USAID
FROM THE AMERICAN PEOPLE

USAID TRADE HUB
WEST AFRICA

TRADE HUB AND AFRICAN PARTNERS NETWORK

INCREASING CEREALS TRADE ALONG THE BAMAKO–ABIDJAN CORRIDOR

Recommended Citation: Holtzman, John S., Kokou Zotoglo, and Sarah Kozyn. "Increasing Cereals Trade Along the Bamako–Abidjan Corridor." Prepared for the Trade Hub and African Partners Network by Abt Associates, Bethesda, MD, April 2015.

Submitted to:

Brinton Bohling, Chief, Office of Trade and Investment
(+233) 30-274-1317
No. 24 Fourth Circular Road, Cantonments
Accra, Ghana

Abt Associates | 4550 Montgomery Avenue | Suite 800 North | Bethesda, Maryland 20814 | T. 301.347.5000 | F. 301.913.9061 | www.abtassociates.com

TRADE HUB AND AFRICAN PARTNERS NETWORK

INCREASING CEREALS TRADE ALONG THE BAMAKO–ABIDJAN CORRIDOR

Contract No.: AID-624-C-13-00002-00

\

CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACRONYMS

ADVANCE II	Agricultural Development and Value Chain Enhancement II project
AGRA	Alliance for a Green Revolution in Africa
ANARIZ-CI	*Association Nationale des Riziculteurs de Côte d'Ivoire*
ANOPACI	*Association Nationale des Organisations Professionnelles Agricoles de Côte d'Ivoire*
APLS	*Association des Acheteurs des Produits Locaux de Sikasso*
ATP/E-ATP	Agribusiness and Trade Promotion/Expanded Agribusiness and Trade Promotion project
BMS	*Banque Malienne de Solidarité*
BNDA	*Banque Nationale de Développement Agricole du Mali*
BRS	*Banque Régionale de Solidarité*
CILSS	*Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel*
CMDT	*Compagnie Malienne pour le Développement du Textile*
CountrySTAT	FAO statistical data base providing decentralized data by region, where available
CTA	*Centre Technique de Coopération Agricole et Rurale*
CV	Coefficient of variation
CVC	Cereal Value Chain project
DNCC	*Direction Nationale du Commerce et de la Concurrence* (Mali)
DNIPA	*Direction Nationale des Industries de Production Animale*
ECOWAS	Economic Community of West African States
ETLS	ECOWAS Trade Liberalisation Scheme
FACI	*Société de Fabrication d'Aliments Composés*
FAO	Food and Agriculture Organization (of the United Nations)
FAOSTAT	FAO Statistics Database
FEWS NET	Famine Early Warning Systems Network
FOB	Free-on-board
FTF	Feed the Future
GADCO	Global Agri-Development Company
GDCM	*Grand Distributeur Céréalier au Mali*
GDM	*Grands Moulins de Dakar*
GIEWS	Global Information and Early Warning System on Food and Agriculture
GMM	*Grands Moulins du Mali*
ha	Hectare
IFC	International Finance Corporation
km	Kilometers

LOP	Life of project
MDM	*Moulin du Sahel*
MELS	*Société de Meunerie et d'Emballage de Légumes Secs*
MFN	Most-favored nation
MMM	*Moulins Modernes du Mali*
MSU	Michigan State University
mt	Metric ton
NBCI	*Nouvelle Brasserie de Côte d'Ivoire*
NMA	*Nouvelle Minoterie Africaine*
OCPV	*Office d'Aide à la Commercialisation des Produits Vivriers* (Côte d'Ivoire)
OMA	*Observatoire du Marché Agricole* (Mali)
OPAM	*Office des Produits Agricoles du Mali*
OPV	Open-pollinated variety
PDG	*Police, douane, gendarmerie*
PKL	*Protein Kissée Là* (local cereal processing firm in Abidjan)
PRA/Accès aux Marchés	*Programme Régional d'Appui Accès aux Marchés*
RADSA	*Réseau d'Appui et de Recherche Pour le Développement Durable et la Sécurité Alimentaire*
RONGEAD	*Réseau Non-gouvernemental Européen sur l'Agroalimentaire, le Commerce, l'Environnement et le Développement*
ROPPA	*Réseau des Organisations Paysannes et de Producteurs de l'Afrique de l'Ouest*
SDF	*Société Doumbia et Fils*
SIPRA	*Société Ivoirienne de Productions Animales*
SKC	*Société Keita Céréales*
SOLIBRA	*Société de Limonaderies et Brasseries d'Afrique*
UCOVISA	*Union des Coopératives du Vivrier des Savanes*
UEMOA	West African Economic and Monetary Union (known by its French acronym, for *Union Economique et Monétaire Ouest-Africaine*)
UN	United Nations
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USD	United States Dollar
VC	Value chain
WAGN	West African Grains Network
WFP	World Food Programme
WTO	World Trade Organization

EXECUTIVE SUMMARY

This study examines opportunities for increasing intra-regional trade in cereals. Although regional cereals trade is fairly limited in most years, there are significant opportunities to increase this trade in response to the evolving boom in poultry production in West Africa, which is greatly expanding demand for maize as a key feed ingredient. Cereals trade along the Bamako–Abidjan corridor, valued at $3.8 million in 2013/14 (see Table 1-2), could expand significantly. Maize made up 90 percent of the volume and 84 percent of the value of cereals trade along this corridor in the baseline year (2013/14).

Rain-fed cereals (maize, sorghum, and millet), often referred to as coarse grains or *céréales sèches,* have historically moved across borders in response to rainfall differences across countries. This has led to a patchwork of surplus and deficit zones that vary from year to year. Demand for maize is rising in both Sahelian and coastal countries, however, due to its use in poultry production and in feeding other livestock. This has created trade opportunities. In addition, Niger—a country with a chronic cereals deficit and rapidly growing population (3.8 percent per annum)—imports coarse grains from Burkina Faso, Mali, and Côte d'Ivoire (and of course Nigeria), particularly during the later dry season and the hungry season.

Intra-regional trade in paddy and milled rice (processed from paddy grown in the region) is limited to trade in parboiled rice from Burkina Faso to Mali and onwards to Guinea, as well from Benin to Nigeria and Togo. The rice trade in West Africa is dominated by imports of various types of Asian rice. Donor, public sector, and private sector investment in irrigated rice production in West Africa will gradually expand supply, but larger rice surpluses will move primarily into domestic market channels and substitute for Asian imports. In the medium term, opportunities to trade West African rice across borders will continue to grow, albeit slowly.

The grain with the greatest medium-run potential for intra-regional trade is maize. Demand for poultry is surging in urban and peri-urban West Africa. This is propelling maize demand and is increasing intra-regional trade in the value chain, with Senegal and Niger importing maize from Mali. The opening of a new feed mill in Yamoussoukro will double the demand for yellow maize used in producing poultry feed in Côte d'Ivoire. With government support, IVOGRAIN is investing in irrigated maize production in central Côte d'Ivoire, but it will take several years for maize production to expand significantly. Although Côte d'Ivoire is not currently importing large volumes of maize from Mali or Burkina Faso, this should change in the medium term with the expansion of IVOGRAIN's production capacity. By some estimates, however, Côte d'Ivoire has been exporting 30,000 metric tons (mt) of maize a year to neighbors in the West African Economic and Monetary Union (UEMOA) in the past few years, of which only a small fraction is recorded (FIRCA 2014).

The Trade Hub and African Partners Network (the Trade Hub), funded by the United States Agency for International Development (USAID), can most efficiently help expand intra-regional trade in maize by:

- **Working with Borderless Alliance** to eliminate non-tariff barriers to cereals trade in the central corridor of West Africa, with particular attention to border crossings in northern Ghana/southern Burkina Faso and northern Côte d'Ivoire/southern Mali and southwestern Burkina Faso.
- **Strengthening the West African Grains Network** (WAGN) and its national member associations, helping them lobby national governments in Burkina Faso, Côte d'Ivoire, and Mali and press for implementation of free trade agreements established by the Economic Community of West African States (ECOWAS). This will reduce delays and unofficial charges on grain trade

along the major trunk roads that lead to coastal markets, and will combat delays and problems crossing borders. These efforts should also address the problem of seasonal bans on cereals trade.

- **Assisting individual cereals wholesale traders and their national associations** to formalize and structure maize trade contracts with large coastal buyers, particularly IVOGRAIN. The project should provide technical assistance, in particular to help negotiate contracts on reasonable and achievable terms, and should provide ongoing trade facilitation support to large-volume maize sellers who sign contracts with coastal buyers.

By directly facilitating trade among suppliers and buyers, the project is likely to achieve its target of $6.2 million of expanded intra-regional trade in cereals by February 2019. As noted in Table ES-1, the investment in a new feed mill by IVOGRAIN will expand the firm's maize buying requirements by up to 240,000 mt per year. Sahelian suppliers can help meet this increased demand, and at present maize prices in southern Mali are competitive with international imports. If the Yamoussoukro mill comes on stream in FY 2016 (by the last quarter of calendar year 2015) and is able to operate at 25 percent of installed capacity in the first year, IVOGRAIN will need to buy 60,000 additional metric tons of maize. Assuming that Malian cereals traders could supply 25 percent of this requirement (or 15,000 mt of maize), this trade would be valued at approximately $3 million.[1] Even if Malian exporters ship only 10 percent of IVOGRAIN's estimated incremental maize milling requirements, it would still result in expanded maize trade of $1.2 million in the first year alone. Although such trade would likely expand in FY 2017 and beyond, even if does not and exports of maize do not exceed 6,000 mt of maize per year, additional trade revenues of $3.6 million would accrue over three years (out to the end of FY 2018).

A broader strategy for increasing cereals trade in the central corridor of West Africa is to engage with a sample of the major cereals buyers (typically processors) to estimate their buying requirements and link them with suppliers, who are large-volume exporters, cereals trader organizations or associations, or producer groups. Other important, although lower-priority, areas of Trade Hub support for expanded cereals trade include strengthening public sector market information and its dissemination, improving rice parboiling techniques used by women's groups in Burkina Faso, and facilitating grain traders' access to finance for assembly and storage of cereals. It is also recommended that the Trade Hub help identify and remove barriers to trade along the Mali–Dakar corridor to help expand Malian exports of both maize and ruminant livestock to Senegal. Demand for maize as livestock feed is rising rapidly in Senegal, and Senegal produces only a fraction of the maize that Mali produces (15 percent as much during the five years from 2009 through 2013).

As maize trade in the region expands and becomes increasingly formal, it will be necessary to ensure that minimum food safety standards are respected. One issue that this study does not address is aflatoxin in West African maize. There is limited awareness of this issue and its implications for trade among cereals traders in Mali and Côte d'Ivoire. If not adequately addressed, aflatoxin could become a serious technical barrier to trade, especially in cereals milled into foods for human consumption. This could be the subject of a separate consultancy.

Table ES-1 provides an initial overview of those buyers, although data are lacking on the actual capacity utilized by some firms, as are estimates of unfilled gaps in their purchasing requirements.

[1] This calculation uses a Mali wholesale maize market price of $200/mt, based on prevailing cereals prices in Mali in early 2015 and on maize trade data from the *Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel* (CILSS).

Other important, although lower-priority, areas of Trade Hub support for expanded cereals trade include strengthening public sector market information and its dissemination, improving rice parboiling techniques used by women's groups in Burkina Faso, and facilitating grain traders' access to finance for assembly and storage of cereals. It is also recommended that the Trade Hub help identify and remove barriers to trade along the Mali–Dakar corridor to help expand Malian exports of both maize and ruminant livestock to Senegal. Demand for maize as livestock feed is rising rapidly in Senegal, and Senegal produces only a fraction of the maize that Mali produces (15 percent as much during the five years from 2009 through 2013).

As maize trade in the region expands and becomes increasingly formal, it will be necessary to ensure that minimum food safety standards are respected. One issue that this study does not address is aflatoxin in West African maize. There is limited awareness of this issue and its implications for trade among cereals traders in Mali and Côte d'Ivoire. If not adequately addressed, aflatoxin could become a serious technical barrier to trade, especially in cereals milled into foods for human consumption. This could be the subject of a separate consultancy.

Table ES-1. Major Processors of Maize and Other Grains in the Central Corridor of West Africa

Country	Firm	Location	Installed Capacity	Capacity Utilized	Notes
Corridor Countries Studied					
Côte d'Ivoire	IVOGRAIN	Abidjan		144,000	Capacity utilized is 12,000 mt/month.
	IVOGRAIN	Yamoussoukro	240,000		Coming on stream mid-2015
	Société de Fabrication d'Aliments Composés (FACI)	Abidjan	60,000	24,000	Plans to increase volume to 3,000 mt/month
	Protein Kissée Là (PKL)	Abidjan		7,000	Uses maize & soya to make processed foods
	Nestle	Abidjan			Uses millet & sorghum from region
	Société de Limonaderies et Brasseries d'Afrique (SOLIBRA)	Abidjan			Uses maize grits
	Ali Ouattara	Agnibilekrou			Poultry/feed cluster in eastern Côte d'Ivoire
Mali	*Grands Moulins du Mali* (GMM)	Koulikoro			Produces livestock feed
	Moulins Modernes du Mali (MMM)	Segou			Mainly wheat/rice miller
	Moulins du Sahel	Bamako	30,000		Mainly uses wheat/mixed local cereals in flour
	Grand Distributeur Céréalier au Mali (GDCM)	Bamako			
	Poultry industry	Near Bamako	30,000		For poultry, ruminants; also in other large towns
	Bramali	Bamako		1,080	Demand for maize grits, 2011
	Nouvelles Brasseries	Bamakoises			
Other Important Central Corridor Countries					
Bukina Faso	*Société de Meunerie et d'Emballage de Légumes Secs* (MELS)	Ouagadougou			Maize mill for human consumption
	SIPRAO	Ouagadougou			Maize mill for human consumption
	Brasseries du Burkina (BRAKINA)	Ouagadougou			Uses maize grits
	Brewery 2	Bobo Dioulasso			Not sure if it is operational

Ghana	Premium Foods	Kumasi			Main product is maize grits
	Ghana Nuts	Techiman			Mainly edible oils/nuts
	Guinness Ghana Brew.	Kumasi			Uses sorghum for grits
	Accra Brewery Ltd.	Accra			
	Feed Millers	Accra, Kumasi			
Senegal	*Grands Moulins de Dakar* (GMD)	Dakar			Cattle, poultry, fish feed
	Nouvelle Minoterie Africaine (NMA) Sanders	Dakar	100,000		400 mt/day feed for livestock, fish, poultry
	SEDIMA	Dakar	250,000		Integrated poultry complex
	Moulins SENTENAC	Dakar			Maize, millet, wheat flour; animal feed

Notes: *Installed Capacity* is for maize milling (may be only one line in factory); is theoretical *capacity. Capacity Utilized* is actual use of mill or present level of operations.

