.e., at the level of the CPSP Dakar warehouses (for example, due to the late arrival of a supply ship). This is quite different from deliberate hoarding by wholesalers for the expressed purpose of creating an artificial shortage in order to drive up prices, which is the "explanation" often put forward by concerned public officials and frustrated consumers. While it is true that certain traders, both wholesalers and retailers, are quick to take advantage of the upward pressure on prices produced by a supply disruption, it is misleading to blame the shortages on traders. More often than not, at least with the case of rice, supply decreases because traders themselves are unable to obtain grain from their only legal

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11. It must be conceded that marketing margins earned by quotataires were difficult to estimate directly. Returns to cereals distribution activities have to be separated out from returns to other components of what are usually extremely diversified enterprises, yet quotataires were often reluctant to divulge sensitive financial information.

supplier, the CPSP. No evidence was found to indicate that cereals distributors, neither wholesalers nor retailers, were anywhere engaging in deliberate, systematic hoarding for purposes of manipulating prices.

If the official distribution channel has performed well in some respects, in other respects it has performed poorly. While the CPSP, working together with the quotataires, has been able to assure a stable supply of cereals at prices which protect the incomes of consumers while restricting the margins earned by intermediaries, the cost of these achievements has been considerable. Part of this cost is incurred by the public sector, and part is incurred by the private sector.

The costs incurred by the public sector are easy to perceive, even if the available data preclude their accurate quantification. To begin with, the government incurs considerable administrative expenses in running the CPSP. While the CPSP does not concern itself exclusively with cereals import and distribution activities, such activities comprise an important part of its operations. In addition, the state channels large sums through the CPSP to subsidize the transportation and storage of grain. These subsidies are made necessary by the panseasonal and quasi-panterritorial structure of official prices, which act as strong disincentives against spatial and temporal arbitrage by private grain traders.

The costs incurred by the private sector are often difficult to perceive, much less to quantify. Some can be described as the "costs of doing business". These include such things as the costs involved in obtaining a rice quota (e.g., under-the-table payments made to CPSP officials), the costs involved in preserving a rice quota (e.g., acceptance of fixed quantity of grain each month regardless of fluctuations in demand), and the costs involved in complying with marketing regulations (e.g., payments made to Controle Economique agents to avoid fines). Other costs falling on the private sector might be described as "indirect costs". These include primarily the potential savings foregone by quotataires as a result of their inability to expand and specialize in order to capture potential scale economies in cereals distribution.

b) Parallel Marketing Channel

How well are wholesaling functions being performed in the parallel marketing channel?

Of all parallel channel marketing activities, wholesaling functions are the most difficult to study. Although itinerant traders can usually be induced to discuss assembly and processing activities (which are not necessarily illegal, since grain may be acquired and processed for personal consumption needs), they are generally reluctant to discuss wholesaling activities (which

are illegal whenever more than 200 kg of rice is involved, when inter-regional transfer is involved, when unlicenced trading partners participate in the transaction, or when official prices are not respected). The sensitivity of parallel channel wholesaling activities makes empirical measurement of market performance difficult.

The evidence presented in Chapter 4 suggests that the performance of itinerant traders in carrying out wholesaling activities has been impressive. Perhaps the most noteworthy characteristic of the parallel channel trade is its flexibility. Near-complete vertical integration from assembly all the way through to retailing encourages the free flow of market information and enables markets to clear rapidly. Many itinerant traders undertake buying trips only once they have established a final demand point; they normally do not assemble, process, and store grain in anticipation of later finding a buyer. From the traders' point of view, this practice of first seeking out a buyer in order to ensure a rapid turnover is desirable for a number of reasons: it reduces the amount of time that scarce capital is tied up in inventory, it minimizes storage costs, and it lessens the risk of being caught in possession of an illegal quantity of grain. The effect on the system as a whole is to improve exchange efficiency.

The efficiency of itinerant traders, earlier alluded to in the evaluation of parallel channel assembly activities,

is similarly apparent in wholesaling. Average wholesaling costs in the parallel channel appear to be lower than in the official channel despite higher levels of risk. Itinerant traders have access to extensive sources of market information and are adept at capitalizing quickly on market opportunities. They make efficient use of resources, especially transport. They personally accompany most shipments and thus are able to reduce losses to improper handling and theft. They carry very little overhead and consequently are able to accommodate large fluctuations in sales volume with little effect on average marketing costs (many are in fact seasonal traders who do not engage in any grain trading activities during large parts of the year). All of these factors work to reduce wholesaling costs in the parallel channel.

Marketing margins in cereals wholesaling are difficult to estimate, because given the extreme vertical integration prevailing in the parallel channel, there is no easy way to separate out returns to wholesaling from returns to other marketing activities. Based on indicative 1985 prices, the combined net margin on assembly, wholesaling, and retailing activities was estimated to be 11.84 FCFA per 1 kg milled rice and 0.6 kg husks-and-bran. (See Table 15) In evaluating this finding, 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 market traders. Furthermore, licenced distributors often trade in large volumes -- up to hundreds of tons per month for the larger wholesalers. Parallel market traders typically trade in small quantities, so that larger per-unit margins may be required 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% per annum opportunity cost of capital) are on the same order of magnitude.[12] 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 market rice trading were both found to generate net margins of 7-8 FCFA/kg of unprocessed grain, the figures are not strictly comparable because they represent returns to different value-adding processes.

If the performance of parallel channel wholesalers rates generally high marks, there is nevertheless room for

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[12]. See Newman, Ndoye, Sow (1985).

improvement. Despite the generally efficient use of resources alluded to above, the illegality of the parallel channel rice trade continues unnecessarily to raise the cost of doing business. As in the case of parallel channel assembly operations, the necessity of engaging in evasive behavior exacts two types of unnecessary costs: 1) out-of-pocket costs (e.g., payments to the additional intermediaries required to accompany split loads), and 2) foregone cost savings (e.g., due to the inability to capture potential economies of scale). These partly offset the cost savings achieved by parallel market traders through more efficient use of resources and reductions in physical losses.

Finally, it should be recalled that all parallel channel marketing activities, including wholesaling, require price variability to provide incentives for productive transformation and exchange. Spot checks in markets throughout the river valley confirmed that prices in the parallel channel fluctuated considerably more than prices in the official channel. On the one hand, price variability is desirable, since it permits the allocation of food which has already been produced to its highest use. But on the other hand, excessive price variability is undesirable, since it affects the real incomes of consumers and introduces risk and uncertainty into investment decision-making. In this latter sense, the parallel channel wholesale trade could perform less well than the official channel wholesale trade,

where the enforcement of official prices removes a great deal of price variability.

5.6 Performance of Retailing Functions

a) Official Marketing Channel

How well are retailing functions being performed in the official marketing channel?

Retail distribution activities in the official channel were described in Chapter 3. As in the case of wholesaling, the lack of reliable long-term data on actual market prices precludes calculation of many of the traditional quantitative measures of market performance based on correlation analysis. Nevertheless, other quantitative and qualitative evidence (including four months of weekly price data collected in markets throughout the river valley) provide important insights into the performance of the cereals retailing industry. The data at the retail level generally confirm earlier findings at the wholesale level: the official cereals distribution system has been able to achieve three important performance objectives in the Senegal river valley.

First, the government has been able to assure a fairly reliable supply of food grains to consumers in the Senegal river valley. During the period of the study, rice and sorghum were generally available through the quotataire-based CPSP distribution network. As noted above, periodic rice shortages do occur, but these are almost invariably attributable to supply disruptions at the source, i.e., at the level of the CPSP warehouses in Dakar. They are not attributable to breakdowns in coordination between retail traders and their local suppliers, the quotataires. On the contrary, the survey results indicate that coordination between quotataires and licenced retailers is very good; the close working ties between wholesalers and retailers ensure that grain is delivered to retail outlets (market stalls and neighborhood shops) as soon as it becomes available to the wholesaler.

Second, the government has largely been able to enforce official prices at the retail level. Although many retailers have devised strategies to raise effective retail prices paid by consumers (e.g., rounding prices up to the nearest 5 FCFA/kg), the discrepancies between official prices and effective prices generally can be explained as cost-recovery mechanisms designed to compensate retailers for additional marketing services (e.g., credit, transport).

Third, the government apparently has been able to keep marketing margins modest. Assuming that most retailers more

or less adhere to the official price structure, gross marketing margins are restricted to a basic range -- around 7 FCFA/kg throughout the river valley. Strict enforcement of official prices by the Controle Economique discourages most retailers from attempting to cheat blatantly on official prices.

In evaluating the performance of official retailing operations, it is important to acknowledge two significant contributions made by SONADIS. Because it is official CPSP policy to favor SONADIS stores during times of supply disruption, SONADIS frequently has grain available even when regular retailers are not able to obtain fresh supplies. The vital importance of SONADIS as a supplier of food grains during times of shortage is shown by the lengthy queues which form outside of SONADIS stores long after market sellers and neighborhood shopkeepers have exhausted their supplies. (This method of rationing limited supplies, as opposed to price rationing, favors low-income consumers for whom the opportunity cost of standing in line is negligible.) In addition to helping assure a reliable supply of food grains, SONADIS may also be contributing to improved market performance by influencing the pricing behavior of retailers. Although extensive data are not available to confirm this hypothesis, it seems likely that SONADIS, by offering rice and sorghum for sale at official prices, limits the ability of market sellers and neighborhood shop keepers to raise prices, at least in the

vicinity of SONADIS stores. While the survey results confirm that retailers do increase effective prices above official levels in return for additional services (e.g., credit), the presence of SONADIS stores presumably constrains the degree to which this is possible.

While retail-level data thus generally confirm earlier findings at the wholesale level that the official channel has performed reasonably well in performing cereals distribution activities, variability in the retail-level data suggest several important qualifications. Specifically, there are indications that performance within the retailing industry varies considerably depending on geographical location. Even though the survey results offer a generally favorable view of cereals retailing, it must be remembered that many of the licenced retailers who served as respondents were located in larger towns and villages. Informal visits to smaller, more isolated villages along the river indicated that the more remote areas are often served by a single licenced shopkeeper, who in the absence of local competition may be able to behave quite differently than the shopkeepers and market sellers situated in the larger towns. Interviews with a number of village shopkeepers, as well as with their clients, suggested that supplies of grain in remote rural areas are far less reliable than in the larger towns and villages, that prices do not always conform to the official structure, and that net marketing margins at the retail level may be considerable. Thus, the official

cereals distribution system appears to perform better for consumers who live in the larger towns and villages than it does for consumers who live in remote rural villages.

Other negative performance dimensions associated with official retailing activities include those discussed earlier in reference to official wholesaling activities, notably unnecessary costs, both public-sector and private-sector costs. The composition of each cost category differs between the two industries, however. Whereas in cereals wholesaling the major public-sector cost is incurred by the government in running the CPSP, in retailing the major public-sector cost is incurred in running SONADIS. It is common knowledge in Senegal that SONADIS as a whole receives considerable subsidies from the state. Because SONADIS accounts are kept confidential, it was not possible to determine the net profitability of SONADIS cereals distribution activities. When questioned, SONADIS representatives conceded that cereals are among the least profitable items carried, but they were not willing to divulge precise figures.[13]

Turning to the private sector, unnecessary costs are incurred by retailers in attempting to comply with marketing regulations and still stay in business. Many licenced retailers find themselves in a difficult position because of

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13. M. M'Baye (SONADIS Regional Representative, Saint Louis), personal communication.

their relative lack of power compared to wholesalers on the one hand and to regulatory agents on the other. Forced by their dependency on credit to accept grain from wholesalers at a price above the official wholesaler-sale price, retailers have little choice but to raise the price at which they sell to consumers above the official retail price if they are to maintain the marketing margin to which they are legally entitled. This practice is extremely risky, however, as it can lead to the payment of fines or under-the-table "arrangements" if detected by the Controle Economique.

b) Parallel Marketing Channel

How well are retailing functions being performed in the parallel marketing channel?

Grain moving through the parallel channel is sold to consumers in a number of different ways. Much of the rice handled by itinerant traders is entrusted to an urban retailer, either an open-air seller, a market stall operator, or a neighborhood shopkeeper. In some instances the itinerant trader and the retailer are relatives, and there is no formal transfer of ownership; the retailer takes delivery of the grain, sells it to consumers, gives the proceeds to the itinerant trader, and in return is paid a

commission. In other instances, the itinerant trader and the retailer are not related, and there is formal transfer of ownership; a wholesale price is negotiated, terms of payment are agreed upon, and the grain is handed over to the retailer for sale to consumers. More rarely, the additional intermediary at the retail level is eliminated, and the itinerant trader sells directly to the consumer.

The evidence presented in Chapter 4, based on interviews with parallel channel intermediaries as well as spot surveys of grain prices in markets throughout the river valley, suggests that the performance of the parallel channel participants in carrying out retailing activities has been impressive. As in the case of the wholesale trade, perhaps the most noteworthy characteristic of the retail trade is its flexibility. The extensive vertical integration prevailing in the parallel channel encourages the free flow of market information and encourages markets to clear rapidly. Since entry conditions into the market are relatively unrestricted, the supply of retail marketing services is highly elastic. During the post-harvest months, the numbers of open-air market sellers increase considerably in response to larger quantities of locally-produced rice moving through the parallel channel. Many of these open-air market sellers are part-time, seasonal traders. Because they work with little or no overhead, they are able to respond rapidly to changes in market conditions, entering the market whenever a profit opportunity presents itself and

exiting as soon as the opportunity has passed.

The efficient use of resources, earlier discussed in the context of wholesaling, is also evident at the retail level. Average retailing costs are kept low in the parallel channel because traders have access to extensive market information, are adept at capitalizing quickly on market opportunities, and are able to reduce losses due to improper handling and theft. Even though the parallel channel is generally more efficient than the official channel in using resources, the advantage is least pronounced at the retail level, because retailing operations are very similar in both channels. (The distinction between the two channels is in fact often blurred at the retail level, since the same licenced retailers often carry both CPSP rice and locally produced rice).

Marketing margins at the retail level appear to be modest in the parallel channel. The fact that local rice at times can be found at prices well below the official retail price would seem to suggest that competition is an effective force in the market, reducing the likelihood of excessive profit-making. The spot surveys revealed that non-official prices are most often offered by unlicenced traders (e.g., open-air market sellers). Licenced traders (e.g., market stall operators and neighborhood shopkeepers) are more likely to sell both CPSP rice and parallel channel rice at or near official prices, apparently out of fear of being

fined for illegal pricing practices.[14]

If the performance of parallel channel retailers rates generally high marks, there is nevertheless room for improvement. Since it is illegal for a trader to possess more than 200 kg of local rice, the scale of parallel channel retailing operations is limited by the ever-present threat of fines. Although the 200 kg limit does not affect many open-air sellers, who generally deal in small lots (e.g., a single 100 kg bag at a time), the limit can affect the purchasing, transport, and storage activities of market stall operators and neighborhood shopkeepers, who occasionally have opportunities to acquire larger quantities at favorable prices.

Finally, one last observation made in reference to other parallel channel activities bears repeating here. All parallel channel marketing activities, including retailing, require price variability to provide incentives for productive transformation and exchange. As pointed out earlier, price variability is a necessary evil having both positive and negative effects on economic performance. For certain interest groups negatively affected by increased price variability, the parallel channel consequently performs less well than the official channel.

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14. Selling below the official price may not actually be illegal, since the official marketing regulations do not make clear whether the official retail price is intended to be a mandatory fixed price or merely a ceiling price.

5.7 Summary of Market Performance

This study has generated much information about the performance of cereals markets in the Senegal River valley. As often happens in sub-sector analysis, however, the wealth of analytical detail is almost overwhelming, and it is easy to get so involved in looking at individual trees as to lose sight of the overall forest. Consequently, it is useful to summarize the principal research findings by formulating brief answers to the following questions:

1) To what extent are the cereals sub-sector performance objectives described in Table 16 being realized?

2) In what respects does performance in the official marketing channel differ significantly from performance in the parallel marketing channel?

