

**MARKET TRANSPARENCY AND THE ROLE OF THE
STATE: THE ESTABLISHMENT OF A MARKET INFORMATION SYSTEM IN MALI**

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ABSTRACT

Several factors increase the thinness of cereals markets in the Sahel. The marketing of cereals in a thin market involves high risks, which discourage the private sector from investing in the cereals subsector. This, in turn, endangers the success of the market liberalization that is currently under way in several Sahelian countries. To encourage private-sector investment, the state needs to try to reduce these risks through various measures, such as making information available to all market participants to improve their decision-making processes.

The design and implementation of a market information system should, however, take into account the scarcity of financial and human resources in these countries, the different types of information needed by various potential market information users, and the characteristics of the institution that will manage the system. This low level of financial and human resources implies that the system must be built on already existing data gathering capacities. The different information needs of each user category require the establishment of a distribution policy that can take these differing needs into account. The choice of the managing institution for the system should be based on that institution's previous data collection experience, its proximity to decision-making centers so that information can be rapidly diffused and used, and its capacity to guarantee the objectivity of the data and subsequent analyses.

Initially, it is necessary to start with a system that is simple in design and has only a limited number of data to collect, analyze and distribute, in proportion with the analytical capacity that is available locally. Nonetheless, to assure the continuity of the information flow in the long term, a policy for training local personnel must be a key part of the system.

The cereal market information system in Mali was built around these principles. Despite its recent establishment, the system has already contributed substantially to raising the level of debate during the 1988/89 marketing year by providing analyses that revealed the consequences of certain regulatory measures for consumers and producers that were fundamentally inconsistent with market liberalization. Thus, the example of Mali shows that a market information system, through its publications, can contribute to improving the design of marketing policies for agricultural products in Africa.

Nonetheless, the success of such a system can cause the demand for information to rise rapidly, surpassing the system's capacity to supply it in the short run. In such conditions, if the system tries to respond immediately to all of these demands, the reliability of the essential, basic data and its rapid distribution may be compromised.

I. INTRODUCTION

Mali has undertaken a program of structural adjustment since 1981 in order to reduce deficits in the balance of payments and the government budget. To reach these objectives, a more important role was given to market mechanisms in an effort to make the economy more flexible through measures such as cereal market liberalization, the privatization of government businesses, the reduction of public expenditures, and price and tax system reforms.

Cereal market liberalization aims to modify the terms of trade between the agricultural and non-agricultural sectors and to encourage trader investment in marketing infrastructure as the government reduces its direct involvement in marketing activities. It was hoped that changing the terms of trade toward the agriculture sector would increase farmers' incentives to invest in agricultural production. Increased production achieved through liberalization was intended in turn to bring about long-term food self-sufficiency. Concern about achieving food self-sufficiency led Mali to focus special attention on producer grain prices.

Achieving increased production through higher producer prices presumes that liberalization will permit the development of an efficient and competitive private sector capable of transmitting changes in consumer prices to the producer. It also presumes that aggregate supply is elastic, meaning that farmers have the means to respond to higher price incentives, which is not certain (see Dioné).

Even if the elasticity of aggregate supply for cereals is high, one of the major constraints to the expansion of an efficient and competitive private sector is the thinness of the cereals market in Mali. This thinness stems from the variability of climatic factors, which makes the marketable surpluses and demand unstable from one year to the next. For example, during a year with sufficient rainfall, the supply of cereals increases and demand falls because some urban dwellers and producers are supplied through non-market transactions, such as gifts of cereals from other producers, or from their own increased production (see Robert Nathan Associates; Staatz, Dioné and Dembélé). In addition, cereal prices vary greatly because of the variability in the aggregate volume of market transactions from year to year.

The thinness of cereal markets increases the risk of marketing for any type of market participant, be it governmental or private, because of the large resulting variability in prices and market volumes. The thinness of the cereals market makes long-term investment in marketing infrastructure very risky. These risks are compounded by those tied to government interventions, such the distribution of food aid and changes in market policies or in regulatory procedures. Merchants often do not have information about regulatory procedures concerning marketing, the dates and locations of free food aid distribution, etc.

To encourage private sector investment in the cereals subsector, the government needs to enact measures to reduce risks linked to the thinness of the cereal market. For example, the liberalization of cereals trade among Sahelian countries, industrial processing of cereals, and the distribution of essential information are measures that tend to stabilize demand and reduce risks linked to marketing operations.

