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**FOOD AND NUTRITION: FOOD POLICY FOR SUB-SAHARAN AFRICA**  
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**FOOD SECURITY POLICY REFORM IN MALI AND THE SAHEL**

by  
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**ABSTRACT**

Poor pricing and marketing policies have been perceived as two major causes of food insecurity in the Sahelian region of West Africa. To address these problems, cereal market reforms were initiated in the Sahel in the 1980s. This paper analyzes market liberalisation in Mali, a landlocked Sahelian country with per capita GNP of U.S. \$210, where donors pledged a multiyear food-aid programme in exchange for market reforms. Most consumers and private traders have benefited from the liberalisation. But improving foodgrain marketing is addressing only one of the five main causes of food insecurity in Mali. Complementary reforms must be undertaken.

# **FOOD SECURITY POLICY REFORM IN MALI AND THE SAHEL**

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## **1. INTRODUCTION**

The food crisis has been particularly severe in the semi-arid Sahelian countries of West Africa, a region encompassing nine countries and some 38 million people.<sup>2</sup> To combat the crisis, donors have poured an unprecedented U.S. \$15 billion of aid over the past 13 years (1975-88) (de Lattre, 1988).

Many analysts have concluded that, besides the lingering effects of the prolonged drought of the early 1970s, poorly designed pricing and marketing policies have distorted agricultural incentives and failed to address the major causes of the food production gap in the Sahel. In the late 1970s, many donors pressed for policy reforms to restore farmers' and private traders' incentives to invest in order to increase the production and improve the distribution of food. For example, under strong pressure from donors, the government of Mali agreed in March 1981 to carry out a policy reform aimed at increasing official producer and consumer prices, liberalising grain trade and improving the efficiency of OPAM, the state grain board.

This paper analyses the impact of the process of market liberalisation on food security in Mali in particular and the Sahel in general. Based on the central thesis that output market liberalisation is a necessary but not a sufficient condition to improving food security in the Sahel, the paper focusses on the interactive effects of technology, institutions and policy reforms on food availability and access to food.

The remainder of the paper is divided in four sections. The first section highlights the food-security problems in the Sahel in general. The second section presents an overview of the evolution of food and agricultural policy in Mali from 1928 to date. The third section discusses the objectives, implementation and achievements of the cereal market liberalisation process in Mali, and some of the major issues for the 1990s. The last section draws some policy implications for food security in the Sahel.

## **2. FOOD-SECURITY PROBLEMS IN THE SAHEL**

The attention of the entire world was captivated by news of hundreds of thousands of people dying from hunger and suffering from starvation during the prolonged drought of the early 1970s in the Sahel, which was stricken again by a

severe drought in the early 1980s. The international donor community responded generously, yet the food production gap continued to widen. The bulk of donors' aid was not directed at improving domestic productivity in the major food crops, for which capita production declined.<sup>3</sup>

Following the disappointing performance of crop-production projects and integrated rural development projects of the 1960s and 1970s, donors' attention has shifted in the 1980s to policy reforms in the general framework of structural adjustment lending programmes throughout sub-Saharan Africa. Pricing and marketing policies, which traditionally subsidised consumers by depressing producer prices and accumulating budget deficits of the state grain boards, were perceived as major impediments to food security. Output price and market liberalisation have therefore been selected as means to restore farmers' and traders' incentives to invest and increase the production and improve the distribution of the basic food staples (particularly cereals).

Food insecurity in the Sahel, however, stems from a complex set of problems which cannot be solved by price and marketing reforms alone (Eicher, 1982; Eicher, 1988). There are five fundamental causes of food insecurity in the Sahel.

First, the overarching cause of food insecurity in the Sahel is poverty (Sen, 1981). With per capita GNPs ranging between US \$160 and US \$260, five Sahelian countries were among the 16 poorest nations in the world in 1987. All Sahelian countries were among the world's 43 poorest countries (World Bank, 1989). Between 1965 and 1986, the average annual growth rate of per capita GNP was positive but less than 1.5 percent in four of the nine countries and negative in the other five countries. Although the bulk of the population still lives in the rural area and is engaged in agriculture, over one-fourth of the Sahelians experience what Professor Sen (1988) calls a "pull failure" in their food entitlements, i.e., inadequate access to food because of the low level of their real incomes. Failures in effective demand affect both the urban poor and food-deficit rural people (non-farmers as well as farmers), thus compounding constraints on the supply-side of the Sahelian food-security equation.

Second, most Sahelian countries lack appropriate agricultural technology that farmers can readily adopt to expand and stabilise the production of rainfed foodgrain (millet, sorghum and maize), which account for about 80 percent of total cereals consumption in the sub-region. As a result of a heavy concentration on export crops (groundnuts and cotton), neither during the colonial period nor over the nearly thirty years of independence have strong national research institutions evolved to improve yields and stabilise the output of rainfed cereals in the Sahel. Today, there are no widespread high-yielding and drought and disease-resistant varieties for millet, sorghum and maize.<sup>4</sup> Growth in aggregate food supply from domestic production will most likely be

limited as long as there are no viable technological options to increase and sustain productivity in the major rainfed cereals.

Third, the capacity of farmers in the Sahel to finance investments in agriculture is undermined by various agricultural surplus extraction strategies, including taxation of crop and livestock production and exports, overvaluation of exchange rates, and head taxes that are levied on some categories of the rural population. The composite effect of the tax burden is not offset by subsidised government credit programmes. Hence, the supply response to higher grain prices is low.

Fourth, of course, severe imperfections in labor markets, farm input supply markets, financial markets and foodgrain markets are serious impediments to both improved availability of, and access to, food in the Sahel. Given the interactions among these different markets, their imperfections also have interactive effects on food availability (through production) and accessibility (through real income). Without a comprehensive view of market-related problems, the scope of actions undertaken to improve the efficiency in only one type of markets (e.g., cereal markets) will be constrained by prevailing imperfections in the other markets.