Referring back to the performance objectives described in Table 16, observed market performance in the Senegal river valley can be summarized as follows:

1. Product Characteristics

a) adequate supplies of cereals (particularly millet and rice) for all consumers:

The cereals marketing system has not been able to provide adequate supplies of food grains to consumers in the

Senegal river valley, as evidenced by the large amounts of emergency food aid distributed throughout the region in recent years. While regional food deficits cannot be blamed entirely on marketing problems, the marketing system is implicated to the extent that it has failed to facilitate interregional transfers of grain or to provide incentives to local producers and importers to increase total supply.

b) assured availability of all grades of cereals preferred by consumers:

The official marketing channel is largely insensitive to consumer preferences. The CPSP generally imports only the cheapest available grades of rice and sorghum, which means that licenced wholesalers (quotataires) cannot be allowed to specify desired grades when they take delivery of their monthly quotas. Furthermore, even though traders recognize that certain grades are strongly preferred by consumers, the uniform official price structure prohibits the setting of retail prices in response to consumer preferences. In contrast, the parallel marketing channel is more sensitive to consumer preferences. Parallel channel traders generally make an effort to procure preferred grades of rice, e.g., by adjusting hullers to produce the broken product desired by consumers, by sorting locally produced rice into different sizes, and by setting different prices for different grades.

c) affordable prices of cereals:

Price levels of food grains depend largely on factors outside the marketing system -- for example, production costs, world grain prices, and government price policies. Yet marketing activities do exert an effect on the level of prices through the size of marketing margins. Since margins in the parallel channel are smaller than margins in the official channel, the parallel channel performs better in contributing to the objective of assuring affordable prices of cereals.

d) stable prices of cereals:

The official distribution system introduces a degree of price stability into cereals markets by fixing official prices, both wholesale and retail. But one cost of increased price stability is non-price rationing to resolve temporary imbalances between supply and demand. (During times of shortage, the price mechanism fails to clear the market, and consumers are forced to spend long hours waiting in line at SONADIS stores to purchase rice or sorghum at official prices.) Price stability is not a characteristic of the parallel channel, where price variability is necessary in order for the market to perform its vital signalling function.

2. Technical and Economic Efficiency

a) use of efficient technologies:

While technological efficiency issues can be found throughout the cereals sub-sector, the issue of greatest import relates to the choice of technique in rice processing. Despite their alleged technical superiority, the SAED rice mills appear to represent a non-optimal processing technique in view of factor endowments prevailing in the Senegal river valley. Timmer describes four ways of viewing efficiency (engineering, market, economic, and social), and he discusses how the choice of technique in rice processing may be affected by different ways of valuing inputs and outputs.[15] Timmer's assessment of the Indonesian experience is relevant to the Senegal river valley, where overreliance on engineering feasibility studies (without adequate consideration of general-equilibrium effects on industries other than processing) and undervaluation of the capital used to construct the SAED mills (which was obtained "free" in the form of development assistance funds) has led to the choice of inefficient industrial processing technologies characterized by an undesirably high K/L ratio. While no attempt has been made formally to duplicate Timmer's analytic procedure using Senegalese data, it is likely that the SAED mills would not compare favorably with smaller-scale processing technologies even if the mills

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[15]. Timmer (1972).

could be operated efficiently (i.e., at full capacity).

b) use of appropriate technologies:

Many technologies being used in the official marketing channel are simply inappropriate in the sense that their use depends on the availability of expensive imported machinery and parts, as well as foreign technical assistance. In contrast, the technologies being used in the parallel channel are more likely to be appropriate for local conditions in the sense that they can be manufactured and repaired locally and operated by Senegalese workers.

c) minimization of unnecessary costs:

Unnecessary costs continue to impair performance in cereals markets. The nature of unnecessary costs differs between the official and the parallel marketing channels. Unnecessary costs in the official channel are caused primarily by waste, inefficiency, and corruption, while in the parallel channel they are caused primarily by evasive behavior undertaken by unlicenced traders seeking to conceal illegal marketing activities.

3. Exchange Efficiency

a) maximization of spatial, temporal, and form utility of cereals:

The official channel relies on a system of centralized planning (involving SAED, CPSP, MCI, and SONADIS) to allocate cereals across space, through time, and among forms. The allocative process is constrained by a number of problems, including information impactedness, lack of planning and management skills, and institutional lethargy. Consequently, food grains are not always available in the right place, at the right time, and in the right form. In contrast, the parallel channel relies more on market prices to guide allocative decisions: parallel channel traders make decisions concerning when and where to buy and sell based on price signals. Wherever market participants have been able to conduct "illegal" transactions involving non-official prices, the parallel channel has operated effectively. Yet it continues to be severely constrained by the Controle Economique's rigorous enforcement of official marketing regulations (including price controls and prohibitions on interregional transfers of grain).

b) rapid transmission of market information to all concerned participants:

Information impactedness is a major problem in cereals markets throughout the Senegal river valley. The geographical dispersion of production, combined with poor transportation and communication infrastructure, makes it extremely difficult for marketing agents to learn about supply and demand conditions. While vertical integration somewhat facilitates the flow of information in the parallel channel, the cost of being informed remains high even for parallel channel operatives. Effective planning continues to be constrained in both channels by unreliable market information, increasing the likelihood of errors and resulting in higher marketing costs.

4. Distribution of Benefits

a) support and stabilization of producer incomes:

The official marketing channel increases producer incomes as long as the official producer price of rice provides an effective floor, i.e., as long as the official producer price exceeds the price available in the parallel channel. But during the past few years the official producer price has often failed to provide an effective

floor in many parts of the Senegal river valley, particularly in the Delta region where parallel channel traders have been most active. Unlike the official channel, the parallel marketing channel does not provide any guarantee that producer prices will be supported above a certain floor; in the absence of government interventions, parallel channel prices rise or fall to clear the market.

Contrary to the conventional wisdom often expressed by Senegalese officials, the government practice of fixing a producer price does not necessarily help to stabilize producer incomes. In fact, the practice of fixing an official producer price for paddy can be presumed to increase the variability of producer incomes by inhibiting the normal tendency of price movements to offset changes in quantity produced. In the parallel channel, on the other hand, offsetting movements in prices and quantity produced can be presumed to decrease the variability of producer incomes.

b) protection and stabilization of consumer incomes:

In the official channel, consumer incomes are protected and stabilized because official pricing policies fix retail grain prices at artificially low levels. In the parallel channel, the variability characterizing retail prices acts to destabilize consumer incomes, although the net effect of this variability on the level of consumer incomes is indeterminate. When prices in the parallel channel fall

below prices in the official channel, real consumer incomes are increased; when prices in the parallel channel rise above prices in the official channel, real consumer incomes are decreased.

c) reasonable returns to intermediaries:

Intermediaries in both the official and the parallel channels appear to make "reasonable" returns to their marketing activities. However, the forces acting to limit the size of marketing margins differ between the two channels. In the official channel, strict enforcement of government price controls plays an important role in restricting marketing margins. In the parallel channel, competitive forces are most important in limiting excess profit-taking.

d) low administrative support costs to the government:

The official marketing channel clearly exacts a high price in terms of administrative support costs to the government. The government organizations and parastatals involved in the assembly, processing, and distribution of grain all require considerable subsidization. Parallel channel marketing functions, on the other hand, are carried out with little or no direct involvement by the government.

e) distribution of benefits across different societal interest groups[16]:

The major beneficiaries of official cereals marketing operations are producers (to the extent that official producer prices provide an effective floor), consumers (to the extent that official retail prices contain subsidies), intermediaries (to the extent that licencing regulations act as a barrier to entry into the industry and thus guarantee market share to licenced traders), and civil servants (to the extent that the government organizations and parastatals involved in grain marketing generate public-sector employment). The major beneficiaries of parallel channel cereals marketing operations are producers (to the extent that farm-gate prices in the parallel channel exceed the official producer price), consumers (to the extent that retail prices in the parallel channel are lower than official retail prices), intermediaries (chiefly itinerant traders, processors, transporters, and distributors), and the government (to the extent that parallel channel marketing activities reduce public-sector expenditures in the official marketing channel).

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16. In considering the distribution of benefits, it is important to remember that interest groups are never completely homogeneous, and that patterns of costs and benefits do not affect all members of a given interest group equally.

5. Growth and Progressiveness

a) increasing production of cereals

Significant progress has been achieved during recent years toward increasing cereals production in the Senegal river valley. Production of paddy has jumped sharply since the SAED reform plan was implemented in 1981, and the impending completion of the Diama dam promises to add further impetus to this trend. But if the production figures are encouraging, important questions remain to be addressed concerning the cost of irrigated cereals production.

b) sustained growth in rural incomes

Levels of rural incomes are difficult to assess under the best of circumstances. Recent events affecting the Senegal river valley (notably the drought and the introduction of irrigation technology) have considerably complicated what was already a difficult task, with the result that little is known about the dynamic path of rural incomes in the river valley. While the spread of commercial farming clearly is monetizing the agricultural economy, the effects of irrigated crop production on the level of rural incomes remain unknown.[17]

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17. An ISRA farming systems research team is currently studying this important topic.

c) progressiveness

The official marketing channel is not characterized by progressiveness: public-sector involvement in assembly, processing, and wholesale distribution insulate those industries from competitive pressure to seek out ways to improve performance, and institutional lethargy restricts the ability of government organizations and parastatals to respond rapidly to changing market conditions. There have been few government experiments with improved marketing technologies or management procedures, and almost no domestic research and development capacity exists. The parallel channel is somewhat more progressive: competitive pressure forces intermediaries to seek out ways to improve performance, and their flexibility allows them to react to changing market conditions (e.g., the recent transformation of the paddy processing industry).

d) institutional flexibility

The cereals sub-sector is not characterized by a high level of institutional flexibility, particularly in the official marketing channel. Extensive direct participation by the state in many economic activities has contributed to the emergence of a rigid set of official rules, regulations, and standard operating procedures which tend to be enforced long after changing market conditions have undermined their usefulness. Parallel channel participants are also restricted in their ability to respond to changing market

forces. The conventional wisdom continues to malign private-sector marketing agents, resulting in formal restrictions on the scope of their involvement even when the official marketing organizations have demonstrated an inability to perform satisfactorily. This lack of institutional flexibility perpetuates the current inappropriate mix between public-sector and private-sector responsibilities in the cereals sub-sector and presents an obstacle to improved performance.

Chapter 6

POLICY OPTIONS FOR THE CEREALS SUB-SECTOR

6.1 Predicting Alternative Development Scenarios

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

These are questions with important implications. If cereals marketing policies are to be effective, they must not only address current problems but also accommodate potential future problems. This discussion of possible policy reforms therefore begins by considering how ongoing development efforts are likely to shape the face of agriculture in the Senegal river valley over the next several decades.

Official SAED projections predict the gradual spread of irrigation technology throughout the arable portion of the river valley and a continuing concentration on the intensive production of cereals crops, primarily rice. Although

cropping intensity and yields are expected to level off soon after the Diama and Manantali dams come on line, production is expected to increase as new land is brought under cultivation. Using what are said to be "realistic" assumptions about the anticipated evolution of three key production parameters (irrigated area, cropping intensity, and yield), SAED planners predict that the Senegal river valley will become self-sufficient in cereals production sometime in the mid-1990's and that the region will become an important exporter of cereals thereafter.[1]

But are the official SAED projections likely to be accurate? The historical record unfortunately is not encouraging. Previous attempts to forecast changes in key production parameters have often been inaccurate, and actual achievements have frequently fallen far short of stated objectives. While past forecasting errors are attributable in part to the excessive optimism of SAED planners, a more intractable problem has been the unpredictability of many exogenous forces affecting agricultural development activities in the Senegal river valley (e.g., climate, technological change, levels of public investment, foreign aid flows, input costs, output prices, exchange rates, and government policies).

Because exogenous forces will continue to play an important role, it is worthwhile to consider how they might

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1. SAED (1984b).

affect future development scenarios. One way to incorporate exogenous forces into a framework of analysis is through modelling, e.g., using systems simulation techniques to depict the general-equilibrium effects of selected external shocks. Unfortunately, formal general-equilibrium modelling is beyond the scope of the present paper; the data requirements would be extensive, and the model would be time-consuming to construct and to test.

A more manageable way to explore the likely effects of exogenous forces on future development scenarios involves simple projection of supply and demand trends under different assumptions about key production and consumption parameters. While considerably less sophisticated than systems modelling, trend projection nevertheless can provide important insights into the likely evolution of future supply and demand conditions under various sets of plausible circumstances. Trend projection thus represents a quick and inexpensive method of helping to focus attention on issues of possible future policy importance.

Trend projection has been used to generate forecasts of the likely long-run evolution of regional cereals balances in the Senegal river valley under several plausible sets of circumstances. The projections are based on four implicit assumptions. First, it is assumed that development of the Senegal river valley for irrigated agriculture will continue, implying that the Senegalese government and/or

foreign donors will provide the funding necessary to bring about future increases in the supply of cereals. Second, it is assumed that the two dams currently under construction will be successful from an engineering point of view, so that multiple-crop irrigation will become technically possible throughout the entire river valley. Third, it is assumed that there will be sufficient rainfall to fill the reservoir above the Manantali catchment dam, so that adequate supplies of irrigation water will be available to support multiple-crop irrigation. Fourth, it is assumed that irrigated crop production will draw heavily upon available supplies of land and labor, leading eventually to the displacement of rainfed and flood-recessional production of traditional cereals crops.

The trend projections are based on the following supply (S) and demand (D) relationships:

S = f(irrigated area, yield, cropping intensity)

D = f(population, annual per capita cereals consumption requirement)

Future supply (regional production) is estimated by multiplying projected irrigated area times projected cropping intensity times projected yield. Future demand (regional consumption requirements) is estimated by multiplying the projected population of the river valley times per capita annual food grains consumption requirements

(180 kg), expressed in terms of unprocessed grain.[2]

Because of the uncertainty surrounding future events, sensitivity analysis is used to test the effects of changes in the ancillary forecasts. On the demand side, cereals consumption requirements are calculated using two annual population growth rates (3% and 2%), and on the supply side, regional production is calculated using two rates of expansion in irrigated area (3000 ha/year and 2000 ha/year), two levels of cropping intensity (1.1 and 1.6), and two levels of yield (4.5 tons/ha and 5.5 tons/ha). Although conservative by SAED standards, these parameter values have been selected based on current conditions in the river valley and recent rates of change. A complete listing of parameter values for each scenario appears in Table 18.

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2. The figure of 180 kg corresponds to the standard FAO "rule of thumb" estimate of the amount of processed grain needed to satisfy annual human nutritional requirements.

Table 18: Parameters Used in Supply and Demand Trend Projections

	Population Growth Rate	Annual Expansion In Irrigated Area	Yield of Paddy (tons/ha)	Cropping Intensity	See Figure In Text:
Scenario 1 (a)	3%	3000 ha	4.5	1.1	14 (a)
Scenario 1 (b)	3%	2000 ha	4.5	1.1	14 (b)
Scenario 2 (a)	2%	3000 ha	4.5	1.1	15 (a)
Scenario 2 (b)	2%	2000 ha	4.5	1.1	15 (b)
Scenario 3 (a)	3%	2000 ha	4.5	1.1	16 (a)
Scenario 3 (b)	3%	2000 ha	4.5	1.1 + 0.025/year until 1.6 in year 2005	16 (b)
Scenario 4 (a)	2%	2000 ha	4.5	1.1	17 (a)
Scenario 4 (b)	2%	2000 ha	4.5	1.1 + 0.025/year until 1.6 in year 2005	17 (b)
Scenario 5 (a)	3%	2000 ha	4.5	1.1	18 (a)
Scenario 5 (b)	3%	2000 ha	4.5 + 0.1/year until 5.5 in year 1995	1.1	18 (b)
Scenario 6 (a)	2%	2000 ha	4.5	1.1	19 (a)
Scenario 6 (b)	2%	2000 ha	4.5 + 0.1/year until 5.5 in year 1995	1.1	19 (b)
Scenario 7 (a)	3%	3000 ha	4.5 + 0.1/year until 5.5 in year 1995	1.1 + 0.025/year until 1.6 in year 2005	20 (a)
Scenario 7 (b)	2%	3000 ha	4.5 + 0.1/year until 5.5 in year 1995	1.1 + 0.025/year until 1.6 in year 2005	20 (b)

The projections are quite revealing. Figures 15 and 16 illustrate the critical importance of maintaining an adequate rate of expansion in irrigated area relative to the population growth rate. If the population of the Senegal river valley continues to grow at its present rate of 3% per annum, expanding irrigated area by annual increments of 2000 ha will not allow the supply of cereals to overtake total consumption requirements, ceteris paribus; only if irrigated area expands by annual increments of 3000 ha will regional self-sufficiency be achieved. (See Figure 15) If on the other hand the population growth rate slows to 2% per annum, expanding irrigated area by annual increments of 2000 ha will eventually enable the supply of cereals to overtake demand, although regional self-sufficiency will not be achieved before the year 2000, and only a modest surplus will be produced thereafter. Only if the population growth rate slows to 2% per annum and irrigated area expands by annual increments of 3000 ha will the Senegal river valley generate a significant surplus for export, approximately 300,000 tons/year by 2025. (See Figure 16)