The establishment of an information system allowing equal access to all participants in the cereals subsector is a major step in this direction. Such an information system, through wide distribution of information pertaining to factors affecting the cereals market (price, export and import policies, volume and date of anticipated food aid, distributions, etc.), will contribute to greater transparency in the cereals market. A transparent market is one in which all participants have equal access to information necessary for the management of their production, sales, shipping, storage and consumption decisions.

However, given the public-good nature of information, the private sector will not supply the amount of information that is socially optimal and make it accessible to all subsector participants (see to Steffen, Dembélé and Staats). Governmental provision of essential information and adequate infrastructure therefore contributes to making the market less risky, more transparent and able to equilibrate cereals supply and demand over time and space.

This document describes the process undertaken in Mali since September, 1987, to increase the transparency of cereals markets by providing equal access to all participants of necessary market information.

II. THE STAGES OF CEREALS MARKET LIBERALIZATION IN MALI

Liberalization in Mali seems to have come about in two stages, following numerous discussions that finally convinced the Malian government of the need for liberalization. The first stage involved searching for a political consensus on liberalization principles. The second stage can be called actual liberalization.

A. The Search for a Political Consensus

The first stage was very important in finding a political consensus that would allow liberalization measures to be accepted. It was necessary to find means to protect some parties' interests or at least reduce the social costs of liberalization. The measures adopted were the following:

- the assumption of the accrued deficits of the government institutions responsible for cereals marketing during the past by the group of donors participating in the Cereal Market Restructuring Program (PRMC);
- the fixing and defending of producer and consumer prices across time and space through use of a buffer stock established at OPAM (Office des Produits Agricoles du Mali, the governmental agency which had a legal monopoly on grain marketing before the liberalization);
- the progressive realignment of official consumer prices with those of the free market;
- research efforts that demonstrated the necessity of liberalizing the cereals market by providing decision-makers with current information about the cereals market.

These measures enabled the group of donors within the PRMC to "buy liberalization" from the Malian government. In fact, approximately 16 billion CFAF (about 320 million French Francs or (U.S. \$53 million) were released by the PRMC, not only to amortize and finance the cost of institutional changes, but also to increase the government's capacity to endure the political risks of liberalization by mitigating social costs. The financing mechanisms enacted by the PRMC consisted of grouping together, in one common account, all the receipts from the sale of program food aid planned during the period of liberalization. Along with these actions aimed at managing the political risks from liberalization came the necessary regulatory measures authorizing cereals marketing by the private sector. Thus, in 1981, the private sector was allowed to market millet, sorghum and maize, and, in 1986, rice, in competition with OPAM within the limits set by pan-territorial and pan-seasonal producer and consumer prices fixed by the government.

After several years of this dual marketing system, which had several weaknesses due to internal inconsistencies, the PRMC began its second phase.

B. The Actual Liberalization

This stage consists primarily of consolidating the gains made by the private sector in cereals marketing by dismantling the dual marketing system, suppressing the market stabilization role assigned to OPAM, and establishing various research projects and surveys to generate essential information for decision-making. The complexity of the questions generated by liberalization required, moreover, establishing an information system

to meet the information needs of decision-makers and the private sector, including producers, cooperatives, merchants and consumers.

OPAM's role in market stabilization was discontinued after it became clear that the government's resources were not sufficient to stabilize prices during 1985-86, a year of very good harvests. Moreover, research results questioned not only the government's ability to stabilize prices through a domestic buffer stock, given the market thinness discussed above, but also the desirability of maintaining high producer prices (see Staatz, Dioné and Dembélé).

The second stage occurred at the time when political risks had diminished and decision-makers had accepted liberalization as a given to be integrated into their decision processes. It was necessary, however, to undertake several complementary actions that would allow the private sector to be efficient in its new role in order to reinforce decision-makers' confidence in the liberalization.

Undertaking these complementary actions required not only testing the hypotheses upon which the liberalization was based, but also increasing the understanding of the functioning of the private marketing system and its principal constraints. This required empirical research whose results would facilitate the identification of the essential complementary measures to be implemented, as well as institutionalizing such applied research efforts in order to provide regular information to agricultural policy decision-makers in Mali.

The primary hypotheses upon which cereals market liberalization in Mali was based were the following:

- the large majority of producers are self-sufficient or net surplus producers.
- an increase in producer prices would motivate farmers to increase cereal production through investment, since their incomes would also increase.
- liberalization would lead more merchants to market cereals, seizing the opportunities offered to them by rapidly investing to expand their operations (see Staatz, Dioné, and Dembélé).

