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## **Mali Agricultural Sector Assessment**

### **Agricultural Policy Development Project**

#### **Volume # 2 In-depth Analyses and Supporting Materials**

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# Executive Summary

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The purpose of this report is to assess the key opportunities and constraints for increasing the agricultural sector contribution to economic growth in Mali. USAID/Mali is in the process of finalizing its Country Strategic Plan (CSP) for the period 2003-2012. This report provides the analytical basis and recommendations for developing and implementing the new CSP.

## The Setting

Malian per capita income in 1999 was about the same as it was 20 years ago. However, over these two decades, GDP per person has fluctuated considerably. During the second half of the 1980s, it fell, then moved up and down in the first half of the 1990s, and began to grow steadily in the second half of the 1990s following devaluation in 1994.

Agriculture makes up about 45 percent of Malian GDP, but its influence goes far beyond that level. In fact, most of the variability of total GDP can be explained by the fluctuations in agricultural income.

Poverty in Mali is quite high, with 64 percent of the population considered poor or very poor as measured in the Poverty Reduction Strategy Paper. Seventy three percent of the population live on less than \$1/day, and 91 percent on less than \$2/day. Income distribution in Mali is similar to Niger and Burkina Faso, but is less equal than Senegal, Ghana, or Guinea.

## Increasing Agricultural Productivity and Risk Reduction

Increasing economic growth and reducing poverty are central objectives for USAID and for the Government of Mali. To achieve these objectives, increased agricultural productivity and risk reduction are essential, and these themes carry throughout this report. Both acute and chronic food insecurity have plagued Mali over the years. Climatic risk is a major source of food insecurity and vulnerability for the Malian population. Risk reduction and productivity improvement will be key to helping Mali become more food secure.

The economics literature provides an abundance of studies and empirical evidence that agricultural growth is essential to achieve poverty reduction and overall economic growth. In Mali, achieving a higher growth in agriculture will be absolutely essential to increasing incomes and employment and reducing poverty.

## Key Assumptions

One of the important underlying assumptions in our analysis is that USAID and Mali will have to accept world market conditions as they are. Commodity prices are low in part because the U.S.



and E. U. provide large subsidies for their farmers, which lead to increased production and lower world prices. There is little evidence this situation is likely to change in the near term.

Another assumption that underlies many of our recommendations is that USAID is not interested in or able to make major infrastructure investments such as building roads or electricity generation and distribution. These are very expensive activities, but very necessary in the long-run if Mali is to achieve sustained economic growth. Some other donors are working in these areas. We have focused our recommendations on the activities we believe will have the highest payoff given that roads and electricity are not expected to be an important component of near-term plans for USAID.

## Summary of Major Proposed Interventions

1. **Investment in irrigation** – The potential for productivity enhancement and risk reduction through irrigation investments is enormous. Risk is reduced for the family participants because they are no longer dependent on rainfall, but it is reduced for the economy as a whole as well, because the overall market basket becomes somewhat less vulnerable to rainfall variability. The productivity enhancement is obvious - crop yields will be multiplied many fold in the impacted zones. One important crop that will be produced is rice.<sup>1</sup> Much of the increase in rice production will be exported to neighboring countries. The potential for increasing rice exports has been clearly demonstrated in other studies. In addition to rice, there will be an increase in horticultural crop production, which is done mainly by women. These crops are produced both for domestic and export markets. Some of them also offer potential for value-added processing. We recommend that USAID make direct investments in irrigation in collaboration with other donors. Before making the investments, a more comprehensive analysis of the benefits and costs of alternative irrigation investments should be undertaken. Possibilities include canal irrigation in the ON, *bas fond* irrigation, and small and medium scale irrigation. The objectives are to expand irrigated area to reduce risk, enhance productivity, and capture regional markets.

*Analysis needed* - In collaboration with other donors, an analysis of potential irrigation investments will need to be undertaken prior to undertaking an irrigation project. The analysis should include projections for finance of the private sector components of the investment package, evaluation of the economics of the irrigation alternatives (ON, *bas-fonds*, small and medium scale, and perhaps others), and evaluation of alternative incentive mechanisms.

2. **Investment in improved variety seed multiplication, dissemination, and demonstration** – Yield increases for sorghum and millet of 20-30 percent are possible if improved seed varieties were more widely available and used in combination with fertilizer and water retention technologies. The GOM is getting out of the seed business in 2002. Analysis indicates that under current conditions, multiplication of sorghum, millet, and maize seeds is not profitable on a pure private sector basis. This is understandable under Malian

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<sup>1</sup> We think it is very important that no compulsory cropping scheme be imposed on farmers. That is, farmers should be free to grow rice or any other commodity they choose.

conditions. Non-hybrid seed multiplication has received public support in most countries that have successfully developed their agriculture. Germplasm maintenance and foundation seed availability are keys to success in this area. USAID should work with IER and other donors to support rationalization of these basic functions. Moreover, we are proposing that USAID provide assistance to NGOs and/or producer associations who would do the seed multiplication and dissemination. A system of incentives to accomplish this objective would need to be designed. The system also should include demonstration plots on farmer fields widely spread around the country to demonstrate the benefits of improved seed, fertilizer use, and water management. Even yield increases of 10-15 percent would have major impacts on poverty and vulnerability reduction in Mali. The program should be designed so that over time some of the associations could move towards becoming full-fledged seed companies. Creating an appropriate incentive system to accomplish the multiplication and dissemination and to help the more successful operations evolve towards private seed companies is very important.

*Analysis needed* - An analysis of mechanisms to encourage seed multiplication by producer associations and/or NGOs is needed. This study should also estimate the potential gains from widespread adoption of improved varieties, and thereby serve as a check on the benefits of undertaking this activity. The system must include extension of production packages of appropriate seed, fertilizer, credit, and water retention technologies. The design also should include mechanisms that could lead to the development of a private seed industry in Mali.

- 3. Investment in cost sharing and/or equity funds** – Investment does not occur in the food and agricultural sectors in Mali at the desired rate because the investments are too risky compared to other investment options. Thus, some means of reducing the risk is required to obtain increased investment. Cost sharing and equity funds are means of reducing the risk born by Malian or external investors. In essence, cost or equity sharing would be buying down the risk and making Malian investments competitive with other alternatives. From USAID's perspective, this approach also would leverage USAID funds probably by a factor ranging from 5 to 10. These funds could go into activities like production of day-old chicks in Mali to expand poultry production or value-added processing of agricultural commodities.

*Analysis needed* - **Study of the financing system.** The fundamental problem in lending in the agricultural sector is the risk of such investments. It is recommended that USAID have a study done by a banking and financial expert with knowledge and experience in this area on risk reduction activities and strategies to support agricultural lending. There are a number of possible options including establishment of leasing companies to reduce the capital cost of investment, training programs and portfolio management, better business and financial plans to account for risk and risk analysis, changing usury laws, and the three options discussed in chapter 5: loan guarantees, cost sharing, and venture capital funds. Following this study (assuming no major impediments are identified), analysis should be undertaken to design appropriate cost sharing/equity fund mechanisms for implementation in Mali.

- 4. Technical assistance in animal feeding** – Animal feed quality is a major constraint in expansion of livestock, dairy, and poultry production. Quality of feed ingredients is poor;

there are no standards for blended feeds or concentrates; and there is little producer understanding of animal nutrition and its importance in production efficiency. There is potential for significant productivity gains in livestock, poultry, and perhaps dairy with successful technical assistance in this area. Greater feeding efficiency means that less feed is required per kilogram of meat, eggs, or milk produced, and ultimately means that consumers would pay less for these products than would be the case without the productivity gains. It also means that more of the products could be exported or substituted for imports. The livestock recommendation is highly complementary with the cereals recommendation.

*Analysis needed* - A consultation is needed to determine how best to go about animal feed quality improvements including possible implementation of grading and standards, technical assistance, etc. This activity should encompass poultry and ruminants, thereby including forages.

5. Potential interventions in other sectors:

1. **Cotton** is the most important export commodity for Mali and represents about 8 percent of GDP. It is very important that this sector continue to grow and show increased productivity. However, it is our judgement that other donors, particularly the World Bank and France, are better positioned to work in this sector. We recommend that USAID become a member of the donor coordinating committee for the cotton sector. In the future, as Mali proceeds with restructuring of the sector, there may be opportunities for USAID to play a role in policy analysis and privatization, which will be important given cotton's weight in the economy.
  2. Mali produces a wide variety of **horticultural crops**, and there is potential to expand some of them both for domestic and export markets, particularly in the West Africa Region. Much of the horticultural crop production is done by women, so there is considerable potential for expanding this source of women's income. Expanding water availability will be needed to achieve significant productivity gains in this area.
  3. There is potential to expand **oilseed** production if certain problems can be solved. Peanuts have potential but only if aflatoxin problems can be solved. Shea production could be expanded both for domestic and regional markets. Assistance will be needed in adapting improved varieties and improving processing technology. Both peanuts and shea offer significant income potential for women.
6. **Policy analysis to achieve Malian and USAID objectives** – Success in the above activities and in many of the other areas mentioned in this report requires a policy environment conducive to achieving economic growth. We recommend that USAID support targeted policy studies designed to support and assist Malian and regional policy makers in their move towards greater market orientation. Policy studies should be undertaken as part of each of the investment activities recommended in points 1-4 above. In addition, policy analysis should be an ongoing part of each of these activities to help ensure their success.

USAID should consider a policy project to group the various analyses needed and to be able to respond to future policy issues as they emerge.

*Additional related Analysis needed –*

- 1) Study the structure of linkages from agricultural growth in Mali to other sectors of the economy (backward, forward, consumption, fiscal, employment). Understanding the nature of these linkages is critical to know how growth in the agricultural sector (e.g., through export promotion) affects employment and income in other sectors—particularly the generation of jobs for the poor. The analysis in Chapter 3 and in Annex 2 is based on many assumptions that need empirical validation. While we believe the general conclusions are correct, it will be very important to have a much better comprehension of the nature and size of these linkages.
  - 2) Analysis of public finance issues at the commune and cercle level—How to effectively tap resources from increased agricultural productivity for investment in health and education infrastructure? If increased agricultural productivity is to lead to better health, nutrition, education, and the like at the local level, some of that growth must be tapped and reinvested in programs aimed at promoting those goals. In the context of decentralization, there is a great need to examine ways that local governments can develop sustainable financing mechanisms for these programs, fueled by the increased local incomes coming from higher agricultural productivity.
7. **Long-term training** - Many of the leaders in Mali today benefited from long-term training in the U.S. We recommend that USAID bring long-term training back into its portfolio to help produce the next generation of Malian leaders.
  8. The incidence of **HIV/AIDS** is probably around 2 percent at present. However, it is very important to act now to contain the spread. We recommend that all programs in agriculture be reviewed to assess the feasibility of including an HIV/AIDS information gathering and dissemination component and that the natural links between HIV/AIDS mitigation and food security interventions be exploited.
  9. **Donor coordination** needs to be improved. Mali receives aid from many sources with the main players being France, Germany, Japan, the Netherlands, Canada, European Union, and the World Bank. Better coordination of activities could increase the overall efficiency of the aid delivered to Mali.

## **Current Activities that Should be Continued**

1. The technical assistance program currently packaged in CAE should be continued. It is providing valuable technical assistance in both the agricultural commodity and value-added areas.
2. Micro-finance activities should be continued, and a greater effort should be undertaken to coordinate with other donors in this area. Micro-finance program modifications may be

needed based on the overall finance study recommended above. Micro-finance is critical to achieving the needed levels of agricultural growth.

3. Support for the market information system (OMA) should be continued and expanded to cover other commodities and regions. Market information is vital to the efficient functioning of markets, and this project is the only currently available information in many cases. Efficient markets will be absolutely necessary for success in the other interventions proposed in this assessment.
4. The OHVN system for extension and improved environmental management should be applied in the ON and other areas where USAID chooses to make investments.

## **Activities of Lower Priority**

The major area in which the team is not as optimistic as others is in value-added processing. Our assessment is that Mali is unlikely to become competitive in many of these activities due to high transport cost, high energy cost, low economies of scale, lack of managerial talent, and a workforce of relatively low productivity. That is not to say that niche market products are impossible. Indeed, some will develop and may become profitable. We are just saying that the likely returns are higher in the areas we have outlined in this analysis.

## **Comparison of Our Recommendations With the Draft Parameters Paper**

While there are some important differences between our recommendations and the approach used in the parameters paper, there are also lots of similarities. The major differences may be summarized as follows:

- Risk reduction, whether it be in finance or production, is elevated in importance in our recommendations. Mali is a country with very high risk, and the problems need to be addressed to achieve sustainable growth.
- The recommendations contain a greater emphasis on growth of agricultural productivity as the major engine of economic growth in Mali.
- The parameters paper puts greater emphasis on value-added processing, whereas we believe the return for investment in other areas will be higher. However, the financial risk reduction mechanisms we recommend could, in fact, result in investment in these areas, but it would be more market driven (adjusted for the risk reduction).
- We put a bit more emphasis on the potential for increasing productivity in animal production sectors. We believe the potential exists, and the activity is highly complimentary with investments in cereal yield increases.
- We recommend that USAID/Mali again invest in long-term training.

If USAID were to undertake the investments outlined here and to continue the activities that are working well, we believe it will have made a very important contribution to economic growth and poverty reduction in Mali.



# Acronyms

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AAMA	Atelier d' Assemblage de Materiel Agricole
ACAM	Chambres d' Agriculture du Mali
AEG	Accelerated Economic Growth
AFD	Agence Francaise de Developpement
AIDS	Acquired Immunity Deficiency Syndrome
AMELEF	Associations of Horticultural Exporters
ANICT	Agence Nationale d'Investissements des Collectivites Territoriales
APCAM	Chambre d'Agriculture du Mali
APIM	Association Professionnelle des Institutions de Microfinance du Mali
ARPON	Dutch funded irrigation project in the Office du Niger
AV	Associations Villageoises (Village Associations)
BADEA	Banque Arabe pour le Developpement Economique Africain (Arak Bank for African Economic Development)
BCEAO	Banque Centrale des Etats de l'Afrique de l'Ouest (West African Central Bank)
BNDA	Banque Nationale de Developpement Agricole (National Agricultural Development Bank)
BSE	Bovine Spongiform Encephalopathy (Mad Cow Disease)
CAE	Centre Agricole d'Entreprises (Agricultural Enterprise Center)
CAS/SFD	Cellule d'Appui et de Suivre des Systemes Financiers Decentralises
CCC	Centres Communales de Conseil
CESA	Commissariat à la Securite Alimentaire
CGIAR	Consultative Group on International Agricultural Research
CIRAD	Centre International des Recherches Agronomiques de Developpement
CILSS	Centre International de Lutte contre la Secheresse
CIMA	Conference Inter-Africain de Marhe D'assurance
CFD	Caisse Francaise de Developpement
CFDT	(aka DAGRIS): Compagnie Francaise de Developpement des Fibres Textiles
CMDT	Compagnie Malienne de Developpement des Textiles (Malian Company for the Development of Textiles)
COCIM	Chamber of Commerce and Industry of Mali
COCSSA	Comite d'Orientation et de Coordination du Systeme de Securite Alimentaire CONOESAM: Coordination Nationale des Operateurs Economiques du Secteur Agro-alimentaire du Mali
COPACO	CMDT cotton export marketing company
CPP	Comite Paritaire Producteurs
CSCOM	Centres de Santé Communautaire (Community Health Centers)
CSP	Country Strategic Plan
DCA	Development Credit Authority
DGRC	Direction Generale de la Réglementation et du Controle

DNCT	Direction Nationale des Collectivites Territoriales
DNSI	Direction Nationale de la Statistique et de l'Informatique
DRC	Development Research Centers
DRSPR	Division de Recherche sur les Systemes de Production Rurale (IER)
ECIBEV	Etablissement de Credit et d'Investissement de Betail et Viande
ECOFIL	Economie des Filieres
ECOWAS	Economic Community Of the West African States
EDF	European Development Fund
EST	echalote sechee selon la methode amelioree
EU	European Union
FAO	Food and Agricultural Organization
FDV	Fonds de Developpement Villageois
FEWS	Famine Early Warning System
FIA	Fonds d'Intrants Agricoles
GAM	Generale Alimentation Malienne
GDP	Gross Domestic Product
GOM	Government of the Republic of Mali
GTZ	Gesellschaft für Technische Zusammenarbeit (German Technical Assistance Agency)
HIV	Human Immunodeficiency Virus
HUICOMA	Cotton oil processing subsidiary of CMDT
ICRISAT	International Crops Research Institute for Semi-Arid Tropics
IEC	Information, Education and Communication
IER	Institut d'Economie Rurale (Institute of Rural Economy)
IFPRI	International Food Policy Research Institute
IMF	International Monetary Fund
IPR/IFPRA	Institut Professionnel Rural (Agricultural School at Katibougou)
INFOCOM	USAID Information and Communication Strategic Objective
INSAH	Institut du Sahel
ISBS	Integrated STI Prevalence and Behavior Surveillance
ISP	Internet Service Providers
KIT	Dutch Royal Institute for the Tropics
LAC	Latin American and Caribbean region
MEGA	Mali Equity and Growth through Agribusiness
MFI	Micro-Finance Institutions
MDR	Ministry of Rural Development- (Ministre du Developpement Rural)
MSD	Ministry of Social Development
NBF	Non-Bank Financial Institutions
NEAP	National Environmental Action Plan
NGO	Non-Governmental Organization
NRM	Natural Resource Management
NSC	National Seed Council
NSL	National Seed Laboratory
NSP	National Seed Plan
NSS	National Seed Service
NSVC	National Seed Variety Committee



OECD	Organization for Economic Cooperation and Development
ODIPAC	Office de Developpement Integre des Productions Arachidiers et Cerealieres
OHADA	Organization pour l'Harmonization en Afrique du Droit des Affaires
OHVN	Office de Developpement de la Haute Vallee du Niger
OMA	Observatoire du Marche Agricole
OMBEVI	Office Malien du Betail et de la Viande
OPAM	Office des Produits Agricoles du Mali
ON	Office du Niger
ORIAM	Organizations Rurales des Intrants Agricoles du Mali (Associations of Malian Input Dealers)
ORSP	Office de Regulation et de Stabilization des Prix
OYB	Off-Year Budget
PASAOP	Agricultural Services and Producer Organizations Program
PASIDMA	Projet d'Appui du Systeme d'Information du Marche Agricole
PDAM	Project for the Development of Poultry in Mali
PNIR	Programme National d'Infrastructure Rurale (National Rural Infrastructure Program)
PNLS	Programme National de Lutte contre le SIDA (National AIDS Prevention Program)
PPP	Purchasing Power Parity
PPV	Perimetres des Petits Villages (Small Village Perimeters)
PRISAS	Programme Regional de Renforcement Intitutionnel en Matiere de Recherches sur la Securite Alimentaire au Sahel
PRMC	Malian Cereal Market Restructuring Program
PRODEJ	Support of Commercial Courts
PRSP	Poverty Reduction Strategy Paper
RETAILEuropean	Union and World Bank Funded Irrigation Project in the Office du Niger
ROESAO	Reseau des Operateurs Economiques du Secteur Agro-alimentaires de l'Afrique de l'Ouest
SAM	Social Accounting Matrix
SAP	Système d'Alerte Precoce
SEG	Sustainable Economic Growth
SIM	Systèmes d'Information du Marché (Market Information Systems)
SMIAR	Global Market Information Monitoring System
SO	Strategic Objectives
SOLAIMA	Société Laitière du Mali
SOMBEPEC	Société Malienne de Betail des Peaux et Cuirs
SONEA	Société Nationale d'Exploitation des Abattoirs
SOTELMA	Societe de Telecommunications Malienne
STI	Sexually Transmitted Infections
UNAIDS	Joint United Nations Programme on HIV/AIDS
UNDP	United Nations Development Program
UNICEF	United Nations Children's Fund
UNCTAD	United Nations Conference on Trade And Development

USAID	United States Agency for International Development
VAT	Value-Added Tax
WAEMU (UEMOA)	West African Economic and Monetary Union (Union Economique et Monetaire Ouest Africain)
WAEN	West African Enterprise Network
WALTPS	West African Long-Term Prospectives Study
WARP	West African Regional Program
WATRA	West African Telecommunication Regulatory Authority
WFP	World Food Programme
WTO	World Trade Organization

# 1. Introduction

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The purpose of this report is to provide an assessment of the key opportunities and constraints for increasing the agricultural sector contribution to economic growth in Mali. USAID/Mali is in the process of finalizing its Country Strategic Plan (CSP) for the period 2003-2012. This paper is aimed at providing the analytical basis and recommendations for developing and implementing the new CSP.

This assessment is based largely on the many studies on the agricultural and value-added sub-sectors that have been conducted in recent years. In addition, team members in Bamako visited with a large number of Malian public sector officials, USAID officers, private sector companies and individuals, representatives of other donors and regional programs, and others. The conclusions reached in the report reflect the views of the team members after gathering and reviewing all the information available.

The next chapter provides background and Malian context for this analysis. However, it may be useful here to present some of the global backdrop in which Malian development is situated. Mali is a small country in the context of international markets, and hence, it does not affect international markets in any significant way. The opposite is not the case - Mali's two most important exports are cotton and gold, and the prices it receives for these commodities are dictated by world market conditions. Since 1997, world commodity prices generally have been trending downward. And at the same time, commodity support for farmers in the OECD countries has been increasing. Table 1 provides the recent support levels for some important OECD countries. The average American farmer has been receiving \$20,803 per year. The effect of this support is to increase production of agricultural commodities and to lower world commodity prices.<sup>2</sup>

**Table 1: Agricultural Support, 1998-2000, U.S. Dollars**

<b>Nation</b>	<b>Per Farmer</b>	<b>Per Hectare</b>
U.S.	20,803	120
E.U.	16,028	762
Australia	2,894	2
New Zealand	336	3
Canada	NR	51

Source: OECD; NR=not reported

In this analysis, we take as given the existing conditions in world markets. The high subsidy levels are likely to continue. At this writing, the U.S. Congress is poised to pass a new ten year

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<sup>2</sup> In November 2001, producer organizations in Bénin, Mali, and Burkina Faso, protested against U.S. and E.U. subsidies for cotton producers. Clearly, these organizations understand that current U.S. and European policies adversely affect cotton farmers in the region.

farm bill that increases these subsidy levels considerably and violates our current WTO commitments. Thus, while no one can predict crop prices far into the future, we think it is prudent to plan assuming prices may remain relatively low. For Mali, this means greater reliance on regional markets to take advantage of transport cost differentials.

Another assumption that underlies many of our recommendations is that USAID is not interested in or able to make major infrastructure investments such as building roads or electricity generation or distribution. These are very expensive activities, but very necessary in the long-run if Mali is to achieve sustained economic growth. Some other donors are working in these areas. We have focused our recommendations on the activities we believe will have the highest payoff given that roads and electricity are not expected to be an important component of near-term plans.

The remainder of the report is divided into six additional chapters. Chapter 2 provides the background and current situation including current Government of Mali (GOM) and USAID development objectives and a brief summary of some important lessons learned from past experience in Mali and elsewhere in the region. Chapter 3 provides the analytical framework for this analysis. The bulk of the analysis is contained in chapter 4, which includes the sector-by-sector analysis of key constraints, opportunities, and possible interventions. Chapter 5 covers the roles and jurisdiction of different economic actors and includes a discussion of possible interventions in these areas as well. Chapter 6 provides a discussion of compliments to the productivity-led strategy including risk reduction, food security, gender, environment, and HIV/AIDS. Finally, chapter 7 contains our recommendations for USAID/Mali's programs related to rural development and economic growth.

## 2. Background and Current Situation

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Following independence in 1960, Mali followed a socialist-oriented approach to economic development.<sup>3</sup> Thirty-three state enterprises controlled most sectors of economic activity. Agricultural and food policy remained highly state controlled for the first two decades of independence. In the early 1980s, Mali started liberalizing markets for agricultural commodities to varying degrees. The first efforts focused on cereals with the Cereal Market Restructuring Program (PRMC). Two of the major goals of the program were to increase cereal production and farmers' incomes. Reforms included elimination of the official state trading monopoly and liberalization of most of the cereals sub-sector. These reforms were carried out over the decades of the 1980s and 1990s. The market reforms were effective in increasing competition in cereals trading, lowering distribution costs, and increasing consumer access to cereals. While the cereals markets have largely been liberalized, cotton production and trade remains essentially under the control of the Malian Company for the Development of Textile Fibers (CMDT). Rice production and distribution lies somewhere between these extremes, but probably closer to the other cereals. The role of the Office du Niger (ON) in managing all aspects of production and distribution has changed significantly since the early 1980s such that it is now basically a provider of irrigation and extension services.<sup>4</sup>

### 2.1. Malian Economic Performance

In real terms, per capita GDP in Mali is slightly lower today (1999) than it was twenty years ago. The Malian economy overall has been essentially stagnant in terms of real per capita GDP over the past twenty years, at about \$275 in constant 1995 US\$. That is, real Gross National Product has increased at about the same rate as population growth. However, that overall comparison masks three distinct economic periods. The period 1980 to 1988 was a period of marked decline for the Malian economy. The first half of the 1980s were mainly drought years. Then the period 1988 to 1994 was quite erratic but overall essentially stagnant. Finally, the post 1994 (devaluation) period was one of substantial economic growth.<sup>5</sup> Figure 1 displays this series both in terms of FCFA and US\$. Generally both measures tell the same story with a slight deviation in the late 1980s when the US\$ was falling against the French Franc, to which the FCFA is pegged.

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<sup>3</sup> This section draws upon "Food Security Policy Reform in Mali and the Sahel" by J. Dioné, "The Response of Cereals Traders to Agricultural Market Reform in Mali" by N. N. Dembélé and J. M. Staatz, "The Reform of Rice Milling and Marketing in the Office du Niger: Catalysts for an Agricultural Success Story in Mali" by S. B. Diarra, J. M. Staatz, and N. N. Dembélé, and "Cotton in Mali: The 'White Revolution' and Development" by J. Tefft, contained in *Democracy and Development in Mali* edited by R. J. Bingen, D. Robinson, and J. M. Staatz.

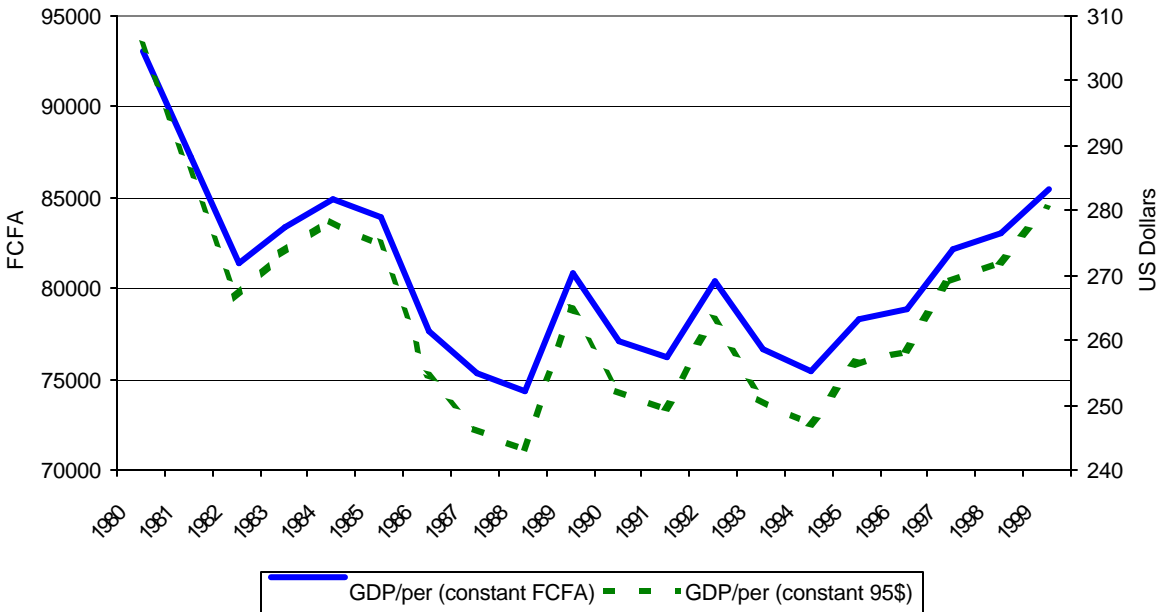
<sup>4</sup> Details of the reforms and current situation in all three of these important sub-sectors are contained in the above cited papers and many other sources, so it is not necessary to repeat them here.

<sup>5</sup> While only preliminary data are available for 2000, it is clear that GDP dropped, due largely to the downturn in cotton prices.

Many economists prefer making international comparisons in purchasing power parity terms (PPP), and in those terms GDP per person has increased by about 50 percent over the two decades from about \$500 in 1980 to about \$750 in 1999, measured in current international dollars. However, interpretation of changes in purchasing power parity over time is very difficult as there is no useful deflator for the series.

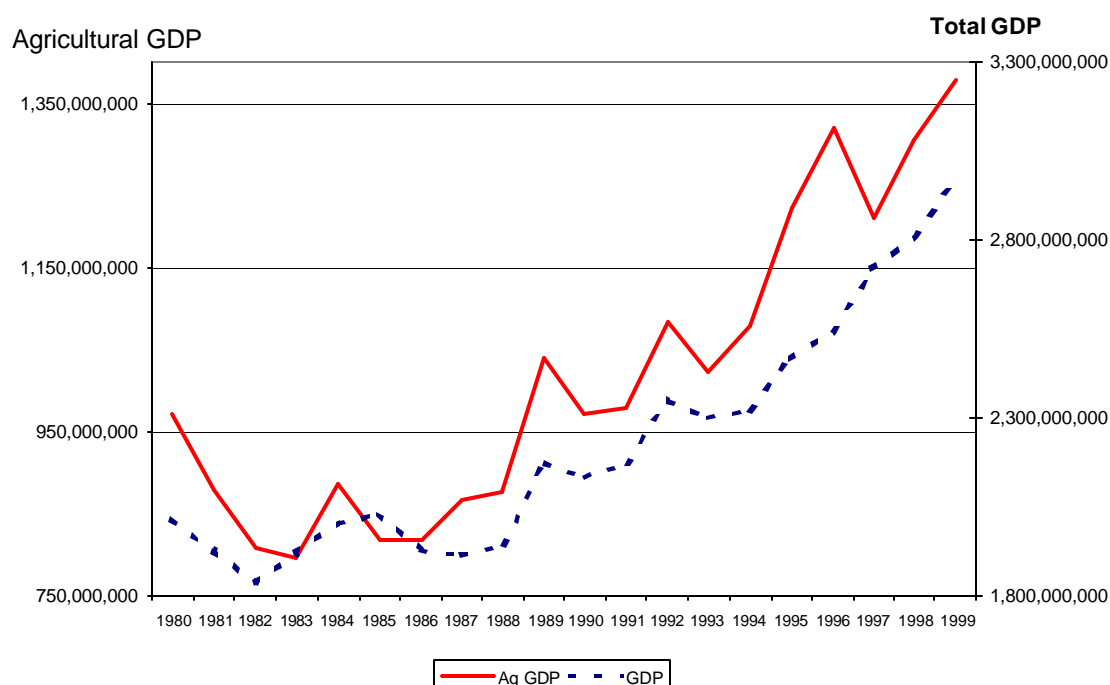
Malian economic performance is determined to a large extent by the performance of the agricultural sector. Figure 2 shows the evolution of Agricultural GDP and Total GDP in Mali over the period 1980-99. To better illustrate the linkage, Ag GDP is on the left vertical axis and GDP on the right (with different scales). One can see how changes in agriculture are generally reflected in overall GDP. Agriculture generally represents about 45 percent of total GDP, but its influence through forward and backward linkages goes far beyond that level. In fact, using regression one finds that variability in agricultural GDP explains 92 percent of the variability in Malian GDP. So it is certainly the case in Mali, as goes agriculture, so goes the economy.<sup>6</sup> Consequently, if we want to achieve higher and more consistent economic growth, we must stimulate and stabilize agricultural growth. Within agriculture in 1999, food crops represented 15 percent of total GDP, while industrial crops (mainly cotton and peanuts) represented 9 percent, livestock 10 percent, fish 1 percent, and forestry 5 percent (Annex Table 1). We return to this topic below.

**Figure 1: GDP per Capita in Dollars and FCFA**



<sup>6</sup> The importance of agriculture in stimulating economic growth and of the backward and forward linkages is covered in the section below entitled “Framework for Broad-Based Growth and Poverty Alleviation.”

**Figure 2: Agricultural GDP and Total GDP in Mali**



The low level of economic growth is reflected in other indicators of economic and social well-being in Mali. Table 2 contains information on urban and rural population, illiteracy rates, infant mortality rates, and life expectancy in 1980 and 1999, plus some other social indicators for 1998. Total illiteracy has decreased from 86 percent in 1980 to 60 percent in 1999, with similar changes in female and male illiteracy. But life expectancy at birth has essentially remained constant at about 42 years. The percentage urban population has grown from 18 to 29 percent over the two decades, but Mali remains a predominantly rural country with 71 percent of the population living in rural areas.

Sixty-four to 73 percent of Malians are considered to be poor, with most of the poor living in rural areas. Table 3 contains poverty information from a 1998 survey reported in the 2001 Poverty Reduction Strategy Paper (PRSP) and 1994 data from the World Bank.<sup>7</sup> The PRSP data are based on living conditions relative to access to food, education, health care, employment, housing, etc. Poverty incidence is classified as either very poor or poor. Twenty one percent of Malians are considered very poor and 43 percent poor for a total poverty rate of 64 percent. The rural overall poverty rate is much higher at 76 percent. Poverty in Mali is largely, but not entirely, rural. The World Bank data uses \$1/day and \$2/day income levels in measuring poverty and counts 73 percent as living below \$1/day and 91 percent below \$2/day. By any of these measures, poverty in Mali is quite high.

In addition to overall poverty indicators, the distribution of income also is important and is reported in Table 4 (1994 World Bank data). The GINI coefficient is an overall measure of the inequality of income distribution – the higher the number, the more unequal the income

<sup>7</sup> *Cadre Stratégique de Lutte contre la Pauvreté (CSLP Mali)*, 18 October 2001, and *World Development Report 2000*, World Bank.

distribution.<sup>8</sup> The GINI coefficient for Mali is 50.5, which is identical to that for Niger and essentially the same as Burkina Faso (48.2). Senegal (41.3), Ghana (32.7), and Guinea (40.3) all have lower GINI coefficients meaning more equal income distributions. However, the Mali coefficient is lower than some Latin American countries such as Brazil (60) and Chile (56.5).

**Table 2: Additional Economic and Social Indicators**

Measure	1980	1999
Illiteracy rate, total (%)	86	60
Illiteracy rate, female (%)	92	67
Illiteracy rate, male (%)	81	53
Infant mortality rate (deaths per 1000 births)	184	120
Life expectancy, total (years)	42	43
Life expectancy, female (years)	43	44
Life expectancy, male (years)	41	41
HIV/AIDS prevalence (%15-49 year olds)		2
Percentage of population denied access to services (1998):		
Water		34
Health care		80
Sanitation		94
Rural population (%)	82	71
Urban population (%)	18	29

**Table 3: Poverty Indicators in Mali**

	Percent		
	Very Poor	Poor	Total
PRSP/CLSP (1998 data)			
Mali	21.0	42.8	63.8
Urban	1.6	28.5	30.1
Rural	27.9	48.0	75.9
World Bank (1994 data)			
Percent below \$1/day	73		
Percent below \$2/day	91		

Sources: *Cadre Stratégique de Lutte contre la Pauvreté (CSLP Mali)*, 18 October 2001, and *World Development Report 2000*, World Bank.

Notes: The PRSP data are based on living conditions relative to access to food, education, health care, employment, housing, etc. Poverty incidence is classified as either very poor or poor.

<sup>8</sup> GINI coefficients normally range between 0 and 1, with 0 representing perfect equality. However, the World Bank multiplies the coefficients by 100, so we report the figures as in the original World Bank data.



**Table 4: Income Distribution in Mali**

Group	Income Percentage
Lowest 10 %	1.8
Lowest 20%	4.6
Second 20%	8.0
Middle 20%	11.9
Second highest 20%	19.3
Highest 20%	56.2
Highest 10%	40.4

*Source: World Development Report 2000, World Bank.*

## **2.2. Malian Government Objectives**

The Malian position for the WTO meetings in Doha (November 2001) summarizes nicely Malian government policy objectives:

The principal objective of economic policy of the Government of Mali is to succeed in growth oriented towards the reduction of poverty. The realization of this objective, among others, is accomplished by putting into place commercial policies and investments that aim to increase the supply of goods and services destined for export or for the domestic market, by improved exploitation of comparative advantage of the country in the framework of multilateral trade liberalization.<sup>9</sup>

### **2.2.1. Poverty Reduction Strategy Paper**

The major objectives contained in the PRSP related directly to economic growth and rural development are as follows:

- To reduce the incidence of poverty to 47.5 percent by 2006.
- To obtain an economic growth rate of 7.3 percent for 2002-06 with a rate of inflation of 2.5 percent.
- To increase food security by increasing and diversifying food sources and maximizing value of agricultural, pastoral, fish, and forestry production.
- To improve the productivity and protection of the environment in the framework of sustainable management of natural resources.

There are also objectives related to education, health care, water, sanitation, employment, housing, governance, income generating activities, infrastructure, and culture, peace, and security. The income generation objective encompasses ten actions designed in general to promote private sector development, competition, and technical competency.

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<sup>9</sup> "Les propositions maliennes à Doha," in *Les Echos*, 12 November 2001, p.4.

The PRSP contains eight major intervention areas:

- Improve the economic, political, legal, social, and cultural environment in favor of the poor.
- Promote income generating activities and self-employment aimed at the poor.
- Improve access for the poor to financial services and other factors of production.
- Promote the development of and improve the performance of agro-food chains in which the poor are concentrated.
- Improve the access for the poor to education and training.
- Promote access for the poor to primary health care, nutrition, potable water, and sanitation.
- Improve housing conditions for the poor.
- Assure an efficient coordination of the strategy.

The Malian development objectives can be summarized as poverty reduction through increased economic growth and improved access to social services targeted at the poor.

### **2.2.2. Schema Directeur du Developpement Rural**

The major objectives contained in the Malian Rural Development Strategy are as follows:

- Increase the contribution of the rural sector to the economic growth of the country by obtaining a sustained increase in the volume of agricultural production, especially food crops
- Reinforce food security by creating a socio-economic and institutional environment in the rural sector favorable to the sustainable production of agricultural goods and services by motivated and organized actors who have access to factors of production (land, credit), to intensive technologies, and to markets
- Improve incomes and living conditions of rural populations by the promotion of food systems and appropriate financial and intermediation services, and by access to basic social and agricultural services
- Protect the environment and assure better management of natural resources by the development of a body of law, regulations and institutions involving participation of all actors, the reinforcement of capacities of these actors so that they can undertake actions to restore and conserve natural resources, and to take into account management of natural resources in all agricultural development programs.

The fundamental options to accomplish these objectives are as follows:

- To disengage the state in production, transformation, and marketing sectors by the process of privatization creating an enabling environment for private sector actors
- Decentralization, by transferring power and competence to local governments and reinforcing their capacity for planning and development of their region
- Liberalizing the economy via liberalizing product markets and prices and markets for inputs and services

- The promotion of the private sector via the training and reinforcement of intervention capabilities with a view to improve the supply of services to the rural world, industrial transformation capacity for agricultural products and competitiveness
- Additional specific strategies:
  - Development of agro-food systems
  - Restoring and maintaining soil fertility
  - Promotion of rural credit

The following strategic orientations also are included:

- Increase diversity of agricultural production aimed at improving income and living conditions in rural areas
- Participate in Malian economic integration programs at the sub-regional and global levels
- Improve the legal and institutional environment for the sector
- Reinforce intervention capacities for all actors in the sector
- Strengthen regional and local planning with a view to promoting sustainable development of the sector
- Promote the rational management of natural resources to achieve sustainable development
- Promote the role of women and rural young and put in place and support mechanisms for rural solidarity

Priority intervention areas are as follows:

- Food security
- Restoring and maintaining soil fertility
- Development of irrigation
- Development of agricultural, animal, forestry, and fish production
- Development of support services

## 2.3. USAID Context

The current USAID/Mali program has three strategic objectives – youth, sustainable economic growth (SEG), and democratic governance – and two special objectives – information and communication, and development in the north. This section will focus on the SEG objective. The general objective is “increased value-added of specific economic subsectors to national income. The targeted subsectors are: cereals, livestock, alternative commodities, and financial services including microfinance.”<sup>10</sup> The SEG program is considered to be successful having met or exceeded three of four Strategic Objective (SO)-level performance indicators and 13 of 15 intermediate-level targets. Five intermediate results are as follows:

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<sup>10</sup> *FY2002 Results Review and Resource Request*, USAID/Mali, March 2000.

- Increased production of cereals, livestock, and alternative commodities sub-sectors in targeted areas.
- Increased processing of cereals, livestock and alternative commodities in targeted areas.
- Increased trade in cereals, livestock, and alternative commodities in targeted areas.
- Increased savings mobilized and credit provided by non-bank financial institutions (NBF) in targeted areas.
- Increased sustainable dryland agricultural and natural resource management (NRM) practices.

The four strategic objectives currently envisioned for the 2003-12 planning period are as follows:

- Responsible reproductive and child health
- Expanded and improved basic education
- Shared governance through decentralization
- Accelerated economic growth<sup>11</sup>

In addition, there are special objectives for information technologies and integration of the north.

The purpose of the Accelerated Economic Growth (AEG) strategic objective is to accelerate economic growth of selected subsectors in Mali. Five activity areas are envisioned under the AEG SO:

- Policy reform
- Finance
- Agro-processing
- Market development
- Environment and natural resource management

The parameters paper elaborates on the activities and performance measures for each of these areas, so it is not necessary to repeat that material here.<sup>12</sup>

## 2.4. Other Donor Activities

Mali receives external assistance from many external donors. The major bi-lateral donors are France, the European Union, United States, Germany, Netherlands, Japan, and Canada.<sup>13</sup> The major international agencies are the World Bank, UNDP, African Development Bank, UNICEF, and Arab Bank for African Economic Development. Table 5 provides a quick reference to the major activities of the larger donors in Mali. The sections that follow describe the programs of

<sup>11</sup> *Country Strategic Plan: Parameters Paper for FY 2003-2012*, USAID/Mali, March 2001.

<sup>12</sup> *Ibid*, pp.15-18.

<sup>13</sup> The European Union program here is treated with the bi-lateral programs, since it functions much like the other bi-lateral programs. Also, since Japan does not have an office in Bamako, we could not get information on their program but understand it is largely gifts of goods and financial resources. Japan provides support for the ON. Japan is the third largest donor in the country.

those donors and agencies that have major programs directly relevant to economic growth and rural development.

**Table 5: Major Activities of Larger Donors and Lenders in Mali in Rural Development**

Activity Area	France	Germany	United States	Netherlands	European Union	Canada	World Bank
Office du Niger – irrigation	■				■		■
Transport	■				■		■
Cereals market restructuring	■		■	■	■	■	
Decentralization	■		■	■	■	■	■
Other rural development	■		■		■		■
Micro-finance	■		■	■		■	
Environment	■	■	■	■	■		■
Agricultural research	■			■			■

■ =major area & large donor    ■ =some activity

### 2.4.1. France

France is the largest bi-lateral donor and provides about 30 percent of the bilateral aid to Mali. With such a large program, the French are working on many different activities. They are providing considerable assistance to institutions working in agriculture and especially in the CMDT areas. They also assist the Chambre d'Agriculture, agricultural unions, and other agricultural associations. They provide studies, training, and technical assistance in many areas related to rural development. For example, they provide policy analysis and technical assistance to the direction of planning and statistics of the Ministry of Rural Development (MDR). Some of the important activities related to rural development are as follows:

- Analysis of production systems for cotton, rice, and livestock
- Cotton restructuring
- Office du Niger – assistance with the *Schema Directeur*, construction of irrigation perimeters, and rehabilitation
- Livestock – assistance with private veterinary services and professional organizations
- Agricultural credit through assistance to the Agricultural Development Bank
- Decentralization – helping the rural communes and providing financial funding for the communes in four circles
- Environment – assistance to the environmental ministry and for improved management of the Niger River
- Agricultural research – support for IER

In addition to their work in these areas, the French are also working in health, education, potable water, and other areas.

### **2.4.2. Germany**

Germany is the second largest (and may be the largest depending on what is counted) donor to Mali at present. Its program covers rural development, environment, mining, energy, transport, private sector development, health, education, and the financial sector. GTZ implements the German Ministry of Foreign Cooperation's aid programs. Mali is Germany's biggest aid recipient on the African continent with a programmed budget for 1999/2000 of about 85 million DM. GTZ provides leadership in donor coordination on the implementation of the National Environmental Action Plan while maintaining its long-running investments in anti-desertification programs, integrated pest management, and approaches to desert locust control. It provides the senior advisor to the Minister of Equipment, Territorial Infrastructure, Environment, and Urban Development. Senior advisors are also posted to the Ministry of Health, and GTZ has programs covering HIV/AIDS, and women's and children's health. A senior advisor is also posted to the Ministry of Finance complementing assistance to enhanced structural adjustment and the development of central and decentralized budgeting and physical implementation of development budgets. Along with the German credit fund KfW, GTZ supports infrastructure development, irrigation rehabilitation, energy development of all kinds, and transport programs. It is also an active participant in the development of micro-finance institutions. German aid also supports communication programs and the post-conflict reconciliation and development programs in Northern Mali.

### **2.4.3. Netherlands**

About half of the assistance from the Netherlands comes in the form of direct budgetary assistance to the GOM. The remainder is allocated to rural development, education, health, and the environment. The Dutch are in the process of reducing the total number of projects and are trying instead to invest in national programs. In addition, they are trying to link as closely as possible with the PRSP. They are involved in the national rural infrastructure program (PNIR) and Agricultural Services and Producer Organizations Program (PASAOP). They have supported the ON since the 1970s. They have funded rehabilitation, new extension of secondary and tertiary canals, rehabilitation of canals outside the formal irrigation scheme so that they may be brought into the formal scheme. The Dutch also played a key role in helping to introduce small rice mills to the ON in the late 1980s, which revolutionized rice milling and marketing in the zone. They are funding 4000 hectares this round. They have not decided whether or not to continue in irrigation after next year.

In addition to the support for ON, the Dutch are also supporting agricultural research (IER) and the Chambre d'Agriculture. They are interested in horticultural products because a considerable fraction of farm income in the ON comes from horticultural products done mainly by women. They are now doing a study on horticultural products to evaluate future options. In addition, the Dutch are providing technical assistance for communes and cercles. They have also moved into micro-finance starting in 2000. They are very interested in improving donor coordination and have found good donor coordination in the Office du Niger.

#### **2.4.4. European Union**

The European Union has in the past worked in most of the major development sectors in Mali. It was active in the Office du Niger, cotton, livestock, environment, and small-scale irrigation. In the future, the EU intends to focus less on projects and more on programs. The resources in their next five year program (about 375 million Euro) is allocated mainly to two areas: transport and decentralization.

The EU also would like to see better donor coordination, but it they believe it must be led by the Malian government. The EU itself plays a role in coordinating European donors, but does not include other major donors such as the U.S., Canada, and Japan. Also, the EU provides input and comments on World Bank projects in Mali.

#### **2.4.5. Canada**

Canada is the sixth largest donor in the country. They are providing assistance in education, health, economic growth, governance, and basic program support. In economic growth, they have allocated significant resources to agriculture and micro-finance. Much of their work is in Diré, north of the Segou region, and is focused on increasing wheat production and providing means of generating off-farm income, especially for women.

#### **2.4.6. World Bank**

The World Bank representative described the Bank's current projects as focusing on three areas: assistance to producer organizations, rural infrastructure, and agro-processing. For the first area, the major current project is called PASAOP. The purpose of the project is "to alleviate poverty in Mali through sustained labor productivity increases brought about by technical change in agricultural and non-agricultural rural productive activities."<sup>14</sup> The project is divided into three phases, with phase one (3 years) involving a loan of \$43.5 million. Phase one is institutional reform and restructuring of the Ministry of Rural Development (MDR). It also includes strengthening of the Chambre d'Agriculture and producer organizations. During phase one, national strategic action plans for rural education and training and for rural information and communication will be prepared. Phase one also will support the national AIDS prevention program (PNLS) in rural areas. Phase two (4 years) begins implementation of the new decentralized demand-driven agricultural service delivery system. In this approach, research and extension funding will be decentralized so that local communes can choose the research and extension they want and who will be the vendor of those services. Phase 3 (4 years) is intended to "complete the integration of the national agricultural knowledge system and ensure its technical and financial sustainability." If the project moves as planned, additional loans would become available for phases 2 and 3 of the project.

The infrastructure project (PNIR) includes irrigation, small roads, and potable water. Irrigation in the Office du Niger is an important part of the project. There is investment in primary and secondary canals, but the secondary must be repaid by farmers. The reimbursement goes into

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<sup>14</sup> Project Appraisal Document, Agricultural Services and Producer Organizations Project, World Bank, October 26, 2001.

a revolving fund to continue expanding operations. There is also support for small-scale irrigation using pumps to bring water from the river.

The agro-processing project is aimed at improving quality of agro-processed products to meet the quality standards of the international market. The USAID CAE project works well with the World Bank project in this area. The Bank project ends in December 2002, and the representative felt it important that the USAID project continue.

The World Bank also has been actively involved in efforts to restructure the cotton sector. A study is now underway on how best to accomplish the privatization and restructuring. Privatization could begin as early as 2005.

The Bank representative also discussed donor coordination and collaboration. Exchange of texts was mentioned as one area of coordination. The representative also indicated that other donors were welcome to insert themselves wherever appropriate into Bank projects.