Fifth, rapid urbanisation is contributing to a shift in consumption patterns away from domestic production structures, hence to developing an unsustainable food-consumption profile throughout West Africa and the Sahel. Both price and non-price factors -- especially lagging processing and handling of local food products -- stimulate an orientation of urban-consumption preferences towards relatively cheap imports of two "fast-food type" commodities: rice (mainly from Asia) and wheat. With an annual urban population growth rate of about 7 percent, per capita consumption of rice and wheat products in the Sahel rose by 29 percent between 1966-70 and 1976-80, while that of millet, sorghum and maize fell by 12 percent (Delgado and Miller, 1984, p. 7). Such a consumption profile is unsustainable because there is little hope that in the medium term that domestic supply will respond adequately to the growing demand of rice and wheat. Moreover, the Sahelian countries' capacity to earn foreign exchange for grain imports is restricted by their declining competitiveness, in the world oilseed-product markets.<sup>5</sup>

### **3. EVOLUTION OF FOOD AND AGRICULTURAL POLICY IN MALI**

With an estimated per capita GNP of U.S. \$210 in 1987, Mali ranked as the twelfth poorest nation of the World (World Bank, 1989). Mali is landlocked in the semi-arid Sahel and Sahara desert in West Africa. About 80 percent of the population live in rural areas, subsisting essentially from rainfed agriculture and livestock production. The entire economy of the country rests on the rural sector, which provides the bulk of employment, food (essentially cereals), and

foreign exchange (cotton, livestock and fish). Cereals provide approximately 70 percent of the total caloric consumption of Malians, and millet, sorghum and maize account for 85 percent of this proportion. Mali appears as the Sahelian country with the best endowment in land suited for both rainfed and irrigated agriculture. In spite of this relative abundance in land, Mali's agriculture has, just as in other Sahelian countries, progressively failed to produce enough foodgrain for a population growing at 2.5 percent per year.

The agricultural and food policy options followed by Mali after independence in 1960 were strongly determined by the 1928-1959 colonial policy legacy in French Sudan. The French colonial policy in this country aimed at expanding the production of export crops needed by the French industry (Jones, 1976, pp. 20-23). Groundnut production was successfully spread mainly because of the similarity of this crop to the local varieties of groundnuts grown for centuries in the region. Success in developing cotton production was much slower, as the first attempt to grow cotton under irrigation failed (Amin, 1965; de Wilde, 1967; Jones, 1976).<sup>6</sup> Cotton production took off in Mali only after 1949, with the interventions of the Compagnie Française de Développement des Textiles (CFDT) in high-potential rainfed areas of the country.

Agricultural research efforts were consequently concentrated on developing improved seeds, fertilisers, pesticides and farming techniques for cash crops. The production of these crops grew particularly from the extension of cultivated land through the spread of animal traction and from the introduction of crop rotations, which included cotton, cereals (especially sorghum), and groundnuts. No significant research programme was undertaken to improve food production per se. Instead of market incentives, head taxes and village-level quotas of cash-crop delivery were established as means to increase market surplus. All important marketing activities were entrusted to French commercial companies holding monopoly rights and to Lebanese traders, leaving only subsidiary assembly roles to domestic merchants.

Guided by an inherited anti-market, anti-merchant bias, misconception of the agricultural incentive system, and a high propensity for state interventionism and monopoly, the leaders of Mali opted at independence for a radical socialist development path, which lasted from 1960 to 1968. Central planning was adopted and initiated with French technical assistance, as the best way to achieve economic independence through a rapid development of agriculture, industrialisation for agricultural input manufacturing and product processing, the systematic search for oil and mineral resources, and the implementation of mass-oriented social policies in education, health, administration, etc. (Amin, 1965; Jones, 1976; Bingen, 1985). A total of 33 state enterprises were created between 1960 and 1968 to undertake or control virtually all the major economic activities, including agricultural input and credit distribution, product processing, domestic marketing, and exports.

Agricultural and food policy was dominated by the development of rice production under irrigation, implementation of crash-production projects in rainfed areas, collectivisation of production, and compulsory marketing through the Office des Produits Agricoles du Mali (OPAM), a state grain board created in 1964, with legal monopoly in agricultural product marketing. Yet merchants continued to trade grain clandestinely on the private parallel market. Official consumer and producer prices for all major commodities were fixed by the state with the three conflicting objectives of (1) increasing rural incomes, (2) providing cheap food (cereals) to urban consumers, and (3) extracting a surplus from agriculture to finance state investment in other economic sectors (Dioné and Staatz, 1988, p. 144). In reality, the last two objectives took priority, resulting in depressed official producer prices; the imposition on farmers of delivery quotas of cereals to OPAM; and subsidisation of consumers through urban consumer cooperatives, at the expense of accumulating OPAM deficits.

The philosophy underlying agricultural development and food policy remained essentially unchanged over the first two decades of Mali's independence. But there was a shift in the 1970s, with strong donor support, from commodity-based projects to integrated rural development programmes. By 1981, these programmes were managed by 26 public-sector agencies called Opérations de Développement Rural (ODRs) in charge of agricultural extension, input and credit distribution, and output marketing (SATEC, 1982). Except for cotton, basic investment in agricultural research and rural infrastructure remained insignificant.

In summary, aggregate food production in Mali stagnated in the 1960s and 1970s. The relative stagnation of food production resulted in Mali shifting from being a net cereal exporter in the 1950s and early 1960s to becoming a net importer of increasing quantities of foodgrain after 1965. This deterioration in the country's food situation and the prolonged Sahelian drought of the late 1960s and early 1970s led to Mali's food crisis.

#### 4. THE CEREAL MARKET LIBERALISATION

Official producer prices of cereals were raised after the end of the 1968-74 drought to stimulate domestic production. OPAM was mandated to sell foodgrain from both domestic supply and commercial imports at official consumer prices set below the full cost of the cereals. The resulting consumer subsidies translated into increasing OPAM budget deficit, which accumulated to about U.S. \$80 million by 1976/77 (Humphreys, 1986, p. 7). Donor concerns grew in the 1970s about OPAM's mismanagement and accumulating deficits, and the perception that OPAM's legal monopoly in grain marketing and the official price system acted as major disincentives to domestic cereal production

(de Meel, 1978). The resulting donor pressure led to the Cereal Market Restructuring Programme (PRMC by its French acronym), to which the government of Mali agreed in March 1981. A group of 10 major donors entered collectively into a policy dialogue with the government of Mali and pledged multi-year shipments of food aid in exchange for a major overhaul of cereals marketing policy.

#### 4.1. Objectives

Initially designed for the six-year period of 1981/82-1986/87, the PRMC aimed explicitly at:

- (1) raising farmers' income through a gradual increase in official producer prices of cereals;
- (2) liberalising cereal trade through the elimination of OPAM's official monopoly and increased private trader participation; and
- (3) improving OPAM's operating efficiency through the restructuring of this marketing parastatal (Dioné and Dembélé, 1987, pp. 8-9).