Unfortunately, these hypotheses were without empirical foundation. In order to test them, several studies were carried out, most notably under the CESA-MSU-USAID Food Security Project established in 1985.¹ This research project which examined cereal marketing by producers and the marketing dynamics of merchants, revealed that contrary to popular belief, in 1985-86, a year of good harvests, only 53% of millet, sorghum and maize producers in the most productive areas in Mali (the OHV and CMDT zones²) were net sellers of cereals, and 43% were net buyers. Net sales were very concentrated, with only 16% of the producers accounting for 75% of the net sales (see Staatz, Dioné and Dembélé). Moreover, almost all these net sellers had access to the best currently available technologies in Mali and lived in zones benefiting from the best available services and most developed infrastructure.

Similar findings have been reported for other African countries (see Weber et al.). The findings signify that any price increase would, in the short run, be beneficial only to producers who were net sellers of cereals, and would be detrimental to the large number of producers who are net cereals buyers. In fact, those producers

1 CESA = Commission Nationale de Suivi et d'Evaluation de la Stratégie Alimentaire (Government of Mali);
MSU = Michigan State University;
USAID = U.S. Agency for International Development.

2 OHV = Opération Haute Vallée
CMDT = Compagnie Malienne du Développement des Fibres Textiles

who are forced to buy cereals would be faced with higher prices, which could cause many farmers to emigrate and increase the already large number of urban unemployed. On the other hand, net sellers of cereals appear to be limited in their ability to increase production due to a lack of improved technology and available inputs (see Dioné).

Furthermore, this same research project revealed that few merchants had sufficient funds to procure significant cereal stocks in order to continuously and consistently supply urban centers and prevent wide fluctuations in price. Lack of financial resources, storage capacity and infrastructure seriously handicapped merchant activities (see Dembélé, Dioné and Staatz, 1986a and 1986b; Mehta). Under these conditions, marketing costs are high since operations are carried out on a small scale, resulting in higher prices to the consumer and lower prices to the producer.

Other studies, such as that of Jean-Loup Amselle and Dramane Bagayogo, concluded that "the inequality of access to sources and means of information and communication is evident among wholesalers and between semi-wholesalers and retailers..." (p. 27). According to the same study, "private cereals operators want to obtain, either through national radio or through other means, reliable and dynamic information on various aspects of the cereals market" (p. 27).

The results of these diverse studies revealed the necessity of undertaking several complementary actions to support liberalization. These actions include opening seasonal marketing credit to the private sector, making storage capacity and treatment of grain stocks available to the private sector and reorganizing semi-wholesalers to facilitate their access to bank credit. These accompanying measures, however, must be complemented by actions that make marketing less risky. Making the cereals market more transparent by establishing a system for collecting and diffusing information that is critical in helping private sector participants make better business decisions represents an important step toward reducing risk in the market.

The second part of this paper examines the methodological aspects of establishing an information system for the cereals market in Mali.

III. ESTABLISHMENT OF AN INFORMATION SYSTEM FOR THE CEREALS MARKET (SIM)

The design and establishment of a cereals market information system in a developing country must, above all, take into consideration the system's sustainability. Its sustainability depends primarily on local financial and human resource capacities. Even if it is possible to establish an information system with external aid, the system's survival in the long run depends on the availability of local resources (see Eicher). Also, before the system is created, one must consider several factors which will determine its short- and long-term success.

A. Key Factors in the Design of a Market Information System.

From the moment when a market information system for Mali was first conceived, the problems of its management and long-term survival were raised. For instance, there was a need to prevent the system from collapsing as soon as external foreign assistance ended. It was therefore necessary to consider all of the factors essential to the system's sustainability.

1. Weak Financial and Human Resources

Financial resource limitations in Mali implied that a cereals market information system needed to be built from existing data collection systems rather than creating an entirely new system from scratch. This

meant that there was a need to inventory all market-related data currently collected in Mali, the locations, intervals and methods of collection, the agencies collecting the data and the frequency and methods of distribution of the resulting information.

This inventory revealed that almost all of the identified information needs could be met using the collection efforts already employed by several government institutions. What remained to be done was harmonizing the methods and intervals of data collection in the existing systems, broadening the geographical collection area and adapting the publication frequency and methods to different user needs.

Such an approach conserves a developing country's scarce resources, as the system will be built using already existing local data collection activities. The approach also takes advantage of the experience already acquired by local personnel working in the institutions responsible for the data collection and utilizes their familiarity with the market milieu.