Sources: Multiple web sites, various interviews, various documents

1. OBJECTIVES AND METHODOLOGY

1.1 OBJECTIVES

1.1.1 GENERAL OBJECTIVE

As specified in the Terms of Reference,[2] the general objective of this study is to identify and prioritize opportunities for increasing intra-regional trade in Feed the Future cereals value chains to meet FY 2015 targets. Table 1-1 below shows the established targets and the increases needed to reach those targets.

Table 1-1. Trade Hub's Targeted Increases in Grain Trade, Relative to Baseline

Value Chain	Baseline* (April 2013–March 2014)	Target by End of FY 2015	Base Period Target (Feb. 2017)	Five-Year Target (Feb. 2019)	Increase Needed Over LOP*
Maize	$9,941,354	$11,432,557	$12,923,760	$14,912,030	$4,970,676
Rice	$1,386,287	$1,594,230	$1,802,173	$2,079,430	$693,143
Millet	$501,036	$576,192	$651,347	$751,554	$250,518
Sorghum	$586,745	$674,757	$762,769	$880,118	$293,373
Total Cereals	**$12,415,422**	**$14,277,736**	**$16,140,049**	**$18,623,132**	**$6,207,710**

Notes: Baseline figures are only for corridors monitored by the *Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel* (CILSS). LOP means life of project.

The targets shown in the table are for the five corridors that the Trade Hub has targeted with significant cereals trade. This study focuses on the Bamako–Abidjan corridor because it possesses significant potential to increase trade in the short to medium term (18 percent of the baseline value was traded along this corridor). Trade between Francophone exporters and Ghana has decreased as the Cedi has depreciated vis-à-vis the Euro and the United States Dollar (USD); this could shift trade at the margin, influencing more trade to stay within Francophone countries that have the same currency. Lessons learned from working on this corridor will be applied in the Trade Hub's interactions with value chain actors in other targeted corridors.

The original baseline cereals data, captured by the *Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel* (CILSS), are shown in Table 1-2. In volume terms, maize trade represented nearly 80 percent of the volume of cereals trade during the baseline period, with sorghum comprising 11 percent, millet 5 percent, and rice 3 percent. In value terms, the maize share was lower, at 71 percent, followed by sorghum (12.5 percent), rice (8 percent), and millet (8 percent). The five-year target and the increase needed (see Table 1-1) assume that these proportions remain the same as trade expands. The strong rise of the USD compared to other currencies, including the Euro (and hence the CFA franc), as well as the continued depreciation of the Cedi, will make it harder to achieve these targets than would a more stable foreign exchange market. It is recommended that cereals (and livestock) trade data be reported in both local currency terms and in USD terms, with the exchange rates used clearly specified.

[2] Annex 1 contains the full Terms of Reference for this assignment.

Table 1-2. Baseline Cereals Trade Data: April 2013 to March 2014

Corridor	Maize		Millet		Sorghum		Rice		Total		Corridor as Percent of Total Value
	Volume	Value	Volume	Value	Volume	Value	Volume	Value	Volume	Value	
Bamako–Abidjan	16,043	$3,185,229	1,671	$587,370	20	$4,883			17,734	$3,777,482	17.6%
Bamako–Dakar	28,871	$6,041,203	146	$49,782	159	$47,403			29,176	$6,138,387	28.6%
Bamako–Kouri							3,561	$1,798,045	3,561	$1,798,045	8.4%
Ouagadougou–Accra	15,945	$3,983,975	929	$332,283	5,144	$1,427,249			22,018	$5,743,507	26.7%
Ouagadougou–Parakou	7,733	$2,078,330	1,850	$722,506	3,970	$1,215,319			13,553	$4,016,155	18.7%
Total	**68,592**	**$15,288,736**	**4,596**	**$1,691,942**	**9,293**	**$2,694,854**	**3,561**	**$1,798,045**	**86,041**	**$21,473,578**	**100.0%**
Commodity: percent compared to total across commodities	79.7%	71.2%	5.3%	7.9%	10.8%	12.5%	4.1%	8.4%	100.0%	100.0%	
Bamako–Abidjan corridor: percent compared to total trade in each commodity	23.4%	20.8%	36.3%	34.7%	0.2%	0.2%	0.0%	0.0%	20.6%	17.6%	

Source: CILSS

1.1.2 SPECIFIC OBJECTIVES

The specific objectives for this study are to answer the following questions:

- **Existing trade.** How much is being traded along this corridor? Who are the principal actors in this corridor?
- **Market opportunities.** What buyers would be interested in increasing purchases? What requirements do they have (for quantity, quality, timing, prices, delivery)? What new market outlets could be developed? If these opportunities were identified, how much new trade would result?
- **Private sector needs and constraints.** Is there a lack of market information? Is the supplier unable to supply the product at a competitive price? Does the buyer have standards that the seller does understand or cannot meet? Is there a problem with financing? Is it hard for the buyer and seller to communicate with or trust each another? Are there recent bad trading experiences that have soured either suppliers or buyers on intra-regional trade? Are there problems with the enabling environment? Do imports from the international market undercut incentives for intra-regional trade by capturing coastal markets for selected products and certain consumer groups?
- **Responding to private sector needs.** Could the project provide training, assistance with access to finance, or trade facilitation? Could an association provide better market information or training? Are there problems related to the enabling environment (e.g., are new regulations or better enforcement required)?
- **Priority activities.** Which activities could the project best carry out? Would they bring an adequate return, in terms of increased trade, to achieve the FY 2015 targets as presented above?

1.2 METHODOLOGY

1.2.1 SOURCES OF DATA

Prior to field work, the Trade Hub's Cereals Value Chain Specialist and the Senior Agricultural Economist/Agribusiness Specialist searched for information on West Africa's cereals value chains, looking at production, trade, and processing. Key sources of information included the Ministries of Agriculture in Mali and Côte d'Ivoire; the Food and Agriculture Organization (FAO) database, called FAOSTAT, and its CountrySTAT database; information from CILSS on cross-border trade flows in agricultural products in West Africa; the Famine Early Warning Systems Network (FEWS NET) web site; and the United Nations (UN) Comtrade database. The team collected and wrote up the following basic information on existing trade and major actors:

- Trade flow data for the previous three years, including data by major supplying region and market destination
- Urban population data for Bamako, Segou, Sikasso, Korhogo, Bouake, Yamoussoukro, Abidjan, and selected other market destinations
- Comtrade data (volume and value data on annual imports into Côte d'Ivoire and exports from Mali and Burkina Faso) for the last ten years, with import data disaggregated by supplying country
- Cost of transport data, in metric tons (mt) per kilometer (km), along major trucking routes from Mali to Côte d'Ivoire
- Maps showing major cereals markets in the two countries

Based on this information, the team developed a preliminary list of possible market opportunities and their estimated value. Two maps show production areas in the region: Figure 2-1 shows entirely dryland cereals (millet, sorghum, and maize), while Figure 2-2 shows both irrigated and upland rice production zones.

1.2.2 DATA COLLECTION IN THE FIELD

Data collection in the field was carried out from February 20 to 28, 2015, by the Abt Associates Senior Agricultural Economist/Agribusiness Specialist and the Trade Hub Cereals Value Chains Specialist. They finished collecting information by conducting research via the Internet, telephone, and Skype.

In Mali the consultants visited Bamako, Segou, and Sikasso and interviewed the biggest Koutiala-based cereals trader while in Bamako. They then continued data collection in Côte d'Ivoire, visiting Korhogo, Bouake, and Abidjan.

The team targeted two categories of actors for interviews: 1) sellers, including private firms, trader associations, wholesalers, and farmer organizations, and 2) buyers, including animal feed mills and grain processors that mill grain for human consumption. The following stakeholders and companies were visited in each country:

- **Mali.** USAID's Cereal Value Chain (CVC) project; the *Place de Niono* rice market in Bamako; Dayana Cereals company, the largest Koutiala-based cereals trader; Auxigages 13, a company offering guarantees to banks and traders and providing third-party inspection/verification; the *Association des Acheteurs des Produits Locaux de Sikasso* (APLS) in Sikasso; and the cereals market in Sikasso.
- **Côte d'Ivoire.** The *Union des Coopératives du Vivrier des Savanes* (UCOVISA) in Korhogo; the *Marché de Gros de Bouaké*; the *Société Ivoirienne de Productions Animales* (SIPRA)/IVOGRAIN company; the *Société de Fabrication d'Aliments Composés* (FACI), an animal feed miller; *Protein Kissée Là* (PKL), a human food processing company; the *Association Nationale des Riziculteurs de Côte d'Ivoire* (ANARIZ-CI); Nestlé Group; and the *Association Nationale des Organisations Professionnelles Agricoles de Côte d'Ivoire* (ANOPACI).

1.2.3 DATA PROCESSING AND ANALYSIS

The Cereals Value Chain Specialist and the Agricultural Economist/Agribusiness Specialist processed interview data and an Abt Associates Research Assistant analyzed secondary data from Comtrade, FAOSTAT and CountrySTAT, and Government of Mali and Government of Côte d'Ivoire sources. They cross-checked information with prior studies and other secondary sources, as well as with Trade Hub staff working on related issues

Chapter 2 presents the basic information collected on cereals production.

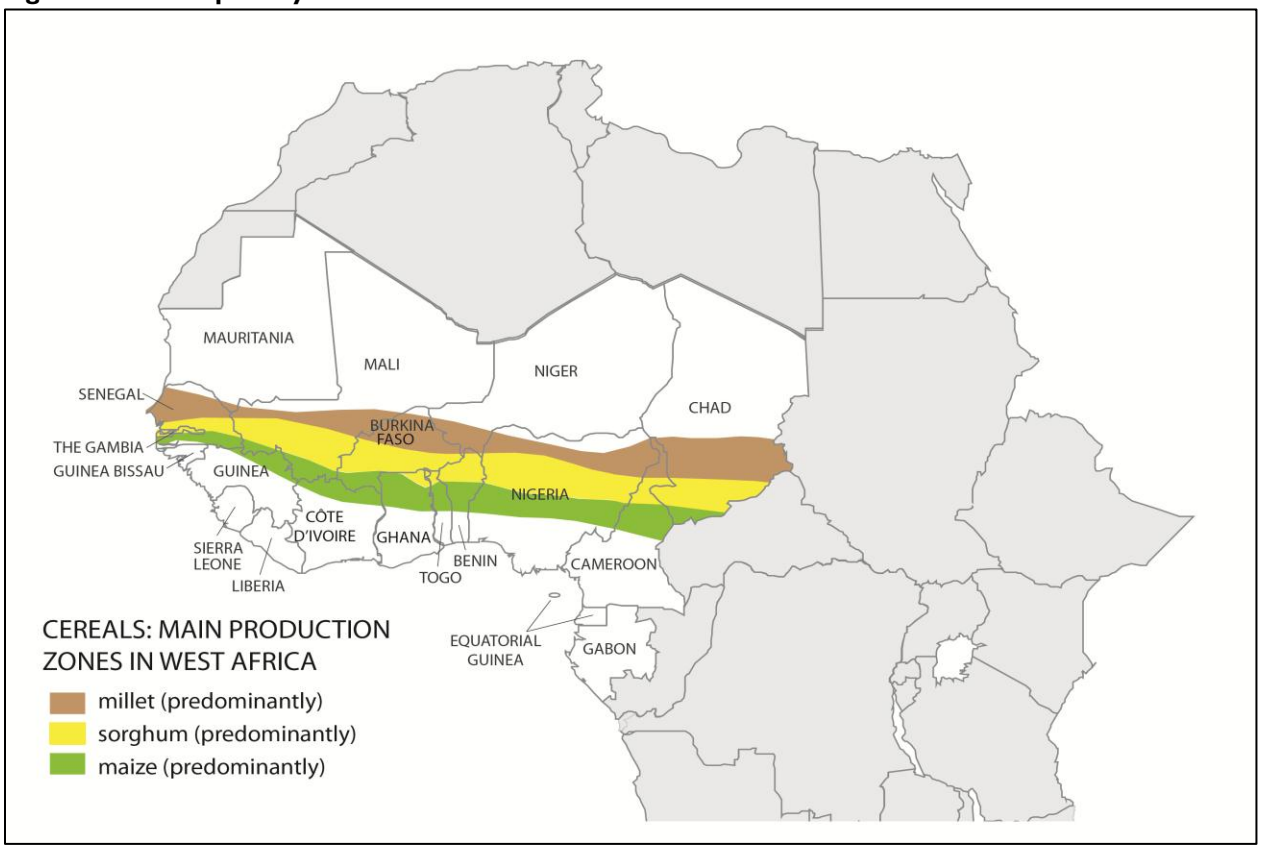
2. CEREALS PRODUCTION

2.1 PREDOMINANT AREAS OF CEREALS PRODUCTION IN WEST AFRICA

West Africa offers a range of agro-ecological zones: coastal lowlands and rainforest in the southern half of the coastal countries, dry savannah in the northern half of coastal countries, and even more-arid Sahelian zones in the interior countries (Mali and Burkina Faso). Even within the Sahelian countries there are multiple agro-ecological zones defined mainly by rainfall isohyets. Mali offers savannah production zones in the southern region of Sikasso; more Sahelian production areas in and around Segou, San, and Kayes; and floodplain agriculture (and irrigation) in the Niger River valley.

The map in Figure 2-1 below, prepared by the *Centre Technique de Coopération Agricole et Rurale* (CTA), shows horizontal (east-west) bands of agricultural production where certain cereals crops predominate. The bands do not show the full range of production zones where crops such as maize and sorghum are grown. Maize cultivation in West Africa is found all the way down to the coast, although the primary production zones are located in the sub-humid Sudano-Guinean and savannah zones of the coastal countries, extending into the southern areas of Mali and Burkina Faso.