The programme was to be financed by reflow money from sales of PRMC-related food aid.

The PRMC objectives and funding mechanisms proceeded, in the absence of adequate empirical information about the structure and conduct of domestic cereal production and marketing, from the implicit assumptions that:<sup>8</sup>

- (a) actual prices received by farmers were highly correlated with official producer prices, which significantly affected coarse grain production;
- (b) farmers constituted an homogenous group of net sellers of cereals, who would benefit from higher foodgrain prices;
- (c) no major constraints other than price disincentives hindered farmers' marginal propensity to invest in cereal production;
- (d) private traders had the capacity and propensity to invest in response to new opportunities opened up by market liberalisation;
- (e) Mali would continue to experience cereal deficits, and thus need food aid to support market liberalisation;
- (f) OPAM should continue to exist to channel food aid and protect its politically influential clientele from higher grain prices.

Because most of these assumptions were found by research to be inaccurate, several adjustments were made in the cereal market liberalisation programme, which was extended for three additional years in 1987.

#### **4.2. Implementation of the Cereal Market Liberalisation: 1981-89**

This section assesses the achievements of the programme with respect to foodgrain production, private grain marketing, and the state grain board (OPAM).

##### **Foodgrain production**

One of the major goals of the cereal market liberalisation programme was to raise farmers' incomes and incentives to produce more cereals for the market. Yet foodgrain production in Mali has continued to be influenced more by rainfall than any other factor. An empirical study of farmers from 1985 to 1987 reveals that neither "getting prices right" nor producer floor prices are simple solutions to food insecurity problems in Mali (Dioné, 1989). First, severe liquidity problems restricted the ability of the government to sustain producer price supports through buffer-stock operations of the state grain board, as will be discussed later.

Second, research has raised serious concerns about the equity implications of increased cereal prices, even at the farmers' level.<sup>9</sup> Even following the two relatively abundant harvests of 1985 and 1986, up to 43 percent of the farm households of two of the best agricultural zones of Mali (CMDT and OHV) were net grain buyers (Table 1). These results are striking in that Mali is generally perceived as having a fairly equalitarian distribution of land. Only 53 percent of the survey farms were net grain sellers, and 90 percent of the total quantity of net sales came from only 28 percent of the sample farms. Most of the net cereal-buying households had poor access to extension services, input markets and formal credit. As a result of their low investment capacity, these farmers used low-productivity technologies. The net sellers of cereals, in contrast, were essentially farm households located in the more humid southern part of the CMDT zone, with good access to improved farming techniques through relatively efficient systems of agricultural research, extension, input supply and credit, and heavily engaged in cotton production.

This clearly illustrates the equity issue of what Timmer, Falcon and Pearson (1983) have termed "the food-price dilemma". In the short run, higher cereal prices would mainly benefit only then a third of the farm households, while depressing the real income of at least 40 percent of them which are net foodgrain buyers. In fact, market demand for grain other than rice in Mali is

Table 1. Farmers' market-transactions and net per capita availability of foodgrains by rural development zone, rainfall subzone, and level of animal traction equipment, Mali (1985/86-1986/87)

Zones/subzones and level of animal traction equipment	Percent. of farm households with:		Average grain transactions per farm household (kg)			Net grain available per capita (kg)
	Net sales	Net Purchases	Sales	Purchases	Net sales	
South CMDT*	75.1	18.2	552	49	502	341
North CMDT	58.6	38.2	188	197	-9	286
South OHV*	35.9	58.9	49	151	-103	151
North OHV	15.2	82.7	119	629	-510	146
Total CMDT	66.7	28.3	368	124	244	310
Total OHV	24.9	71.6	86	406	-319	148
Total South**	62.4	31.4	389	82	306	273
Total North**	43.5	53.7	164	348	-184	241
Total sample						
Equipped Farms	77.0	19.1	509	219	290	290
Semi-Equipped	45.2	51.7	173	185	-11	230
Non-Equipped	32.0	61.5	103	256	-153	201
Total	52.7	42.9	273	219	54	256

\* CMDT is the largest cotton-producing zone; OHV is a zone with a similar agricultural potential but without significant cotton production.

\*\* The south of each zone has higher rainfall and better agricultural land than the north.

Source: Dioné (1989), pp. 133, 147, 163, 193.

essentially located in the rural areas (among non-farmers as well as a large number of food-deficit farmers), since millet, sorghum and maize account for less than 45 percent of the total cereal consumption of the 20 percent of Mali's total population living in urban areas (Rogers and Lowdermilk, 1988). Given the generally low supply elasticity for food in the context of poor technology, infrastructure and institutions in developing countries such as Mali, higher producer prices need a long gestation period and substantial complementary investment in research, extension and other supporting services before they induce any significant effect on foodgrain availability and the real incomes of the rural poor.<sup>10</sup>

Third, adequate attention has yet to be paid to interactions between pricing and marketing policies and policies in other areas (especially fiscal policies), which jeopardise farmers' food security in the short run and impede their capacity to invest and sustain capital formation in agriculture. For instance, in one of our 1985-87 survey zones (OHV), 37 percent of the farmers sold cereals without producing any real surplus beyond home-consumption requirements. In this zone, over half of the total grain sales were made at low prices during the first three months following harvest, and 71 percent of the grain sellers reported head tax payment as the most important motive for their sales (Dioné, 1989). About 72 percent of the farm households of the same region had to buy back cereals later in the year at higher prices than those at which they sold at harvest, often using very costly coping strategies (e.g., cereal loans to be paid at next harvest, migration, and sale of family labour during the cropping season). Moreover, indirect farmer taxation through official cash-crop price schedules and head taxes compound farmers' weak self-financing capacity.<sup>11</sup> Restricted access to official credit further limits farmers' weak capacity to maintain their investment. Thus, about two-thirds of the OHV survey-farmers who had historically invested in animal traction had also disinvested from it to generate cash to face both household food shortages and head tax payments in years of poor harvests (Ibid.).