External financial and technical assistance is essential in getting the system started. Certainly, harmonizing collection methods, targeting the distribution of information to different users, and coordinating the activities of different information gatherers will impose additional costs on some agencies, whose budgets will not be adequate to cover these expenses. Centralizing the data within one institution requires resources to process, analyze and distribute the information. For very poor countries such as Mali, these supplemental costs will initially have to be covered by outside funding.

Harmonizing the collection methods and designing and implementing an information system can put local abilities to a severe test if there is no available technical assistance. Nonetheless, the technical assistants should not undertake the design and implementation of such a system by themselves, but should work in close collaboration with the local personnel in every aspect of system design. Collaborating in this manner offers excellent training for host-country personnel, and instituting such a training policy will develop a local analytical capacity within the information system to meet the growing needs of information users (see Weber et al.).

2. Identification of Users' Actual Needs

Setting up an information system required proper identification of the potential users and their specific information needs. Differences in motivation among the different users of the data mean that each user category needs a different type of data. There is certainly no doubt that producers, merchants, consumers and decision-makers all have different informational needs. For example, producers need, among other things, to know prices in nearby rural markets and large urban centers, whereas grain merchants need to know, among other things, the dates and locations of food aid distributions, the availability of credit for rural marketing, etc.

Those different information needs imply that the method and frequency of distribution of information should be a function of the type of user targeted. To reach producers, for example, one must use rural radio, broadcasting in local languages. Some urban-based users can be reached through written publications. It must be noted, however, that the needs of producers, merchants and consumers can only be met through the distribution of current information, while decision-makers need both current data and the results from analyses using historical data. Whereas some users' needs can be met with simple statistical data, others may require more in-depth analyses.

The information system should, therefore, include an analytical capacity that could eventually carry out long-term research on many aspects of the dynamics of the development of market structure and regulation, in addition to the publication of simple price data. Consequently, it becomes necessary to build local analytical capacity into the system to provide pertinent information to decision-makers about the dynamics of the production and marketing structures.

3. Institutional Location and Size of the System

Within a developing country's administrative structure the institutional location for a market information system is important for two essential reasons. First, the system should be located where it can most easily reach decision-makers, diffuse applied research results, and most easily identify the decision-makers' informational needs. Second, the system should have a location within the administrative structure that assures the credibility of both the data collected and the information published. In other words, the system should be protected from any manipulation that might destroy its credibility and divert it to serving purely administrative tasks. The choice of a managing institution for the system should, however, also take into account the institution's experience in data collection and not just its proximity to decision-makers in the administrative structure.

The institution responsible for managing the system should eventually be able to collect or centralize all data identified as important in analyzing the market. Initially, however, it is necessary to limit the amount of data to be collected, centralized and distributed. This implies that one should begin with a relatively simple system that is capable of collecting, analyzing and distributing essential information in a timely manner. Even if a more complex system would conform more closely to standards of professional statistical practice, such a system may prove incapable of entering, processing, analyzing, and diffusing the information collected in a timely manner.

For this reason, one must avoid carrying statistical professionalism to excess (the "fetish" of professionalism), which tends to sacrifice rapid diffusion of information for statistical precision. The failure to strike such a balance explains, in part, the inability of statistical agencies to generate timely information for decision-making in some African countries. The value of information for a decision-maker is not always tied to its statistical precision, but to its availability when the decision must be made.

B. The Problem of Establishing a Market Information System

A 1987 survey of data gathering efforts identified many institutions in Mali that collect data at various levels of the marketing chain and in different areas in the country. Some data are collected on a permanent basis, while others are collected periodically using varying methods (see Dembélé and Steffen). The large number of objectives and varying levels of resources available largely explain the multiplicity of methodologies used by these different data collection efforts.

The multiplicity of methodologies has constituted a serious handicap to data comparability. Consequently, one was confronted by a paradoxical situation in which information needs that could in theory be met were not because of the impossibility of developing a consistent series from existing data. Compartmentalization of data and the fact that they were reported mainly in internal agency documents also made the information inaccessible to many potential users (see Dembélé and Steffen).

Given the paucity of financial and human resources in Mali and the large number of variables to be recorded, it was necessary to "implement a system that could bring all important, existing data together into a framework that addressed the major questions raised by liberalization" (Egg, p.7).

In consideration of the factors mentioned above, it was decided that the system to be implemented should not be a new institution, but rather a coordinated effort among different existing systems, whose methodologies would then be improved. This new system should also make information accessible to all the different categories of users and avoid duplication in data collection efforts.