Figure 2-1. Principal Dryland Cereal Production Zones in West Africa



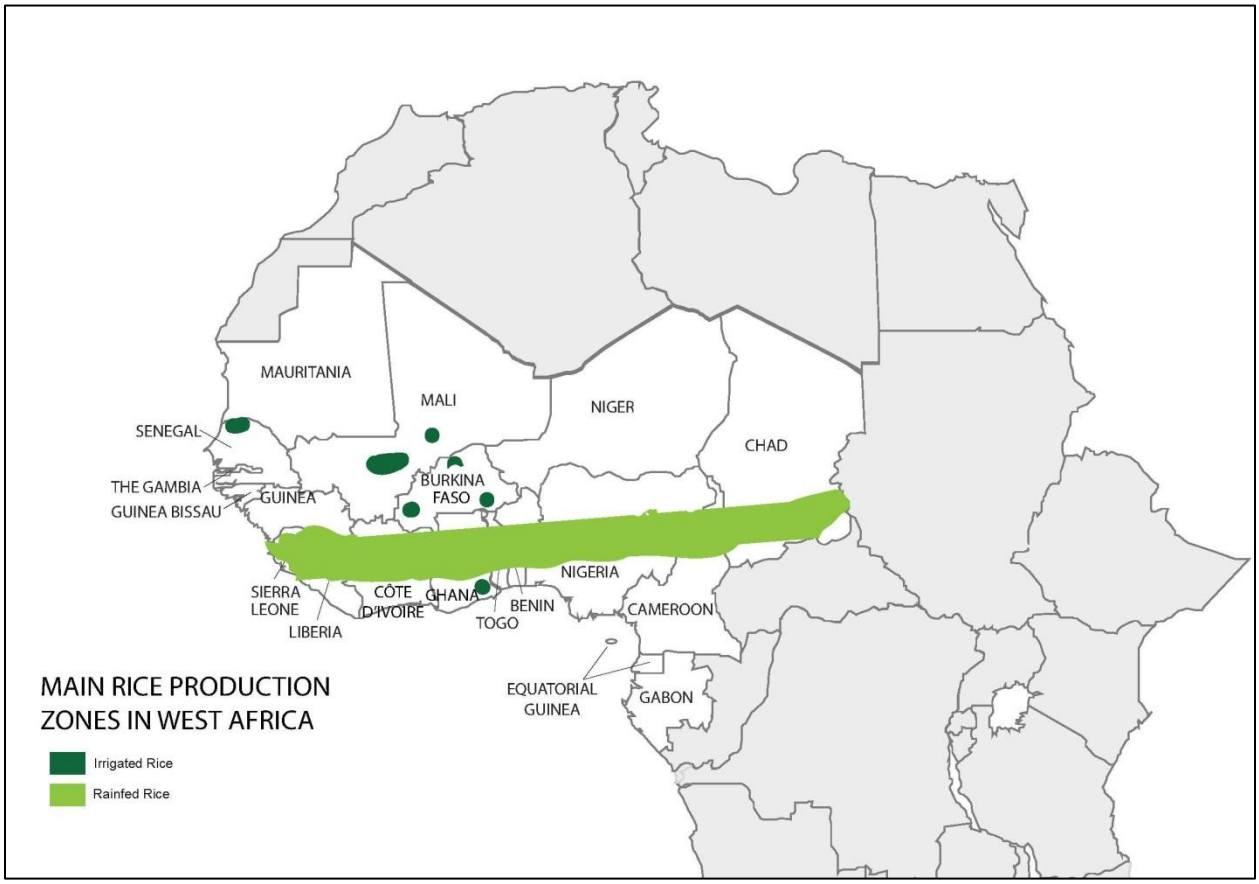
Source: CTA 1992

Most cereals production is dryland, depending entirely on rainfall and its temporal and spatial distribution. Some paddy production is irrigated, and there has been increasing investment in irrigated rice production in nearly all countries of West Africa, including in the central corridor countries of Mali, Côte d'Ivoire, Burkina Faso, and Ghana. Upland and lowland (*bas fonds*) paddy production predominates.

For rice, the production is especially concentrated in the areas as shown in the map in Figure 2-2. The yield of rainfall rice is low—1.5 to 2.5 mt per hectare (ha), while the irrigated zone produces 3.5 metric tons per hectare. Rain-fed rice is predominantly lowland rice. Paddy rice production is concentrated in the following:

- Large-scale rice irrigation schemes in Mali (the *Office du Niger*), as well as smaller-scale irrigated perimeters in Mopti along the Niger River, in the Senegal River valley, and in Ghana (southwest) by the Global Agri-Development Company (GADCO) in the Volta River Valley.
- Several lowland rice production areas in Mali (the Sikasso Region) and Côte d'Ivoire (throughout the country), and in the rest of West Africa, as shown in the map in Figure 2-2.

Figure 2-2. Principal Paddy Production Zones in West Africa



Source: Trade Hub

2.2 CEREALS PRODUCTION IN MALI

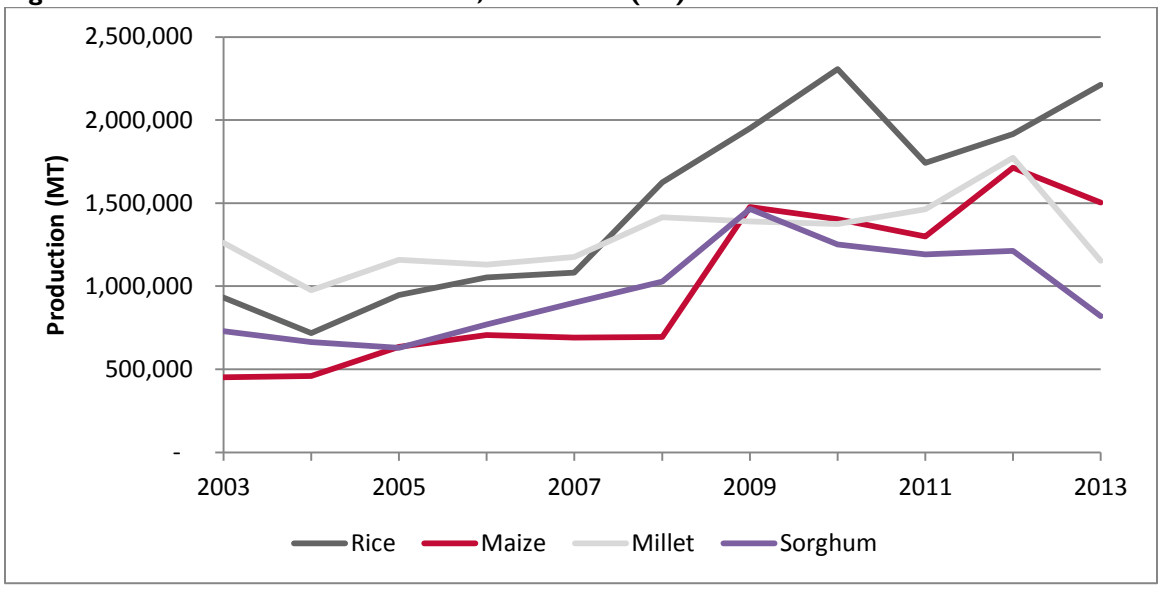
2.2.1 NATIONAL TRENDS

Maize. Maize production in Mali has trended upward strongly since the early 2000s, as have overall production and yields. The average maize area harvested over the five-year period 2009 to 2013 was 59 percent higher than it was during the previous five-year period (2004 to 2008). And, due to higher yields, total production was 132 percent higher during the same period. Yields averaged 2.57 mt/ha per year during the 2009 to 2013 period—57 percent higher than during the 2004 to 2008 period. If the poor harvest season of 2011 is excluded, yields, were 74 percent higher in recent years than in the 2004 to 2008 period, and average production exceeded 1.5 million mt/year (with area harvested averaging 541,800 hectares). In 2009, a year with exceptional rainfall, Mali saw its highest estimated yields—3.34

metric tons per hectare. Maize yields in Mali are higher than in Côte d'Ivoire, averaging 2.57 mt/year in Mali during the 2009 to 2013 period, compared to 1.99 mt/year in Côte d'Ivoire during the same timeframe. Note that the coefficient of variation (CV)[3] for maize yields over the ten-year period 2004 to 2013 is far higher for Mali (0.34) than for Côte d'Ivoire (0.09). The CVs for maize area harvested and total production in Côte d'Ivoire also show very little variability relative to the Malian data. The reason for these differences is most likely the variability of annual rainfall and its distribution across months during the growing season. Rainfall is more likely to be higher and more evenly distributed across months in the savannah of northern Côte d'Ivoire than in the semi-arid production zones of Mali.

Rice. Mali produced 2.2 million metric tons of paddy in 2013, the highest production level since 2010 (when 2.3 million metric tons was produced), while importing 421,544 metric tons of rice. Conversion of paddy production to milled rice equivalent terms shows that Mali imported 24 percent of its rice requirements (assuming net exports of Malian rice were zero) in 2013. Malian paddy production has dramatically increased since the early 2000s. The country produced an average of 865,300 mt/year during the 2003 to 2005 period, an amount that increased to an average of 2.02 million mt/year during the 2009 to 2013 period. Production increases have leveled off in the most recent five-year period, however. As more irrigated land comes on stream and is put under paddy cultivation, Malian paddy production will expand, but the country will remain rice-deficit for years to come. Export potential is clearly limited, as the domestic market will absorb paddy production increases.

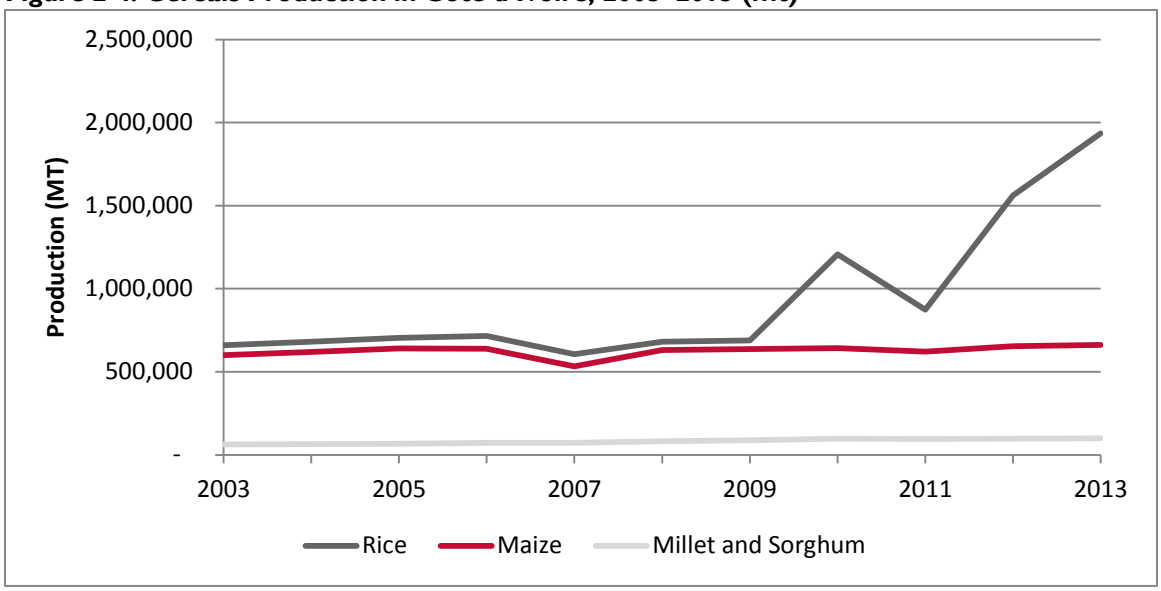
Figure 2-3. Cereals Production in Mali, 2003–2013 (mt)



Source: FAOSTAT

[3] The coefficient of variation is a measure of dispersion of a probability or frequency distribution. It is defined as the standard deviation over the mean of a data series.

Figure 2-4. Cereals Production in Côte d'Ivoire, 2003–2013 (mt)

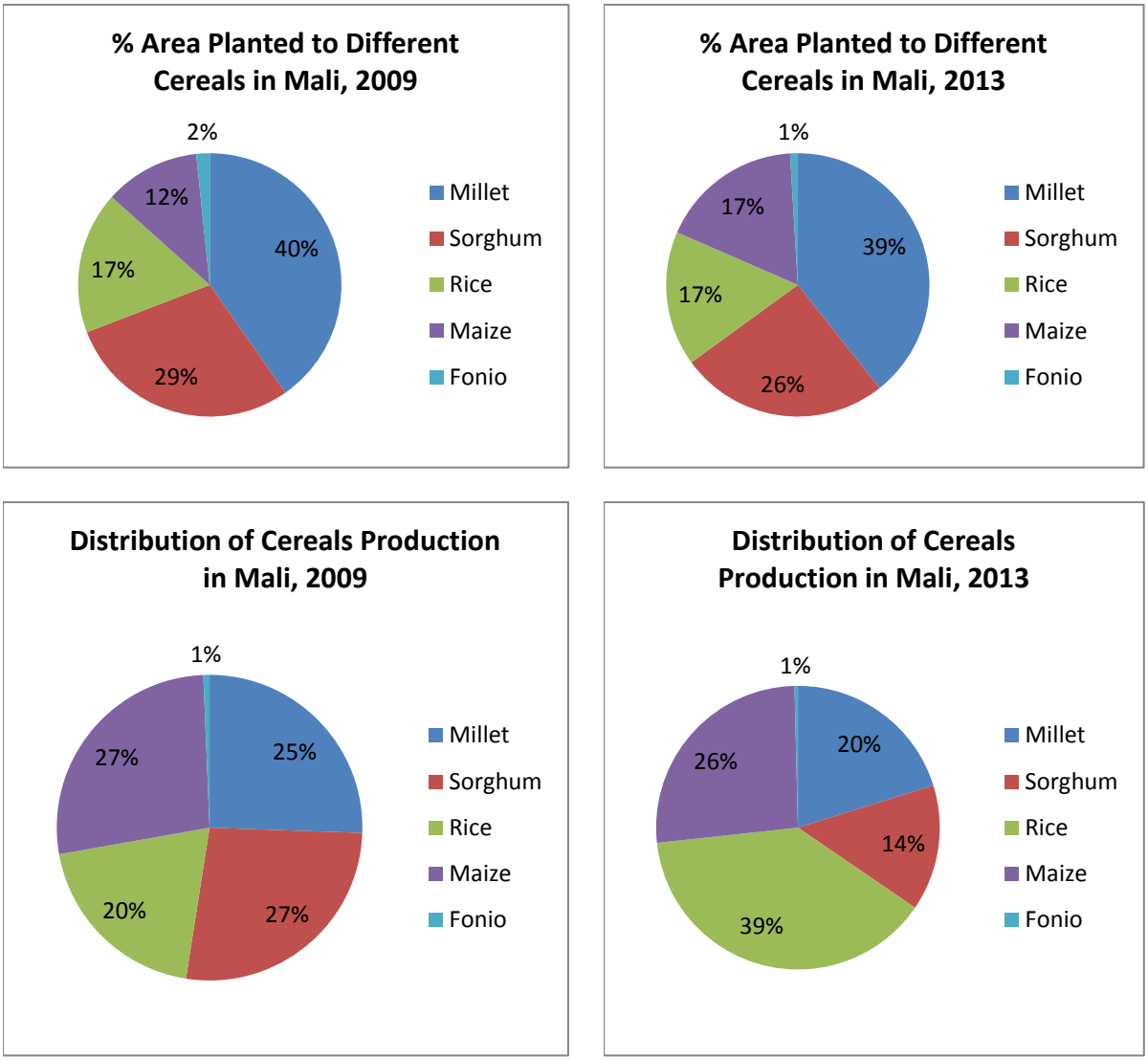


Source: FAOSTAT

Millet and sorghum. Both millet area harvested and millet production have been stable over the past decade. Area harvested increased by 6 percent between the 2003 to 2008 period and the 2009 to 2013 period, while production increased by 10 percent during the same timeframe. CVs are low for area harvested (0.16), production (0.18), and yield (0.14). Sorghum has shown somewhat more growth than millet, and higher variability with CVs in 0.21 to 0.28 range. Area harvested with sorghum increased by 13 percent and production by 20 percent between the 2003 to 2008 and the 2009 to 2013 periods. Yields for millet and sorghum averaged 848 kg/ha and 985 kg/ha per year during the 2009 to 2013 period, increasing marginally (5 percent for millet and 8 percent for sorghum) relative to the earlier five-year period. Typically, farmers retain seed for these grains and do not apply fertilizer, as most open-pollinated varieties (OPVs) are not fertilizer-responsive like maize or paddy. The overall picture of millet and sorghum production in Mali is, therefore, one of relative stagnation. These cereals have also been losing ground to rice among many urban consumers, though evening meals in many urban households remain millet- and sorghum-based. There are two women-owned firms in Mali that produce bagged and processed millet- and fonio-based cereal products, sometimes combined with soybean or peanuts. These firms produce small volumes and export small volumes outside West Africa. They are worth monitoring.