## **2.5. Lessons from Past Experience**

There are several important lessons learned from development experience in Mali and West Africa that need to be taken into account in creating a new strategic plan for USAID interventions over the next decade:

1. Good donor coordination is essential. Programs that have had good donor coordination such as the cereals marketing reform project generally have been more successful. In addition, the expected payoffs from improved coordination are quite large. Also, donors should do more specialization in areas for which they have a comparative advantage and leave other areas for other donors. It is neither necessary nor desirable that all donors work in all areas.
2. Proper sequencing of reforms is important. In the cereals marketing reform program, the monopoly marketing institutions had been eliminated before the 1994 devaluation. Because of that, the benefits of the devaluation were passed on through the marketing system to producers. Had the monopoly traders still existed, in all likelihood, they would have captured many of the rents from the devaluation.
3. Hard-nosed realistic assessments of investment and intervention possibilities are very important. On the surface, many value-added opportunities look promising. But the hard reality is that Mali is a very poor land-locked country with very poor infrastructure. Investments and interventions must consider that reality. Generally, investments that increase productivity in basic production, improve infrastructure, help establish the pre-conditions for success of a market economy, and target export activities will have the highest payoffs in economic growth and poverty reduction.
4. Reform is a process, not an event, and there has been a high payoff to USAID's "staying the course" on policy reform over the long-term and engaging building long-term



collaborative arrangements with the Malian government and donors on these issues (e.g., through the PRMC).

5. There has been a very high payoff to building local analytic capacity in Mali to help participate in and guide policy reforms. This has helped foster greater Malian ownership of the reforms and contributed to a “learning by doing” approach to reform rather than the sterile ideological debates that have accompanied reform efforts in other countries.
6. There are strong positive interactions between cash-cropping and food-cropping activities. Cash-crops often serve as the motor to capitalize farms and finance local infrastructure, which contribute to expanded food crop production and higher farm and non-farm incomes.
7. Market reforms have been quite successful, but many problems remain in assuring consumers of reliable and affordable coarse grains in Mali. Most of the problems are due to structural problems in coarse grain production and high transportation costs in Mali.

### **3. Framework for Broad-based Growth and Poverty Alleviation**

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#### **3.1. The Link Between Agricultural Productivity and Poverty: An Overview**

A tremendous amount of research has been done on the linkages between changes in agricultural productivity and poverty levels.<sup>15</sup> Thirtle, et al. summarize the literature as follows:

The literature provides overwhelming theoretical and empirical evidence that agricultural growth is essential, especially in the poorer developing countries. It identifies the diverse roles that agriculture plays in the process of growth and development on the one hand, and the link between economy-wide growth and poverty alleviation on the other. In this indirect way, this literature shows how agricultural research generates productivity growth that improves the living conditions of the poor.

. . .Agricultural research generates new technologies that increase agricultural productivity. Agricultural productivity growth has an impact on GDP growth, both directly and through agriculture's linkages with the broader economy, that generate increases in non-farm incomes. Both agricultural growth and GDP growth have impacts on inequality, poverty and nutrition.

Of course, to obtain the benefits from the agricultural research, policies must be in place that enable the link between research gains, productivity increases, economic growth, and the consequent poverty reduction and nutrition improvement. Some of the important conclusions from the research in this area are as follows:<sup>16</sup>

- Two sector growth models, such as Matsuyama (1992) established that subject to reasonable assumptions, accelerating economic growth requires growth in agricultural productivity.
- Irz and Roe (2000) develop a multi-sector growth model that leads to two important results. First, in a largely agrarian economy, a minimum rate of productivity growth in agriculture is necessary to counter population growth and avoid the Malthusian trap. The second result states that a relatively small difference in agricultural productivity can have a major impact on the speed of industrialization and the overall development process, consistently with the results of Matsuyama (1992).

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<sup>15</sup> Much of this material is taken from a paper by Colin Thirtle, et al., "Relationship Between Changes in Agricultural Productivity and the Incidence of Poverty in Developing Countries," DFID Report No. 7946, 2001.

<sup>16</sup> The citations here come from the Thirtle paper.

- Kanwar (2000) uses Indian data to establish that growth in agriculture, infrastructure and services are all causally prior to growth in manufacturing and construction, but the reverse is not true. Rangarajan (1982) quantifies this effect, showing that 1 percent growth in agriculture generates 0.5 percent growth in manufacturing and 0.7 percent growth of the overall economy.
- Wichmann (1997) showed, based on a dynamic general equilibrium model, that an increase in agricultural productivity can lead to significant increases in the household consumption of the poor.
- Datt and Ravallion (1996) show that the sectoral composition of economic growth matters to the poor in India. First, rural growth reduces poverty both in rural and urban areas, but urban growth does not alleviate poverty in rural areas. Second, a decomposition of growth in terms of output sectors establishes that growth in the primary sector benefits the poor in both urban and rural areas, while growth in manufacturing has no impact on poverty in either. Woden (1999) produces similar findings for Bangladesh, where simulations show that rural growth reduces poverty 3 percent more than urban growth, by 2008, and the differential effect on the poverty gap is greater. Throbecke and Jung (1996) come to similar conclusions for Indonesia using simulations from a SAM. The significance of agriculture for poverty reduction is also confirmed by results from cross section data sets.
- A cross-country examination of the relationship between growth and poverty by Gallup et al. (1997) establishes that a one percent increase in agricultural GDP leads to a 1.61 percent increase in income of the poorest quintile, while the corresponding values for the manufacturing and services sectors are only 1.16 percent and 0.79 percent. Other cross-country studies (Timmer, 1997; Bourguignon and Morrisson (1998)) provide further evidence of the pro-poor bias of agricultural growth.
- Mellor (1999) argues that agricultural growth reduces poverty so effectively, as in addition to generating income for poor farmers, it generates demand for goods and services that can easily be produced by the poor (non-durable consumer goods sold by small shops, market trading services, hoes, plows and other capital goods etc).

These are only a few of the many studies that have demonstrated quite conclusively that agricultural growth is imperative to achieve overall economic growth and poverty reduction. Hazell and Haddad characterize the linkages as follows:<sup>17</sup>

In poorer countries, agriculture typically accounts for the lion's share of national income, employment and export earnings. Under these conditions, even a modest growth rate for agriculture can have significant leverage on the national economy. Rapid agricultural growth contributes to the economic transformation in a number of important ways. It supplies basic foods, raw materials for agro-industry, and exports, and frees up foreign exchange for the importation of strategic industrial and capital goods. It releases labour and capital (in the form of rural savings and taxes) to the non-farm sector. It generates purchasing power among the rural population for non-food consumer goods and services and therefore supports growth in services and trade and provides a nascent market

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<sup>17</sup> P. Hazell and L. Haddad, *CGIAR Research and Poverty Reduction*, IFPRI, 2000.

for an emerging manufacturing sector. It reduces poverty by increasing labour productivity and employment, and by lowering food prices for all.

Thirtle, et al. do a cross-section analysis of the relationship between agricultural productivity and poverty using World Development Indicators data from the World Bank (2000). They do several statistical analyses relating land and labor productivity to poverty measures, specifically the proportion of people living on less than \$1 per day. Their results clearly demonstrate a strong statistical relationship between agricultural productivity and poverty. Depending on the model and data set used, a 10 percent increase in crop yields leads to a reduction in the percentage of people living on less than \$1 per day of between 6 and 12 percent. For African countries, a 10 percent increase in yields leads to a 9.4 percent decrease in the percentage of those living on less than \$1 per day. Thus, research from the 1960s to the present clearly demonstrates the importance of agricultural development in stimulating economic growth and reducing poverty. It is for this reason that this analysis focuses on measures to stimulate growth in agricultural productivity.

## **3.2. Agricultural Strategy and Poverty Reduction in Mali**

Poverty dominates Mali. Seventy three percent of the population falls below the World Bank's \$1/day poverty line (Table 3). It is by that definition of poverty that the OECD/DAC, and the foreign assistance donor community generally, set targets to reduce poverty by half by 2015. The bulk of poverty reduction occurs through increased income of the poor – hence the OECD/DAC primary focus is on income poverty, even while setting targets for education, health, and gender. Indeed, reducing the latter aspects of poverty is highly complementary with reducing income-related poverty. Furthermore, without sustained economic growth, countries will lack the resources needed to sustainably fund programs aimed at improving health, education, and expanded opportunities for women. This report to USAID focuses on achieving poverty reduction through productivity increasing growth in the agricultural sector. This section demonstrates the connection between the agricultural growth recommended in this report and poverty reduction.

### **3.2.1. Causes of Poverty Reduction**

The poor have few assets other than labor, and so it is increased employment that brings the bulk of poverty reduction. Increased employment increases incomes of the poor by increasing the amount of time bringing in income, and, as increased employment tightens the labor market, by raising real wages. Rapid poverty reduction comes when employment grows enough faster than labor force growth, for a long enough period of time, to bring a substantial increase in real wage rates. Thus, in relating agricultural growth to poverty reduction one must ask what the contribution of agriculture is to employment growth. The poor also benefit from lower relative food prices as agriculture grows rapidly, but that is a natural accompaniment of the employment impact. Food security is, of course, closely related to poverty.

### **3.2.2. Agriculture and Employment Growth, Sectoral Shares**

Because agriculture is so large, even a less than proportionate increase in employment is important in aggregate. Far more important, the increased incomes of prospering farmers are

largely spent in rural areas, including the small market towns. In very low-income societies such as Mali, that creates an important market for agricultural produce. But, expenditure on rural non-farm goods and services is also important. To the extent that this expenditure is on domestically produced goods rather than imports, the expenditure further stimulates economic activity and growth. Further, as farmers prosper they increasingly substitute hired laborers, who are amongst the poorest people in rural areas, for family labor. That substitution of hired for family labor is particularly important in the case of family labor from children and wives, both in farm production and in household work as maids, which is a major source of employment for the poor.

These powerful, indirect effects of rising agricultural incomes explain why recent studies of the structure of growth show that rural growth is far more powerful than urban growth in reducing poverty. The same is true for agricultural growth compared to manufacturing growth. The analysis in this section is fully consistent with those intertemporal and international studies.

Economic data are rarely categorized in a manner to show the effect of agricultural growth on employment (and hence on poverty reduction). Table 6 presents reasonable approximations of the necessary data for Mali, constructed from national income accounts, including those in the World Banks “World Tables.” In essence, this table reflects the growth rates for the various sectors that would be necessary to achieve an overall economy growth rate of 4.9 percent. Annex 2 presents the data from which Table 6 is derived and a full set of explanatory notes on assumption and calculations.

**Table 6: Employment Growth, and Related Data, by Sector, Hypothetical Projections for Mali from 1999-2000**

Sector	Gross Domestic Product			Employment			
	Size of Sector (% GDP)	Growth Rate	Share of GDP Growth	Base Percent	Elasticity	Growth Rate	Share of Employment Growth
Rural Sector	70	5.6	80	90		3.7	94
Agriculture, tradable	22	6.6	30	22	0.6	4.0	22
Agriculture, non-tradable	25	3.8	19	33.5	0.6	2.3	20
Rural non-farm	23	6.6	31	34.5	0.9	5.9	52
Urban Sector	30	3.2	20	10		2.2	6
Formal (tradable)	0.9	8	15	0.9	0.4	3.2	1
Non-formal (non tradable)	0.7	3.4	5	6.3	0.9	3.1	5
Foreign aid	14	0	0	2.8	0.0	0.0	0
Grand Total	100	4.9	100	100	3.9	3.7	100

Explanatory Notes: See Annex 2.

Most striking, in Table 6, is that 94 percent of incremental employment is generated in the rural sector. Of that, well over half is in the rural non-farm sector. The urban sector, excluding small market towns that are included as rural, accounts for only six percent of incremental employment. That portion is so small in substantial part because foreign aid, which represents 14 percent of GDP, is shown as not growing (it fell by half in the five years up to 2000). Thus, the fast growth of eight percent shown for the urban formal sector is offset by the lack of growth in foreign aid. Consequently, the multiplier to the labor-intensive urban non-formal sector is quite modest.

The rural non-farm sector bulks so large in employment growth for three reasons: it is large, it experiences fast growth (by assumption), and it is very employment intensive. It is difficult to establish the size of the rural non-farm sector, but placing it about half as large as agriculture in proportion of GDP seems consistent with data on sources of income on farms and labor force data (see Annex 2.) The rural non-farm sector includes many people who may be nominally declared as farmers, but who in fact derive a high proportion of their income from rural non-farm activities.

Demand for the rural non-farm sector's output is determined by the growth of farm incomes. The farmer's marginal propensity to spend on the sector is high. The standard is to multiply the growth in per capita farm income by 1.5 (annex 2) and then add the population growth rate to obtain the growth of the sector. That is consistent with a marginal propensity to spend on the sector of 0.5 – that is, half of incremental income is spent on rural non-farm goods and services.<sup>18</sup>

It is further assumed that labor productivity does not increase much as the rural non-farm sector expands. While agriculture expands substantially through technological change, the rural non-farm sector is driven by rising demand from rising farm incomes. Expansion is largely through increase in the number of enterprises not growth of existing enterprises. That confirms the tendency for factor proportions to remain the same and hence for labor productivity not to rise significantly. Agriculture and the formal urban sector both tend to expand with rising labor productivity, thereby diminishing the effect of growth on employment.

The growth assumptions in Table 6, provide an overall growth rate of employment of 3.9 percent. That is 1.7 percentage points greater than the labor force growth rate of 2.2. With the increase in the growth rate from increasing weight of the faster growth sectors and the benefit of compounding, employment will increase by about 10 percentage points more than the labor force growth over a five year period. That should tighten the labor market somewhat. Consequently, assuming a five percent increase in real wage rates might be reasonable. With the impact concentrated on the poor (who comprise bulk of the laboring classes) that would represent a 20 percent increase in their real incomes. Assuming half the poor are 20 percent below the poverty line, that increase would lift half the poor above the poverty line in five years. The assumptions here are substantial but consistent with the record in other countries (e.g. Mellor for Rwanda and Egypt.) The important question is can the 5.1 percent growth rate in

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<sup>18</sup> Because we do not have good estimates of these multipliers and linkages for Mali, these values should be treated as “best guesses” at this point.

agriculture be achieved. It should be noted in passing that the 7 percent growth rate of aggregate GDP assumed in the PRSP is unlikely to be achieved, since it must assume an even faster growth rate in agriculture than the 5.1 percent assumed here.

### **3.2.3. Composition of a High Agricultural Growth Rate**

If agricultural GDP grows only at the population growth rate, the rural non-farm sector grows at slightly less than the population growth rate. The multiplier of 1.5 applies only to increase in per capita income. Agricultural employment will probably grow at less than the population growth rate. Thus, agriculture's contribution to employment growth depends on an agricultural growth rate faster than the labor force growth rate. Is that feasible? One way to assess that question is to decompose the overall agricultural growth rate into component parts that can be related to the strategy in this report. Then, each component can be judged for reasonableness. In general, this report makes function specific recommendations, but they can be related to commodity-based sectors, as is done below.

Table 7 shows the composition of the growth rate of 5.1 percent shown for agriculture. Are these predictions of future growth? Of course not. They provide a basis for judging what has to be done to achieve a growth rate in agriculture that will make a substantial impact in reducing poverty. This report is concerned with the priorities and policies required to provide some prospect of achieving such growth rates. To the extent that given growth rates are not achieved in some sub-sectors, others will have to grow faster, or progress in poverty reduction will be reduced. This section makes it clear how important it is to make every effort to implement the priority actions and to have them succeed in substantially raising the agricultural growth rate if poverty reduction targets are to be met.

Note that in Table 7 agriculture is divided into tradable and non-tradable subsectors. That is because at least initially major portions of agriculture have to grow faster than domestic demand. Those are the tradable components.

#### ***Crops, tradable***

The tradable crop sector is comprised largely of exports beyond the region – principally cotton.<sup>19</sup> That sub-sector comprises over one-third of agricultural GDP. For that sector, demand is fully elastic since Mali does not export enough to influence global prices. The constraints on growth are technology, world price, and area. A growth rate of 7 percent has been assumed for this sector. That is a very rapid growth rate that requires significant improvement in technology as well as substantial expansion in area. A reasonable assumption would be for the growth to be equally split between the two.

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<sup>19</sup> Increasingly rice is a regional export, and there is considerable potential to expand regional rice exports.

**Table 7: The Composition of a High Growth Rate for Agriculture, by Subsectors, Mali, Subsequent to 2001**

Sub-Sector	Percent Agricultural GDP	Growth Rate, Percent	Proportion of Growth
Crops, Tradable	27	7.0	37
Livestock, Tradable	20	6.0	24
Livestock, Non-Tradable	6	6.0	7
Crops, Non-Tradable	33	4.0	26
Forestry, Non-Tradable	14	2.2	6
Total/Average	100	5.1	100

*Explanatory Notes: Annex 2*

The recommendations in this report include assistance to growth in area and productivity of irrigation. It is assumed that other donors, particularly France and the World Bank, will ensure rapid improvement in the technology of cotton production.. This report also recommends emphasis on rice, export horticulture for regional markets, and some industrial crops. Currently these crops represent only a tiny proportion of agricultural GDP. However, they can over the longer term expand to contribute significantly to the export sector and contribute to achieving the high growth rate postulated for this sector.

### ***Livestock, tradable***

Currently close to half of livestock production is exported. Table 7 assumes that the entire livestock sector except milk and eggs are exportable (about three-quarters of the livestock sector). There is also some potential for import substitution for milk and eggs. The market for livestock, unlike cotton, is largely in neighboring countries of the region.

An optimistic assumption has been made that the tradable livestock sector can expand by six percent a year. That requires a combination of rapid growth in demand in the neighboring countries, an assumption belied by the current stagnation in much of that set of countries. However, the coastal countries have scope for rapid growth due to their potential strong agriculture export sectors. They also have greater scope in the short run for expansion of their non-farm sectors. Alternatively, technological improvement in the Malian livestock sector could increase competitiveness and hence market share in the neighboring countries. To achieve that potential, this report places a high priority on improving the domestic livestock feed industry, reduced transport costs, and improved market information. That is the logical route to decreased costs of production. In any case, achieving a 6 percent growth rate in livestock production requires technological advance through improved feed and feeding practices. Expansion of pasture capacity seems unlikely to support a high rate of growth in the livestock sector.



### ***Non-tradable agricultural sub-sectors***

Over half of the agricultural sector is seen as non-tradable (see Delgado et. al. for a full exposition of this view).<sup>20</sup> That means that the bulk of demand must come from domestic sources and that necessarily means from growth in agricultural incomes.

The largest component of the non-tradable sub sector of agriculture is the crop sector, primarily coarse grains. The bulk of effective demand for increased production of coarse grains must come from rising incomes within Mali. Although that demand will be largely for direct food consumption, a significant potential lies in increasing the feeding of coarse grains, particularly maize, to livestock.

The growth rate of 4 percent for the coarse grains sector is based on two reinforcing assumptions. First, it is consistent with the growth of domestic demand for food, assuming the growth rate in GDP shown in table 6 and a high-income elasticity of demand of .67. That elasticity is consistent with the high proportion of the population under the poverty line. Demand could grow faster if substantial quantities of coarse grains are pulled into a rapidly expanding livestock sector or if exports to neighboring countries grow rapidly. Second, it is consistent with reasonable assumptions about the pace of technological progress in coarse grains production.

A 4 percent growth rate in coarse grains production presumes a somewhat faster than 4 percent rate of increase in yields. That is because the area in coarse grains will contract with expansion in the irrigated area. This report recommends a priority to production of improved seed and an associated increase in fertilizer use. A 20 percent increase in yields from that package, achieved over 5 years, would provide roughly the 4 percent growth rate in coarse grains production.

The growth rate of 6 percent for non-tradable livestock (largely milk and eggs) is consistent with the income growth projected and an income elasticity of demand of 1.4. That elasticity is consistent with the income elasticity of demand for those products in countries with similar income levels to Mali. Although arrived at quite differently, the growth rate assumed for tradable and for non-tradable livestock is the same, at six percent. Thus, the two sectors can be seen as substitutable. For the non-tradable portion of livestock the same increases in productivity, achieved through improved feed and feeding practices is critical to success.

The forestry sector is quite large at 14 percent of agricultural GDP. The sector produces largely fuel for domestic use, is considered as non-tradable, and is expanding at the same rate as the labor force. That in turn assumes inelastic demand, with increments in fuel consumption coming from non-domestic forestry sources.

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<sup>20</sup> In fact, there are some coarse grains traded regionally, and there may be increasing potential in the future.

### **3.2.4. Implications For Poverty Reduction**

The content of Tables 6 and 7 has chastening news for poverty reduction. The urban sector cannot achieve growth rates sufficient to make a significant dent in present poverty levels. That is because it is so small, a position reinforced by the heavy weight of foreign aid in the urban sector. Even the urban non-formal sector cannot be expected to expand rapidly. Moving to new heights with a higher growth path is a formidable task.

Thus, the burden for employment growth and poverty reduction falls on agriculture, particularly through its multipliers to the labor intensive rural non-farm sector. Even with an assumption of a 5.1 percent growth rate in agriculture, its multipliers are still modest and the employment impact, while accumulating to something quite substantial in five years, will be all too low if there is a significant shortfall in the agricultural growth rate.

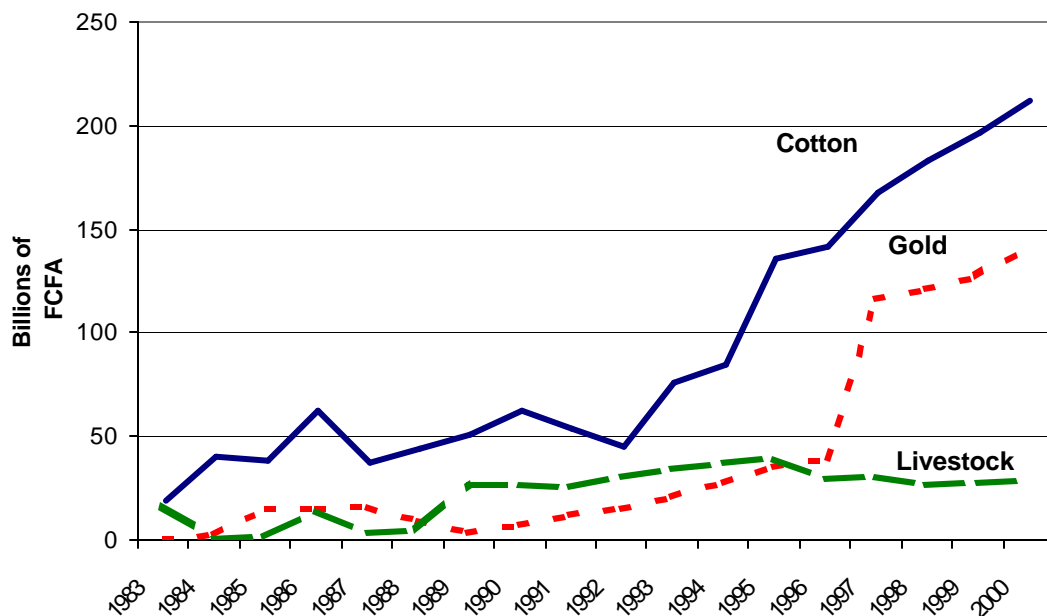
As shown in the discussion of Table 7, the 5.1 percent growth rate for agriculture presumes stellar performance in each agricultural sub-sector. That requires a substantial set of actions as delineated in this report and clear priority to those actions. Indeed - a formidable task, but there is no other option. The rest of this report is designed to providing understanding of the base situation, and from that, to seeing the priorities needed to succeed in this formidable task. This chapter demonstrates that success in increasing agricultural productivity and growth will cause a major reduction in poverty levels.

## 4. Strategic Opportunities and Challenges for Key Agricultural Subsectors

### 4.1. Overview

This section provides sub-sector by sub-sector a review of the key constraints, opportunities, and possible interventions. For each sub-sector, background information is provided that forms the basis for the analysis of constraints and opportunities. Annex Table 1 contains the share of GDP for each sector and major agricultural sub-sector of the economy. In terms of exports, three commodities (cotton, gold, and livestock) represent 90 percent of Malian exports. The export values over time are depicted in Figure 3. Cotton and gold constitute about 80 percent of all exports. Cotton exports have been growing rapidly since 1992, and gold has grown significantly since 1996. Livestock exports, which increased in 1994 following the CFA devaluation, appear to have stagnated since then. Increasingly, rice is being exported within the region, but the level is still small. Also, some sorghum and millet is traded regionally, but at present, small quantities are involved. There is growing export potential for horticultural and poultry products, and these are discussed in greater detail below.

**Figure 3: Major Malian Exports**



## 4.2. Cotton

Production of seed cotton and lint for export has historically been the most intensively managed and supported commodity subsector in Mali. It is managed by CMDT, owned jointly by the GOM and the former *Compagnie Française de Développement des Fibres Textiles* (CFDT), known now as DAGRIS. The Malian government and DAGRIS hold 60 percent and 40 percent, respectively, of the subscribed capital share of CMDT. Until the late 1980s, CMDT carried out ginning and marketing of seed cotton on the behalf of the government, operating with a pre-approved annual budget under the supervision of the Ministry of Finance. All export revenues from cotton were deposited in a government account and used to finance both the CMDT's pre-approved budget and cotton taxes and related expenses.

In the late 1980s, the government introduced a reform program for the cotton subsector by granting an autonomous status to CMDT and putting in place a system of performance contracts. The measures implemented were: (a) replacing the 3 percent export tax with a corporate profit tax; (b) complete separation of commercial and industrial activities of CMDT from the rural development activities now executed on behalf of the government; (c) linking farmgate prices of seed cotton to world prices for lint through a mechanism based on the combination of a floor price and a profit sharing formula, whereby farmers receive a guaranteed price in addition to a percentage of the cotton subsector profits; (d) establishment of a Floor Price Support Fund to insulate the subsector from short-term price fluctuations in the world market; and (e) capping of CMDT's overall purchasing, processing and marketing costs per kilogram of cotton fiber at preset levels in order to increase efficiency, with government deducting all CMDT's cost overruns from its share of profits while allowing CMDT to keep all cost underruns.

Since the mid-1980s, the relationship between the GOM, CMDT and producers has been governed by the *Contrat-Plan* that lays out the roles and responsibilities of each entity.

### 4.2.1. Subsector Organization

The cotton subsector comprises a well-integrated system spanning from input distribution to the marketing of cotton fiber. The CMDT approach begins with a varietal breeding research program that integrates Mali's national agricultural research program at the *Institut d'Economie Rurale* (IER) into a network of other West and Central African breeding programs managed by CIRAD. Newly released seed varieties are tested and adapted to the Malian physical environment through a tight working relationship between IER, the CMDT extension services, and farmers. Seed is provided to farmers free of charge. Meanwhile, farmers purchase other inputs (fertilizers, fungicides, and equipment) through the CMDT-managed credit system that enables the CMDT field agents to deduct the loan amount from the value of the output.

Seed cotton produced by farmers is collected mainly by Village Associations (AV). CMDT involvement in collection is marginal and takes place only in villages where an AV has not been set up. The price for seed cotton is fixed before the agricultural season by a committee composed of CMDT, the Ministry of Finance, and the Producers' Association.

This highly integrated management and commercial system has resulted in rapid production growth over the past decade. Farm level yields grew rapidly in the late 70s and 80s, averaging 1300 kg/ha in the late 1980s. Inadequate farmer incentives, poor cropping practices (including inadequate input and manure use) and pesticide resistance have contributed to a recent drop in yields. On-farm yields that averaged over 1200 kg/ha in 1995 were below 1000 kg/ha in 1999, although the best farmers reach 1500-2000 kg/ha. This decline in average yields is due in part to expansion in area to less productive soils. The recent productivity trend raises the issue of cotton production sustainability in the years ahead and calls for vigorous action to maintain and raise productivity in the future.

With the decline in productivity, increases in seed cotton production resulted from area expansion in the traditional production zones and those in the new production regions such as Kayes. Seed cotton and lint production expanded rapidly after the 1994 devaluation of the CFA franc, surpassing 500,000 tons in 1998/99. However, production dropped significantly in 1999, due to the combined effect of a downturn in world market prices, CMDT mismanagement, an ineffective attempt to renegotiate producer prices, and failure to consider farmer grievances resulting in a cotton boycott. These events led to the arrest of the top CMDT management, a financial crisis at the CMDT, greater financial assistance from the French government, which was contingent on greater French technical assistance, and a politically expedient but financially unsustainable agreement to pay farmers 200 FCFA/kg for seed cotton in 2000/2001. Because of the cotton crisis, the Government of Mali has set up, under the Prime Minister's leadership, a unit in charge of reflecting on how best to restructure the cotton subsector. According to information provided by this unit, restructuring experience in West Africa and other parts of the world will be fully integrated into this reflection exercise to safeguard the viability of the cotton subsector and improve its competitiveness in the years to come.

#### **4.2.2. Assessment of Value-Added Potential**

Experience in many high-income countries has shown that textile and apparels have laid the foundation for industrialization by learning the basic skills for manufacturing. Some think that Mali could venture into textiles to add value to its locally produced cotton fiber. However, we concur with the AIRD 1999 report and do not suggest investment in downstream processing sectors.

One potential value added activity that could help to increase income is the design of the fabric called "bogolan" consisting of drawing beautiful pictures on a traditionally woven cloth. Although efforts have not been focused on this activity, it could represent an important source of income generating activity for the young and skilled urban unemployed. There is some anecdotal evidence that the market for this product may be growing.

Mali could also attempt to venture into processing cotton fiber into swab to substitute for the imported one. Steps need to be taken to target the regional market where the demand for swab has expanded in recent years as a result of esthetic needs following urbanization. At the same time, there has been expanded use of "compress" in the region and Mali could position itself to be a supplier of the regional market.

### 4.2.3. Factors Affecting Competitiveness and Value-added

#### **Key constraints**

There are several important constraints to improving competitiveness and value added:

- *High transport cost* – Because of its poor transportation infrastructure, Mali has very high “natural” transport costs. On top of the basic high cost, the government taxes transport such that the effective cost of transport is much higher. The tax situation is very complicated, and there is no easy fix.
- *Inefficient transformation and marketing system* – According to an unpublished World Bank paper, cotton seed prices for 1984-97 for Mali, Zimbabwe, and India, were 42, 72, and 90 percent respectively of lint export prices. Monopsony losses to farmers in Mali were substantial (Sanders 1999).
- *High energy cost and limited supply* - It appears that one of the most binding constraints to enhancing value added for cotton is the limited supply and high cost of electrical energy in Mali. Though the installation of the first turbine at the Manantali dam will be completed soon to expand energy supply, the increasing demand for electricity resulting from rapid urbanization will be hardly met, and it will be difficult to satisfy additional demand from the industrial sector. Yet, electricity supply at affordable prices will be the key to the expansion or establishment of manufacturing activities in the coming years.
- *Low labor productivity* - Another constraint that the Malian manufacturing sector faces is low labor productivity, as shown by Coulibaly (1999). Although the Malian wage rate is lower than that in Cote d'Ivoire, the low productivity of the Malian work force makes it difficult for Malian manufactured goods to compete in domestic markets, let alone in regional markets. Addressing the productivity issue will entail enhancing and improving training within each firm so as to respond to specific needs. It also entails organizing the industrial sector to undertake general training common to the entire industry. In sum, human capital needs to be upgraded in the years to come to improve productivity. Also, Malian labor laws need to be revised to make it easier to release unproductive workers. The productivity issue goes hand in hand with improving management. Poor management practices make it difficult to organize and plan imports of inputs that are not produced locally. It is also an impediment to finding the right mix of input use for efficient production.

#### **Opportunities**

The crisis that erupted in recent years in cotton has prompted the Malian government to seek assistance from the donor community. This government has already engaged discussions with the World Bank and the French Cooperation to bail out CMDT, which has been in financial distress. Because of their financial clout, these two donors are maneuvering to require some structural changes in the operation of CMDT and the cotton subsector at large. It is well known that the World Bank is in favor of liberalizing this subsector to withdraw the State from productive activities and introduce competition so as to bring about greater efficiency. While the Bank's view is known, that of the French is yet to be spelled out clearly and openly because of

the CFDT interest. The outcome and future of the cotton subsector will depend largely on the balance of power between these donors

The opportunities in this sector come from potential gains to be achieved through privatizing cotton ginning and marketing and through alleviating the constraints mentioned above. While privatization likely would yield gains, it must be approached cautiously in this subsector that represents half of Malian export earnings. The process needs to be tried on a pilot basis in one region, and then expanded to other areas based on lessons learned in the pilot zone.

### ***Interventions***

USAID likely will play only a marginal role in this restructuring process. If USAID decides it wants to become involved in the cotton subsector liberalization, following are some possible intervention areas:

- Working with producer associations to help them replace the CMDT managed input and credit systems with their own processes to handle these critical needs
- Extending the market information system to provide complete coverage of market information for cotton products
- Preparing Mali to take positions on issues that are likely to emerge in the international fiber negotiations under the aegis of the World Trade Organization (WTO).
- Working with producer associations to help them establish sustainable production systems with less environmental degradation
- Helping to improve the transportation infrastructure
- Working with producer associations and extension agents to incorporate HIV/AIDS education into other extension activities

#### **4.2.4. Growth Linkages**

Cotton has the potential to induce growth in other subsectors of the economy through several channels. First, because cotton is such an important export crop, the growth multipliers from increased production are quite high because demand is assured for the increased production, assuming Mali is competitive in the world market at world market prices. Increased income growth from cotton production can be reinvested in acquiring equipment designed to improve productivity and increase plot size to hire additional labor. Increased income can also be invested in livestock to integrate agriculture and livestock. Such appears to have been the case in southern Mali in the 1980s, as shown by Dione (1989). To enhance potential linkages, better mechanisms need to be developed to tax incomes in cotton to support infrastructure improvement and other activities. There is evidence that following devaluation, there was investment in infrastructure in the cotton areas.

### 4.3. Rice

Since the early 80's, rice has been at the center of an ongoing debate in Mali because of its strategic role in the nation's social environment. Rice has become the main staple food in urban centers and as a wage good, it determines to a large extent real income in the cities. It also represents an important source of income for part of the rapidly expanding rural population.

Rice is grown on nearly 3 percent of sown areas of Mali. According to data from the Direction Nationale de la Statistique et de l'Informatique (DNSI), rice production has been increasing significantly since the early 80's, from less than 110,000 tons in 1984/85 to over 427,000 tons in 1998/99. This annual increase of nearly 10 percent is due to (1) major liberalization programs launched through the *Programme de Restructuration des Marchés Céréalières* (PRMC) and (2) development and irrigation rehabilitation projects. These projects contributed significantly to the upsurge of rice production in the *Office du Niger* (ON) area, which has a huge potential for rice cultivation with full water control. While only 50,000 hectares are currently under irrigation, the irrigable potential in this area could be as much as one million hectares.<sup>21</sup>

Based on water source and the level of water flow control, the country's rice production systems can be classified into three sub-systems: (1) the fully controlled irrigation subsystems in large (*Office du Niger*, Baguinda, Manantali, and Selingué) or small perimeters along the Niger (1,700 km) and Senegal Rivers; (2) the partially controlled irrigation subsystems which are found in smaller irrigated perimeters (*Opération Riz Ségou*, *Opération Riz Mopti*, *Opération Riz Sikasso*) and smaller rivers in the south; and (3) the largely undeveloped traditional flooded plains and *bas-fond* sub-system, which are found mostly in southern Mali. Currently, the largest share (48 percent) of the rice area (126,078 ha) is found in the flooded plains, followed by the fully irrigated subsystem (25 percent; 65,953), the traditional *bas-fond* (14 percent; 37,264 ha), and the partially irrigated (13 percent, 34,588 ha) sub-systems.<sup>22</sup> Rainfed rice is grown in the CMDT area where rainfall exceeds 1,000 mm/year. This type of cultivation, which accounts for nearly 10 percent of national production, is expanding, and yields are about 1.6 T/ha (FAO, 1994).

Rice cultivation by controlled submersion differs from traditional cultivation because water control is improved, and agricultural services are provided. Total area involved is estimated at over 81,000 ha, with barely one third of this area being planted. This system remains very dependent on climatic variations; rainfall being particularly important for sowing and for transplanting of paddy while flooding is determinant for the vegetative phase of rice. Yields rarely reach 1.5 T/ha. These systems may be fitted with auxiliary pumping equipment that can bring them close to full water control (as in the cases of CMDT in San and Koriomé in the Tombouctou area).

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<sup>21</sup> Probably more realistic estimates put the economically irrigable area at less than 300,000 hectares, but that is still a very large irrigation potential.

<sup>22</sup> George Dimithè, "Small-Scale Inland Valley Swamp Rice Production: a Viable Enterprise in the Grain-Cotton Farming System of Southern Mali," in *Democracy and Development in Mali*.



Irrigated rice cultivation with pumping relies on full water control using small diesel powered pumps. Total area involved is about 10,000 ha. This type of scheme is principally developed in the Mopti, Gao and Tombouctou areas, in the context of small village perimeters (PPV). Parcels are generally small, but they often yield over 5 tons per hectare, with the possibility of double cropping.

The largest volume produced, accounting for 45 to 50 percent of national production comes from the ON, where the dominant system is irrigation with full water control. The system involves a dam, diversion of floodwaters and a network of irrigation channels. This production system, covering nearly 53,000 hectares, generates yields exceeding 5 tons per hectare, and is expected to increase steadily with ongoing rehabilitation programs as well as those planned in 1998 for the sub-areas of Kouroumary and Molodo. This type of rice cultivation is also practiced in Baguinéda, Sélingué and small perimeters in the Kayes, Tombouctou, Mopti and Gao Regions.

Though the full water control production system of the ON accounts for a large share of the domestic rice supply, it is practiced on only 4 percent of the national area devoted to rice production. Owing to the physical potential at the ON, this production system has been the focus of efforts to achieve both self-sufficiency and large-scale export of Malian rice to the regional markets.

Summarizing the factors that influence rice production at the ON, several elements stand out in government-induced policies. From the time of independence to the first stages of grain market liberalization in the 1980s, rice policies sought to strike a balance between the desire to increase national production and the objective of meeting the ever-expanding consumption needs of a growing and low-income population at a low price. These objectives were continually evaluated by the government and adjusted on the basis of problems encountered as well as the economic environment. In general, Malian decision makers opted, as did those of other Sahelian nations, to subsidize consumption. In addition, the increasing overvaluation of the CFA franc, beginning in the mid 1980s, made rice imports much cheaper than they otherwise would be, thereby implicitly subsidizing rice consumers. At the time of independence, government control of agricultural markets had the hidden objective of securing urban supplies of staple foods, especially rice, at prices within the reach of consumers. An important concern was that private traders that were often perceived wrongly as opportunistic speculators should not take advantage of their dominant position to gain excessive profits by creating temporary shortages aimed at increasing profits (Dioné, 1989).

At the same time, efforts were made to promote rice production at the national level. This promotion policy relied essentially on the ON, a parastatal created in 1932. Over time, various strategic approaches were used to achieve the goal of enhancing rice production in Mali. Three major stages, with significant institutional differences, can be distinguished:

- During the first two decades of the country's independence, the government intervened at every level of the cereal subsector, particularly in the rice subsector. This heavy-handed intervention did not promote efficiency at the producers' level. Furthermore, ON's cropping strategies and resources were deficient. Seed varieties were inadequate

for local conditions, irrigation schemes were not maintained and price incentives were insufficient to induce any meaningful supply response. As such, average yields rarely exceeded 2.4 metric tons per hectare between 1973 and 1978.

- In the late 70's, feeling that its policies were failing, the government took a turn toward alternate strategies.<sup>23</sup> Institutionally, the ON went through a sweeping restructuring allowing paddy farmers to sell their crops to whomever they wanted, when and how they chose, beginning in 1987. Underlying this process were both the creation of a new food security agency in 1984, CESA (Commissariat à la Sécurité Alimentaire), and implementation of Phase II of PRMC. This first liberalization of the subsector culminated in 1987/88, with the elimination of price setting for paddy and rice by the Office de Régulation et de Stabilisation des Prix (ORSP). One of the most important changes was liberalization of rice milling in the ON, which led to the expansion of small rice mills.
- In 1984 rural areas started going through broader changes, with the emergence of a new institution, the Associations Villageoises (AV), which were granted full responsibility for management of agricultural inputs and equipment. Concurrently, credit lines were established with the support of multilateral and bilateral organizations. The Fonds d'Intrants Agricoles (FIA) designed to supply agricultural inputs to the AV farmers on credit was created in 1985 and later replaced with the Fonds de Développement Villageois (FDV) financed by the Dutch Cooperation. In 1988, it was Banque Nationale de Développement Agricole (BNDA)'s turn to enter the rice subsector and support implementation of more credit lines to finance rice production.

On the investment side, the ON started in 1982 a major rehabilitation program of dilapidated irrigation parcels, leading to the implementation of the Dutch-funded ARPON project and the RETAIL project supported by the Caisse Française de Développement (CFD), the European Development Fund (EDF) and the World Bank. In 1988/89, 9,880 ha were rehabilitated (3,875 ha at Macina and 6,005 ha at Niono). This rehabilitation was conducted along with innovative production techniques, such as systematic transplanting, use of short straw and non-photosensitive varieties (B.G. 90-2), and high dosage of fertilizers. Also, new farming systems and post-harvest technologies were introduced, namely threshers and hullers by the ARPON project. At the end of the 1994/95 season, the four projects accounted for a total rehabilitated area of 18,830 hectares (about 40 percent of total cultivated area), 59 percent under the ARPON project (11,300 ha), 16 percent under World Bank (3,000 ha), 13 percent under RETAIL (2,400 ha) and 11 percent under EDF (2,100 ha).

Strengthened by the positive outcome of this last phase, the Malian government took new steps to promote rice sector reforms in the "Lettre de Politique Rizicole" in 1991. Most importantly, the letter announced full liberalization of paddy prices. It also included a policy of state disengagements from production and marketing activity. This included liquidation of the Atelier d'Assemblage de Matériel Agricole in 1991, and the closing of the rice mills belonging to the ON

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<sup>23</sup> Sall, 1989.

in 1995.<sup>24</sup> This disengagement changed the status of the ON to that of a service provider and a consultative role in water management, under the responsibility of the Délégation du Gouvernement which reported to the Prime Minister.

Paddy farmers were given even more responsibility through the creation in the Niono region, in 1992, of a committee (Comité paritaire producteurs-Office de gestion des redevances) aimed at facilitating the participation of farmers in the management of water fees. Once liberalization was in place, the AVs became more dynamic and took over some stages of the rice subsector, investing for instance in huller and threshers. More traders also entered the rice market and invested sometimes considerable amounts of resources in local rice production, contributing to lowering rice processing costs from over 17 CFAF/kg to nearly 7 CFAF/kg.

As a result of the institutional and technical changes described above, production increased markedly in the ON areas, reaching over 200,000 metric tons in 1992/93 (DNSI, 1993). Between 1982/83 and 1994/95, average yields more than doubled and the rehabilitated areas more than quadrupled in Niono (Barris et al, 1996). Investments in rehabilitation of irrigation perimeters (drainage, leveling of parcels), together with the policy changes and the new farming practices, played a significant role in propelling rice production through productivity gains. In addition, they help to increase returns to family labor from 1300-3500 CFA/day before devaluation to 3000-4800 CFAF/day after devaluation (Mariko et al., 1999).

More recently, the government took steps to reform the old land tenure law in which land was exclusively under State ownership and as such, the ON was in charge of managing it. The right of the farmer was to use land it only for a fee depending on the quality of irrigation infrastructure. While the old tenure law granted priority to the settlers of the ON, the new one gave Malian and non-national interested parties broad access to land as long as they are in compliance with the rules set by the ON. Under the new law, four types of land tenure coexist: the annual production permit, the agricultural production permit that has a longer period and that can be renewed as long as the owner complies with the rules of the ON, the usual lease and the long-term lease. The main objective of the new land tenure law is to provide tenure security to farm families and promote private investments in the zones that are not under production yet.

The importance of the new land tenure law cannot be overemphasized for Malian policies makers because it opens new opportunities for the private sector to undertake profitable investments. It will also contribute to create additional employment in rural areas where opportunities are few at this time. In addition, it will contribute to reduce the burden on government, faced with dwindling financial resources, so that it can focus its attention on other priority areas such as investments in the social sectors that are supporting pillar to a more productive environment in the long run. However, land reform always is difficult, and measures must be taken to ensure that land is not taken away from local residents to the benefit of outside interests.

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<sup>24</sup> The large mills were driven out of business by the small mills, which, because of lower per-unit processing costs, could afford to pay a higher price for paddy than the large mills (Diarra, et al., 2000).

With the liberalization of the subsector, paddy production, rice milling and marketing have been completely taken over by the private sector. The introduction of small mills has enabled farmers to process their paddy into rice and sell it in the open market to wholesalers or their representatives. This process has been so widespread that the once- powerful large-scale mills have gone out of business. Rice is then shipped to the domestic consumption markets. In recent years, rice has been exported informally to the regional markets, albeit in small quantities. A formal request has just been made by a foreign West African government to import nearly 1,000 tons of Malian rice, and this transaction will make Mali an official rice exporter in the region, attesting that this Malian rice is competitive.

#### **4.3.1. Assessment of Value-Added Potential**

There exists great potential to increase value added in the Malian rice subsector. Following the introduction of the small-scale millers at the Office du Niger, the overall quality of processed rice declined in the early years as the broken content of processed rice was high and rice was mixed with dirt and other foreign elements. Thanks to the Market Information System that provides price information for different rice qualities, more care has been given to handling rice prior to processing, and investments were undertaken in sifting processed rice to separate broken from whole rice that fetches a premium. Despite this better care and improvement in rice milling, rice quality can be improved further through post-harvest handling and simple processing techniques using the small-scale mills.

#### ***Key constraints***

*World rice prices* – World rice prices have declined in recent years along with the decline in other commodity prices. The results of the study undertaken by Barry et al (1998) suggest Mali's comparative advantage in rice is stronger for higher yielding farming systems such as that practiced in Niono, a testimony that productivity will be an important piece in the future of the rice subsector. According to Barry et al. (1998), Mali's comparative advantage in rice extends beyond its borders, namely in the northern part of Cote d'Ivoire and almost as far as the center of that country. However, this comparative advantage vanishes beyond the center of Cote d'Ivoire, due to high transport costs between the Malian production zones and the coastal urban consumption markets and lower world prices.

*High transport costs* - Several factors converge to induce these high transport costs including the old condition of the fleet, high import duties on trucks, spare parts and fuel, as well as the poor road conditions and informal taxation benefiting law enforcement officials (Barry and Tall, 1999).

*Under-investment in irrigation* - With the present functioning of the rice market, chances are that the profitability will be maintained in the short to medium term, and farmers will have the incentive to undertake the necessary investment to improve profitability through improved productivity. Enhancing productivity will contribute to increased domestic rice supply, but it may not be enough to meet the increasing demand. As such, expanding irrigated land will be required, but this expansion is constrained by the ability of the private sector to invest in irrigation infrastructure.

*Land tenure problems* - Even though Barry and Diallo (1999) have shown that private sector investment in the secondary and tertiary infrastructure is financially profitable, irrigated land has not expanded, owing to the lack of land security. The government has rewritten the land tenure law, but it has not been applied yet because the decentralization underway has not defined clearly the responsibility of the different local, village level and regional governments.

*Credit for irrigation investments* - Irrigated land is not likely to expand because credit will not be extended to the private sector to invest in the irrigation infrastructure. The credit constraint is closely linked to the lack of guaranty for the financial institutions and potential lenders, thereby putting them at risk in an environment where enforcement of transactions is difficult. As such, public investment or guarantees of some sort likely will be required to make basic irrigation infrastructure available to the private sector.

*Processing issues* - Rice competitiveness is also affected by its quality stemming from processing. The quality of processing is influenced by the homogeneity of seed and the humidity content of paddy that varies from farmer to farmer, due to the lack of synchronization in paddy cultivation and harvesting. Some farmers plant and harvest their paddy too soon, and others undertake these activities too late, causing the former to dry their harvested paddy too much and the latter to dry their output insufficiently.<sup>25</sup> Paddy dried too much tends to break easily and increase the broken content of rice. Paddy insufficiently dried tends to keep its husk. As such, it is not properly processed and is mixed with processed rice, lowering the overall quality of rice. In addition to the constraint regarding the homogeneity of seeds and humidity content of paddy, rice quality is affected by the type of machinery used to process paddy into rice. In this respect, the performance of different machines has been evaluated by the USAID SEG CAE project, and the information will be widely available to the private sector to guide them in technology section. The project also trained the private sector on how best to process paddy into rice. As such, it needs to continue its activity to bring about greater efficiency in rice processing so as to improve competitiveness.

*Packaging* - Though rice packaging does not appear to be a determinant factor in competitiveness in the domestic market, it is likely to play an important role in the future. If Malian rice is to conquer the regional market, it needs to be packaged in such a way to catch consumers' attention so that it appeals to them not only in terms of presentation but also quality and cost.

### ***Opportunities***

The prospects for the competitiveness of Malian rice in the nearby regional markets look good, even in the face of low world prices. The most promising consumption markets for Malian rice appear to be those of Cote d'Ivoire, where rice is the preferred staple food for the middle class. The rising middle class in Ghana that is shifting consumption from roots and tubers to rice needs to be targeted in the years to come. However, consumers in Guinea and Burkina Faso should not be overlooked because the markets in these countries are close to Mali. Senegal is also a potential export market.

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<sup>25</sup> No doubt there are other constraints faced by farmers that lead to this behavior. We need to better understand the farming systems in order to develop remedies to these problems.

## ***Interventions***

To capture the promising regional rice markets, Mali needs to improve rice quality. The assistance that Malian rice traders are receiving from the Center for Agro-Enterprises (CAE) of the SEG Project needs to be pursued vigorously to teach improved post-harvest technologies to rice processors and traders. The bulk import of packaging material by the project is a useful activity that aims to organize traders so that they can undertake large-scale import to lower their cost.

One possible intervention for USAID in the future would be to help expand irrigated rice production at the Office du Niger where only a small portion of the irrigable land is currently under use. Mali, being marginally self-sufficient in rice, could position itself to supply its rice to the vast regional market by expanding production. The USAID-sponsored Guaranty Fund put in place to facilitate access to credit by the private sector to invest in irrigation perimeters and reduce risk appears to be a useful mechanism to alleviate the credit constraint at the Office du Niger. If proven successful when the scheme is evaluated, efforts will need to be deployed to extend it gradually to a larger pool of credible investors by increasing the fund. Increasing the loan amount for investment in secondary and tertiary canals should be explored in the medium term, as the banking sector is reluctant to lend to the agricultural private sector.