C. Methodological Approach in Establishing the SIM

Three information systems were identified in March, 1988, that would be combined to comprise a provisional system (Système d' Information Transitoire, or SIT). These three systems were chosen because of their experience in data collection, entry, processing, and diffusion. The nature, frequency and geographical coverage of these systems were also taken into account.

The primary tasks of the provisional system were to:

- serve as the place where discussions and reflection would take place regarding the design and establishment of a permanent information system,
- train personnel from the institution chosen to manage the permanent information system,
- coordinate the data collection methods of the three systems that made up in the SIT in order to generate and publish a consistent set of price data gathered at different levels of the marketing chain and covering a large part of the country.

The discussions that took place within the SIT led to better identification of the different users of information as well as their specific needs. This permitted a more appropriate policy regarding information diffusion to be established that considered each user category's specific needs. The form and frequency of distribution vary according to type of user. For example, radio broadcasts of weekly producer and consumer prices were planned to serve producers, merchants and consumers. At the same time, information obtained through analyses of these same prices would be provided to decision-makers in weekly and monthly reports, and in quarterly bulletins.

The information system's institutional location within the administrative structure was defined following the discussions and reflections held in the SIT. These discussions led to the conclusion that the Office des Produits Agricoles du Mali (OPAM) should manage for the cereals market information system.

1. Institutional Location of the SIM within the Administrative Structure.

OPAM was chosen to manage the cereals market information system because, as its direct role in cereals marketing decreased as a consequence of the liberalization, OPAM was becoming the major tool for government production and provision of public goods for the cereals market (see Steffen, Dembélé and Staatz).

The choice of OPAM raised several concerns about its ability to preserve the data's objectivity since OPAM itself was responsible for monitoring the movement of market prices in order to forecast and curb sudden increases in prices. The primary reasons for these concerns stemmed not only from the fact that merchants might not trust OPAM (especially given its previous role in the market) and hence not report accurate prices to OPAM enumerators, but also that OPAM might possibly manipulate information for its own benefit. After 12 months of experience, however, it became clear that these fears were ill-founded and that the OPAM market information system was well accepted by merchants.

As a governmental instrument for helping design and implement cereals marketing policy, OPAM was well-indicated as the agency to distribute the results of analyses pertaining to the cereals market. Decision-makers are easily accessible through OPAM, which the government had already designated as a major actor in the definition and implementation of marketing policies. OPAM is also administered by the powerful Ministry of Finance and Commerce, and hence is closely linked to key policy-makers. Finally, OPAM has experience in data collection and considerable familiarity with the cereals market.

2. The Provisional Information System (SIT)

The three systems which comprised the SIT were identified as a function of their experience in data collection and by the type of data collected. The three systems selected were those managed by:

- OPAM (Office des Produits Agricoles du Mali);
- the Canadian Agency for International Development (ACDI);
- the CESA-MSU-USAID Food Security Project.

The OPAM system had collected consumer price data in the regional capitals since 1981. The ACDI system collected data on producer prices, the volume of transactions carried out by merchants, and the importance of cereals exchanges between different markets and regions in the country. The CESA-MSU-USAID Food Security Project recorded producer prices in rural markets and in several towns, the quantities purchased by rural market assemblers, as well as the quantities bought and sold by wholesalers.

The SIT decided to initially limit data collection to a level commensurate with its data-entry and processing capabilities. Therefore, the SIT collected data on:

- producer prices and
- consumer prices.

Producer prices were collected for millet, sorghum, maize, paddy rice, parboiled rice and white rice. Consumer prices were collected for millet, sorghum, maize, RM40 rice (40% broken) and BB rice (100% broken). Producer prices were collected in 4 rural markets and in 9 assembly markets for millet, sorghum and maize. Prices for paddy rice, parboiled rice and white rice were gathered in 2 major assembly markets, and consumer prices were collected in the 8 most important urban centers.

2.1 The institutional location of the SIT

A technical working group as set up within the SIT to discuss all technical aspects and conceptualize how the permanent information system should be established. This working group had one representative from each of the three systems that made up the SIT, one representative from the National Statistical Service (Direction Nationale de la Statistique et de l'Informatique [DNSI]) and one from the Statistical Office of the European Community. The working group also had the benefit of technical contributions from foreign specialists, in addition to the results from experience of market information systems in other African countries, such as Senegal.

The Committee of Orientation and Coordination (Comité d'Orientation et de Coordination [C.O.C.]), which is the Malian national equivalent of the PRMC donor group, and the PRMC became the agencies that made the key policy decisions concerning the SIT. They were regularly informed about the working group's efforts and regularly received the SIT's periodic publications on prices.