Figure 15: Projected Supply and Demand For Cereals
With 3% Population Growth Rate (1985 – 2025)
(a) Irrigated Area Expands at 3000 ha/year
(b) Irrigated Area Expands at 2000 ha/year

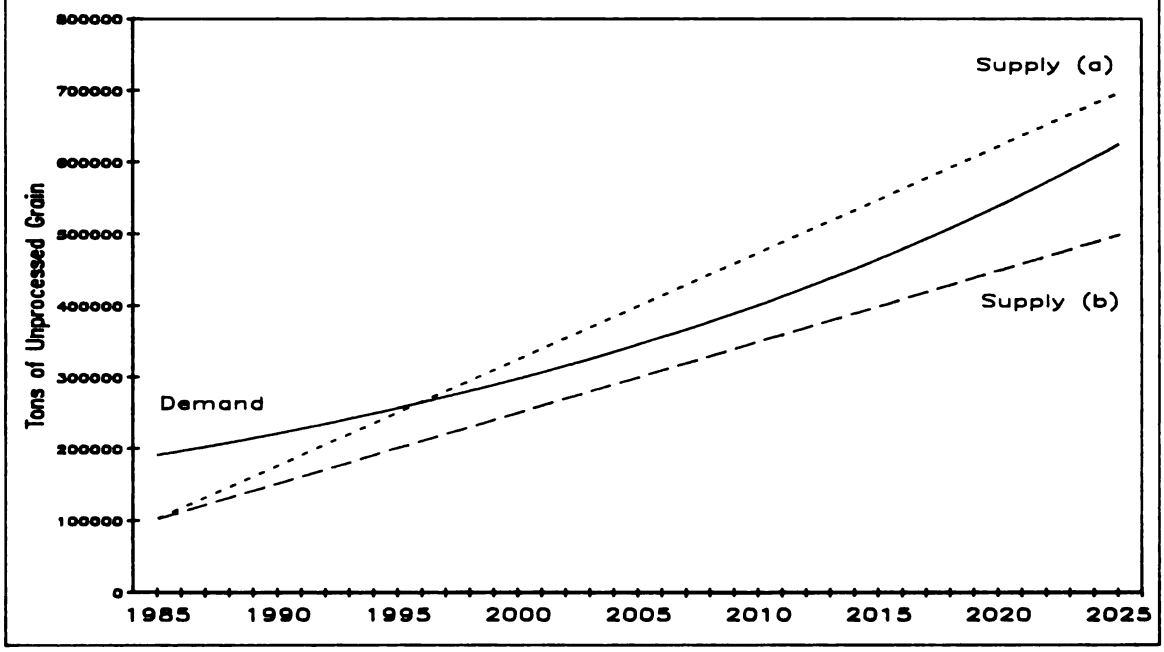
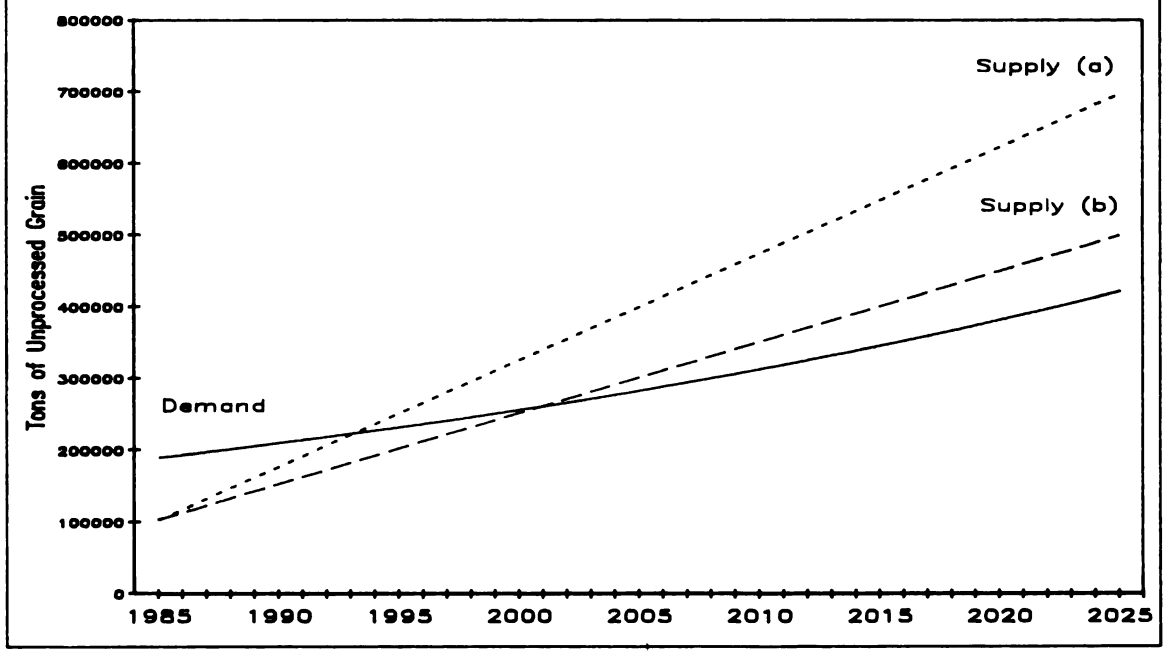


Figure 16: Projected Supply and Demand For Cereals
With 2% Population Growth Rate (1985 – 2025)
(a) Irrigated Area Expands at 3000 ha/year
(b) Irrigated Area Expands at 2000 ha/year



Figures 17 and 18 illustrate the potential effect of changes in cropping intensity on regional self-sufficiency. With no increase in cropping intensity, expansion in irrigated area by annual increments of 2000 ha, and an annual population growth rate of 3%, the Senegal river valley will not achieve self-sufficiency in cereals production, ceteris paribus. But if the completion of the dams and improvements in water management practices succeed in increasing cropping intensity from the present level of 1.1 to a level of 1.6 by the year 2005 (meaning that nearly 2/3 of the total irrigated area will be double-cropped), supply will overtake demand during the mid-1990's, and a modest cereals surplus will be produced thereafter, approximately 100,000 tons/year from 2000 through 2025. (See Figure 17) If on the other hand the population growth rate slows to 2% per annum, self-sufficiency will eventually be achieved even without an increase in cropping intensity, as long as irrigated area continues to expand by 2000 ha/year. Yet very little surplus grain will be produced under this scenario. Only if cropping intensity can be increased will the surplus assume significant proportions, approaching 350,000 tons/year by 2025. (See Figure 18)

Figure 17: Projected Supply and Demand For Cereals
With 3% Population Growth Rate (1985 — 2025)
(a) Area Expands 2000 ha/year, No Cropping Intensity Increase
(b) Area Expands 2000 ha/year, Cropping Intensity Increases

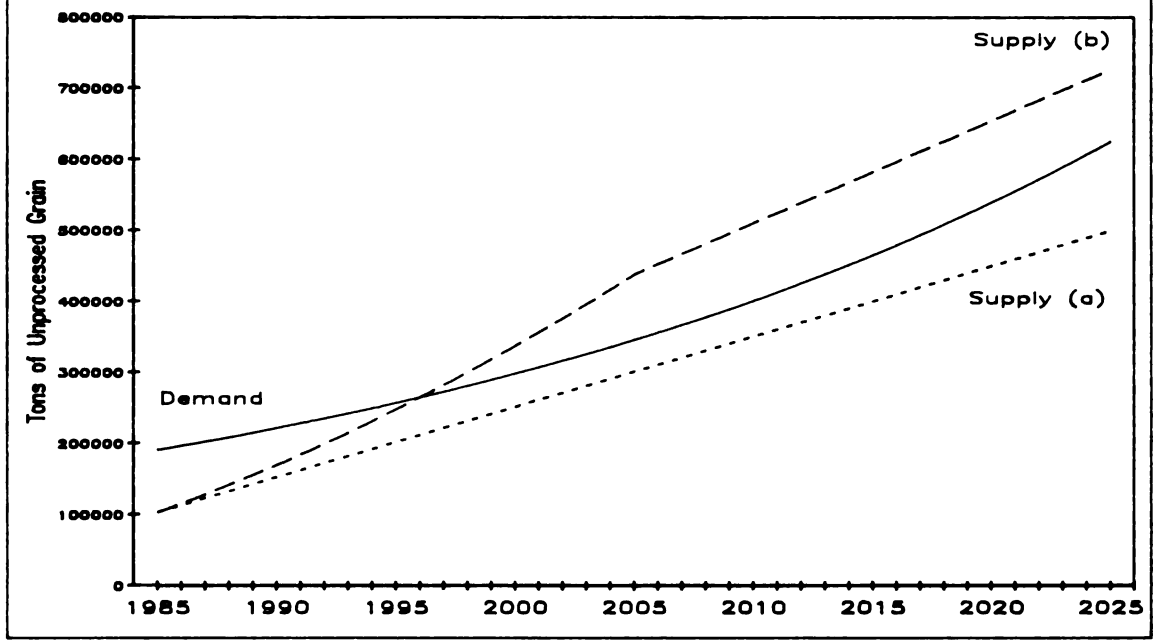
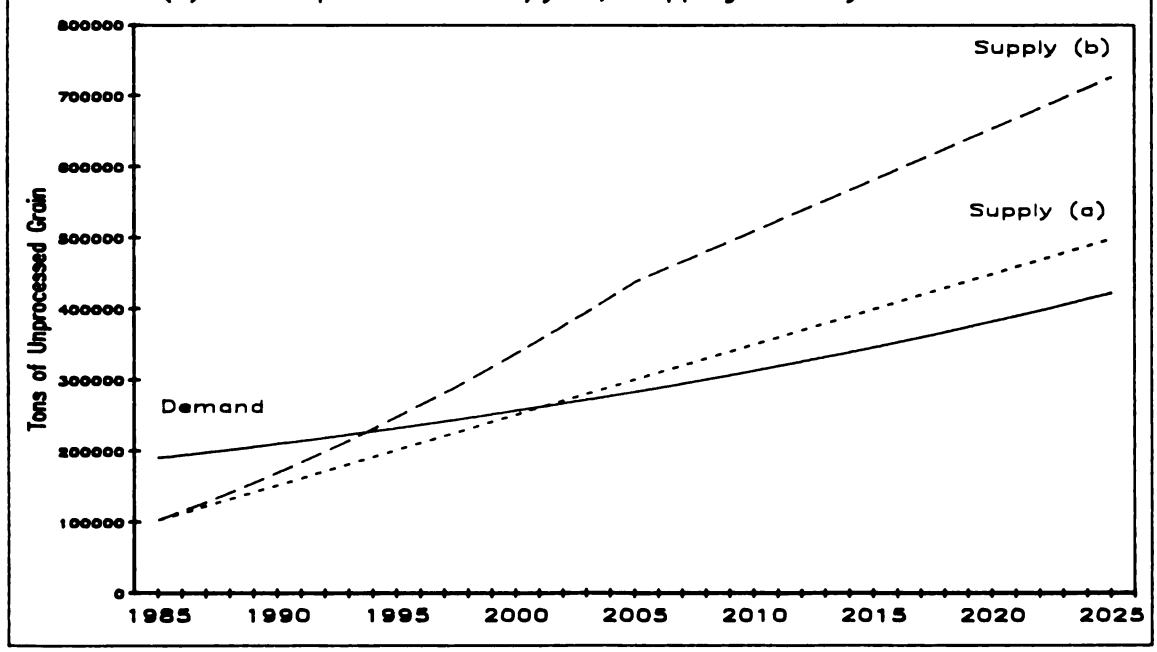


Figure 18: Projected Supply and Demand For Cereals
With 2% Population Growth Rate (1985 — 2025)
(a) Area Expands 2000 ha/year, No Cropping Intensity Increase
(b) Area Expands 2000 ha/year, Cropping Intensity Increases



Figures 19 and 20 illustrate the potential effects of changes in average yields on regional self-sufficiency. With no increase in average yields, expansion in irrigated area by annual increments of 2000 ha, and an annual population growth rate of 3%, the Senegal river valley will not achieve self-sufficiency in cereals production, ceteris paribus. If improved cultivation practices and introduction of high-yielding varieties succeed in increasing average yields from the present level of 4.5 tons/ha to a level of 5.5 tons/ha by 1995, supply will overtake demand during the late 1990's. Without further yield increases demand will soon outpace supply, however, and a regional cereals deficit will once again develop. (See Figure 19) If on the other hand the population growth rate slows to 2% per annum, increasing average yields will result in a surplus of approximately 200,000 tons/year by 2025, as long as irrigated area continues to expand by 2000 ha/year. (See Figure 20)

Figure 19: Projected Supply and Demand For Cereals
With 3% Population Growth Rate (1985 – 2025)
(a) Area Expands 2000 ha/year, No Yield Increase
(b) Area Expands 2000 ha/year, Yield Increases

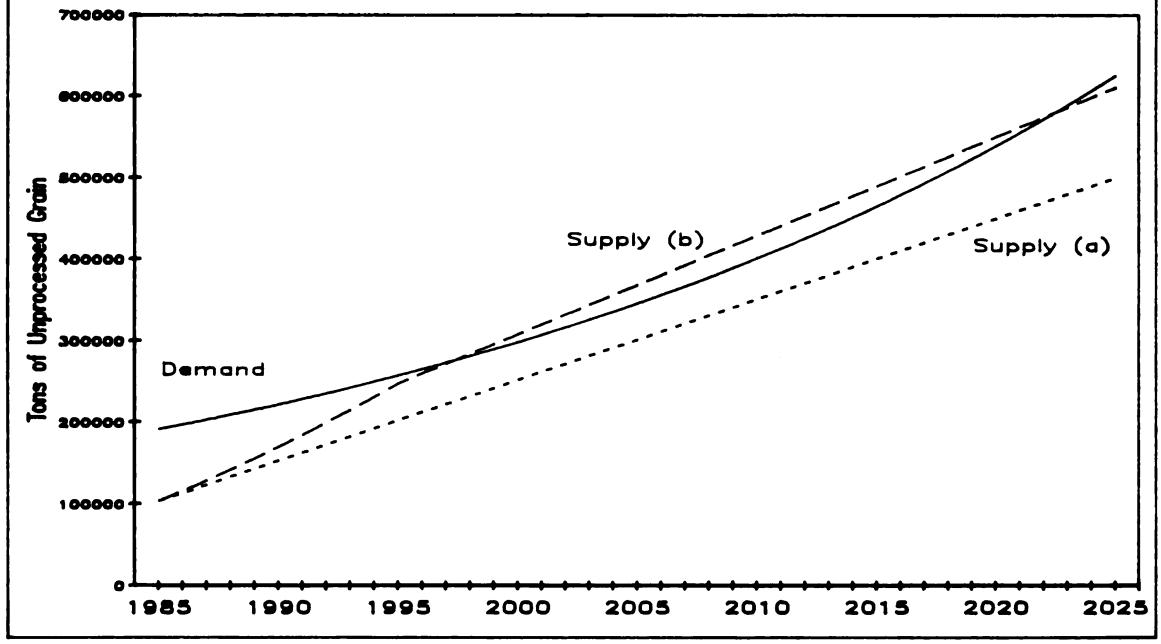


Figure 20: Projected Supply and Demand For Cereals
With 2% Population Growth Rate (1985 – 2025)
(a) Area Expands 2000 ha/year, No Yield Increase
(b) Area Expands 2000 ha/year, Yield Increases