Comparisons. Despite the relative stagnation of millet and sorghum in Mali, these cereals dominate area planted to grain, including paddy, although this is beginning to slip. They accounted for 69 percent of area planted to grain in 2009 and 65 percent in 2013. The productivity advantages of maize and paddy over millet and sorghum, however, mean that they dominate grain production (rising from 47 percent of total grain produced in 2009 to 65 percent in 2013). Figure 2-5 compares area planted and production of cereals in Mali between 2009 and 2013.

Figure 2-5. Comparison of Area Planted and Production of Cereals in Mali, 2009 vs. 2013



Source: FAOSTAT

2.2.2 REGIONAL SPECIALIZATION IN CEREALS PRODUCTION

Cereals production in Mali is concentrated regionally, particularly for maize and paddy. Important regions within Mali for cereals production by crop are noted below, using ten-year time-series data for the period 2004/05 through 2013/14 provided by the Ministry of Agriculture in Mali. Detailed time-series production data by region are found in Annex C.

Millet. Segou and Mopti dominate millet production. Over this ten-year period, an average of nearly two-thirds of the area planted with millet (993,248 hectares) and 63.4 percent of millet output (802,565 metric tons) come from these two regions. The record years for area planted and production were 2012/13 (1.87 million hectares) and 2011/12 (1.89 million metric tons). Average yields have exceeded one mt/ha in only three recent years—2009/10, 2010/11, and 2011/12. Although it is reported that some farmers apply fertilizer to millet, this is not common practice and most millet OPVs are not very fertilizer responsive.

Mali supplies millet to Côte d'Ivoire during the month of Ramadan, as millet is used to break the fast at the end of each day. Buyers come to Segou from Senegal as well to purchase millet from wholesale traders. According to the largest wholesale trader in Segou, some millet is also exported to Niger by the World Food Programme (WFP)/Mali, which buys it from Malian traders and transfers it to WFP/Niger.

Sorghum. Koulikoro and Sikasso are the most significant sorghum-producing regions in Mali. In these regions, an average of 60 percent of both area planted (537,000 hectares) and production (554,000 metric tons) was devoted to sorghum during the 2004/05 through 2013/14 period. Kayes and Segou are also significant sorghum producers. It is not clear where marketed surpluses for potential export come from in Mali—probably from several regions, although the proximity of the Bamako market might make the Koulikoro region less likely to ship sorghum across borders. Average yields are at one metric ton exactly, with a national record yield of 1.4 mt/ha in 2012/13.

Maize. Sikasso is by far the largest maize-producing region in Mali because it receives higher rainfall than the rest of the country. Long-term averages show rainfall in Sikasso to be 50 percent or more higher than in Segou. The average area planted in the Sikasso region (280,300 hectares per year) over the past decade was 65 percent of total maize area planted in Mali, while average production (646,100 mt/year) comprised 73 percent of national output. Both area planted to maize and production expanded significantly in the last several years. National area planted with maize exceeded 0.5 million hectares for the first time in 2012/13, hitting a record of 633,400 hectares in 2013/14. Similarly, national production was over one million metric tons in both years, achieving a record output of 1.66 million metric tons in 2012/13, with excellent national average yields of 2.9 metric tons per hectare. Average yields nearly eclipsed 3.0 mt/ha in Sikasso, where they were 2.97 metric tons per hectare. Maize yields exceeded 2.0 mt/ha in Mali during four of five years from 2009/10 to 2013/14, up from the 1.2 to 1.8 mt/ha range to which they had fallen during the 2000/01 to 2008/09 period. Increased use of fertilizer and expanded use of improved OPV seed has driven these yield increases and greatly expanded commercialization of maize.

As Sikasso, in the southern-most part of Mali, predominates in maize production, its location gives it an advantage in accessing coastal markets, particularly Côte d'Ivoire. Proximity helps minimize transport costs, although trucks must still cross the problematic Mali–Côte d'Ivoire border.

Rice. Segou and Mopti are the big paddy-producing regions in Mali. The two regions combined produced an average of 306,700 hectares (69 percent of the national total) and 838,400 metric tons (71 percent of the national total) over the ten years from 2004/05 through 2013/14. With its lowland paddy production, Sikasso contributed 10 percent of paddy area cultivated and 11.6 percent of national output. Total area cultivated with paddy in Mali was highest in 2013/14, at 605,000 hectares, while the year with the greatest total paddy production was 2008/29, at 1.6 million metric tons. It appears that Segou produces a greater marketed surplus of rice than Mopti, due to the larger rice holdings in the *Office du Niger* production zone and the better irrigation infrastructure and water control in Segou. The largest rice mills are also concentrated in Segou, including the recently established *Moulins Modernes du Mali* (MMM).

2.3 CEREALS PRODUCTION IN CÔTE D'IVOIRE

Maize production in Côte d'Ivoire reached 661,300 metric tons in 2013[4] according to FAOSTAT, with maize harvested from 340,000 hectares and a mean (calculated) yield of 1.945 metric tons per hectare.

[4] FAOSTAT reports agricultural production data by calendar year. West African governments typically report these data by production plus market year. As agricultural production in the northern hemisphere takes place almost entirely during the calendar year, the FAOSTAT data and the Malian and Côte d'Ivoire data are the same.

While both area harvested and total production reached record levels that year, the yield was lower than the 2012 level of 2.12 metric tons per hectare. Yield exceeded 2.0 mt/ha in five of six years from 2003 to 2008, with a high of 2.41 mt/ha in 2006. Area harvested and total production were quite stable during the past decade, although yields were on average lower in the second half of the 2004 to 2013 decade than during the first half. It is noteworthy that Côte d'Ivoire's maize production totaled only 44 percent of Malian maize production in 2013.

There are no reliable statistics available on the distribution of maize across regions in Côte d'Ivoire. Maize is grown in all parts of Côte d'Ivoire, with the northern half of the country generally in surplus in maize and districts in the southern half of the country, particularly the large urban agglomerations (greater Abidjan, Gagnoa, San Pedro), either in equilibrium or net deficit. According to an excellent study of the maize subsector in Côte d'Ivoire (RONGEAD-ONG Chigata 2014), key surplus production zones are in the central-north area around Korhogo and Ouangolo, Daloa in the central-western area, and along the eastern border with Ghana in the Agnibilekrou/Abengourou zone.

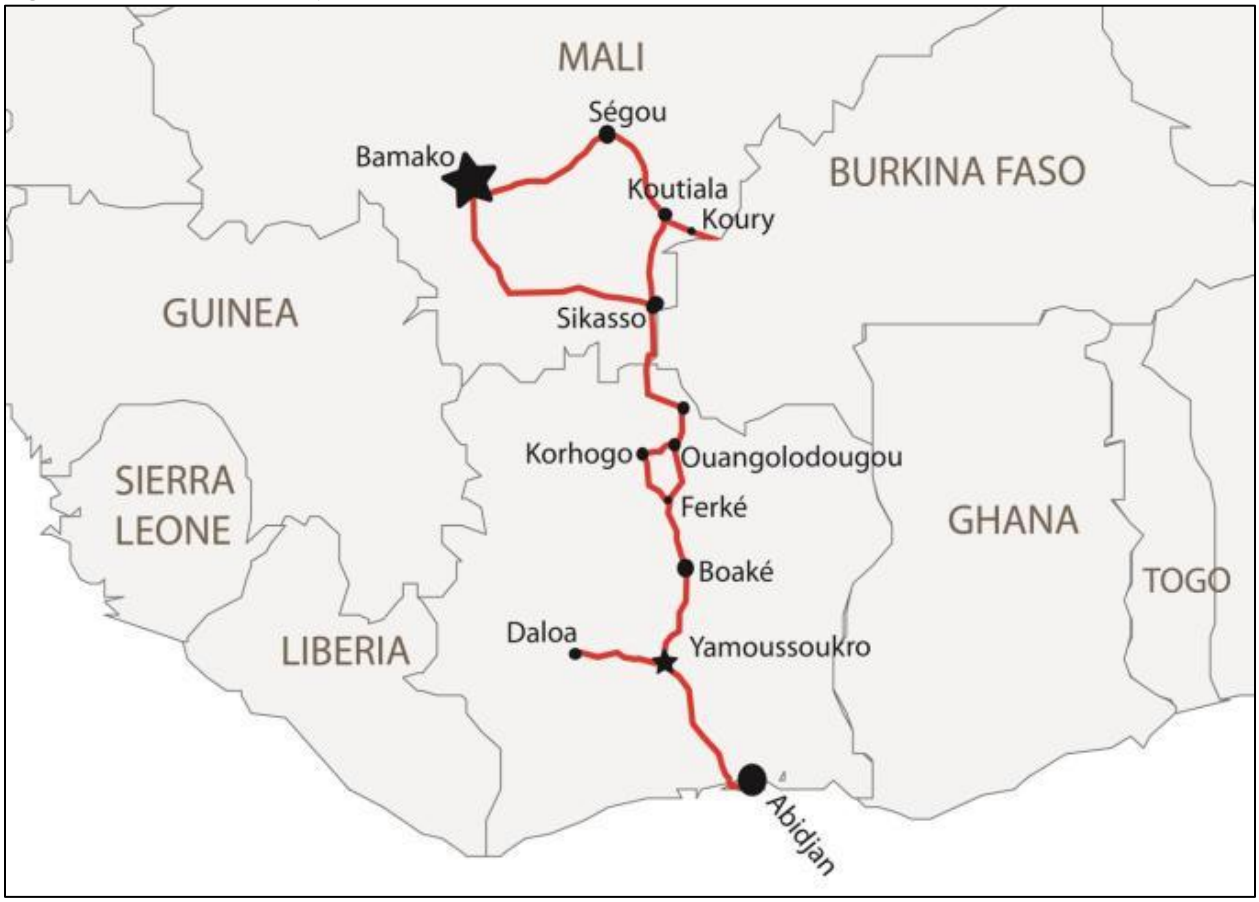
As described in detail in the RONGEAD-ONG Chigata report, the timing of planting and harvest operations differs across agro-ecological zones. In the forest zone, first cycle maize is harvested in the June–August period, while second cycle maize is harvested in September–November. Late cycle maize production in the southern half of Côte d'Ivoire results in an even later harvest—in the November–January period. In the northern half of the country, the savannah zone, the maize harvest falls in September–November. This is similar to southern Mali, where somewhat drier conditions than in Côte d'Ivoire lead to later planting (June–July) and harvesting (October–November).

Traders and feed millers interviewed in Côte d'Ivoire reported that maize grown in the northern part of the country is drier and cleaner than maize coming from other production zones, such as Daloa and Gagnoa. It is also cheaper. In 2014/15, for example, it was assembled at well under 100 FCFA/kg in many areas of the northern savannah. One source reports that immediate post-harvest prices for maize in the north can fall as low as 50-60 FCFA per kilogram (FIRCA 2014).

3. BAMAKO–ABIDJAN CORRIDOR MARKETS

The Bamako to Abidjan corridor is 1,200 kilometers by road, although cereals generally do not move all the way from Bamako, a major urban consumption market, to Abidjan. From the standpoint of cereals marketing, the effective corridor is Koutiala or Sikasso to Abidjan, which is 967 or 833 kilometers respectively. The drive to the coast takes two days and is affected by how long it takes to cross the border at Zegoua/Pogo. Certain stretches of the trunk road south, starting with the 100 kilometer section from Sikasso to the border, are in very poor condition, with frequent, large potholes that force trucks to operate at low speeds in order to avoid damage. Certain sections of the main north-south corridor road (A3) in Côte d'Ivoire, running 731 kilometers from Pogo to Abidjan, are also in very poor condition, particularly the 44 kilometer stretch from Ouangolodougou to Ferkessédougou in the north, and the 67 kilometer section from Niakaramandougou to Katiola in the central north. The final 238 kilometers from Yamoussoukro to Abidjan are a dual carriage-way in excellent condition, in stark contrast to much of the road between Katiola and Sikasso.

Figure 3-1. Bamako–Abidjan Trade Corridor



Source: Trade Hub map, created using Adobe Illustrator

3.1 CEREALS MARKETS IN MALI

Cereals markets are concentrated in the southern part of the country, mainly in Bamako, Segou, Koutiala, and Sikasso.

In **Bamako,** there are two cereals markets: the *Place de Niono* for rice and the market of Aregda for all cereals. Traders do not carry large stocks; they buy on a monthly basis and sell as quickly as they can to already identified buyers. Semi-wholesalers procure their stocks in those markets and proceed to retail distribution in various parts of the city. The supply channels for the industrial millers, namely *Moulin du Sahel* (MDM) and *Grands Moulins du Mali* (GMM), are not documented.

In **Segou,** the *Société Keita Céréales* (SKC), the biggest trader, owns storage facilities and has stocks of 5,000 metric tons of maize and millet. The main grains traded during the marketing season are millet and sorghum. The firm has signed contracts (in the past, but not recently) with buyers such as companies and WFP, *Caritas Mali*, *Action Allemande*, the United Nations Children's Fund (UNICEF), the Red Cross, and the *Office des Produits Agricoles du Mali* (OPAM). The owner also owns a grain winnower/cleaner (*souffleur* in French) with a capacity to clean 15 metric tons per day. The company relies on grain collectors in villages around Segou to assemble grain. Those collectors, called *pisteurs,* constitute the engine of the supply channel. Collectors receive advances from SKC, buy in the village markets, and supply the company in one or two weeks' time. Delivery procedures are established and well-known by the collectors. The company has a bank account and has received loans from banks. Auxigages, a firm that provides guarantees to banks and buyers, as well as offering third party inspection and verification services, plays a key financial intermediation role.