2.2 Equipment and personnel requirements

The SIT's actions were coordinated by the ACDI representative. The CESA-MSU-USAID project assigned a cereals market analyst to OPAM (the senior author of this document), who was in charge of helping institutionalize within OPAM a capacity for entry, processing and analysis of price data.

Institutionalization was accomplished through on-the-job training of two OPAM agents. This training was supplemented by discussion and training on theoretical aspects of agricultural marketing. The OPAM agents were directly linked to all considerations and discussions regarding the design and establishment of the system.

It was important to institutionalize a national capacity for data entry, processing, and analysis to ensure that the permanent system could replace the SIT once the ACDI system and the CESA-MSU-USAID project came to an end. The institutionalization also focused on ensuring the continued flow of information to different users after the SIT was terminated. The SIT received contributions in equipment and financial resources from the Statistical Office of the European Community (OSCE), the CESA-MSU-USAID project, OPAM, and the PRMC.

2.3. Achievements of the SIT

The transitional system was at first given a six-month mandate, which was later extended to one year. The process of institutionalizing the computerized data entry, processing, analysis capacity via technical assistance from the CESA-MSU-USAID project was continued for an additional year. Harmonization of the three different systems' data collection methods was the most important achievement of the SIT. The approach used for coordinating these systems could be applied in other African countries.

2.4. Coordination of the different methodologies

Upon examination of the different methodologies used by these three systems, it became clear that it would be impossible to combine the data obtained from the different systems for analysis. The lack of comparability of the data derived from differences in: (a) the transaction levels for which price data were obtained, (b) the sample from which the data were gathered, and (c) the frequency of data collection.

2.4.1. Definition of the transaction level

Producer prices were generated at two different levels by the ACDI and the CESA-MSU-USAID project. The CESA-MSU-USAID project recorded prices for the first transaction level, that is, prices for exchanges between producers and rural assemblers. ACDI, on the other hand, recorded "producer prices" primarily at the second level in the marketing chain--between rural assemblers and assemblers from redistribution points. The "producer prices" thus recorded by ACDI were over-estimated because they included transaction costs incurred between the rural market and the redistribution market (the rural assembler's profit margin and transportation costs).

Consumer prices recorded by OPAM were subject to the same problems. Wholesale, semi-wholesale and retail prices were frequently confused with one another because the enumerator did not make a distinction among the three categories. Under these circumstances, the average consumer prices published were often under-estimations.

To compensate for these inconsistencies, the SIT asked ACDI to record producer prices only for transactions between merchants and producers in redistribution markets or for assemblers' purchase prices when they were interviewed while reselling to other merchants. OPAM was asked to record prices

observed by enumerators during retail transactions. If, at the time when the enumerator was present, there were no transactions, the enumerator then obtained the necessary price information by asking retailers and several consumers present in the market about the prices they had observed in the market during that day.

2.4.2. Defining the samples

Both the ACDI system and the CESA-MSU-USAID project were carrying out complete censuses of all buyers present in the market when prices were recorded. The entire population of assemblers was therefore used in the survey. OPAM's system, on the other hand, did not use any systematic sampling techniques in its price data collection. The enumerator usually recorded one observation per collection point and per urban center.

Therefore, given the fact that OPAM worked in the large urban centers, a sampling method was created exclusively for OPAM. This method consisted of recording all the points of sale for cereals in each urban center. The points of sale were then classified according to the volume of transactions executed at each point of sale. Depending on the point of sale's importance, one, two, three or four observations were made. The average from the total of these observations then became the average for the urban center in question.

2.4.3. Frequency of data collection

OPAM collected price data every ten days, but the other systems collected data weekly. To allow the SIT to publish complete information in one release, OPAM was requested to collect weekly data. Furthermore, the Food Security Project was asked to transmit its data more frequently to Bamako so that the information could be integrated into joint, regular publications.

It should be noted that coordinating these different methodologies imposed supplementary costs on OPAM and on the CESA-MSU-USAID project. In collecting weekly data, OPAM made four to five trips per month instead of three, as in the past. Also, the time needed to execute each survey increased because the number of observations would vary between one and four, depending on the importance of the point of sale, as opposed to one single observation as was done before. The Food Security Project also incurred additional costs by transmitting data weekly to Bamako.

3. Establishing a Permanent SIM

The establishment of the permanent Market Information System (SIM) was preceded by lengthy discussions within the SIT to define and better specify the system's objectives. A seminar was also conducted to define the practical details of the system's establishment (see Republic of Mali, seminar recommendations, December, 1988).