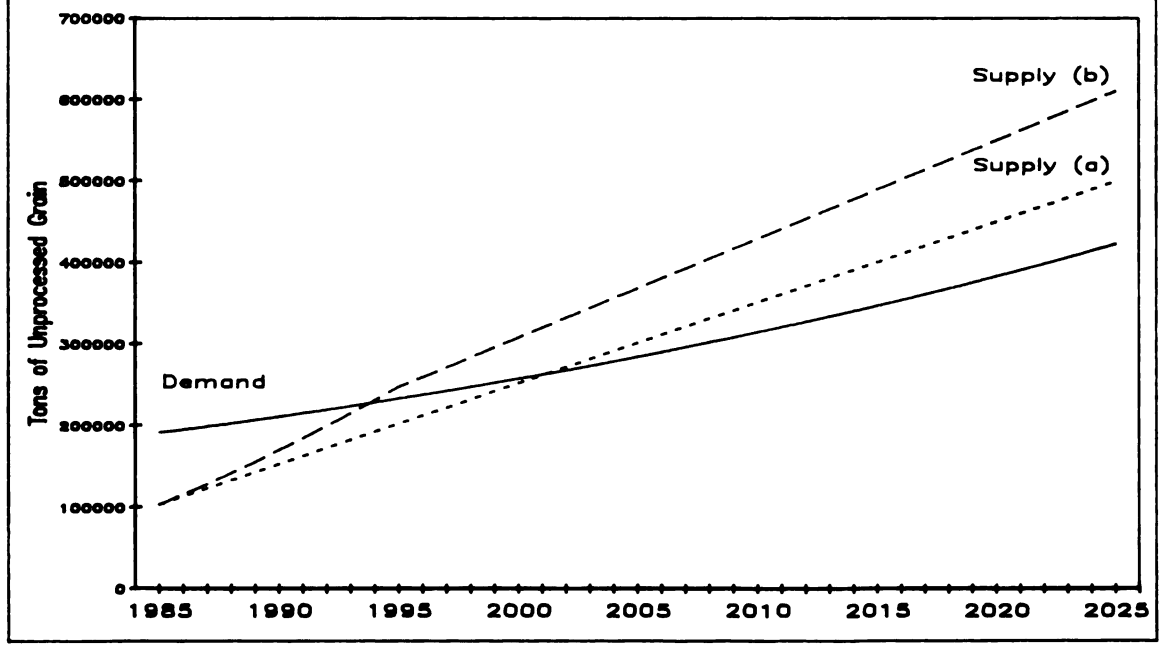


Figure 21 depicts two "best case" scenarios, indicating the combined effects on the region's cereals balances of: a) rapid expansion in irrigated area (3000 ha/year), b) increases in cropping intensity, and c) increases in average yields. In both the 2% and 3% population-growth-rate scenarios, the Senegal river valley will achieve self-sufficiency in cereals production by the mid-1990's, and significant surpluses will be produced thereafter -- approximately 250,000 tons/year by 2025 under the 3% growth rate scenario, and nearly 450,000 tons/year by 2025 under the 2% growth rate scenario. (See Figure 21)

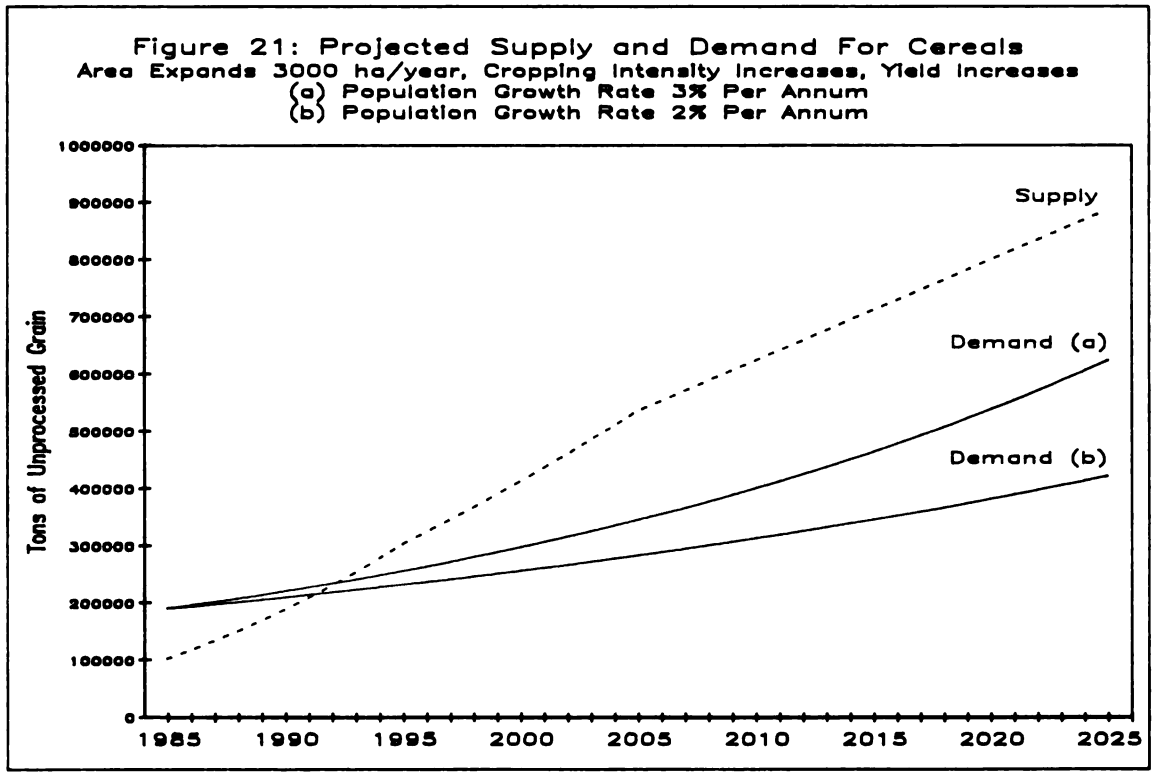


Figure 21: Projected Supply and Demand For Cereals
Area Expands 3000 ha/year, Cropping Intensity Increases, Yield Increases
(a) Population Growth Rate 3% Per Annum
(b) Population Growth Rate 2% Per Annum
Tons of Unprocessed Grain
1000000
900000
800000
700000
600000
500000
400000
300000
200000
100000
0
1985
1990
1995
2000
2005
2010
2015
2020
2025
Supply
Demand (a)
Demand (b)

It is important to recognize that these simple trend projections are only rough forecasts of what could happen to cereals balances in the Senegal river valley. The projections ignore many important determinants of supply and demand (such as prices and incomes), and they fail to accommodate interactions between parameters (e.g., the relationship between area and yields). Notwithstanding these obvious limitations, the trend projections illustrate the relative importance of several policy-influenced parameters in determining regional cereals balances and indicate a range of possible outcomes under several plausible sets of circumstances.

Three main conclusions can be drawn from these projections.

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

income or taste changes). This implies that demographic analysis should be incorporated more explicitly into development planning exercises, with a view to establishing whether or not it would be desirable to allocate additional public-sector resources to population control activities.

Second, the rate of expansion in irrigated area and the rate of increase in cropping intensity will be much more important in influencing total cereals production than the rate of increase in average yields. While there is certainly room for improvement in increasing yield levels, average yields are already relatively high by global standards, so that significant increases in total cereals production will almost certainly have to come through expansion in irrigated area and/or cropping intensity.[3] This implies that agricultural policy makers should determine whether production-support resources are being allocated appropriately among land development activities, water management training activities, and varietal improvement activities.

Third, relatively small changes in key parameters, both on the demand side and on the supply side, could lead to quite different degrees of regional self-sufficiency in cereals production. Sensitivity analysis indicates that

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[3]. The following average yields on irrigated rice are presented by way of comparison:

under several entirely plausible scenarios, the Senegal river valley could either: a) remain a net importer of cereals, b) barely achieve cereals self-sufficiency, or c) become an important exporter of cereals. This implies that the cereals marketing system -- both the infrastructure used to perform physical marketing activities and the policies and institutions used to accomplish coordinating functions -- must remain sufficiently flexible to accommodate a wide range of diverse marketing situations.

6.2 Key Issues and Selected Policy Options

The research findings presented in previous chapters provide much detail about the organization and performance of the cereals sub-sector, and the results of the trend projection exercise provide important clues about how the future marketing system may have to evolve in response to the changing face of agriculture in the Senegal river valley. Together, this information provides a convenient springboard for the discussion which follows of cereals policy issues currently facing Senegalese decision-makers. Instead of addressing all the myriad issues raised by the research findings, however, the discussion is restricted to a manageable sub-set of five key issues deemed to be of

primary importance.

Five Key Policy Issues in the Cereals Sub-Sector

1. Level of Public Investment in Irrigated Agriculture in the Senegal River Valley

2. Market Organization and Licencing Requirements

3. Levels of Prices and Pricing Mechanisms

4. Choice of Technique in Processing, and Ownership and Operation of Processing Facilities

5. Mix of Public-sector and Private-sector Responsibilities in Cereals Import Markets

For each of these five key issues, selected policy options are discussed, along with some of the substantive performance consequences likely to result from their implementation. No attempt is made to consider all possible policy options, which would be difficult considering that the number of possibilities is nearly always extensive. Rather, a limited number of policy options is described, providing an indication of the range of possibilities associated with each particular policy issue.

Key Issue #1: Level of Public Investment in Irrigated Agriculture in the Senegal River Valley

The first key issue concerns the optimal level of public investment in irrigated agriculture in the Senegal river valley. Underlying this issue is the question of the long-run economic viability of irrigated agriculture. Even though the Senegalese government has received firm commitments from foreign donors to continue funding investment in irrigation infrastructure, there is little evidence that production of cereals crops using irrigation technology is now or ever will be economically viable in the Senegal river valley.

Many of the cost-of-production studies commissioned by major investors in the river valley (e.g., SAED, OMVS, USAID) use administered prices in valuing production inputs and outputs, with little or no attempt to calculate shadow prices reflecting true scarcity values. Since many inputs and outputs are heavily subsidized or taxed by the government, there is reason to believe that the use of administered prices severely distorts the cost-of-production estimates.

Significantly, the few studies which go beyond financial analysis come to far different conclusions about the cost of producing irrigated rice in the Senegal river valley. After calculating shadow prices for inputs and

outputs and adjusting for exchange rate distortions, Tuluy concludes that the net social profitability of irrigated rice production (including initial land development costs) is negative, except perhaps for home-consumed rice.[4] While a considerable portion of current production is still home-consumed, particularly in the Middle and Upper Valleys, future production increases theoretically will generate marketable surpluses which will be available for transfer to food deficit areas elsewhere in Senegal. Tuluy's analysis suggests that these surpluses may not be able to compete with imported grain.

This finding is corroborated by Diallo, who concludes that the cost of producing irrigated rice in the Senegal river valley (including initial land development costs), whether measured in financial terms (i.e., using administered market wages and prices reflecting direct and indirect subsidies) or in economic terms (i.e., adjusting for wage and price distortions), far exceeds the cost of importing rice.[5] Koita and Bernsten, working on the Mauritanian side of the river, similarly conclude that the cost of producing rice locally (again including initial land development costs) clearly exceeds the cost of importing

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4. Tuluy (1979).

5. Diallo (1980).

Thai brokens.[6] Collectively, these findings cast doubt on the economic viability of irrigated rice production in the Senegal river valley.

Additional research is urgently needed to examine the economic cost of production of irrigated crops, both cereals and other crops. Surprisingly, little research is currently underway on this crucial policy issue. The omission is glaring, because sound policy decisions concerning the future of agriculture in the river valley will require an accurate understanding of the economics of production. Over the long run, economic considerations may become more important than food security concerns or welfare objectives in determining sustainable cropping patterns. If irrigated rice production turns out to be prohibitively expensive even under the best yield and cropping-intensity scenarios (as some critics of the current development strategy have alleged), it may be necessary to encourage farmers to shift into other crops, either alternative cereals for domestic consumption, cereals for export, or non-food cash crops.

The point cannot be overemphasized. Depending on the state of the future Senegalese economy, cost considerations might necessitate a complete re-evaluation of the ambitious plan to develop the Senegal river valley. While many policy analysts act as if the decision to press ahead with irrigated agriculture were irreversible, no policy decision

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6. Toka and Bernsten (1986).

can ever be considered final. As circumstances evolve and human knowledge increases, policy choices may change. The original strategy in the Senegal river valley was to promote irrigated rice production as a way of maximizing returns to the investments in the Diama and Manatali dams, but this strategy was devised when relatively little was known about the economics of irrigation. Much more information is available today. This information must be collected and examined in order to determine whether or not the original development strategy remains sound in light of current policy goals. If the empirical evidence suggests that rice production is fundamentally uneconomical, perhaps farmers should be encouraged to shift to alternative crops. In the extreme, if the evidence shows that investments in irrigation infrastructure and/or production support activities are not an effective way for the government to achieve its food policy objectives, perhaps entirely different investment strategies should be considered.

Key Issue #2: Market Organization and Licencing Requirements

The second key issue concerns market organization and licencing requirements. Although market organization

questions are similar across successive stages of economic activity, a number of features nevertheless differentiate assembly markets, wholesale markets, and retail markets. For this reason, the three markets are discussed separately.

a) Assembly Markets

At present, the state participates directly in assembly markets by virtue of SAED's legal monopoly on purchases of paddy from farmers. Yet SAED's assembly operation has experienced difficulties, with the result that disenchanted farmers have increasingly diverted grain into a thriving parallel marketing channel. As the heavily subsidized SAED assembly operation continues to struggle, a consensus has emerged among government decision makers and foreign donors that the official channel needs to be reorganized.

What policy options are available to reform the present assembly system, and what would be the likely performance consequences of their implementation?

To begin with, the existing state monopoly on assembly could be maintained and improved. Although this runs counter to the national policy objective of decreasing direct state participation in agricultural commodity markets, the recently announced Medium and Long-term Structural Adjustment Program (PAMLT) reveals the

government's intention to pursue such a policy for paddy.[7] Economic arguments traditionally invoked in Senegal in favor of state monopolization of paddy marketing include the necessity of protecting the infant rice production industry and the importance of capturing scale economies in processing. Based on these arguments, the PAMLT proposes that SAED continue to monopolize assembly functions, while conceding that reforms are needed to remedy problems which have arisen from mismanagement, overbureaucratization, and corruption.

From an economic point of view, the PAMLT proposal is unsound. The infant industries argument originally used to justify direct public-sector involvement in assembly may no longer be valid, since the parallel channel now provides an alternative market outlet for the majority of producers. More importantly, the economies of scale argument is difficult to sustain in light of clear empirical evidence that SAED monopolization of paddy assembly operations has led to higher, not lower marketing costs. The potential economies of scale associated with large-scale, centralized assembly and processing facilities are outweighed by two types of diseconomies. First, for reasons spelled out in Chapter 3, a publicly owned and operated grain marketing agency such as SAED has problems carrying out grain assembly

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7. Interestingly, under the PAMLT proposal rice would remain the only cereal assembled exclusively by the state. Assembly of millet, sorghum, and maize would be liberalized.

and processing operations at a reasonable cost. Second, as was demonstrated in Chapter 5, in many areas of the river valley high assembly and distribution transport costs outweigh the savings achieved on per unit average processing costs.

A stronger argument in favor of continuing state monopolization of paddy assembly operations can be made based on non-economic considerations. SAED monopolization of the assembly function does have several advantages: it assures a market outlet for all producers, and it allows the government to guarantee the official producer price. Most importantly, SAED's control over vital production inputs such as water, seed, fertilizer, and cultivation services provides a means of pressuring producers to cooperate with official development strategy. In a very real sense, the SAED marketing monopoly is important not because it reduces marketing costs, but because it provides the state with a lever to impose its development strategy on the local populations.[8]

A second policy option, one lying at the opposite extreme from continuing state monopolization, would be to disengage the public sector as completely as possible from grain assembly operations and to leave extensive responsibilities to the private sector. If the observed

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[8]. For an insightful analysis of this issue, see Waldstein (1984).

performance of parallel channel assemblers serves as any indication, the advantages of this option would soon become evident: leaving increased responsibility to private merchants would result in a significant reduction in assembly costs (because of private traders' ability to respond quickly to changing market conditions, their more efficient use of resources, and their willingness to work at low rates of remuneration).

On the other hand, withdrawal of the public sector from assembly markets would also entail certain disadvantages. Many of these would be relatively minor, assuming private traders step in to fill the void left by the departure of public marketing organizations. But some of the effects likely to result from state disengagement might over the long run have more serious impacts on market performance. For example, without adequate public investment in infrastructure (e.g., roads, central markets, storage warehouses, communications facilities), assembly costs could remain high even if private merchants were extraordinarily efficient. Similarly, without government involvement in coordinating activities (e.g., establishment of grades and standards, dissemination of market information, enforcement of contracts), transactions costs and information costs could seriously impair the performance of private traders.

A third policy option, lying between the extremes of state monopolization and complete state withdrawal, would be

some form of mixed system. In a mixed system, the blend of public-sector and private-sector responsibilities would be determined largely by economic considerations having to do with total assembly/processing/distribution costs associated with alternative centralized and decentralized forms of market organization. Private traders would be encouraged to assume an active role in grain assembly operations. This would ensure a high level of responsiveness and help keep down marketing costs. At the same time, the state would maintain an active presence in assembly markets, concentrating primarily on facilitative activities. While selective buying and selling would probably be necessary to stabilize prices and to ensure a standard of competition for private traders, the state would concentrate most of its efforts on maintaining adequate marketing infrastructure, improving vertical coordination, and perhaps targeting particular interest groups inadequately served by private traders for supplementary income support.

b) Wholesale Markets

At present, responsibility for wholesaling activities is divided. The public sector through the CPSP plans food distribution flows, operates a network of regional cereals warehouses, and manages the quota system, while the private sector through the quotataires assumes responsibility for

the day-to-day physical distribution of grain to retailers. Although the current system "works" in the sense that most wholesalers have access to adequate supplies of grain most of the time, the empirical evidence suggests that unequal distributions of economic power characterize relationships between wholesalers and the CPSP on the one hand and between wholesalers and retailers on the other hand, contributing to high marketing costs, unnecessarily large margins, and a general lack of progressiveness throughout the wholesaling industry.