In **Sikasso**, traders are organized into a local products traders association, APLS, which was created in 1996 and has 25 members. The association buys and sells maize and sorghum. APLS buys more than 35 percent of its yellow maize in northern villages in Côte d'Ivoire, such as Niele, Begin, Djawala, and Ouangolo. The annual capacity of the association depends on the demand. The greater the demand among buyers, the more grain the association traders are able to assemble. On average it trades 50,000 metric tons per marketing season. Grains are sold to WFP and Senegalese traders, as well as to GMM. Sales contracts to GMM in recent years have been for the following volumes: 3,810 metric tons (2014/15), 2,835 metric tons (2013/14), 1,678 metric tons (2012/13). The association obtains loans from *Banque Malienne de Solidarité* (BMS) and Kafo Jignew.

In **Koutiala,** the *Société Doumbia et Fils* (SDF) is the biggest cereals player in that part of the country. The company, which deals mainly in millet and sorghum, collects cereals in small markets around Koutiala. The company's owner was initially a smaller volume grain collector, assembling for sale in Bamako. Later, he created a company that he runs with his son and younger brother today. In February the company had cereals stocks of 5,000 metric tons. SDF receives loans from *Banque Nationale de Développement Agricole du Mali* (BNDA). Its annual trading volumes are as follows: millet (15,000 metric tons), sorghum (13,000 metric tons), and maize (8,000 metric tons). The company also sells to institutions such as the WFP, OPAM, and humanitarian projects, as well as to foreign traders (maize to Senegal, millet to Côte d'Ivoire, and both to Niger).

There are reports of an important trade flow of grain between Sikasso, Korhogo, and Bobo Dioulasso. This triangular market seems to be important, but it is not documented. One example of trade relationships within this triangle is the aborted contract for maize between Premium Foods and UCOVISA, based in Korhogo, in November 2014. According to that contract, UCOVISA was supposed to deliver 3,000 metric tons of maize from Bobo Dioulasso to Premium Foods. An interview with UCOVISA managers revealed that UCOVISA was planning to sub-contract with a Burkinabé trader who owned the maize stock. These types of trade interactions in the triangular market and supply shed formed by the Sikasso region in Mali, southwestern Burkina Faso (the production zone around Bobo Dioulasso), and the northern maize surplus zone around Korhogo should be encouraged.[5]

[5] This particular trade opportunity was not consummated for several reasons. First, UCOVISA is a farmers' union that is an apex for 26 cooperatives. UCOVISA does not store grain itself or control member cooperatives' grain stocks. Secondly, it lacked access to working capital finance to purchase maize from member cooperatives. Lastly, UCOVISA had not negotiated contracts with large-volume buyers and was unable to meet all contract terms and conditions.

3.2 CEREALS MARKETS IN CÔTE D'IVOIRE

The main wholesale markets for cereals in Côte d'Ivoire are Korhogo in the north and Bouaké in the central part of the country. Daloa (not visited by the team) is also reported to be an important maize bulking point. Surplus maize production along the Ghanaian border near Agnibilekrou/Abengourou goes into poultry production in that same area, and there may be cross-border trade in both directions between Côte d'Ivoire and Ghana, depending on maize harvests and prices in each country. Each of these wholesale markets draws from a network of smaller assembly markets in villages and small towns, typically within a radius of about one hundred kilometers. Wholesale traders in large town markets employ collectors (*pisteurs);* they some sometimes pre-finance the collectors to assemble maize on their behalf at an agreed-upon price. The collectors may buy from farmers on producer credit in their home production zones.

Most maize storage is done on the farm or in rural areas and not in towns, where warehouse space is limited. In addition, few wholesale traders are interested in tying up their working capital for long periods when returns on cross-seasonal storage are uncertain. The analysis conducted by RONGEAD-Ong Chigata on estimated returns on storage at the wholesale market of Adjamé (Abidjan) concluded that in only two of nine years over the period 2004/05 to 2012/13 were returns on six-month storage strongly positive. In three years, estimated returns on storage were weakly positive. Losses were calculated for four of the nine years.[6]

There is some evidence that the market for maize in Abidjan has oligopsony characteristics, with IVOGRAIN playing a major role in setting prices. During the second half of February 2015, Bouaké wholesale traders had shipped some twenty 40-metric ton capacity trucks of maize to IVOGRAIN in Abidjan. These large-volume shipments followed upon an initial contract between a major cereals cooperative in Bouaké and IVOGRAIN, where the maize price was set at 120 FCFA/kg in the earlier part of the 2014/15 marketing season. As IVOGRAIN maize stocks were drawn down, the Bouaké wholesalers pre-emptively assembled and shipped more maize in anticipation of a renewal of the contract at the same delivered sale price. IVOGRAIN had not officially signed any second contract having those terms and ended up declaring their purchase price as 110 FCFA/kg as of mid-February 2015.[7] Twenty or more tractor-trailers were parked on the street near the IVOGRAIN feed mill at the end of February, as the situation was at an impasse. It looked as if the wholesale traders might be forced to sell at the lower price, leading to losses to traders who had sent truckloads to Abidjan.[8]

This is clearly a case where the major maize buyer was exercising formidable market power and where the Bouaké wholesalers had made a grave mistake in assuming that a second supply contract would be signed on the same terms as the initial, earlier marketing season agreement. The Trade Hub can work with suppliers to avoid similar situations in the future, particularly where Malian and Burkinabé exporters are negotiating contracts with large-volume buyers.

---

[6] The cross-seasonal storage analysis compared mean post-harvest prices in the November–February period and mean hungry season (*soudure*) prices in the July–September period in each marketing season. The analysis uses prices from the *Office d'Aide à la Commercialisation des Produits Vivriers* (OCPV) and assumes six-month storage costs of 15 FCFA per kilogram. In this team's view, the analysis would be more robust if price averages across one or two months (instead of four months) were used. In addition, this analysis focuses on storage returns in Abidjan and not upcountry in Bouaké or Korhogo, where cross-seasonal returns may be more attractive. The analysis is sufficiently convincing, however, to show that returns on grain storage are not positive in nearly half of the years. The conventional wisdom that returns on storage are generally highly positive is often wrong; location-by-location analysis of storage costs and returns needs to be done across several years in order to confirm or disconfirm the notion of high returns on storage. See RONGEAD-ONG Chigata 2014, pp. 31-32.

[7] The smaller feed miller FACI, whose mill and silos are adjacent to those of IVOGRAIN in Abidjan, was offering to buy maize at 115 FCFA/kg at the end of February 2015. FACI is only processing about 20 percent of the volume of maize processed per month by IVOGRAIN, however.

[8] This is based on personal communication with the *Société Coopérative Benkelema des Produits Vivriers*.

In addition to maize supplied domestically or imported from neighboring countries, Ivoirien buyers in and around Abidjan have the option of importing maize from international markets. The delivered price of maize in Abidjan from suppliers in countries such as Argentina is currently higher than prices of West African maize. The import parity price in Côte d'Ivoire sets a ceiling on prices that local buyers are willing to pay for West African maize. World market prices for grain have softened in 2014/15,[9] which may begin to put downward pressure on West African maize prices. The maize harvests in most of West Africa, however, were very good in 2014/15, which has kept prices at competitive levels (free-on-board, or FOB, prices at the Malian and Burkinabé border were slightly more than $200/mt in late 2014).

Although precise information is lacking on international sea freight charges to ship maize from a country such as Argentina to Abidjan, the costs are likely to be high. First, vessels have to be chartered, as there is no direct service from South America to West Africa. Charter rates are highly variable and depend on origin and destination, opportunities to find cargo in West Africa for a follow-up shipment, and the class (size) of vessel used. Most grain, particularly wheat and maize, is bulk-shipped rather than bagged and shipped in containers. One shipping web site quoted prices from $6,500 to $7,200 for a 40-foot container shipped from Rio Grande, Argentina, to Abidjan—equivalent to approximately $187-$206 per metric ton.[10] If these container shipping costs are factored in, Argentine maize is not competitive in coastal West Africa markets. Bulk shipping costs are typically much lower, but this team was unable to determine how much lower. Bulk grain is shipped in "handy-class" freighters with capacity of 15,000 to 35,000 metric tons. As average maize imports into Côte d'Ivoire are only 13,200 mt per annum, a typical maize delivery to Côte d'Ivoire from Argentina will not fill a sea freighter. This would tend to offset the cost advantage of bulk shipment over shipment in containers, unless a full freighter of maize (perhaps in combination with another grain) could be shipped to more than one West African destination (to Côte d'Ivoire and Ghana or Nigeria, for example).

It is also noteworthy that West African countries apply tariffs (see Table 3-1) to imports of grain from world markets—5 percent in Côte d'Ivoire and Senegal and 20 percent in Ghana on maize imports. Milled rice attracts duties of 10 percent in Côte d'Ivoire and Senegal and 20 percent in Ghana. This does not seem to deter rice importers. Côte d'Ivoire imported an average of nearly one million metric tons (990,000) of rice per year between 2009 and 2013; Mali imported an average of 255,200 metric tons per annum from 2008 to 2012, which reached a record high 421,554 mt in 2012; Ghana imported nearly half

Table 3-1. External Tariffs on Imports of Maize and Rice into Key West African Coastal Markets

	MFN* Tariffs for Maize	MFN* Tariffs for Rice
Côte d'Ivoire	5%: maize, maize seed	5%: paddy rice 10%: husked or brown rice, semi-milled or wholly milled rice, broken rice
Ghana	0%: maize seed for sowing 20%: maize, excluding seed for sowing	10%: paddy rice 20%: husked or brown rice, semi-milled or wholly milled rice, broken rice
Senegal	5%: maize, maize seed	5%: paddy rice 10%: husked or brown rice, semi-milled or wholly milled rice, broken rice

Note: MFN=Most-favored nation

Source: WTO

[9] U.S. maize export prices (U.S. No. 2 Yellow, FOB Gulf of Mexico) as of March 13, 2015, are 23 percent below the 2014 level at the same point in the marketing season ($171.46/mt in 2015 vs. $223.30/mt in 2014).

[10] By contrast, the cost to ship a 40-foot container from Le Havre, France, to Abidjan is $2,600 to $2,900 (equivalent to approximately $75 to $83/mt). These quotes are from http://worldfreightrates.com/

a million metric tons (482,600) per year from 2009 to 2013; and Senegal nearly 900,000 metric tons per annum (888,300) over the same period.[11]

In 2012, Côte d'Ivoire imported 23,800 metric tons of maize at a total value of $8.7 million, or $367/mt (UN Comtrade database). Sixty-four percent of this maize came from Argentina, at an average value of $348 per metric ton. From 2003 through 2013, 50 percent of all recorded maize imports were sourced from Argentina. In 2013, maize imports dropped by 84 percent to 3,800 metric tons and were mainly imported from South Africa at a cost of $1,021 per metric ton. Across all suppliers, the average import price was $986 per metric ton. This is surprising; this team can offer no plausible explanation for this high price and greatly decreased import volume. Maize imports as reported by Comtrade averaged 13,911 mt/yr. over the 10-year period 2004 through 2013.

World market prices for maize have dipped significantly in the past couple of years. Argentina had a record maize crop in 2014, where the harvest period is March through May, with an estimated 33,000 metric tons, which was 46 percent above the average annual production of 22,579 metric tons from 2009/10 through 2013/14. This has led to record maize exports (forecast at 19,000 metric tons during the 2014/15 marketing season, 21 percent above the average over the prior five marketing years (GIEWS 2015).

Although this analysis could be extended and deepened with further research, there is sufficient evidence to demonstrate that West African maize production is competitive in West African markets, including coastal cities with ocean ports. Maize is also the cheapest cereal grown in Mali, as shown in Table 3-2. In Mali in January 2015, millet was 46 percent more expensive at the producer/assembly market level than maize, while sorghum was 28 percent more expensive. The reasons for these differences are not entirely clear, but the team advances a couple hypotheses:

- In Mali (and other Sahelian countries), many consumers prefer millet and sorghum to maize, particularly in rural areas and for evening meals in urban areas. Maize has only become an important grain over the past 25 years or so, while millet and sorghum are the traditionally consumed grains.
- As maize has become a far more productive cereal than millet and sorghum, with much higher yields on average (2.1 mt/ha vs. 0.8 and 0.9 mt/ha respectively), maize marketed surpluses are larger than for the other coarse grains.

Table 3-2. Producer and Wholesale Prices for Selected Cereals in Mali (FCFA/kg)

	Producer Prices			Wholesale Prices			
Crop	**Millet**	**Sorghum**	**Maize**	**Millet**	**Sorghum**	**Maize**	**Rice**
Location	**Weighted National Averages**			**Segou**	**Segou**	**Sikasso**	**Segou**
January 2014	139	117	99	148	137	107	
December 2014	119	100	78	131	114	95	256
January 2015	115	101	79	121	113	89	268

Source: OMA 2015

It was surprising to note that maize prices are actually lower in northern Côte d'Ivoire than in southern Mali, as shown in Table 3-3. Maize is flowing more during the market season from northern Côte d'Ivoire to Mali than in the opposite direction. Some of this cross-border flow ends up being purchased by Senegalese traders in southern Mali, who haul it all the way to greater Dakar. The authors of this

[11] There are re-exports of rice imported through Senegal and Abidjan to neighboring countries. Rice imported through Abidjan is reportedly re-exported in significant volume to Ghana, which has a higher import duty. Figures as high as 100,000 mt/year are suggested, but this trade is not recorded, as smuggling takes place.

study project that strong increases in demand for maize in feed milling will alter these price relationships over the next couple of years, making Malian maize more competitive in the Ivoirien market.

Table 3-3. Producer and Wholesale Prices for Maize in Côte d'Ivoire, early February 2015 (FCFA/kg)

	Korhogo		Ouangolo		Bouake		Daloa	
	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum
Producer Prices	80	85	80	85	60	70		
Wholesale Prices	85	95	90	95	90	125	90	105
Retail Prices	90	125	100	150	100	200	250	

Source: OCPV 2015

Converting wholesale maize prices to USD per metric ton yields the following figures for Mali and Côte d'Ivoire in early 2015:

- $158/mt in Sikasso, Mali
- $147 to $165/mt in Korhogo and Ouangolo in northern Côte d'Ivoire

Adding transport costs of $35/mt (20,000 FCFA/mt) from Korhogo to Abidjan still brings the delivered cost of maize to Abidjan to no more than $200 per metric ton. If the transport costs from Sikasso to northern Côte d'Ivoire are assumed to add another 50 percent to shipping costs, Malian maize can likely be delivered to Abidjan at a price of $210/mt (or approximately 120 FCFA/kg). As this price is higher than feed millers in Abidjan were willing to pay (110-115 FCFA/kg) in late February 2015, Malian maize is not moving south to coastal Côte d'Ivoire at present. This should change with expanded demand for maize as feed (especially with the opening of a new IVOGRAIN feed mill in Yamoussoukro) or as a result of seasonal influences, such as the beginning of the cashew marketing campaign in March. As most wholesale maize traders in Côte d'Ivoire also collect and sell cashew seed, they shift their funds and attention to cashew and away from maize during the period of most intensive cashew assembly. This could create a later dry season export opportunity for Malian maize traders, although buyers from Senegal and Niger end up competing for the same maize stocks that Malian traders assemble.