Fourth, the search for increased foodgrain production and accessibility in Mali has overlooked important synergies among cash crops and food crops. These synergies and differences in the performance of agricultural support institutions may lead to considerable gaps in productivity and growth between regions with similar agricultural potential. Our 1985-87 survey found that, relative to other zones, higher agricultural growth was achieved in the CMDT cotton-zone through a strategy centered on a vertically coordinated set of activities (research, extension, input and credit distribution, processing and marketing, and investment in road infrastructure) for the long-term growth of cotton production and income. As a major cash crop with guaranteed outlets and prices, cotton gives farm households a privileged access to extension services, formal credit, input markets, and therefore to improved farming techniques for all major crops, particularly rainfed cereals that also benefit from residual cotton fertilisers

through crop rotations. Thus, cotton income not only covers farmers' fixed cash liabilities (taxes and loans), but also gradually supports the development of food production and nonfarm activities. The CMDT cotton-farmers also produced on average 2.7 times as much cereals per capita as those in OHV, a zone with similar agricultural potential. After net outflows amounting to 10 percent of their own production, the farm households in the cotton zone still had enough foodgrain to meet their home-consumption needs (at 188 kg per capita per year) at least a full year beyond the two years of the survey. By contrast the farms in the non-cotton zone could barely meet their family foodgrain needs in spite of purchasing the equivalent to 16 percent of their own production (Ibid., pp. 357-58).

To summarise, there is more to improving food security at both the national and the farm-household levels in Mali than just improving grain pricing and marketing. In Professor Sen's terms, the "endowment bundles" and the "exchange entitlement mappings" are so interdependent in Mali that improving long-term access to food is almost synonymous with improving food and agricultural production. Mali still has to face the central issue of significantly raising the productivity of the agricultural sector. This requires that careful attention be paid to policies in other areas (agricultural research, extension, financing, taxation, employment generation, etc.), which have significant effects on farmers' opportunities and capacity to invest in agricultural production. It also requires a comprehensive strategy aimed at real income growth in agriculture through the development of improved policies and institutions, technology adoption and capital formation.

#### **Private foodgrain marketing**

From 1981 to 1986, the following government measures were introduced to improve the capacity of firms to market cereals: the abolition the monopoly position of the government grain board (OPAM), the legalisation of the private grain trade, and the removal of restrictions on interregional cereal trade prior to 1981. In fact, the abolition of OPAM's legal monopoly was more symbolic than real because the share of OPAM's grain marketing exceeded 5 percent of total domestic production and one-third of the estimated total quantities traded in only 3 of the 11 years prior to the beginning of the reform in 1981 (Dioné and Dembélé, 1987, p. 21).

The legal action taken to promote private cereal trade nevertheless opened the door to new traders, who accounted for 39 percent of the 118 coarse grain wholesalers operating in four major cities in 1985. This led to some increase in specialisation and scale of operations by longtime grain traders (Mehta, 1989). Hence, most consumers, including food-deficit farmers (who previously had no access to OPAM's subsidised supplies), have benefited from cost-savings resulting

from free circulation of grain and larger-scale operations of grain merchants induced by the cereal market liberalisation (D'Agostino, 1988).

The inability to support producer prices through the buffer-stock operations of the government grain board led the market reform programme in 1987 to launch, with donor support, a seasonal grain-trade credit programme aimed at enabling private traders to buy more foodgrain in the post-harvest period and assume seasonal storage of cereals. This programme has encountered several problems, including the complexity of loan procedures, the unwillingness of traders to keep large grain stocks as a loan guarantee, poor access to loans for those who lack political influence within the Chamber of Commerce, and poor loan repayment records of the politically influential members of the Chamber of Commerce.<sup>12</sup>

Even a significant improvement of this seasonal credit programme would leave several problems of the foodgrain distribution system unsolved (Dioné, 1989, pp. 324-33). First, private traders still lack access to bank financing for long-term investment in transportation and storage facilities. Second, very little basic investment has been made to improve road infrastructure and facilitate grain transfer between surplus and deficit areas. The government clearly faces here medium-term investment trade-offs between storage and transport facilities to improve the efficiency of the private grain trade. Third, the government continues to show a high propensity to control private traders' operations tightly and foodgrain exports even following good harvests. These controls and regulations apply to trader registration, minimum stock-levels, information about suppliers and clients, export authorisation, etc.. Such restrictive conditions and high business taxes impedes flexibility and overt competition in private grain trade.<sup>13</sup> Fourth, a generalised liquidity crisis, which grew worse under a continuous government fiscal crisis, results in an increasing reluctance of private traders -- who usually play also the role of informal bankers -- to extend additional credit in cereals to increasingly insolvent civil servants, whose food security is more and more at stake.

Finally, private grain traders are chronically subjected to unstable expectations caused by several risk factors. In the context of the thin and volatile cereal markets in Mali,<sup>14</sup> these factors include:

- (a) uncertainty about supply from domestic production which, can be halved or doubled from one year to the next because of the vagaries of the weather;
- (b) demand uncertainty resulting from the combination of unforeseen interventions of the public marketing system (OPAM) and food aid distributors, and the weakness and instability of consumers' real income;

- (c) uncertainty about official cereal marketing and trade policies and regulations, which change constantly without prior consultation with, or notification to, private-sector participants; and
- (d) the absence of appropriate measures to induce the development of forward planning through enforceable contracting mechanisms.

These different kinds of risk and merchants' general lack of confidence in the continuity of policies contribute to inducing private traders to adopt short-run, small-scale, and diversified trading strategies, which do not allow the whole food production and distribution system to benefit from all potential economies of larger-scale operations.

#### **OPAM: The state grain board**

The public sector received 92 percent of total PRMC food aid reflow funds (about U.S. \$41 million) used over the first six years of the cereal market reform programme (Table 2). OPAM alone received, in addition to considerable donor technical assistance, 72.5 percent of this share of the public sector. This paradoxical outcome of the food aid programme, which aimed primarily at increasing private-sector participation in foodgrain marketing, illustrates the political difficulty of this type of reform and the overriding concern of donors and the government of Mali to improve OPAM's financial situation. Access to these funds, along with drastic cuts in personnel (60 percent) and truck fleet (about two-thirds), improvement in stock management, and reduced consumer subsidies allowed OPAM to narrow its annual operating deficit by 68 percent between 1982 and 1986 (Dioné and Staatz, 1988, p. 150). OPAM's financial improvement was also facilitated by poor harvests, which kept market prices above official producer prices from 1982 through the harvest of 1985, thereby reducing the domestic supply of cereals handled by the public sector. Reflow funds from food aid (which increased by 229 percent, from an annual average of 38,000 tons in 1978-81 to 125,000 tons in 1982-85) served as an effective means to finance the PRMC activities between 1981/82 and 1984/85 (OSCE, 1988).