What policy options are available to reform the present wholesaling system, and what would be the likely performance consequences of their implementation?

One alternative would be to increase the role of the public sector in wholesaling, for example by eliminating the quota system and requiring that all wholesaling activities presently performed by licenced private traders be performed by government agencies such as the CPSP and SONADIS. While state monopolization of wholesaling might strengthen the government's control over the supply of food grains and increase its ability to fix prices (assuming parallel channels do not undermine the monopoly), the price of such a solution is likely to be high. The public agency charged with performing wholesaling activities would have to develop an extensive network of distribution facilities to ensure access to food supplies by rural-based retailers. Once

these facilities were developed, efficient management of day-to-day wholesaling operations would be extremely difficult; the CPSP already experiences problems of mismanagement, waste, and corruption, and these problems could only increase in proportion to the wholesaling agency's effective monopoly power.

A second solution would be to go to the opposite extreme, i.e., to terminate all public-sector involvement in cereals wholesaling and to turn over responsibility entirely to the private sector. Under such a solution, although the state would be conceding direct control over supplies of strategic food staples and prices, exchange efficiency would almost certainly improve (since private merchants are better able to respond to changing market forces), and marketing margins would almost certainly go down in the short run (since private merchants are able to use resources more efficiently).

Despite these potential performance improvements, complete privatization of wholesale markets could have undesirable results as well. Underinvestment in "public goods" (e.g., roads, communication facilities, information) would very likely impede effective coordination and keep transaction costs high at the wholesale level. Also, if relations between market participants were not competitive, collusion among wholesalers could potentially lead to higher marketing margins and excess profits.

A third policy option, lying between the extremes of state monopolization and private-sector domination, would be some form of mixed system. In a mixed system, private traders would be strongly encouraged to assume an active role in wholesaling operations. At the same time, the state would maintain a presence in wholesale markets to provide a measure of competition for the private trade and also to protect food security objectives. Direct public-sector participation would be necessary because of the difficulty of legislating the behavior of private traders through licencing requirements and marketing regulations. However, efforts to control the specific quantities of grain handled by private traders through a system of fixed quotas are inappropriate; quotas merely create a barrier to entry into the industry, restrict the ability of traders to manage their stocks, and provide opportunities for corruption.

The PAMLT has proposed a dual-channel system based on the active participation of private wholesalers along with an official government wholesaling agency (SONADIS). According to the PAMLT, wholesale distribution of imported as well as locally-produced cereals will be accomplished through direct and freely negotiated agreements between private traders. While much will depend on the specific rules governing these agreements, the proposed system could potentially offer increased exchange efficiency and reduced marketing margins while at the same time enabling the state to meet essential food security objectives.

Licencing Requirements For Wholesale Traders

The question of licencing requirements for wholesalers is sufficiently important to deserve special mention. Under the current system, private merchants wishing to participate in the wholesale grain trade must obtain two separate licences: first they must obtain a permit to engage in general wholesale trade, and then they must obtain a quota giving them the right to purchase a monthly allocation of rice from the CPSP. Various preconditions must be met before these licences are issued, and various stipulations must subsequently be adhered to in order for the licences to be renewed. While government officials maintain that strict licencing requirements are necessary in order to preserve an orderly marketing environment, merchants have charged that many of the current requirements are not only unnecessary but actually counterproductive and that market performance would improve if existing licencing regulations were substantially revised.

What options are available to the government for licencing cereals wholesalers, and what are the likely performance consequences of their implementation?

One option would be to maintain existing licencing requirements, i.e., to continue requiring cereals wholesalers to obtain both the permit to practice general wholesale trade and the quota guaranteeing access to a

monthly allotment from the CPSP. The main arguments in favor of the permit to practice general wholesale trade are that it serves as a registration device to help the Ministry of Commerce keep track of merchants and that it generates money which is used for market-support activities. While these arguments are valid, at the same time some of the licencing requirements -- notably the requirement that every applicant show a bank balance of 5 million FCFA -- create a barrier to entry into wholesaling. Similarly, quotas also have positive and negative attributes. The main argument in favor of maintaining quotas is that they facilitate management of CPSP grain stocks. Faced with the task of distributing a fixed supply of rice each month among a large number of competing traders, the CPSP uses quotas as a means of establishing who will receive what quantities. Quotas are undeniably useful for this purpose, but the empirical evidence indicates that the quota system exacts a considerable price from the wholesale distribution industry as a whole. Because quotas represent a barrier to entry, they reduce the number of traders who may operate in the official channel. This restricts competition among wholesalers and reduces incentives for traders to engage in progressive behavior. In addition, because quotas have tremendous economic value, the quota system creates opportunities for corruption. Many quotataires have had to make under-the-table payments to acquire and preserve their quotas, contributing to higher marketing costs which

ultimately are passed on to consumers.

Alternatively, existing licencing requirements could be revised. The PAMLT reveals the government's intention to revise licencing requirements, without giving many details concerning the specific changes being contemplated. Since performance consequences will depend to a great extent on nitty-gritty details of institutional design (e.g., the way licencing requirements are worded), it is difficult to discuss the likely effects of the imminent revisions. Yet it is possible to predict that performance will be improved by the relaxation of those existing licencing requirements which serve little purpose other than to restrict access to the industry (e.g., the requirement that quotataires prove a minimum bank balance of 5 million FCFA and the requirement that quotataires demonstrate access to a CPSP-certified storage facility).

c) Retail Markets

At present, responsibilities for cereals retailing are divided. While private traders handle most of the sales volume, the state regulates their behavior by means of marketing rules and regulations. In addition, the state maintains an active presence in retail markets by operating SONADIS distribution outlets. Most of the time, market

performance at the retail level is satisfactory; supplies are abundantly available at or near official prices, and merchants compete aggressively for customers by offering short-term credit and locational convenience. Yet shortages occasionally develop, and then the system's shortcomings manifest themselves. As supplies become scarce, private traders are often quick to capitalize by withholding stocks in anticipation of higher prices, and lines form outside of SONADIS stores, where sales at the official price generally continue long after prices in the market place have risen. Angered by the perceived "exploitative mentality" of private retailers, critics of the current system have called for reform.

What policy options are available to reform the present retailing system, and what would be the likely performance consequences of their implementation?

One alternative would be to increase the role of the public sector in retailing, for example by altogether prohibiting private traders from selling cereals and assigning responsibility for the retail trade to an expanded network of SONADIS stores. The advantages of such a solution would be to increase state control over the cereals trade, thereby increasing the government's ability to regulate supplies and to set prices at socially desirable levels.

But this option would be virtually impossible to implement from a practical standpoint. If most of the cereals consumed in the Senegal river valley were imported, the government might conceivably attempt to assume direct control over the grain trade. But given that a large and growing proportion of the grain consumed in the river valley is locally produced, and given that most locally produced grain moves through geographically dispersed parallel marketing channels, it is unlikely that the state would ever be able to gain direct physical control. In any event, this may be a moot point. Problems of practicality aside, there are strong economic reasons why the state would not want to assume complete responsibility for retail distribution activities. In order for it to become the sole retail distributor of cereals, the state would have to develop a vast network of distribution outlets. Hundreds of villages throughout the river valley are currently served by small-scale private traders whose services would have to be replaced by a SONADIS store or some other form of official distribution outlet. Quite obviously, the cost of providing retailing services to rural areas would be prohibitively expensive.

An alternative option would be to go to the opposite extreme, i.e., to terminate all public-sector involvement in cereals retailing and to turn over responsibility to the private sector. Under such a solution, although the state would be conceding all control over supplies of strategic

food staples and prices, marketing margins would almost certainly go down (since private retailers are able to operate with fewer resources than SONADIS stores and at lower rates of remuneration).

But complete privatization of the retail industry might have undesirable results as well. Extreme price variability could conceivably become a problem if local production fails to stabilize; supply shortages might become commonplace if private traders find it unprofitable to carry reserve stocks; and collusion among retailers could potentially inflate marketing margins in areas where relations between market participants are not characterized by a high level of competition. Furthermore, as in the case of wholesaling, underinvestment in "public goods" (e.g., infrastructure, information) could impede effective vertical coordination and keep transaction and information costs high.

A third policy option, lying between the extremes of state monopolization and private-sector domination, would be some form of mixed system. The existing retailing system falls squarely in this category. Currently, private traders are encouraged to assume an active role in cereals retailing activities. At the same time, the public sector is involved in retail markets, both directly (through SONADIS) as well as indirectly (through marketing rules and regulations applied to private merchants). The objectives of the

government's involvement are to encourage socially acceptable commercial practices among private retailers, to provide a measure of competition for the private trade, and to ensure the widespread availability of staple food grains at affordable prices. The empirical evidence indicates that the current mixed system has performed well (albeit at the price of perennial government subsidies to SONADIS). Access into private retailing is not restricted by onerous licencing requirements or other barriers to entry, and the industry is characterized by a high degree of competition. Marketing margins have remained small, and despite allegations to the contrary, the occasional cereals shortages are rarely attributable to problems at the retail level. Not surprisingly, the PAML does not propose any major reforms at the retail level.

Key Issue #3: Levels of Prices and Pricing Mechanisms

The third key issue relates to price policy and includes two important dimensions: 1) levels of prices, and 2) pricing mechanisms. Despite basic similarities between producer and consumer price policy issues, a number of features nevertheless differentiate the two. For this reason, producer price policy and consumer price policy are

discussed separately.

a) Producer Prices

Producer price levels for paddy are currently set by the government, which announces a single panseasonal and panterritorial producer price to be paid by SAED to all farmers marketing grain through the official channel. Because assembly costs differ through time and across space, traders operating in the parallel channel do not adhere to the official producer price and instead offer farmers a range of prices. As a result, official assembly operations are affected. Since SAED cannot compete effectively with parallel channel traders by adjusting its offer price, it is prevented from taking advantage of profit opportunities where assembly costs are low, while being forced to absorb losses where assembly costs are high. This partly explains why the SAED assembly operation has consistently been unprofitable.

What policy options are available to reform the present structure of producer prices, and what would be the likely performance consequences of their implementation?

To begin with, panseasonal and panterritorial producer prices could be maintained. Arguments traditionally invoked

in favor of the current policy include the relative ease of administering a single producer price and the high degree of equity supposedly achieved when every farmer receives the same price. (The latter argument of course ignores the fact that not all farmers incur the same production costs.)

But the advantages of uniform producer pricing are offset by a number of disadvantages. Chief among these is the fact that uniform producer pricing introduces distortions into economic decision-making, encouraging patterns of marketing activity which are economically inefficient or otherwise undesirable. Parallel channel traders concede that they are active only in certain areas and during certain periods -- namely, whenever assembly costs are low enough that they can offer farmers a price equalling or exceeding the official producer price and still earn positive net returns to their marketing activities. Meanwhile, the SAED marketing operation is left most of the trade involving high transport and/or storage costs. As a result, average assembly costs in the official channel are kept high, squeezing marketing margins because of the fixed official producer price and thus contributing to SAED's persistent operating losses. This undesirable pattern is likely to persist as long as a uniform producer pricing structure remains in place.

An alternative policy option would be to abandon uniform producer prices in favor of a more flexible pricing

structure allowing for seasonal and regional variability. Although such a pricing structure would have adverse welfare effects in the sense that farmers whose paddy is more expensive to assemble would be offered lower prices, if necessary these adverse effects could be compensated (e.g., by direct transfers, or by other income redistribution mechanisms). In the meantime, the benefits of a flexible pricing structure would be considerable. Most importantly, flexible producer prices would transmit the signals necessary to direct resource flows to their most efficient uses in assembly markets. With prices free to vary in response to changing market conditions, profit-motivated private traders would receive incentives to purchase, transport, store and sell grain in all regions of the river valley and throughout the year. In turn, traders would be able to transmit price signals back to producers to encourage increased production in places and at times where demand is strongest. Flexible producer prices thus would play a key role in allowing markets to clear while at the same time lowering average marketing costs across the system as a whole (because private traders manage resources better than SAED). Additional benefits would include a reduction in government subsidies paid to support SAED assembly operations.

The second important dimension of producer price policy involves pricing mechanisms. Under the present system, official producer prices for major cereals crops in Senegal

are established each year by presidential decree. The regional development agencies and government marketing organizations authorized to purchase cereals are legally required to pay these prices. Although this system supposedly enables the government to control producer prices, prices actually received by farmers frequently diverge from official levels. (The fact that official prices do not always prevail in the market place may or may not be of concern to government officials. While the presidential decrees announcing official producer prices describe them as mandatory, enforcement has been inconsistent at best, implying that the authorities realize official price levels are frequently inappropriate. This has merely added to the climate of uncertainty prevailing in grain assembly markets and fueled criticism of the official price determination mechanism.)

What policy options are available to reform the existing producer price determination mechanism, and what would be the likely performance consequences of their implementation?

To begin with, the present system of centrally administering producer prices could be maintained and improved. The main argument in favor of maintaining the present system is that it strengthens government control over prices, thereby facilitating policy implementation. For example, as long as producer prices are established by

presidential decree, the state can introduce price incentives consistent with economic growth targets (e.g., encouraging farmers in the Senegal river valley to produce more rice). Alternatively, the state can manipulate producer prices to bring about income transfers consistent with welfare goals (e.g., assuring farmers in remote parts of the river valley the same prices for their production as farmers in more accessible areas).

Yet it is one thing for the government to announce official producer prices and quite another to enforce them in the market place. And if centrally administered prices cannot be enforced, then the main argument in favor of the central administration mechanism is undermined. This is precisely what has happened with paddy in the Senegal river valley. Spot surveys in rural assembly markets revealed that the state has not been able to maintain effective control over producer prices. Whenever official producer prices have gotten too far out of line with supply and demand conditions, parallel channel traders have simply ignored the official prices, offering farmers higher or lower prices as conditions have dictated.

Why have official prices gotten out of line? A large part of the answer has to do with the inflexibility of the current price determination mechanism. When producer prices are established administratively, as they are in the Senegal river valley, a set of signals goes out from policy

makers to farmers, traders, and consumers. Because the prices are fixed, however, there is no good mechanism 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, marketing, and consumption activities, policy makers are prevented from reacting to changes in market conditions. As a result, official prices often fail to reflect prevailing supply and demand conditions. Meanwhile, food system participants ignore the official prices and act on their own knowledge of actual market conditions, leading to the emergence of a parallel marketing channel and gradual weakening of government control over prices. The problem is deep-seated and structural: because administered pricing systems are by nature inflexible, changing market conditions sooner or later create pressure for the emergence of parallel marketing channels; because parallel channels are virtually impossible to suppress, administered prices will inevitably be undermined.

A second policy option would be to abandon the present system of administered producer prices in favor of one in which producer prices would be determined by market forces. The most important performance consequence likely to result from such a change would be increased price flexibility, resulting in improved market coordination and more efficient use of resources. The market represents an ingenious mechanism for collecting and summarizing a large amount of

idiosyncratic information about supply and demand conditions in the easily understood form of prices.[9] The inter-ministerial planning council which sets producer prices has demonstrated its inability to act quickly and efficiently to adjust official producer prices in response to changing market conditions. By reducing the influence of administrative bodies such as the interministerial council in the price-determination process, a well-functioning market system would increase exchange efficiency in grain assembly markets and improve horizontal and vertical coordination. The effect over the long run would be a reduction in marketing margins. Evidence from the field bears out these conclusions: parallel channel intermediaries operating in response to market-determined prices have demonstrated the ability to perform assembly operations more rapidly and more efficiently than SAED. Another potential advantage likely to result from the introduction of market pricing is cost the savings which would be achieved if private traders no longer had to engage in evasive behavior to avoid the price controls.