Even though this Guaranty Fund will help to alleviate constraints to investment in secondary and tertiary canals and bring some irrigable land into production, the main constraint related to the primary canal will remain because such an investment appears too heavy for the private sector. In this regard, USAID could intervene by joining forces with other donors to undertake the capital investment in the Office du Niger. Key among these donors are the World Bank, the European Union, French Cooperation, and Dutch Cooperation that have the financial clout to undertake such a large investment operation. In addition, USAID needs to examine irrigation potential from all the irrigation approaches discussed above to design a package of interventions that will yield the greatest decrease in risk and gain in productivity per dollar invested.

### **4.3.2. Growth Linkages**

Expansion of rice supply to the domestic and regional markets can contribute to poverty reduction by creating employment opportunities for agricultural laborers in the Office du Niger and increasing the demand for inputs. It has also the potential to expand the demand for transport services for inputs and rice, as well as packaging materials. In addition, it can contribute to diversify and foster export earnings that will be channeled in the Malian economy and create additional wealth through its multiplier effect. Increased rice supply through expansion of irrigation can also contribute to fostering the production of other agricultural commodities such as horticultural products that will be discussed in a subsequent section. At present up to 40 percent of the agricultural income in the ON comes from horticultural products produced mainly by women.

One of the major challenges that Malian policy makers will face is to transform Mali from being self-sufficient in rice into a reliable surplus producer and supplier of rice to the vast and growing

West African consumption market. Crossing this line will require addressing several issues including increased investment in irrigation infrastructure, continuing improvement in farm productivity, putting in place an objective grading and standard system, improving the quality of Malian rice through the introduction of improved processing techniques, and expanding the market information system that provides information on regional market conditions to both traders and farmers to enable them to take advantage of market opportunities and better allocate their resources. While these challenges are all important, it appears to us that this potential can be realized in Mali.

#### **4.4. Other Cereals (Maize, Millet, and Sorghum)**

Millet and sorghum can be grown in an environment with annual rainfall ranging between 400 and 700 mm. In contrast, maize, having a higher water requirement, is concentrated in southern Mali. This region also accounts for more than half of millet/sorghum supply in Mali. Because these differences, maize will be treated separately in this analysis.

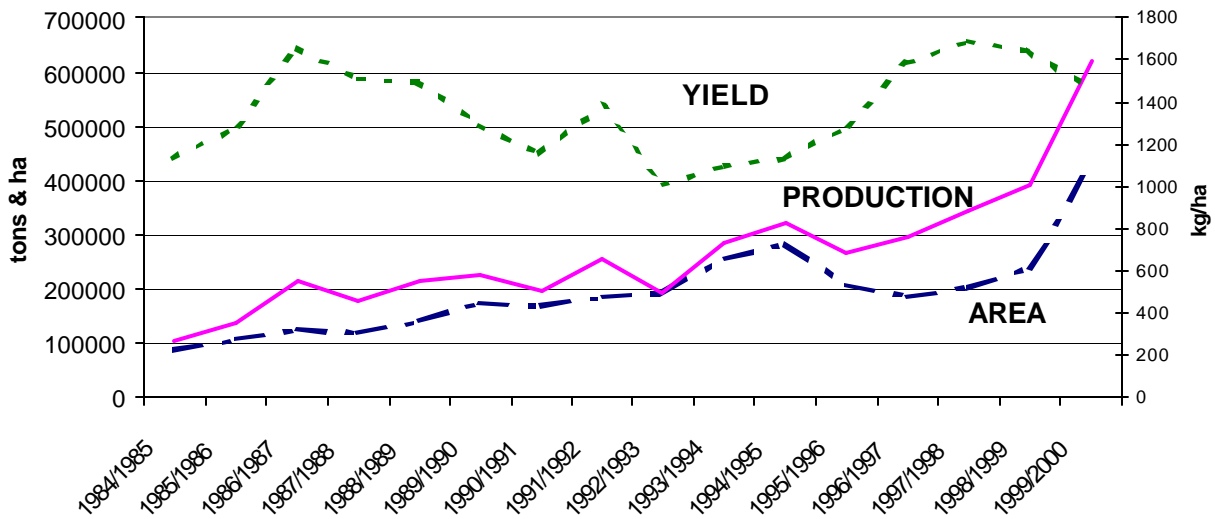
According to the DNSI data, maize is one of the fastest growing cereal crops. Maize production, starting from a low base, grew by over 10 percent per annum over the 1984-99 period (see Figure 4). Supply of millet and sorghum increased by less than 2 percent per annum over the same period (see Figure 5). The increased supply of coarse grains resulted almost entirely from area expansion, which was remarkable for maize. Maize area increased from just over 89,000 hectares in 1984/85 to approximately 426,000 hectares in 1999/00, representing almost a five-fold hike during the period. Analysis of the production data available suggests that increased maize supply was concentrated in the southern production zones of the *Compagnie Malienne des Fibres Textiles* (CMDT), where maize is grown in rotation with cotton. Thus, maize is a complement, not a substitute, for cotton.

Contrary to cultivated area, productivity for coarse grains has stagnated at best over the 15 year period. However, yields for these commodities appear to have improved markedly following the devaluation of the CFA franc, suggesting that the increased demand for locally produced cereals has helped to enhance farm level profitability (Barry, 2000). It is possible that farmers may have increased investment in inputs such as fertilizers and equipment in response to the increased demand. The improved yields are also due to the good rainfall level observed in Mali in recent years, making Mali one of the main coarse grain suppliers for regional markets.

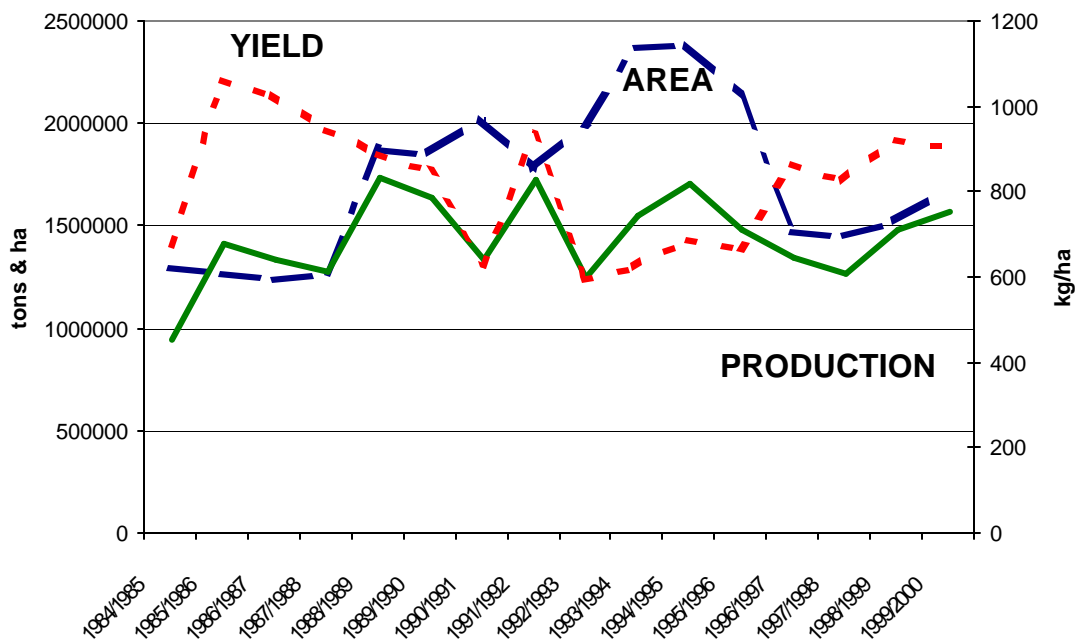
##### **4.4.1. Subsector Organization**

The cereal market reform program introduced in 1981 and described above for rice changed the complexion of grain trade in Mali. Since the changes in responsibilities for the Office des Produits Agricoles du Mali (OPAM), coarse grain marketing has been completely handled by the private sector consisting of producers, collectors, semi-wholesalers, wholesalers, retailers, and processors. Wholesalers may sometimes provide funding to semi-wholesalers and collectors to purchase coarse grains from producers, thereby driving the process of price formation in cereal markets.

**Figure 4: Maize Area, Production and Yield**



**Figure 5: Sorghum and Millet Area, Production and Yields**



Following the launching of the cereal policy reforms, traders invested in cereal marketing, focusing on either transport or storage to bring about more efficiency. Between 1981 and 1989, traders' investments in transport and storage facilities grew by 19 percent, with net investments split equally between these facilities Dembele (1994). As a result of traders' investments in



transport and storage, together with the improved market information, cereal markets are better integrated, and prices reflect market forces. Nevertheless, market prices are still volatile, reflecting the high dependence of production on rainfall. The time series of producer and consumer prices for millet, sorghum, and maize are provided in Table 8. Producer prices experienced an upward trend immediately after the devaluation. Producer prices more recently have fallen with the increased supply, but consumer prices have increased, and marketing margins have increased substantially in 1999-2000 according to this GOM data. While we recognize that national average data can mask what is really going on, in this case the regional data tell a similar story. It is not at all clear what has been happening in 1999-2000, but certainly the situation should be evaluated to learn where interventions might be helpful. With consumer prices and margins so high, it is possible that policy changes could result in the farmer gaining a higher share of the consumption level value of the cereals.

**Table 8: Coarse Grain Production and Consumption Prices and Margins**

Year	Consumption (fcfa)			Production (fcfa)			Margin (fcfa)			Margin (percent)		
	millet	sorghum	maize	millet	sorghum	maize	millet	sorghum	maize	millet	sorghum	maize
1990	81	80	74	54	52	40	27	28	34	50%	54%	85%
1991	122	119	107	84	83	65	38	36	42	45%	43%	65%
1992	75	68	69	44	41	38	31	27	31	70%	66%	82%
1993	77	75	74	45	45	38	32	30	36	71%	67%	95%
1994	76	71	70	45	38	33	31	33	37	69%	87%	112%
1995	93	93	100	51	59	55	42	34	45	82%	58%	82%
1996	148	147	139	97	99	83	51	48	56	53%	48%	67%
1997	129	124	123	77	77	69	52	47	54	68%	61%	78%
1998	123	116	116	79	75	68	44	41	48	56%	55%	71%
1999	152	145	137	48	47	41	104	98	96	217%	209%	234%
2000	131	125	119	52	51	44	79	74	75	152%	145%	170%

Source: MDR, Cellule de Planification et de Statistique

### **Key constraints**

*Rainfall variability* - Increasing coarse grain production is constrained by several factors. Of particular importance among these is the production instability induced by the reliance of coarse grain production on rainfall.

*Access to appropriate input packages* – There is considerable evidence that cereal yields could be increased considerably if farmers had better access to improved seeds, fertilizer (including credit), and water retention technologies. Private seed multiplication is not profitable, and the government is getting out of seed multiplication in 2002. While fertilizer use may not be profitable for millet (see the fertilizer section in chapter 5), it appears profitable for maize and sorghum. Thus a package of seeds, fertilizer, and water retention technologies could bring about substantial yield improvements in a relatively short time.

*Post harvest handling* - Another constraint to expanding regional markets is that coarse grains marketed contain a high percentage of dirt and foreign elements. A greater emphasis on grain quality will be necessary to expand markets.

### ***Opportunities***

There exists considerable potential for coarse grains, especially in regional markets and for an expanding domestic animal feed industry. There is some possibility of marketing limited quantities to European urban centers where the Malian diaspora prefers cereal-based dishes. .

At present, much of the expansion of coarse grain demand has focused on direct human consumption. Yet, the livestock subsector represents another potential market that could help to absorb increased coarse grain supplies. As urban population is increasing at a fast rate, it is anticipated that the demand for poultry will expand and this can provide an impetus to the maize subsector. Increasing livestock production will depend, however, on providing improved information on alternative feed rations and providing extension services to the livestock subsector (see poultry and livestock sections for details on constraints and interventions).

Mali also has potential for growing the regional market for coarse grains, especially Mauritania and Senegal where the binding constraint for livestock and poultry production is feed availability. Expanding the market information system in these areas would be useful.

### ***Interventions***

As noted above, the coarse grain subsector is confronted with several constraints including seed supply, grain quality, and value added. IER and ICRISAT have available varieties that routinely yield double the one ton per hectare average in Mali for sorghum and millet.<sup>26</sup> Yet this seed is not being multiplied and extended onto farmers' fields. A project providing incentives to producers' associations or NGOs to multiply this seed and demonstrate packages of seed, fertilizer, and water retention technologies could yield substantial widespread benefits in terms of higher incomes and poverty alleviation. At the very least, USAID should proceed to an analysis of the seed multiplication and dissemination constraints and how they might be alleviated via USAID interventions.

USAID is providing technical assistance to cereal traders to enable them to market a higher quality product. Several marketing participants found this activity useful because it teaches them how to store and present cereal-based products. It should continue for several years to solidify the results expected. It should also focus its attention on drying and storing coarse grains because the quality of the product starts at harvest. Increasing cereal quality should go hand in hand with setting norms and standards in both Mali and the regional markets. As Mali is one the leading cereal producers in West Africa, it is well positioned to take the lead on cereal norms based on objective criteria. This is being undertaken through the regional market information networks.

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<sup>26</sup> However, it is not clear how much of this yield difference is due to the seed and how much to differences in fertilizer use.

#### **4.4.2. Assessment of Value-Added Potential**

The bulk of coarse grains produced is used for home consumption in rural areas. It is estimated that nearly 80 percent of coarse grains are consumed in rural areas. These cereals are typically hand-pounded and processed by rural women to make traditional dishes such as “tô”, degue, moni, etc. About 20 percent of coarse grains production is marketed to reach urban centers where they are processed into flour, “semoule,” using small hullers. The processed commodity is then cooked in the different dishes mentioned above. As such, value added is minimum for coarse grains.

In anticipation for the increasing opportunity cost for urban women, coarse grains are being timidly processed, pre-cooked, packaged and sold in supermarkets in the Bamako region. It appears that the pre-cooked cereals are finding greater opportunities in the markets of the neighboring countries. As such, there exists some potential to add value to coarse grains and target the local and foreign urban markets.

Mali exhibits a strong comparative advantage in the production and marketing of coarse grains for local and regional consumption (Barry, 1994 and Stryker, 1987). This advantage is due in large part to the low input-output nature of cereal production that relies heavily on family labor and land. There is considerable potential for Mali to export coarse grains to neighboring countries and to supply inputs for an expanding animal feed sector domestically.

#### **4.4.3. Growth Linkages**

Though there exist ample opportunities to expand human consumption of coarse grains, poultry and livestock appear to be the best avenue for increasing domestic demand and fostering coarse grain supply. If productivity increases were to lead to cereal price decreases, the poorest farmers would be the least affected because they consume most of their production. The major linkages would be through the livestock production chains and the associated income streams. Increased regional exports also would have important income multipliers.

### **4.5. Livestock/Meat Subsector**

The available statistics on livestock numbers, consumption, exports, etc. are poor for Mali and often contradictory. However, it is well known that livestock production is widespread throughout Mali, involving at least 30 percent of the Malian workforce, contributing 10-12 percent of value added in GDP, 25-30 percent of value added in agriculture, and more than 10 percent of export earnings. (Yiriwa). In addition, linkages are important to the crops sector, through the use of animal traction, manure, use of agricultural by-products as feed, and the role of animals as “savings accounts” in rural areas. Small ruminants (sheep and goats) are widely held in rural areas; thus, increases in their productivity could lead to broad-based increases in income. Livestock are an important source of women’s income. In rural areas, for example, women dominate milk marketing and are often involved in small ruminant production. In addition, nearly 40 percent of small ruminants are produced in the arid Northeast (regions of Gao, Kidal, and Tombouctou), compared to only 14 percent of cattle. Therefore, efforts to

increase income from small ruminants would have important sub-regional income distribution effects.

The most important types of livestock in Mali are cattle (producing meat, milk, traction, hides, and manure), goats and sheep (meat, milk, hides), poultry (eggs and meat), donkeys and horses (mainly for transport), and, in the northeast, camels. Meat comprises 72 percent of the animal flesh consumed in Mali, with fish making up 28 percent. Beef accounts for 51 percent of meat consumption, meat from small ruminants makes up 32 percent, and poultry 15 percent. (Schema Directeur, p.64). Approximately 73 percent of the cattle and 55 percent of small ruminants are located in mixed cropping areas, with the remainder in pure pastoral areas or the interior delta. This represents an important shift in the geographical distribution of animals since the severe droughts of the late 1960s, when nearly 2/3 of the animals were in more transhumant, pastoral systems (Metzel et al.). It is also indicative of the impoverishment in Northern pastoral areas.

The geographical shift represents a shift in wealth from pastoralists to farmers, and raises the scope for productivity gains in ruminant production given the greater availability of feedstuffs in the south. The other major shift over the past 20 years has been the growth of peri-urban livestock production in response to the demand generated by growing cities. This has involved increased poultry and dairy production, destined for the urban market, and livestock fattening activities (both cattle and small ruminants), which take advantage of strong seasonal price fluctuations due to differences in seasonal availability of forage and, for sheep, the strong demand linked to holidays, particularly the Muslim ceremony of Tabaski.

Government actions have focused primarily on “public health” activities (e.g., rinderpest vaccination campaigns; provision of slaughter facilities), extension, promotion of actions aimed at increasing value added in Mali, and improving access to veterinary inputs and diagnoses (e.g., creation of the Central Veterinary Laboratory and the Pharmacie Vétérinaire du Mali). While there were efforts by state-owned or organized firms to become involved in marketing of livestock products (particularly milk and hides) from the 1960s through the mid 1980s, the livestock industry has historically had much more private-sector participation and competition than traditional export crops such as cotton. The reforms of the mid 1990s allowing the private practice of veterinary medicine and the opening of private veterinary pharmacies appear to have improved access to farmers and herders to veterinary services in areas where there is strong effective demand. As of May, 2000, there were 550 private veterinarians in Mali, employing 680 veterinary agents (Yiriwa). Some observers have raised concerns about whether the liberalization has led to more remote areas having less access to such services.

#### **4.5.1. Cattle/Beef**

As shown in Table 9, total cattle numbers are estimated at 6.4 million head in 1999, with an annual growth rate of 3 percent (after taking account of an annual offtake of roughly 10.5 percent). Production growth has been much greater in the agro-pastoral areas (particularly in the CMDT region) than in the pastoral areas (Metzel et al., p. 5), owing to greater feed availability. Production in most of the country is extensive, taking advantage of the Mali's widespread availability of forage in the rainy season and dry-season grazing possibilities in the

interior delta of the Niger River. There is some use of supplementary feeds (agricultural by-products—particularly cowpea hay, peanut hay, and cotton-seed meal) in the agro-pastoral and peri-urban zones, both for fattening and for maintenance of draft oxen (which after a few years are sold for beef). The herds are managed as dual purpose, providing milk for local consumption as well as meat. Intensification via smallholder-managed fattening of livestock in peri-urban areas is expanding. Attempts at larger-scale feedlots have generally proven unprofitable.

After years of concern about the “unwillingness” of Malian pastoralists to sell their animals and the consequent overgrazing of pastures, offtake rates jumped sharply in 1994 and 1995 following the CFA franc devaluation. Faced with higher prices, cattle owners sold off many older animals, especially old cows (Yade and Staatz, 2001). Table 9 shows, however, that the higher offtake rates were not sustained after 1995, falling back into the 10 percent range.

Between 53 and 66 percent of offtake goes to domestic consumption. This proportion varies from year to year, depending on relative prices in the domestic and export markets.<sup>27</sup> For example, the jump in export prices following the CFA franc led to a much higher proportion of offtake to coastal markets (Yade and Staatz, 2001). The flexibility of the trade to redirect flows to the export trade depending on relative prices in the domestic and export market demonstrates the danger of relying on naive projections that estimate “exportable surplus” as a residual over domestic consumption. In reality, many low-income Malian consumers have been priced out of the beef market in recent years, as prices have risen in the export market.

Metzel et al. estimate per capita beef consumption at 5 kg/year in rural areas and 8 kg/year in urban areas. Most beef is consumed as part of a sauce cooked for over an hour; hence, there is little premium for tender, marbled beef except in limited hotel, supermarket, and restaurant trade, primarily in Bamako. Failure to take account of this limited demand may be at the root of the lack of profitability of several large-scale cattle-fattening schemes, which often implicitly assumed a premium price for high-quality beef.

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<sup>27</sup> The Yiriwa (2001) study cites OMBEVI data showing that less than 30% of domestic beef production is consumed domestically. These figures, however, would imply a per capita consumption of beef of only about 2.5 kg/year, less than half that estimated by Metzel et al.

**Table 9 Mali: Cattle and Small Ruminant Exports, Slaughter, and Animal Numbers, 1995-2000**

	1995		1996		1997		1998		1999		2000*	
	Cattle	Sheep & Goats	Cattle	Sheep & Goats	Cattle	Sheep & Goats	Cattle	Sheep & Goats	Cattle	Sheep & Goats	Cattle	Sheep & Goats
<b>Exports</b>	<b>418,000</b>	<b>925,000</b>	<b>216,000</b>	<b>537,000</b>	<b>396,000</b>	<b>925,000</b>	<b>308,000</b>	<b>758,000</b>	<b>293,000</b>	<b>654,000</b>	<b>398,000</b>	<b>990,000</b>
Recorded	107,000	426,000	65,000	215,000	119,000	349,000	108,000	259,000	129,000	324,000	279,000	440,000
Non-recorded	311,000	499,000	151,000	322,000	277,000	576,000	200,000	499,000	164,000	330,000	119,000	450,000
<b>Slaughter</b>	<b>547,000</b>	<b>2,007,000</b>	<b>425,000</b>	<b>2,137,000</b>	<b>450,000</b>	<b>2,007,000</b>	<b>347,000</b>	<b>2,212,000</b>	<b>382,000</b>	<b>2,433,000</b>	<b>423,000</b>	<b>3,626,500</b>
Recorded	130,000	301,000	149,000	321,000	158,000	319,000	172,000	394,000	191,000	432,000	279,000	419,000
Non-recorded	417,000	1,706,000	276,000	1,816,000	292,000	1,706,000	175,000	1,817,000	191,000	2,001,000	119,500	3,207,500
<b>Livestock Numbers (end of period)</b>	<b>5,708,000</b>	<b>13,179,000</b>	<b>5,882,000</b>	<b>13,809,000</b>	<b>6,058,000</b>	<b>14,500,000</b>	<b>6,240,000</b>	<b>15,225,000</b>	<b>6,427,000</b>	<b>15,986,000</b>	<b>6,692,000</b>	<b>16,785,000</b>
<b>Off-take Rate</b>	16.9	22.2	10.9	19.4	13.9	20.0	10.5	19.5	10.5	19.3	12.3	30.0

\* Preliminary figures

SOURCE: OMBEVI, unpublished data

#### 4.5.2. Small Ruminants/Meat

Sheep and goats are a particularly important form of production and savings in rural areas. There are approximately 16 million small ruminants in Mali, an average of 1.6 head per resident. Production is concentrated in the north, with over 60 percent found in the Gao, Timbuktu, Kidal and Mopti regions (compared with 36 percent of the cattle in the country). These animals are particularly adapted to the more sparse range and browse conditions of the north. Their shorter reproductive cycle than cattle means that production can be increased more quickly than cattle if there is sufficient feed. While they are an important export, between 68 and 80 percent of offtake in recent years has gone to domestic consumption in recent years. Sheep and goat meat is the most widely eaten meat in rural areas. In addition to the coastal markets, there is a significant (though largely unrecorded) export of small ruminants towards Algeria.

#### 4.5.3. Competitiveness, Influential Factors, and Value-Added Potential

##### *Export market*

Mali has historically been a major exporter of cattle and small ruminants, and DRC studies confirm Mali's comparative advantage in production of live animals for export (Metzel et al.). Cote d'Ivoire, Ghana, and to a much smaller extent, Senegal, Algeria, and Nigeria, have been the main export markets for live cattle. Emerging markets include Guinea and Benin. Test marketings to Guinea in 2001, organized through the *Réseau des Opérateurs Economiques du Secteur Agro-alimentaire de l'Afrique de l'Ouest (ROESAO)*, indicate promise.<sup>28</sup> Export is both by truck and, in some cases on the hoof to the major assembly point or to the border. While there have been several attempts over the years to export chilled beef by air, rail, and road, both within West Africa and to other African markets (Gabon, north Africa), these efforts have generally proved unprofitable. Major constraints to meat exports are higher value placed on byproducts in coastal markets (which make it more profitable to export live animals), the high-cost of refrigerated transport, and the need for tight coordination in order to assure no disruption in the cold chain and reliable service to the importer.<sup>29</sup> Developing meat exports would also require rehabilitation of the Bamako abattoir, which is currently in a poor state of repair.

In the early 1990s, the Malian government significantly simplified export procedures for cattle, eliminating the export tax; simplified the obtaining of necessary veterinary and customs documents, and opened the export trade to individual livestock raisers, cooperatives, and village associations as well cattle traders. This greatly facilitated the ability of exporters to take advantage of the increased prices in export markets that resulted from the devaluation. The competitiveness of the trade resulted in over 90 percent of the price increases being passed

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<sup>28</sup> Initial problems arose because Guinean law did not allow Malian animals grazing rights in the country. This rule appears to have been changed, and further test marketings are planned for later in 2001.

<sup>29</sup> The "fifth quarter" (hides, hooves, head, and offal) is much more highly valued on the coast, where almost everything, including hides, are eaten; in Mali, they are not. The fifth quarter typically sells for between 45,000 CFA F and 50,000 CFA F in Abidjan, for example, compared with 12,500 CFA F in Bamako.

back to producers (Yade and Staats, 2001). Traders report that while some non-tariff barriers (basically bribes to police and customs officers at road check points) still exist in Mali, the major problem is in Côte d'Ivoire and Senegal. Traders report that such harassment is not a problem in Ghana.

The level of the payoffs is large; one trader reported paying on average 6000 CFA F/head in Côte d'Ivoire (the main export market) and 16,500 CFA F per head in Senegal (for animals that would sell for around 160,000 CFA F in Abidjan or Dakar). The problem of payoffs and seizures of animals in Côte d'Ivoire became so severe during the political crisis in that country in November, 2000, that Malian cattle merchants refused to ship cattle to that country for nearly two weeks. This boycott prompted the Ivorian government to provide military escorts for trucks of cattle from Mali to prevent harassment by police and other officials. This arrangement has now been replaced with the requirement that livestock exported to Côte d'Ivoire be handled by an Ivorian "Société de Convoyage", a company that, for a fee, handles all paperwork and bribes for the exporter. These non-tariff trade barriers are nothing new, but most traders report they have become worse in Côte d'Ivoire in recent years.

### ***Domestic marketing***

Roughly half the cattle sold for slaughter each year and nearly 80 percent of the small ruminants are consumed domestically. The trade is in the hands of the private sector, and most evidence suggests that it is fairly competitive. Market information is collected through OMBEVI (*Office Malien du Bétail et de la Viande*) and is diffused via the Malian agricultural market information system (OMA).

The livestock are typically trekked to market and then slaughtered either in the countryside, or in publicly provided slaughter slabs or abattoirs. Under the decentralization program, each commune is responsible for maintaining its own livestock corridors for the passage of trade animals and animals on transhumance. A major question is how well this local management of the livestock corridors and associated watering points will work. These paths are essential to maintaining market access for livestock producers and avoiding crop damage by livestock.

There are two refrigerated abattoirs in Mali, one in Gao (built in the 1960s for meat exports to North Africa, but which has never been put into service) and one in Bamako. The Bamako abattoir is owned by the Ministry of Rural Development, which has been trying to sell it for the past 5 years. There has been only one bid, which was for about a third of what the Ministry was asking. In the 5 years it has been up for sale, there has been little reinvestment or maintenance, and the facilities are degrading. An employee group approached the MDR about purchasing the plant, but their bid was considered inadequate as well.

#### **4.5.4. Constraints, Opportunities And Potential Interventions**

##### ***Constraints***

The major areas historically stressed for value added have been through improving the quality of animals slaughtered via improved nutrition, and genetic improvement, lowering marketing



costs, and shifting to exporting a greater proportion of meat in place of live animals. Of these, the scope for productivity gains and value added is greatest through improved nutrition and reduced marketing costs.

The main constraints to expanded ruminant production are the following:

*Inadequate feed availability and quality.* The lack of adequate feed is the most widely cited problem by livestock producers and traders contacted during the study, as well as by most previous studies. Almost all observers state that feed constraints are much more important in limiting livestock production in Mali than are genetic constraints. The feed problem has several aspects:

- inadequate dry-season forage, which leads to significant weight loss during the dry season and weakens the condition of work animals;
- costly or unavailable concentrate feeds. This problem is closely related to the failure to fully liberalize the cotton-seed market. Distortions in this market have led to feeds that use excessive amounts of cotton seed or cotton-seed meal, and to non-market allocations of it that often lead to shortages. This, in turn, has led to inefficient feed use.
- Poor quality of feedstuffs, both forage and concentrates, and very little quality control on materials going into concentrates, stemming in part from lack of application of regulations regarding quality of raw materials and finished feeds.
- Because of all these problems, livestock producers have limited access to reliable, balanced rations.

In recent years, given the profitability of dry-season fattening of cattle and small ruminants, both for the urban market and for export, markets for peanut hay and groundnut hay have developed, particularly in peri-urban areas.

A key issue for the future is how pasture resources will be managed at the commune level under decentralization. Each rural commune will be required to establish and manage its own communal grazing area and livestock paths. How these systems are managed and what rights are granted to herders who are not permanent residents of the commune (e.g., those with transhumant herds) could have a major impact on feed availability and livestock productivity. If not managed well, the scope for conflict between herders and farmers over crop damage could become severe, particularly if communes decide to intensify agricultural production (e.g., of rice) in areas that have been traditional dry-season grazing areas. On the positive side, there may be scope under the decentralization to develop improved range management practices through locally based grazing associations. Such efforts have not had much success in the past, but that may have been due in part to the local community not having had real control over its local grazing resources.

*Non-tariff trade barriers*, particularly in Côte d'Ivoire and Senegal, which act like a tax on Malian cattle exports to these countries, thus making Malian meat less competitive in the neighboring markets.

*Effective demand*—One of the biggest uncertainties facing the Malian livestock market is the evolution of effective demand, particularly in Côte d'Ivoire. On the negative side, disruption of this market, due to political uncertainty, will have major impacts on cattle prices in Mali; hence, the need to diversify export markets. On the positive side, growth of income both in domestic and export markets, and hence demand for higher quality meat, will increase the returns to seasonal fattening.

*Costly transport* - both for live animals and for refrigerated transport of meat, linked to the poor state of the available trucks and rough roads..

*Potential export competition from Europe and the U.S.*- In the late 1980s, Mali's share of coastal export markets for beef was seriously eroded by highly subsidized beef exports from the EU. The reduction of EU export subsidies, the imposition of countervailing tariffs by the Côte d'Ivoire, and the 1994 CFA franc devaluation allowed the Sahelian countries to recapture their traditional market share. A big unknown is whether the build-up of stocks of unsold beef in Europe as a result of the BSE (Mad Cow Disease) crisis will lead Europe to reimpose export subsidies that could undermine Mali's market share.

A similar, but somewhat less serious issue, arises from the U.S. export of very cheap poultry parts (e.g., leg quarters and turkey necks) into coastal markets, such as Ghana. Malian livestock exporters report that the availability of this cheap poultry limits demand for Sahelian beef in the coastal markets.

### ***Opportunities and interventions***

Mali's key assets are a long tradition of livestock production, including skilled herdsman and farmers, the proximity of traditional export markets, and the shift in production to more humid areas. The shift of livestock to the more southern agro-pastoral zones also opens the opportunity for greater intensification of production based on greater use of agricultural byproducts.

The major opportunities appear and related interventions appear to be:

*Seasonal feeding*-- to offset dry-season weight loss, and limited fattening for both the domestic and export markets. This has greatest potential in southern Mali, and appears to have become much more profitable following the CFA franc devaluation (Metzel et al., p. 39). Both small-scale and large-scale operations appear profitable on paper, although in the past, the small-scale operations have proved more economically sustainable. Many projects (e.g., the USAID-sponsored ECIBEV project) were launched in the late 1980s to encourage small farmers to fatten livestock during the dry season. Although the projects have ended, many of the farmers continue to fatten animals for this market and the national agricultural development bank (BNDA) continues to make loans for this purpose.

In addition to dry-season fattening, fattening small ruminants for Tabaski remains highly profitable, particularly if mortality rates are kept reasonable. There is probably scope to expand this activity as well as the dry-season fattening.

Improving feed availability and quality is likely to have a much greater payoff in the short-run than genetic improvement for beef production (there may be some scope for genetic improvement in dairy). Seasonal feed shortages lead to significant weight loss and prevent cattle from reaching their current genetic potential. Better nutrition also would allow animals to be marketed at an earlier age, thereby increasing herd turnover and livestock owners' incomes. Better utilization of existing agricultural byproducts may allow for maintenance rations during the dry-season and some fattening for high-end markets. Currently, the markets for mixed feed and protein supplements are strongly distorted by the subsidized, non-market distribution of cottonseed and cottonseed cake (see description of cotton subsector and Timbo et al.) and by the lack of quality control on feed components. Research and other public investments aimed at increasing livestock productivity are likely to have their highest economic payoffs if focused on the agro-pastoral and flood-recession areas, which have the greatest potential for production of forage and agricultural byproducts.

*Interventions: Feeding*—The main interventions here should be aimed at improving feed availability. These include:

- (1) a study to explore the feasibility of instituting improved range management practices at the commune level (e.g., the creation of grazing associations to manage the communal grazing areas). Based on the results of this study, USAID may want to support work with commune-level associations aimed at improving pastures and other feed availability. While there is considerable uncertainty in the short-run about the application of legislative texts for decentralization, over the medium to long-run, how communal range resources are managed will be an important determinant of Mali's capacity to be a competitive producer of ruminants.
- (2) applied research by IER and on-farm testing of alternative feed rations to determine least-cost rations for different types of livestock and different feeding regimes, based on locally available agricultural products and byproducts. Once promising rations are identified, support for designing appropriate extension messages and technical support to producers may be warranted
- (3) inclusion of information on the price and availability of key feedstuffs, such as peanut and cowpea hay, in the OMA's weekly market information reports. This would facilitate the fattening activity by strengthening of the emerging forage markets in peri-urban areas;
- (4) continued policy discussions with the Malian government to push for full liberalization of the cotton-seed market, which is necessary to rationalize the feed industry

*Development/Strengthening of export markets beyond the Côte d'Ivoire*—Targeting the Ghanaian, Guinean, Beninois, Togolese and Nigerian markets for live animals appears to have promise and is strategically important given the political disruption and attendant increased harassment of Malian cattle exporters in Cote d'Ivoire, Mali's chief export market. Diversification of export markets will involve strengthening commercial relations with buyers in these countries, facilitating import procedures (e.g., veterinary clearance), and bank transfers. A particularly attractive opportunity could be in developing contracts to supply cattle to the new slaughter facility in Kano, Nigeria. This facility, which has a 4,000 head/day slaughter capacity and 20,000 tons of cold store capacity, recently gained access to several Middle Eastern

markets. The manager of the plant has expressed interest in exploring Mali as a supply source, with animals being shipped to Niger, where the slaughter plant would have its agents take possession of the animals. Other potential, smaller markets, are in Central Africa, where air shipments of sheep for Tabaski have taken place in the past.

Meat exports are unlikely to be more profitable than exports of live cattle in the foreseeable future, except with the possible exception of exports of select cuts for high-income markets in the Middle East and the coast (e.g., Gabon). Promoters of meat exports have historically failed to take into account that the coastal markets put a much higher value on byproducts (e.g., hides and feet are consumed as food in Ghana and Cote d'Ivoire). The problems on air shipment highlighted in the section on horticulture exports apply equally to meat exports, and these problems are getting worse with the demise of Air Afrique and Sabena and the tightened security surrounding airlines after September 11. Therefore, without improved measures to increase profitability of byproducts in Mali and the development of cheaper refrigerated ground transport, the meat export business is unlikely to compete successfully for animals for the "mass market."<sup>30</sup> Furthermore, policies affecting other parts of the subsector have worked against promotion of meat exports. For example, Metzger points out how the imposition of an export tax on hides and skins in 1995, aimed at protecting the domestic tanning industry, worked against the profitability of meat exports. (This tax was subsequently removed in 1996 due to lobbying efforts by exporters, supported by USAID).

*Interventions: Developing New Markets*—Possible interventions include:

- (1) Developing a simple "cattle on feed" market report would help potential buyers like the Kano abattoir manager to identify producers in Mali who had suitable animals for export and when they would be available. OMA, in conjunction with OMBEVI, could prepare and diffuse such a report
- (2) Continued support, via the bilateral and the WARP programs, to the regional market information system network, will help make information on potential alternative markets more available to Malian exporters.
- (3) Continued limited support to trader associations, such as the West African Agro-Food Business Network, has the potential to play a key role in bringing political pressure to bear on both sides of the border to reduce non-tariff barriers. The key here is to avoid putting so many resources into these organizations that they become highly donor-dependent and lose their own initiative.
- (5) In spite of the Malian government's desire to shift from live animal to meat exports, it is very unlikely that meat exports will become competitive with live animal exports in the next 5-10 years. USAID should not invest much money in trying to promote meat exports. From a public health standpoint, however, the deteriorating conditions in Bamako in the abattoir

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<sup>30</sup> Ivorian regulations forbidding the shipment of produce and fish in refrigerated trucks that have hauled meat in Côte d'Ivoire severely restrict the possibility of backhauls to Mali, thus rendering meat export by truck very problematic.

raise concerns. USAID should use its influence with the government to try to convince the MDR to lower its asking price so that the facility can move into the hands of someone interested in managing and rehabilitating it. Over the longer run, any possibility of developing private-sector-led meat exports will require substantial rehabilitation of the existing slaughter facilities, which is unlikely to occur if the asking price for the Bamako abattoir remains as high as it is.

*Intervention: Identifying constraints to expanded small ruminant production*—Most interventions, to date, have focused on cattle. Given the broad-based ownership of small ruminants in Mali, identifying the constraints to increasing their productivity could have very positive income distribution effects.

#### **4.5.5. Hides and Skins**

The overall profitability of livestock production for meat depends not only on the value of the meat but also on that of the byproducts, hides and skins being among the most important. The production of hides and skins is dependent on the number of animals slaughtered in Mali. Records from official slaughterhouses show increased production of hides and skins since 1995 for both cattle and small ruminants. Official slaughtering, however, is estimated to represent less than 40 percent of total cattle slaughtered (about 495,000 animals) and less than 15 percent of small ruminants slaughtered (3,100,000 animals). Production levels in Mali are strongly influenced by demand for red meat and the competitiveness of meat vs. live animal exports to other countries in the region (e.g., Côte d'Ivoire). In addition, the ability of the tanneries to attract hides for processing depends on the level of competition for hides to export to the coast as food. In recent years, Ghanaian women merchants have begun coming to Bamako to buy cattle shanks/hoooves and hides for shipment to Ghana for food. The Ghanaians pay up to 2000 CFA F/hide for the "food hides", compared with 1750 CFA F/hide paid by the tanneries. In addition, the Ghanaians are not very demanding on how carefully the animal is skinned, while the tanneries are. Thus, when the Ghanaians are active in the market, the tanneries sometimes have difficulty in attracting enough hides.

Domestic demand for hides and skins are absorbed in the domestic market. The hides are tanned using traditional methods and then used to produce artisanal leather products made by approximately 1200 artisans.

Most of the hides/skins produced are exported to Europe by licensed exporters or tanneries who purchase the hides/skins from traders who, in turn, collect the hides from producers (butchers, slaughter houses, villages) throughout the country

Mali has a history of government intervention in the hide/skin market that began immediately after independence with the creation of state-owned companies to deal with marketing (SONEA, which later became SOMBEPEC) and processing (TAMALI). Beginning in 1978 there were a series of actions taken to liberalize the market because the sector was thought to be producing at less than half of its potential capacity. Despite the liberalization, certain controls remained in place that continued to discourage the production and sale of hides/skins through formal channels. At present there are three tanneries, only two of which are active. TAMALI was

privatized in 1993, and has a capacity of 200 hides and 150 skins per day. La TAPROMA in Kayes was created in 1978 with a capacity to produce 50,000 hides and 500,000 finished skins per year, but it has not been functioning since 1984. TAO was opened in 1994 with Spanish capital to supply the Spanish market; capacity is 30,000 small ruminant skins per week processed to the stage of Awet blue. The total capacity of the three firms for skins is 3,500,000 per year. About what the production is estimated to be but the capacity for hides is only 100,000, substantially less than the estimated 495,000 animals slaughtered. An American investor is considering opening a plant in Segou, aimed at exporting hides to the US for his glove manufacturing business. CAE has worked with the investor to help develop this possible new investment.

The subsector consists of four key actors: animal producers, butchers, hide/skin traders, and processors. There is a mix of Malian and non-Malian traders traveling throughout the country to collect hides/skins. Traders focus on purchasing as many hides/skins as possible, often offering pre-financing to ensure supply. Given the focus on quantity, there is little or no attention given to quality and fraudulent practices are used by some to make a hide/skin appear to be better quality than it really is.

### ***Assessment of value-added potential***

The Yiriwa study concludes that the hides/skins sector has great potential, which is not being realized at present. This conclusion seems dubious. Tanneries have had difficulty getting adequate supplies due in part to government policies (e.g., an export tax on hides that decreased incentives to sell cattle on the domestic market), and in part to higher demand (and prices) in coastal countries for animal byproducts that have little value in Mali.

### ***Key constraints, opportunities, and potential interventions***

The major opportunity is the large number of hides/skins that become available in Mali every year and the anticipated growth in the domestic demand for red meat. The very poor quality of Malian hides/skins and the poor quality of artisanal leather products appear to be the biggest problems in terms of both export markets and domestic consumption. Many factors lead to poor quality: poor animal health (e.g., external parasites), branding procedures that damage the hides/skins, poor skinning techniques, inadequate infrastructure for butchering animals and drying hides/skins. USAID-supported efforts (via CAE) to work with herders and butchers to improve hide quality have had only limited success. The decline in the quality of hides/skins exported from Mali has meant that importers are no longer willing to prefinance purchases; this results in erratic supply because local traders lack the necessary capital. Another key problem is the lack of pollution legislation and enforcement to prevent the tanneries from polluting waterways, particularly with the chromium they use in their tanning processes.

*Intervention:* Apart from continued CAE work with potential investors in this area, no major USAID interventions are apparent. There may be some scope in working with NGOs to expand the market for Malian artisanal leather products, both in export markets and in conjunction with the tourist trade, but this is likely not a large activity.

## 4.6. Poultry

Very little statistical information is available on the poultry sector in Mali. The sector is divided into two major systems: traditional and modern. There are two major products: eggs and meat. The analysis done by Yiriwa Conseil indicates that production of meat in the traditional sector is quite profitable and could be expanded. About 12,000 birds per week are exported to the Ivory Coast, where the demand for the traditionally produced meat is high.

In the traditional production system, birds are free range and scrounge for food from materials available in the local environment. Disease and mortality are high, but production costs are low. The major constraint on increased production is space for the birds to live and scrounge for food. Egg production is quite low in this system and is considered a by-product of the meat production objective.

In the modern system, production conditions are quite difficult. Chicks are imported at a high cost. Feed ingredients are expensive, and the blended feed rations are not nutritionally balanced to provide good feed conversion. Some large producers blend their own feeds, and others provide ingredients to feed mills to have feed custom blended for their needs.

Egg production is estimated at about 31 million per year compared to a total demand of about 39 million, leaving about 8 million per year to be imported, largely from the Ivory Coast and Senegal. Broiler production in the modern system is small compared to the traditional system, partly because of the higher costs, but also because of the consumer preference for “free range” birds. However, it appears that there may be potential for increased demand in the future as consumer demand outstrips capacity of the traditional system, and potentially the modern system becomes more efficient.

There is currently an important externally funded project operating in the poultry sector in Mali. Project PDAM (Project for the Development of Poultry in Mali) is financed by the Arab Bank for African Economic Development (BADEA). It includes the following interventions:

- Construction of 32 poultry markets, 32 centers for poultry processing, and 5 cold rooms
- Furnishing equipment for the production of layers and broilers and for the production of blended feed, and transport and transformation
- Providing vaccines and the vaccination and treatment of 5 million birds per year.
- Equipment and training for village vaccinators
- Organization, promoting, and training for actors in the poultry sector

The project envisions bringing in a foreign vet for training on making poultry vaccines. It will also equip the Central Veterinary Laboratory for increased poultry vaccine production. The project will work with both the traditional sector and the modern, but much of the planned activity is oriented towards the traditional system.

### 4.6.1. Constraints

For the modern system, the major constraints are the following:

- 1) Technical know-how in modern poultry production: nutrition, disease prevention and management, production management, etc.
- 2) Availability and cost of feed ingredients. Maize is the major ingredient in poultry feed if the conversion rate is to be good, and there is insufficient maize for much expansion. Also, fishmeal is often of low quality. Fishmeal should not be used in poultry rations for more than about 5 percent of the ration, and it appears that the use is substantially higher than that. It also appears that the fiber content of the feed may be too high for good feed conversion.
- 3) Cost of imported chicks. Day-old chicks are not produced in Mali at present. Most have been imported from Europe, but that will be prohibitively expensive with the demise of Sabena and Air Afrique. Imports from other West African countries are possible, but local production would be far more cost effective.
- 4) Lack of credit for what is perceived to be a very risky business makes the operation quite tenuous. With credit, producers or feed blenders could purchase maize at harvest time to lock in a low price and supply. Credit is also needed for purchase of chicks and to modernize feed mills and production facilities.
- 5) Quality standards do not exist for blended feeds, chicks, or egg and meat products. Introduction of quality standards could improve the efficiency of the whole chain.

For the traditional system, the major constraints are:

- 1) Because the birds are totally in a "wild" environment, disease is high, and growth rates are slow.
- 2) Given that the birds depend largely on whatever is available from the environment for nourishment, expansion is limited.

#### **4.6.2. Opportunities**

As people's incomes increase, poultry meat and eggs become one of the main means of improving the quality of diet. Poultry meat and eggs in other countries are relatively inexpensive sources of protein. In Mali, beef is still cheaper than poultry. Normally, as the modern system becomes more efficient, poultry becomes less expensive. So as Mali continues to develop, it is likely that demand for poultry meat and eggs will grow significantly.

Capacity in the traditional system might be expanded by greater use of supplemental feeds such as maize and by greater use of vaccines for the most prevalent diseases.

In the modern system, production costs probably could be reduced considerably if baby chicks could be produced in Mali from parent stock. This possibility has been investigated by at least



two entities, but with no success to date. Chick production has become even more important now that air service to Mali has been cut back substantially.

Also, training in nutrition is very important. Feed conversion could be dramatically improved in the modern system with better nutrition.

#### **4.6.3. Possible Interventions**

USAID could intervene in at least three important areas:

- 1) An equity fund might invest in a potential joint venture between a Malian company and a foreign company to create the capacity for production of day-old chicks in Mali. The foreign company would bring the technology needed for successful chick production. Production of day-old chicks in Mali would lower the chick cost and ultimately the cost of producing broilers and eggs.
- 2) Peanut meal can be an ideal source of protein for poultry diets. In the past, Mali has produced more peanuts than today. Aflatoxin problems have been a major barrier to expansion and use of peanut meal in poultry rations. If these problems could be solved, peanut production for oil, animal feed, and direct human consumption could be expanded considerably.
- 3) Technical assistance is needed in feed formulation, blending, and quality control. Feed constitutes most of the cost of producing poultry meat and eggs. Feed conversion efficiency in Mali generally is quite low. It takes over 3 pounds of feed to produce a pound of poultry meat in Mali, whereas more advanced countries require less than 2 pounds. Improved feeds would lead to better feed conversion and therefore lower costs for poultry meat and eggs. If the modern sector in Mali could reach a conversion rate of 2.5, costs would fall at least 15 percent, and much of that would be passed on to consumers in lower meat and egg prices. The lower prices, in turn, would expand the market for poultry products and thereby the inputs used in poultry feed like maize, peanut meal, fishmeal, cottonseed meal, and other locally produced feed ingredients.

In each of these cases, the linkages with the rest of agriculture are strong. Also, the interventions would lead to a fall in poultry meat and egg prices, which would have wide consumer benefits, particularly in urban areas.

#### **4.7. Dairy**

Most ruminant livestock are managed as dual-purpose animals in Mali, and dairy production is an important enterprise in rural areas, particularly for women. In the past 20 years, peri-urban dairy production has also grown, aimed at satisfying a growing urban demand for milk. A 1999

study by KIT estimated national milk production at 316 million liters for cattle, 23.5 million liters for goats and sheep, and 3 million liters for camels (cited in *Schema Directeur*, vol. 1, p. 64).<sup>31</sup>

Production in rural areas relies almost entirely on local breeds, which have very limited production (typically about 3 l/day for cows), due to both feed constraints and genetic limitations. Most observers believe that in rural areas, lack of adequate nutrition, rather than genetic potential, is the binding constraint. In peri-urban areas, some producers have developed cross-breeds with European breeds (e.g., Montbeliardes), using both artificial insemination and direct importation of breeding stock.<sup>32</sup> These cross-breeds produce up to 20 l/day.

Per capita dairy product consumption in 1996 was less than 20 liters per year (liquid milk equivalent), less than half of the target consumption set by the Malian government for the year 2000 (Bonfoh, 2001). In spite of its large number of milk producing animals, Mali imported approximately 15.5 billion CFAF (US \$2.1 million) worth of dairy products in 1999, mostly powdered milk from Europe.