The sustainability of both supporting producer prices through direct public sector intervention in the market and financing the reform programme only with food-aid reflow funds was seriously challenged following two successive good harvests in 1985 and 1986. As a result of good rainfall, domestic production of millet, sorghum and maize rose by 44 percent in 1985 relative to 1984. OPAM was then authorised to use PRMC funds and bank credit to support producer prices (which had fell in November 1985 to as low as 35 CFAF/kg for maize in major surplus zones) through buffer-stock purchases at the official producer price of 55 CFAF/kg.

Table 2. Allocation of PRMC food-aid reflow funds (CFAF million, 1981-87)

A l l o c a t i o n	1981/82	1982/83	1983/84	1984/85	1985/86	1986/87	Total
OPAM deficit coverage	452.0	195.0	408.0	--	--	--	1055.0
OPAM (Misc.)	--	--	--	--	1161.5	--	1161.5
Public sector imports	--	--	425.0	1211.0	--	--	1636.0
Nat'l security stocks	--	--	725.0	--	--	726.0	1451.0
Price support through:							
- OPAM	--	--	244.2	247.2	2454.0	--	2945.4
- ON*/OPAM	--	--	--	--	896.0	539.2	1435.2
- ORS** & ORM*** /OPAM	--	--	--	--	--	600.0	600.0
Office du Niger	--	--	--	152.0	--	--	152.0
Price stabilisation through OSRP****	--	--	--	397.0	550.0	--	947.0
Studies & consulting	--	--	--	--	--	8.0	8.0
Private trader credit	--	--	--	--	--	500.0	500.0
Farmer coop. credit	--	--	--	--	--	500.0	500.0
Total funds available	875.4	2840.5	3567.3	2607.3	1815.4	n.a.	n.a.
Total funds used	452.0	195.0	1802.2	2007.8	5061.5	2873.2	12391.7
Public sector share (%)	100.0	100.0	100.0	100.0	100.0	64.9	91.9
OPAM's direct share (%)	100.0	100.0	100.0	72.6	71.4	25.3	66.6

\*ON = Office du Niger, \*\*ORS = Opération Riz Ségou,

\*\*\*ORM = Opération Riz Mopti

\*\*\*\*OSRP = Office de Stabilisation et de Régulation des Prix

Source: Mali, Ministère de Tutelle des Sociétés et Entreprises d'Etat (1987).

Notwithstanding record public-sector purchases of nearly 83,000 tons of millet, sorghum and maize between December 1985 and February 1986, actual producer prices of these cereals merely stayed around 50 CFAF/kg until March 1986, then fell to 42-45 CFAF/kg for millet and 31 CFAF/kg for maize in March 1986, as soon as OPAM's funds ran out and it withdrew from the market (see Figure 1). Unable to resell more than 43 percent of the total 103,000 tons of grain acquired through domestic purchases and food aid, OPAM was caught with most of its working capital tied up into cereal stocks in 1986, mainly because sales official prices were set too high above market prices (République du Mali, 1987).

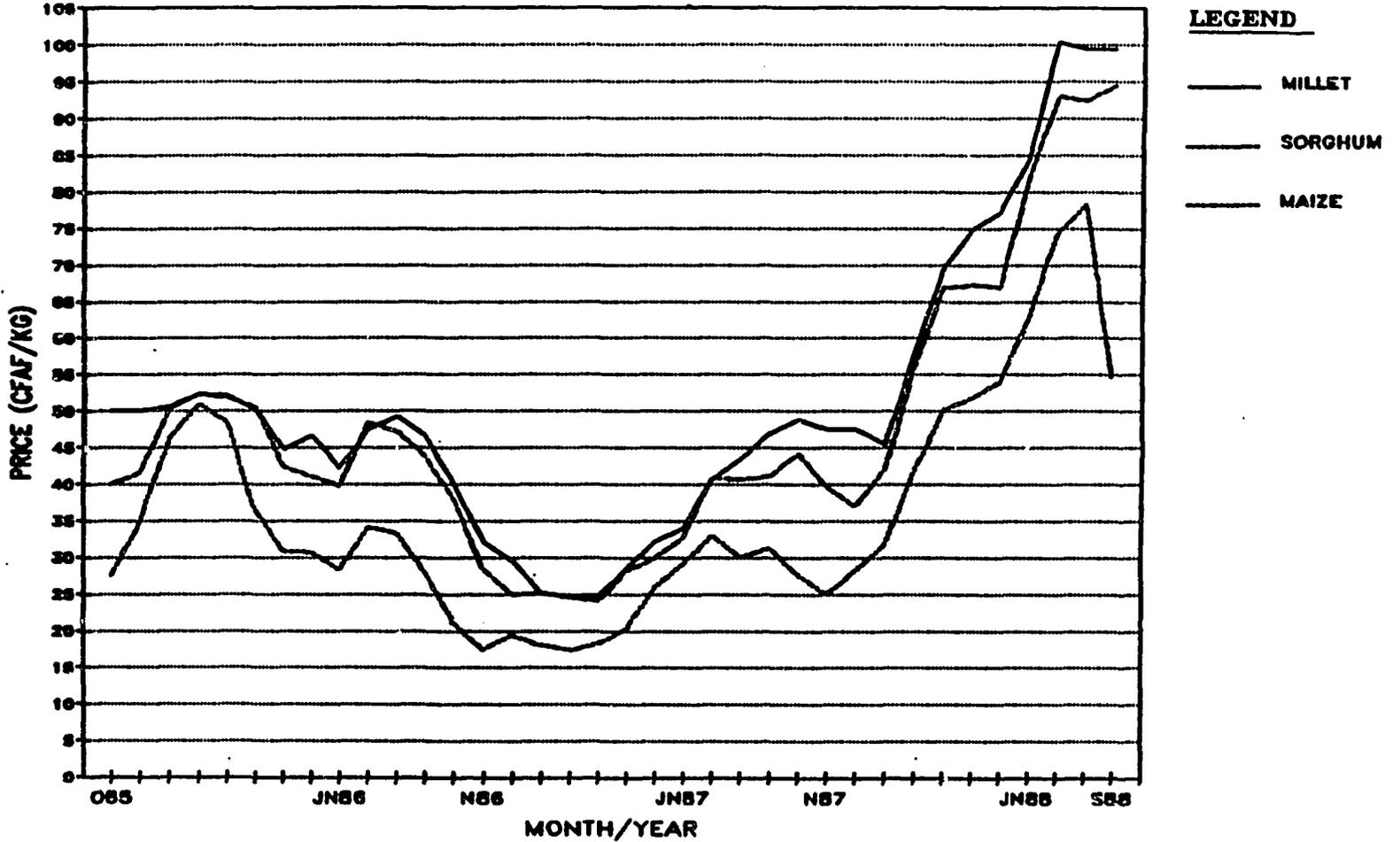
The situation grew even worse with a second good harvest in 1986, which exceeded that of the previous year by 4 percent (OSCE, 1988). OPAM's intervention in 1986/87 was limited to purchasing 10,000 tons of domestic foodgrain to replenish the national security stock, since the parastatal was ineligible for new bank credit because of its incapacity to pay the loans contracted the previous year. Producer prices of rainfed cereals in major assembly markets fell an average of 25-31 percent in 1986/87 relative to 1985/86, with bottom-levels of 24-25 CFAF/kg for millet and sorghum and 17-18 CFAF/kg for maize over the period of January-March 1987 (Dioné and Staatz, 1988, p. 158).