4. DRIVERS OF REGIONAL MAIZE TRADE

4.1 MALI

4.1.1 POULTRY INDUSTRY

According to an assessment of Mali's agricultural sector by Michigan State University (MSU 2011), expenditure on meat and poultry represented 13.0 percent of urban consumers' food budgets in 2006 and 7.5 percent of rural consumers' food budgets, as shown in Table 4-1 below. This contrasts with the percentage of food expenditures allocated to grains: 33.1 percent for urban households (of which 20.3 percent was rice) and 45.6 percent in rural areas.

Table 4-1. Food Expenditure Shares in Urban and Rural Areas by Food Product, 1989 and 2006 (Percent)

	1989		2006	
	Urban	Rural	Urban	Rural
Sorghum	5.4	11.4	3.2	7.6
Rice	16.0	9.2	20.3	17.3
Millet	6.4	17.8	6.7	15.6
Maize	1.6	4.2	2.6	4.9
Wheat	1.9	0.5	0.3	0.2
Roots and tubers	1.7	0.9	3.0	1.0
Fruits and vegetables	12.8	11.6	5.8	8.2
Pulses	4.7	8.5	8.4	4.4
Fats and oils	4.4	2.7	4.9	3.8
Meat and poultry	15.1	6.9	13.0	7.5
Fish	6.0	5.6	5.3	5.5
Milk products and eggs	3.1	3.3	4.5	4.0
Sugar and sugar products	5.0	2.3	6.4	6.3
Other foods	15.9	15.0	15.6	13.7
Total	**100%**	**100%**	**100%**	**100%**

Source: MSU 2011

Maize is a major ingredient in poultry feed (typically 60 percent or more of the ration by weight) and increasingly in cattle fattening. According to the MSU 2011 study, the *Direction Nationale des Industries de Production Animale* (DNIPA) estimated that as of 2010, more than 30,000 tons of maize grain are used yearly as feed for cattle and poultry. This estimate has likely been exceeded in the past five years. Increasing urbanization in Mali has substantially expanded the demand for poultry, and semi-industrial and industry poultry production has emerged in peri-urban areas (Holtzman 2010). The Trade Hub's assessment of trade opportunities for the livestock value chain along the Bamako–Abidjan corridor (Holtzman et al. 2015) also showed that demand for maize and cereal processing byproducts is increasing among cattle fatteners in Mali.

4.1.2 CEREALS PROCESSING INDUSTRY FOR HUMAN CONSUMPTION

Large grain millers are producing maize flour for human consumption and some grits for use in beer brewing as sidelines to their focus on wheat and rice milling. They are also using maize as an ingredient in livestock feed. Most other maize milling in urban areas is done by hammer mills located in residential areas, to which households take purchased grain in modest amounts (5 to 100 kg) to mills for batch processing. Payment is typically per kilogram or in the form of maize bran, which is sold as livestock feed.

According to the MSU study, a dozen women's milling units were promoted in the *Compagnie malienne pour le développement du textile* (CMDT) zones in the 1980s, but they were not economically viable and fell out of operation. The MSU study also noted that the *Zones Greniers* program, launched by the Ministry of Agriculture and the Alliance for Green Revolution in Africa (AGRA), had planned create or rehabilitate 10 to 20 milling units (each one with a processing capacity of 300 to 600 tons per year) in villages in the Sikasso region (Teme et al. 2010). This program never really got underway, due to the political difficulties in Mali that started in early 2012.

There are several large rice mills in the Niger River valley near irrigated paddy production zones, including MMM in Segou and *Grand Distributeur Céréalier au Mali* (GDCM) in Bamako. Most paddy is processed by small-scale village dehullers (*décortiqueuses*) and ends up having a high proportion of broken grains. There is little evidence that milled rice is exported from Mali, although there are some reports of modest volumes of rice crossing from Segou/Mopti into Mauritania.

4.1.3 ALTERNATIVE USES OF MAIZE

Maize grits are used in brewing beer. According to the MSU study, *La brasserie du Mali: Bramali,* the principal brewery in Mali, uses some 1,080 metric tons of maize grits in its brewing process, which are supplied by GMM.

Large industrial mills in Mali have a processing line for maize, which goes into livestock feed mixes. These mixes also may include wheat or rice bran, an oilseed cake (such as cottonseed cake, groundnut cake, or molasses), sometimes fish or bone meal, and other grains or their milling byproducts (e.g., millet bran).

Bread makers in Sahelian countries, including Mali, have experimented with substituting some maize, sorghum, or millet flour for wheat flour. The results appear to be inconclusive, although substituting up to 10 percent is considered feasible in bread-making (personal communication, Richard Cook). As this is purely an import substitution opportunity (up to 10 percent local grains for imported wheat), it has not been pursued this as part of this trade assessment. The MSU study notes that Malian bakers are willing to substitute maize flour for 5 percent of wheat flour in bread-making; it estimates potential demand of more than 15,000 tons of maize grain per year as a result, citing a study by Koné (2005).

4.2 CÔTE D'IVOIRE

4.2.1 POULTRY INDUSTRY

The poultry industry in Côte d'Ivoire is poised to expand further, up from an already-significant base. The SIPRA group has received an International Finance Corporation (IFC) investment of 1.5 billion FCFA and a West Africa Emerging Markets Growth fund investment of 1.0 billion FCFA. SIPRA plans to expand its output of day-old chicks (through its subsidiary IVOIRE POUSSINS), its production of livestock feed (through its subsidiary IVOGRAIN), and its Abobo-based production and slaughter unit COQIVOIRE. IVOGRAIN is by far the largest feed producer in Francophone West Africa, producing some 12,000 metric tons per month of maize-based feed at its Yopougon (Abidjan) plant. This will soon

more than double with the opening of a second feed mill, with bulk storage silos, in Yamoussoukro. IVOGRAIN estimates that over 80 percent of its feed is used in poultry production, with other feed formulated for fish, cattle, hogs, rabbits, and small ruminants.

Until the Yamoussoukro facility opens, IVOGRAIN cannot supply feed to interested regional buyers. The firm supplied a couple thousand metric tons of feed to Mauritania several years ago, but this ceased. An interested buyer in Burkina Faso has asked for 1,000 metric tons of feed, but IVOGRAIN cannot satisfy external demand at this point. With a more than doubling of feed mixing capacity, this could well change.

A competing feed miller in Yopougon (FACI) is currently producing 2,000 mt/month but plans to expand to 2,500 to 3,000 mt/month in the second half of 2015. Its principal feed ingredient is maize but, depending upon price relationships, it formulates feed at least cost using a wide range of ingredients, including soybeans, wheat bran, copra, palm oil cake, rice flour and bran, cottonseed cake, and fish meal. FACI relies on a handful of wholesale suppliers with whom it has done repeat business; there are no formal contracts with or pre-financing of these suppliers. FACI's storage capacity is 5,000 metric tons on-site. The firm's commercial director mentioned exports of containers of feed to Gabon, as well as exports of day-old chicks to Burkina Faso and Mali.

4.2.2 CEREALS PROCESSING INDUSTRY FOR HUMAN CONSUMPTION

As in Mali and many other parts of West Africa, consuming households process maize in Côte d'Ivoire in hammer mills. They buy the grain and bring it to neighborhood mills. Two firms that buy local cereals for food processing are PKL and Nestlé.

PKL produces both grits for a major brewery and processed foods with maize and soybeans (and some sorghum) as major ingredients. Soybeans are more difficult to source than maize in Côte d'Ivoire, so PKL has sourced some soybeans from Togo and Burkina Faso. At present, PKL can process 200 kilograms of grains per hour, but it is acquiring new equipment that will increase its capacity by a factor of five or more (to 1.0 to 1.5 metric tons per hour). PKL exports some of its processed products to Senegal and Burkina Faso in containers—by sea to Dakar and by rail to Burkina Faso. Retail packs of PKL products are sold in supermarkets, superettes, and pharmacies. The firm prefers to source its maize from the domestic market, particularly the drier and cleaner maize of northern Côte d'Ivoire (around Korhogo), but it keeps an eye on the international market price. It cited its maize requirements, once all the new equipment comes on line, as 7,000 metric tons per annum.

In Côte d'Ivoire, the Nestle Group buys West African-produced millet and red sorghum for some of its processed products, such as Milo, Burvinta, and Cerelac. Due to limited lime and the unavailability of a Nestle manager for a meeting, the study team was unable to obtain details.

4.2.3 BREWERIES AND MILLS

The *Nouvelle Brasserie de Côte d'Ivoire* (NBCI) buys some 3,000 metric tons of maize grits from PKL, the Abidjan-based food processor, but mainly from Argentina. NBCI is a company that produces and distributes soft drinks in Cote d'Ivoire under license from Monarch Beverages, an American firm. The company offers quality products using the latest technologies. Marketing efforts by Premium Foods to supply NBCI with grits have not resulted in sales because Premium Foods' prices have not been competitive.

4.3 ECOWAS PROVISIONS FOR CEREALS EXPORTS

The policy to liberalize trade. West African countries have made various commitments to remove restrictions on exports and support free trade in the region. Examples include Article 3 of the 1993

Economic Community of West African States (ECOWAS) Treaty (Vision of a common market), which included the "removal of barriers to the free movement of persons, goods, services and capital;" Article 35 of the ECOWAS treaty (with a 10-year old objective to establish a customs union and remove trade restrictions and bans); and the 2003 West Africa Economic Monetary Zone (UEMOA) treaty, in which signatories commit to refrain from creating new restrictions on exports and to work together for the gradual reduction of existing restrictions. ECOWAS and UEMOA have trade liberalization schemes based on the introduction of improved laws and regulations in favor of free trade (the ECOWAS Trade Liberalisation Scheme, or ETLS, and the UEMOA community preferential tariff).

The gap between policy and reality. Over the past few years policymakers at both national and local levels in Benin, Burkina Faso, Guinea, Mali, Senegal, and Togo have often imposed seasonal restrictions on exports when pre-harvest estimates indicate lower cereal production than in the previous year (or lower than initially forecast). A study by USAID's Agribusiness and Trade Promotion/Expanded Agribusiness and Trade Promotion (ATP/E-ATP) project revealed that restrictions on exports can take various forms, including the following:

- official restrictions (with no time limit)
- seasonal official restrictions (with a specific time limit)
- unofficial, although real restrictions (where traders are turned back from borders)
- administrative restrictions (when the regional governor's approval is required for exports or the certificate of origin for livestock is used as a quantitative restriction on trade)

Once established, restrictions on exports are not often removed or even reviewed. This perpetuates the harassment. National and local policymakers who impose restrictions on exports argue that these measures help improve food security. The restrictions, however, are not efficient.

The cost and who pays. Bans on exports mean that farmers and traders can sell only in their own country and that processors can source only from their own country, even though farmers could obtain better prices if the regional market were accessible. Seasonal restrictions on cereals trade during the most important marketing periods of the year significantly reduce regional trade or create new incentives for road harassment, even on transport of processed food products. They also introduce an element of unpredictability to trade. Restrictions on exports also deter those who might have considered scaling up their operations to take advantage of regional markets for food and processed goods. In the short term, export bans make it easier for a country to feed its urban consumers while also reducing the income of farmers and food processors and decreasing incentives for

Figure 4-1. ECOWAS Rules for Staple Foods Trade

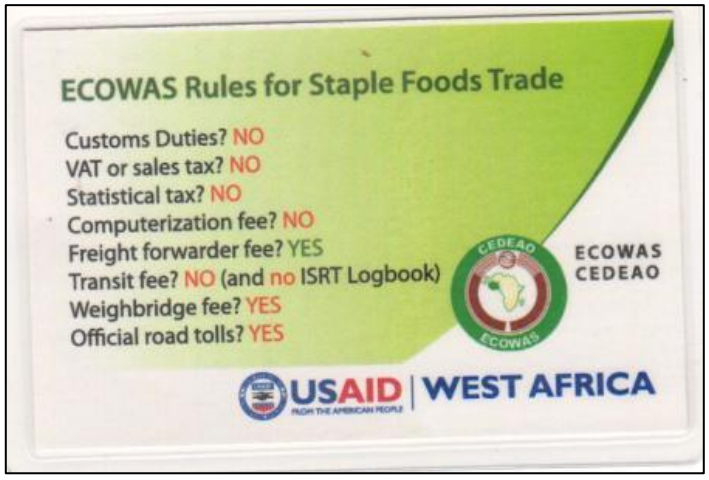


Figure 4-2. Documents Required for Trading in Staple Foods

traders (who are potential exporters). Traders always find a way around restrictions, usually by bribing the officials and law enforcement agents as well as customs officers.

The cards shown in and Figure 4-2 summarize ECOWAS provisions for cereal exports in West Africa. The card in Figure 4-2 clearly shows the documents that are needed and those that are not needed to conduct intra-regional cereals trade. Rather than looking to see whether shippers comply with these requirements and then accepting their compliance and passing them through checkpoints, police, gendarmes, and *douanes* (customs) officers, known as PDG, often look for or invent reasons to extract illegal payment for presumed or falsely claimed instances of noncompliance

5. CONSTRAINTS TO INCREASING CEREALS TRADE

5.1 ROAD HARASSMENT

PDG officials staff checkpoints along major roads and at border crossings throughout West Africa. There are numerous checkpoints, which require trucks to stop and increase transport time. Transport costs are also increased by informal payments made to these officials. These informal payments may enable transporters to avoid fines or larger penalties for trucking infractions (i.e., technical violations) or overloading, which is common in long-distance grain shipments.

In its most recent report on road harassment, CILSS cited 17 checkpoints along the roads travelled by grain traders moving from Bouaké to the Burkina Faso border, a distance of 318 kilometers (CILSS 2015). Hence, there is a checkpoint on average every 19 kilometers, which by any metric is excessive. In cereals trade from Koutiala, Mali, to the Senegal border, CILSS reports 34 stops over a distance of 1,184 kilometers. According to the CILSS report, trucks carrying grain or livestock face the highest unofficial payouts in Mali, as compared to other survey countries (Burkina Faso, Niger, and Senegal in the Sahel, and Benin, Côte d'Ivoire, and Ghana on the coast). The weighted (by kilometers traveled) average cost of informal payments per kilometer of road traveled in Mali and northern Côte d'Ivoire was $0.63 (or $0.016 cents per metric ton per kilometer). Using data for unofficial payouts on cereals transport in northern Côte d'Ivoire and along the Koutiala–Senegalese border route, the study team estimates informal payments as $249.57 along the Sikasso–Abidjan corridor. This is equivalent to $.30 per kilometer (or $0.008 per metric ton per kilometer), less than half of the cost in Mali and northern Côte d'Ivoire. The extra time required to negotiate the checkpoints in northern Côte d'Ivoire (a 318 kilometer stretch) was about an hour (or almost 19 minutes per 100 kilometers), while it was only six minutes per 100 kilometers in Mali.