Rural milk production is widely dispersed, with the largest concentration of animals in the Mopti region (see data on ruminant numbers in the section on the livestock/meat subsector and recall that most of these animals are dual purpose). Women typically manage the dairy cows and market the milk in local markets, either in fresh or fermented form (*lait caillé*). There are strong seasonal variations in production, based on feed availability. Local market availability of milk in northern areas also depends on where the animals are in their seasonal transhumance path. Given the lack of any refrigeration in the traditional system, there is a significant risk of bacterial contamination of the products sold.

Peri-urban milk production is more intensive, making greater use of purchased forage (groundnut and cowpea hay), crop residues, and feed concentrates to supplement natural pastures. In the Bamako area, there are two dairy processing companies, Malilait and GAM (*Générale Alimentation Malienne*). Malilait was originally created as a state enterprise in the 1960s to serve the milk processing needs of local dairy farmers, who were grouped in a government-organized cooperative. By the 1970s, this cooperative was dominated by associates of the wife of the then-President, Moussa Traoré. Malilait was pressured to pay high prices for local milk in order to make the producers' high-cost operations (based on imported European animals) profitable; and consequently, the company perpetually lost money. Following the 1991 coup, Malilait was privatized and GAM (also a private company) entered the market.

Both Malilait and GAM produce fluid milk and a range of processed products, such as yogurt, *lait caillé*, and ice cream. Approximately 80 percent of the milk they process is reconstituted milk powder imported from Europe. The heavy export subsidies on European dairy products throughout the 1990s made it cheaper for these firms to rely on powdered milk imports. In

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<sup>31</sup> In contrast, the production figures provided by the Yriwah study appear very unrealistic, reporting milk production from goats and sheep as constituting 54% of total milk production in Mali.

<sup>32</sup> Artificial insemination is arranged through local private veterinarians, but is reportedly costly (35,000 CFA F/insemination) and with a low success rate (approximately 30%). [Dick Cook, CAE, personal communication.]

addition, using such milk is logistically much easier, as the firms can more easily control raw-product quality, seasonal availability of product, and relations with suppliers.

Currently, these plants accept fluid milk deliveries from farmers once a day, five times a week. This means that local dairy farmers have to have their own outlets for their milk produced during the second milking of the day and on weekends. Most of these farmers sell the milk directly to customers who come to their farms to buy. There are a few who sell to local vendors or have contracts with schools or other institutions. Some of these farmers boil the milk; others sell it raw. Farmers complain that being constrained to retail their own milk limits their scope for expanding production; and some higher-income consumers complain of the lack of easy availability of fresh milk. Fresh milk currently sells at a premium over reconstituted dried milk (300 CFAF/liter compared with 250 CFAF/liter).

In the last few years, small private milk plants that run entirely on local fluid milk production have been established in Mopti (capacity of 360,000 l/year) and Segou (capacity of 75,000 l/year). Even smaller plants have been established at Kayes, Sikasso, Koutiala, Niono and San. These plants produce both fluid milk and processed products, such as yogurt and *lait caillé*. In addition, for several years, a group of producers in the Bamako area, with support of APCAM, have been attempting, with French partners, to establish a new processing company, SOLAIMA, that would exclusively buy and process local milk in the Bamako area. The aim is to provide an outlet to local producers, thereby allowing them to expand production. The project, however, has been plagued by managerial and financing problems, and in October, 2001, the major French and Malian partners withdrew, leaving the project on hold. Most of the equipment for the new plant is already in Mali and the plant is largely completed, but it would require additional financing to finish the building, install the equipment, and begin operating.

In addition to fluid and processed products, powdered milk is widely sold throughout Mali. Powdered milk is preferred by many consumers because of its lower price (until recently, when the reduction of EU export subsidies has led to substantial price increases); because most consumers lack refrigeration to handle fluid milk; and because they do not have to worry about adulteration or product quality (assuming they have a safe water source!).

#### **4.7.1. Constraints, Opportunities, and Potential Interventions**

The major constraints facing the Malian dairy industry are the following:

1. *Feed constraints.* These are the same constraints outlined in the section on the livestock/meat and poultry subsectors. For peri-urban intensive dairy production, the problems in the feed concentrate market are particularly important. These are linked to the problems in the cottonseed market, and the problems it engenders for the markets for other protein concentrates. In rural areas, seasonal availability of pasture is the main constraint.
2. *Rural marketing constraints.* There are a number of food safety concerns about milk marketed in rural areas. Developing techniques to stabilize the milk could also expand market opportunities for rural women engaged in this enterprise. The Central Veterinary

Laboratory, with support from INSAH and the Swiss foreign assistance agency, is conducting a research project (*“Lait Sain pour le Sahel”*) aimed at addressing these issues, so there is probably no need for USAID action in this area at this time.

3. *Low cost of imported powdered milk.* As long as imported milk powder remains highly subsidized, it will be difficult to develop the mass market for fresh milk, particularly in the urban areas. The recent reduction in export subsidies, linked to the EU’s establishment of tighter production quotas for milk, has led to some price increases in powdered milk and begins to open the door for the establishment of a broader market for fresh milk in Bamako. How EU subsidy levels evolve in the future will be an important determinant of how much this market can grow.
4. *Weak managerial talent for running a cooperative milk plant.* The effort by APCAM and Bamako-area dairy farmers to establish its producer-affiliated milk plant has been plagued by weak management. Managing such a plant, and all the attendant producer relations in a farmer-run organization, is difficult, and would be a new experience for Mali.

#### **4.7.2. Potential USAID Interventions**

6. *Improving feed availability.* These are the same recommendations as for the livestock/meat subsector, including possible work at the commune level with local grazing associations and efforts to improve the feed concentrate market.
7. *Technical assistance on cooperative dairy plant management.* Over the long-term, there probably is a potential for expanded production and marketing of fresh milk in the Bamako area. Such a market could help expand incomes and employment of local farmers. Should the financing be forthcoming for completion of the SOLAIMA plant, USAID might want to consider whether, via CAE or with other partners (e.g., Land o’ Lakes), it should offer technical assistance on the management of such a producer-run plant.
8. *Monitor results of Swiss-supported study on rural and small-scale urban milk marketing.* The *“Lait Sain pour le Sahel”* study mentioned above is aimed at identifying interventions aimed at improving the healthfulness and the profitability of local milk marketing in Mali. USAID should coordinate with those carrying out this study to see if, in the future, there are key investments that the agency might want to consider to improve this system. This could be an important way of raising women’s incomes in rural areas.

### **4.8. Fish**

#### **4.8.1. Assessment of Competitiveness of Raw Products**

Mali has a total area of about 1,240,000 km<sup>2</sup>. At periods of peak flow in normal rainfall years it has from 20,000-30,000 km<sup>2</sup> (1.6-2.4 percent) of water area, located mainly in the inland Delta of the Niger River. There are about 700 km of waterway along the Senegal River and its tributaries, along with about 900 km<sup>2</sup> of reservoir area behind the Selingué and Manantali dams.

The difference between peak and ebb flows of the Senegal and Niger River systems is substantial. In good rainfall years the difference can be three to one. In average years, it is five to one. In drought years, overall flows may be cut more than half affecting not only fishery productivity, but irrigation water availability, recessional agricultural area, and available forage and fodder.

Mali's fisheries are exploited by villages and family groups and small production units. An estimated 71,000 skilled, traditional fishermen (mostly Bozos and Somonos tribesmen) work the capture fisheries. About half of them fish part time, as part of their overall agro-pastoral livelihoods. About 213,000 persons are employed in the secondary sector (fishing-net vendors, fish traders and smokers -- many of whom are women -- pirogue builders, etc.).

The seasonality of the fisheries is reflected in the nomadic movement of the fishermen primarily along the Niger river and its tributaries with the advent of high water (October-January) and back again during the low-water period (March-June) when the fish are restricted to the river channel. Regular fish production comes mainly from the central delta and is estimated (FAO, 1998) to be in the range of 100,000 MT in 1995. From 4,000 to 6,000 MT of fish is exported, much of it in smoked form to Burkina Faso and Cote d'Ivoire. The average production of the two reservoirs of Sélingué and Manantali is estimated at 4,000 MT and 1,300 MT respectively for 1995. During the drought years of the 1970's and to 1980's fishery production descended to between 30,000 to 50,000 MT. Maximum fish production by the wild capture fishery is estimated to be about 120,000 MT by the FAO. More than 130 species of fish have been recorded in Mali. The most common genera are: *Alestes*, *Tilapia*, *Synodontis*, *Labeo*, *Clarias*, *Hydrocynus*, *Auchenoglanis*, and *Lates*.

#### **4.8.2. Assessment of Value-Added Potential**

Based on sales at dockside, the total contribution of primary fish production is about \$45 million with about \$5.6 million in export sales. About 75 percent of the catch is smoked, salted and sun-dried, or seared. Fresh fish consumption increases with the size and reliability of the catch and with proximity of the fisheries to urban centers. Using the average values of the Yirwa report, wholesaling of fresh fish adds about \$0.73 (525 FCFA) per kg to the producer value. Retailing of fresh fish adds about \$0.59 (425 F CFA) per kg more. If 30 percent of the fresh catch (25 percent of 100,000MT) is consumed in the general vicinity of capture then the value added of 7,500 MT is about \$5,475,000. The 65 percent that is retailed (or 16000 MT) adds about \$9,440,000.

Smoked and dried fish is exported at about \$1/kg if FAO and Yirwa study figures are used. If fresh fish is bought at the average delivery price of \$0.45 per kg the total cost of raw material supply to smokers and driers of 75,000 MT is \$33,750,000. The crude value-added (wholesale and export) at \$1/kg assuming a 50 percent conversion rate (a very high estimate since the conversion rate is about 33 percent for smoked and 25 percent for smoked and seared) is \$3,750,000 or about \$0.10/kg. It is unlikely that processors pay the going rate for fresh fish. They are more likely to buy lower quality fish at lower prices. (This would of course, lower overall average primary sector value estimates because so much of the catch is processed.) The estimates by ICRAF and regional energy projects are that 40 percent of the processing cost is spent fuelwood leaving about \$0.06/kg of total margin for the processor. To make matters

worst, Operation Peche Mopti studies suggest that retail prices do not vary much with supply, even in years of very tight supply such as in the low catch year of 1994.

Fresh fish provides greater absolute value-added opportunities, but total consumption is limited by the low purchasing power of Malian consumers, the high energy costs for production and storage of ice, and lack of insulated transport (whether on water or on the roads), high transport costs linked to poor roads and expensive fuel, and taxes sauvages (It is difficult to hide fresh fish from police at stops). When the economy cools or is shocked, less fresh fish is purchased and in good catch years processed fish remains for up to a year or more in storage (1999/2000), and are relegated to onward processing for feed and oil as a salvage operation.

### ***Key constraints***

The Malian fishery is a competitive fresh water fish supplier to national and nearby markets, especially fish in smoked and dried form. Fresh water fish is competitive with imported marine fish when local supplies are abundant. In times of drought, and during the low flow season, frozen marine fish may become competitive with local fresh fish. The large variations in water flows in the principal fisheries is the biggest constraint to value added activities.

Malian dried and smoked fish will increasingly lose their competitiveness on EU export markets for sanitary control reasons. Drying and smoking are done primarily on wooden structures with a large amount of hand contact. Since the late 1980's, the European Commission has increased its overseas inspection and surveillance of fresh, frozen, and smoked fish. Smoked and dried fish, most of Mali's production, is handled many times in processing on drying racks that are difficult to clean. The drying and smoking processes would not pass EU or FDA inspection. However, regional markets are much less demanding. Micro- and small-scale processors smoked, dry, and sear fish in widely dispersed locations and using questionable hygiene practices. Operation Peche Mopti's fish landing, ice machines, and designated smoking and drying areas are dilapidated. Processed product at Mopti is stored in extremely poor conditions.

The cold chain for fresh fish is spotty at best. Ice production capacity is concentrated in Bamako. Transport remains undifferentiated with only partly iced fish transported in baskets in uninsulated trucks. The largest fish offloading port at Mopti has rapidly deteriorating infrastructure and is being crowded out by other trade. Ice machines do not meet peak demands.

There is a market in Bamako and the secondary cities for frozen marine fish, which is beginning to build distribution channels, as electric and kerosene freezers increase. This provides an important protein buffer in the diet, but only for a very limited segment of the population. Over the 1990's and early 2000's dozens of entrepreneurs have tried to import frozen fish and sell them to middle income consumers at lower prices than fresh fish. Most have underestimated cold storage, transport, and distribution costs and failed.

## ***Opportunities***

It is very difficult to quantify opportunities for fisheries development in Mali, despite the research programs being run by IER with support from French Aid via IRD (former ORSTOM) and the FAO.

Urban growth in the secondary cities of West Africa provides the opportunity for increased exports. Improvements in drying should provide the opportunity for increases in extra-regional sales. Finally, development of a cold chain from Mopti to Burkina Faso or Ferkessodougou in Cote d'Ivoire would increase export potential.

Beyond fisheries research in the Niger Delta, the EU, BADEA, World Bank, and GTZ are supporting the development of fishing quays, handling facilities, ice stations, and on-board and on-truck insulated containers. Their support targets the Selingue and Manantali reservoirs that are closer to fresh fish markets in Bamako.

While donors in Mali have made fishfarming investments, they have also supported hatchery development for the capture fisheries and studies on overall ecosystem management to sustain capture fisheries productivity. The latter investments are much more likely to generate sustainable results than aquaculture.

## ***Interventions***

USAID does not have a comparative advantage in the freshwater fisheries subsector. We do not propose any important investments in this area. Currently USAID support to improved smoking and drying of fish and quality control through IER. USAID can continue to focus of supporting IER training of micro-entrepreneurs in micro- and small-scale processing (drying, smoking, salting), cleaner handling, storage, and packaging of fish products. The technologies exist and are known in Mali. As long as this activity is fully subsidized or nearly so, it will not increase the costs of the women involved. However, hardnosed analysis needs to be done to see if there are really any input (energy, salt) savings, reduced waste or spoilage, or improvement in the realizable value of the product that would justify the extension effort. If the rationale is public health, i.e., subsidize cleaner and better processing to reduce food-borne disease incidence, then perhaps the public good starts to approach the public costs. Low-level investment in fisheries may be justifiable on the basis that it helps prepare the sector for the day that the infrastructure, energy, and low consumer purchasing power constraints are alleviated. However, other donors seem already well-positioned and better financed to sustain this effort over the medium and long-term, and deal with the full channel from production through marketing.

### **4.8.3. Other Growth Linkages**

Fish an important protein input into the Malian diet, with the percentage varying between dry and normal rainfall years. The female labor content of value added is high, probably greater than 60 percent. Also, fishmeal is an important animal feed ingredient, and demand could grow with increasing livestock production. This might absorb some of the excess processed production in good catch years.

## 4.9. Horticultural Crops

INSAH did an update through 2000 of the PRISAS post devaluation study of horticultural production, export, and import trends in the Sahel (Simo, Yade, and Sow). They found that most of the Sahelian countries had made some gains in horticultural production (onions, potatoes, tomatoes, and green beans) and exports (or import substitution) after the 1994 devaluation, but were unable to maintain the growth over time. A few major exceptions were noted: Senegal, Niger and Mali continued to expand onion production, and Mali alone continued to expand potato and tomato production. Aggregate Sahelian imports of onions have increased dramatically since 1995 (Senegal is principal importer), tomato imports declined slightly through 1998 and then began to climb again, and potato imports have been slowly growing since 1998. On the export side, Mali has continued to export potatoes to the Côte d'Ivoire with small amounts also going to Europe, while Niger remains the biggest onion exporter in the region, with Mali exporting primarily to Côte d'Ivoire. This update of aggregate Sahelian trends shows that Mali remains a key actor in the Sahelian horticultural sector. The growth in imports of many neighboring countries that began two or three years after the devaluation suggests that there may be market opportunities in the region (e.g., onions in Senegal) that could be captured by Malian producers and exporters. The expected demographic shift to a predominantly urban population in West Africa in this decade should provide additional growth opportunities. Domestic Malian markets are still undersupplied in onions and potatoes, along with other vegetables, for much of the year. While Mali has exported green beans, potatoes, and onions to Europe in the past, there is little scope for expanding extra-regional exports unless post-harvest handling and transport can be improved significantly.

**Fruit.** Mali has been a competitive producer and exporter of mangos to Mauritania, Senegal, Guinea, and Ivory Coast for decades. It has been a small exporter of mangoes to France both directly by air, and more recently by sea. Indirect exports of Malian mangoes through both Burkina Faso and Cote d'Ivoire have occurred historically, because both possess much better postharvest packing and handling facilities and have greater access to air, rail, and boat transport. Over the past decade Burkina Faso has expanded its mango production, adding more of the high color varieties sought by the international market. Over the same time, Ivorian planters have increased their crop diversification programs to include more mangoes, papayas, and other exotics. Mali produces papayas varieties that are well-suited to domestic and regional markets, but has only begun to produce the smaller Hawaiian types (Solo) that are sought by extra-regional buyers. Fruit production has been centered in Southern Mali and Sikasso for many years, with expansion in belts around Bamako and in the growing secondary cities where irrigation is available.

**Alternative Horticultural Crops.** Hibiscus, Ginger, Okra, Amaranth, Chili Peppers, Tamarind, and Néré are among the alternative cultivated and gathered products that are important as beverage and condiment components of the Malian and regional diet. The Tiger Nut (*pois sucré--Cyperus esculentus*), while cultivated on a tiny scale for years in Mali and throughout Africa, has been reintroduced as an export crop by Spanish and Malian interests. These crops offer may offer niche opportunities for local, regional, and extra-regional markets. All of these crops are produced throughout the subregion. Mali's competitive advantage lies in its ability to do the intensive labor needed to grow or gather and handle these crops at a low labor cost.



#### 4.9.1. Subsector Organization

The basic organization of production, transport, and marketing of horticultural products has changed very little in Mali over the past 20 years. Producers and collectors supply local markets and traders with supplies that are bought by larger traders or their agents for transport to Bamako and the major secondary cities. The major change has been the involvement of Rural Development Organizations (such as CMDT and OHVN) and an increasing number of NGO's in the sector since the mid-1980s. These structures play important roles in providing subsidized technical support and financing.

Decades of work by donors and NGO's have helped develop local groups of producers of **shallots** in the Niono and Mopti areas with improved processing, but much of their sold production is still channeled through the 18 or so shallot and onion wholesalers in Bamako. All of these wholesales have roots in the production zones. They, in turn control shallot marketing through related traders in Cote d'Ivoire, Burkina, and Senegal.

**Potato** production follows a pattern of production on small parcels primarily in the Sikasso and Kati zones. Most producers sell to buyers from their fields or at local markets to agents of wholesalers and exporters. Wholesalers sell to semi-wholesalers who sell on to retailers of all sizes. Two of the exporters are also the major suppliers of seed potatoes in Mali and control an important portion of the crop that is produced in the off-season. The dozen or so smaller exporters of potatoes tend to export through relatives established in the wholesale and semi-wholesale markets of Côte d'Ivoire and Senegal. Small caliber new potatoes (*primeurs*) may find an export market in Europe through commission buyers when there are particularly harsh or wet winter conditions in North Africa. There is a very small urban market for potatoes for french fries in restaurants and hotels and a very small scale market for potato chips.

**Green bean** production is largely oriented to exports to the French market. It has a similar structure to that of potatoes. Seed importation is dominated by a few firms with a number of smaller traders also involved in seed and input supply. Marketing during the export season is a battle among collectors called *pisteurs* and their financiers, who bid up or bid down prices based on price signals received from Rungis commission buyers. The larger exporters generally obtain air freight space for export, but the twenty smaller exporters may find their shipments delayed. Delay is a disaster, because even with the two refrigerated containers at the airport, storage for more than a day leads to increased costs and decreased quality. With no precooling infrastructure and cold transport in country, even a one day delay can eliminate the profit from export shipments. The current primary zones of production are in Ouelessébougou and Dialakoroba, (OHVN supported areas). Total production levels are about what they were 25 years ago (around 1200 MT a year with 400-700MT exported annually).

The level of **tomato** production has **never** been linked to processing capacity in Mali. The processing capacity of SOMACO has always been miniscule in comparison with tomato production. And, the tomato varieties produced have been poorly adapted to processing needs because of their relatively low solids content. Tomato production varies with the fresh market uptake and minor amounts of sun drying for use as a condiment. Production swings back and

forth as producers overproduce and underproduce in response to the prior season's price fresh market peaks and valleys. Production takes place wherever irrigation is available and a market is at hand. Yields decline with continued use of saved seeds (disease build up) and reduced intensity of input use in line with anticipated market prices and margins.

**Fruit tree** production is concentrated around towns. Sikasso has a few larger-scale orchards (50 hectares) that are reputed to have been in the same family for at least three generations. Most other fruit tree production is in the hands of smallholders. Mango production in the 3<sup>d</sup> region of Mali is estimated to be about 205,000 MT (Yiriwa). Exportable varieties are Amelie (47,000 MT), Kent (30,000MT), and Keitt (25,000MT) concentrated in Sikasso, Bougouni, Koutiala, Yanfolia, and Kadiolo. While there are estimates that about 55 percent of this total is exportable, these estimates are based upon 30 percent loss rates and 15 percent national consumption. It is more likely that national consumption is at least 30 percent of production. And, work by the USAID-funded CAE has shown that the level of fruit fly damage is very high. It is more likely that about 30-40 percent of grafted mango production is exportable - or between 30 and 40,000 MT. Papaya production is done on small parcels and field edges again with a concentration around towns and in peri-urban villages.

**Alternative Crop** production follows two forms of organization. One occurs throughout southern Mali on small plots and hedgerows and from native trees on farms, grazing lands, and forest reserves (hibiscus, okra, ginger, tamarind, and néré). The second is organized through rural development organizations (CMDT, OHVN, and development projects) and projects working with village associations, NGO's, and companies (hibiscus, Tiger nut). Domestic and regional markets exist for all of these products. Extra-regional market demand drives the production of the Tiger nut.

All horticultural crop production and marketing is characterized by lack of vertical integration and multiple handling from producer to consumer. There is generally very low investment in postharvest handling and storage infrastructure, because quality control is low at the first stage of product aggregation from producers. Investment in shallot and potato storage is just beginning after years of experimentation. There is poorly differentiated transport from fields and villages to urban markets. Traders dominate domestic markets in Bamako, Sikasso, Segou, and Mopti. Input suppliers and traders with marketing contacts dominate channels to extra-regional export markets. The links between horticultural crop production and processing are weak and seasonal. The largest fruit and vegetable processor, a small-scale operation by any standard, has ceased operations. Carbonated beverage, dairy, and juice processors prefer to import concentrated purees, juices, and flavorings for their formulations. Microprocessing is increasing in both urban and peri-urban areas but currently handles a miniscule portion of horticultural product flows.

#### **4.9.2. Assessment of Value-Added Potential**

For purposes of this discussion, value-added is taken to mean adding value to product in excess of the value of the inputs used. Horticultural crops are generally higher in unit value than cereals, grain legumes, and forage crops. Conversion of land from lower to higher-value crops can be a value-added activity in itself. **Diversification** to horticultural crops holds potential

wherever a reliable water supply and market approach costs are reasonable. **Intensification** is the second general value-added strategy across Malian crop production. While Mali has very respectable yields, there is still considerable room for yield improvement from increased input use, better variety selection, and improved production practices. **Reduction in waste** is the third cross-cutting value-added strategy. Elements of this strategy include broader use of maturity indices to time harvests, use of proper harvest techniques and containers to reduce damage to harvested crops, and use of improved postharvest storage techniques. **Processing and Packaging** is the fourth approach to adding value to products. It is most successfully applied when there is good quality raw material that is consistently available at prices below fresh market levels and where there is strong market demand for processed products. **Utilization of by-products** may also add value, for example, in the use of culls from fruit or vegetable packing operations as fodder for livestock. Value can also be added by **improving market linkages** by moving from consignment sales to contract sales or by integrating forward in marketing channels by investing in distribution networks or sales outlets. Finally, value can be added by **improving transaction and organizational efficiencies**. Examples would be speeding up payment for consignment sales of fresh produce in export markets, or grouped purchase of seed and fertilizer for production, packaging materials for processing, and order delivery services.

### ***Shallots***

Diversification. Shallots fit well with the weak post-harvest handling, storage, and transportation that is available in Mali. They benefit from progressive growth in the number of urban consumers in sub-regional primary and secondary cities in the lower two income quartiles who retain major portions of traditional diets, but who need greater convenience in meal delivery.

Intensification. While shallot yields are respectable, they could be improved through acquisition of better seed bulbs, heat treatment of seed bulbs, and better fertilization.

Reduction in waste. This is probably the single most important set of value-added activities for shallots. More widespread use of maturity indicators (collar closure) and more uniform field curing would reduce postharvest losses, as would wider use of aerated storage structures that have been developed over the past 20 years. Diffusion of uniform drying and fermentation techniques would improve processed product output.

Three types of processing are currently in use. Two of three do not produce products that would be acceptable in international markets. Value added, however, is important (the chief role of the traditional processing is to avoid sales when the market is flooded). The third—EST (echalote séchée selon la méthode améliorée)—produces a product that would be acceptable by international sanitary/quality norms, but the size of the market for this product not well known. Value added for EST is estimated at 400 F/kg (using producer price at time that market is flooded). The EST method is used primarily in Dogon Plateau of Mopti Region (from 8.8 t in 1991 to 70.3 t in 1998, representing 2.4 percent of the regions production), but is expanding in ON region. The method still uses hand-cranked cutters and small drying trays that are not adapted for medium-scale processing volumes.

The Malian processed shallot does not compete directly with the Nigerien Galmi red onions currently. Competition will become likely if crop storage and marketing periods are extended for the Malian shallot. The trade routes for shallots and galmi onions intersect in Burkina, Cote d'Ivoire, Ghana, Togo, and Benin (Arnould 2000: Eric J. Arnould. 2000. Ethnography, Export Marketing Policy, and Economic Development in Niger. Forthcoming in the Journal of Public Policy and Marketing). Both Malian shallots and Niger's Galmi onions are produced in a short-day length (i.e., tropical) environment. This means that shallot and onion yields in the low altitude tropics will never reach the levels of the long-day onions in the higher latitudes. Dutch onions are offered to coastal cities in West Africa at competitive prices through most of the summer and fall period. Malian producers need to maintain a differentiated product that fits West African tastes if they intend to build market share in the subregion. The high Malian energy costs of controlled drying with gas may be recovered for middle tercile consumers in subregional cities. Dogon shallots and processed products should be branded to better defend value in national, regional, and extraregional markets, as is the case for the Galmi onion.

### **Potato**

The biggest value added potential is in harvest and postharvest practices to **reduce waste**. Diffuse light storage with anti-sprout treatment for local market use is being extended in the OHVN and CMDT zones of influence. The potato crop is a good candidate for import substitution and regional exports if potato quality can be improved to the point that **improved market links** can be made to secondary cities in the subregion. Yield levels are too low (the statistical data base is poor on this topic) to seriously compete for coastal markets as long as ocean transport prices from the EU and South Africa hold. On the **processing front** artisanal chip and fry production is probably the only way to go for several years, until buying power increases in the Malian towns. Then, it may make sense to introduced higher soluble solids varieties for chipping. If purchasing power increases in Mali's urban areas over the next ten years, major value-added potential for potato would come in cleaning, sorting, grading and packing for export, storage, and the move from artisanal to more modern potato chip manufacture. A more modern chip industry implies threshold level changes in the organization of production, postharvest handling, and processing equipment, that would need to be with fruit and other starch (banana, plantain, cassava) chip and snack manufacture to utilize plant capacity.

In general, potatoes provide a good opportunity that is buffered by the cost of transport from the West African coast to the growing interior cities and towns of the subregion. The closer the consumers are to the West African coast, the greater the threat from EU and South Africa competition. The EU, South Africa, and North Africa also offer differentiated potatoes varieties for the low solids boiling market and the high solids fry markets. The same type of competition would occur with processed potato products, where large EU manufacturers (Bahlsen's) are making steady inroads into both the chip and snack markets. Nigeria, Côte d'Ivoire, and Ghana also have their own extruded cereal and starch snack food production capacity.

The marketplace for chips, snack, and traveler fast foods has to be the starting point for examining this type of investment. West Africa has certainly diversified its consumption of these products among many different urban income groups over the past decade. Where potato chips

fit relative to parched grains, popcorn, peanuts, grilled corn, hardboiled eggs, cigarettes, gum, and candy and other products that soak up 100 CFAF and 250 CFAF coins is always an interesting question that may or may not provide strategic opportunities in the medium term for value-added industries. Unfortunately good quality consumption statistics are not available.

### ***Tomato***

Intensification is needed through the use of disease and nematode tolerant varieties adapted to seasonal weather patterns and pest and disease complexes. Better fertilization and water management with better crop management practice are needed. **Waste reduction** through the use of adapted containers for harvest, transport and marketing would improve the fresh market added value of the crop. Industrial **processing** as paste is not indicated with current varieties, yield, energy costs, packaging costs, etc. Yields would need to reach between 85 and 90 MT per hectare and processing (energy) and packaging costs cut in half before Malian paste could compete with Italian or Bulgarian product. Tomato paste has been commoditized over the past ten years on a worldwide basis. The number of small-scale plants has declined worldwide to be replaced by larger-scale, highly energy efficient processing units that are linked to producers who supply very high solids content tomatoes. Small scale processing facilities work only where higher solids varieties are combined with low raw material costs (yields from 2-3 times current Malian levels and low fresh market competition), low skilled labor costs, and low energy costs.

### ***Green Beans***

**Reducing post-harvest losses** through establishment of a cool chain with pre-cooling is one strategy for exports. However, green beans are unlikely to become an important part of regional diets. There is almost no processing potential. The best opportunity for increased value added at present is to improve quality and to diversity export markets (currently focused on France). Green bean exports climbed in the late 1990's, providing a welcome boost to Mali's agricultural exports and good returns to producers. Green beans are part of an off-season vegetable industry that has become increasingly mobile. In fact, the current green bean industry has reached export levels that Mali had achieved in the early 1970's. The challenge, now, as then, is to expand the range and volume of high value vegetable exports so that Mali can become a consistent supplier of EU markets. The problem is that many other producers, near and far, are further down the road. That road includes prepacked produce and fresh-cut produce for supermarket distribution. Small incremental addition of production and products is not likely to get Mali over the threshold quantities needed to justify required postharvest handling, storage and transport infrastructure investments. Direct investment by larger foreign firms is needed, but is problematic because of the low level of air service and lack of alternative local demand for off-grade products (40-60 percent of total production). Combining exports of fruit (mangos and melons) and, possibly, flowers with vegetables would build a stronger base, but transport costs are likely to increase and availability to decline as new air cargo security measures come into play worldwide. And, growth in these crops requires growth in the skilled human resource base, both in the technical aspects of production, postharvest handling and transport and in the management aspects of running a cost-effective business.

## ***Mangoes***

**Reducing waste** is probably the most important value added step. It is dependent on developing better harvest planning, adopting better harvest and transport containers, avoiding postharvest heating through shading of the harvested crop, and cooling for export marketing. Finding an economic solution to fruit fly damage is equally important. Over the next five years, drying is probably the best **processing opportunity**. However, greater uniformity in raw material selection (using maturity indicators and refractometers to gauge sugar content) is needed if extraregional exports are to be built up. There is little point in pursuing canning and bottling on any almost any formal scale until energy costs and packaging costs can be brought down.

Ocean freight for mangoes may provide a growth market, if it can be combined with other products that use the same logistics channel. Abidjan's port is ten days voyage from Rotterdam, Algeciras, and Livorno with frequent service. Dakar does not currently have the same level or type of reefer service. The ocean route makes refrigerated truck and/or reefer container service critical. **Organizational and transaction efficiencies** will be difficult to realize until either one exporter or a small group can consistently aggregate two to three thousand tons of mangoes for export each year.

Tradeoffs exist among the main technology and scale choices for postharvest handling, storage and transport and their linkage to other sectors (mango). The issue of mechanized washing, grading, sorting, refrigerated transport and storage is tightly linked to energy availability and reliability. It probably needs to be linked to a more specific look at how consumption patterns are evolving in the secondary cities in Mali, i.e., are refrigerators going into shops that would support a reefer truck delivery system from Bamako that would permit reefer backhauls to Bamako? If there is an imbalance in seasonal reefer transport demand, would seasonal positioning of reefer containers make more sense than fixed structures? Do the combined production and consumption trends in the secondary city aggregation points (Segou, Sikasso, Mopti) point to a time when fixed cold storage would pay for itself?

## ***Hibiscus***

**Intensification** of selected varieties is needed to provide a better export base. Improved drying conditions (cleanliness and monitoring) are needed to prepare the crop for export sale to the herbal tea and flavored health drink industry. Gradual expansion of microprocessing as syrup and jam would be more feasible if microprocessors would group purchases of packaging materials and labels.

## ***Other products***

**Tamarind:** Improved handling after harvest. Cleaner drying and storage.

**Miscellaneous vegetables:** Drying is a processing option to be combined with mango drying. Microprocessing as preserves and pickles may grow if urban incomes expand.

**Nere:** Improved handling after harvest. Controlled fermentation. Drying, grinding and packaging of fermented product.

**Tiger Nut:** Improved seed stock to increase yields and oil content from their very low levels. Regional exports to complement extra-regional sales. Market development work on processed product in region. No processing of tiger nuts is done in Mali, with the exception of a test of juice production in 1997 by CIS-SA. Exports to Spain are transformed into juice and sorbet. The best bet for increasing value added is probably to improve quality and yields (and perhaps change to a higher fat variety) but CIS-SA is also talking about setting up a juice processing factory (by products can be used for animal feed). Yiriwa suggests that local demand for juice is not known and a small pilot project before building a factory would be better.

#### **4.9.3. Key Constraints**

*Lack of Investment by Experienced Professionals.* Malian producers have increased the volume and value of horticultural output since devaluation. However, there are only a handful of producers who are forward integrated with packing and shipping operations. There is a total absence of the international investors who drive the major horticultural export industries and who have the financing to build logistic channels to both regional and international markets. Mali's horticultural subsectors are technologically and organizationally late in comparison with their near neighbor competitors (Cote d'Ivoire), the continental leaders in their subsectors (Kenya, Zimbabwe, Egypt and Morocco), and the world leaders (e.g., North America, Western Europe, Chile, Brazil, South Africa). It is about twenty year's behind the times in terms of organization of production, packing, and marketing. Given the accelerating pace of change in the horticultural industries worldwide, Mali does not have time to home grow its horticultural sector. It needs to make an order of magnitude jump in at least one horticultural subsector. None of the existing players appear to have the capacity to make the threshold investments required, and government policies related to land titles, import duties, and generally high overall taxation of the formal sector all increase risk and costs to investors.

*Transport costs and unreliability.* Transport makes up about 30 per cent of the costs of imports of all kinds, including packing, packaging materials, and fuel. Comparable figures for other countries in West Africa are 12-14 percent (UNCTAD and Price Waterhouse). Mali is at the end (or beginning) of a long and bumpy logistic chain whether the market is the West African Coast or overseas. High taxation of transport equipment (duties and VAT) and transport services (VAT) and fuel itself is an easy way for the Malian government to indirectly tax the 70-80 percent of the economy that is informal. However, this policy provides a disincentive for investment in differentiated transport services in Mali. It also provides a massive incentive for skewed transfer pricing by regional and international forwarding and transport lines that have business bases in Mali. Intermediate inputs imported for processing (primarily packaging and ingredients) increase consumer prices domestically and place Mali at a disadvantage for exporting processed products compared to its near neighbors.

Internal roads have improved but the network is far from satisfactory. With a normalized road transport index of 71 out of 100, it is near the bottom of West African nations on this World Bank development indicator scale. The rail line to Dakar continues its decades-long process of

deterioration. Its privatization is embroiled in political and financial infighting and is substantially behind schedule. Upgrading of service to permit reliable handling of refrigerated produce will take at least two years after privatization.

Malian exporters benefitted in the past from very competitive air transport rates (\$0.75-0.80/kg), but available space was highly constrained. Costs are likely to increase to the \$0.95 to \$1.00/kg level because of decreased space and increased security costs at all airports following the September 11 tragedy. Scanners and explosive detection equipment installation at international airports will cost in the range of \$2.4 million per airport with recurrent operating and maintenance costs of about \$150,000.

Intermodal transport (truck to rail, truck to rail to ocean, rail to ocean) has been a big structural breakthrough for transport to and from Mali, but costs are still high because of the lack of reliable backhaul volume from Mali to either regional or extra-regional destinations. Containerization is increasing for imported products, but the lack of reliable container handling on the Kouloukou-Dakar rail line keeps costs high and reduces transit and destination scheduling to narrow windows. This is one of the factors that severely constrain development of the Malian mango export industry.

There are some signs of differentiation of transport services in the Bamako area. There are some refrigerated and insulated 20 foot trucks and 10 foot vans for delivery of dairy products and frozen imported fish. There is still a lack of differentiated transport services (insulated truck bodies with ice handling capacity or standard refrigerated vans) from major centers of production Sikasso, Kati, Niono, Segou, Mopti to and from Bamako. This is a cross cutting problem for perishable produce and fish industry development.

*Unreliable Energy Supply and High Energy Costs.* Fresh or processed products require substantial energy inputs. While energy (electricity, gas) is heavily subsidized for domestic use, rates jump for industrial users. The power grid in Bamako is unreliable and all manufacturing industries must invest in generators. Elsewhere in the country self-generation of power for industrial purposes is a must. Low reliability and high costs increases the operating risks and costs for product handling, washing, grading and packing equipment, temperature and humidity controlled storage, and processing equipment. Malian horticultural industries are at an energy cost disadvantage relative to coastal countries. Completion of the gas pipeline along the West African coastline will deepen this cost disadvantage, particularly for agroprocessing industries that use gas or can use waste heat from pressurization stations. Today, most microprocessors in Mali rely on wood and charcoal for their energy needs. Gas driers are micro-units and used only when raw material costs are at their lowest (e.g. the peak production periods for mangoes, okra, tomatoes).

*Shallowness of the Domestic Market.* While a middle class is emerging in Mali, it is small and still poorly remunerated. The vast bulk of the consumers are near or below the poverty level. For horticultural products, this means that consumption is extremely price sensitive. Consumption of horticultural products will be highly seasonal (highest consumption when production is high and prices are low) and skewed towards products that have longer shelf life (onions, cabbage, potatoes, and root and tuber crops) or can be easily preserved through sun-



drying or brining. Adding value to perishables that requires technical skills (overhead and labor costs), energy inputs for storage or processing, packaging, and distribution also tends to put the product price out of reach of the purchasing power of more than 8 million Malians.

*Disorganized Supply of Raw Materials and Poor Quality Control.* Production takes place on small units spread over large areas. There are few large farms and even fewer farms that are vertically integrated with packing facilities, processing operations, or wholesale markets. Planning of production, harvesting, and marketing is poor. There are layers of transaction costs in aggregating products through many local markets and individual smallholders. A wide diversity in input use, knowledge of production techniques, and management strategies leads to difficulties in obtaining uniform lots of produce. The harvest season of many gathered products coincides with high labor demand periods for main season crops leading to real constraints in harvest scheduling and the timeliness of post-harvest operations. These constraints have a relatively small impact on national and sub-regional markets that accept wide variability in product quality relative to price. However, they severely restrict development of perishable exports to extra-regional markets and dampen the potential for processed horticultural products that will be competitive on higher-value coastal West African and extra-regional markets.

*Low-quality labor force.* Mali's labor force is cheap, but it is not necessarily low cost because it is also primarily illiterate and unskilled. The lack of an educated work force translates into long lag times in the transfer of technology to the farm level, to micro, small and medium enterprises, and to the processing plant floor. This means that both basic training and ongoing supervision costs require more direct management involvement and time than in neighboring countries. It also means less reliable repair and maintenance services. Poverty deepens some of the problems that more modern packing and processing facilities face with the Malian workforce. Only 27 percent of households have electrical power. Only 10 percent have running water. Only 14 percent have refrigerators. Only about 40 percent have an indoor kitchen. While around 66 percent use improved cooking stoves (wood and charcoal) the use of gas burners and stoves is tiny because of their initial cost and high operating cost compared to wood (Konaré and Teme 1997).

*Competition from better endowed and organized origins.* As an example, competition from imported potatoes to Mali's primary export market (Cote d'Ivoire) from the EU, South Africa, and even Northern Africa is a potential constraint (threat) to market expansion. It is unlikely that Mali can take much more than 30 percent or so of EU or South African position on the estimated 34 KMT imported potato market in the coastal West Africa states. On the other hand, medium-term projections show that the key demographic transition from predominantly rural to predominantly urban will take place in West Africa around 2003. The growth of secondary cities in the sub-region (WALTPS, CILSS/Institut du Sahel) should lead to increased demand for potatoes, and other middle and upper middle class products, over the medium term (five years).

Mali has made remarkable progress in potato production, but there are classic issues of good quality seed supply, improving yields from about 60 percent of EU, US, and RSA average levels to closer to 80 percent levels, and improvements in harvest and postharvest handling. The sector is technically constrained by monopolistic supply of seed potatoes, input quality and delivery timing issues, viral (and probably fungal and nematode) disease challenge, lack of

investment in postharvest storage and lack of refrigerated transport. It is organizationally challenged by the small average size of potato fields, multiple handling of potatoes throughout the postharvest chain to aggregate supply, and highly variable application of quality control standards.

If the current trends in the seed potato industry continue, Mali (and many developing countries) could see an increase in seed potato costs. It is not clear that Mali's potato production volume can support the costs of developing seed potato multiplication (micro and mini-tuber production and subsequent bulking) that would be needed to maintain good seed quality and industry productivity. Mali would need around a 150 KMT potato industry to do so. Dutch aid and the IER have worked on tissue culture multiplication and proposals have been put forward to build a commercial tissue culture facility to support micro and minituber production. These proposals are probably a mistake, for at least two principal reasons. The most important is that Mali, as is the case for most low-elevation tropical countries, does not have suitable environments for seed multiplication cool microclimates where roguing for viral and fungal diseases of potatoes can be done reliably and economically in order to bulk-up micro-tubers to mini-tubers to certifiable seed stock in sufficient quantities to be released to producers. ELISA testing of plants and seed is not an economic alternative to field roguing for certified seed production. Even if adapted zones existed, private and public returns would be greater and much less subject to risk if early generation certified seed were imported to produce commercial seed for growers in Mali. To get less expensive seed, the Malian industry has to get big enough to support more than one or two suppliers (i.e., the producers or groups of producers have to make regular annual direct purchases without defaulting on payment for at least three years running before they begin to gain any commercial bargaining power).

A similar case can be made against the development of a vegetable seed production industry in Mali. National vegetable seed industries are almost always a mistake unless the formal industry is big and dynamic, supporting research infrastructure (whether public or private) is strong, and good seed multiplication and storage capacity (refrigerated and humidity controlled for germplasm, breeder seed, and certified seed) exists. None of the three is present in Mali.

#### **4.9.4. Opportunities**

*Free up the rotations on Office du Niger land.* Rice is a required crop to hold and use land in the Office du Niger. De-linking land access from rice production should enable more rapid growth in higher value horticultural crop production. It would also provide greater flexibility in the scheduling of crop production and marketing. It would enable, for example, hibernage production of potatoes, sweet potatoes, etc. as rotational crops and permit exploration of the viability of expanding other root crops, cassava and sweet potatoes, along with their leaf protein, vitamin A, and antioxidant contribution, to local markets for humans and for fodder.

#### **4.9.5. Possible Interventions**

The main suggested intervention is to continue to use CAE to improve business and technology skills. CAE focuses on enterprise development and does careful screening of individual opportunities. In many horticultural subsectors this appears to be the right approach to take. Even

in the highly constrained circumstances of Mali there will be opportunities for those who can build strong vertical links back to producers and forward to markets. A private sector focus keeps most of the costs with the private sector. Exports require threshold levels of investment that are substantially higher than sales to domestic markets, so targeted assistance by CAE should enable a few firms to work towards breaking through the export ceiling that has plagued Mali for decades. However, the export transport chain will need substantial strengthening before broadly-based growth in the horticultural sector can occur.

#### 4.9.6. Other Growth Linkages

**Shallots:** Strong consumption linkages as incomes are going to the poor (Mopti Region) and to women (Office du Niger, Baguineda); strong health/nutrition linkages if it is true that women are more likely than men to spend their income on improved health/nutrition. Weakness in processing means weak employment linkages. Some weak backward linkages due to input demand (seed in particular but also inorganic fertilizers). There are also farm productivity complementarities through crop-livestock links in ON and Mopti due to high levels of manure use which has carryover effect on subsequent crops.

**Tomato:** Potential employment linkages through large scale processing. Income of farmers in irrigated zones (many of whom are already the better off farmers) would increase through increased demand for tomatoes. Weak backward linkages through input use (seed and fertilizer).

**Green Beans:** Production concentrated in OHVN zone where agronomic conditions are particularly good. Expansion of sector unlikely to involve many farmers/traders but could have important backward (input) and consumption (income) linkages within the zone.

**Mangoes:** At present, dried mangos and jam are produced in an artisanal manner by many micro-enterprises and sold for local consumption.

**Hibiscus:** It is suggested that value added and competitiveness could be enhanced by improving the quality of the hibiscus produced and reducing harvesting costs. Quality could be improved by planting varieties that get better prices in international markets and using improved production techniques (e.g., planting in fields instead of as hedges).

**Tiger Nut:** Production is very area specific (2 zones of Sikasso region) and is dominated by women (68 percent).

While it is tempting to attempt to rank crops for investment, the data base for an economic evaluation of their rank is poor. When one compares the results of consumption studies (Konare, 1997) with production figures, disparities up to five-fold exist. DRC evaluation of most of the horticultural crops has not been done since the FCFA devaluation. In this type of situation, more qualitative approaches have to be employed. It probably makes the most sense to concentrate on crops which have a large production base, and at least some hope of expanded exports in the 4,000 to 10,000 MT range. The tonnage is needed to obtain better transport terms. Using these criteria, a strategic concentration on mangoes, potatoes, and

shallots is indicated if broad economic and employment impact is sought. Other crops are more appropriate for an opportunistic approach working with enterprises who bring long experience with production and marketing and can vertically integrate their operations into the difficult Malian investment environment.

## **4.10. Oilseeds**

In Mali, cotton seeds, peanuts and shea, known locally as karite, are the most important oilseeds. Sesame and soybeans are also produced, albeit at in small quantities. There may be potential to expand sesame production in the future.

### **4.10.1. Cotton Seed**

Cotton seeds are a joint product in the production of cotton lint. CMDT, upon ginning seed cotton, sells cotton seeds to HUICOMA, which has been granted monopoly power to manufacture oil in Mali. HUICOMA is a mixed firm in which CMDT, the State, and the private sector are share holders with 53, 40 and 7 percent, respectively. Until recently, HUICOMA bought cotton seed at a very low fixed price of 11 CFAF/kg and transported it at an average cost of 10 CFAF/kg to its mills located in Koutiala, Koulikoro and Kita. Cotton seed price was recently increased to 29 CFAF/kg, but it is still much below that in neighboring Cote d'Ivoire and Benin, where oil, cottonseed meal (animal feed), and soap are manufactured. HUICOMA also produces soap and animal feed but has been plagued with serious inefficiencies resulting from the HUICOMA monopoly and a quota system.

Despite the low acquisition price of seed, oil produced by HUICOMA has not been competitive in domestic markets, requiring stringent protective measures to keep the local firm in business. HUICOMA's poor performance prompted the government to undertake an audit, which found a host of inefficiencies in its operations and management. Thus, there is room for improving HUICOMA competitiveness. However, it is unlikely that HUICOMA can venture into a new line of products to add value to cotton seed.

### **4.10.2. Peanut**

Peanut production is concentrated in four regions, namely Kayes, Koulikoro, Sikasso and Segou. Among these regions, Kayes is by far the largest peanut producer in the country, accounting for over 35 percent of peanut supply during the period 1984-1999. During this period, total peanut supply grew by about 11 percent per year, but this growth emanated almost entirely from expansion in cultivated area. Although peanut supply stagnated from 1995/96 to 1998/99, it increased spectacularly in 1999/00 to reach its all time peak of 278,000 tons.

This subsector, until the early 1990s, was under the leadership of the Office de Développement Intégré des Productions Arachidières et Céréalières (ODIPAC) in charge of extension and marketing unshelled peanuts in Kayes, Kita and Kolokani located in western Mali. Peanuts, collected by ODIPAC, were sold to SEPAMA, which produced shelled peanuts and unrefined oil either exported to Europe or sold in the local market to HUICOMA, which in turn supplied refined peanut oil for the domestic market. The involvement of numerous government-owned

parastatals in peanut-based products distorted the incentive framework and led to high costs to the point where Mali could no longer sell its products in the international market. As a result, the parastatals were dismantled in the early 1990s and left a vacuum that has not been filled by the private sector, except to produce for the local market. Also, serious aflatoxin problems plagued the sub-sector.

Since dismantling of the parastatals, peanuts have been processed mainly by the private sector. The bulk of peanuts is consumed in the form of butter by Malian households. The demand for peanut butter has been so strong that the Malian government, in collaboration with the Chinese government, is planning to put in place a processing unit in the Bamako region.

There exists considerable potential to add value to meet local and regional demand for raw nuts, oil and peanut meal, and butter. The bulk of peanuts is marketed locally in raw and butter form usually processed by women. The combination of favorable agro-ecological conditions and farmers' experience with the crop suggests that Mali could be competitive in groundnut production, but more analysis is needed to determine which zones have a comparative advantage in peanut production.

As indicated in the poultry section, there is considerable potential for expansion of that sub-sector. Peanut meal is an ideal source of protein for poultry feed, and extraction of peanut oil is a very simple technology. So there may also be potential for increased peanut production for oil and meal, given that a market will exist for the meal.

#### **4.10.3. Shea**

The performance of this subsector is hard to assess because data are poor. Estimates of shea supply indicate that production varies between 80 and 250 thousand tons per annum and occurs mainly in the regions of Bamako, Bougouni, Koutiala, San, Segou and Sikasso. This subsector is heavily dependent on women. Collection of shea is exclusively a female activity that lasts between May and August-September. Once shea is collected, it is buried to facilitate fermentation, dried and pounded in a mortar to yield nuts. While a large portion of the nuts is sold to wholesalers, some of it is dried and pounded with mortars to obtain the power. This power is then cooked and laminated on a stone to obtain a thick butter, which is then manipulated by hand and heated to obtain some oil.