On the other hand, the introduction of a market pricing system could potentially lead to highly undesirable performance consequences, particularly if real production costs remain high enough to keep Senegalese rice non-competitive with imports. Under such circumstances, if the

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9. Shaffer (1983).

market "works" well enough to value resources at their true economic value, price movements would make irrigated rice production unprofitable in the Senegal river valley, and profit-maximizing behavior on the part of food system participants logically would result in no product coming on to the market. Ironically, although economists often talk about "getting prices right" so that the market can go to work, the danger of a well-functioning market system is that it can produce outcomes which are inconsistent with non-economic policy goals (e.g., food security).

b) Consumer Prices

As in the case of producer price levels, policy options regarding consumer price levels range from maintaining the present system of fixed quasi-panterritorial and panseasonal prices to introducing a more flexible pricing structure allowing for some degree of price variability.[10] The present system of uniform consumer prices theoretically is easier for the government to administer and to some extent facilitates the achievement of welfare objectives, although

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10. Strictly speaking, official wholesale prices are not panterritorial -- some allowance is made for differences in transport costs between regions of the country. (See Table 1). However, the legal transport margins do not always cover actual transport charges, with the result that transport costs are partially subsidized on grain distributed through the regional CPSP warehouses. Hence the references to official wholesale prices as "quasi-panterritorial".

the empirical evidence shows that it also encourages inefficient resource flows, reduces exchange efficiency, raises marketing margins, and forces the state to pay for most transport and storage services. A more flexible pricing structure could introduce incentives for private traders to assume many of the distribution functions currently performed by the state, especially transport and storage, thus improving the performance of the marketing system. In return, the government might have to give up using cereals prices as a tool for achieving policy goals.

As in the case of producer prices, policy options concerning consumer pricing mechanisms range from central administration to market determination. Central administration of consumer prices (as currently practiced) probably increases state control over cereals prices, but problems can arise if policy makers lose sight of the functional relationship between producer and consumer price levels. (This happened in early 1985, when consumer rice prices were raised an average of 23% without a concomitant raise in the producer price; overnight, the gross margin for distributors was greatly increased, and parallel channel traders responded by stepping in to take advantage of the opportunity for easy profits.) In addition, when consumer prices are set administratively, institutional rigidities can prevent prices from responding to changing market conditions, eventually forcing traders to engage in costly practices designed to circumvent the official price

structure and thereby creating opportunities for corruption.

Market pricing could increase exchange efficiency and lower marketing margins by improving the signalling function of prices. In addition, market pricing would ensure that the functional relationship between producer and consumer price levels is maintained. But these gains would be achieved only at the cost of a reduction in state control over price levels. As in the case of producer prices, market pricing is potentially dangerous: if consumer prices are completely market-determined, price movements could encourage consumption patterns which might seriously compromise the achievement of national policy objectives. For example, if left uncontrolled prices of imported cereals might fall relative to prices of locally produced cereals, encouraging increased consumption of imported grain in spite of the policy objective of increasing cereals self-sufficiency.

Key Issue #4: Choice of Technique in Processing, and Ownership and Operation of Processing Facilities

The fourth key issue concerns processing. Two important dimensions can be distinguished: 1) the optimal choice of technique, and 2) ownership and operation of the processing industry. These warrant separate discussion.

a) Choice of Technique in Processing

Currently, three rice processing technologies are present in the Senegal river valley: 1) industrial scale processing; 2) small-scale mechanical hulling; and 3) hand pounding. Of the three, the first two are the most important. (With the spread of mechanization, hand pounding has become increasingly rare and will probably soon disappear.) No clear consensus has emerged as to which of the two mechanized technologies is optimal under local conditions. Some analysts cite the potential technical superiority and larger throughput capacity of industrial processing facilities. Others point to the greater mobility and "technological appropriateness" of small hullers. Confronted with the prospect of future production increases, Senegalese decision-makers thus find themselves facing a difficult choice concerning what sorts of policies to introduce in order to facilitate the expansion in processing capacity which may soon be needed.

What are the relative advantages and disadvantages of industrial processing facilities as compared to small hullers, given the current and likely future organization of the cereals sub-sector?

Industrial processing facilities are attractive for several reasons. Properly maintained and managed, they are able to process grain at high levels of technical efficiency, as measured by indicators such as recovery rate (% milling returns) and quality of output (% unbroken grains, purity of by-products). In addition, industrial processing facilities because of their large throughput are able to capture certain economies of scale, thereby driving down average processing costs per unit of output. Finally, industrial processing technologies are characterized by a high ratio of capital to labor (K/L), which is desirable in situations where labor is scarce.

These potential advantages are offset by at least three disadvantages. First, industrial processing facilities are dependent on a large and reliable supply of paddy to maintain the throughput required to keep down average per-unit processing costs. This is an important consideration in the Senegal river valley, because in the past the SAED assembly operation has not been able to deliver enough paddy to keep the SAED mills operating at high levels of capacity utilization. All too often, in Senegal and elsewhere, it has simply been assumed that the establishment of a

processing plant would attract an adequate supply of raw material.[11] Given the uncertainty (emphasized by the trend projection exercise) about future production levels, the reliability of future supplies of paddy must be questioned.

Second, the economies of scale in processing associated with industrial facilities are offset by increased assembly and distribution costs. The potential cost advantages of industrial mills can be realized only if production and consumption are sufficiently concentrated around the mills that transport does not become prohibitively expensive. At present, production and consumption are dispersed throughout the Senegal river valley, and transport charges are high. In the case of grain transported from the Middle and Upper Valleys to the SAED mills for processing and then trucked back to the original production area for sale, the high transport costs more than offset the cost savings achieved through the use of industrial-scale processing technology.

Third, industrial-scale processing technologies are not entirely appropriate for Senegal, which lacks the capacity to manufacture and repair industrial machinery. Both of the present SAED mills contain machinery imported from Europe. Technological dependency has clearly impaired the performance of both mills. SAED has had to rely on foreign technicians to help keep the machinery functional, and numerous delays and shutdowns have resulted from the

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11. Abbott (1986), p.5.

difficulty of acquiring spare parts.

Small-scale mechanical hullers are attractive for numerous reasons (some, though not all, being precisely those which make industrial milling facilities unattractive). To begin with, small hullers are not dependent on a large and reliable supply of input, since they have a much smaller capacity and furthermore can be operated profitably at a wide range of capacity utilization rates. Second, small-scale processing facilities do not contribute to high assembly and distribution costs; on the contrary, because hullers can be transported into production areas and moved around during the harvest, they reduce the cost of assembling paddy and of distributing milled rice. Third, while many hullers presently located in the Senegal river valley were imported, the census of hullers revealed that a domestic manufacturing and repair capacity has fast been developing. Fourth, small hullers use processing technologies characterized by a high ratio of labor to capital (L/K) relative to other mechanized processing technologies, which is desirable in rural Senegal, where private investment capital is scarce. Fifth, compared to hand pounding, small hullers represent an important labor-saving technology with tremendous implications for rural women and children.

The advantages of small hullers are offset by at least two disadvantages. Theoretically, steel-cylinder hullers

are not as technically efficient as industrial milling facilities, as measured by indicators such as recovery rates (% milling returns) and quality of outputs (% unbroken grains, purity of by-products). Nor, theoretically, are hullers as cost-effective: under factor prices currently prevailing in Senegal, average processing costs per unit of output should be higher for a small huller than for a well-maintained and fully utilized industrial processing facility.

Yet there is a big difference between rated performance and actual performance under field conditions. According to the research results, many of the small hullers operating throughout the Senegal river valley perform as well or better than the SAED mills. Given the variable quality of input (paddy), the dispersed and uncertain nature of supply, a chronic lack of management capacity in the official marketing channel, the difficulty of obtaining replacement parts for imported industrial-scale machinery, and other constraints, the SAED mills have performed very poorly. At the same time, small hullers have demonstrated the ability to produce an acceptable grade of output at comparable per-unit processing costs. And when assembly and distribution transport costs are factored in, small hullers clearly outperform the existing SAED mills, particularly in processing rice produced and consumed in the Middle and Upper Valleys.

An additional consideration regarding choice of technique in rice processing relates to employment effects of alternative technologies. As Timmer (1972) points out, employment aspects of marketing change have traditionally received little attention; economists have usually treated labor as an input, on a par with many other inputs, without considering the desirability of increased employment as an explicit performance goal in and of itself. Given the strong priority in Senegal of increasing productive employment opportunities, the question of employment effects of alternative rice processing technologies warrants consideration. At present, a surplus of labor exists in the Senegal river valley. Although temporary labor shortages do occur during the agricultural cycle (e.g., at planting and harvest), unemployment and underemployment persist throughout much of the year. (Apparently one of the chief causes of the outmigration from the Middle and Upper Valleys is the lack of employment opportunities.) Given their capital intensity, the SAED rice mills utilize far less labor per unit of paddy processed than do small hullers.[12] Consequently, small hullers are preferable to industrial processing facilities with respect to the performance goal of employment generation. Significantly, processing can be scheduled around other activities, so that the labor requirements of processing need not conflict with other,

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12. Since SAED representatives declined to estimate the exact numbers of workers employed at the mills, it was not possible to make a direct comparison.

more inflexible labor demands associated with the cropping calendar.

b) Ownership and Operation of the Processing Industry

At present, the public sector through SAED controls the only two industrial processing facilities located in the Senegal river valley, while private entrepreneurs (including village associations and cooperatives) own and operate the many small hullers scattered throughout the region. Because SAED has not been able to run its processing operation at a profit, some policy analysts have argued in favor of transferring ownership and/or management of the two SAED mills to private interests. Others have countered that private investors are unlikely to be interested in acquiring industrial processing facilities because of risk considerations. Consequently, argues this second group of analysts, the government must retain control of the strategic processing industry and should in fact be thinking about expanding total capacity in anticipation of future production increases.

This debate raises an interesting set of questions: in the future, how might grain processing facilities be owned and operated, and what would be the advantages and

disadvantages of the different forms of ownership and operation?

One alternative would be to continue direct public-sector participation in processing. The arguments in favor of public-sector participation are partly economic and partly political. The main economic argument is an "infant industries" argument: if it is true that private entrepreneurs will be unwilling to assume the risk of investing in industrial processing facilities until irrigated agriculture is well established in the Senegal river valley, it may appropriate for the government to do so during some initial period. The main political argument is a "food security" argument: if it is true that the government has a vital strategic interest in retaining control of the processing industry, then it should own and operate processing facilities.

While both arguments have some validity, it is important to consider whether the benefits of public ownership and operation of the processing industry will be worth the costs. Judging from past experience, the costs are likely to be extremely high. The history of the SAED rice mills suggests that state ownership of processing facilities can easily lead to chronic underutilization of capacity, mismanagement, waste, and possibly corruption. The reasons for this can be found at several levels. Because the personal incentive structure for public

employees does not reward effective management, the civil servants who run the SAED mills have no compelling reason to improve the performance of the mills. And because SAED's operating losses are invariably covered out of the public treasury or by foreign assistance, little pressure to reform is directed at the processing industry. As a result, the industry remains static and inefficient, processing costs stay unnecessarily high, and the drain on the public treasury continues year after year.

An alternative to state ownership of processing facilities would be complete "privatization" of the industry. The private sector has demonstrated the ability to react quickly and effectively to changing market conditions, as evidenced by the rapid rise in processing capacity in the parallel marketing channel. Once installed, privately owned processing facilities are generally well-managed, providing a valuable service at relatively low cost to producers, itinerant traders, and consumers throughout the river valley (including areas inefficiently served by the centralized SAED processing operation). In addition to these purely economic advantages, the distribution of benefits associated with the private processing industry are also consistent with national policy goals: small hullers provide attractive investment opportunities for rural entrepreneurs; small hullers generate employment for the rural work force; and small hullers help reduce the work load of rural women.

Despite these numerous advantages, however, complete privatization of the processing industry might be undesirable in certain respects. For example, considering the distortive price policies and high levels of regulatory uncertainty which characterize the Senegalese economy, entrustment of the processing industry to profit-maximizing private investors might result in overinvestment or underinvestment in processing capacity, investment in a sub-optimal mix of large- and small-scale facilities, and/or investment in antiquated technologies. Evidence of this has already appeared. The field surveys revealed that most privately owned processing facilities operating in the Senegal river valley are steel-cylinder hullers, which are technologically obsolete compared to technologies being used elsewhere in the world (e.g., rubber-roller shellers). Private entrepreneurs may not know about these improved technologies, or perhaps they have been discouraged from investing in them because of the prevailing climate of regulatory uncertainty (which raises the risk of investing in expensive capital requiring a lengthy depreciation period). Risk considerations may also be discouraging investors from acquiring in large-scale technology, as evidenced by SAED's inability to find interested buyers for the two industrial mills. These findings suggest that complete privatization of the processing industry might over the long run result in socially undesirable investment patterns.

A third policy option would be to work toward some type of intermediate solution involving active participation of both the public and private sectors in the processing industry. Under such a solution, primary responsibility for processing activities would be transferred to the private sector. Past experience in Senegal, as well as in many other countries, suggests that private processors are not only able to operate more efficiently than state processing monopolies, but that they furthermore tend to play an active role in developing linkages backwards into assembly markets (as a way of stabilizing supplies of raw materials) and forwards into distribution markets (as a way of stabilizing disposal channels for processed outputs). Itinerant traders operating in the parallel channel have already demonstrated this tendency to improve vertical coordination, albeit on a quite limited scale. If private processors can be induced to expand the scale of their facilities, the positive effects of their aggressive coordinating behavior are bound to increase and spread throughout the sub-sector. The state would meanwhile retain control of a minimum level of milling capacity consistent with food security objectives (perhaps but not necessarily industrial scale facilities). Various degrees of direct state participation would be possible. For example, if the decision were taken to retain state ownership of the SAED mills, steps would have to be taken to improve their management; one possibility would be to experiment with management contracting as a way of

delegating day-to-day management responsibilities to private firms. In addition to participating directly in processing activities, the state would play a vital indirect role in providing "public" goods and services related to the private processing industry. For example, an immediate need exists for applied research into the adaptability of rubber-roller processing technologies to local conditions.

Key Issue #5: Mix of Public-sector and Private-sector Responsibilities in Cereals Import Markets

The fifth key issue concerns the mix of public-sector and private-sector responsibilities in cereals import markets. At present, cereals are imported commercially by the CPSP, the government agency charged with stabilizing food supplies and cross-subsidizing prices. The CPSP holds a legal monopoly over imports; in order to strengthen state control over the cereals trade, private traders are formally prohibited from importing grain. CPSP management of cereals import and distribution operations has come under severe criticism in recent years. Supply disruptions have been a recurring problem, particularly at the level of the regional distribution warehouses, and many quotataires claim that preferred grades of rice are often unavailable. More

importantly, the agency's financial performance has been devastated by mismanagement, corruption, and political favoritism; while CPSP records remain largely confidential, external audits conducted during the 1982 and 1984 revealed evidence of large and persistent operating losses.[13] Critics of the CPSP have argued that cereals import and distribution activities could be performed more effectively and at lower cost by private merchants.

What policy options are available to reform the current imports system, and what would be the likely performance consequences of their implementation?

One alternative would be to continue state monopolization of import markets. Theoretically, state monopolization enables the government to assure the availability of adequate food supplies, provides increased leverage for the state control of food prices, and facilitates cross-subsidization among food prices. But these objectives are not always achieved in Senegal. Overbureaucratized procedures, a lack of analytical capacity, and a shortage of personnel with management skills consistently impair the performance of the CPSP grain import operation. Also, the tremendous political importance of the rice trade opens the door to corruption and abuse of the quota system by influential interest groups and individuals.

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13. See Arthur Anderson Gaye and Associates (1982, 1984).

An alternative to state monopolization would be to end public-sector participation in import activities. Responsibility for commercial imports would be entrusted to the private sector, with the hope that cost savings would be achieved without appreciable damage to food security objectives -- even though the state would suffer some loss of control over cereals prices and experience greater difficulty in implementing cross-subsidization programs.

But what would be the consequences of this option? If private merchants were able to obtain free access to the imports market, profit-maximizing behavior in a competitive environment would soon lead to an increase in exchange efficiency and a lowering of marketing costs. On the other hand, if monopoly interests were able to erect entry barriers to prevent free access to the market, a non-competitive environment might eventually arise, providing opportunities for excess-profit taking. It is hard to predict which of the two possible outcomes is more likely. Government officials are quick to point out what happened prior to the establishment of the CPSP, when a small number of politically influential figures was able to gain control of the cereals import market and manipulate prices to their own personal advantage. Given the skewed distribution of political and economic power in Senegal, complete state withdrawal from all involvement in the industry could result in a recurrence of such a situation, making privatization somewhat risky.

A third policy option, lying between the extremes of state monopolization and private-sector domination, would be some form of mixed system. In a mixed system, private traders would be encouraged to assume an active role in cereals import operations. At the same time, the public-sector would maintain an active presence in import markets. Depending on the degree of competition prevailing between private importers, the state could be either engage directly in trading operations or restrict itself to a regulatory and facilitative role.