Note that the border crossing costs from Mali into Côte d'Ivoire do not appear to be factored into CILSS estimates. Cereals traders in southern Mali report that they pay 50,000 FCFA per truck to leave Mali, or $88 ($2.20 per metric ton). It is not uncommon to pay 250,000 FCFA per truck crossing from Côte d'Ivoire into Mali. This is equivalent to about $440 per truckload of grain, or $11 per metric ton. Because of this high cost, Malian wholesale traders in Sikasso assemble maize in northern Côte d'Ivoire and have it shipped into Mali along secondary roads in smaller vehicles. Given these high costs, it is not surprising that there is not more grain moving from surplus regions in Mali to coastal markets. A large portion of the unofficial costs appear to include unnecessary, duplicative documentation, including a second set of certificates of origin and phytosanitary certificates requested by the Ivoirien authorities, and even import permits. Yet it is also important to note that export permits are not being granted by the office of the *Direction Nationale du Commerce et de la Concurrence* (DNCC) in Bamako, which has the sole authority to issue them.

5.2 BORDER CROSSING CONSTRAINTS

Crossing the border with a truckload of cereals is always problematic and subject to harassment. Most shipments lack the administrative and trade documents required to move goods across borders in West Africa: an export certificate, a phytosanitary certificate, a bill of sale or other waybill, and an import permit. Furthermore, trucks—particularly vehicles hauling grain, oilseeds, or other agricultural products—are often overloaded, contravening ECOWAS regulations limiting loads to 50 metric tons per truck (with a lower weight imposed by Ghana). Many shipments also lack the required documentation for transport.

5.3 OTHER CONSTRAINTS

Other constraints to increasing cereals trade include the following:

1. *Access to finance,* especially working capital, which limits what a trader can buy and store.
2. *Access to well-designed storage.* Note that storage is linked to finance; as many informal traders lack working capital, they are unable to stock a lot of cereals, so they do not need significant warehouse space.
3. *Access to transport.* Seasonal availability and demand for transport to ship cotton in Mali and cashews in Côte d'Ivoire affect supply and cost.[12]
4. *Axle load limits* that are often exceeded. There are few weigh stations along major roads, and even where they do exist, drivers of overloaded trucks can bribe their way through the stations and continue to move with excess cargo. This speeds up road degradation.
5. *Difficulty or inability to obtain export permits* (from the DNCC in Mali and from Burkina Faso). This is likely tied to seasonal export bans.
6. *Non-implementation of ECOWAS free trade agreements* (duplicative, unnecessary paperwork; checkpoints; shakedowns).

Most cereals traders lack collateral to offer as a guarantee to banks. Few own their own storage facilities or trucks, although the four or five largest traders in Mali and Burkina Faso do own both. Banks in Mali will offer credit to traders if they have collateral and if they work with Auxigages, a guarantor and third party inspection/verification and warehouse management firm active in most of West Africa. Both BNDA and *Banque Régionale de Solidarité* (BRS) are providing working capital to the largest grain traders in Mali; they insist that Auxigages play a role. Auxigages also arranges for maize going into storage be treated with insecticides to avoid losses to pests in storage. Auxigages will inspect warehouses and it uses a double lock and key system on storage warehouses. This allows for meticulous tracking of all grain going into and leaving the facility. Some traders find Auxigages's services expensive and say they are a disincentive to cross-seasonal storage. These traders state that high monthly fees (for example, 200,000 FCFA was paid by a Segou-based trader to Auxigages) compel them to store grain for short periods.

Transport costs vary greatly over the marketing season. A 40-ton truck that rents for 300,000 to 350,000 FCFA on the Bamako–Abidjan corridor can double in cost during periods of peak trucks to transport cotton to gins and from gins to ports. Illustrative truck rental costs are shown in

Table 5-1. Grain Shipping Costs in Mali and Côte d'Ivoire, February 2015

	FCFA/mt	$/mt	km	$/mt/km
Shipping within **Mali**				
Koutiala to Bamako	15,000	$26.32	317	$0.08
Koutiala to Sikasso	7,500	$13.16	134	$0.10
Segou to Bamako	12,500	$21.93	240	$0.09
Segou to Sikasso	10,000	$17.54	295	$0.06
Sikasso to Bamako	12,500	$21.93	235	$0.09

[12] There is probably nothing the Trade Hub can do about these seasonal factors.

Shipping within **Côte d'Ivoire**				
Korhogo to Abidjan	20,000	$35.09	595	$0.06
Bouaké to Abidjan	12,500	$21.93	344	$0.06
Bouaké to Agnibilekrou	11,250	$19.74	270	$0.07

Table 5-1. Average transport costs in the second half of February 2015 for shipping cereals were $0.08/mt/km in Mali and $0.06/mt/km in Côte d'Ivoire. Part of this difference can be attributed to 10 percent higher fuel costs at the pump in Mali than in Côte d'Ivoire. These costs vary and can be higher, depending on the supply of and demand for trucks. Trucking costs are higher during both the cotton harvest and export period in Mali, and the cashew assembly and export season in Côte d'Ivoire, than during other periods.

Table 5-1. Grain Shipping Costs in Mali and Côte d'Ivoire, February 2015

	FCFA/mt	$/mt	km	$/mt/km
Shipping within **Mali**				
Koutiala to Bamako	15,000	$26.32	317	$0.08
Koutiala to Sikasso	7,500	$13.16	134	$0.10
Segou to Bamako	12,500	$21.93	240	$0.09
Segou to Sikasso	10,000	$17.54	295	$0.06
Sikasso to Bamako	12,500	$21.93	235	$0.09
Shipping within **Côte d'Ivoire**				
Korhogo to Abidjan	20,000	$35.09	595	$0.06
Bouaké to Abidjan	12,500	$21.93	344	$0.06
Bouaké to Agnibilekrou	11,250	$19.74	270	$0.07

Source: Interviews with traders

OPAM, the Malian food security agency, plays an important role in cereals markets in Mali. It is mandated to support cereals producers, providing attractive prices and the distributing grain at affordable prices to poor consumers. It calls for bids to supply large volumes of cereals. OPAM purchases some 40,000 to 50,000 metric tons per year. At a recent cereals exchange in Segou, it was by far the largest buyer of grain, purchasing 17,000 metric tons of millet and sorghum at 175,000 FCFA/mt ($307/mt) and 10,400 metric tons of rice at 300,000 FCFA/mt ($526 per metric ton). The total cost of these purchases was 6.095 billion FCFA ($10.7 million). The prices paid by OPAM—175 FCFA/kg for millet/sorghum and 300 FCFA/kg for rice—were higher than the wholesale prices quoted by a leading cereals trader based in Koutiala, which were 135 FCFA/kg for millet and 125 FCFA/kg for sorghum, and higher than the average wholesale rice prices in the Segou region noted in the OMA monthly bulletin for January 2015 (which were 256-268 FCFA per kilogram).

6. RECOMMENDATIONS

The main recommendations for increasing cereals trade in the sub-region surrounding the central (Bamako–Abidjan) corridor are grouped into two categories: short-term recommendations, and medium- to longer-term recommendations.

Short-term recommendations:

1. Seek to expand maize trade through direct engagement with sellers and buyers. The Trade Hub should encourage the use of well-conceived contracts that take into account key features of a sound trade deal: clear language and delivery terms; transport arrangements; quality specifications (including those for moisture content, allowable foreign matter, mycotoxin limits); financial/payment arrangements; and penalties for non-compliance. In collaboration with WAGN, the Trade Hub can address this issue collaboratively.
2. Promote linkages between export-oriented, larger-volume Malian maize traders and Côte d'Ivoire feed mills (IVOGRAIN and FACI) and with PKL. The Trade Hub should identify exporters in Mali (and Burkina Faso) who are willing to pursue exports to coastal markets and educate them about buyer requirements. A study tour could be organized in Côte d'Ivoire for selected Malian and Burkinabé wholesale cereals traders who wish to meet with selected Ivoirien buyers.
3. Work with private buyers and sellers to raise their awareness of aflatoxin contamination issues and help them understand how they can address this problem in the maize trade in West Africa.

Medium- and longer-term recommendations:

1. Remove non-tariff barriers to trade in agricultural products, particularly cereals. Provide technical support and grants to Borderless Alliance and WAGN to address border crossing problems and PDG harassment along major trade routes. These organizations should inform members and shippers of minimal yet necessary documentation. The Borderless Alliance border information center should play a key role by providing adequate information to truckers and traders.
2. Reinforce and encourage cereals trading relationships between Korhogo, Sikasso, and Bobo Dioulasso traders. Organize a sub-regional maize exchange to develop buyer-seller linkages among producers, traders, and processors in the maize triangle formed by the three key maize production zones.
3. Encourage governments to support, not impede cereals trade. WAGN and ROPPA should strengthen policy enforcement by carrying out advocacy actions to liberalize intra-regional trade in cereals. To reinforce ECOWAS regulations on the free movement of people and goods, these organizations should organize advocacy actions and lobby key government officials and national legislatures in selected West African countries. NGOs and producer associations can also be invited to participate. The Trade Hub should work with these organizations to develop compelling and focused messages and advocacy points.
4. Organize workshops with regional value chain stakeholders on structuring and negotiating formal contracts for intra-regional cereals trade. These workshops would build on lessons learned from earlier experiences promoting intra-regional maize trade.
5. Hold initial meeting with Ali Ouattara's integrated poultry complex, which by all reports is the second-largest animal feed producer and user in Côte d'Ivoire, after IVOGRAIN. As this firm is located close to the Ghanaian border, it has potential to influence the maize trade between the two countries. Depending on what is learned in initial meetings, the Trade Hub may be able to expand cross-border cereals or animal feed trade between the two countries, which can contribute to the project meeting its cereals trade targets.

REFERENCES

ACDI/VOCA. 2015. "Market Status Report on Maize, Paddy Rice, and Soybean." Prepared for the Agricultural Development and Value Chain Enhancement II (ADVANCE II) project of USAID/Ghana. January 2015.

APEX. 2015. « *Etude diagnostique opérationnelle des filières mais et soja dans les régions administratives de mise en oeuvre du PARFACI.* » Fiches Actions, January 2015.

APEX (Agriculture, Performance, Expertise) and FIRCA (Fonds interprofessionels pour la recherche et le conseil agricoles). 2014-2015. « *Etude diagnostique opérationnelle des filières maïs et soja dans les régions administratives de mise en oeuvre du PARFACI.* » Côte d'Ivoire. October 2014–January 2015.

Banyan Global and SSG Advisors. 2015. "Feed the Future Finance and Investment Opportunities Report." Prepared for the Trade Hub and African Partners Network. February 2015.

CILSS (*Comité Permanent Inter-Etats de Lutte Contre la Sécheresse dans le Sahel*). 2014. « *Le flux des échanges transfrontaliers des produits agricoles en Afrique de l'Ouest.* » *Programme Régional d'Appui Accès aux Marchés (PRA/Accès aux Marchés).* December 2014.

CILSS. 2015. « *Rapport sur les Tracasseries Routières.* » (*PRA/Accès aux Marchés*). January 2015.

CTA. 1992. « *Le technicien de l'agriculture tropical : Le sorgho.* »

ECOWAS (Economic Community of West African States). 2012. "Supplementary Act/Sp.17/02/12 Relating to the Harmonization Of Standards and Procedures for the Control of Dimensions, Weight and Axle Load of Goods Vehicle within Member States of the Economic Community of West African States." Fortieth Ordinary Session of the Authority of the Heads of State and Government. Abuja, Nigeria. February 16–17, 2012.

ECOWAS and PACA (Partnership for Aflatoxin Control in Africa). 2013. "Communiqué on the Regional Workshop on the Aflatoxin Challenge in West African States." Alisa Hotel, Accra, Ghana. November 18-20, 2013.

FAO (Food and Agriculture Organization of the United Nations). 2014. "FAOSTAT." Accessed at http://faostat3.fao.org/home/E

FIRCA. 2014. « *Etude pour une stratégie concrète et opérationnelle de mobilisation des ressources des cotisations professionnelles auprès de la filière mais pour le compte du FIRCA.* » Abidjan, Côte d'Ivoire. December 2014.

Ghana Highway Authority. 2014. "Implementation of Axle Load Limitations under Road Traffic Regulations 2012." January 6, 2014.

GIEWS (Global Information and Early Warning System on Food and Agriculture). 2015. "GIEWS Country Briefs: Argentina." Produced by the FAO. Accessed at http://www.fao.org/giews/countrybrief/country.jsp?code=ARG

Holtzman, John S. 2010. "An Initial Overview of the Poultry Value Chain in Selected West African Countries." Prepared for the Expanded Agribusiness and Trade Project by Abt Associates, Bethesda, MD, January 2010.

Holtzman, John S., Daniel Kaboré, Moussa Tassembedo, and Raissa Adomayakpor. 2013. *« Burkina Faso: Indicateurs de l'Agro-business. »* Report No. 94327; working paper prepared for World Bank Group, Washington, D.C. May 1, 2013.

Holtzman, John S., Seydou Sidibé, and Sarah Kozyn. 2015. "Opportunities for Increasing Livestock Trade in the Mali–Côte d'Ivoire Corridor." Prepared for the Trade Hub and African Partners Network by Abt Associates Inc., Bethesda, MD, February 2015.

Holtzman, John S. and Kokou Zotoglo. 2015. "Mali/Côte d'Ivoire Cereals Trade." PowerPoint presentation prepared for the Trade Hub and African Partners Network. March 5, 2015.

Koné, Oumar S. 2005. « *Plan marketing pour les produits issus de la transformation du maïs (brisures, farines et semoules.* » Prepared by the *Réseau d'Appui et de Recherche Pour le Développement Durable et la Sécurité Alimentaire* (RADSA) for Afrique Verte. August 2005.

Michigan State University Food Security Team, Department of Agricultural, Food and Resource Economics. 2011. "Mali Agricultural Sector Assessment, 2011." Prepared for USAID/Mali-AEG under the Food Security III Cooperative Agreement. USAID/Mali-funded PROMISAM II Associate Award. April 2011.

OCPV (*Office d'Aide à la Commercialisation des Produits Vivriers*). 2015. « *Bulletin sur le marché du maïs. » Les Nouvelles des Prix Agricoles,* 27/02/15-No. 67. February 2015. Accessed at http://nouvellesdesprixagricoles.blogspot.fr/

OMA (*Observatoire du Marché Agricole*). 2015. « *Bulletin mensuel : Produits céréaliers.* » Government of Mali. January 2015.

RONGEAD (*Réseau Non-gouvernemental Européen sur l'Agroalimentaire, le Commerce, l'Environnement et le Développement*)-ONG Chigata. 2014. « *Diagnostique de la filière mais en Côte d'Ivoire, Projet 'Redynamiser les productions, l'accès au marché et le conseil agricole pour les filières vivrières et commerciales du Nord de la Côte d'Ivoire.'* » Abidjan, Côte d'Ivoire.