Export demand for good quality shea almonds is strong in Europe and Japan, but the quality of Malian production lags behind that of neighboring countries such as Burkina Faso. Exports of industrially processed butter (by Karite-Mali, SIKA) are not competitive to some countries that are importing nuts and processing themselves. Industrially processed shea butter is also not competitive with traditionally processed shea butter in the domestic market.

#### **4.10.4. Key constraints**

*Cotton seed:* The competitiveness of cotton seed oil is affected by the high cost of imported inputs to process oil and by poor management. The restructuring of HUICOMA and the increase in seed price will be a test for the future viability of the oil subsector. Also, if the cotton

sector is liberalized, it is possible that cotton seed would be exported, and that could change the economics of both oil and animal feed operations in Mali.

*Peanuts:* The peanut sub-sector is constrained by many factors including: (i) lack of improved seeds in the production zones, making it difficult for farmers to increase yields to lower unit costs; (ii) low level of fertilizer use in the production zones; (iii) poor storage facilities causing a high level of aflatoxin; (iv) painful and labor-intensive processing activities due to the lack of appropriate technology; (v) lack of transport in the production zones; and (vi) strong competition from other vegetable oils in the domestic market.

*Shea:* The constraints to shea are: (i) the time consuming collection of shea fruits and the heavy burden on women's time; (ii) the lack of convenient processing technology; and (iii) lack of transport facilities in rural areas.

#### **4.10.5. Opportunities**

*Shea:* There is a good opportunity to increase exports by improving collection techniques to reduce waste. The recent change in the European Union rules to permit use of shea butter in cocoa manufacturing provides a good opportunity to expand shea production. Demand for shea butter is also strong in the cosmetic industry and can be a source of income for rural women. To maintain a long-run income stream, a systematic program of protecting existing trees and planting new ones needs to start soon, using grafting methods developed by research.

*Sesame:* While India, China, Myanmar, and Sudan dominate world sesame production, there has been considerable expansion of sesame production in the Australia, the USA, Mexico, and in smaller commercial programs around the world. African programs supported primarily by NGO's have also ramped up production. While consumption growth still exceeds the growth of production, it is expected that demand will flatten out over the next three to five years. Apart from the sesame oil trade, the sesame seed trade (confectionary) tends to promote production to get a broad set of suppliers who will compete for market share through quality and pricing. While NGO activities in Mali have substantial room to increase domestic production as long as peanut production is depressed, and can count on three-to-five years of growth in exports, it would be a mistake to project sustainable Malian exports beyond the 2000 to 3000 MT range. Maintenance of existing activities in this arena should permit this level to be reached over the first half of the strategic plan period.

#### **4.10.6. Interventions**

The Platform Project funded by a pool of donors appears to be a good opportunity to reduce women's burden. It plans to target 450 villages, but it has equipped 200 villages only. USAID could join the pool of donors to speed up the process of equipping additional villages with the multi-function platforms and improved shea and peanut processing. Mali has underutilized processing capacity and reportedly only harvest half the crop. Even much of that harvest is gathered too late to maintain quality. There is a seasonal labor use conflict with other crop production. The key issues are very practical ones. How do you increase the portion of the crop

that is collected? The timing of collection? Improve the average quality of the nut? Improve intermediate storage? Reduce the time to processing or sale?

Concentrating on promoting the shea butter in the US markets will not solve these problems. In fact, it is more likely to benefit the better organized producers and processors in Burkina Faso and Ghana than those of Mali. Ghana, which is a larger producer of shea butter than Mali) has 65 percent of its processing capacity lying idle. In December 2001, a new plant that adds 33 percent more capacity to the Ghanaian industry. The new facility has the capacity to quadruple its capacity by adding modular units. It was put in place by a partnership of two of the largest shea butter traders and marketing organizations in West Africa linked to the dominant shea butter formulation and distribution company in the world. While Malian processors are spared very much direct competition for supply by the CFA/Cedi exchange barrier today, they are still subject to the direct product competition on world markets. Over the 10-year strategy period, if the exchange barrier comes down, more direct competition for supply will take place. While in broad development terms a shea marketing effort in the USA may be beneficial for the West African industry, but what will it do for the Malian industry. The market will procure the bulk of its requirements from the more reliable and cost-competitive source.

If USAID is interested in pursuing activities in the shea butter industry, it should adopt a vertical approach working along the entire value chain from production through marketing. Early involvement should be weighted towards the improving production, collection, quality preparation of shea nuts, and maintenance of the shea nut quality. Innovative transnational work in West Africa will be needed to attack the development of shea butter markets in a way that will pay off over a ten-year period. Such an activity will not be inexpensive, but the pace of development with a gathered crop cannot be forced by front-loading expenditure. It will require nothing less than a long-term business plan for the industry and an annual investment of somewhere between \$300,000 to \$500,000 to realize.

Facilitating the multiplication of improved peanut seeds could help expand the oilseed area, as Mali has good production conditions for peanut. Technical assistance in storage and processing also would help ensure a market for the products.

#### **4.11. Seeds**

Recent studies<sup>33</sup> suggest that there are serious structural problems in the seed industry. These problems include:

- Legal texts regulating the seed industry that are contradictory. Fortunately, the regulations have not been enforced. Revisions of the laws have been prepared, but with little or no input

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<sup>33</sup> Lamissa Diakite et Alpha Macki Diarra. Octobre 2000. "Etude de développement de la filière des semences dans les pays du Sahel (Cas du Mali): Rapport Final" CILSS/INSAH et IER. Bamako. This study is partly synthesized in Bakary Kante, Mariam Sow, Samba Ly, and Valerie Kelly in "Développement de la filière semences au Sahel et intégration régionale: Quel rôle pour le secteur privé: Le cas du Mali.

from farmer groups, professional associations, private seed growers, and seed importer associations that have only recently been formed.

- The coordinating structures of the National Seed Plan are the National Seed Council and the National Seed Variety Committee. Neither has farmer or private sector representation. The Seed Council meets too infrequently to fulfill its role of planning the level of basic seed (R1) needed to meet a recommended seed variety renewal period of three years. The National Seed Variety Committee meets but hasn't kept the national seed variety catalogue up to date.
- The National Seed Service (SSN), which has guided seed multiplication in Mali since 1989 is scheduled to be disbanded in 2002, leaving a major void in the organization of basic and certified seed multiplication.
- The Institut d'Economie Rurale provides new varieties for a range of crops. As an Etablissement Publique à Caractère Administratif it now sells pre-basic seed to the SSN for multiplication.
- The Direction Générale de la Réglementation et du Contrôle (DGRC) that is responsible for seed regulation and the management of the Laboratoire de Semences (Labosem) is a new structure. The seed laboratory needs to be decentralized to provide for seed analysis closer to the sites of production and distribution.
- The Office du Niger, CMDT, and OHVN run their own seed programs. There are high rates of rejection of cereal seeds by the seed laboratory when samples are analyzed. Presumably CMDT does better cotton seed multiplication than food crop seed multiplication.
- There is a lack of information on private sector participation in the seed industry as importers, producers and distributors of seeds. The private companies work primarily with imported vegetable crop seed, maize, and irrigated rice.
- Low returns to individual or grouped farmer multiplication of dryland seed (Villages Semenciers) established with the aid of the FAO from 1989 through 1996 provide little incentive for seed multiplication. The information presented is incomplete, but sorghum seed production incurs a loss, and millet and maize are only marginally profitable as shown in Table 10.

**Table 10: Seed Prices, Production Costs, and Margins**

Crop	Sales Price F CFA/kg	Cost of Production F CFA/kg	Margin F CFA/Kg	% Margin
Millet	120	112.06	7.94	7.1
Sorghum	120	124.86	-4.86	-3.9
Maize	120	115.87	4.13	3.6
Rice	175	113.61	61.39	54
Cowpea	250	208.52	41.18	20

- Withdrawal of the state from the financing of seed multiplication.

Calculations of effective demand for seed are based on the seed rate recommended by researchers, renewal of certified seed by farmers every three years, and the area of coverage that is estimated by the National Seed Service. These calculations are relatively artificial, because seeding rates and seed renewal rates vary greatly by farm size, farm management



objectives, soils, drought avoidance and other production risk management strategies, etc. Using the assumptions results in the coverage rates for improved seeds for 2000 and projected rates for 2010 shown in Table 11.

**Table 11: Seed Coverage**

Crop	Estimated 2000 Coverage (percent of surface area planted)	Estimated 2010 Coverage (percent of surface area planted)
Millet	6.62	6.1
Sorghum	4.03	0.47
Maize	8.58	10.40
Rice	10.52	12.76
Cowpea	3.52	4.28

The same study's data on adoption rates and surface area coverage suggest that farmers are using a variety of different seed acquisition strategies. Certified seed tends to get used on larger farms in the irrigated areas. For example, 41 percent of farmers in the Office du Niger used rice seed from official seed farms but 95 percent of the area planted was planted with this seed. In the CMDT zone, a similar relationship exists for maize seed. Both rice and maize varieties are selected for strong response to fertilization. Ratios between adoption and surface area coverage for millet, sorghum, and cowpea are more even in CMDT and OHVN areas. Other zones covered by long-standing development programs in Mopti, Segou, and Koulikourou seem to have ratios that vary with the type of production system, e.g. high rates of adoption of millet on small surface areas where market gardening is important in peri-urban zones.

So, are adoption rates and coverage rates low, average, or high? It is not possible to tell from the studies done to date. There is probably more farmer-to-farmer exchange of varieties than would be detected by the surveys that have been done. It is clear that the official system for production of seeds for dryland cereals does not provide an incentive for continued participation. The official prices paid may explain why nearly 90 percent of the *village semencier* seed produced does not enter official seed distribution channels. Too, a seed market study would look much more closely at actual performance of certified seed of national catalogue varieties across locations and generations on farmer fields. Sorghum varieties, in particular, seem to be grown on small areas relative to the number of farmers who have tried them.

#### **4.11.1. General Recommendations**

1. Mali has a good history in millet, sorghum, maize, rice, and cowpea varietal development. Maintaining this capacity and developing efficient approaches to maintaining breeder and foundation seed multiplication is an essential food security and growth-supporting function of agricultural research. Support to these crops needs to be maintained and perhaps increased. At a minimum a national security stock of breeder, foundation, and first generation certified seed should be maintained as a drought or other catastrophic crop loss (desert locust or political disturbance) insurance policy. USAID has not been directly involved in the seed sector for some time. GTZ, Dutch Aid, and AFD have been involved.

2. Greater involvement of the private sector in varietal research and seed multiplication decisions is needed. The PASAOP may provide an opportunity for this involvement at the level of grant funding for agricultural research.
3. The call for rapid decentralization of the National Seed Laboratory seems premature. Laboratory personnel are scarce. Seed laboratory equipment, while relatively inexpensive, requires a regular income to maintain in operating condition. Strategic location of at most two seed labs would probably cover the national needs. Both GTZ and Holland have extensive experience in these issues.
4. USAID, at relatively low cost, could add a seed market information report to its current support to OMA. This could be accompanied by support that looks at seed demand on key dryland and irrigated cereals and forage crops to better target information needs in the creation of a private market for certified seed producers. The new input suppliers association, chambers of agriculture, trading networks, NGO's would be appropriate partners in these efforts. The seed market network should include neighboring countries where peanut, maize, bean, and forage seed production is available.
5. Mali and its research institutions should focus more on regulation through the DGRC and the National Seed Laboratory of vegetable seed imports than attempt to breed and multiply seed in country. The international vegetable seed industry is light-years ahead of Malian public capacity to breed, multiply, package, and market vegetable seed. Rather than erecting barriers to seed importation, as some plant breeders seem to want, Mali should facilitate the importation of quality, certified seed in order to achieve greater sampling and testing of the total volume of seed that is imported.
6. USAID, as a matter of policy, should support regional and international free commerce in certified seed that is accompanied by adequate phytosanitary certification. Over the ten-year strategy period, it may be appropriate to help support a seed or input association that addresses seed trade issues.

#### **4.11.2. Possible USAID intervention**

It likely would be productive for USAID to support seed multiplication by producer groups and NGOs combined with demonstration activities bringing together appropriate packages of seed, fertilizer, and water retention technologies. It appears that substantial production gains could be achieved for sorghum, millet, peanuts, and perhaps maize. The state is vacating seed multiplication next year; seed multiplication for these crops is not profitable at present; and yet, the improved seeds offer significant yield gain potential (coupled with other inputs).

#### **4.12. Fertilizer**

The commodity subsector assessments have all mentioned problem of availability and timely access to credit for affordable, high quality inputs as a major constraint to improvements in agricultural productivity, profitability and future performance. A well-functioning fertilizer subsector is arguably one of the most critical (and best documented) prerequisites for sustainable growth of Mali's agricultural sector. Because fertilizer is often the largest single input expenditure that a farmer makes and often the most expensive inventory item that an input trader stocks, development of the fertilizer sector goes hand in hand with the development of the banking and credit system. This section briefly discusses the current structure and recent

evolution of the fertilizer subsector, identifies the major constraints with respect to current performance and expansion of the sector, and makes a number of recommendations for actions to promote both increased fertilizer supply and demand.

#### **4.12.1. Recent Evolution And Current Structure Of The Fertilizer Imports And Distribution**

Mali is one of the Sahel's best performing countries in terms of sustained growth in fertilizer consumption and development of private sector import and distribution networks (Kelly 2001), yet fertilizer use remains far below levels needed to raise productivity to the target levels mentioned in Chapter 2 of this report. Annual growth rate in fertilizer imports during the 1990s was 15 percent (up from 4 percent during the 1980s). Mali's average annual imports during the 1990s (22,800 nutrient tons) placed the country in 3<sup>rd</sup> place when ranked with other W. African countries (well behind Nigeria and Côte d'Ivoire but slightly ahead of Burkina Faso, Cameroon, and Benin). About 80 percent of Mali's fertilizer is used on cotton in the CMDT zone, 16 percent on irrigated rice in the Office du Niger, 2 percent on cotton in the OHVN zone, and the remaining primarily on horticultural crops, with small amounts going to coarse grains and pulses.

A mix of private sector actors and government funded rural development organizations (ORDs) such as the CMDT, *Office du Niger*, and OHVN carry out fertilizer import and distribution activities in collaboration with farmer or village associations which are often responsible for input credit and transport functions. At present, different fertilizer import and distribution systems can be distinguished primarily by (1) different levels of ODR vs private sector involvement (2) different levels of grouped (e.g., farmer association) vs individual purchases and (3) different levels of input/output marketing linkages.

The trend has been toward increasing private sector responsibility for fertilizer supply, but progress is uneven across ORDs. CMDT lags farthest behind, taking full responsibility for organizing an international bidding procedure for fertilizer imports and distributing it to CMDT farmers; farmer associations assist to varying degrees with organizing the transportation and administering the CMDT credit program. OHVN is next, allowing CMDT to organize fertilizer imports for OHVN farmers while farmer associations take care of getting credit from banks and arranging transportation. The Office du Niger has been completely liberalized since the early 1990s, with farmers associations dealing directly with banks to get credit and directly with distributors to purchase fertilizer (see IFDC 1998 for more details). The relative importance of vertically linked input/output markets follows the same pattern, being strongest in the CMDT and OHVN, where there remains a monopsony on cotton sales and weaker in the Office du Niger, where rice marketing is fully liberalized, and banks are attempting to use village association stocks as collateral (see Mariko et al for more details).

Input supply to horticultural producers has always been in the private sector. Supply is poorly organized and heavily dependent on many small scale, informal retailers who buy very small quantities and re-bag products into even smaller quantities (raising concerns about input quality and adulteration). Although there are many horticultural producer associations, most producers in this sector purchase their inputs individually. Consequently, they have been the strongest proponents of a market information system for inputs that provides information on availability,

quality, and prices (Teme 2000 and 2001, Songo 1998). Producers of coarse grains and pulses in the rain-fed zones not benefiting from ORD coverage rely entirely on the private sector (which is reluctant to enter this low-demand, high-risk market) and fertilizer promotion programs run by NGOs, such as SG2000.

A recent PASIDMA study identified 9 private-sector fertilizer importers based in Bamako. They are all representatives of foreign based companies located in West Africa and Europe, except PROFEBA (PRoduits FERTilisant BActérien) which is a local company involved exclusively in the marketing of “Ségou nogo”, an organic fertilizer made by a Ségou based manufacturer.<sup>34</sup>

The sector is dominated by agronomists having training and experience in the use of fertilizers and crop production issues. Importers rely primarily on cash or 90 day supplier credit for their import purchases. When asked about the minimum level of financial assets required to enter the input importation business, the typical response was in the neighborhood of 10,000,000 FCFA (about \$14,000 using a 720 F/\$ exchange rate). An amount of \$14,000 is not an adequate level of financial assets for importing fertilizer at volumes capable of realizing economies of scale. Poor economies of scale due to inadequate financing was a key factor preventing private dealers from being competitive with CMDT prices when they attempted in the early 1990s to supply OHVN farmers with cotton fertilizers and more recently when they tried to supply CMDT farmers with cereal fertilizers and pesticides. Another example of how this financial constraint inhibits the growth of the Malian input sector is illustrated by the CMDT system of procuring fertilizer for their farmers. CMDT goes through an international public bidding process to obtain its fertilizers but the financial assets required to submit a bid far exceed the capacity of individual local importers, so foreign suppliers continuously win the CMDT bids, which represent 80 percent of Mali’s fertilizer imports.<sup>35</sup>

All importers surveyed by PASIDMA claimed that their business was growing and profits were good, attributing the growth primarily to increased demand in the cotton and rice sectors but also to expansion in the horticultural sector. Despite satisfaction with the increasing business, none of the importers interviewed maintains any branch sales offices. Reasons given for this were the high investment required to build storage infrastructure, high risks in moving fertilizer products to areas which might have inadequate demand, and risks of fertilizer spoilage and losses.

Instead of developing formal distribution networks and branch stores, importers and wholesalers sell to independent traders (usually in small quantities and on a cash basis) who constitute the remaining parts of the wholesale and retail distribution networks in both Bamako and elsewhere in the country.

Importers believe that input prices in Mali are generally lower than in neighboring countries such as Senegal and Cote d’Ivoire, but they argue that they could be even lower if the 11 percent

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<sup>34</sup> The discussion of the Bamako import/wholesale sector is drawn from an unpublished report by A. Traoré synthesizing preliminary results from a 2001 PASIDMA study of the structure of the Mali fertilizer import and distribution sector.

<sup>35</sup> This information comes from discussions with representatives of Mali’s input traders association.

going to taxes and import duties could be reduced (We have not looked into this, but apparently some input taxes have recently increased due to TEC/UEMOA changes).

A number of input dealers have recently formed an input dealers association (ORIAM) that is trying to provide more structure and organization to the sector. One of their key concerns is developing an even playing field for all importers and dealers. Members of the association argue that inputs are being brought into the country informally and by-passing the rigid inspection/tax procedures to which the formal sector is subject, making it difficult for the latter to compete effectively, particularly in the Sikasso market where the borders are relatively porous. There are two ways of dealing with this uneven playing field: 1)reducing some of the restrictions/taxes placed on formal sector operators or 2)better controlling illicit imports. The former option is probably a more realistic way to proceed than the latter.

While creating trade associations is a positive step, there is also a danger of collusive pricing practices resulting from these activities, particularly if the informal sector is forced out of business. Good technical assistance and training to this and other trader associations through existing or new USAID projects could minimize the risk of collusive activity which would be detrimental to input users.

#### **4.12.2. Fertilizer Research**

Most research on soil fertility issues has been conducted by the ODRs (CMDT, OHVN, ON) in collaboration with Mali's agricultural research institute IER. Although there has not been a focus on fertilizer research in recent years, IER is currently undertaking studies to develop regional fertilizer formulas for cereals, and the FAO/World Bank (WB) funded Soil Fertility Initiative team did an extensive review of existing studies on fertilizer response and use of organic amendments to improve soil fertility (Heno, 1992). This document identifies crops and zones where there is potential for increasing both organic and inorganic fertilizer use as well as areas needing further research. It provides an excellent guide for developing future fertilizer and soil fertility research programs.

The future of Malian rock phosphate production and use is a key fertilizer sector issue. Recent studies by IFDC (Heno and Baanante, 1999 and Debra 2000) examine the potential for using rock phosphate deposits in northern Mali (Telemsi) as an alternative to imported phosphate products. In the Malian study, as in other African studies of rock phosphates (IFDC 1999), the research did not result in a clear-cut recommendation for the promotion of local phosphates: use of local phosphates is profitable, but use of imported phosphates is more profitable. The pros and cons of countries developing their own rock phosphate industries continues to be hotly debated, with proponents arguing that it would save foreign exchange and create jobs and the opponents arguing that imported fertilizers are easier for farmers to apply and get more rapid, visible results that encourage faster adoption (see Sanders and Ahmed 1999). Given the amount of research that has been done on this topic, it is unlikely that "more research is needed", yet there is little consensus on where to go. This appears to be an issue that needs to be resolved at the national level with a systematic review by all interested parties (ag, industry, etc.) of the potential benefits and costs of local vs. imported phosphates. Leaving this issue

unresolved may have negative impacts on fertilizer importers' decisions concerning investments in much needed storage capacity.

### **4.12.3. Fertilizer Extension**

Extension concerning fertilizer use in the ORD zones is carried out by the ORDs while efforts to promote fertilizer in other zones have been carried out by the former WB- funded T&V extension program, sometimes in collaboration with NGOs such as SG2000. We are not aware of any private sector input distributors in Mali who have gotten involved in extension activities, but this is something that has begun in neighboring countries (e.g. Senegal) and should be looked into jointly by the ORDs, NGOs, representatives of farmer associations, and the input traders association.

Although fertilizer use is high in cotton and irrigated rice zones, there is a need for extension programs in these zones to promote more efficient use of inorganic fertilizers. The USAID funded natural resource management (NRM) program in the OHVN provides multiple examples of how fertilizer efficiency can be improved through simultaneous use of organic matter and various efforts to reduce erosion (Kelly 2000). Extension efforts addressing the issues of soil salinization and acidification in irrigated zones must also be on the agenda for the future in these high fertilizer using zones.

Fertilizer promotion is a more difficult task in the rain-fed cereal/pulse production zones where farmers do not have a major cash/export crop with which to finance fertilizer adoption. Despite long-term efforts to promote fertilizers and improved organic methods in these zones, yields remain low and growth trends have been either negative or static. Some analysts have argued that increased productivity through the use of improved (but more expensive) technologies will not occur in these zones until something is done to reduce the extremely high variability in output prices or provide farmers with better means for coping with these price fluctuations such as cereal banks, rainfall insurance programs, etc. (Sanders et al., Hazel...).

This report is projecting an annual increase in coarse grain production of 4 percent per year during 5 years. This is a feasible goal for maize production, which has already been increasing at a faster annual rate, but a tall order for millet and sorghum producers. Making improved seed available to farmers will help. SG2000's introduction of shorter cycle seeds in combination with appropriate fungicides in the Segou region resulted in a small 133 kg/ha yield increase but a large return on the investment (value/cost ratio of 10) and was very much appreciated by farmers. Unfortunately, available evidence from farm-level demonstrations continues to raise questions about the potential for profitable use of fertilizer in these zones characterized by high climatic and price risk (Nubupko et al. 2000, Sanders et al. 1999). Any program to introduce improved seeds that require fertilizer will need to be carefully studied and monitored. Efforts to increase fertilizer efficiency through the simultaneous use of organic fertilizers and anti-erosive methods in these zones will be particularly important, but the feasibility of doing this if there is no cash or export crop to provide investment capital remains questionable (Kelly 2000). Higher use of organic fertilizers depends on their availability and competing uses. In zones where there are limited prospects for cash or export crops, more attention to increasing cash income

from livestock could provide both manure for organic fertilizers and cash for the purchase of inorganic complements.

#### **4.12.4. Key Factors to Consider in the Future**

1. Increased financing for importers, distributors, and farmers is critical if the fertilizer sector is to expand. As noted above, the Malian private sector is at present unable to assume responsibility for importing fertilizers for the CMDT and unable to realize economies of scale in other imports due to limited capital. Furthermore, traders are currently unwilling to invest in the storage and shop infrastructure required to build internal distribution systems capable of providing a timely, reliable supply of fertilizer.
2. Increased access to importer capital needs to go hand in hand with training to improve skills in dealing with international fertilizer markets (timing of orders, choice of shipping procedures, etc.) and government ensuring that there is an even playing field between formal and informal sector operators.
3. Experimentation with new alternatives for extending credit to farmers should accompany any effort to increase credit to traders and to do away with monopoly output markets for cotton. Currently, the CMDT interlocking credit system is substituting for social, political and legal institutions needed for credit market development. Looking at experiences in other countries (e.g., Benin) as well as trying to synthesize information from different experiences in Mali would be a useful place to start. The WB funded IFDC in 2001 to do a study of options for developing input markets in liberalized cotton systems; the results of the study are not yet available but should provide some insights (Mali was one of the countries studied). A WB is planning a workshop on the subject in early 2002. The CLUSA-style training of farmers and farmer associations promoted by USAID in the OHVN appears to have had high payoffs in terms of improving farmers' ability to conceptualize good agricultural investments, obtain bank credit for them, and achieve high reimbursement rates; this appears to be a good model for USAID to expand.
4. Fertilizer quality is an issue that has been raised by horticultural producers and some rice producers. To the extent that USAID gets involved in activities concerning grades and standards, fertilizer (and other inputs) should be included in the products covered. A recent World Bank report on input market regulation provides good discussion of various options for both seed and fertilizer quality control .
5. "Professionalization" of traders operating in the input sector is necessary. This could be supported through training programs for members of the Malian input traders association as well as programs promoting the development of regional associations. It may require the government to develop some type of formal (but simple) registration procedures for input traders.
6. Better market information systems for inputs are needed at all levels. Importers need help with finding the best import prices and qualities. Demand for information on availability, quality, and prices by horticultural produces appears to be the highest priority producer need.
7. To decrease fertilizer costs through increased economies of scale, some consideration could be given to promoting regional coordination of imports with countries through which Mali must transship fertilizer (Côte d'Ivoire, Ghana?, Benin?). This would require discussions among researchers and extension experts from Mali and potential collaborating

countries to see if greater harmonization of fertilizer formulas could be achieved; this is often accomplished by shifting from complex NPK formulas to greater reliance on DAP and urea.

8. Increased fertilizer demand in the rice, cotton, and horticultural sectors will most likely come through area expansion of the crops and improvements in the credit system and extension efforts to help farmers increase fertilizer efficiency.<sup>36</sup> Increased efficiency will increase profits, making more money available to reinvest in inputs.
9. Increasing demand in rain-fed cereal and pulse zones will require a concerted effort on the part of research and extension to find the right combination of seeds, NRM practices and inorganic fertilizers. A well-run program of demonstrations with the right input package could be an effective inducement to adoption. Simultaneous attention to issues of credit and price variability, and climatic risk will be required.

Fertilizer use and distribution systems vary significantly depending upon the region and crop. For cotton, there is at present an integrated system wherein inputs including fertilizer are provided to farmers with repayment coming in the form of a deduction from the delivered crop. In the CMDT zone, maize also is generally cultivated with cotton fertilizer. For other crops, there is no such integrated system. In the ON zone, producer associations have taken over provision of operating credit for seeds and fertilizers with mixed success. In other regions and for other cereals and horticultural crops, fertilizer use varies considerably. Lack of credit is commonly cited as a constraint to increased fertilizer use. For sorghum and millet, some believe availability of varieties or seeds that can take advantage of increased fertilizer is an issue.

#### **4.12.5. Constraints and Opportunities**

It is clear that the low level of fertilizer use is a serious constraint to increased production in Mali. It is also clear that we do not fully understand all the reasons for the low level of fertilizer use.

The current situation presents an opportunity for expanded demonstrations on farmer's fields of use of improved seeds and fertilizers. It appears that the demonstration effect is strong, so widespread demonstrations of the increases in yields that are possible could have a significant impact.

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<sup>36</sup> Rice farmers in the ON are already using recommended levels of DAP and most are only slightly below recommended levels of urea. Cotton farmers have tended to use less than recommended fertilizer rates since the devaluation, preferring to increase income through area expansion rather than intensification.



## 5. Roles and Jurisdictions of Different Economic Actors

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Sorting out who should do what in an economy involves identifying the characteristics of the problems to be solved (e.g., type of goods and services to be produced) and then matching those tasks with the appropriate group(s) to carry them out. The general guiding principle is that the problem should be solved by the smallest group possible that can adequately address the issue. For example, most economists would argue that individual adults or households ought to be the primary decision makers in determining what they each have for breakfast in the morning, but that an individual or even local government is not the appropriate “jurisdiction” to solve problems of global warming. Obviously, determining what constitutes “adequately addressing the issue” requires some judgment calls.

In Mali, the government’s view of “who should do what” has changed radically since the economic reforms began in the 1980s, and particularly since the political reforms began in 1991. Immediately following independence, the country opted for a “state does everything” approach that involved heavy state involvement in direct production of goods and services, including creation of some state farms. In reality, the state lacked the financial and human resources to totally dominate the economy. The private sector remained involved, but the “rules of the game” led to high transaction costs, in terms of needing to operate in the shadows, pay off officials, etc.

Since 1991, three themes have guided government policy about “who should do what”: (1) reduction of direct state involvement in production of most goods and services (“*disengagement de l’état*”); liberalization of the economy; and a shift of responsibility for economic activities, including production of supporting services, to civil society (“*reponsibilisation des populations*”). The latter theme includes both political decentralization and fostering of organizations for collective action, such as farmer and trader organizations.

These themes are consistent with Malians’ desire to allow broad-based decision making as part of the country’s new democracy and recognize the reality of the scarce human and financial resources of the government. In implementing the policies, however, one needs to bear in mind that the Malian economy is characterized by a large amount of exogenous uncertainty (e.g., concerning weather and the evolution of international markets), missing markets and asymmetric information. These conditions imply that naïve reliance on simply “letting the market work” will not necessarily lead to good economic performance. Getting good performance involves determining the appropriate roles of the individual and collective action and then empowering the relevant actors with the legal, financial, organizational and technical resources needed to carry out those roles.

This reflection must encompass regulatory framework and contract enforcement, finance, grades and standards and the provision and management of various types of infrastructure (e.g., transport, rural electrification, communications, irrigation, agricultural research, extension, market infrastructure and information, and market development). A great deal of analysis is needed to identify creative ways of linking the mix of public and private sector activities to achieve growth. The debate between “public vs. private” has often been cast too narrowly. A

myriad of ways exist to construct "private" markets, each with different sets of rules and each implying a different public and private role (Schmid).

In short, the challenge is determine the best way of organizing individual and collective action to improve the productivity of the different levels of the various subsectors, and the coordination among those levels. This needs to be done while taking into account economies of scale, the spill-overs (externalities) from certain activities, and the need to minimize rent-seeking behavior. (Dioné et al.).

Defining the appropriate roles of different actors in the economy is no small challenge in a place like Mali where democratization, liberalization and decentralization have led to a growing number of public and private actors active at many levels (e.g., cooperatives, corporations, community-based associations (health, education), farmer organizations, government agencies, private businesses, national and international NGOs, donor-financed projects, new line ministries (Ministry of Social Development)). The challenge is complicated by actors' risk strategies, low level of trust and confidence of the public sector by private actors, and low managerial capacity of many public sector and newly created civil-society organizations.

## 5.1. The Overall Policy Environment

The roles, responsibilities and jurisdictions of different economic actors fits within the policy environment of the country. In many ways, policy reforms generally remain as a responsibility of the public sector. Increasingly, however, the private sector is beginning to play a more active role in policy issues through its lobbying efforts. One of the more significant results of globalization has been redefinition of the relationship between the private and public sectors. In some areas of the world a split has developed between those countries that compete in the global marketplace and those that do not compete. In countries that compete, the private sector usually has changed from its traditional role of lobbying as individuals for individual benefits and favors to taking an active role in public policy development through lobbying government as a group and making alternate suggestions for legislation.

Political involvement and lobbying of government will likely expand as part of the decentralization effort now underway in Mali. One of the problems with this and other political empowerment of local and private organizations is access to sufficient information and basic analysis capabilities to support effective local-level as well as national-level lobbying efforts.

In Mali each commodity sub-sector has its own particular policy issues. It is important that means be developed internally or through outside assistance of providing a voice within these sub-sectors on policy issues that affect them in some form of sub-sector strategic planning. The *Economie des Filères* (ECOFIL), division of the *Institut d'Economie Rurale*, is mandated to organize task forces for this purpose, but it appears not much has been done to date.

The liberalization process begun in the mid-1980's has resulted in reduction of much of the state's direct involvement in the productive sectors of agriculture. The exception to this has been cotton. The *Compagnie Malienne pour le Développement des Textiles* (CMDT), or its parastatal partners COPACO and HUICOMA, still has a monopoly on most aspects of production, inputs, marketing and sale of cotton. Pressure from the World Bank and related

financial institutions on the government to divest part of the cotton activity to the private sector has had only limited success to date, but liberalization and privatization is planned for the future. Recent protests by producers over low purchase prices have had a major impact in reducing the amount of cotton going through the CMDT system. This crisis has focused attention on how CMDT does business including the arrest of top CMDT management and a major financial crisis. A number of public policy changes have been proposed to open up CMDT to outside capital. Proposed changes include participation by producers and improvement in its management. Mali now has a rigid, inefficient, and non-competitive high cost cotton sector. At the present time the breakeven sale price of CMDT's cotton is above world market prices. The trend of its costs, particularly its fixed costs, are going up while world market prices are going down. It must reduce costs, accept lower market share, or provide massive subsidies paid by the government or its French counterparts to make up the price differences.

In the cereals sector, much of the state apparatus has been dismantled. State companies are out of business, and the markets generally have been liberalized. There are still parts of the markets that do not function well, such as credit, that need further attention. Also, for a country such as Mali with relatively small markets, there are concerns in some sectors regarding monopoly power of private sector entities. Normally a small country can use open borders to prevent development of domestic monopoly power. However, in the case of Mali, there are important goods that at present are non-tradeable, such as electricity, and other goods that aren't traded much because of high transport costs. In these cases, Malian isolation from outside markets opens up the potential for domestic market power.

In other liberalized commodity sectors there are also a number of public policy issues that have been tabled that relate to increased competitiveness. These include: impact of political decentralization on the sub-sectors, infrastructure particularly electricity and roads, and public and private sector roles in formerly public services such as extension and research.

## **5.2. Regulatory Framework and Contract Enforcement**

The problem of efficient and fair adjudication of contract disputes is one of the major issues raised by traders, exporters, farmers, processors and bankers. Regulatory activities and commercial and financial interaction activities take place within a legal framework. For most businesses, these activities generally refer to commercial law and the commercial courts. The foundation of these activities is the contract between parties for a commercial or financial transaction.

A recent survey of Malian citizens' view of democracy found that there is little confidence in the judicial system (Bratton). This view has also been supported in interviews by this team with traders, bankers and lawyers, most of whom gave examples of perceived injustice or corruption in the system. Interestingly, the feeling among the interviewees was always that the judicial system was biased against them and favored their opponents. Lack of confidence in the judicial system to adjudicate business disputes limits bank financing in new business enterprises, business activity through contracts, and reduces incentives to build partnerships beyond one's close circle of friends. If Mali is to move its economy and business sector into the modern

world, the ability to support an efficient and fair contracting system is essential. Lack of reliable third-party contract enforcement is also a major constraint to attracting private-sector investment and expansion in Mali.

Western society's concept of contracts supported by an unbiased, aloof judicial system has to be merged with Mali's strong sense of social capital and social sanctions. This widespread cultural tradition in Mali has been the basis of tolerance and social cohesion that has held Mali together and allowed concepts such as democracy to be developed in the country. The introduction of an impersonal and independent legal system could conflict with traditional social concepts. In addition, the widespread statist orientation of Mali's recent economic history provides little basis for understanding, and sometimes, appreciating issues such as private property rights. Nevertheless, for democracy truly to take hold in the country, and for economic activity to continue to expand, the general rule of law including an honest, efficient judicial system will have to be developed in Mali. Many things are needed for this development to take place. Requirements include advocacy by interested parties, including the private sector, to enact appropriate laws and regulations. In addition, there is a need to establish the personnel and infrastructure needed to enforce these laws.

Private sector involvement is particularly important in those areas related to regulation, contract enforcement, and taxes and duties. These areas impact directly private sector activity and competitiveness of the sector in world markets. Activation of existing business associations as well as creation of new interest groups to actively lobby and campaign for policy changes are important as corrective measures for outmoded regulations and laws. These associations also fully engage and inform interested parties on the rapidly changing environment of global markets. This engagement is now taking place through such organizations as CONOESAM and others.

Mali has made considerable progress in simplifying its previous byzantine system of business regulation. The regional project OHADA has developed revisions and simplifications of many of the legal texts related to business contracts for the region. In 1998, most of their recommendations were enacted into Malian law. Many of the actors related to this new legislation (including judges, lawyers, small-scale traders, farmers, and lower-level government officials) are unaware, however, of the current status of these rules. This ignorance leads to confusion, opportunities for graft, and other barriers to trade. For judges and lawyers, it is essential that a system of continuing education be put into place to update their knowledge and understanding of the new laws on the books, particularly those related to commercial law. As far as traders, farmers and lower-level government officials are concerned, the *Chambres d'Agriculture* (ACAM) have proposed, as part of the World-Bank financed PASAOP, to develop a program aimed at educating local chambers about the current regulatory environment. Such educational activities are potential high-payoff areas for professional organizations, such as APCAM and the Chamber of Commerce and Industry of Mali (COCIM), and might be implemented through hiring local consultants (e.g., from the faculty of Law and Economics of the University of Mali).

Infrastructure to support this legal framework is extremely weak. There are two major complaints about the legal system related to contracts: 1) lack of honest judges, and 2) length of

time and cost of seeking settlement of contract disputes. The first complaint reflects the low level of training and salaries of the present judges and a long tradition of rent-seeking by the magistrates. The second complaint reflects the extremely limited resources put forward by the state to support the legal system, particularly concerning commercial issues. There are only three commercial courts (*Tribunaux de Commerce*) in the country. Bamako has one of these courts. As a comparison, there are six civil courts in Bamako, one for each commune. The commercial court meets in formal session only one day a week (Wednesday) although the commercial court can, outside its regular session, take up small claims and emergency issues. Any action taken place outside of the court's regular session cannot be appealed. The commercial court does not have its own courthouse but meets in a rented building.

At the moment there are fewer than 300 judges for the entire country. This number is actually falling because as old judges retire they are not being replaced. There are three identities in the legal system in Mali: judges, lawyers and notaries. They each have different levels of training. All of them go to a secondary school (*école supérieur*) for four years after the *baccalaureate* and then, after testing, enter the law faculty for two years for judges, three years for lawyers, and two years for notaries. The lawyers also have to pass a bar exam. Given its low pay and lack of job opportunities, the study to become a judge is not attractive to better students.

Because of limited resources, cases to be settled in the commercial court face a long queue and delays before being heard. In addition, any case concerning values over CFAF 5 million can be and usually is appealed. An appeal adds considerable extra time and cost to arrive at a final legal settlement.

Once cases are actually brought to the court, a major problem in their adjudication is lack of knowledge not only of the current commercial law, which has already been mentioned, but of the complexities of the case itself. Judges have no technical knowledge of business issues, let alone issues related to agriculture. To try to remedy this situation, in late 1998, a new charter of the Malian Chamber of Commerce and Industry was put into place. Under the charter, special adjudicators were appointed to the commercial court to advise the judge on technical issues related to a given case. By mid-September 1999 there were to be commercial court adjudicators for all sectors of the economy including agriculture. But in July 2000 no court adjudicators were in place (Konare), and few are available now.

Many of the banks and businesses distrust this entire process, feeling that the commercial court is biased against them. It is clear that the entire system is still in its teething stages and that much needs to be done to strengthen the system. The biggest need is upgrading the standards and knowledge of the judges and clerks of the court. UNDP and the Canadians have small programs to do this upgrading, as do the regional programs of OHADA and CIMA (*Conference Interafricain de Marché d'Assurance*). USAID does not have plans at this time to provide support to the judicial system in Mali.

### **5.3. Finance**

Credit and agricultural finance are top concerns of planners, farmers and private sector operators in the agricultural sector. The need for efficient financial intermediation to support

savings mobilization and subsequent resource allocation to the most efficient and competitive entrepreneurs and projects is paramount to the eventual advancement of the agricultural sector as a source of growth the in Malian economy.<sup>37</sup>

Most formal banking in the country is directed towards short-term inventory financing for trade, towards support of crop purchases for cotton and towards group lending for inputs linked to the government controlled cotton or the structured rice sector. For a small trader or producer to obtain access to commercial credit, s/he generally needs to be in a larger urban area, be referred or guaranteed by one of the bank's large clients, have large physical collateral, or be a friend or relative of the banker (Konare). Lending to smallholders by commercial banks is on a group basis only, as is most lending by the microfinance institutions (MFI).

Finance in Mali is dominated by the banking sector. The commercial banking sector is composed of nine commercial banks and three financial institutions. The banks are both foreign and locally owed. The commercial banks have extremely limited penetration into rural areas. Microfinance institutions have filled some of the financial needs of the rural sector although in a very limited way (see below). While expanding in recent years, MFI's still play a very small part in the country's financial operations. Figures for 1998 from the BCEAO indicate that MFI's have about 4 percent of the deposits and 4.3 percent of the credits within the financial system. The two systems, however, serve a very different client base. How agricultural finance is structured is closely related to the crop subsector it serves. Table 12 (adapted from Konare) indicates the financial characteristics of selected subsectors.

**Table 12: Financial Characteristics by Agricultural Subsectors**

	<b>Agricultural Subsector</b>			
	<b>Cotton</b>	<b>Rice</b>	<b>Coarse Grains</b>	<b>Horticulture</b>
<b>Buyers</b>	One large (state controlled)	Many small	Many small	Many small and few large
<b>Producers</b>	Many small	Many small	Many small	Many small
<b>Financing Schemes</b>	Input Credit/ Output payments (Interlinked Markets through CMDT)	Group loans/ Microfinancing	Input credit/ Output payment supported by commercial banks and informal credit	Supported by commercial banks and informal credit

The principal difference among the subsectors in Table 12 is that cotton has an integrated financing system, whereas the other subsectors do not. In an integrated system, a single entity both provides credit to the subsector and serves as the monopsonist purchaser of the product of the subsector. Thus credit can easily be recouped at the time of purchase of the product. Without such a system, a bank is faced with the need to evaluate the honesty and creditworthiness of each of its clients and their loan proposals to adequately reduce the risk in

<sup>37</sup> A recent paper by Kadida Konare on financing of the agriculture sector provides a current overview of the sector and is drawn upon to a great extent in the following discussion.

making loans. This evaluation increases the transaction cost for both parties in processing the loan. To deal with this asymmetric informational situation and reduce transaction costs, the banks direct the bulk of their credit towards known, usually larger, clients. This same problem is also addressed, mostly by MFI's, through a reliance on group lending, where all members of the group are responsible for the debts of any individual within the group. In the rice area this was primarily done via the *Association Villageoise* (AV). There have been problems with the AVs and while reforms have been put into place to deal with most of these problems, the AVs still need additional capacity development.

BCEAO's figures indicate that real credit to the Malian economy in 1995 CFAF has increased 56 percent from 1986 to 1999 when it stood at CFAF 248 billion (\$413 million). Most of this was short-term credit. Of the total, 71 percent was for short-term credit, 16 percent for medium term credit and 3 percent for long term credit. Ten percent of the outstanding loans were classified as doubtful. It is difficult to determine how this credit is allocated within the economy because the credit report issued by the Central Bank only records loans in Mali over CFAF 5 million. The report thus misses most of the loans to smallholders and small traders, whose loans are usually much smaller than that amount.

Credit to the agricultural sector has increased since 1990. Most of this increase has been in the cotton sector, to increase processing capacities following devaluation and to cover increased cost of imported inputs. In 1999 it is estimated that the credit to the agricultural sector was about 20 percent of the total to the economy at CFAF 49 billion (\$82 million). Most were short-term loans (76 percent), with 22 percent for medium-term loans and 2 percent for long-term loans. The medium and long-term loans were to CMDT and major food processors (Konare).

Commercial banks in Mali are conservative and risk averse. They lend where they can find the highest returns for the perceived level of risk. The cotton sector and CMDT, with its integrated financial system, therefore receives the largest share of the credit in the agriculture sector. In 1999, for example, CMDT received CFAF 28.2 billion (\$47 million) in short-term financing from a consortium of five commercial banks, with BNDA providing 70 percent of the total.

Investments in subsectors other than cotton have been constrained by not having access to the integrated financial system of CMDT. The AVs are being used in the rice subsector, but the problem of AV member's defaulting on their loans is a continual problem. In the horticultural subsector, the larger producers have access to credit from their usual banking relationships, but the small producers have to rely on self-financing or the informal credit systems. APROFA has attempted, with limited success, to convince bankers to lend more to the horticultural subsector.

### **5.3.1. Monetary Policy**

Monetary policy for Mali is controlled through the Central Bank of the West African States (BCEAO) located in Dakar, Senegal. Basic monetary policy is directed toward control of inflation to maintain parity of the CFAF with the French franc (and now therefore with the Euro). This policy environment encourages conservatism and discourages the development of new lending instruments (Konare). A strictly pegged currency can slowly become overvalued

meaning that the country's exports are not as competitive as they would be with market exchange rates. The present monetary policy resulted from poor macroeconomic conditions in the 1980s that led to a series of economic and financial reforms in the late 80s and early to mid 90's. These reforms culminated in 1994 with the devaluation of the CFAF. These changes reinforced increased competitiveness and output of the agricultural sector. Increased liberalization also began breaking the linkages in the integrated financing system used by state agencies to support the agricultural sector. Mali is still struggling to find a replacement for this integrated financing system. A major concern in this area is how to deal with transaction costs and information asymmetries (Konare).

The reforms BCEAO began in 1989 involved both financial liberalization and institutional reform. The goal was to replace direct instruments used in a highly controlled and regulated banking system with indirect instruments to implement monetary policy as much as possible. Among the reforms were the following:

- Introduced in 1993, a reserve requirement ratio based on sight deposits and short-term loans. The requirement is set at 1.5 percent for commercial banks and 5 percent for financial institutions.
- Expanded in 1989 types of credit covered by the overall credit ceiling per state member to include agricultural production and marketing credit.
- Consolidated debt owed to the BCEAO by governments and restructured this debt for long-term pay down.
- Established in 1996 an open market operation to expand the money market.
- Established in 1990 a mechanism of loan classification within the framework of credit management.
- Liberalized in 1993 the lending rate within the range of two times the discount rate.
- Liberalized the deposit rate for all except small savings of less than CFAF 5 million (\$83,000) and fixed term deposits of less than one year. The rate for these small and fixed-term deposits is set at 3.5 percent.

The reforms also included the establishment of new prudential regulations beginning in 1991 to ensure the solvency and liquidity of financial institutions. These regulations included the following:

- Establishing accounting requirements that included:
  - o Obligation to publish annual statements
  - o External audit of accounts
  - o Definition of bad loans
  - o Establishment of minimal reserves to cover bad or substandard loans.
- Establishing key management ratios including:
  - o Startup Capital fixed at CFAF 1 billion (\$1.5 million) for commercial banks and CFAF 300 (\$462,000) for financial institutions.
  - o Capital ratio based on Basel standards.
  - o Coefficient of liquidity asset ratio set at 60 percent.
  - o Coefficient of coverage of medium and long-term loans set at 75 percent.
  - o Risk allowed for a single borrower set at a maximum of 25 percent of capital.



- o Portfolio refinancing requirement that at least 60 percent of the portfolio must be classified as appropriate.

The goal of these reforms was to allow reallocation of credit towards the users most capable of generating higher rates of return to capital (Konare). Unfortunately, loopholes in the reforms have had a negative impact on agricultural financing. One of the more important of these is that 60 percent of the total credits must be classified by the Central Bank for refinancing, and the minimum loan amount to be classified is CFAF 5 million. The result of this requirement is that small rural credit is de facto rationed as banks cannot easily refinance it. In addition, the limits on deposit interest rates for small loans hurt the MFIs in capital mobilization through deposits.

### **5.3.2. Banking Practices of Commercial Banks**

Past and ongoing financial reforms have liberalized much of the financial market in Mali, but the response has made it more, rather than less, difficult to support lending to the agricultural sector. In Mali's banking industry, lending practices lean more to loan screening than to monitoring loan use. This bias is due to the difficulty of enforcing contracts, the limited capability of loan officers to monitor loans, and the cost of such monitoring effort. Thus, to cut down risk, banks have focused on strict collateral requirements in their lending procedures.

Commercial banks in Mali require collateral to cover both the capital and the accumulated interest to be paid for the loan (Konare). Banking collateral has to be easy to transform into liquid assets. High collateral requirements serve as a way to deal with problems of imperfect information including adverse selection and moral hazard in lending. They also work against the interests of most agricultural and rural borrowers. Land is considered one of the best collaterals but limited, expensive and complex land tenure legislation in Mali prevents most rural and farm people from officially registering the land they use. For 1998, it is estimated that only 9 percent of the cultivated land in Mali was registered. Without access to land to use as collateral, most rural loans must be based on alternate forms of collateral, such as group loans or third party guarantees.

Another way banks have of reducing risks is through lending procedures. Since the banks have extremely limited ability to evaluate agricultural investment portfolios, they focus instead on evaluation of the borrower. Most banks stay away from agricultural loans altogether, viewing them as too risky and unknown. Most agricultural loans by commercial banks are done through BNDA. At BNDA, about 80 percent of their loans go through the interlinked cotton credit system. Most of the rest goes to the rice sector. Some of the banks claim to have written lending procedures, but there is little evidence that they are used (Konare). Loans that are made other than for input purchases or marketing are made to large processors, most of which are state owned.