According to the PAMLT, the government is actively considering this latter option. Although the proposed reforms have yet to be signed into law, a plan has been advanced to relieve the CPSP of its responsibilities for importing and distributing rice. Under the terms of this plan, private merchants would be permitted to import rice on their own accounts, as would SONADIS. A variable levy would be used to restrict the total quantity of imports in accordance with national food self-sufficiency targets and to maintain consumer prices at high enough levels to favor the consumption of locally produced cereals such as millet, sorghum, and maize.

Such a dual-channel system based on the active participation of both private importers and SONADIS could potentially increase exchange efficiency and reduce marketing margins while at the same time enabling the state

to meet essential food security objectives. The ultimate performance consequences of the proposed reforms will depend on precisely how the rules of the game are designed and implemented. Effective use of a variable levy to control the level of imports and determine domestic prices presumes a certain level of analytical capacity which may be lacking in Senegal. At the very least, some trial-and-error experimentation will probably be necessary to establish an appropriate size for the levy. Inevitably, introduction of the levy will create strong incentives for private importers to misrepresent their sales volume, which may lead to problems of regulatory enforcement. While these are hardly insurmountable problems, until they are resolved the proposed reforms may simply exacerbate the climate of regulatory uncertainty which presently exists.

Chapter 7

CONCLUSION

As the government of Senegal proceeds with its ambitious plan to develop the Senegal river valley for irrigated agriculture, cereals marketing policy is receiving increasing attention. Although the policy debate in Senegal has traditionally focused on the question of how to increase and stabilize food production, analysts are more and more coming to the realization that marketing issues can no longer be ignored. For even if the two dams currently being constructed on the Senegal river help pave the way for significant production increases, the government's overall regional development strategy could be threatened if the future cereals marketing system proves incapable of handling additional flows of grain. Consequently, a thorough understanding is needed of the current cereals marketing system, its strengths, weaknesses, and prospects for future expansion.

This study has examined cereals markets in the Senegal river valley, using the sub-sector framework of analysis and drawing on selected aspects of the S-C-P paradigm. The sub-sector framework focuses on individual industries within the cereals sub-sector, as well as on the vertical coordination mechanisms linking them into an articulated, dynamic system. The S-C-P paradigm is based on the idea that market

performance can be understood by examining how structural characteristics of industries interact with the conduct of market participants.

A three-step analytical procedure has been followed, consisting of:

1) description of the organization and performance of the cereals sub-sector, with particular emphasis on the assembly, processing, wholesaling, and retailing industries;

2) diagnosis of major problems affecting the sub-sector, i.e., identification of areas of unsatisfactory performance and determination of their cause(s); and

3) projection of the likely performance consequences of alternative policy options under a range of plausible development scenarios.

A major objective of the study is to inform the ongoing policy dialogue by providing new insights into the operation of existing cereals markets and by spelling out the likely performance consequences of various reform measures. Yet a unique set of policy recommendations has not been explicitly prescribed. The difficult task of selecting among the many possible policy alternatives has been left to Senegalese policy makers.

It is hoped that the research results will inject a much-needed note of realism into the policy dialogue. In

Senegal, food and agriculture policy choices are often cast in terms of simple "either/or" alternatives. Although the terminology sometimes varies, policy options are generally described as involving a choice between "public sector" solutions or "private sector" solutions, "dirigisme" or "laissez faire", "central planning" or "market system". Implicit in this simplistic dichotomization is the idea that the alternatives are mutually exclusive, as if there is no complementarity, nor room for compromise between the two.

It is important to recognize that these much-debated policy options do not reflect the full range of choices currently facing Senegalese decision makers. The analysis presented in this dissertation suggests that cereals marketing policy choices are in reality far more complex. "Private-sector" solutions and "public-sector" solutions are not mutually exclusive alternatives. On the contrary, every economic system necessarily involves some degree of public-sector participation, as well as some degree of private-sector participation. For example, even though the Senegalese government maintains an official monopoly over many grain marketing activities (a so-called "public-sector solution"), private firms and individuals play an active role in production, transportation, distribution, and consumption.

Marketing policy analysis is complicated by the fact that markets do not always work the way the governments

would like them to. In Senegal, official rules and regulations governing cereals marketing activities are often unenforceable, with the result that state control over grain markets is less than complete. For example, a thriving parallel marketing channel for paddy operates alongside the official marketing channel throughout much of the Senegal river valley. A significant portion of the paddy harvest moves through this channel at prices which do not always conform to the official price structure -- increasingly this appears to be a larger portion of the harvest than is sold legally to SAED at the official producer price.

The analysis has revealed that both the official and the parallel marketing channels perform well in some respects and poorly in others. Direct state participation in cereals marketing activities facilitates the achievement of some performance objectives, while extensive reliance on private marketing agents facilitates the achievement of other performance objectives. Changing the mix of public-sector and private-sector responsibilities involves difficult tradeoffs, in the sense that improved performance with respect to one criterion often can be achieved only by compromising with respect to other criteria.

Many such tradeoffs have been identified during the course of this research. Direct public-sector participation in cereals assembly operations has helped to guarantee a market outlet for all cereals producers in the Senegal river

valley and has enabled the government to support the official producer price for paddy, but the cost in terms of government subsidies to SAED has been high. Private grain traders operating in the parallel channel have been able to perform assembly functions at lower per-unit costs while reducing the drain on the government's budget, but parallel market traders do not find it profitable under existing regulations and price barriers to serve all producers.

Direct public-sector participation in cereals processing activities has enabled the government to maintain considerable processing capacity in the Senegal river valley, even though extensive subsidization has been necessary to keep the two SAED rice mills in operation, and even though the economic performance of the mills has been poor. At the same time, private processors operating in the parallel channel have demonstrated the ability to expand capacity in response to profit opportunities, although they have not responded with what appears to be the most effective technology, based on comparisons with other countries. While private processors are able to process paddy more rapidly and at lower cost than the SAED mills, they do not find it profitable under existing regulations and price barriers to operate throughout the river valley.

Direct public-sector participation in cereals distribution activities has enabled the government to make rice and sorghum generally available to consumers at or near

official prices, yet CPSP licencing requirements impose transactions costs on distributors and create opportunities for corruption. Private traders operating in the parallel channel have been able to distribute grain in certain portions of the river valley more rapidly and at lower cost than official distributors, but quantities and prices in the parallel channel have been characterized by seasonal variability, which increases uncertainty for producers and consumers alike.

In summary, the research findings indicate that direct participation by the Senegalese government in cereals marketing activities has had both positive and negative performance consequences. At a time when many public marketing organizations have come under increasing attack, it is particularly important to recognize their positive contributions to the achievement of national policy goals. In spite of much justifiable criticism of SAED's inefficiency, institutional lethargy, and poor financial health, SAED has been instrumental in increasing irrigated rice production in the Senegal river valley. Similarly, despite much justifiable criticism of the CPSP's performance in cereals distribution activities, the CPSP has been instrumental in ensuring food security for the population of the river valley. These important points are often overlooked in the policy debate, particularly by those who have called for the disengagement of the government from grain marketing activities in favor of extensive

privatization of grain marketing activities. The critics are correct in asserting that parallel channel marketing agents are able to respond quickly to changing market conditions while lowering per-unit marketing costs throughout the cereals marketing system, but they overlook the fact that profit-motivated private traders are not in a position to contribute as effectively as the public marketing organizations to welfare and food security goals.

The research findings have provided the basis for a discussion of possible policy reforms and their likely performance consequences under a range of plausible development scenarios. The discussion is intended to lay out the advantages and disadvantages of alternative policy options, rather than to favor one option over another. Considering the multi-dimensional nature of performance, future policy choices will inevitably involve difficult tradeoffs between conflicting performance objectives. These tradeoffs have been spelled out as explicitly as possible.

Achieving a satisfactory compromise between conflicting efficiency, welfare, and food security goals will almost certainly require a cereals marketing system in which responsibility for assembly, processing, and distribution functions is shared by private and public market participants. But even if Senegalese decision-makers acknowledge that future policies will have to involve a mix of public- and private-sector participation, they are still

left facing difficult questions about what those future policies should look like. The critical policy question finally boils down to: What marketing functions are best performed by the state, what marketing functions are best performed by the private sector, and what marketing functions are best performed collaboratively, with the state playing an active facilitative role to encourage and support private sector initiatives?

The present study is designed to help address this critical question. The research findings suggest that many current cereals marketing policies have outlived their usefulness in the Senegal river valley. While state monopolization of cereals marketing functions may have been appropriate twenty or more years ago, circumstances have changed. The official cereals marketing system is today overly dominated by inefficient state grain marketing organizations operating in response to poorly informed central planning directives, while private-sector intermediaries operating in the parallel channel in response to market prices are able to achieve better results at lower costs. The implications for policy are clear: the role currently played by the state should be changed, and increased participation by private merchants actively encouraged, if significant progress is to be made toward improving sub-sector performance.

But this does not mean that policy makers should opt for the complete withdrawal of the state from direct participation in the cereals sub-sector, as some analysts have argued. If the research findings reveal the disadvantages of centrally administering cereals marketing activities, they also suggest that excessive reliance on the market might also lead to unsatisfactory performance. Clearly, certain limited government interventions are not only desirable but necessary to ensure performance consistent with national policy goals. The state and the private sector are finally complementary partners, neither of which can operate effectively without the other. This fundamental proposition often gets lost in the policy debate.

Unfortunately there is no simple way to predict when reliance on the market will result in unsatisfactory performance, necessitating such interventions. Much depends on the nature of performance goals, on the initial distribution of rights and privileges, on the specific way the rules of the game are formulated and enforced, on the motivations and behavior of market participants, and on the existing set of government support institutions. This study sheds light on the way these factors interact at the micro level to determine market performance at the macro level in the Senegal river valley. Such knowledge can help policy-makers decide where specific interventions may be necessary and how they should be designed and implemented to affect

desirable changes.

Finally, this study has revealed the need for additional research on selected aspects of the cereals sub-sector in the Senegal river valley. While the potential research agenda is long, priority should be given to those topics of greatest importance to the policy debate: the economics of irrigated crop production; the frequency and timing of producer grain transactions; the behavior of actual market prices for cereals at the farm gate, wholesale, and retail levels; the profitability of small hullers compared to alternative investment opportunities for private entrepreneurs; the costs incurred by grain traders in attempting to comply with official marketing regulations (or, alternatively, in attempting to avoid them when compliance is prohibitively expensive); and the losses due to mismanagement, waste, and corruption. Accurate empirical information on these priority topics is urgently needed to help Senegalese decision makers formulate effective policy reforms.

If food and agriculture policies are to be successful, policy decisions cannot be based on mistaken impressions of the way people think the market works, nor on wishful thinking about the way they would like it to work. Rather, policy decisions must be grounded in an accurate understanding of the way the market <u>really</u> works. This study contributes to that understanding by generating

important new insights into the organization and performance of existing grain markets, as well as information about prospects for change. The challenge facing researchers is to begin to fill the gaps which still remain in the knowledge base.

APPENDIX

Appendix

FIELD RESEARCH ACTIVITIES

This appendix provides a brief description of the field research activities.[1] The description will be of interest to two groups of readers. First, it will interest those who may want to know more about how the empirical research findings were obtained. Such methodological background is important, particularly in Senegal, where research results are often presented with little or no explanation concerning their provenance. Second, it will interest those who are considering similar research, in Senegal or elsewhere. While the intention is hardly to present a detailed guide for conducting sub-sector or marketing research, the methodology is documented here in the hope that future researchers in some small way may learn and profit from the experience of others.

The roots of this study trace back to late 1983, just after the creation of the BAME, when a national research agenda was elaborated identifying priority research topics. The importance of cereals in the national food policy debate led to the decision to target a considerable portion of the BAME research effort on the cereals sub-sector, with

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[1]. For additional detail on the conceptualization, planning, and implementation of the study, see Morris (1985d).

particular emphasis on marketing policy issues.[2] Three coordinated regional grain marketing studies were envisioned (to be conducted in the Fleuve region, in the Peanut Basin, and in the Casamance), with the hope that the major findings of the regional studies might eventually be combined to produce policy analysis which would be relevant at the national level.

Work on the Fleuve study began in March 1984 with the arrival of the researcher 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) active in cereals marketing in the Senegal river valley. These visits served to publicize 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. Numerous sources of published and unpublished documents were consulted, including the ISRA, OMVS, SAED, and USAID documentation centers. While these centers yielded many useful references, in general their collections were found to be incomplete, poorly referenced, and outdated. A more productive source of documents turned out to be the private collections of food system participants and of other

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[2]. See Newman, Crawford, Faye (1984).

researchers.

While the literature review was in progress, a series of reconnaissance surveys served to familiarize the researcher with the region of the study and helped initiate additional contacts with representatives of public and parastatal agencies. The Delta was covered in a series of one-day field trips; the Middle and Upper Valleys were visited during longer missions. Irrigated perimeters were inspected throughout the various production zones, and farmers were interviewed informally about their production and marketing activities. Approximately 20 markets between Saint Louis and Bakel were also visited, and several dozen grain traders 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.

During June and July 1984, a working document was drafted, entitled "The Food Grains Sub-Sector in the Senegal River Valley." The document pulled together the results of the literature review as well as the findings of the reconnaissance surveys in describing the cereals sub-sector and in diagnosing major policy problems. The exercise of writing the working document helped to organize the vast amount of information collected and facilitated identification of gaps in the existing knowledge base.

Next, an operational plan of work was elaborated. This entailed the planning of field surveys, the development of detailed timetables, and the construction of a list of logistical support activities. By mid-August 1984, four separate field data collection exercises had been proposed:

1) a formal survey of licenced grain distributors;
2 a complete census of small rice hullers;
3) an in-depth survey of a sample of hullers;
4) an informal survey of parallel channel participants.

In addition to the field data collection activities, the plan of work also called for the collection of secondary data relating to the operations of government agencies and parastatals involved in cereals marketing activities. Many of these secondary data are contained in classified reports and unpublished internal records and can be accessed only with the voluntary cooperation of the appropriate government officials.

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

Enumerators for the field surveys were recruited and trained during August 1984. Candidates, who were hired through the national employment agency in accordance with Senegalese law, fell into two broad categories: 1) high school diploma (Bac or DFEM) with no field experience, or 2) field experience but no diploma. Based on a written test and an interview, eight candidates were invited to attend a four-day training program held at the ISRA regional research center in Saint Louis. The training program included formal lectures on the objectives of the research, discussion of data collection techniques and interviewing strategies, practice interviewing in a classroom setting, and practice interviewing in the markets of Saint Louis. At the completion of the training program, six candidates were selected for the study, with the other two designated alternatives. Selection criteria included performance on the pre-selection tests and interview, performance in classroom and field interviewing exercises, performance in written tests administered during training, previous experience, education, and language skills. One enumerator was appointed supervisor.

In mid-September 1984, the six enumerators were posted to their sites along the river: Saint Louis, Dagana, Podor, Aere Lao, Matam, Bakel. (See Figure 2) Each enumerator was given 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

enumerators remained in the field, they were visited every two weeks by the researcher and the supervisor. Supervisory visits normally lasted one day, although often the researcher and/or supervisor stayed in a site for several days at a time when special assistance was necessary. Completed questionnaires were carefully reviewed by the researcher during each visit, and progress to date as well as future plans were discussed at length. The researcher and the supervisor made a point of meeting all survey respondents and participated in as many interviews as time allowed.

Each of the survey instruments (with the exception of the questionnaire used during the reconnaissance surveys) underwent a lengthy process of design, pre-testing, and revision.[3] In most cases, several cycles of pre-testing and revision were necessary, since pre-testing often turned up new responses which had not 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 completely because the respondents could not or would not provide credible answers. In addition to improving the survey instruments, extensive pre-testing also provided a valuable training experience for the enumerators by enabling them to familiarize themselves with the questions and to develop strategies for eliciting the

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[3]. Examples of the survey instruments appear in Morris (1985d).

desired information.

As indicated previously, field data collection activities included:

1) a formal survey of licenced grain distributors;

2) a complete census of small rice hullers;

3) an in-depth survey of a sample of small hullers;

4) an informal survey of parallel channel participants.

Each activity is discussed below.

1) The Formal Survey of Licenced Grain Distributors

The formal survey of licenced grain distributors proceeded in two stages. During the first month in the field, the enumerators contacted as many local cereals traders as possible, particularly wholesalers and other volume traders. These traders were subsequently interviewed using Fiche I. The objective of this first stage was to generate information on the numbers and types of cereals distributors active in the Senegal river valley and to generate a frame from which a sample could be drawn for follow-up interviews. A secondary objective was to provide additional "hands-on" interviewing practice for the enumerators. Over two hundred distributors were contacted and interviewed during this first stage.