These developments resulted in two major shifts in the policy-reform package. First, several donors gradually agreed to replace some of their food aid contribution with cash to be injected in the private grain marketing channels to support producer prices in years of abundant production. Second, by the end of 1987, the government of Mali abandoned the concept of official producer prices for millet, sorghum and maize, and restricted OPAM's roles to: (i) managing the national security stock; (ii) managing and distributing food aid; (iii) assuring, in complementarity with the private sector, adequate food supplies in chronically food-deficit areas; (iv) developing and maintaining a market information system; and (v) providing other market facilitating services to private sector participants (Steffen, Dembélé, and Staatz, 1988, pp. 4-7).

The combination of a poor harvest in 1987 and a temporary ban on rice imports in early 1988 led foodgrain prices to rise enough to allow OPAM to sell off most of its commercial stocks and thus improve its financial situation again. In addition, OPAM is clearly moving since 1988 toward a specialisation in producing and providing improved public-good type market services such as information and training for different market participants. The sustainability of these new developments thus far initiated and supported mainly by donors' financial and technical assistance is, however, a major challenge that the government of Mali will have to face in the 1990s.

FIGURE 1

PRODUCER PRICES FOR COARSE GRAINS  
IN A MAJOR RURAL MARKET IN SOUTH-CMDT, MALI  
(OCTOBER 1985 - SEPTEMBER 1988)



SOURCE: CESA/MSU -- NOTE: Prices are for the village of Zangasso

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## 5. CONCLUSION AND IMPLICATIONS FOR THE SAHEL

Structural adjustment lending programmes started in the 1980s and they are now underway in 32 out of the 45 countries of sub-Saharan Africa. Mali, a poor and landlocked country in the Sahelian region of West Africa, was chosen by donors as a test-case. Donors offered to provide multiyear food aid to help feed Mali's cities in exchange for foodgrain pricing and marketing policy reforms. The cereal market liberalisation programme in Mali (PRMC) was launched on the basis of implicit assumptions about both farmers' and traders' capacity and propensity to respond to cereal market incentives. Because most of the initial assumptions were unsustainable, numerous changes have been made in the programme. As a result, some progress has been made since 1981: private grain trade has been legalised; cereals circulate more freely from suppliers to consumers; the roles of the public sector have been more appropriately redefined to some extent; and market facilitating services such as financing and information are improving.

Nevertheless, improving foodgrain pricing and marketing, however important, addresses only one of the five fundamental causes of food insecurity in Mali and the Sahel. The government of Mali and donors still have to address several additional crucial issues. On the production side, the weakness of the national agricultural research system results in the lack of appropriate agricultural technology that farmers can adopt to increase and stabilise productivity in foodgrains. Farmers' capacity to respond to new market opportunity sets is severely undermined by heavy and rigid taxation and restricted access to more income-generating activities (such as cash-crop production), improved

technologies, credit, input supplies, and efficient supporting institutions. These deficiencies critically hamper growth in food and agricultural production by impeding sustained capital formation through the adoption of more productive technologies in the rural area.

On the demand side, considerable instability in the cereal markets remains an unresolved issue for farmers, traders, as well as their clients. The rice production-consumption gap is also a major issue to address, since the demand for rice will continue to grow with urban population, while domestic production of rice under irrigation continues to be unable to compete with imported rice and no major prospect for expanding foreign-exchange earnings is in immediate sight. Above all, the entire foodgrain production-distribution system must cope with a persisting weakness of effective demand, which is characteristic of the general poverty and liquidity crisis of Malian consumers. The effects on food security of the cereal market liberalisation will remain modest as long as adequate attention is not also paid to these other major issues.

Notwithstanding some country-specificities, three major lessons emerge from Mali's experience with market liberalisation for the Sahel. First, because structural adjustment programmes involve tough political and institutional issues, and given the poor climatic, institutional and technological context of the Sahel, food security policy reform in Sahelian countries must be perceived as a medium to long-term battle. It is clearly not a short-term undertaking as it was perceived by donors when the cereal market liberalisation programme was launched in 1981 in Mali. Second, the complexity of the food insecurity problems in the Sahel calls for a comprehensive approach to improving rural incomes across the board. Third, since severe resource limitations prevent Sahelian countries from simultaneously tackling all the major causes of their food insecurity, the prioritisation and the sequencing of the reforms become crucial. Focussing on the root cause of food insecurity, poverty, should guide Sahelian governments' and donors' choice of actions. Since the bulk of the population of Mali and the Sahel are farmers, national food security policies must first deal with both sides of the food-security equation -- increasing food availability and access to food -- at the household level. Such national policies would require substantial and long-term commitment to invest primarily to increase the productivity of food staples, recapture domestic markets through improved competitiveness, and generate new employment and income streams for the rural as well as the urban poor. In this sense, food security in the Sahel also involves improving cash-crop production and nonfarm activities along with food-crop production.

## NOTES

1. Visiting assistant professor, Department of Agricultural Economics, Michigan State University, and former Director of the CESA/MSU/USAID Food Security Research Project in Mali.