To obtain a loan, most of the commercial banks require that the borrower have a checking account at the bank and show continuous movement of deposits and withdrawals, have a profitable project and sufficient working capital, have financial statements for the last three fiscal years, have a minimum deposit (25 percent) on the requested loan, and provide collateral to

cover capital and interest on the loan. These requirements effectively exclude smallholders and small traders.

Borrowers are often classified into three distinct groups: preferred clients, ordinary clients and informal (farming) clients (Konare). Preferred clients meet all the criteria noted above and generally have a long and well-established client relationship with the bank. The transaction cost for the bank of lending to this group is almost zero. They get full lending priority.

Ordinary clients have projects of medium profitability and are linked in a third party guarantee to a state-owned or large firm. Generally banks will loan to this group if it would be costly to the borrower to default. Usually this costliness is established through high collateral costs. Loans to this group are partially rationed.

The informal (farming) clients are viewed as bad risks. They do not meet most of the criteria noted above. They often have inadequate or no account records. They usually work in the informal sector and are viewed as not having appropriate collateral. Loans to this group are fully rationed.

### **5.3.3. Microfinance**

Microfinance institutions (MFI) play an important part in finance and credit for the rural sector. As already indicated, most smallholders and small traders cannot get access to credit in the commercial banking sector. In a limited way, microfinance fills in some of the credit needs in this area. Under the National Strategy for Microfinance in Mali established in 1998, three systems of microfinance are recognized: mutual credit programs, savings banks, and solidarity group credit. As of 1999 there were about 215,500 members in the mutual credit system, 85,200 clients of the saving banks, and 45,300 in solidarity group credit systems. In 1999 about 119 microfinance institutions had been registered with the Ministry of Finance, although more than 700 actually exist. Total deposits in the system were more than CFAF 13 billion (\$19.7 million) in 2000.

The BNDA provides a refinance window for some of the MFIs. According to the BNDA Annual Report for 2000, some CFAF 2.46 million (\$410,000) was granted to the *Cellule d'Appui et de Suivie des Systèmes Financiers Décentralisés* (CAS/SFD) of the Ministry of Finance for refinancing MFI portfolios.

USAID supports four partners in the microfinance sector, three NGOs supporting two MFI institutions each (GGLS and Fasso Jigig by Save the Children, Piyeli and Jigiyaso by World Education, and Nyesigiso and Kafo Jiginew by Freedom from Hunger) and a consultant firm (Weidemann Associates) providing technical support to the central bank, the Ministry of Finance, and the *Association Professionnelle des Institutions de Microfinance du Mali* (APIM). A number of workshops have been held under this program including workshops on business planning, policy and regulatory environment for microfinance, and intermediation between commercial finance and microfinance institutions. USAID through its consultants has also worked on donor coordination in the micro finance area. It has help to support the Ministry of Finance to put into place the "Consultative Group of Microfinance Donors in Mali."

Microfinance institutions (MFIs) and commercial banks operate in two different worlds. The banks are concerned with serving the urban and larger clients, and the MFIs focus on rural populations and low-income urban clients. The MFIs play an important role in rural financing. MFIs take many forms and operate in different fashions.

To get a clearer picture of how one of the largest and most important MFIs operates, we can look at Kafo Jignew. Kafo Jignew operates mainly in the cotton sector related to CMDT's operation. As such, Kafo Jignew also benefits from the integrated financial system of CMDT. In 1999 about 74 percent of Kafo Jignew resources went into the cotton sector. This represented some CFAF 3.4 billion (\$5.7 million). Kafo Jignew was started in 1987. It seeks to organize smallholders and small traders in the cotton zone and provide access to financial services. It has four levels of organization: the local bank, the local union, the regional union, and the federation. It has some 112 local banks and 96,740 members. Kafo Jignew is considered profitable with profits of CFAF 261 million (\$435,000) in 1999. Nevertheless, it also appears to be generating lower profits from its activities and assets than it should.

Like many MFIs, most of Kafo Jignew's loans use group lending in place of traditional collateral. About 80 percent of its loans are based on group lending methodology or a hybrid model (Konare). Kafo Jignew has two savings and five loan instruments. Its members can save either via a savings account (3 percent interest annually) or fixed-term deposits (4 percent interest annually). In addition to savings mobilized from its member's accounts, Kafo Jignew has also established lines of credit with local commercial banks.

Kafo Jignew's five loan instruments include production credit, short-term credit, equipment credit, credit with education, and cereals credit. Production credit is mainly for purchase of fertilizer for cotton. It is six to nine months in duration at 2 percent per month interest. Short-term credit is for a maximum of three months to support farmers and their households between harvests. Interest is 2.5 percent per month. Equipment credit can be for as much as three years at 1.5 percent interest per month. The equipment purchased can serve as security in addition to personal guarantees and other collateral requirements. Credit with Education is undertaken with the NGO Freedom from Hunger and is integrated with health and nutritional training for rural women. It is a 16-week loan at 3 percent per month. Finally, cereal credit is similar to short-term credit, but it requires the harvest to be used as collateral. Its interest rate is 10 percent per year.

In 1999 Kafo Jignew lent CFAF 4.5 billion (\$7.5 million). The average loan size was CFAF 100,000 (\$167), and its bad debt was about 3.7 percent. Production and equipment credit made up the bulk of its loans. Short-term and credit for education were about 16 percent of the total, and cereal loans were around one percent.

MFIs such as Kafo Jignew face the same central dilemma as the rest of the banking structure in Mali: information asymmetry due to imperfect information and high transaction costs including contract enforcement. Kafo provides both group and individual lending contracts, but due to high risk, most (80 percent) is done through group lending (solidarity groups). The principal mechanism for this group lending is the *Association Villageoise* (AVs). Kafo also does some

lending with women's groups (Credit with Education). Individual lending makes up some 20 percent of Kafo's lending. These loans require a member to wait six months after opening an account. Most individual loans are short-term credits.

In recent years the AVs have been in a state of crisis, which has affected Kafo Jiginew's performance. There are economic, social, and institutional reasons for this crisis. The fall in the world prices for cotton and the concurrent management problems of CMDT resulted in late receipt of payment to farmers for their crops and a rapid increase in indebtedness and non-performing loans at the AVs. These economic problems also resulted in opportunistic behavior by some AV administrative staff. These problems were exacerbated by the high illiteracy rate among producers, which resulted in misunderstanding of interest rates and terms of the loans. Since most AVs are not self-selecting, individual members of the group may have little in common with one another, and individual members may disappear, causing additional burden on remaining members. In addition, some AVs had as their heads strong local leaders who ran the AV as their own private organizations. Finally, with a minimum of 20 members in each, the AVs are often too large for members to know and trust each other.

Not only do the MFIs have problems with the solidarity groups with which they work, but they also have tension and difficulty in their linkages to the commercial banking sector. In general, banks view MFIs as competitors, not as potential partners (Konare). Banks and MFIs have at the moment two levels of contact: deposits of funds by the MFIs into the commercial banks and refinancing services of the MFIs portfolio by the commercial banks, primarily done through BNDA. There is some tension in this relationship due to lack of understanding among the parties. Banks view MFIs as expensive to work with because of high transaction cost and risk. For the commercial banks, transaction costs are viewed as fixed costs for each loan, thus they view a number of smaller transactions, such as you would find in rural and agricultural loan situations, to represent high transaction cost. The banks lack information systems and cost accounting to assist in properly evaluating the cost of making an individual loan. This lack of information further accentuates a bias on the part of the banks towards larger loans and against smallholders and small trader loans, which are the client base for the MFIs.

The issues of intermediation between banks and MFIs has been the bases of several studies and forums supported by Weidemann Associates and others culminating in a workshop in March 2001. Many of the problems noted above were documented in these studies. The workshop drew together representatives of the Malian banking and financial institutions, MFIs, APIM, CAS/SFD and BCEAO. The workshop recommended five specific actions to be taken. These actions were the following: improve MFI's information system to ensure sustainability of MFIs, establish a National Fund (guarantee fund) for Microfinance, strengthen the relations and intermediation between MFIs and the banks, establish a regional training center to provide training to MFIs and bank personnel, and strength the organizational and technical capacities of CAS/SFD in order to improve the regulation and control of MFIs.

#### **5.3.4. Recommendations for the Financial Sector**

As this summary has shown, the financial sector is extremely reluctant to provide resources for the agricultural sector. There are three reasons for this reluctance: 1) agriculture, by its very

nature, is risky, 2) there is significant information asymmetry between borrower and the banks, 3) there are high transaction costs. A number of suggestions have been put forth by various observers of the financial sector to deal with some of these problems. Among these are the following:

1. To reduce the asymmetry of information between bankers and borrowers, the establishment of some form of credit bureau or credit rating system could track an individual's loan history and repayment record to prevent fraud and reduce defaults.
2. Capacity building at all levels in the banking and MFI sector is needed to reduce information asymmetry and transaction costs by better understanding of the needs of the clients, the realities of agricultural and agribusiness operations, and better management of loan portfolios. Konare has suggested an exchange of personnel between banks and the MFIs to increase awareness of how each institution operates. The support activity USAID is giving the MFI sector should continue. USAID is encouraged to review the recommendations of the workshop on intermediation between banks and MFIs for possible support of the activities proposed.
3. The MFIs would benefit from several actions including: 1) the BCEAO should allow full liberalization of interest rates including small accounts and fixed deposits. This would allow the MFIs greater ability to mobilize savings and to create more flexible lending and savings instruments. 2) the ability of the MFI to refinance its lending portfolio should be increased. The establishment of a special window in the BCEAO to support such refinancing has been discussed, but due to problems of such a facility in North Africa, there has been reluctance in the Mali banking sector to be part of it. This initiative should be re-examined to find out what the problems were in the North Africa program and to activate a better program in the CFAF zone.
4. MFIs should be expressly allowed to lend for agricultural production (as opposed to only processing or value-added activities). Operating credit will be absolutely essential to increase use of fertilizer and improved seed packages.
5. The fundamental problem in lending in the agricultural sector is the risk of such investments. It is recommended that USAID have a study done by a banking and financial expert with knowledge and experience in this area on risk reduction activities and strategies to support agricultural lending. There are a number of possible options including establishment of leasing companies to reduce the capital cost of investment, training programs and portfolio management, better business and financial plans to account for risk and risk analysis, and the three options noted in more detail below: loan guarantees, cost sharing, and venture capital funds.

The BCEAO currently limits interest rates for the formal and direct finance sector regardless of sector or loan risk. The usury law prevents the development of financial products for the rural and agricultural sector, and probably for the urban microfinance market, that reflect the real loan risks. As a policy issue, region wide, it needs to be revisited and modified.

### **5.3.5. Loan Guarantee Fund**

USAID is in the process of implementing a loan guarantee program to help support economic activity in Mali. The program provides up to 50 percent loan guarantees. The maximum total guaranteed amount per loan has to be less than half the total guarantee fund of \$3 million. The guarantee program is part of a special operation within AID known as the Development Credit Authority (DCA). DCA is a financing account for AID missions to provide support to activities that support development goals and Strategic Objectives (SO). The Mali program supports expanded agro-processing activities.

DCA is a Mission-driven effort where the Missions identify, design, authorize and implement DCA projects. The OYB cost of DCA to the Mission is the projected “subsidy cost” as calculated by the USAID/Washington’s Chief Financial Officer based on the advice of the USAID/Washington’s Credit Review Board. The subsidy cost is the estimated true net cost to the United States Government over the life of the guarantee as expressed in discounted present value terms. Generally the true cost is the risk of default. An estimate of this risk is used by the Chief Financial Officer to arrive at the subsidy cost the Mission pays for access to the loan guarantee amount. The subsidy cost in the Mali program is \$90,000.

The funds for the guarantee do not transfer to the Mission or the country but remain in control of the U.S. Treasury. The Treasury is responsible for all disbursement and recovery of funds from the DCA. It also bears all the risk and will make adjustments in the subsidy cost over time to balance the DCA account. The advantage to the Mission of the DCA is the leverage it provides in its development effort within a limited budget. Budget leverage ratio can vary from 1:10 to 1:25. The program, on the other hand, is complicated to manage and requires both economic and financial analysis to set up. There is also additional paperwork in processing the loans. DCA requires “true risk sharing,” which implies an independent risk analysis performed by firms participating in the program with a real financial stake in the outcome. Most loans are to go to private sector, non-sovereign risk activities. There are a number of restrictions on the loans. They cannot be made for activities that degrade national parks or protected areas or for the development of export processing zones where environmental, tax and labor laws do not apply. There are also a number of restrictions requiring special USAID approval. These deal with pesticides, logging and other potentially environmentally damaging actions, and activities that might result in loss of jobs in the United States. Market rates of interest for the loans are generally to be used. The loans to the clients are made through local banks. In Mali this is the Bank of Africa and BISSIM.

### **5.3.6. Financial Tools to Increase Investment in Agriculture and Agribusiness**

Mali’s agricultural and agribusiness development is subject to substantial climate and production risk. Its producers, processors, and exporters must use long and fragile logistic chains to the coastal West African markets and their ports that provide outlets to European markets. The bankruptcies of both Air Afrique (undeclared) and Sabena airlines have greatly increased the risks and substantially increased costs associated with air cargo shipments. Since the tragedy of September 11, airlines have been reluctant to carry airfreight on scheduled passenger flights. The new shipper identity and security requirements will require substantial investment at

Bamako's Senou airport in the near future that will have to be passed on to shippers. Overall, the country's business climate has seen some major improvements since the mid-1990's, especially in registration procedures, legal protections, customs, and taxation. However, neighboring countries still offer better investment opportunities at lower risk than Mali. The primary reason is that they have markets with consumers with higher purchasing power than Mali.

Mali's credit system is still shallow and still heavily weighted towards short and medium term lending to urban, mining, trading, and real estate markets. Large amounts of outstanding loans in the public sector banks (BNDA) are of doubtful quality. The nation's private banks have substantial liquidity, but are politically pressured (through Malian government shareholding) into accepting questionable loans and participation in pooling of public bank risks. Agricultural lending is constrained by a number of factors, including:

- lack of financially viable projects because of high investment and operating costs, unpredictable transaction costs (*taxes sauvages*), low labor productivity, and weak domestic markets;
- a tiny pool of skilled managers,
- a history of credit loan defaults and refinancing in the agricultural sector,
- lack of secure and alienable land titles,
- inadequate collateral recovery mechanisms, and,
- a poor judicial climate for resolving contract disputes that is associated with an expensive commercial court system.

Guarantee funds that subsidize credit, such as the Credit Development Authority, are unlikely to change the credit risk evaluation policies of participating banks. Banker incentives will still be weighted to recovering administrative costs early and offsetting risk by overweighting to short and medium-term credits. Collateral requirements for agricultural and agribusiness projects are unlikely to change significantly in participating banks in Mali. Loan requests from heavily indebted traders with poor accounting and management practice will still require substantial securitization. High securitization through linked credit guarantees, discounting of commercial contracts, and insurance increases the costs of already costly agricultural investments.

Microcredit programs have provided welcome financing for micro-enterprises, bridging loans for rural households waiting for crop (cotton and rice) payments, and helped to mobilize and formalize savings in urban and rural areas. However, these programs are not good sources of agricultural credit for the types of projects that would create the high the level of output and productivity growth needed to modernize agricultural production, processing, and marketing. They simply do not have the level of capital needed. Further, the more successful micro-credit programs are those linked either to urban areas, where loan portfolio turnover is high or in rural areas where large production (ON, OHVN) and vertically integrated production, processing and marketing structures (CMDT) virtually guarantee loan performance. But, even given these limitations, there has been, and continues to be, a large numbers of small scale activities , that benefit from strong microfinance institutions. These activities have significant social and economic impact on small farmers and processor, particularly women. The issue is not whether or not to support microfinance efforts, but how to have strong institutions and mechanisms to support both microfinance as well as traditional financial institutions supporting small and medium scale enterprises needed to accelerate growth in the agricultural sector.

As in many developing countries, the small and medium scale farms and agro-enterprises are the ones most capable of accelerating growth and capturing niche markets. However, they are also the firms that have high administrative and supervisory costs relative to bank fees and profits.

Liberalization of CMDT would also increase the risks of financing the agricultural sector in general. While it may be tempting for USAID to seek to provide a safety net of some sort, it has neither the financial resources nor the sector expertise and institutional knowledge needed to make a significant difference. Its resources are better spent where it has clear advantages and an established and respected implementation history, i.e. cereals, livestock, and food security.

Agriculture in Mali is a risky business. Our review of the Malian economy demonstrates that growth in the agricultural sector must come primarily from increased exports, with a focus on cereals, livestock, and horticultural products delivered to neighboring and near nations in West Africa. Devaluation has created opportunities for Mali's highly laborized production and marketing channels to deliver competitively priced rice, millet and sorghum, cattle and small ruminants, and fruits and vegetables to the growing secondary cities in the region. Substantial import substitution opportunities also exist in rice and poultry. However, investment in modern technology and skilled management must be mobilized to realize these opportunities. The credit system in Mali will deliver neither on anything like the schedule needed to generate rapid growth in output, exports, and employment.

To increase investment and attract modern management requires tools that reduce risk. USAID will maintain involvement in policy issues at the national and regional levels that will help over the long run. In the long run, however, slow growth means lost investment and lost markets. More radical steps are needed to stimulate investment over the early and mid-strategy period (2-5 years). Cost-sharing and equity funds are two ways to stimulate investment by buying down the risks of new market development, new technology adoption, and modern management acquisition. They can be used to bring Malian capital back to Mali, induce expatriate exploration of investment in Mali, and increase the level of investment in market development and penetration.

### ***Agribusiness Cost-Sharing Fund***

Cost-sharing funds have been used in USAID programs for many years. They have tended to be successful (Morocco, Kenya) when they have the following features:

- at least half of the cost is provided by the promoter (individual, group, company, or association). If the promoter cannot provide a cash match, s/he is unlikely to be able to finance the follow-up steps if a successful venture is found;
- both national and international firms or individuals are eligible. Malian capital for agriculture and agribusiness management expertise are rare;
- cost-shares are calculated only to cover risks, not to subsidize profits;
- business references and credit checks are run on cost-sharing participants, before cost-sharing is approved;



- ranking criteria are properly weighted; for example, test shipments of a traditional product (string beans) to a traditional market (France) using a traditional channel (pisteur to exporteur sales to a commission agent) would receive a very low score. A search for buyers of cattle in Nigera or Ghana (traditional product in a new market) would receive a higher score than the same search in Cote d'Ivoire (traditional product in an established market). Production of a new product using a new technology (dried organic mango slices with differentially permeable plastic packaging) for shipment to a new market (UK) would receive a high score;
- ranking criteria incorporate a time-to-return period that is consistent with product and market development cycles and the life of the project. Cost-sharing funds are best used to try to quickly test and accept or reject market, technology, or management approach. One production and marketing cycle (18 months) is about the longest cost-sharing period that should be considered. Anything longer than a production and marketing cycle is an R&D investment program. The fund can be divided into small/quick disbursing activities and larger/slower disbursing activities.
- disbursements are made against completed expenditures to the supplier or provider upon verification of payment and physical completion of part or all of the activity;
- agreements must incorporate completely transparent account examination and audit procedures;
- agreements must incorporate confidentiality accords, as well as reporting requirements;
- procedures for doing initial environmental examinations and obtaining timely review;
- procedures for application of AID regulations of grants, procurement of equipment, prohibited origins, goods, and intellectual property rights have to be translated into simple guidelines. Cost-sharing agreements incorporate AID's regulatory language.
- A committee of disinterested parties (USAID, government, private sector as appropriate) is established to approve large cost sharing agreements. Small cost-shares (the size of a large or small cost share is a design issue) need speedy decision-making that may be best left in the hands of USAID and the fund manager.

Cost shares basically offer businesses a way to extend their product and market development budgets to areas with potential but with high associated risk. They tend to be managed using some form of technical assistance that searches for partners, technology providers, and market opportunities and then plays the role of matchmaker to structure the cost share. USAID can orient the cost-sharing to those subsectors or types of activities that have high labor and high female labor content, but it should not expect every activity to meet a set direct job generation or gender-specified threshold for approval.

### ***Mali Equity and Growth through Agribusiness (MEGA) Fund***

Investment capital and reliable management are fundamental to agribusiness success. They are in short supply in Mali. Cost-sharing will enable working relationships to be established between foreign and Malian businesses. A Malian poultry operator may be able get a day-old chick supplier in Cote d'Ivoire to come and explore establishment of a chick operation in Mali. Marketing directors often have the discretion to spend their already allocated budget on such exploratory ventures. But, to induce a Babcock or Hi-Line regional board to set up a Mali operation with a Malian partner requires their boards to assess the opportunity costs of capital

and management that they would need to put in place. One way to reduce the risk to the investment is to buy it down with an equity fund. A twenty-five percent equity position, can provide the investment anchor that frees up both local partner and international partner capital. In Mali, an operating partner with an established track record in the region would be as important as the capital investment that is made.

Objectives of such a fund in Mali would include:

- Inducing Malians with established businesses in regional countries or outside the region to re-invest in Mali;
- Providing a mechanism to supply anchor capital to attract experienced management for joint ventures or new companies established by Malian and regional or international partners;
- Reducing the financial packaging and risk coverage costs of investment in agro-enterprises in Mali;
- Leveraging investment and finance from third parties.

The design challenge for a fund of this type is to estimate the level of leverage of investment that is likely to occur so that a good business plan can be developed for the fund. In middle income countries, a total financial leverage factor of around twenty would be sought (20 times the fund investment from other capital and loan sources). In Mali, leverage of from 5 to 10 times should be targeted.

Part of the business plan is a life-cycle analysis of the fund itself to determine if, when, and how it would wind up its affairs and distribute fund assets. The simplest way to avoid creating an incentive for premature or self-serving dissolution of the fund by its board is to provide at its creation for distribution of assets to one or more unrelated charitable or socially worthwhile institutions; for example, a hospital or medical trust or scholarship fund.

The minimum size for such a fund is about \$5 million. A fund smaller than this cannot do enough small (\$100,000 to \$250,000) or large (\$1,000,000) investments to provide for early re-flows and to spread its risks. One of the design issues is finding the right initial size to ensure that risks can be spread without starting at so high a level that the fund managers have no incentive to seek additional capital for the fund. One of the advantages of a fund established as a not-for-profit institution registered in Mali is that it can seek to attract capital from other donors – both private and public.

Fund operations would consist of identifying opportunities and partners (investment promotion agencies, banks, financial institutions, and targeted cost-sharing) and assisting in the development of the investment. It is not unusual for only one in five opportunities to reach the investment stage. Each equity investment includes a share buy-back provision. Depending on the investment type and cash-flow profile, the agreement would specify the earliest time that a company could start to buy out the equity fund and the latest time that a company could start to buy its shares back from the fund.

Funds are generally structured with a board of directors drawn from the business and government community (if the latter is allowed under national law). International as well as

national directors may be appointed. While USAID cannot directly participate on the board, it can ensure that the articles of incorporation are written to preserve USAID's right to appoint a majority of the Board Directors and approve management appointments. Good knowledge of respected and honest people in the business community is a must. USAID may also direct the drafting of the investment policy of the fund at inception, or provide that its funds be directed to specific sectors. Attempted fund micro-management, however, is a recipe for disaster.

Funds generally engage an independent advisor to conduct due diligence of partners to the investment deals, to develop standard contracts and agreements, and to provide an opinion on the fund's evaluation of the risks and returns to the investment. The Fund's Board usually holds a closed meeting with the advisor without fund management for each investment decision. The advisor may be paid fees that are built into the investment and/or be paid fees on dividends or proceeds from share repurchases. The fee structure is determined in advance and applied to all investments made by the fund for a given operating year.

Some funds operate as venture capital funds in which each investment carries with it direct involvement by a fund's Board, management or technical team as a Director of the new business. Others retain board appointment as an option depending on company performance. Others may have performance, share value, or financial ratio triggers that would lead the fund to replace management. All or none may be appropriate for a given investment.

USAID has established such funds in the past (the HIAMP Agricultural Venture Trust in the Eastern Caribbean – a pure equity fund for small and medium-scale agribusinesses – and LAAD in the LAC region – a mix of loan and equity). USAID is supporting their establishment in a few locations today (Zambia Agribusiness Technical Assistance Center's Zambia Investment Fund – a mix of loan and equity and the Ukraine – a mix of loan, loan guarantee, grant and equity). They do require special care in both their establishment and their winding-up provisions to ensure that USAID has no contingent legal or financial liability for equity investments or equity payback. Implementation can be done through an independent not-for-profit trust or a non-profit non-bank financial institution. The AID Office of Procurement does not believe that missions can support a for-profit fund structure. The type of organization that is selected depends primarily on the laws regulating non-bank financial institutions, capital investments and liquidations, and taxation in the country. Income-tax and VAT relief is often sought because these funds return only small amounts of fees for capital and financial intermediation services in their early years. Tax authorities look more kindly on structures with operating and winding-up procedures that prevent fund Directors or Managers from personally profiting (beyond pre-established salary and bonuses) from fund operations.

Given the costs of developing a pipeline of investments and generating returns from fees and the repurchase of shares, the fund's operations will need to be subsidized over at least a five-year period. This can be done with a standard technical assistance-type contract or through a grant agreement. The fund could be set up as a shell with minimum own-costs in its initial years. Staff and operating costs can be provided as an in-kind grant to the fund through a contract. As the fund generates revenue it can take over operating expenses and hire its own staff. The fund should have the flexibility to enter into short-term loan agreements to generate income in its early years. USAID/Mali's own experience in the Niono area with loans supporting

irrigation development are an example of the general type of loan that might be made, although a tighter linkage to early fees on product flows may be advisable.

Another example would be a joint marketing alliance among a UK produce importer/distributor, a large mango packer in Mali, and an Ivorian shipping interest. The seasonal operation may require the forward contracting for vessel space, the leasing of refrigerated containers and electric generators, rental of small reefer trucks as fruit collection stations, and the upgrading of packing station equipment in Sikasso. For a 2,000 metric ton operation, total operating capital requirements would be around \$2 million. The fund could provide a one-year loan of \$500,000 to generate a return on fund assets and to promote the establishment of an operating company in which the equity fund could participate. In this type of very high-risk operation, it might take three years of loan participation before a longer-term investment deal could be put together, perhaps expanding to include charter air operations to add more perishable products to their export mix.

### ***Comparison of Cost Sharing and Equity Funding***

A cost sharing fund could be established within an existing or new contract that works in agribusiness development. Staff with experience both in Mali and in the main markets of interest are needed to develop a pipeline of business prospects. It would set up an account of about \$200,000 to be used in small amounts, say up to \$10,000. A 50 percent match would be set as a minimum contribution by an interested business. Let's say that a U.S. firm has licensed an environmentally benign bacterial technology from the USDA that destroys fruit flies. The Malian team identifies their technology as a potential winner and contacts the firm. Given the potential size of the West African market, the USA firm is interested, but sees the risks as too high. To induce them to come to explore the Malian market, the team offers to reimburse a quarter or up to half of their costs to evaluate the market and see if a local partner or organization can put together trials on mangoes. Reimbursement of expenses would be done on a completion basis against receipts furnished. If the trials work, and a market exists, then the Malian team would work with both parties to try to structure broader commercial trials and demonstrations to permit a product launch. Many cost-shares would not result in commercial deals, but perhaps one in five to ten would. However, the ones that do work can result in the establishment of businesses that work and grow for many years after the life of project. Cost sharing is an inexpensive way to leverage private sector business effort that cannot be purchased on the open market at two to three times the daily rates of private sector consultants.

Even with a couple of years of trials and development of a commercial entry strategy, the above example might never get off the ground, because either the local or US partner could not get their banks to back a two year market development effort. Let's assume that the fruit fly technology gets to a takeoff point, but needs a million dollars to finance the two year launch. Despite the trials, banks are unconvinced that the technology is a winner. The Malian partner works well with the US firm, but cannot get a bank loan to finance her portion of the deal. The US firm finds its bankers reluctant to provide more than one year financing of exports of the bacterial insect killer. Together their venture is undercapitalized. An equity fund could step in and pick up a minority position of say \$100,000 in equity and \$50,000 in a short-term loan at commercial rates. The fund's manager could designate a board director for the new firm. If the

fund itself is created with care, with some drawn from the financial and industrial communities, the board composition itself may improve the credit-worthiness of venture.

In a business climate like Mali's, the choice is not which tool to use, but how to use both of them to leverage investment in agribusiness. The advantages and disadvantages of the two approaches are summarized in Table 13.

#### **5.4. Grades and Standards**

With the exception of the cotton industry, which sells directly to the international market, grades and standards are not widely used in Mali. Exporters of horticultural products generally ship their products according to the quality demands of their importers. While there are a number of laws and regulations on the books for grades and standards, most are outdated or have significant omissions for use in modern agriculture. A committee to revise and update grade and standard legislation has been established in the Directorate of Industries of the Ministry of Commerce and Industry. The Ministry of Rural Development is working within this committee on grades and standards for animal and agricultural products. Some limited funding from USAID and the French have helped this process. The work has been in progress for some time, and there is no indication it will be completed soon. At the present time this slow progress does not represent a significant problem. With the exception of cotton and very limited horticultural exports, few Malian products reach overseas markets. There are some products that are regularly traded in the regional markets. These are cattle and small ruminants, cereals and vegetables (shallots, tomatoes, and potatoes). There are issues with the quality and standards for these products, but they can be and are being dealt with at the market rather than at the regulatory level (see below).

There are limited quality control capabilities within the country in terms of inspectors and control laboratories. The Ministry of Rural Development's General Direction of Regulation and Control maintains three laboratories, one each for veterinary and animal health, cereals, and food products. These labs are poorly equipped and lack materials. Their staff needs upgrading in skills. They also lack communication and transportation facilities, which would allow them to go to any problem area in the country. The Director of the service is concerned about their inability to support expansion of regional exports of livestock and cereals and to control the quality of imported food goods.

**Table 13: Cost Sharing and Equity Funding**

Cost Sharing		Equity Funding	
Pro	Con	Pro	Con
Administrative Ease	Some Resistance in USAID to providing locally large but absolutely small private sector firms with grant funds	Provides for establishment of a structure that can perpetuate equity funding and perhaps trigger venture capital fund	Administratively complex as reflows require the establishment of a not-for profit, and because AID regulations are administratively complex and subject to contradictory interpretation, and because of local legal constraints
Fast-Disbursing, Set-Up Costs are Low	Usually limited to small, short duration activities	Can take a longer view (3-5 years)	Slowly disbursing because of due diligence requirements, set-up costs in terms of TA and legal expense can be high
Permits rapid testing of innovative technologies, market approaches, and product or service introductions	Must impose shorter time limits for activities (1-6 months)	Helps avoid undercapitalization in business expansion or start-ups	Requires care in structuring exit provisions to ensure that a return on success is achieved. Needs a legally solid exit strategy for each investment in order to succeed.
Simple to explain to business people	Still imposes irksome administrative "hoops to jump through"	Can be used to replace inadequate management	Board participation can lead to game-playing by appointed directors unless they serve at the pleasure of the not-for-profit structure and have their performance carefully evaluated

Lack of proper quality control laboratories within Mali will become an increasing hindrance to the horticultural industry as it tries to expand exports to the EU. Increasingly strict controls on pesticide residue within the Market, for example, require competent testing and certification that products are pesticide free before they can be released into the marketplace. Exporters now have to pay in laboratories outside of Mali to do spot testing of their products to meet this requirement. Such testing increases their costs and makes the product less profitable.

In the cereals area, a recent study by the Program to Restructure Malian Cereal Markets (PRMC) found that there was a possibility for exporting Malian cereals to regional and sub-regional markets, but that this effort was hindered by the products destined for export not responding to the local, often segmented, market demand for grade and quality. While most countries in the region have some form of official grade and quality standards, most traders do not use them. Even if the official standards were not followed, however, de facto quality standards in the marketplace do reflect consumer demand. The problem is that these de facto standards are often different or segmented among markets. The problem Malian traders face is getting information on what grade and quality is appropriate and desired in each market so they

can respond to what is wanted. It has been proposed that a trademark be established with appropriate quality controls to support the sale of Malian cereals in the region. Efforts are also being put into place to see how market information on various grades and quality requirements of these segmented markets can be transmitted to appropriate traders. Ideally, this would be done among the traders themselves, and is being tried in the traders network.

Quality control and standards also is a problem for animal feed ingredients and blended feed, as discussed in the livestock, dairy, and poultry sections of the previous chapter. Some form of labeling, standards, and quality control in these areas would lead to greater efficiencies in transactions and in animal feeding in general.

Generally, given the present structure and status of Malian agriculture, there is little justification for USAID to make a significant effort in support of grades and standards at this time. Grades and standards will become important issues in the future as Mali expands its exports, particularly international exports of horticultural products. But with cotton being dealt with by CMDT and the limited level of other exports, most grades and standards issues are best dealt with at this point by traders and traders associations and networks. Grades and standards for internal trade in such areas as seeds and feed can also be dealt with by existing institutions and activities or those recommended below. USAID, through its other projects and programs, can support these efforts, but it is not recommended that a separate effort in this area be initiated.

## **5.5. Transport**

Transport constitutes one of the binding constraints to fostering agricultural supply and improving competitiveness. Factors contributing to this constraint are infrastructural and institutional. Transport costs, which account for at least two-thirds marketing costs, result partly from poor or non-existing infrastructure. Rural areas lack feeder roads and even when they are endowed with roads, these are generally in poor condition, especially during the rainy season. As a result, rural transport costs are as much as 500 CFAF/ton/km and at best 100 CFAF/ton/km on the best rural roads (World Bank, 2000). In addition to the road condition, heavy taxation of the transport sector contributes to high transport costs. According to Barry and Tall (1999), government-imposed taxes account for over 22 percent of transport costs despite the reduction on truck import duties in recent years. In addition to trucks, spare parts are taxed at over 32 percent. Taxes on fuel amount to nearly 105 percent. Yet, revenues generated from transport taxes are not used to improve road conditions, let alone build new roads; rather, they go into the general budget. The transport problem is, of course, tightly linked to the overall problem of public finance in Mali.

Of particular importance in transport costs is the harassment of transporters by law enforcement officials along the roads leading to the coastal markets, especially in Cote d'Ivoire. According to transporters, trucks are stopped repeatedly between the borders and their destination and are required to pay illicit or informal taxes that are pocketed by these officials. A conservative calculation estimated these illicit taxes to be 2 to 3 percent of total transport costs. When lost time resulting from roadblocks and product spoilage are taken into account, roadblocks account for as much as 7 to 10 percent of transport costs. Another related problem is the uncertainty

and risk that these blockages generate. Malian suppliers can be seen as less timely or reliable because of the this uncertainty.

There is a strong need to lower transport costs for Malian agricultural commodities. The competitiveness of these commodities can be improved markedly if better feeder roads are available, transport taxes are reduced or used to maintain and build new roads, and roadblocks are curtailed significantly between Malian and coastal markets.

## **5.6. Rural and Secondary City Electrification**

Another constraint to enhancing agricultural production and reducing poverty has been the lack of electrical power in both rural areas and secondary cities. Because of the limited electrification in Mali, storage activities can hardly develop, leading to spoilage of agricultural commodities. Processing activities generally need electricity to be competitive. As such, employment opportunities are limited outside of the large urban center of Bamako. Unreliable electricity supply limits development of small industry producing local consumer and producer goods. It is through such activities, in part, that one gets the linkage effects of agricultural growth stimulating employment and further income growth.

Though the bilateral USAID Mission does not need to be involved in electrification, it is encouraged to work with the West African Regional Program (WARP), which has been working closely with ECOWAS to develop the West African power pool that is intended to benefit Mali in the medium- to long-term. WARP's support of a more harmonized regulatory environment for West Africa for electric power generation, transmission, and communications industries is important. Potential foreign investors don't want to have to deal with a plethora of different regulatory environments.

## **5.7. Irrigation**

Mali is endowed with huge irrigable potential to foster agricultural production and growth. This potential is located especially in the Office du Niger for which some analysts have estimated the irrigable land to be nearly 1 million hectares. Conservative figures for this potential are approximately 243 thousand hectares (World Bank, 2000). Notwithstanding this conservative estimate, the irrigable potential land is important and yet, only 56 thousand hectares are under production, raising the issue of why this cultivated irrigation area is so low. In this section, we will review the potential for increasing irrigation in the ON and also *bas-fonds* and other small and medium scale techniques. The important point here is not which approach to use but that irrigated area needs to expand and USAID can play a significant role in helping obtain that expansion.

### **5.7.1. Office du Niger**

Although the Malian government deployed great efforts to rehabilitate the dilapidated irrigation perimeters, there is a considerable need to expand land under irrigation because this type of production system reduces risk and uncertainty in the erratic Malian physical environment. Expansion of irrigated land will be contingent on expanding the irrigation infrastructure



comprising the primary canal, and the secondary and tertiary canals. Studies have shown that construction of secondary and tertiary canals are within the reach of the private sector because they can yield financial profits under current market conditions (Barry and Diallo, 1999). Despite this profitability, the private sector has not invested in the Office du Niger, as expected. The reason for the lack of private sector investment in the Office du Niger lies in the fact that it does not have access to medium- to long-term credit. Several factors underline this lack of credit (see the finance section above). Commercial banks in the WAEMU, because of regulations from the Central Bank, are prohibited from using short term deposits to finance medium- and long-term credit. This requirement appears to have been tightened since the credit crisis in the WAEMU countries, during which credit was extended to the private sector but was not repaid. Second, commercial banks are reluctant to lend to the agricultural private sector because potential investors lack the collateral necessary to secure loans. The recent revision of the land tenure system will help address this issue. The newly designed investment fund put in place by USAID, as well as the World Bank-funded infrastructure program, will also contribute to alleviating the lack of credit.

One of the actions that USAID can undertake to alleviate the constraints to investment in a newly designed primary canal is to initiate, in collaboration with the Government of Mali, collaboration and coordination among donors so as to join forces to fund the investment operation. The success in the cereal marketing reform seems to indicate that donors can work well together as long as they pursue the same goal, which is here economic growth and poverty alleviation in a zone that has the potential to reverberate to other regions through the linkage effects. This investment does not have to be a one-time deal, rather a multi-stage operation requiring each donor to readjust its interventions in Mali. In this respect, USAID could work closely with the World Bank, the European Union, and the Dutch at the onset to bring other donors on board.

### **5.7.2. Bas-fonds**

*Bas-fonds* are narrow inland valley swamps that once were rivers, but have since dried up.<sup>38</sup> During the rainy season, the water level rises generally providing water throughout the growing season. It is estimated that about 48,657 hectares of *bas-fonds* exists in Mali-Sud, of which only about 5 percent are under some type of water control. There are important land tenure issues that must be resolved, as is the case for ON. It does appear that a significant fraction of the existing *bas-fonds* production is done by women. Dimithé concludes that *bas-fonds* production is competitive under several alternative production systems. Thus, this approach to increasing irrigated area must be considered along with other alternatives.

### **5.7.3. Small-Scale Supplemental Irrigation**

In some parts of Mali, small or medium scale irrigation is being expanded using pumps to bring in nearby river water or using wells. These approaches also merit consideration in expanding irrigated area in Mali.

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<sup>38</sup> This section draws upon "Small-Scale Inland Valley Swamp Rice Production: A Viable Enterprise in the Grain-Cotton Farming System of Southern Mali" by G. Dimithé, contained in Bingen, et al, *Democracy and Development in Mali*.

## 5.8. Communications

Telecommunication in Mali has been the sole responsibility of SOTELMA, a state company. Efforts are now underway to privatize SOTELMA. The objective is to break the company into three components and privatize each part separately. These three components are 1) the classic wire-based telephone system, 2) a cellular phone system, and 3) an Internet service system. At the moment, the cellular system has been privatized with two cell phone companies now operating in Mali, SOTELMA as a separate private system and a second private provider. The Internet component is to be privatized in early 2002, and the rest of the system will be privatized in late 2002. There appears to be little problem in privatizing the Internet component but quite a bit of concern on privatizing the wire-based component. The biggest issue in this latter privatization is how to assure phone service to smaller towns and rural areas. This may well be one of those situations where creative regulation is required. Even in rich countries like the U.S., residential service, especially in rural areas, is heavily subsidized by other customers through the rate setting process. However, by introducing competition in mobile phones, Mali may be able to by-pass the problem of wired connections. Recent evidence from Bangladesh demonstrates that mobile phone competition can lead to provision of affordable mobile service even in rural areas.

SOTELMA with donor support has been upgrading the traditional system, focusing primarily on improving inter-urban connections. The existing PANAFTEL system linking towns with microwave line-of-sight-based equipment is gradually being replaced with the DOMSET satellite based system. DOMSET satellite dishes have been put into place in 14 major towns in the country. DOMSET is highly reliable and provides a much higher quality signal than does PANAFTEL. Under the DOMSET system, space is usually rented on the transponder of one of the international communications satellites with a footprint covering Mali. Negotiations are now underway to establish a West African Telecommunication Regulatory Authority (WATRA), which hopes to buy a still viable but at present decommissioned satellite to provide service to the region. The WATRA system should provide adequate broadband capabilities and serve as an alternative to the international communication companies.

USAID has been working with the government to expand Internet business in the country. It is presently working on providing Internet capacity to the University of Mali. Under USAID's tutelage, there are now 15 Internet service providers (ISP) in the country. Additionally, SOTELMA has developed system wide access to users of local ISPs through a "76" number that allow Internet users to call their provider as a local call from anywhere in the country.

In addition to communication by telephone, radio plays an important role in Mali, particularly in rural areas. There are a number of private FM radio stations throughout the countryside. Seventy-six percent of the population has access to at least one private radio station. These stations are used for a number of communications purposes including dissemination of market price information by OMA. To fill in the gaps in this radio network, USAID through its INFOCOM project is preparing to put what are known as "suitcase radios" in areas not presently served by a local private station. These suitcase-sized radio stations contain transmitter, controls,

cassettes and CD equipment in a single unit. The radios have a power of 50 watts and can transmit a signal up to 85 kilometers. Twenty one units are presently available to be installed.

Coupled with the private radio system, USAID is preparing to distribute digital radio receivers to selected radio stations. These receivers are part of an international private digital radio network, which has allocated 5 percent of its bandwidth spectrum for transmission of development oriented material. Mali has a time period within that spectrum to send material out to a number of private radio stations who then can retransmit the material to their audience. This material can include health, education, extension and marketing information. This program is to start by the end of November, 2001. Training of program developers and producers for the radio system is also part of the USAID program. Some 600 radio producers have been trained.

A communication-based program now being developed for possible future funding by USAID could have significant impact on agribusiness and marketing in the rural sector. This program, now in operation in Bangladesh, was developed by the NGO VITA and is known as "store and forward" e-mail. VITA has purchased a decommissioned but workable satellite and is using it to send and receive e-mail messages from briefcase sized satellite units placed throughout the countryside. The satellite passes over the unit approximately three times a day, and on each pass it sends and receives a bundle of messages. The satellite is linked to the Internet system to transmit and receive these messages world-wide. Cost of messages is less than a stamp. Illiterate people can use scribes to type and read messages. The possibility of inexpensive near-real time communication to almost anywhere in the country makes a number of marketing and business schemes more possible. Unfortunately, USAID is re-examining at its overall funding allocation, and this program may not be supported.

## **5.9. Agricultural Research**

Agricultural research in Mali takes place largely in four organizations: The Institut d'Economie Rurale (IER), CMDT for cotton (done jointly with IER), and, to a much smaller extent, the Institut Polytechnique Rurale et Institut de Formation et de Recherche Appliquée (IPR/IFRA) de Katibougou (the agriculture school of the University of Mali) and the Central Veterinary Laboratory.<sup>39</sup> Except for CMDT, private-sector agricultural research is practically non-existent, apart from small local demonstration tests carried out by some private seed dealers as part of their marketing strategy. Research in the country is coordinated by the Comité National de Recherche Agricole (CNRA). CNRA is located within the Ministry of Rural Development (MDR) and includes representatives of the MDR, Ministries of Scientific Research, Finance, and the Environment; the Chambers of Agriculture, research user groups (mainly farmers), NGOs, private-sector agribusinesses, external scientific experts, and donors. The research program is guided by the Strategic Plan for Agricultural Research in Mali, which was first elaborated in 1991. The most recent revision was in 1999 and covers the period 1999-2005. (The plan is elaborated for 12 years, with 6-year implementation programs. Because of the upheaval in Mali in the early 1990s, the first phase of the plan was not launched until 1994.)

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<sup>39</sup> International organizations, such as ICRISAT also conduct agricultural research relevant to Mali.

The first phase of the strategic plan was financed for a total of 112 million Euros, jointly by the Malian Government, the World Bank, USAID, the Novartis Foundation, the French Ministry of Cooperation, CMDT, and the governments of the Netherlands and Switzerland. USAID made particularly strong contributions in long-term training (via the SPARC project) and strengthening research design through short-term workshops. USAID support for the research system and long-term training waned in the mid 1990s, and the agency provided virtually no direct support to IER during the 1998-2002 USAID strategic plan.<sup>40</sup>

Starting in the late 1980s, IER, with USAID and World Bank funding, undertook a broad restructuring, aimed at reducing the number of employees, controlling costs, introducing a strategic planning process for agricultural research and making research more responsive to farmers needs. This process eventually led to the development of the current strategic plan for agricultural research in Mali. As part of this process, IER redesigned its research program along 14 commodity lines<sup>41</sup> and two cross-cutting programs (farming systems and natural resource management (DRSPR); and subsector economics (ECOFIL). The program was also regionalized, with research programs defined in accordance with the needs of the various areas of the country where IER has its research stations. As part of this process, national and regional research users' committees were established, made up mainly of farmers. The committees' roles were to advise IER researchers on farmers' research needs and provide feedback on the usefulness of research results. Also in the late 1980s, faculty members at IPR/IFPRA were granted the official status of "researchers" as well as teachers, which permitted them to apply for research funding. This led to expansion of labs and experimental farms at Katibougou, which previously were used almost exclusively for teaching.

### **5.9.1. Constraints and Opportunities**

IER has made undeniable progress in reforming its research program. Yet significant problems remain.

*Human resources:* While senior staff are generally well-trained, the new generation of IER recruits are much weaker. With the withdrawal of USAID funding of long-term training support, the new generation of IER researchers are mainly graduates of the 5-year *ingenieur agronome* program of Katibougou. They need additional training in research design and in some of the technical skills needed to execute the research program. Social science capacity (to analyze profitability and social acceptability of technologies developed, as well as policy analysis) also remains weak, and is concentrated primarily in the farming systems and subsector economics divisions

*Coordination of research:* Although IPR/IFRA researchers are allowed to compete for research funding, they remain the "poor cousins" of the research system, in spite of the presence of some very talented individuals at Katibougou. The coordination between Katibougou and IER has

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<sup>40</sup> Some indirect support for policy research was provided through the USAID-Michigan State University Food Security II Cooperative Agreement.

<sup>41</sup> Peanuts, Cotton, Fruits and Vegetables, Maize, Millet, Cowpeas, Small Ruminants, Forest Resources, Fisheries Resources, Rainfed Rice, Irrigated Rice, Sorghum, Poultry, and Cattle.

improved in recent years, but still needs to be strengthened. Since most of IER's scientific staff has studied at Katibougou, the personal links are there to make this happen.

*Research-extension linkages:* There are still very weak links between research and extension. The creation of the users' committees and the farming systems division were attempts to replicate some of the links between farmers and researchers that a well-functioning extension system would provide. But apart from the CMDT extension system (which is now focusing mainly on cotton, having pulled back from its general development activities), extension services in Mali are extremely weak. There is thus insufficient feedback to researchers about farmers' needs and the suitability of technologies developed by the research system. It is not at all apparent that this situation will improve under the PASAOP.

The structure of the research scientific committees and users committees also need improvement. The user groups only include farmers, with no representation of agro-entrepreneurs, such as processors, who may have specific needs regarding agricultural technology. Furthermore, the user groups only get a voice in the early stages of the definition of the research process (expressing to the researchers what the users' research needs are) and at the end, when they review the research results presentations of the IER staff. They do not participate in the critical annual meetings of the scientific committee, which decides on what projects actually get accepted and funded. These decisions are made largely in-house, with the result that the research may or may not respond to users' needs. Creating mechanisms whereby civil society groups, such as networks of private traders or processors could interact with researchers, via subsector taskforces, on research needs, could strengthen the targeting of agricultural research. Creating such task forces is within the mandate of ECOFIL, although it has only rarely done so.

## **5.9.2. Future Perspectives**

Current plans call for agricultural research in Mali to be funded largely by the World Bank funds, via the PASAOP. Under the PASAOP, researchers from both Katibougou and IER will be able to bid for research funds. While USAID will likely want to leave the funding of agricultural research largely to this World Bank-led effort, four areas might warrant USAID support:

1. Targeted research on critical policy areas constraining expansion of Malian agricultural production, such as the biosafety and intellectual property rights environment for introduction of biotechnology in Mali. (Congress has earmarked \$40 million/year for biotechnology work in Africa.) The subsector economics unit (ECOFIL) of IER, in conjunction with biotechnology researchers from IPR/IFRA would be the logical place for such research to take place.
2. Subsector strategic planning. – ECOFIL has a mandate to pull together key actors from across a subsector to assess opportunities and constraints to improved subsector competitiveness. Such exercises focus on identifying action needed beyond the scope of any one actor in the subsector to provide—e.g., design and implementation of grades and standards. ECOFIL conducted one such exercise for maize in the early 1990s, and further such exercises, carried out in collaboration with the market information system (OMA), the agri-food traders network, and other private sector actors could help identify ways of stimulating growth in promising subsectors.

3. Very applied research on alternative least-cost feed rations, given the importance of the feed constraint to expanding livestock production and that the liberalization of the cotton-seed market will likely change input prices.
4. Working with the PASAOP to strengthen linkages between research, extension, and training (e.g., at Katibougou). The current PASAOP plan for extension looks very questionable, partly because there is not any clear articulation in the plan between extension, research, and training of new agro-entrepreneurs.

*Long-term training:* This historically has been one of the U.S.'s leading contributions to agricultural growth in Mali. The lack of such training opportunities raises real questions the ability of the new generation of IER researchers to address Mali's needs in the future and to replace the current generation of research leadership, most of whom were trained in the U.S. and France.