The second stage of the survey involved follow-up interviews with a sample of respondents. The sample

selection for follow-up interviews was made at the beginning of October 1984. Because the baseline questionnaires 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. Since volume traders clearly wielded tremendous power, all of the wholesalers who had been contacted and interviewed were included. In addition, enough retailers were added at each site to bring the enumerator's workload up to the target figure of 25. (In two sites, the target figure was actually surpassed.) Selection of retailers was based partly on 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 (Fiche II and Fiche III). During this period, 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 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.

Table 13: Composition of the Sample of Licenced Distributors

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

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

It is important to note that many of the questions posed to distributors touched upon sensitive subject matter. In order to estimate costs and returns to marketing activities, it was necessary to have knowledge of traders' financial records. This is considered an invasion of

privacy in Senegal, 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 stiff fines imposed for illegal activities (e.g., failure to adhere to the official price structure, trading without a licence). Many respondents were reluctant to disclose information regarding their grain marketing activities for fear that it would get back to regulatory enforcement agents. Some traders declined to respond to certain questions, and a few resorted to obvious lying in order to evade self-incrimination. In an attempt to minimize such evasive behavior, enumerators were coached to establish personal relationships with "problem" respondents, for example by visiting them in their homes after working hours. This type of informal socializing, very important in Senegalese society, helped overcome the suspicion of many traders that the enumerators were really working undercover for the Controle Economique and appeared greatly to improve the quality of the responses in the distributors survey.

2) The Census of Small Rice Hullers

During the month of February 1985, a complete census was performed of small 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, hullers proved relatively easy to find. Most inhabitants of rice-producing areas of the Senegal river valley know where nearby hullers are located, and many people know the locations of a dozen or more machines. Mobile hullers were sometimes difficult to find, and occasionally the same mobile huller re-appeared several times in different locations, but it is thought that very few hullers were overlooked or double-counted.

A questionnaire (Fiche IV) on huller type, ownership, and operations was completed for each machine, based on interviews with the manager, and, if present, the owner. The information was non-sensitive, 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, when huller operators generally had little free time to respond to questions.

3) The In-depth Survey of a Sample of Hullers

Following the completion of the census of small hullers, an in-depth survey was conducted of a sample of hullers. The purpose of the survey was to collect cost and returns data necessary to estimate prototypical operating budgets. These budgets would reveal the profitability of huller ownership and operation. A second objective of the survey was to generate input-output data so that the performance of small hullers could be compared with the performance of the industrial processing machinery operated by SAED.

Twenty six hullers were selected for in-depth study. This number was judged adequate to permit the calculation of many statistically significant performance measures, considering the similarity in operating characteristics which had been observed during the census.[4] Since time and resource constraints did not permit inclusion of hullers located in the Middle and Upper Valleys, the sample frame consisted of the population of machines located in the Delta (97 out of 142 identified in the census). While this non-random aspect of the sampling procedure may have introduced some regional bias, it is unlikely that the final results were greatly affected, because it nevertheless was possible

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[4]. Unfortunately, the population did not include enough electric or gasoline-powered motors to allow statistically significant cross-group comparisons between operating costs associated with the three types of motors.

to cost out the two representative types of operation found in all three regions of the river valley ("village huller" and "commercial huller").

Each huller was visited by the enumeration team (the researcher and the two remaining enumerators), and 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 paddy:hulled rice conversion rates. Finally, samples of hulled rice were collected at each site for subsequent determination of the percentage of broken grains present in the output.

4) The Informal Survey of Parallel Channel Participants

One important group of parallel channel participants was difficult to approach directly: parallel channel 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 is performed on a part time basis, identification of traders can be difficult. Furthermore, parallel channel trading is technically illegal, so that few

traders are willing to discuss their activities. 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 huller sites and to question them informally concerning their marketing activities. While it was usually impossible to work openly with an actual questionnaire, a list of questions was memorized to be posed to each respondent. The questions related to the physical flows of grain (sources and destinations, quantities, qualities), marketing activities (buying, financing, transport, storage, processing, winnowing, bagging, selling), and costs and returns data (prices paid and/or received). The responses given by each respondent were committed to memory and later recorded in field notebooks, after the interview had been completed.

In addition to traders, other parallel channel participants were interviewed in similar fashion -- farmers, transporters, huller operators, winnowers, 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 marketing channel. While the non-systematic sampling procedure does not permit estimation of a set of statistically significant marketing costs and returns (which would require a large sample, given the enormous variability

in the data), the mean values calculated from the data are indicative of transactions occurring in the central Delta region during the post-harvest months when the parallel market is most active. These estimates have been of great interest to Senegalese policy makers, because they are derived from the first empirical data collected on parallel channel operations.

All survey instruments were pre-coded. Each question was accompanied by a list of numerically coded responses, and blank spaces were left along the margin of every form for the enumerator to record the response codes corresponding to the answers given by respondents. The enumerators were instructed to circle the appropriate answers in the field, but to enter the codes into the blank spaces only later that evening, after reviewing the forms at home. This reduced the enumerator's work during the actual interview and increased the legibility of the inscribed codes.

Primary data generated during the field surveys were analyzed at the Saint Louis research center using a hand-held calculator and an IBM XT microcomputer, as were additional secondary data obtained from published and unpublished sources (e.g., SAED records, CPSP records, SONADIS records, CSA records).

Because an important objective of the study was to produce research results that would contribute to the ongoing policy dialogue in Senegal, considerable effort was expended in analyzing the data and disseminating research results in a timely and effective manner. Preliminary research results were published as a series of BAME Working Papers rather than as a single comprehensive research report, which would have taken considerably longer to write and produce.[5] The Working Paper format offered two major advantages: 1) individual papers could be brought out quite rapidly, thus responding to policy makers' needs in 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 Working Paper were circulating as early as June 1985, only three months after field data collection activities were completed, and a final version of the paper appeared in July. The other three Working Papers followed shortly thereafter. This rapid turnaround time assured 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 research findings for decision-making purposes.

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5. See Morris (1985a, 1985b, 1985c, 1985d).

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 large number of government officials, development agency representatives, private sector interests, and other key participants in the sub-sector. 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 research results included a presentation to Agriculture and Development Office 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 agriculture policy in Senegal. This latter presentation received extensive coverage in Le Soleil, the national daily newspaper.

Field research activities concluded in September 1984 with the departure from Senegal of the researcher.

BIBLIOGRAPHY

BIBLIOGRAPHY

Abt Associates, Inc. (1984) Senegal Agricultural Policy Analysis. Dakar: USAID. September 1984.

Adams, Adrian (1977) "The Senegal River Valley: What Kind of Change?" Review of African Political Economy (10) (September-December):33-59.

Adams, Adrian (1979) "An Open Letter to a Young Researcher." African Affairs (78) 313:451-479.

Arthur Anderson Gaye and Associates (1982) Caisse de Perequation et de Stabilisation des Prix: Etude Diagnostique. Dakar: Arthur Anderson Gaye and Associates.

Bain, Joe (1968) Industrial Organization (2nd edition). New York: John Wiley.

Bloch, Peter (1985) "Land Tenure Issues in River Basin Development in Sub-saharan Africa." Madison, Wisconsin: Land Tenure Center.

Bonnefond,P.; J. Caneill; O. Auriol; M. N'Diaye; J. Menvielle; and A. Clement. (1980) Etude d'Unites de Production de Paysans Pratiquant la Culture Irriguee dans le Cadre de la SAED. Dakar: ORSTOM/ISRA.

Borsdorf, Roe (1984) "Evaluation of Rice Import Operations of the Caisse de Perequation et de Stabilisation des Prix." Manhattan, Kansas: Grain Storage, Processing, and Marketing Report (No. 99). November-December 1984.

Brandow, George (1977) "Appraising the Economic Performance of the Food Industry." Lectures in Agricultural Economics, Economic Research Service, USDA.

CCCE (1982) Evaluation Economique de l'Amenagement de la Rive Gauche du Fleuve Senegal: Rapport General. Republic of Senegal, Caisse Centrale de Cooperation Economique. (December).

Chateau, Robert (1982) Etude sur les Couts de Commercialisation et de Transformation du Paddy a la SAED (Campagne Agricole 1981/82). Saint Louis: SAED.

Cisse, Couty (1984) "Rapport de Stage." Saint Louis: SAED. May 1984.

Crawford, Eric; Curtis Jolly; Philippe Lambrecht; Valerie Kelly; Makhona M'Baye; and Matar Gaye (1985) "A Field Study of Fertilizer Distribution and Use in Senegal, 1984: Final Report." Working Paper 1. Dakar:ISRA/BAME.

Diallo, Mamadou Dian (1980) "Comparative Analysis of Capital Intensive and Labor Intensive Rice Irrigated Perimeters In The Senegal River Valley." Master's thesis, Michigan State University.

Dumont, Rene and Marie-France Mottin (1982) Le Defi Senegalais. Dakar: ENDA.

Gannett Fleming, et al. (1980) Assessment of Environmental Effects of Proposed Developments in the Senegal River Basin: PLAN OF ACTION. Harrisburg, Pennsylvania.

Haggblade, Steven. (1986, forthcoming) "Vertical Considerations in Choice of Technique Studies: Evidence From Africa's Indigenous Beer Industry."

Harriss, Barbara (1979a) "Going Against the Grain." Proceedings of the International Workshop on Socioeconomic Constraints to Development of Semi-arid Tropical Agriculture, 19-23 February 1979. Patancheru, A.P., India: ICRISAT.

Harriss, Barbara (1979b) "There Is Method in My Madness: Or Is It Vice Versa? Measuring Agricultural Market Performance." Food Research Institute Studies, Vol. XVII, No. 2.

Harriss, Barbara (1982) "The Marketing of Foodgrains in the West African Sudano-Sahelian States: An Interpretive Review of the Literature." ICRISAT Economics Program Progress Report 31. Patancheru, A.P., India: ICRISAT.

Hirsch, R.D. (1985) "Note sur le Prix du Riz au Senegal." Paris/Dakar: CCCE. January 1985.

Holtzman, John S. (1982) "A Socio-economic Analysis of Stall-fed Cattle Production and Marketing in the Mandara Mountains of Northern Cameroon." Ph.D. dissertation, Michigan State University.

Jammeh, Sidi (1984) "Non-Market Constraints On Policy Choices: Agricultural Price Decision-Making in Senegal." Ph.D. dissertation, Johns Hopkins University.

Johnson, Glenn (1986, forthcoming) Research Methodology For Economists. New York: MacMillan and Co.

Jolly, Curtis O. and O. Diop (1985) "La Filiere de Commercialisation Cerealiere en Basse et Moyenne Casamance." BAME Working Paper 85-13. Dakar: ISRA/BAME.

Koita, Toka and Richard Bernsten (1986) "Comparative Analysis of Rice Production Costs In Small and Large Scale Irrigated Perimeters, Upstream Zone of the Fleuve, Mauritania." Invited Paper presented at the Forum on Irrigation Research in Africa, Cornell University (May 13-15, 1986).

Kramer, Carol S. (1984) "Food Consumption, Food Demand in Senegal: Summary of Literature and Suggestions For Needed Research." Daker, Senegal: USAID.

Lele, Uma (1971) Food Grain Marketing in India: Private Performance and Public Policy. Ithaca: Cornell University Press.

Mackintosh, Maureen (1985) "Economic Tactics: Commercial Policy and the Socialization of African Agriculture." World Development 13-1: 77-96.

Marion, Bruce W. (1976) "Application of the Structure, Conduct, Performance Paradigm to Subsector Analysis." N.C. Project 117, Working Paper No. 7, March 1976.

Marion, Bruce W. and C.R. Handy (1973) Market Performance: Concepts and Measures. Agricultural Economics Report No. 244, Economic Research Service, USDA.

Martin, Frederic (1985) "La Reforme de la Politique Cerealiere dans le Sahel: Le Senegal." Alexandria, Virginia: Elliot Berg Associates.

Meillassoux, Claude (1975) Femmes, Greniers, et Capitaux. Paris: Maspero.

Miller, Richard Paul (1984) "Peasant Autonomy and Irrigation: Innovation in the Senegal River Basin." Ph.D. dissertation, Northwestern University.

Morris, Michael L. (1985a) "The Parallel Market For Cereals in the Senegal River Valley." BAME Working Paper 85-8 (July). Dakar: ISRA/BAME.

Morris, Michael L. (1985b) "The Official Market For Cereals in the Senegal River Valley." BAME Working Paper 85-10 (August). Dakar: ISRA/BAME.

Morris, Michael L. (1985c) "The BAME Fleuve Cereals Marketing Study: Conclusions and Implications." BAME Working Paper 85-14 (September). Dakar: ISRA/BAME.

Morris, Michael L. (1985d) "The BAME Fleuve Cereals Marketing Study: Methodology." BAME Working Paper 85-16 (October). Dakar: ISRA/BAME.

Ndiame, Fadel (1985) "A Comparative Analysis of Alternative Irrigation Schemes and the Objective of Food Security: The Case of the Fleuve Region in Senegal." M.S. thesis, Michigan State University.

N'Diaye, Amadou M. and S. Chevassus-Agnes (1981) "Enquetes de Consommation Alimentaire de L'ORANA de 1977 a 1979: Methodologie, Resultats." Ottowa: International Development Research Council.

Newman, Mark; Eric Crawford; Jacques Faye (1984) "Orientations et Programmes de Recherches Macroeconomiques sur le Systeme Agro-alimentaire Senegalais." BAME Working Paper 84-1 (October). Dakar: ISRA/BAME.

Newman, Mark; Ousseynou N'Doye; Pape Sow (1985) "Tradeoffs Between Domestic and Imported Cereals in Senegal: A Marketing Systems Perspective." BAME Working Paper 85-7 (June). Dakar: ISRA/BAME.

Newman, Mark; Pape Sow; Ousseynou N'Doye (1985) "Regulatory Uncertainty, Government Objectives, and Grain Market Organization and Performance: The Senegalese Case." BAME Working Paper 85-9 (August). Dakar: ISRA/BAME.

OMVS (1980a) Etude Socio-economique du Bassin du Fleuve Senegal. Partie A: Presentation Generale du Bassin du Fleuve. (Edition Provisoire). Dakar.

Patterson, William McClinton (1985) "Village Irrigation Systems Along the Senegal River: A Comparative Analysis." Ph.D. dissertation, Cornell University.

Platon, Pierre (1981) "The Development of the Senegal River." Special issue of Marches Tropicaux et Mediteraneens (April 17).

Reboul, Claude (1982) Barrages Contre le Developpement? Contribution a l'etude des Projets d'Amenagement de la Vallee du Fleuve Senegal. Paris: INRA.

Ross, Clark G. (1979) "A Village Level Study of Producer Grain Transactions in Senegal." CRED Discussion Paper No. 81. Ann Arbor, Michigan: University of Michigan Center for Research on Economic Development.

Ross, Clark G. (1980) "Grain Demand and Consumer Preference in Senegal." Food Policy, November 1980.

SAED (1984a) "Etude de Factibilite et Avant Projet Sommaire d'une Rizerie dans la Moyenne Vallee du Fleuve Senegal." Saint Louis: SAED. (July).

SAED (1984b) "Plan d'Action de la SAED dans la Perspective de l'Apres Barrage." Saint Louis: SAED. (August).

SAED (1985) "Role et Activites de la SAED dans le Developpement Rurale des Vallees du Fleuve Senegal et de la Faleme: Note de Synthese." Saint Louis: SAED. (January).

Scherer, Frederick M. (1970) Industrial Market Structure and Economic Performance. New York: Rand McNally.

Shaffer, James D. (1973) "On the Concept of Sub-sector Studies." American Journal of Agricultural Economics, May 1973:333-335.

Shaffer, James D. (1980) "Food System Organization and Performance: Toward a Conceptual Framework." American Journal of Agricultural Economics, May 1980: 310-318.

SONED. Etude de la Commercialisation des Cereales au Senegal: Rapport sur les Resultats des Enquetes Periodiques. Dakar: SONED. February 1985.

Sosnick, Stephen (1964) "Operational Criteria for Evaluating Market Performance," in Farris, Paul (ed.) Market Structure Research; Ames, Iowa: Iowa State University Press.

Sow, Alassane and Mark Newman (1985) "La Reglementation et l'Organisation des Marches Cerealiers au Senegal: Sitiuation des Campagnes de Commercialisation 1983/84 et 1984/85." Dakar: ISRA/BAME Working Paper BAME 85-2. March 1985.

Timmer, C. Peter (1973) "Choice of Technique in Rice Milling on Java." Bulletin of Indonesian Economic Studies, Vol. IX, No.2 (July)