3.1 Objectives of the information system

The SIM's objectives were the following:

- harmonization of data collection methods, information distribution, analysis and interpretation in Mali;
- data centralization to ensure the widest possible publication and distribution;
- organization of the access to information for all participants (decision-makers, private-sector participants, producers, etc.);
- coordination among information gathering agencies.

Thus, the SIM is not primarily an information gatherer. Its data collection responsibility involves collecting only complementary information, not available elsewhere, that is essential to user needs. This approach offers the advantage of allowing the SIM to benefit from the experience gained by other data collection agencies, and to form a data bank at a low cost, avoiding overlapping efforts (see Dembélé and Steffen).

3.2. Types of data to centralize

Data were identified according to user needs and the SIM's data entry and processing capacities. A data inventory was established for each of the following types of users:

- producers,
- merchants,
- consumers,
- institutional users.

However, given the impossibility of satisfying all user needs at once, certain essential data were given priority, with collection and diffusion of additional data scheduled progressively as the capacity of the SIM increased.

Initially, the SIM was supposed to focus on centralizing producer and consumer price information on millet, sorghum, maize, RM40 rice (40% broken), BB rice (100% broken) and paddy rice. It also was to furnish information about the general supply situation for cereals in different markets. Currently, the system processes approximately 3,000 data per week for its different publications.

Eventually, the SIM should also supply information on world prices and prices in neighboring countries, production levels, the cereals deficit, imports and exports, food aid, and regulatory measures concerning grain marketing. Furthermore, the SIM, because of its planned analytical capacity, should also be able to evaluate the level of merchant stocks and the extent of the cereals trade in different parts of the country. The SIM should also eventually be able to carry out research that better informs decision-makers about the dynamics of the production structure and the market.

3.3 Analytical framework and market topology

For a better understanding of price movements, it was necessary to place the main determinants of price formation in their spatial context. The discussions that took place during the national seminar with merchants and farmers led to the identification of four major trade networks or axes in the country. Assembly, redistribution or transit markets, consumer markets and border markets were identified for each axis. The market topology thus defined is linked to the different levels in the grain marketing channel. Knowing the prices at each level allows one to calculate "subsector accounts", which show price and cost levels at each stage in the marketing chain. Decision-makers can use these figures to derive the marketing costs by axis and the margins realized by each market participant.

3.4. Publication and distribution policy

The different motivations of the various users of the cereals market information imply a difference not only in the type and nature of data to be collected, but also in the methods of information dissemination. The SIM focuses primarily on satisfying the needs of two broad user categories: decision-makers and private economic agents (including traders, farmers, consumers, and cooperatives).

Data are published in weekly, monthly and quarterly bulletins for decision-makers and other institutional users. Weekly and monthly bulletins provide information on short-term price movements as well as information on market supply. Quarterly bulletins offer a more complete analysis of seasonal price movements. The first part of the bulletin contains an analytic synthesis of market prices and trends over the previous three months in the markets covered by the SIM. The price level for the last month in the quarter is then compared to the price level for the same month in the previous year. All additional available information explaining price movements is incorporated in to this analysis.

The second part of the bulletin provides a detailed analysis of several markets per marketing axis. The evolution of producer and consumer prices within individual marketing axes is analyzed in detail. The last section of the bulletin gives additional, complementary information about the current marketing year. This can include information pertaining to regulatory measures, current credit programs, import prices and prices in neighboring countries.

For other users, especially those in the private sector, including producers, merchants, cooperatives and consumers, data are diffused weekly by radio and in written publications. Radio broadcasts provide comparisons of the current week's prices to those of the previous week, in addition to information about market supply. The lowest and highest priced consumer and rural markets are also named.

Publications are therefore targeted to certain user groups and can be adapted to changing needs. Thus, there are plans for future radio broadcasts about regulatory measures in the cereals market in order to inform the private sector better and re-establish merchants' confidence in the government. The SIM could also eventually furnish specific, personalized information to certain clients for a fee.

To preserve client loyalty, information should be as complete and comprehensible as possible for the targeted user. It should also be current and distributed in a timely manner, allowing the users to respond to current pressing needs facing them (see Weber et al.). This is especially important for decision-makers who expect current information that is relevant to prevailing policy questions. Users of the system will be discouraged by delays in information distribution or by information that is presented in an overly technical manner. One must therefore include information dissemination policies as an integral part of the system's design. As part of this design it is important to implement a two-way flow of communications between the system and its users. Such a dialogue guides the system in the type of information to collect and prevents the collection of data that do not meet any particular users' needs.