## **5.10. Extension and Human Resource Development**

Outside of the structured regions such as CMDT and ON, extension activities are extremely limited or nonexistent. Most work that is done is related to NGOs or a specific donor supported project. The World Bank, through its new PASAOP project, plans to greatly reinforce extension work as one of four components of the project. This activity will be commune-based and will attempt to provide resources for the commune to provide for itself or to contract for extension services from NGOs or other sources. USAID has had little work in the extension area in the past and is not planning to do much in the future. Other sources of technical support to producers could come from exporters, input suppliers or traders. At this time, such support is also extremely limited. Many of the smaller exporters of horticultural products, for example, provide inputs to the producers and then return several months later to pick up the product. They do limited or no supervision or support of the production process. This affects the quality of the product they obtain, but they claim they do not have resources to provide this support. Likewise, input dealers claim a desire to provide information on use of their products to their clients but say they do not have funds to provide this information.

In the area of training and human capital support for other areas of the agricultural and agribusiness sector, the situation is also quite limited. The principal institution supporting agriculture, and increasingly agri-business, is the Agricultural School at Katibougou (IPR). IPR has several programs that could be useful in capacity building in the agricultural sector. One of these is their Center for Continuing Education. Within this Center is an innovative program responding to the concern that students graduating from Malian schools have had training but have not been having success in getting jobs. One of the problems they have is lack of an entrepreneurship spirit. In this program, therefore, the students are taught how to set up their own agribusinesses concerns and receive training in management and operations. The program also works with groups of producers as part of the decentralization effort underway in the country. Much of this work has been done with women-owned businesses (smoked fish, honey) and women's associations (fruits and vegetables). The goal of the program is to reduce unemployment of young people. It is assumed that income generated from this employment will help pay for the part of the program. Another similar program at IPR is known as Bac+2. This is a diploma program in which the students combine coursework with work as entrepreneurs to gain experience and confidence that can make them more employable in the private sector.

IPR is developing a program to support extension agents. This program provides additional training and upgrading. The curriculum for the program is being jointly developed with the Ministry of Rural Development and the Ministry of Education. This program could also work with the PASAOP project to upgrade commune level extension agents under the supervision of the communal Mayor. Financing is an issue, as IPR would need at least 25 percent of the cost of this training to be provided by the commune or other sources.

The lack of qualified people at all levels in both the public and private sector in Mali is one of the biggest constraints to long-term economic growth and development in the country. While local institutions such as IPR can provide some support in training, its facilities and resources are limited compared to the needs in the human capital area. For this reason, USAID and other donors need to seriously look at provision of long-term higher-level education and training. This level of training is needed to deal with the near and medium term requirements for trained people. While primary education is receiving its just due by both government and donors, the results of this lower level training will only have impact on the economy in the long-term. A strong cadre of trained people is need now to provide the basis of an economic structure that will provide the jobs and the resources to support eventual output of expanded primary and middle school education now being proposed and undertaken.

U. S. institutions of higher learning have strong comparative advantage in educating Malians in practical and appropriate skills in support of a broad-based market led economic system that is the goal of both Malian and U.S. interests. These strengths are particularly strong in the areas of agriculture, agribusiness, science, technology and business. These are all areas of fundamental importance to Mali's developmental needs. In addition, training in the U.S. exposes the participants to the important subtleties of how a market oriented democracy actually operates and to the entrepreneurial drive that makes it work. Many of the senior actors, advisors and officials in both the private and public sector, who are making a difference in Mali's development efforts, have been recipients of long-term training provided when USAID was heavily involved in this type of assistance. In recent years, however, USAID has shied away from supporting long-term higher education of third world country participants. This policy should be re-evaluated in light of the present needs of the country.

## **5.11. Market Infrastructure and Information**

The *Observatoire de Marché Agricole* (OMA), a GOM structure housed in APCAM provides domestic market price information for a wide range of products including cereals, processed cereals, selected horticultural crops and, in more limited way, livestock. OMA plans to add fish to its product concerns in the near future. OMA receives technical support and capital equipment support from USAID via the PASIDMA project and from the PRMC. OMC collects and reports on prices throughout the marketing chain from farm-gate prices through assembly point prices to wholesale and consumer prices. OMA has enumerators in all of the regional capitals and high value production areas in the country. With the assistance of PASIDMA, it has installed in eight of its regional offices a computer/radio system that electronically transmits price data on files directly to the OMA central office for immediate analysis without being re-keyed in.

OMA distributes its data and analysis in a number of ways, dividing its distribution into public and commercial services. The public distribution is at no charge as a public good to facilitate marketing activities in the country. The commercial distribution is directed at private firms and interests that need basic or specialized data and analysis. Thus OMA distributes its reports free to government offices, but sells them to banks, NGOs and consultants. In addition to its normal reports, OMA also can provide data in spreadsheet files for specific data requests.

In terms of specific products, OMA publishes a monthly bulletin of market prices (*Le reflet*), an annual bulletin on the agricultural market, special publications (*Bulletin de Conjoncture*), and selected weekly price bulletins. Price information is also distributed via a network of private radio stations located throughout the rural area. Evaluations and observation in the field indicate that the price information disseminated by OMA has had significant impact in increasing market competition, lowering marketing costs and improving price incentives in the market. But more needs to be done. OMA, with its developmental partners, has been undertaking efforts to upgrade and harmonize the diverse market price information systems (SIM) in the West Africa region. The goal is to have current and reliable regional price information to facilitate trade and investment in the region. To this end, annual conferences on regional perspective of agriculture have been held to bring together representative of the SIMs as well as traders and others concerned about the regional market. These conferences are used to exchange information and learn about the perspectives of various agricultural sub-sectors in the region and forces and policies that influence them. It also serves as a forum by which traders and other private sector individuals and firms in the region can exchange information and cut deals. An unintended but extremely important outcome of these meetings has been formation by the traders in the region of a formal network (ROESAO) to exchange information on market supply and demand and to create sale across borders of agricultural commodities.

As the various agricultural sub-sectors begin to develop, further additional price and market information will be required. For example, in the livestock sector there will be increasing need to have information on prices of major fodder crops (peanut and niebe hay) to calculate economical feeding regimes. Information on livestock on feed will also become more important for marketing decisions as greater confined management of livestock is put into place. As the modern poultry industry expands, price information on broilers and eggs will also become more essential for making market decisions and increasing efficiency in the marketplace. In the cereals market, information on seed availability would be useful to increase access and geographic distribution of certified seeds.

## **5.12. Market Development**

Outside of the cotton sector, formalized market development is a fairly recent phenomenon in the agricultural sector in Mali. Traders and exporters, as individuals, have always worked with their personal contacts to find markets for their goods. The forming of associations or groups of traders or other operators in the marketplace to formally seek out and develop markets is new. The USAID-supported PASIDMA and the market price information system (OMA) have been instrumental in establishing this new approach. Associations of horticultural exporters (AMELEF), input dealers (ORIAM), and a regional traders' network (ROESAO) and its national



equivalent (CONOESAM) are some of the more important new associations formed to expand and develop markets for Malian agricultural goods.

CAE has been very active in seeking and promoting agricultural markets, particularly for mangoes, green beans, potatoes and shallots. They are also working to improve quality and differentiation of rice milled in small local mills. Most of the CAE work has been helping individuals and groups to test markets and market approaches by sending test shipments and supporting market visits. CAE has also helped to organize growers' groups in shallots and potatoes. They have also helped mango growers to develop a logo and trademark. They are also providing support to AMELEF and ORIAM as well as to other trade and growers' associations in management, market information and group purchases.

The *Observatoire du Marché* (OMA) has viewed its mandate for market information in the broadest sense. Not only does it gather and disseminate price information in the country but it also tries to see that this information has a positive impact on market efficiency and trade. OMA was moved under the tutelage of the Chamber of Agriculture (APCAM) to be able to have close contact with its principal clients, agricultural producers, processors and traders. In keeping with this broader mandate, OMA, with other market information systems (SIM) in the region, meet annually to review the agricultural perspective in the West Africa region. Regional producers, processors and traders are part of these meetings. During the first annual conference, the private sector participants began to exchange information informally among themselves and cut deals for sale of agricultural commodities across borders in the region. At the second annual conference, the value of this type of exchange and trade was recognized, and it was decided by the traders and other private sector agri-business firms to form a formal network to facilitate this activity. At the third annual meeting in Bamako in mid-March 2001, the network known as *Reseau des Operateurs Economiques du Secteur Agro-alimentaire de l'Afrique de l'Ouest* (ROESAO) was formed.

ROESAO is a network of national coordination units (*Coordination Nationale des Operateurs Economiques du Secteur Agro-alimentaire*) within the countries of the region. The national coordination unit in Mali is known as *Coordination Nationale des Operateurs Economiques du Secteur Agro-alimentaire du Mali* (CONOESAM). Each national coordination unit pays annual dues to the regional network. ROESAO's stated functions include reinforcing the capacity within the region to collect and exchange information on the supply of and demand for agricultural products and related trade opportunities, organizing workshops to support members and providing publicity and public relations for the agri-business sector.

CONOESAM is based in Bamako with sub-units in Ségou and Mopti. The coordinating unit has ambitious objectives including increasing the competitiveness of Malian agricultural products, improving the information network on business opportunities, reducing constraints within the marketing system, capturing sub-regional and international markets, seeking out and mobilize sources of financing of trade activities, and establishing a formal office. Even though the operation of CONOESAM has just started, it has already had some success in increasing trade (see below) and in trouble shooting hold ups and bottlenecks in regional trade operations. The regional network, of which CONOESAM is a part, has been particularly important in bringing pressure on both sides of the border to address the problems of non-tariff trade barriers.

Within this network context, a number of interesting events have taken place. In 2000, following the second annual conference on Agricultural Perspectives in West Africa, Niger traders made contact with their Malian counterparts for contracts of almost 50,000 MT of coarse grains from the Ségou region. Cereal trade of up to 60,000 MT to Burkina Faso, Ivory Coast, Mauritania, Senegal and Niger is anticipated in 2001. In addition, in December 2000, cattle traders within the network in Mali and Guinea made a contract to trade 500 head of cattle to Guinea. This is a small beginning, but the potential for inter-regional trade is large, and the network will facilitate the achievement of this potential.

## 6. Issues Related to a Productivity-Led Strategy

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No productivity-led strategy can be successful in the Malian context unless it addresses issues of food security, risk, HIV/AIDS, gender, and environment. This chapter covers these issues and develops the relationship between the proposed productivity-led strategy and these issues.

### 6.1. Food Security

The Government of Mali has adopted the widely used definition of food security first proposed by the World Bank: “Food security involves assuring the total population a diet adequate to permit a healthy and active life” (OPAM, Cellule de Veille et de Logistique, 2001). Assuring food security involves addressing its three components: availability, access, and utilization. Improving availability involves actions aimed at increasing food supply through increased production, reforms of marketing systems to drive down costs of food to consumers, improved marketing technologies, and strengthened transport and market infrastructure. Improving consumers’ access to food involves raising consumers’ real incomes through efficient economic growth; actions aimed at income redistribution to the poor; and creation of safety nets (e.g., emergency food aid) that allow the destitute access to food when they lack real income. Utilization refers to the ability of an individual to use the food she obtains. It thus involves both improvements in food preparation and feeding practices (e.g., for young children) and general health improvements, given the very important effects that disease can have on nutrient absorption and that malnutrition can have on disease morbidity and mortality.

Food insecurity can be either *acute* or *chronic*. Acute food insecurity results from short-term shocks (e.g., droughts, pest infestations, temporary reductions in income, or disease outbreaks) that reduce food availability, access, or utilization of an individual. In Mali, acute food insecurity is most often associated with weather events (drought and floods) and pest infestations that disrupt agricultural production, marketing systems for food, and farmers’ incomes. Chronic food insecurity is the result of structural problems in the economy that limit, on a long-term basis, food supply and an individual’s access to and utilization of food. Chronic food insecurity thus results from poverty and from food production and distribution systems that have high unit costs (in terms of the food that actually reaches the consumer).

USAID and GRM programs that have an explicit “food security” label have tended to focus more on acute problems of food availability (e.g., crisis management tools for droughts). A large number of the SEG programs, however, although not always labeled explicitly as food security activities, have important impacts on improving long-term food security through improving availability via food market reforms and improving access through stimulating broad-based income growth. Thus, many of the activities discussed earlier in this report concerning subsector development, policy reforms, and support of farmer and trader groups, have important impacts on long-term food security. The activities of the Youth/Health SO on child and maternal nutrition, as well as the SEG-supported work on agriculture-nutrition linkages,

address, among other things, improving food security through improved utilization (particularly by dealing with nutrition/disease interactions).

### **6.1.1. Tools to Deal with Acute Food Insecurity Due to Disruptions in the Food Supply**

Since the 1973/74 droughts, Mali has made tremendous progress in establishing organizations and procedures for monitoring and responding to acute problems of availability and access to food. The majority of these changes can be attributed to reform efforts undertaken over the last twenty years by the Malian government and a group of donors to reform the cereals sector under the Cereal Market Restructuring Program (PRMC), initiated in 1981. The PRMC is currently jointly funded by the Malian government and a consortium of 7 donors (World Food Program, EU, France, US, Canada, Germany, and the Netherlands).

The PRMC played a major role in dismantling the system of public monopoly and administered prices that attempted to manage cereal commerce from independence through 1981. The reform effort led to a complete redefinition of the government's involvement in the cereal sector. The government's current activities are limited to the production of key public goods (communication and transport infrastructure, agriculture research and extension, market information, grades and standards), establishing and collecting import tariffs and water fees (Office du Niger), and preventing and alleviating food crises.

The PRMC has developed an impressive set of tools to deal with acute food insecurity arising primarily from disruptions in food availability (e.g., due to drought). These are coordinated through the *Comité d'Orientation et de Coordination du Système de Sécurité Alimentaire (COCSSA)* and include:

- a. The national agricultural market information system, *l'Observatoire du Marché Agricole (OMA)*. The OMA reports on market conditions in 50 locales throughout the country.
- b. The national food crisis early warning system, *le Système d'Alerte Précoce (SAP)*. The SAP, which draws on information collected by local development committees at the ex-arrondissement level, monitors food availability and poverty conditions in 22 urban communes and 326 rural communes (mainly north of the 14<sup>th</sup> parallel) considered to be chronically "at risk" of food insecurity.
- c. The annual agricultural survey, *l'Enquête Agricole de Conjuncture*, carried out jointly by the national statistical agency (DNSI) and the National Direction of Agriculture (DNA), which provides timely estimates of production,
- d. The national security stock (SNS), composed of 35,000 T of millet and sorghum,
- e. A national food security financial reserve, initially funded at 5.5 billion CFA F (approx. \$7.3 million assuming an exchange rate of 750 CFAF/US\$), but whose current level is 3.5 billion CFA F (approx. \$4.7 million).
- f. The *Cellule d'Appui au Développement de la Base* of the Ministry of Territorial Administration and Local Collectivities.

The COCSSA also coordinates closely its information gathering with other donor-funded monitoring efforts, such as the USAID-supported Famine Early Warning System (FEWS) and the FAO's Global Market Information Monitoring System (SMIAR).<sup>42</sup>

The food security system regularly monitors the food situation throughout Mali, determines when localized crises exist, and recommends emergency action such as the release of emergency food aid or the launching of food-for-work programs. It has developed a set of norms to define when different types of crises exist and the appropriate remedial actions.

The PRMC also serves as a forum for the policy discussions between the donors and the Malian government on reforms aimed at improving the functioning of the market to improve longer-term food security. The system has been built up over 20 years and is widely cited throughout Africa as a model of donor coordination. The PRMC's Technical Committee, composed of representatives of the 7 donor agencies and the Malian government, meets at least once every two weeks to discuss the evolving food situation and actions aimed at improving the functioning of the cereals markets. The IMF and World Bank have observer status at these meetings, as the PRMC's actions are closely coordinated with Mali's agreements with the Bretton Woods institutions. Major decisions are made by the Management Committee, made up of the heads of the diplomatic missions or the aid agencies of the participating donors, as well as high-level representatives of the Malian Government.

Through most of the 1980s, the PRMC donors funded the system primarily through food aid, which was monetized in Mali, with the funds going into a jointly managed Malian-donor *fonds de contrepartie*. As Malian agricultural production has grown, donors have largely switched to monetary funding out of concern that large food aid sales might reduce local agricultural production and marketing incentives.

Over the past three years, funding for the recurrent costs of all elements of the system except the SAP have been taken over by the Malian government. The investment costs and technical assistance to the system are still provided by the donors, both through bilateral assistance and contributions to the *fonds de contrepartie*. Currently, 50 percent of the SAP's recurrent costs are covered by the national budget, with the other half still funded by the PRMC donors. This decision to keep half of the SAP's operating budget on the donors' budget may, in part, reflect a strategic decision by some of the donors to exert greater control of the SAP. The SAP is the critical instrument in determining when, where, and with what amounts the state intervenes with emergency actions, such as free food aid distributions and sales of national security stocks. Free food aid, when it is distributed, is targeted geographically (e.g., to a specific commune or cercle), but not to specific individuals.

Mali faces localized crop failures nearly every year, which put at risk rural people whose incomes depend on those crops. At some point in the future, Mali will also face a major

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<sup>42</sup> For Mali, FEWS and SMIAR do not collect primary data. Rather, they compile data collected through the COCSSA system and complement it with other information, such as satellite imagery from NASA. The utility of these systems for Mali is that they provide comparable data for neighboring countries, which helps in forecasting the evolution of Malian market conditions. These systems also provide the data for several countries in a uniform format for decision-makers in Europe and the US.

drought. Having the tools of the COCSSA in place will be critical in dealing with the crisis in a timely way.<sup>43</sup> This system merits continued support from USAID.

### 6.1.2. Dealing with Chronic Food insecurity

The PRMC's activities aimed at improving the functioning of the marketing system, both through support of the market information system and judicious use of the national security stock, help reduce chronic food security by helping build a more reliable food system. These activities merit continued support. Two important types of food insecurity that the COCSSA/PRMC system is not designed to deal with are the following:

- a. Short-to-medium term food insecurity resulting from sharp declines in real incomes due to generalized shocks to the economy (e.g., last year's cotton crisis). This problem could be partly addressed if communes developed an inventory of labor-intensive public works projects "on the shelf" that could be launched, e.g., through food-for-work programs, during times of sharp economic downturns. If the daily wage were set low enough, these programs would have the advantage of being self-selecting (at least among the able-bodied), attracting those whose incomes are lowest. The programs could be designed in a way to help build infrastructure (e.g., feeder roads) needed to support broad-based economic growth.
- b. Chronic food-insecurity of the destitute. The COCSSA system is aimed at identifying food-insecure *regions*, not individuals. However, even in regions deemed food secure due to their high levels of per capita food production (e.g., areas in the southern CMDT zone), there large numbers of households and individuals who have inadequate access to food due to poverty. Some are truly destitute. A challenge for a country as poor as Mali is whether it is possible to develop cost-effective food safety nets for such individuals. If there were self-targeting foods available, these might in some way be subsidized, but this option is probably not feasible.<sup>44</sup> Exploring what options exist for self-targeting food security safety nets for the destitute constitutes an important area for a future analytic agenda.

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<sup>43</sup> The only major drought that Mali has faced since the COCSSA was put in place was in 1985, when the system was still very young and nearly 100% funded by donors, primarily through food-aid monetization. The general impression is that the system allowed the food crisis to be handled in a much more cost-effective way, with greatly reduced loss of life, than comparable droughts in the 1970s.

<sup>44</sup> A self-targeting food for the poor is what economists term an "inferior good." This term does not mean the food is inferior nutritionally, but is one that people buy less of as their incomes increase (i.e., its income elasticity of demand is negative). Such a food, if subsidized, will thus appeal mainly to the poor, making such a subsidy less of a financial drain on the government. Budget consumption studies in Mali conducted in the mid 1980s (e.g., Rogers and Lowdermilk) indicated that at that time, there were no inferior staple foods in Mali. Incomes were so low that all income classes consumed more staples as their incomes rose. Even if one identifies an inferior food to use as a self-targeting food-assistance product, one has to identify where and how to apply a subsidy, which may not be easy in Mali's dispersed food marketing system.

## 6.2. Climatic Risk and Vulnerability

### Box 1 - Vulnerability

*As traditionally defined and measured, poverty is a static concept—a snapshot in time. But insecurity and vulnerability are dynamic—they describe the response to changes over time. Insecurity is exposure to risk; vulnerability, the resulting possibility of a decline in well-being. The event triggering the decline is often referred to as a shock, which can affect an individual (illness, death), a community, a region, or even a nation (natural disaster, macroeconomic crisis.)*

*Risk, risk exposure, and vulnerability are related but not synonymous. Risk refers to uncertain events that can damage well-being—the risk of becoming ill, or the risk that a drought will occur. The uncertainty can pertain to the timing or the magnitude of the event. For example, the seasonal fluctuation of farm income is an event known in advance, but the severity is not always predictable. Risk exposure measures the probability that a certain risk will occur. Vulnerability measures the resilience against a shock—the likelihood that a shock will result in a decline in well-being. Vulnerability is primarily a function of a household's asset endowment and insurance mechanisms—and of the characteristics (severity, frequency) of the shock.*

*World Bank World Development Report 2000-0, p. 139.*

A country as poor as Mali suffers much more than other countries from variability in climate or external market conditions. While the percentage of the population that is poor is quite high, the percentage that is vulnerable is extremely high. Dealing with vulnerability is part and parcel of poverty alleviation.

The two major themes of the strategy being proposed in this paper are risk reduction and productivity enhancement. Risk reduction is imperative if we are to reduce vulnerability. The proposed investments in irrigation, increased production of basic cereals, greater productivity in livestock through improved feeds, and in diversification through horticultural products and some value added processing activities – were all selected because they contribute not only to reduction of poverty and increased economic growth, but also because they lead to an overall lower level of risk and, consequently, vulnerability. This theme is developed further in the next chapter.

## 6.3. HIV/AIDS

HIV/AIDS poses a development crisis across much of Africa. Mali, with relatively low levels of prevalence in most communities, has the opportunity to control the spread of the epidemic and its devastating effects. As rates in neighboring countries such as Cote d'Ivoire, Nigeria and Burkina Faso start climbing with alarming momentum, Mali should mount an aggressive campaign to prevent the spread of this disease. In addition, systems are needed to monitor the spread and impacts of the HIV/AIDS in the many different sub-populations across the country. While most of the interventions at this stage of the epidemic relate primarily to the health sector, the impact of HIV/AIDS extends into all sectors. An effective response to contain and hopefully reduce the HIV/AIDS epidemic in Mali will require multi-sectoral collaboration.

In this section, we review the prevalence of HIV/AIDS in Mali, the factors associated with transmission, the potential impact of the disease on rural income growth, and the ways in which agricultural sector programs and interventions should be tailored to the reality of potentially growing rates of HIV/AIDS among targeted populations.

### 6.3.1. Prevalence of HIV/AIDS

There are several different estimates of the dimension of the HIV/AIDS epidemic in Mali at present. Initial results from the 2001 Demographic and Health Survey (DHS) indicate a national prevalence rate of 1.7 percent.<sup>45</sup> Government estimates from 1995 placed national HIV prevalence between 3 and 4 percent.<sup>46</sup> According to UNAIDS, the number of Malians living with HIV or AIDS at the end of 1999 was 97,000; more than half (53,000) of these may be adult women.<sup>47</sup> The aggregate national prevalence of HIV masks important heterogeneity among sub-groups. Particular distinction is made between prevalence in low-risk groups (2.2 and 2.5 percent in rural and urban areas, respectively), and high-risk groups (52.8 and 42.1 percent in rural and urban, respectively). High-risk groups in Mali include commercial sex workers, bus station attendants, truck drivers, migrants, armed forces, factory workers, youth and prisoners.<sup>48</sup> While often mistakenly characterized as an urban disease, HIV/AIDS has the potential to decimate rural populations. The preliminary DHS data suggest only a modest gap between urban prevalence (2.2 percent) and rural prevalence (1.5 percent); rural Ségou has a rate as high as the urban average. Because of the sheer size of the rural population in many developing countries, most HIV/AIDS sufferers may reside outside of cities.

HIV/AIDS is not currently the major cause of death or illness in Mali. Most health assessments stress the importance of malaria, which may cause 13 percent of all deaths.<sup>49</sup> However just as national prevalence data hide serious localized epidemics, they also mask the future risk. Projects for the year 2020 suggest as many as 500,000 Malians will be living with HIV/AIDS if strong programs are not implemented. HIV/AIDS differs from other major illnesses. By the time the death rates are noticeable, many are infected. Because it is primarily transmitted sexually (in Africa), it hits the most socially active and economically productive population. Once the disease gains momentum, it has inevitable consequences: overwhelming the capacity of the medical system, producing illness and death, swelling the orphan population, and resulting in a tremendous loss of human resources. As these effects spread, there is a corresponding and economically debilitating loss of physical and social capital as well.

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<sup>45</sup> These are the preliminary results of the DHS3 Survey by the Ministry of Health/Central Statistical Office/Macro International based on fieldwork from February through June 2001. They have not yet been adjusted by data from the sentinel sites and may be an underestimate due to lower response rate in urban areas outside of Bamako.

<sup>46</sup> The Malian Rural Development Strategy gives a figure of three to four percent (page 10). A similar figure is reflected in the PRSP, which calls for reducing prevalence from three to two percent (paragraph 179). As of the end of 1999, UNAIDS estimates that adult prevalence was 2.03%. [See UNAIDS. (2000c)]. These higher figures are in part because these studies were conducted in urban areas and targeted high risk groups.

<sup>47</sup> UNAIDS (2000c). Likewise, the preliminary DHS-3 data show the prevalence rate among women of all ages to be 2 percent, relative to 1.3 percent for men.

<sup>48</sup> ISBS and GOM (2000b).

<sup>49</sup> USAID (2001), pg. 6.



### 6.3.2. HIV Transmission Factors in Mali

In Mali, vulnerability to HIV is associated with cultural factors, poverty, poor health conditions and migration. Cultural factors may include the early onset of sexual activity among women, polygamy, genital cutting, the low status of women, and the stigma associated with HIV/AIDS. Poverty, poor access to health services, poor sanitation, and low literacy levels contrive to create an environment conducive to the spread of HIV and hostile to efforts to mount an effective response. Low incomes, for example, may bring about increased prostitution and migration as Malians seek out sources of income. The prevalence of sexually transmitted infections (STI's) and condom use, which are affected both by cultural factors and health services, represent important co-factors of HIV transmission.

Of the co-factors mentioned above, migration creates the critical link between the agricultural sector and HIV. Researchers have identified the extensive level of migration in West Africa as a salient feature in the sub-region's HIV epidemic.<sup>50</sup> Migrants often travel without the companionship of a long-term partner or family member. Removed from social pressures or cultural norms, they may seek out short-term and often more risky sexual encounters. Females who migrate in search of income may turn to commercial sex work. A study from neighboring Senegal confirms the trend; in 70 percent of Senegalese HIV patients, migration was an important feature of their personal histories.<sup>51</sup>

The agricultural sectors of West Africa act as major buyers of migrant labor. As a study of the UNAIDS Inter-Agency task force on migration and HIV in West Africa revealed, "43.4% of migrants are found in the agricultural sector and/or forest exploitation, cattle raising, fishing and hunting and 19.6% are involved in trading activities."<sup>52</sup> The links between agriculture and migration also prevail in Mali:

- *Seasonal Migration.* Malians often migrate, for example, to the Sikasso region for seasonal employ in the cotton sector, which is associated with a commercial sex industry. Agricultural labor often migrates to the urban sector or the growing mining sector in Kayes for employment in the off-season. Although Mali's mining population is relatively small, experience from Southern Africa suggests that the combination of men, mobility and money has proved a deadly source for transmitting HIV/AIDS across that region.
- *Agricultural trade.* The delivery of agricultural products to market also entails significant migration. For example, weekly markets, which rotate through various villages in the Sikasso region, attract Malians from all over the country as well as foreigners from across national borders. It is a common practice for female and male traders from distant villages to sleep in the marketplace.
- *Movements in the sub-region.* As the center of economic activity in West Africa, Côte d'Ivoire attracts a number of migrants from surrounding countries. It is no coincidence that Côte d'Ivoire is also saddled with the highest level of HIV prevalence in the sub-region at over 11 percent. In 1994-1995, a shocking 70 percent of commercial sex workers in Côte

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<sup>50</sup> Hunt (1989) was the first to extensively discuss the link between migration and HIV transmission in West Africa.

<sup>51</sup> Sow et. al., 1993.

<sup>52</sup> Pg. 13.

d'Ivoire tested positive for HIV.<sup>53</sup> In addition to the large number of Malians who migrate either temporarily or permanently to Côte d'Ivoire and therefore risk infection, the transnational trucking routes linking Mali and Côte d'Ivoire also attract high-risk populations. A quickly worsening epidemic in Nigeria also threatens to further contribute to the rapid spread of HIV across the entire sub-region.<sup>54</sup> Mali may be especially at risk given that half of the prostitutes in the country are Nigerian.<sup>55</sup> Neighboring Burkina Faso, with an estimated 7 percent its population of 10 million already infected with the virus, represents yet another threat to the sub-region. Authorities worry that this figure may reach 10 percent by the end of the year.<sup>56</sup>

- *Return migration.* Evidence from across the continent indicates that when individuals fall sick, they often return to homes and families in rural areas to convalesce and die. The impact of this return migration on the rural sector is two-fold. First, many HIV-infected individuals may not care to or be able to identify their condition. When they return to the rural areas, therefore, they often transmit the disease to sexual partners. Second, additional strain is levied on rural resources as these individuals not only cease providing remittances, but also absorb household income and labor in their care. Anecdotal evidence relates that Malian commercial sex workers in Côte d'Ivoire return to their, often rural, households when they become ill. The recent ISBS data indicate that half of the male bus station attendants have fiancées in the rural area. With over 5 percent of this sub-group infected, they serve as a key bridging population that is likely to transmit HIV to the rural sector.<sup>57</sup>

### 6.3.3. The Impact of HIV/AIDS on Potential Rural Income Growth

The terms of reference for the current agricultural sector assessment include an analysis of the *impact of HIV/AIDS on Mali's potential for income growth as well as recommendations for specific interventions* to respond to the negative economic effects on growth and household incomes. In order to link our analysis and recommendations with the overall agricultural sector assessment, the discussion below is limited to the impact on the potential of *rural* income growth and interventions for the *agricultural sector*.

Due to the multifaceted ways in which the HIV/AIDS epidemic interacts with economies, projections of the economic impacts require complex models. Although there exist computable general equilibrium models that project the impact of HIV/AIDS on overall economic growth (GDP and GDP per capita), they can only be applied where data are sufficient to describe and project the effects of the disease's epidemiology on demographics and labor markets, government budgets and spending, investment and productivity in various interlinked sectors, as well as savings and investment rates.

Such modeling is just now possible in the countries hardest-hit by HIV/AIDS such as South Africa where prevalence rates run about 20 percent and population growth rates are anticipated to fall from about two percent to zero in the next decade.<sup>58</sup> One such model predicts that real

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<sup>53</sup> UNAIDS. (2000a).

<sup>54</sup> At present, estimates place adult prevalence in Nigeria at 5.8%.

<sup>55</sup> ISBS, Table 2.4.

<sup>56</sup> Plus News (2001). "Burkina Faso: IRIN Focus on community mobilization" December 6, Ouagadougou.

<sup>57</sup> ISBS.

<sup>58</sup> See Arndt & Lewis (2000), Bonnel (2000), BER (2001) for a review of the macro-economic effects of HIV/AIDS. See UNAIDS (2000d) for HIV prevalence in South Africa.

GDP in the AIDS case will be 17 percent lower than in the non-AIDS case by 2010. A simple cross-sectional analysis of data from all of Sub-Saharan Africa for 1990-97 suggests that HIV/AIDS lowered per capita income growth rates by 0.7 percentage points per year.<sup>59</sup>

In the case of Mali, where the disease has yet to produce economic impacts of great enough scale, and even the epidemiological data are sparse, any discussion of economic impacts must draw on the analogous experience of other African countries.

Even in the hardest hit areas of the continent, few studies to date have empirically examined the impact of HIV/AIDS on the rural sector. The majority of work that examines HIV/AIDS and agriculture relies on anecdotal evidence. However, lessons learned from East and Southern Africa can provide guidance on the types of impacts expected on the rural sector and effective policy interventions.

HIV/AIDS directly affects rural households by reducing their supply of labor, draining household savings and deteriorating human capital. HIV/AIDS reduces the supply of labor through the morbidity and mortality of infected family members, but also through the time spent caring for the sick. The FAO estimates that up to 25 percent of agricultural labor in sub-Saharan Africa could be lost to AIDS by 2020. The FAO also estimates that the agricultural labor force in neighboring Côte d'Ivoire has already been diminished by 5.6 percent and will fall by 11.4 percent by the year 2020.<sup>60</sup> Household savings decline as the sick are not able to generate income and moreover require additional health expenditures. Lastly, human capital is lost – first through death, and second as a result of lower investments in education, as families cannot cover the additional monetary and foregone labor costs of schooling.<sup>61</sup>

The massive impacts on labor, savings and human capital manifest themselves in a variety of adjustments in the agricultural and rural sectors. Reduced labor availability results in lower area under production, lower crop output, substitution away from labor-intensive cash crops, and a curtailment of natural resource management techniques. As rural savings fall, so do capital investments and the purchase of high-cost inputs such as fertilizer, which are associated with higher productivity. Moreover, falling incomes may force the sale of rural assets such as livestock. As human capital is lost, important agricultural skills that promote productivity are also extinguished.<sup>62</sup>

The impacts on the farming household discussed above link directly into the collapse of rural micro-credit, out-grower schemes, commercial farming ventures, and agro-industrial enterprises.<sup>63</sup> Moreover, the disease affects the capability of government agencies such as the Ministry of Agriculture to support troubled communities. Extension agents are at especially

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<sup>59</sup> See Bonnel (2000).

<sup>60</sup> FAO (2001), pg. 7.

<sup>61</sup> Using a human capital focus, Corrigan, Glomm and Méndez estimate that per capita GDP growth would decline by 30-40% for countries with prevalence between 15-20% of the adult population.

<sup>62</sup> An early study by Lockheed, Jamison and Lau found that education was associated with higher agricultural productivity. This result has been confirmed by more recent microeconomic analyses in the African context. See Weir and Knight (2000), Pinckney (1996) and Appleton and Balihuta (1996).

<sup>63</sup> See Rugalema, et. al. (1999).

high-risk for contracting HIV as they traverse rural areas.<sup>64</sup> International organizations in agriculture such as CGIAR, IFPRI and FAO have begun to explore these impacts in a still nascent but growing literature.<sup>65</sup>

#### **6.3.4. Interventions for the Agricultural Sector**

All USAID/Mali strategic objectives have been required to integrate HIV/AIDS into their programs for the next strategy. The Mission's overall approach to the disease is to target high-risk groups and high transmitters based on the 2000 ISBS survey. In keeping with that approach, agricultural sector policies, programs and projects should, at a minimum, avoid increasing vulnerability to HIV infection<sup>66</sup>. More proactively, agricultural sector interventions should reduce the vulnerability of target groups to infection and mitigate the impacts of the disease on rural households. Because of the vicious cycle between poverty and HIV/AIDS, reducing vulnerability often goes hand in hand with mitigating the impacts.

The Mission's primary means for addressing HIV/AIDS in the agricultural sector are to use current and future agricultural interventions to:

1. provide services which build rural incomes, food security and resilience to shocks;
2. gather and disseminate information; and
3. build links to other groups and sectoral interests concerning HIV/AIDS, such as government, other donors, NGOs and CBOs.

Each of the following proposed interventions address one or more of these dimensions. All should be coordinated with efforts by the GoM, USAID and the larger donor community:

*Food Security Programs.* The vicious cycle between poverty and HIV/AIDS is even more vicious when it comes to the related problem of food insecurity. In addition to the interactions between low incomes that both cause and reflect vulnerability to the HIV/AIDS virus, the poor health conditions associated with poor nutrition leave food insecure people more likely to contract the virus upon exposure and less able to withstand its debilitating effects. Food security interventions that build incomes (access), provide food (availability), or improve health and sanitation (utilization) will help prevent and mitigate HIV/AIDS.

HIV/AIDS-induced food insecurity has its own characteristics that call for changes in methods for diagnosing, targeting and implementing food security interventions. Even if the agricultural season is favorable, HIV/AIDS affected households may lack the labor to cultivate their land. Widows and orphans may lose access to family lands. Nutritional requirements change. At present, methods for incorporating HIV/AIDS into assessments of food insecurity are not as yet well elaborated, even though organizations such as WFP are starting to target food security

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<sup>64</sup> See Cohen (1999) for a discussion of the impact on government institutions.

<sup>65</sup> See, for example: Barnett and Blaikie (1992), Hunter, et. al. (1993), Barnett and Halswimmer (1995), Kwaramba (1998), Rugalema (1999) and Haddad and Gillespie (2001).

<sup>66</sup> *A priori*, activities that split families or lead to long absences from home, such as training, survey work, rural infrastructure building projects, or long-haul transport with extended border delays, can increase high risk behaviors. Additionally, these are often income-generating activities for those involved, increasing opportunities for contact with commercial sex workers.

interventions to HIV/AIDS affected households (in, for example, Rwanda and Zambia). In terms of targeting, it is often difficult to identify persons living with HIV/AIDS or, once identified, avoid the potential for increasing stigma and discrimination.

Similarly, there may be a need to review whether the proposed interventions adequately match the needs of HIV/AIDS-affected populations. For example, are interventions such as food-for-work, community insurance schemes, and labor-sharing associations designed for people who may be immuno-compromised, weaker, or smaller (e.g., women and children)? Are there social or economic barriers to their participation? Do food aid rations meet the altered requirements of HIV/AIDS-infected populations?<sup>67</sup> Can the interventions be linked better to other services to support HIV/AIDS affected pops (e.g, prevention and treatment efforts). Do the interventions achieve the desired balance between relief and development goals?

Turning specifically to food aid, a report by the USAID-funded FANTA project presents guidelines for using Title II food aid to mitigate the effects of HIV/AIDS (FANTA 2000). Conditions under which food aid can improve food security for affected households and communities include:

- Providing infected people with special diets to boost energy and immunity;
- Targeting children vulnerable to stunting
- Targeting female and child-headed households with basic food rations.

The report discusses several pilot projects which have used food aid 1) as relief, 2) to safeguard assets, 3) to provide incentives for affected populations (PWLHA and orphans) to participate in vocational training programs, 4) to support school feeding programs and 5) to support specific community-based activities to help HIV-infected people.

*Agricultural training programs.* One of the great costs of HIV/AIDS is the loss of parental guidance, knowledge and skills. In addition, the high financial and labor burden of the disease often forces parents to pull children out of school. To the extent that USAID sponsors training programs in agriculturally related topics (such as farming, trade, land rights), the agency should ensure that those programs include and address the concerns of women, children and orphans in HIV/AIDS affected areas. Additionally, such trainings should contain an information, education and communication (IEC) component developed in collaboration with health experts. On a test basis, USAID might collaborate with others to integrate AIDS extension materials into agricultural interventions in important agricultural towns with significant migrant labor and trade, such as Niono in the Ségou region (which has the highest rural prevalence rate in the country).

*Rural Credit.* The Malian Rural Development Strategy emphasizes the need to extend rural credit. Under SEG, USAID addresses financial services, including microfinance. Currently smallholders in Mali receive very little credit, except for those in the cotton sector, through BNDA. The only other major form of credit available to smallholders comes in the form of

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<sup>67</sup> Persons infected with HIV require 10-15% additional energy (about 300 k/cal for women and 400 kcal for men daily), 50-100% additional protein (48 to 72 grams/day for women and 57 to 85 grams/day for men) as well as higher levels of vitamin A, vitamin B<sub>6</sub> (niacin), vitamin<sub>12</sub>, iron and zinc (FANTA, 2001).

microfinance. USAID might therefore explore possibilities for broadening traditional credit programs to HIV/AIDS conditions. BNDA or the World Bank's PASAOP project (that focuses on farmer organizations) could make good partners. USAID might take advantage of CMDT's close contacts with smallholders to work with that organization to design an HIV/AIDS-adapted approach to advancing credit.

Already many of the other micro finance institutions make loans to address the wide array of problems faced by rural communities (see the example of Kafo Jegnew above). There is a growing experience from East and Southern Africa on incorporating HIV/AIDS into such portfolios. The *Fonds de Soutien aux Initiatives Communautaires face au VIH/SIDA* in Rwanda provides financing of \$1,000 to \$3,000 for micro-credit projects that help people affected by HIV/AIDS to generate incomes, maintain productive capacity, seek medical care or testing, or place orphans.

*Agricultural Research and Extension.* In Southern and Eastern Africa, trained government employees are unable to work due to absenteeism, illness, and often death. Although Mali is at a much earlier stage of the epidemic, USAID may want to monitor and intervene to protect the fragile human capacity of partner institutions. USAID may consider supporting assessments (institutional audits) of the impact of HIV/AIDS on national capacity to deliver agricultural research and extension. The process and results of such a study can be used to help the Ministry of Rural Development develop a strategy to 1) protect its staff, 2) understand the impacts of HIV/AIDS on its client populations and 3) incorporate that knowledge into its own policies and programs.

There are many interesting examples of interventions that enlist services of African ministries of agriculture in the fight against HIV/AIDS. Across Africa, large numbers of agricultural extension workers work in communities and can be trained to disseminate accurate information on the disease, vulnerability factors, and choices of response. In Cameroon, UNAIDS supported an initiative by the National Agricultural Extension and Research Program that provided HIV/AIDS training to 2,045 extension workers who now receive weekly allocations of condoms. In addition, the NAERP sensitized 560,000 rural families to issues concerning HIV/AIDS.<sup>68</sup> In Zambia, a South African company printed HIV prevention messages on 800,000 fertilizer bags. Also in Zambia, Michigan State University took the opportunity of the 1999/2000 post-harvest survey to target an HIV/AIDS awareness message to both enumerators and respondents (in collaboration with two USAID-funded health projects).

In terms of agricultural research, the Consultative Group on International Agricultural Research has established an HIV/AIDS initiative focused on guiding breeding programs towards productivity-enhancing technologies that save labor (rather than land) or address the needs of women or children farmers (e.g., lighter plows). Mali already experiences seasonal bottlenecks in the supply of agricultural labor. While the shortages of skilled farm labor seen in East and Southern Africa are probably not imminent in Mali, USAID may wish to track labor-related issues in the zones worst affected by HIV/AIDS.

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<sup>68</sup> World Bank. (2000). Cameroon: Multi-sectoral HIV/AIDS Project: Project Appraisal Document, pg. 5 and pg. 20.

*Building an Agricultural Constituency for HIV/AIDS.* If the prevalence of HIV/AIDS grows in Mali, the results on the agricultural sector can be devastating. In addition to monitoring the spread of the virus, USAID should take advantage of this low-prevalence period to gather and disseminate information on HIV/AIDS in all of its agricultural activities. For example, questions linking morbidity and mortality due to AIDS (and other major illnesses such as malaria) should be added to studies of agricultural production, transformation and trade.<sup>69</sup> USAID could foster local leadership on HIV issues by involving leaders from Mali's agricultural sector in conducting and using the results from such studies. The results could also be used to design systems to monitor the impact of the disease on food security and agriculture.

Another way for USAID to build a multi-sectoral approach to combating HIV/AIDS is to support the highly decentralized GoM effort to work through a broad coalition of local NGOs addressing HIV/AIDS at the communal level. Using a "Knowledge Management" approach, these NGOs will be encouraging exchanges between communes to compare experiences and develop best practices. If the process succeeds in soliciting sincere local support, it would likely lead to a broad range of intervention options, including from the agricultural sector. At the more centralized level, USAID could work within the PRSP process to support agriculture sector interventions that offer income-generating possibilities for groups either affected by HIV/AIDS or highly vulnerable to the disease. Mission agricultural and health specialists could also promote indicators in the PRSP that link HIV/AIDS to food security and poverty.<sup>70</sup>

There are several other interventions that do not, strictly speaking, fall within the agricultural sector but nevertheless have a huge impact on the viability of agriculture. At this stage of the epidemic, selectively treating Mali's migrants, prostitutes, truckers, miners could dramatically decrease the transmission of this disease to the general population. While treatment remains a thorny issue for USAID, the PRSP contains an entire section devoted to HIV/AIDS interventions, including increased access to anti-retroviral drugs. Advocates for the rural sector will want to stay on top of this issue.

Although the Youth SO is slated to change form in its next strategy, USAID should continue to combat HIV/AIDS by promoting the role of women and rural youth. Improving the status and economic role of women and youth will be a hugely effective way to curtail the spread of HIV/AIDS.<sup>71</sup>

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<sup>69</sup> Michigan State University is already adding such questions to USAID-funded agricultural surveys in Rwanda and Kenya.

<sup>70</sup> There is an increasing literature on HIV/AIDS, poverty and debt relief. See: <http://www.unaids.org/debt/> for a slide show and paper addressing how to mainstream HIV/AIDS into development programs.

<sup>71</sup> When asked about the greatest challenges in fighting the HIV/AIDS epidemic, UN Special Envoy, Stephen Lewis cited gender inequality as the first of four central challenges. PLUSNEWS Interview with Stephen Lewis, UN Special Envoy, December 3, 2001, Part I posted at <http://www.irinnews.org/AIDSfp.asp>. Also highlighting the role of gender in the HIV/AIDS epidemic is: USAID/Mali, HIV/AIDS Strategy (2001-2005), pg. 4; "Girl Power is Africa's Own Vaccine for HIV" *The Guardian*, June 26, 2001, Catherine Rielly; and the FAO, "Indigenous knowledge - a key weapon in fighting HIV/AIDS", posted at <http://www.fao.org/news/2001/011108-e.htm>.

### **6.3.5. Conclusions**

The example of Senegal shows that a massive HIV epidemic is not a foregone conclusion. Uganda's experience suggests that the epidemic does respond to aggressive policy responses. The South African government's reluctance to address the burgeoning epidemic underscores the costs of mishandling the situation. While the future course of the HIV epidemic in Mali depends on a variety of socioeconomic, cultural and epidemiological transmission factors, few of these are beyond the reach of policy. As rates in neighboring countries climb with alarming momentum, Mali has an opportunity to develop an effective multi-sectoral response to contain and hopefully reduce HIV/AIDS.

### **6.4. Gender**

Gender issues have been treated above in all the sections for which there are gender specific impacts. For example, horticultural crop production is normally done by women, and stimulation of irrigation will enable more women to produce horticultural crops especially in the off-season. Some of the value-added activities described above also tend to be handled mainly by women. But beyond the activities directly done by women, increasing agricultural productivity – making more cereals available for human consumption directly impacts the lives of women and children through improved nutrition and reduced poverty. It also provides the resources locally to finance sustainable programs in maternal-child health, education, and nutrition, all of which disproportionately benefit women and young children.

The main point of this section is to argue that USAID/Mali should assess the impacts on women of the programs and projects it chooses to implement. The agency should not assume that women will benefit equally without an analysis of the impacts on women of USAID interventions.

### **6.5. Environment**

#### **6.5.1. Current and Potential Environmental Impacts of Agriculture**

Agricultural production can have negative impacts on the environment if farmers do not use adequate levels of inputs in combination with anti-erosion measures or if they incorrectly apply or use excessive amounts of inputs. Low agricultural incomes can also promote excessive exploitation of forest resources (e.g., wood, charcoal, medicines, animals) because farm households are forced to use these resources to supplement inadequate farm incomes.

The prevailing situation in most of Sub-Saharan Africa is one of inadequate attention to external inputs and anti-erosion measures (Weight and Kelly, Sanchez et al.), which leads to degradation of soil and forest resources. In Mali, we find increasing soil degradation caused by soil mining and deforestation. Both are the result of addressing increased population pressure on the land through reductions in fallow and expansion of cultivation to woodlands and forests or marginal lands not suited for crop production. Research in the CMDT cotton zone confirms that nutrient depletion of the soils (e.g., van der Pol 1992) and the long-run impacts of current



production practices on soil quality and productive capacity are serious problems.<sup>72</sup> Even with the relatively high levels of fertilizer used in the CMDT zone, soil nutrient depletion and general soil degradation are continuing. This problem has been exacerbated since the 1994 devaluation, as farmers have greatly expanded cotton area and reduced fertilizer doses (Tefft et al. 1998). The combined effects of expansion to marginal lands, lower fertilizer doses and low use of anti-erosion techniques (CMDT 1998 reported that only 28 percent of farmers use these techniques) has been reduced yields. Multiple factors lead farmers to pursue these undesirable practices, including cash and labor constraints as well as the underlying institutions associated with communal land use rights (Tefft 2000).

Although there has not been the same type of research on nutrient depletion, soil degradation, and use of anti-erosion techniques in other zones of Mali, there is general agreement that coarse grain yields in these zones have been stagnant or declining as a result of soil degradation from soil mining and erosion.

Available evidence suggests that Mali is not yet experiencing serious problems due to the negative effects of salinization commonly associated with irrigated agricultural production systems such as the Office du Niger. In any irrigation system, externalities are recurrent issues because irrigation water brings some salt. Salt level is driven by water entry into and exit from fields. According to Ndiaye et al. (1990), the salinization process that started in the early 1990s following the degradation of the irrigation infrastructure has stabilized over the years thanks to crop diversification and the vigorous action undertaken by the Office du Niger to assure proper drainage.

In contrast to salinization, the level of soil acidity is increasing in the ON, and care should be taken to reverse the process because of possible adverse effects on commodity production. Although we have no evidence of soil acidity being a problem in the cotton zone, it has been identified as a problem in other cotton areas in the Sahel (e.g., Senegal). One way of reducing risks of soil acidification is to encourage farmers to use chemical fertilizers in combination with organic fertilizers (manure, crop residues, etc.) rather than as substitutes for them. There is a tendency in Africa for farmers to neglect organic amendments when they start using chemical fertilizers, despite the ample research results showing that the two inputs are complements rather than substitutes.