This paper draws on research conducted under the Food Security in Africa Cooperative Agreement DAN-1190-A-00-4092-00 between the U.S. Agency for International Development (USAID) and Michigan State University (MSU) and under the CESA/MSU/USAID bilateral Food Security Project in Mali. The author gratefully acknowledges contributions and support from colleagues and staff of these institutions, as well as the helpful comments of C.K. Eicher, A. Sen, J.M. Staatz, S. Wangwe, and M.T. Weber on an earlier draft of the paper. The final content of the paper is, of course, the sole responsibility of the author and does not reflect official positions of either CESA or USAID.

2. The Sahelian countries include Burkina Faso, Cape Verde, the Gambia, Guinea-Bissau, Mali, Mauritania, Niger, Senegal, and Chad.

3. For instance, de Lattre (1988) reports that of the total aid received by the Sahel, not much more than 25 percent was allocated to productive investment, and only 4 percent was devoted to improving productivity in rainfed food crops. Delgado and Miller (1984) estimate that per capita production of foodgrain in the Sahel declined annually between 1961-65 and 1976-80 by 2 percent for millet, 1.3 percent for sorghum, 3 percent for maize and 1.4 percent for rice.

4. In a few cases, some of the research on export crops has benefited food crops. For instance, since cotton and sorghum are often grown in rotation, the fertilizer residual from cotton is of benefit to sorghum the following year.

5. There are no heat-tolerant wheat varieties and no improved rainfed rice varieties in the Sahel. Moreover, Berg (1989) shows that in spite of a 50 percent increase in world rice prices in 1988, the cost of rice produced under irrigation in the largest rice-consuming country of the Sahel (Senegal) amounted to 2.3-3.6 times the average landed price of broken rice imported from Thailand. While the Sahel's imports of rice and wheat products continue to grow by nearly 8 percent per annum, FAO trade data indicate that Sahelian exports of groundnut products fell by 67 percent in quantity and 69 percent in value between 1976 and 1986.

6. The Office du Niger project was initiated in the late 1920s with the objective of irrigating 1.2 million hectares in the central delta of the Niger River in order to create the "bread basket" of French colonial West Africa and to substitute for U.S. sources in supplying raw cotton to the French textile industry.
7. These donors were the World Food Programme (which acted as secretariat of the programme), Austria, Belgium, Canada, the European Community, France, Great Britain, the Netherlands, the United States, and West Germany.
8. Dioné and Staatz (1988), Staatz, Dioné and Dembélé (1989) and Dioné (1989) give more details on the objectives and the implicit assumptions of the cereal market liberalisation programme in Mali.
9. Because of the lack of data on the clandestine private system which, in most years, handled over 70 percent of the estimated total quantity of rainfed grain traded prior to cereal market liberalisation, it is impossible to quantify rigorously the effect of the PRMC on actual producer prices.
10. Estimates of the price elasticity of agricultural supply reported by various authors typically range from 0.2 to 0.7 in most developing countries and regions, including sub-Saharan Africa (Berg, 1989, pp.13-18).
11. Estimated rates of implicit farmer taxation through official price schedules in the 1970s are 24-61 percent for cotton and 48-65 percent for groundnuts (SATEC, 1982).
12. Donors contribute funds to the seasonal credit programme, which is administered through commercial banks and the Chamber of Commerce.
13. Since most traders are illiterate and do not hold formal accounts, business taxes are based on "guestimates" of profits by agents of the ministry of finance. These estimated profits are taxed at 50 percent for companies and 30 percent for enterprises not set up as companies (Stryker et al., 1987).
14. The coefficient of variation of both producer and wholesale prices of millet, sorghum and maize ranged, depending on the region, from 18 percent to 27 percent between November 1985 and October 1987 (Dioné, 1989, p.326).

## REFERENCES

- Amin, S. (1965) Trois Expériences Africaines de Développement: Le Mali, la Guinée et le Ghana (Paris: Presses Universitaires de France).
- Berg, E. (1989) "The Competitiveness of Sahelian Agriculture", Club du Sahel (ed.) Regional Cereals Markets in West Africa (Paris: OECD) pp.17-76.
- Bingen, R. J. (1985) Food Production and Rural Development: Lessons from Mali's Operation Riz-Segou (Boulder: Westview Press).
- D'Agostino, V.C. (1988) "Coarse Grain Production and Transactions in Mali: Farm Household Strategies and Government Policy", unpublished M.S. Thesis, Michigan State University, USA.
- de Lattre, A. (1988) "What Future for the Sahel?", The OECD Observer, vol.153, pp.19-21.
- Delgado, C. and Miller, C. (1984) "Changing Food Patterns in West Africa: Implications for Policy Research", IFPRI (ed.) Compte-Rendu du Premier Atelier Interne du Projet Conjoint sur la Substitution des Céréales Importées pour les Céréales Traditionnelles en Afrique de l'Ouest (Washington, D.C.: IFPRI) pp.1-20.
- de Meel, H. (1978) La Politique Céréalière au Mali (Rome: FAO).
- de Wilde, J.C. (1967) Experiences with Agricultural Development in Tropical Africa (Baltimore: The Johns Hopkins University Press).
- Dioné, J. (1989) "Informing Food Security Policy in Mali: Interactions between Technology, Institutions and Market Reforms", unpublished Ph.D. Dissertation, Michigan State University, USA.
- Dioné, J. and Dembélé, N.N. (1987) "Le Programme de Restructuration du Marché Céréalière au Mali (PRMC): Une Analyse de ses Objectifs, son Fonctionnement et ses Performances", Working Paper No. 87-01 (Bamako: MSU-CESA Food Security Project).
- Dioné, J. and Staats, J.M. (1988) "Market Liberalization and Food Security in Mali", Rukuni, M. and Bernstein, R.H. (eds.) Southern Africa: Food Security Policy Options, Proceedings of the Third Annual Conference on Food Security Research in Southern Africa, 1-5 November 1987 (Harare: UZ/MSU Food Security Research Project) pp.143-170.