3.5. The information system's impact on cereals marketing policy

Because the information system was developed so recently, it may be too soon to assess its impact on marketing policy. However, already the system's publications for the 1988/89 season have provided information to the public about several cereals supply problems in urban areas. For example, by diffusing consumer price information, the system has drawn attention to the problems in supplying the Kayes area with cereals. Since the beginning of the season, this area has seen prices higher than the national average. This observation led the national news media to inquire into the reasons for these higher prices.

Their inquiry revealed the following causes:

- Illegal imports of rice from Senegal and Mauritania were discontinued following measures taken by the government during late 1988 to control smuggling. In addition, importers were required to buy from the Office du Niger the same quantity of domestic rice that they import. (This system

was known as jumelage, or "twinning" of rice imports with purchases of higher-priced domestic rice.) These measures increased the average consumer price of rice in Kayes.

- Most economic agents in the region have very limited financial resources, causing them to operate on a small scale. Their small scale raises the unit supply price for millet, maize and sorghum consumed in the Kayes area. Also, Kayes is far removed from the surplus agricultural areas of the country, and this increases transportation costs for merchants coming from other towns.
- Clandestine exports of millet, maize and sorghum to Mauritania were tolerated by government authorities in order to allow local producers to receive higher prices for their grain.

The causes of higher prices in Kayes, as revealed by the media through the information system's publications, has led administrative and political leaders in this area to begin to question the validity of the rice import policy.³

Furthermore, the information system revealed the incongruity of the Office du Niger's rigid price structure with market liberalization for paddy rice. The Office du Niger markets the rice it receives from producers as payment in kind for irrigation fees, inputs, etc. However, this rice is valued according to a fixed price schedule that does not correspond to market conditions. Therefore, in the 1988/89 season, merchants who were required to sign purchase contracts with the Office du Niger in order to import rice were later unable to sell their rice on the market because of the drop in the market price level. The prices suggested by the Office du Niger were higher than open market prices due to the introduction of privately owned grain dehullers in rice-growing areas. These small mills had lower processing costs than those incurred by the Office du Niger, and hence could undersell Office du Niger rice.

These examples show that an information system, through its publications, can help to improve decision-making in a developing country by increasing decision-makers' knowledge about the operation of cereals markets. Discussions regarding the marketing campaign were enhanced by the information system's insights about supply problems in certain areas and the inappropriateness of the rice import policy and price structure set by the Office du Niger during the liberalization.

Mali's recent experience with its information system has also demonstrated that potential demand for market information exists in developing countries. The success of an information system, however, can increase user demand beyond the system's ability to supply information in the short run. Under these conditions, if the system tries to respond to all these demands, it runs the risk of compromising the reliability of its basic information and delaying its dissemination. It is therefore important to have in place a plan, from the very beginning, to increase the system's capacity to supply market information as the demand for such information grows. Obviously, staff training should be a key component of such a plan.

IV. CONCLUSION

One of the objectives desired from cereals market liberalization is increased efficiency in the marketing system. In order for the open market to ensure increased efficiency, however, agricultural products must be traded in markets that are competitive and less risky for all participants. Without competition and lower risk in the private marketing system, producers and consumers may not benefit from any increase in efficiency, and private monopoly may simply usurp the government as the agency extracting a surplus from agriculture for its own use.

³ In late 1989, the Malian government abandoned the policy of tying rice imports to purchases of Office du Niger rice.

It is therefore the responsibility of the government to decrease risk in cereals markets in order to make them more transparent and encourage more competition in the process of price formation. The provision of information to all market participants is one of the most important conditions for ensuring market transparency and preventing the formation of private monopolies.

Market information systems become an essential step to accompany liberalization because they encourage market transparency and competitive pricing. However, establishing a market information system must be viewed as a process rather than a one-time event. This process provides an opportunity to convince decision-makers, through empirical research results and not just theoretical hypotheses, of the need for an information system. It also allows for a gradual build-up in the system's data collection and dissemination capacity. This approach permits the system to be based upon needs expressed by the system's users and allows an information dissemination policy to be created that better meets those needs.

The establishment of an information system allows a country to develop its own data collection, processing and distribution capacities to provide current cereals market information. In addition, the country's resources can be economized by drawing upon already existing information collection agencies instead of creating new ones. The experience in Mali has shown that this type of approach is better adapted to a developing country where financial and human resources are very limited.