Use of pesticides in the horticultural and cotton sectors is very common, but there has been little systematic analysis of the negative impacts that pesticide use might be having on farmer health (due primarily to improper storage, handling, and application), on bird/animal populations, or on water quality. Despite the lack of systematic analysis, there is quite a bit of anecdotal evidence suggesting that more effort must be extended to train pesticide suppliers and farmers in the

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<sup>72</sup> Although there is agreement among researchers that nutrient depletion and soil degradation are serious problems, there are differences of opinion concerning the long run implications. Van der Pol's nutrient balance methods of analysis using research trial data suggest dire consequences and very costly losses of soil capital ; the more complex EPIC modeling procedures used by Dalton that take into account farmers' actual practices rather than practices used in research trials show soil degradation continuing over time but at a much slower pace than that suggested by the van der Pol work.

proper use and handling of these toxic materials, and more systematic efforts must be instituted to test water sources for pollution.<sup>73</sup>

## 6.5.2. USAID Interventions: Past and Future

USAID appears to have made excellent progress in promoting improved natural resource management practices in the OHVN cotton production zone (Kelly 2000). Among the key techniques adopted by farmers are the construction of various types of anti-erosion barriers and the use of improved forms of organic matter (compost, “*parc amélioré*”) in combination with direct application of inorganic fertilizers. These techniques are used on fields where the crop rotates from cotton (which is fertilized directly) to a coarse grain (which usually benefits from only the residual cotton fertilizer, but is starting to be fertilized directly) and back to cotton. In addition, this natural resource management (NRM) program worked with selected villages to develop their own systems for managing woodlands and forests. This was a major change as it took responsibility for the forest areas away from the local administration and placed it directly in the hands of the villagers. Some preliminary results from aerial photos taken periodically during the last 20 years suggest that in areas of the OHVN where the USAID project was most active and successful the downward spiral of soil and forest degradation has been halted (pers. communication Mike McGahuey and Gray Tappan). This approach suggests the gains that are possible under more local management of natural resources, as is envisaged nation-wide under Mali’s decentralization process.

In thinking about future USAID efforts in the realm of NRM, it is important to put these apparent successes in context. The NRM program was part of a much larger effort which included not only the promotion of NRM techniques but also a substantial amount of individual farmer and farmer association training in literacy, management (including how to conceptualize credit-worthy agricultural investments and write proposals for bank loans), and cooperative action; feeder road investments, financial support to the extension services, etc. In addition, USAID funding to the OHVN in general began in the 1980s and has continued to present, with attention being given to NRM during the entire period but becoming a key focus of action after 1993....in other words, these results came about because of a very broad and long-term investment of resources on the part of USAID. Based on information gathered during a rapid appraisal of the OHVN NRM program in 2000 (Kelly 2000), the key ingredients contributing to the program’s success appear to be :

- Good identification of *technologies* capable of increasing yields
- Potential for increased cash income from expansion of *cotton* production
- *Community* approach to implementation
- Focus on *youth*
- Focus on villages/farmers most *likely to benefit* from NRM actions
- Use of *demonstration effect* through model farmers and model villages
- *Incremental training* (literacy, technical skills, community organization, management skills using the CLUSA model)

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<sup>73</sup> A few years ago, for example, tests of the Bamako water supply revealed the presence of some horticultural pesticides, including very high levels of DDT.

- *Support services offered*
  - Roads
  - Credit guarantees for limited period following management training
  - Input/output transport assistance
  - Regular supervision and support to trainees
  - Some free equipment for implementing GRN activities
  - Market research by OHVN to help with crop diversification

Furthermore, the proximity of the OHVN zone to the large urban market of Bamako may have made certain of these NRM investments more profitable than they would be in more remote areas.

If USAID were to consider future development of an NRM program in another zone, the following key ingredients would need to be present from the start:

- a profitable cash crop with reliable markets and reasonably stable prices;
- improved, affordable NRM technologies that benefit both cash and food crops; and
- training programs that equip young farmers with the literacy and management skills needed to function as effective commercial farmers, both independently and in associations.

If USAID accepts the recommendation in this report that some future investments be targeted at irrigated production zones such as the Office du Niger, various *bas fonds*, or peri-urban horticultural zones, which are using various types of irrigation, the first ingredient is already present (profitable rice and/or horticultural products). The availability of appropriate NRM technologies would need to be researched through discussions with IER, ON, Operation Riz Segou, and other research/extension services. Assuming that appropriate NRM technologies were already 'on the shelf', a USAID project that focused on promoting these technologies and funding a CLUSA-type training program that to empower farmers (both individually and collectively) to become commercial farmers could be a major contribution.

Information available to the team on (1) the performance of village associations in the *Office du Niger* (e.g., continuing problems of cash management, output marketing, and credit) and (2) the lack of collective action by farmers in the horticultural sector, suggests that some combination of NRM technology transfer and CLUSA-type training could be a valuable contribution to improving farmer capacity to increase value added at the farm level while conserving productive resources (soil, water, trees, etc.).

This type of training/technology transfer combination would also be very appropriate for seed multiplication projects. As seed projects would likely be in zones similar to the OHVN where USAID has a good knowledge of available NRM technologies, the transition from the current OHVN program to a new one would be relatively easy.

A major shortcoming of the current NRM effort in the OHVN has been the lack of rigorous evaluation of the number of adopters, whether the adoption was sustained, and what the impacts of the adoption were on income, land, and labor productivity. There have been numerous rapid appraisals—all resulting in positive assessments—but there is a need for USAID to invest in a more rigorous, systematic analysis of what has been happening in the

OHVN if they want to draw on lessons in this zone for application elsewhere (see Kelly 2000 for a discussion of various ways to accomplish this).

## 7. Proposed SEG Interventions

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All of the analysis and stock-taking above leads us to suggest an investment portfolio for USAID that builds upon past activities and successes and at the same time departs from past practice in some important ways. The underlying themes of our recommendations are risk reduction and productivity enhancement.

Risk reduction is imperative for several reasons. Agriculture constitutes about 45 percent of Malian GDP, but the agricultural component is highly variable, and the variability in agricultural GDP “explains” 92 percent of the variability of total Malian GDP. As goes agriculture, so goes Mali. If we are to achieve increased growth and stability in Malian GDP, we must grow and stabilize agricultural GDP. The variability in agricultural GDP comes from two major sources: climatic variability (mainly rainfall) and world market variability (mainly for cotton and gold). Neither of these “external” factors can be controlled or affected in any way by Mali. Thus, a risk reduction strategy must take these factors as givens and develop coping mechanisms.

Productivity enhancement means getting more with less. That is, we use a combination of improved technologies or capital investment to obtain greater outputs from Malian land and labor. The process of economic development is one of people becoming better off through increases in the value of what they produce and exchange. If we are to achieve poverty reduction objectives as well, we must also pay attention to the distribution of the productivity enhancements and income increases.

Fortunately, the risk reduction and productivity enhancement objectives are quite complimentary. That is, we can define a set of interventions that both enhance productivity and reduce or cope with the overall level of risk in the economy.

Also, as many of the strategies are designed to increase exports of agricultural commodities, the multipliers through the rest of the economy are quite strong. To have multiplier effects there must be demand for the increased production. Exporting is one means of assuring that demand. In addition to offering strong growth multipliers, exports also offer some risk reduction potential. To the extent that Mali produces surpluses in normal rainfall years, these surpluses can be exported, and produce the direct and indirect income increases that are so important. But in years with low rainfall, a greater percentage of the production can be consumed in Mali. Thus, exports can be thought of as a sort of sponge that absorbs excess production in good years and returns the increased income. In bad years, that “excess capacity” relative to national needs becomes a basis for national food security.

The linkages among the major proposed interventions also are important. For example, we propose interventions in cereal production and also in livestock feed improvements. To the extent that livestock productivity is increased, there will be an increased demand for cereals for livestock feed. Conversely, if cereal production increases to the point that grain prices fall,

greater amounts will be consumed by livestock. Thus, these interventions are quite complementary.

## 7.1. Major Proposed Interventions

1. **Investment in irrigation** – The potential for productivity enhancement and risk reduction through irrigation investments is enormous. Risk is reduced for the family participants because they are no longer dependent on rainfall, but it is reduced for the economy as a whole as well, because the overall market basket becomes somewhat less vulnerable to rainfall variability. The productivity enhancement is obvious - crop yields will be multiplied many fold in the impacted zones. One important crop that will be produced is rice.<sup>74</sup> Much of the increase in rice production will be exported to neighboring countries. The potential for increasing rice exports has been clearly demonstrated in other studies. In addition to rice, there will be an increase in horticultural crop production, which is done mainly by women. These crops are produced both for domestic and export markets. Some of them also offer potential for value-added processing. We recommend that USAID make direct investments in irrigation in collaboration with other donors. Before making the investments, a more comprehensive analysis of the benefits and costs of alternative irrigation investments should be undertaken. One possibility is canal irrigation in the ON. Another is the *bas fond* irrigation. Yet another would be rehabilitation of existing irrigation infrastructure. The objective is to expand irrigated area to reduce risk and enhance productivity. The technology and incentive mechanisms used must be carefully evaluated to get the highest return for USAID investments.

*Analysis needed* - In collaboration with other donors, an analysis of potential irrigation investments will need to be undertaken prior to undertaking an irrigation project. The analysis should include projections for finance of the private sector components of the investment package, evaluation of the economics of the irrigation alternatives (ON, *bas-fonds*, small and medium scale, and perhaps others), and evaluation of alternative incentive mechanisms.

2. **Investment in improved variety seed multiplication, dissemination, and demonstration** – We believe that yield increases for sorghum and millet of 20-30 percent might be possible if improved seed varieties were more widely available and used in combination with fertilizer and water retention technologies. The GOM is getting out of the seed business in 2002. Analysis indicates that under current conditions, multiplication of sorghum, millet, and maize seeds is not profitable on a pure private sector basis. This is understandable under Malian conditions. Non-hybrid seed multiplication has received public support in most countries that have successfully developed their agriculture. Germplasm maintenance and foundation seed availability are keys to success in this area. USAID should work with IER and other donors to support rationalization of these basic functions. Moreover, we are proposing that USAID provide assistance to NGOs and/or producer associations who would do the seed multiplication and dissemination. A system

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<sup>74</sup> We think it is very important that no compulsory cropping scheme be imposed on farmers. That is, farmers should be free to grow rice or any other commodity they choose.

of incentives to accomplish this objective would need to be designed. The system also should include demonstration plots on farmer fields widely spread around the country to demonstrate the benefits of improved seed and fertilizer use. Even yield increases of 10-15 percent would have major impacts on poverty and vulnerability reduction in Mali. The program should be designed so that over time some of the associations could move towards becoming full-fledged seed companies. Creating an appropriate incentive system to accomplish the multiplication and dissemination and to help the more successful operations evolve towards private seed companies is very important.

*Analysis needed* - An analysis of mechanisms to use to encourage seed multiplication by producer associations and/or NGOs is needed. This study should also estimate the potential gains from widespread adoption of improved varieties, and thereby serve as a check on the benefits of undertaking this activity. The system must include extension of production packages of appropriate seed, fertilizer, credit, and water retention technologies. The design also should include mechanisms that could lead to the development of a private seed industry in Mali within five-ten years.

- 3. Investment in cost sharing and/or equity funds** – Capital investment does not occur in the food and agricultural sectors in Mali at the desired rate because the investments are too risky compared to other investment options. Thus, some means of reducing the risk is required to obtain increased investment. Cost sharing and equity funds are means of reducing the risk born by Malian or external investors. In essence, cost or equity sharing would be buying down the risk and making Malian investments competitive with other alternatives. From USAID's perspective, this approach also would leverage USAID funds probably by a factor ranging from 5 to 10. These funds could go into activities like production of day-old chicks in Mali to expand poultry production or value-added processing of agricultural commodities.

*Analysis needed - Study of the financing system.* The fundamental problem in lending in the agricultural sector is the risk of such investments. It is recommended that USAID have a study done by a banking and financial expert with knowledge and experience in this area on risk reduction activities and strategies to support agricultural lending. There are a number of possible options including establishment of leasing companies to reduce the capital cost of investment, training programs and portfolio management, better business and financial plans to account for risk and risk analysis, changing usury laws, and the three options discussed in chapter 5: loan guarantees, cost sharing, and venture capital funds. Following this study (assuming no major impediments are identified), a study should be undertaken to design appropriate cost sharing/equity fund mechanisms for implementation in Mali.

- 4. Technical assistance in animal feeding** – Animal feed quality is a major constraint in expansion of livestock, dairy, and poultry production. Quality of feed ingredients is poor; there are no standards for blended feeds or concentrates; and there is little producer understanding of animal nutrition and its importance in production efficiency. We believe there is potential for significant productivity gains in livestock, poultry, and perhaps dairy with successful technical assistance in this area. Greater feeding efficiency means that

less feed is required per kilogram of meat, eggs, or milk produced, and ultimately means that consumers would pay less for these products than would be the case without the productivity gains. It also means that more of the products could be exported or substituted for imports.

*Analysis needed* - A consultation is needed to determine how best to go about animal feed quality improvements including possible implementation of grading and standards, technical assistance, etc. This activity should encompass poultry and ruminants, thereby including forages.

- 5. Policy analysis to achieve Malian and USAID objectives** – Success in the above activities and in many of the other areas mentioned in this report requires a policy environment conducive to achieving economic growth. We recommend that USAID support targeted policy studies designed to support and assist Malian and regional policy makers in their move towards greater market orientation. Policy studies should be undertaken as part of each of the investment activities recommended in points 1-4 above. In addition, policy analysis should be an ongoing part of each of these activities to help ensure their success. USAID should consider a policy project to group the various analyses needed and to be able to respond to future policy issues as they emerge.

*Additional related Analysis needed* –

- 1) Study the structure of linkages from agricultural growth in Mali to other sectors of the economy (backward, forward, consumption, fiscal, employment). Understanding the nature of these linkages is critical to know how growth in the agricultural sector (e.g., through export promotion) affects employment and income in other sectors—particularly the generation of jobs for the poor. The analysis in Chapter 3 and in Annex 2 is based on many assumptions that need empirical validation. While we believe the general conclusions are correct, it will be very important to have a much better comprehension of the nature and size of these linkages.
  - 2) Analysis of public finance issues at the commune and cercle level—How to effectively tap resources from increased agricultural productivity for investment in health and education infrastructure? If increased agricultural productivity is to lead to better health, nutrition, education, and the like at the local level, some of that growth must be tapped and reinvested in programs aimed at promoting those goals. In the context of decentralization, there is a great need to examine ways that local governments can develop sustainable financing mechanisms for these programs, fueled by the increased local incomes coming from higher agricultural productivity.
- 6. Long-term training** - Many of the leaders in Mali today benefited from long-term training in the U.S. We recommend that USAID bring long-term training back into its portfolio to help produce the next generation of Malian leaders.



## 7.2. Activities to be Continued

- a. The technical assistance program currently packaged in CAE should be continued. It is providing valuable technical assistance in both the agricultural commodity and value-added areas.
- b. Micro-finance activities should be continued. They should be expanded to include agricultural production operating credit. A greater effort should be undertaken to coordinate with other donors in this area. Virtually every donor is doing something in micro-finance with almost no coordination. Also, micro-finance program modifications may be needed based on the overall finance study recommended above.
- c. Support for the market information system (OMA) should be continued and expanded to cover other commodities and regions. Market information is vital to the efficient functioning of markets, and this project is the only currently available information in many cases. Efficient markets will be absolutely necessary for success in the other interventions proposed in this assessment.
- d. The OHVN system for extension and improved environmental management should be applied in the ON and other areas where USAID chooses to make investments.

## 7.3. Activities of Lower Priority

The major area in which the team is not as optimistic as others is in value-added processing. Our assessment is that Mali is unlikely to become competitive in many of these activities due to high transport cost, high energy cost, low economies of scale, lack of managerial talent, and a workforce of relatively low productivity. That is not to say that niche market products are impossible. Indeed, some will develop and may become profitable. We are just saying that the likely returns are higher in the areas we have outlined in this analysis.

## 7.4. Comparison of our Recommendations with the Draft Parameters Paper<sup>75</sup>

While there are some important differences between our recommendations and the approach used in the parameters paper, there are also lots of similarities. Table 14 contains an abbreviated comparison of the major issues. The major differences may be summarized as follows:

- Risk reduction, whether it be in finance or production, is elevated in importance in our recommendations. Mali is a country with very high risk, and the problems need to be addressed to achieve sustainable growth.

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<sup>75</sup> USAID/Mali, Country Strategic Plan, Parameters Paper for FY 2003-2012, March 2001.

- The recommendations contain a greater emphasis on growth of agricultural productivity as the major engine of economic growth in Mali.
- The parameters paper puts greater emphasis on value-added processing, whereas we believe the return for investment in other areas will be higher. However, the financial risk reduction mechanisms we recommend could, in fact, result in investment in these areas, but it would be more market driven (adjusted for the risk reduction).
- We put a bit more emphasis on the potential for increasing productivity in animal production sectors. We believe the potential exists, and the activity is highly complimentary with investments in cereal yield increases.
- We recommend that USAID/Mali again invest in long-term training.

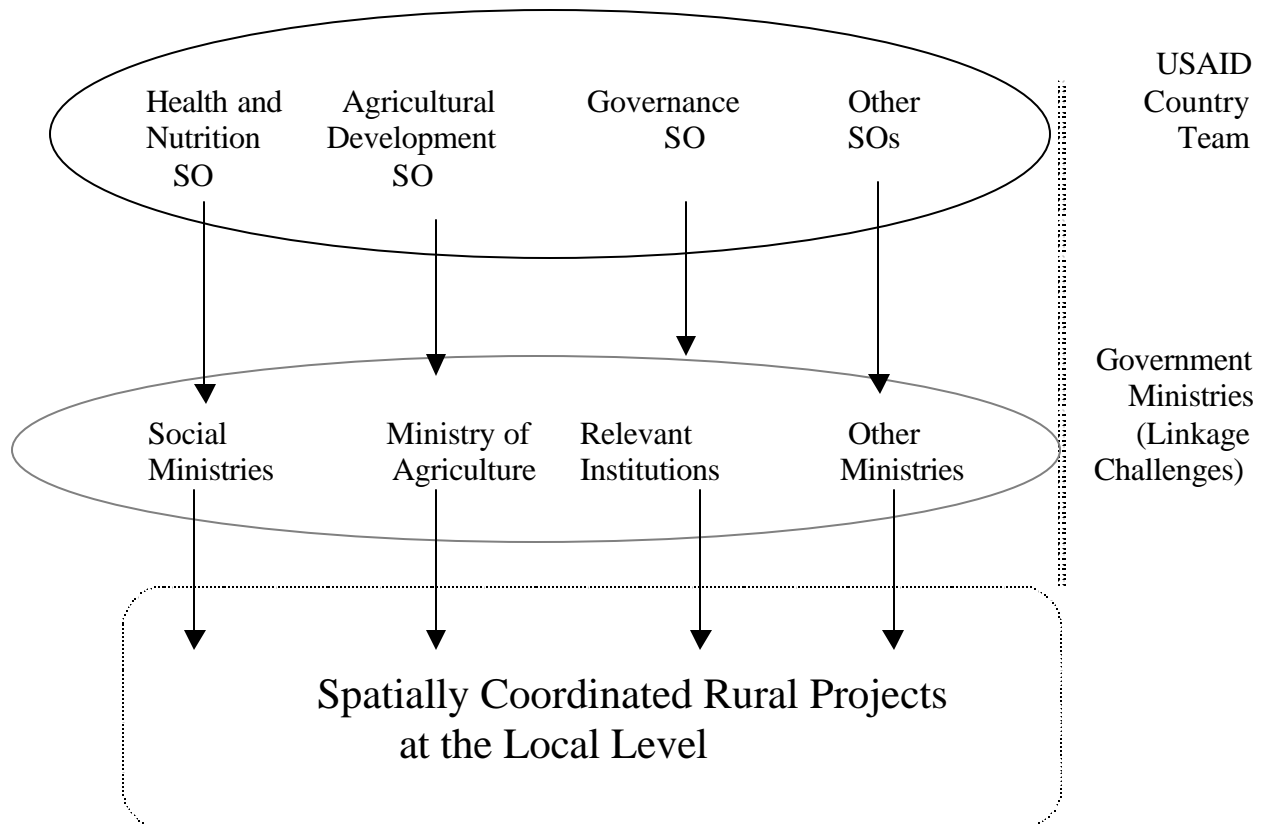
**Table 14: Comparison of the Parameters Paper and Recommendations in this Report**

<b>Parameters Paper</b>	<b>Recommendations in this Report</b>
<b>Basic theme</b> Strengthening competitiveness	<b>Basic theme</b> Increasing ag productivity and risk reduction
<b>Policy Reform</b> Analytical assistance Support policy advocacy groups	<b>Policy Reform</b> Analytical assistance, especially targeted towards intervention areas
<b>Finance</b> Medium-scale enterprise finance Loan guarantee Assistance in business plans Microfinance support	<b>Finance</b> Cost sharing fund Equity fund Assistance in business plans (CAE) Microfinance support (with modifications)
<b>Agroprocessing</b> Assist public research to respond to private sector needs Market research on new process products Norms and standards Support industry associations	<b>Agroprocessing</b> Norms and standards – as part of other activities such as improving animal feed quality Support industry associations
<b>Market Development</b> Increase market efficiencies Market information Support joint export efforts Support market infrastructure New and improved technologies	<b>Market Development</b> Increase market efficiencies Market information (OMA) Support joint export efforts (CAE) Support market infrastructure (OMA) New and improved technologies (CAE)
<b>Environment and NRM</b> Expand E/NRM into ON and ORS Increase use of IPM	<b>Environment and NRM</b> Expand OHVN into ON and other areas
	<b>Infrastructure investment</b> Invest in irrigation
	<b>Improved cereals productivity</b> Seed multiplication and dissemination coupled with fertilizer and improved technology demonstration
	<b>Animal feed</b> Improve quality of feed ingredients and blended feed
	<b>Long-term Training</b>

## 7.5. Donor and Program Coordination

The other major overall recommendation is that **USAID should attempt to improve donor coordination in all areas in which it works**. This recommendation applies to SEG and the other SOs as well. Coordination has appeared to work well in the cereals market reform area and is now functioning in the ON.

Figure 6: Parallel Project Orientation



Improved coordination also would be helpful among the USAID SOs. Some important coordination issues are summarized in Annex 3. There are likely to be many circumstances in which SEG interventions could be coupled with programs in health (HIV/AIDS), decentralization, gender, etc. to improve the overall effectiveness of the programs. For example if, USAID chooses to invest in irrigation, then the other programs should also offer complementary assistance in the same geographic areas. Or if seed multiplication is undertaken, nutrition, health, and decentralization activities might be done with the same producer associations or NGOs. This “parallel project orientation,” illustrated in Figure 6, could lead to better coordination both within USAID and in the Malian countryside.

If USAID were to undertake the investments outlined here and to continue the activities that are working well, it will have made a very important contribution to economic growth and poverty reduction in Mali.

# ANNEX 1

**Annex Table 1: Value Added by Economic Sector**

<b>Value added by economic sector</b>	<b>1999</b>	<b>Percent</b>
Food crops	257145	15.4%
Millet	51990	3.1%
Sorghum	46361	2.8%
Rice	56623	3.4%
Maize	23735	1.4%
Industrial crops	144978	8.7%
Cotton	125797	7.5%
Peanuts	18222	1.1%
Livestock	174549	10.4%
Cattle	65769	3.9%
Sheep and goats	44933	2.7%
Poultry meat	11670	0.7%
Eggs	6391	0.4%
Milk	34308	2.1%
Fish	15869	0.9%
Forest products	89672	5.4%
Mining	85464	5.1%
Food- drinks-tobacco	48866	2.9%
Textiles	9638	0.6%
Electricity and water	36872	2.2%
Buildings and public works	88731	5.3%
Commerce	275493	16.5%
Transport and telecommunications	79000	4.7%
Other non-financial commercial services	84936	5.1%
Financial services	15846	0.9%
Non-commercial services	113330	6.8%
Fictitious sector	-9680	-0.6%
Gross value added	1533899	91.8%
Import duties and taxes	136800	8.2%
Gross domestic product	1670699	

Source: Ministry of Economy and Finance, Mali, Economic Accounts of Mali, May 2001.

Note: The sub-categories are approximations except for rice and cotton, as precise value added data were not available for the other sectors.

## ANNEX 2

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### CALCULATION OF THE EMPLOYMENT IMPACT OF AGRICULTURAL GROWTH

The World Bank, in its country studies, tends to use an average elasticity of poverty reduction with respect to the growth rate. Thus, with the rate of growth of GDP given, it is a simple calculation to find how long it will take to achieve a given reduction in the percent of the population below the poverty line. The problem with this approach is that the variance is large. Growth in GDP only explains 37 percent of the reduction in poverty, leaving 63 percent to be explained by other factors. The bulk of that variance is explained by the structure of growth.

Early work by Ahluwalia, Narian, and Mellor, focusing on the large data sets for India showed that growth in agriculture was the dominant explicator of poverty reduction. Using much more powerful analytical tools and better, more comprehensive data sets, Peter Timmer shows, from intertemporal, cross national data that agricultural growth is far more powerful than industrial growth in reducing poverty. Martin Ravallion and his colleagues at the World Bank made similar findings using recent data sets and somewhat different methodology to that of Timmer. These studies also show that when agricultural land ownership is concentrated in a few very large holdings that the agricultural impact on poverty reduction is greatly reduced. They also find a three to four year lag in the full impact of agricultural growth on poverty reduction. Both these latter findings are consistent with the agricultural impact on poverty reduction working indirectly through the demand pull effect of prospering farmers on the rural non-farm sector. That converts the relation of growth into one of relative sectoral growth rates and of poverty into employment growth.

Given that agricultural growth is critical to poverty reduction and that it works indirectly through demand for the rural non-farm sector, the question arises how much poverty reduction will a given rate of agricultural growth provide. Working from earlier work by Mellor and the later work by Timmer and Ravallion, Mellor has been developing measures appropriate to these calculations. Making these calculations is difficult and time consuming because the national income accounts are not kept in a manner that facilitates such calculations. The critical problem is separating out the rural non-farm sector and the urban non-formal sector. These are the major sources of employment growth and hence of poverty reduction.

Following are three tables, from which Tables 1 and 2 in the text were derived. Annex Tables 1 and 3 divide the economy into six sub-sectors. Three are rural and three are urban. Table 2 divides agriculture into five sub-sectors to facilitate calculation of a growth rate for the sector. The content of these tables is discussed in the main text. Here explanation is provided as to why the particular sub-sectors were defined and how and why the numbers were derived.

Agriculture is divided into tradable agriculture and non-tradable agriculture, while the remaining rural sector is the rural non-farm sector. The two agriculture sectors are engines of growth in the rural non-farm sector. The division into tradable and non-tradable agriculture is made

because both the scope and means of growth in the two sectors differ somewhat. They have the same effect on growth in the rural non-farm sector.

The urban sector is divided into the formal sub-sector which can be thought of as tradable and an engine of growth for the urban non-formal sector just as is agriculture for the rural non-farm sector. Foreign aid is defined as a separate sector. That is because it is such a large portion of GDP, more than 50 percent larger than the urban formal sector. Also it cannot grow indefinitely and is therefore not a dynamic element in the economy. In a sense foreign aid can be seen as like an export, bringing in foreign exchange and the means of that foreign exchange earning are the specific activities it finances. Those activities then have a multiplier on the urban non-formal sector. Of course, foreign aid should be used in a manner that increases efficiency and productivity and thereby has favorable long-term effects. Measuring those in not the purpose of this exercise.

Table 1 presents estimates of the proportion of GDP and of employment in each of those sectors. The table also presents growth rates for GDP in each sector and the proportion of growth occurring by sector, weighting the growth rate by the proportion of GDP in the base.

The last column in Table 1 presents the ratio of the GDP proportion to the employment proportion for each sector. This provides a comparison of the value added per worker in each sector. It is a rough test of reasonableness of the division of the GDP and employment by sector. Thus, the tradable agriculture shows a value added per worker that is one third higher than for non-tradable agriculture. That is because the tradable agriculture, particularly the crop part takes place on higher value land and probably uses more capital as well. That increases the value added per worker. Similarly the rural non-farm sector shows even lower value added per worker because there is little or no land in production in that sector and very little of other forms of capital. In contrast the urban formal sector shows eight times the value added per worker because it is a relatively capital intensive sector.

Table 2 presents estimates of growth rates for each of five sub-sectors of agriculture. These sub-sectors relate to the main text recommendations for action.

Table 3 takes the growth rates from tables 1 and 2, applies an elasticity of employment with respect to GDP growth to estimate a rate of employment growth by sub-sector as well as the proportion of employment in each sub-sector.

Following each table is a set of notes that explain how each number was derived. Following the tables is a set of references for the data and for the methodology.

**Annex Table 2:  
GDP and Employment Shares and GDP Growth Rate, by Sector, Mali, Nominally 2001**

Sector	Percent GDP	Percent Employment	GDP Growth Rate	Weight	Percent of Growth	Implicit wage ratio
Rural						
Agriculture, Tradable	22	22	6.6	145	30	1.00
Agriculture, Non-tradable	25	33.5	3.8	95	19	0.75
Rural Non-farm	23	34.5	6.6	152	31	0.67
Sub Total	70	90	5.6	392	80	0.78
Urban						
Formal	9	0.9	8.0	72	15	8.1
Foreign Aid	14	2.8	0	0	0	5.0
Non-formal	7	6.3	3.4	24	5	1.1
Sub total	30	10	3.2	96	20	3.0
Grand Total	100	100	4.9	488	100	1.0

NOTES

**GDP**

1. Agriculture, tradable.
  - a. The division into tradable and non-tradable is to provide focus on those elements of agriculture that can grow faster than domestic demand, thereby contributing to a higher overall growth rate and to higher growth in income. That in turn increases the rate of growth of domestic demand with a further boost to output growth. Much of Malian agriculture produces goods that are non-tradable because of low quality and high transaction costs (see Delgado et. al. for a full exposition on this point.) Non-tradable goods are caught in a trap of low rate of demand growth because of low-income growth and the slow growth of non-tradables reinforces the slow income growth. Agricultural exports represent the engine that can lift the country out of this trap.
  - b. From Mali, National Income Accounts, Agriculture was 47 percent of GDP in 2000. The tradable portion is taken as all of the Industrial crops (primarily cotton) plus all of livestock except milk and eggs. All industrial products represent 27 percent of agricultural output and livestock minus milk and eggs comprise 20 percent, for a total of 47 percent. Agricultural is 47 percent of GDP; hence tradables are 22 percent of GDP (47 percent of 47 percent.)
  - c. The industrial products exported into the global market, have no measurable effect on global prices, and hence output growth is largely a function of technological change, including increased commercial input use associated with technology, and area expansion that in turn is likely to be associated with cost reduction due to



improved technology and increased commercial input use as well as expansion in the irrigated area.. The livestock products are more complex; a substantial proportion is exported into other countries in the region. Although it has not been the case because of instability and poor policy, the coastal countries should have a higher growth rate than Mali because of greater export potentials and a generally more favorable resource base. Livestock have a high-income elasticity of demand, so treating these exports as tradable in a global sense is a reasonable simplification. But, attention must be drawn to the importance of regional growth to Mali, in this context. Of course, the elements stated as non-tradable also trade in small part in the region, However, the proportions are small compared to livestock and it is a reasonable simplification that demand will be largely a function of domestic demand (again, see Delgado, et. al.)

Alternatively, National Income Accounts show exports represent 11 percent of GDP, while agriculture represents 94 percent of all exports, hence agricultural exports are 10.3 percent of total GDP . That is 22 percent of agricultural GDP, while industrial products are 27 percent of agricultural GDP. That confirms that the trade data probably somewhat understate exports even to the global market and probably exclude the bulk of regional livestock trade. Hence raising the tradable category to include all industrial crops (27 percent of agricultural GDP) and all livestock except milk and eggs (20 percent) for a total of 47 percent of agricultural GDP, or 22 percent of total GDP (.47 percent tradable and 47 percent of GDP in agriculture) seems reasonable. The category tradable is not necessarily all in international trade.

2. Agriculture, nontradable. These are the remainders of agriculture (47 percent minus 22 percent), 25 percent. This sector depends on domestic demand for its growth. That domestic demand is substantially driven by agricultural growth – and hence pushes the pressure back to the agricultural export sector.

3. Rural non-farm (non tradable)

Assume that 71 percent of the population is under the poverty line (from World Bank Survey) and that the proportion rural is the same; that consistent with other parts of the world those under the poverty line spend 80 percent of income on food (Lipton et. al.) and hence 20 percent locally on rural non-farm, and that the 29 percent of the rural population above the poverty line spend 40 percent of their income on rural non-farm goods and services; then a weighted average is 26 percent of rural GDP is rural non-farm supported by expenditures of farm income. Further assume that all the tradables are marketed and 30 percent of the non-tradable (consistent with 20 percent of agricultural GDP spent on rural non-farm, and also consistent with 30 percent of the population as non farm . Then the marketing percent comes to 29.5 (22 plus .30 times 25 = 22 + 7.5) and if marketing costs are equal to 20 percent of the total value (cite), then 5.9 percent of GDP is rural non-farm marketing. The total rural non-farm comes to 26 plus 5.9 = 31.9 of agricultural GDP are spent on rural non-farm. Conservatively estimating that 15 percent of that is imported or from the urban area, leaves 85 percent times 29.5 or 25.1 percent of agricultural GDP spent in the rural non-farm goods and services, that in turn represents 11.8 of total GDP (25.1 times 47 percent). Assuming a multiplier of 2 (consistent with a marginal propensity to spend on itself of .5) of that sector on its own demand comes to 23 percent of total GDP (rounding down, conservatively from 23.6.)

#### 4. Urban formal

Foreign aid is 14 percent of GDP and its first round effects are assumed to be in the urban sector. That leaves 16 percentage points of the 30 in the urban sector to be divided between formal and non-formal. Arbitrarily divide that a 9 percentage points formal and 7 percentage points non-formal and test for consistency as follows: assume that 70 percent of the urban formal and foreign aid leak into imports and back into the formal sector. That leaves 30 percent of 23 percent (9 formal, 14 foreign aid) to stimulate the non-formal sector or 7 percentage points in the non-formal sector. That is to say the division is consistent with 30 percent of expenditure from the formal and foreign aid sectors being spent in the local non-formal sector.. Manufacturing makes up four percent of GDP (World Bank Tables) so the other five percentage points is large-scale elements of government and services, both seen as exogenous to the domestic economy and thus equated as tradable.

### EMPLOYMENT

1. Start with the data that 90 percent of the work force is in rural and small town areas and 10 percent in the capital city (Mali population census.) Then each of those must be divided into the three sub-sectors in each. Statistics are not collected in that manner. The division must add up to 90 percent rural (rural plus Non-capital City towns.) and 10 percent in the largest city. It is assumed that the smaller towns are driven almost entirely by agricultural incomes.
2. With 70 percent of the GDP and 90 percent of the employment rural (including small towns), the GDP per capita ratio is 90 divided by 70 or 0.78. The number is 1.0 for all the sectors combined. This means that output per worker is 22 percent lower in the rural sector than for the economy as a whole. Within the rural sector, output per worker will be highest in the agricultural tradables sector. That is because the output per worker includes not only the return to labor, but to land and capital as well. In the non-tradable agriculture output per worker is assumed to be 0.75 percent of that in the tradable agriculture. That is because the tradable agriculture is on the more valuable land, which is reflected in the output per worker. The rural non-farm sector is assumed to be 0.67 percent or somewhat less productive than the other two rural sectors because there is no land and little capital used on the average. Of course within each sub-sector there is considerable variability. Note that in most statistics the actual agricultural labor force is overstated by including much of the rural non-farm labor force. That understates the output per worker in agriculture. The statistics here represent a more nearly correct statement of the actual division of rural labor between farming and non-farm occupations.
3. In the urban sector with 30 percent of GDP and 10 percent of the labor force, the productivity per worker is 3.8 times higher than in the rural sector. This is not a reflection of imperfections in the labor market but rather the much larger amounts of capital, both human and physical in the urban sector.
4. It is assumed that labor output per worker is 10 times as high in the formal sector. That allows for only 0.9 percent of employment in the formal sector. The World Bank reports (p.81 of World Statistics) value added per worker of \$10,477 in 1995, which would represent a much larger multiple of the average than the 10 assumed here. Foreign aid has a direct impact on employment and an indirect effect through the non-formal sector. The direct effect

is assumed to show half the productivity per worker of the formal sector, that is the 14 percent of GDP from foreign aid would generate 2.8 percent of employment directly. That in turn has a multiplier effect on the urban non-formal sector. The urban non-formal sector is assumed to be one third more productive per worker than the rural non-farm sector because of greater capital, both human and physical, but to be far less productive than the other urban sectors. This of course fits common observation as well. Thus, the urban non-formal generates 6.3 percent of employment. That is nearly two-thirds of urban employment

**Annex Table 3. Agricultural Growth Rate, By Sub-Sector, Mali, Nominally 2000**

Sub-sector	Agriculture GDP (%)	Growth Rate (%)	Weight	Proportion of Growth (%)
Crops, Tradable	27	7.0	189	37
Livestock, Tradable	20	6.0	120	24
Livestock, Non-tradable	6	6.0	36	7
Crops, Non-tradable	33	4.0	132	26
Forestry, non-tradable	14	2.2	31	6
Total/Average	100	5.1	508	100

NOTES

1. The growth rate of the tradable crops sector is not determined by demand, since Mali does not affect global prices significantly. Thus, the growth rate is a function of technological change and technology driven inputs and expansion in area. Expansion of area is over the long run of stable or declining commodity prices driven by technology and by investment in irrigation. Thus, the issue of the growth rate for tradable crops is an estimate of the pace of technological change and investment in irrigation. That growth rate for tradable crops is estimated at seven percent per annum. That is based on the assumption that Mali has considerable scope for catching up on global technology and that will in turn drive expansion of area. Note that from 1965-99, while overall agriculture grew at 3.2 percent, exports grew at 6.9 percent. Note that with the given sub-sectoral growth rates that tradable crops represent 37 percent of the over-all agricultural growth.
2. Tradable livestock depend on the regional market, in which Mali would have a price depressing effect if it increased its share of that market. Note under 3 below, that with per capita income growing at 4.9 percent per year, the domestic demand for livestock grows at 6 percent. The coastal countries should achieve a growth rate faster than that for Mali given their better export prospects. Of course, that has not happened. Mali could by technological improvements; increasing livestock productivity and decreasing costs pick up some additional share in the coastal markets. Hence a six- percent growth rate is taken. Just as in the case of the tradable livestock sector, reaching this growth rate will require increased productivity in the livestock sector. The tradable livestock sector accounts for 24 percent of agricultural growth.

3. Non-tradable livestock is assumed to grow at the same rate as effective demand, that is per capita income times an income elasticity of 1.4 (FAO) plus the population growth rate =  $(5.1-2.2) 1.4 + 2.2 = 6$ . The non-tradable livestock sector accounts for 7 percent of total agricultural growth; livestock in total accounts for 31 percent.
4. The non-tradable crop sector, primarily coarse grains, is set to grow at the same rate as domestic demand, assuming an income elasticity of demand for that sector of 0.67. That is a high elasticity for basic food staples, but is consistent with the very high poverty ratio in Mali. That 4 percent rate will require accelerated technological change, particularly since the area would be expected to shift somewhat towards tradable commodities. This sector accounts for 26 percent of agricultural growth.
5. The forestry sub-sector, also non-tradable, is assumed to grow at the same rate as population growth. That too will require increased productivity and technological change.
6. Note that that all the sub-sectoral growth rates will be difficult to achieve. Note also that without unreasonable expectations for any one sub-sector that over-all high growth rate cannot be achieved without difficult to achieve attainments in each the major sub-sectors.

**Annex Table 4: Employment Growth Rate by Sub-sector, Mali, Notional 2001**

Sector	Growth Rate GDP, Percent	Elasticity, Employment	Employment Growth, Percent	Weight	Percent Incremental Employment
Rural					
Agriculture, tradable	6.6	0.6	4.0	132	36
Agriculture, Non-tradable	3.8	0.6	2.3	78	21
Rural Non-farm	6.6	0.9	5.9	135	37
Sub-total					
Urban	5.6				
Formal	8.0	0.4	3.2	3	1
Foreign Aid	0	-	0	0	0
Non-Formal	3.4	0.9	3.1	20	5

**NOTES**

1. The growth rate for tradable agriculture is the weighted average of the tradable crops and tradable livestock from table 2.
2. The growth rate for non-tradable agriculture is the weighted average of the non-tradable livestock, crops, and forestry from table 2.
3. The growth rate for the rural non-farm sector is derived from the agricultural growth rate. As a non-tradable sector its growth depends on domestic demand. That comes from agriculture and "itself" the latter a product of the multiplier. A widely used multiplier (see Mellor 1991 for a review) of 1.5 times the per capita income plus population growth  $(5.1-2.2) 1.5 + 2.2 = 6.5$ . The 1.5 is consistent not only with meta analyses but also with a marginal propensity to consumer rural non-farm goods and service of .5, which is consistent with rural household studies (IFPRI.) Note the effect is for the rural non-farm sector to grow increasingly faster than the farm sub-sector as the agricultural growth rate exceeds the population growth rate and to contract when the agricultural growth rate is less than the population growth rate. Throughout this analysis a population growth rate of 2.2 is used. That is consistent with the

World Bank figures for labor force growth and is probably a reasonable depiction of population growth rate in the near future. The current population growth rate is 2.5.

5. The growth rate for the formal sector is arbitrarily put at a very high 8 percent. Foreign aid is assumed to hold constant (it dropped in half as a percent of GDP over the past decade.) The stagnation in foreign aid results in a slow growth rate for the urban sector. The weighted average of the formal and the foreign aid sub-sectors comes out at 3 percent. As foreign aid declines as a percent of GDP the growth rate will pick up. Here, foreign aid is viewed not in terms of its positive effects on productivity, but simply as an exogenously driven sector that provides employment directly and through multiplier effects to the urban non-formal sector.
6. The growth rate for the urban non-formal sector is derived from the two formal sectors, as for agriculture in the rural sub-sector. That is, per capita income in the urban sector times a multiplier of 1.5 plus the population growth rate. That is  $(3.0-2.2) 1.5 + 2.2 = 3.4$ .
7. The employment growth rate is calculated from the GDP growth rate by assuming elasticities of employment with respect to GDP, sector by sector.
  - a. The elasticity for agriculture, (both tradable and non-tradable) is taken as 0.6 (Mellor). That is a ten- percent increase in GDP brings forth only a 6 percent increase in employment. Agricultural growth occurs largely through technological change and while that is land and animal productivity increasing it also increase labor productivity.
  - b. The rural non-farm sector expands through increased demand and tends to expand symmetrically with little change in factor proportions until real wage rates commence to rise significantly. A small increase in labor productivity is assumed in a coefficient of 0.9 (Mellor) Note that the faster growth of the rural non-farm sector than agriculture and the much higher employment elasticity results in the rural non farm sector accounting for nearly 40 percent of employment growth in the rural sector.
  - c. The formal sector is assumed to have a low employment elasticity of 0.4. This coefficient, as for the preceding two, is consistent with a growing cross-country literature (Mellor.)
  - d. The urban non-formal sector expands in the same manner as the rural non-farm sector and is likewise assumed to have an elasticity of 0.9.

# ANNEX 3

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## Complimentarities with other USAID Strategic Objectives

### 1. Democracy/Governance

- a. *Support of local civil society organizations, such as producer organizations and trader organizations, and their capacity to deal with local government (commune, cercle) on economic policy issues.* (There are 702 communes, 50 conseils de cercles, and 9 regional assemblies). SEG's assistance, via PASIDMA, to local chambres d'agriculture to deal with economic policy issues at the region, cercle, and commune level, is consistent with and complementary to the good governance (GOV) SO's planned activities on "Shared Governance through Decentralization." This GOV activity is aimed at strengthening the capacity of NGO's with local governments on a broad range of issues. The SEG/PASIDMA work with local chambres is more targeted on key policy decisions needed at the local level to promote broad-based economic growth through expanded agricultural and related activities.
- b. There is a need to strengthen the management and analytic capacity of the communes, particularly concerning local taxation and administration (Ability to design a budget, execute it, and report on it). . The need for better management capacity is huge, as everyone is counting on the commune to do everything (health, education, extension, natural resource management—including pastures, and dispute resolution). Currently, the Malian government, with donor support, has two agencies involved in providing technical assistance and financing to the new communes:
  - i. **The Direction National des Collectivités Territoriales (DNCT).** This agency is aimed at providing transitional technical support to the newly created communes (both the elected officials and the secretary (permanent staff) of the commune. USAID, through its GOV SO, has supported DNCT.
    - (a) The DNCT has grouped together all the NGOs in a given cercle into Centres Communales de Conseils (CCC). Bids were held for each cercles for NGOs to bid to become the coordinator of the CCC. The aim of the CCCs are to provide assistance to the communes to: (i) design a project proposal and submit it to ANICT (see below) or other sources for financing and (ii) act as the interface between the communes and contractors offering services to the commune.
    - (b) DNCT also anticipates that the CCC, being located at the cercle level, may play a very useful role in helping coordinate actions across adjoining communes (e.g., location of required livestock paths) and between the communes and other jurisdictions, such as local health districts (*aires de santé*).
    - (c) **A big constraint is that the CCCs are planned to last for only 2 years.** It is anticipated that during this period, the new elected officials and their staffs will all be trained. This seems to ignore the ongoing nature of technical assistance needs at the local government level. For example, elected officials aren't always re-elected, and the new officials will need training as well. Furthermore, the more successful the communes are, the more complex their tasks will become and hence, the need for more training.
    - (d) USAID's GOV team is currently examining different formulas to try to deal with this ongoing need. Given the critical importance of local government management of infrastructure, policy, etc. for economic growth (and for local

economic growth to translate into better education and nutrition of the population), it is very important that SEG coordinate with GOV in this area. A particularly important area is likely to be development of local public finance (taxation) tools.

- ii. **The Agence Nationale d'Investissement des Collectivités Territoriales (ANICT).** ANICT is the agency in charge of providing initial funding for the development projects submitted by the communes. It is funded by the EU, the UNDP, the Agence Française de Développement (AFD) and the Malian government. (The Dutch and the Italians have also indicated that they will likely support ANICT next year. USAID is not supporting ANICT financially.) Each commune is allocated certain drawing rights to the fund, based on a formula. The current formula is based on the communes population, distance from main population centers, and its current level of infrastructure, with the aim of giving some preference to poorer, more isolated areas and areas with higher populations.
  - (a) Communes submit proposals to ANICT that they have developed with the help of the CCC. The communes have to put up 20 percent of the cost of the project, half of which can be in kind, while the other half must be in cash. ANICT then puts up the other 80 percent.
  - (b) ANICT sees as part of its mandate helping communes develop their capacity to mobilize local resources. As an incentive to local resource mobilization, the formula used to establish drawing rights will be modified next year to include the rate of local tax collection.
  - (c) Although strengthening communes' capacity to generate local resources falls within the ANICT's mandate, it appears that they do not as yet have any programs developed to help local communities develop their local taxation systems. USAID's GOV program is examining various options in this area, and developing such programs in conjunction with USAID/GOV and ANICT could be an area of SEG collaboration.
- c. Support of commercial courts and court system in general (PRODEJ) for contract enforcement.
- d. Provision of training on economics/management (how to read a balance sheet, cash flow statement, basic market concepts) to judges and members of commercial courts.

## 2. Health and Education

- a. Agriculture/Nutrition linkages. Rural income growth or nutrition education programs alone will be unlikely to lead to rapid declines in Mali's high level of child malnutrition. They need to take place in tandem in order to:
  - i. Provide households the income necessary to purchase nutritionally rich foods for their young children.
  - ii. Drive down real cost of food to the poor
  - iii. Understand poor's food strategies in order to design better safety nets.
  - iv. Provide rural communities (particularly the communes) with a tax base to fund the CSCOMs (communal health centers), nutrition education programs (targeted at all caregivers—including grandmothers and older siblings, not just mothers), general education programs, and other components of the national health program. The challenge is how to tap, at the commune and cercle level, some of the increased income that would result from higher agricultural productivity in order to provide complementary healthy, education and nutrition programs.
- b. Link with HIV/AIDS program.

- i. Lack of rural broad-based income growth increases incentives to migration (and, for young widows and other single women, to enter the sex trade?) and migrants become a major vector of the disease.
- ii. To date, HIV/AIDS has not become major constraint on ag. labor supply, but if it becomes more widespread, such problems could arise.
- iii. Household costs of caring for sick (esp. time of caregiver) limit resource availability for income generation and productivity growth.
- c. Malaria
  - iv. Spread of irrigation may increase malaria.
  - v. Small changes in cultural practices in the ON may have large impacts on malaria prevalence through effects on anopheles mosquito population relative to other mosquitos. Joint research by IER, the University of Mali's medical school, and the National Institute of Public Health Research has demonstrated this.
  - vi. Limiting malaria through spread of bed nets, etc. could have major impacts on labor productivity.

### **3. INFO/COM**

- a. INFO/COM's support of local radio stations (radios de proximité) has facilitated diffusion of agricultural market information and the training (via APCAM/PASIDMA) of local radio announcers in concepts of agricultural marketing (so that they can more accurately report the news).
- b. Hooking up IPR/Katibougou, APCAM, OMA, and trader networks to internet could have major impacts on:
  - i. Improved agricultural research by linking researchers at Katibougou more closely to the world scientific community
  - ii. Strengthen regional and international trade through better information flows.

### **4. WARP**

- a. WARP's support of West African Enterprise Network WAEN to promote regional trade (in agriculture, WAEN has focused most on processed products)
- b. WARP's support of CILSS initiatives to remove regional trade barriers—e.g., support to creation of Observatoires des pratiques anormales. Publicize findings through regional market information network
- c. WARP's provision of computers to other market information systems within the region to help improve information to Malian entrepreneurs on trade opportunities throughout the region.
- d. Work on UEMOA/WTO that links into grades and standards (e.g., work at INSAH) and on the impact of the UEMOA common agricultural policy and supposed free trade zone.
- e. WARP support for regional electricity modeling and trade.



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