- Eicher, C.K. (1982) "Facing Up to Africa's Food Crisis", Foreign Affairs Vol.61, No.1, pp.154-174.
- Eicher, C.K. (1988) "Food Security Battles in Sub-Saharan Africa", revised version of a plenary address presented at the VII World Congress for Rural Sociology, June 26-July 2 1988 (Bologna, Italy).
- FAO (1973-87). FAO Trade Yearbook, Vols. 27-41 (Rome: FAO).
- Humphreys, C.P. (1986) "Cereals Policy Reform in Mali", draft report (Washington, D.C.: World Bank).
- Jones, W.I. (1976) Planning and Economic Policy: Socialist Mali and her Neighbors (Washington, D.C.: Three Continents Press).
- Mehta, M. (1989) "An Analysis of the Structure of the Wholesale Cereals Market in Mali", unpublished M.S. Thesis, Michigan State University, USA.
- Office Statistique des Communautés Européennes (OSCE) (1988) Statistiques de Base: Agriculture - Elevage (Bamako: OSCE).
- République du Mali (1987) "Evolution de la Politique Céréalière", paper prepared for the "Séminaire National sur la Politique Céréalière au Mali", 15-18 June 1987 (Bamako: Ministère de Tutelle des Sociétés et Entreprises d'Etat).
- Rogers, B.L. and Lowdermilk, M.L. (1988) "Food Prices and Food Consumption in Urban Mali", final report of the Tufts/DNSI/USAID Food Price Project (Medford: Tufts University).
- SATEC (1982) Etude des Opérations de Développement Rural (ODR) et des Organismes Similaires: Première Phase - Analyse et Bilan (Paris: SATEC).
- Sen, A. (1981) Poverty and Famines: An Essay on Entitlement and Deprivation (Oxford: Clarendon Press).
- Sen, A. (1988) "Food Entitlements and Economic Chains", LeMay, B.W.J. (ed.) Science, Ethics, and Food, Papers and Proceedings of a Colloquium Organised by the Smithsonian Institution (Washington, D.C.: Smithsonian Institution Press) pp.58-70.
- Staatz, J.M., Dioné, J. and Dembélé, N.N. (1989) "Cereals Market Liberalization in Mali", World Development vol.17, no.5, pp.703-718.

- Steffen, P., Dembélé, N.N. and Staatz, J. (1988) "Une Critique des Rôles Alternatifs pour l'OPAM sur le Marché Céréaliier à Travers des Concepts de Biens Publics", Working Paper no. 88-02 (Bamako: CESA-MSU Food Security Project).
- Stryker, J.D., Dethier, J.J., Peprah, I. and Breen, D. (1987) Incentive System and Economic Policy Reform in Mali (Washington, D.C.: A.I.R.D.).
- Timmer, C. Peter, Walter P. Falcon and Scott R. Pearson, 1983. Food Policy Analysis (The Johns Hopkins University Press, Baltimore).
- Weber, M.T., Staatz, J.M., Holtzman, J.H., Crawford, E.W. and Bernsten, R. (1988) "Informing Food Security Decisions in Africa: Empirical Analysis and Policy Dialogue", American Journal of Agricultural Economics, vol.70, no.5, pp.1044-1051.
- World Bank (1989) World Development Report 1988 (New York: Oxford University Press).

**APPENDIX  
OVERVIEW OF THE CESA/MSU/USAID FOOD SECURITY  
RESEARCH PROJECT IN MALI**

Empirical findings cited in this paper about foodgrain producers and traders in Mali result from primary data generated between October 1985 and October 1987 by the on-going CESA/MSU/USAID Food Security Research Project. These data were collected at the level of a two-stage stratified sample of 990 farm households at the first stage and 190 farm households at the second stage, and a panel of 118 coarse-grain wholesalers in four of the major cities (Koutiala and Sikasso in the surplus-producing zones, and Bamako and Mopti in major marketed-cereal consumption zones). The sample farm-households came from 16 villages, which were equally distributed between the south (about 1,000 mm of annual rainfall) and the north (approximately 700 mm of annual rainfall) of two savannah zones with similar agricultural resource endowments: the CMDT, which produces the bulk of cotton and has the best agricultural support institutions in Mali, and the OHV, which has a weaker institutional base. The 190 farm-household panel was roughly distributed equally among 3 technological strata, i.e., farmers owning (1) a full set of animal traction equipment, (2) an incomplete set of animal traction equipment, and (3) no such equipment.

Coarse-grain transaction (quantity and price) data were collected through repeated enumerator interviews, weekly in the major rural markets of the survey zones and monthly for farmers and wholesalers. These price data were complemented with PRMC-monitoring of time-series of cereal retail prices in the 8 regional capitals of Mali. Less repetitive questionnaires and informal interviews were used to collect basic information on farm household production and farmer and trader characteristics and perceptions.

The primary data was processed for analysis using both tabular and econometric techniques. The results reported in this paper are essentially estimated group-averages for the 990 farm-household sample, where the estimates from the smaller 190 household sample are weighted by the respective proportions of the different farm strata among all the farms of the 16 survey-villages. The empirical findings of these analyses have been reported in numerous working papers and other documents, and continuously discussed with policy decision-makers of the government of Mali, members of the Technical Secretariat of CESA (the national monitoring and evaluation commission of the food strategy of Mali), and representative of the PRMC donors. These frequent discussions have helped develop and maintain close interactions and feedback between policy makers and food security policy researchers in course of the on-going policy dialogue between the government of Mali and donors on food policy reforms. See Weber et al. (1988) for a discussion of the importance of this approach of simultaneously improving both the supply of, and demand for, policy-relevant empirical insights.

## LIST OF ACRONYMS

- CESA** Commission Nationale de Suivi et d'Evaluation de la stratégie Alimentaire (Food Strategy Commission), Mali.
- CFDT** Comapgnie Française pour le Développement des Fibres Textiles (French Textile Development Company).
- CMDT** Compagnie Malienne de Développement des Textiles (Malian Textile Development Company).
- CFAF** CFA Francs (Currency unit of the CFA zone).
- FAO** Food and Agriculture Organization of the United Nations.
- GNP** Gross National Product.
- MSU** Michigan State University.
- ODR** Opération de Développement Rural (Rural Development Agency), Mali.
- OHV** Opération Haute Vallée (Niger River Upper-Valley Development Agency), Mali.
- OPAM** Office des Produits Agricoles du Mali (Mali state grain board).
- OSCE** Office Statistique des Communautés Européennes (Statistical Agency of the European Community).
- PRMC** Programme de Restructuration du Marche Céréaliier (Cereal Market Restructuring Programme), Mali.
- USAID** United States Agency for International Development.