Teme, Bino et al. 2010. « *Modèle de transformation intégrée des 'Zones Greniers' au Mali: Développement de la Zone Grenier pilote à Sikasso.* » Ministry of Agriculture and the Alliance for a Green Revolution in Africa (AGRA). Bamako, Mali. April 28, 2010.

UEMOA (*Union Economique et Monétaire Ouest-Africaine).* 2005. « *Règlement N° 14/2005/Cm/UEMOA Relatif à l'harmonisation des Normes et des Procédures du Contrôle du Gabarit, du Poids, et de la Charge a l'essieu des Véhicules Lourds de transport de Marchandises dans les Etats Membres de L'union Economique et Monétaire Ouest Africaine (UEMOA).* » *Le Conseil des Ministres.* December 16, 2005.

"UN Comtrade Database." United Nations (UN). Accessed at http://comtrade.un.org/

Zotoglo, Kokou. 2015. "Cereals seasonal export bans in West Africa." Prepared for the Trade Hub and African Partners Network by Abt Associates, Bethesda, MD. (See section on "Required documents for traders exporting maize from Ghana to West Africa.")

ANNEX A: TERMS OF REFERENCE

Increasing Trade in Cereals Value Chains along the Bamako–Abidjan Corridor

1. Introduction

USAID/West Africa's Mission-wide goal is the West-African led advancement of social and economic well-being. This goal is supported by several development objectives, including "broad-based economic growth and resilience advanced through West African partners." The Trade Hub and African Partners' Network Project (the "Trade Hub") will contribute to this development objective by achieving two critical intermediate results:

1) Improving the capacity of West Africa's farmers and firms in targeted regional and global value chains.
2) Improving the business enabling environment by addressing transport constraints and trade barriers affecting the efficiency of the region's corridors and borders.

The Trade Hub will work through regional private sector associations and regional governmental entities to help channel all partners' efforts in a way that will address critical constraints to trade competitiveness, capture opportunities to expand trade, demonstrate West Africa's productive potential to investors, and facilitate greater investment in the region. Its results will include both an increase in 1) regional trade in key agricultural commodities, a critical Feed the Future (FTF) indicator, and in 2) value-added global exports, a targeted indicator for the Africa Competitiveness and Trade Expansion (ACTE) Initiative, which ultimately aims to increase Africa's share of world trade.

The project will build the capacity of several key groups of African partners—regional private sector associations and alliances, the Economic Community of West African States (ECOWAS), the Economic and Monetary Union of West Africa (UEMOA), a multi-donor funded Transport and Facilitation Observatory, and Global Development Alliances with private sector companies. As the Trade Hub works with associations and regional alliances, it will help them serve as leaders in promoting reforms, attracting buyers and investors, and adopting improved practices. Eventually, the Trade Hub's partners will act independently and take on even greater leadership roles.

The Trade Hub's major components are:

- Regional staple foods development (livestock and grains)
- Global value chain development (targeted agro-processing and manufactured consumer goods)
- Finance and investment
- Transport and the trade enabling environment
- Capacity building
- Communications
- Administration and management, including grants administration

2. Context of the assignment

Identification and prioritization of opportunities for increasing trade in the cereal value chain along a targeted trade corridor.

3. Objectives

3.1 General Objective

The general objective of the assignment is to identify and prioritize opportunities for increasing cereals trade with respect to the FY 15 targets below for the Feed the Future value chains:

Value chain	Baseline along CILSS monitored corridors	Five-year target	Increase needed
Maize	$9,941,354	$14,912,030	$4,970,676
Rice	$1,386,287	$2,079,430	$693,143
Millet	$501,036	$751,554	$250,518
Sorghum	$586,745	$880,118	$293,373

These targets are for the four corridors that the Trade Hub has targeted with significant cereals trade (a fifth corridor is focused on livestock). This exercise will work on the Bamako–Abidjan corridor because it possesses the highest potential to increase trade in the immediate term (40 percent of the baseline value was traded along this corridor). Lessons learned from this exercise will be applied in the Trade Hub's interactions with value chain actors in the other targeted corridors.

3.2 Specific objectives

The specific objectives are the following:

- **Existing trade**: How much is being traded along this corridor? Who are the principal actors in this corridor?
- **Market opportunities**: What buyers would be interested in increasing purchases? What requirements do they have (quantity, quality, timing, prices, delivery). What new market outlets could be developed? If these opportunities were identified, how much new trade would result?
- **Private sector needs and constraints:** Is there a lack of market information? Is the supplier not able to supply the product at a competitive price? Does the buyer have standards that the seller does understand or cannot meet? Is there a problem with financing? Is it hard for buyer and seller to communicate with or trust each another? Are there recent bad trading experiences that have soured either suppliers or buyers on the intra-regional trade? Are there problems with the enabling environment? Do imports from the international market undercut incentives for intra-regional trade by capturing coastal markets for selected products and certain consumer groups?
- **Responding to private sector needs**: Could the project provide training, assistance with access to finance, or trade facilitation? Could an association provide better market information or training? Are there problems related to the enabling environment, e.g., are new regulations required or better enforcement?
- **Priority activities**: What activities is the project best equipped to carry out and would they bring an adequate return in terms of increased trade, to achieve the FY 15 targets as presented above?

4. Expected Results and Deliverables

The expected result is a 20 pp. document that includes:

- Analysis of existing trade (including quantities sold at major markets, names and contact information for major buyers and sellers, and a map showing production areas and markets).
- Analysis of market opportunities including suggestions of potential deals.
- Analysis of private sector needs in order to capture the opportunities.
- Possible project and partner response to private sector needs.
- Priority activities for the project and partners to undertake, ideally to achieve a 20% increase in trade by the end of FY15 and a 50% increase by the end of 2018. This section will be written in a format that could become an addendum to the project work plan.

5. Methodology

The work will be carried out in phases by a combination of project staff and a Senior Agribusiness Advisor.

Initial analysis via desk work (Feb. 2–10): Using project files, CILSS data, internet research, email inquiries, and phone interviews, the VC team will collect and write up basic information on existing trade and major actors:

- Trade flow data for the previous two to three years, including data by major supplying region and market destination
- Urban population data for Korhogo, Bouake, Yamoussoukro, Abidjan, and selected other market destinations.
- Any recent urban food consumption/expenditure/income survey for Abidjan and other Ivoirian cities, which would provide breakdowns in quintiles by income, since this would help understand the market for cereals.
- COMTRADE data (volume and value data on annual imports into Côte d'Ivoire and exports from Mali and Burkina Faso) for the last five years, with import data disaggregated by supplying country.
- Cost of transport data, per metric ton per kilometer along major trucking routes from Mali to Côte d'Ivoire.
- Maps showing costs of corruption, number of checkpoints, and delay data for the last two or three years.

The team will develop a first cut of possible market opportunities and their estimated value. The communications specialist will prepare a rough working map showing production areas and markets along the corridor.

Preparation for field work (Feb. 11–13). The VC team and agribusiness advisor will discuss the findings of the initial analysis, plan the field work, and finalize the report outline. Key informant interviews should be scheduled with the following:

Cereals market association

- Key traders or market monitors
- Recent studies about the cereals value chain in this corridor
- Ministries of agriculture in both countries for production data and lists of producers

Initial Field work (Feb. 16–18). The cereal value chain specialist of the Trade Hub team will carry out field work in Mali.

Second phase of field work (Feb. 19–27). The cereals specialist and agribusiness specialist will carry out field work along the corridor.

Draft Report and mission presentation (March 2–4). The VC team, agribusiness specialist, and communication specialist will complete a first draft and present a summary of the findings to the mission on/about March 5th in Accra Time permitting, the team will meet with buyers in the Accra/Tema market to understand demand for livestock products shipped along the Ouagadougou–Accra/Tema corridor.

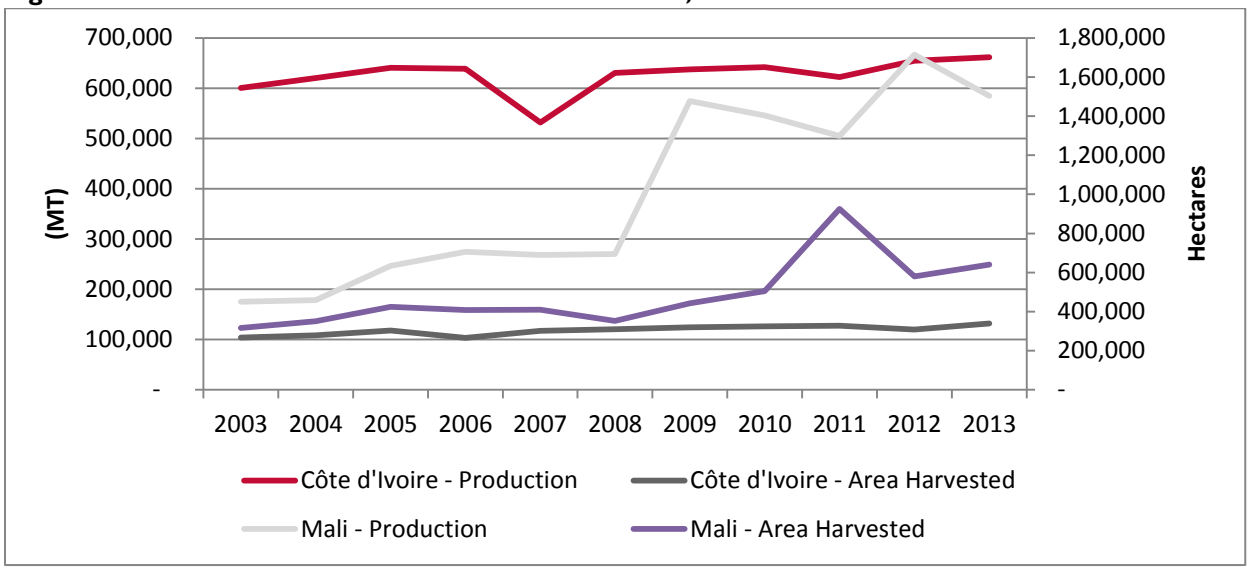
Completion of the report (March 5–12). The VC team leader, agribusiness specialist, and communication specialist will complete the report.

ANNEX B: LIST OF PERSONS MET

1. Halatou Dem, Dayana Cereales, processing
2. Moctar Traore, Financial Access Facilitator
3. Ousmane Gnana, Trade Specialist, CVC
4. Souleman Nimaga, Trader, *Marche central de Bamako*
5. Chaka Boueré, Commerçant riz à *Niono place* (Bamako)
6. Mama Toure, *Société Malienne de Commerce des Céréales*
7. Sako Assama, Commerçant petit mil et sorgho au *Marché Aregda* (Bamako)
8. Sidiki Badian, SDF, Koutiala
9. Yakouba Keita, SKC, Segou
10. Moussa Keita, SKC, Segou
11. Isaïe Siané, Responsible, Auxigages, Segou
12. Zakaria Traore, Executive Secretary, APLS, Sikasso
13. Daouda Sidibe, President, APLS, Sikasso
14. Mama Dao, Responsable à l'Organisation, APLS, Sikasso
15. Kalilou Diallo, Treasurer, APLS, Sikasso
16. Ouattara Yakouba, Convoyeur, UCOVISA
17. Mme Jeanne Sekongo-Coulibaly, President, UCOVISA
18. Emmanuel Sekongo, Director, UCOVISA
19. Etienne Sekongo, Informaticien, UCOVISA
20. Yeo Adam, Pisteur, Korhogo
21. Ibrahima Coulibaly, Commerçant de gros, Korhogo
22. Coulibaly Sina, Gestionnaire grand moulin riz, Korhogo
23. Traoré Tahirou, Commerçant de gros, Korhogo
24. Diawara Aboubacar Marifa, Commerçant, *Marché de Gros de Bouaké*
25. Dao Amara, Directeur d'Exploitation, *Marché de Gros de Bouaké*
26. Dembele Oumar, President, *Société Coopérative Benkelema*
27. Coulibaly Sidy, Vice-President, *Société Coopérative Benkelema*
28. Djarassoba Tsokoroba, Commissaire au Compte, *Société Coopérative Benkelema*
29. Adam's Traoré, Techno-Commercial, IVOGRAIN
30. Soro Lenitelehe, Directeur Technique et Commercial, FACI
31. Koffi Kouamé Siméon, Directeur Commercial, PKL
32. N'ZI Kouakou Florentin, Executive Secretary, ANARIZ-CI
33. N'DRI Veronique, President, CA ANOPACI

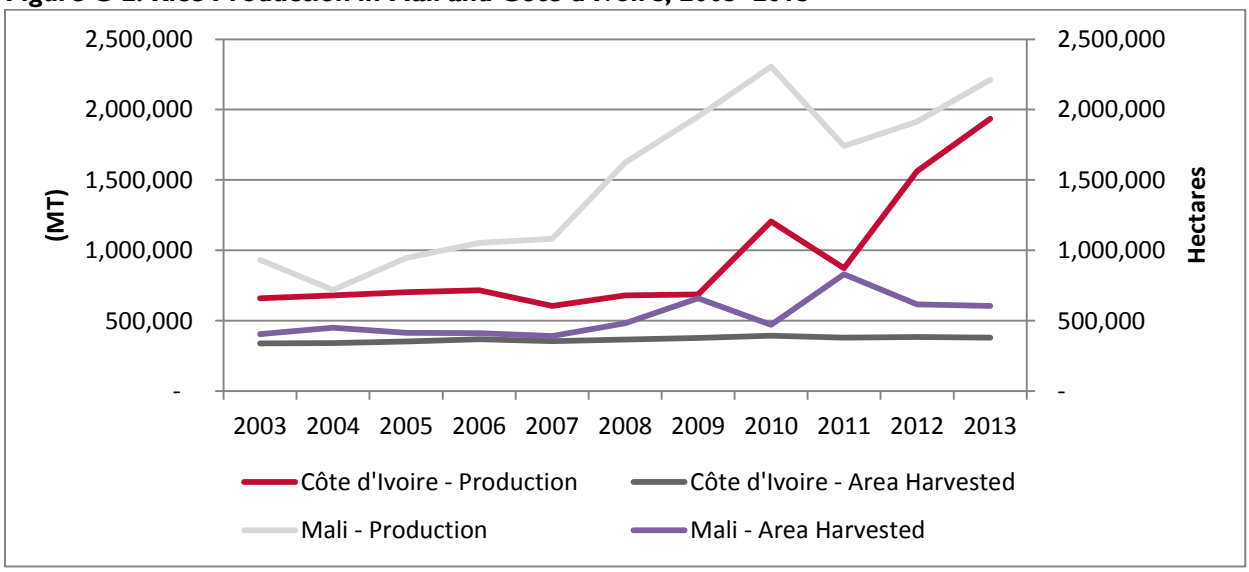
ANNEX C: AGRICULTURAL PRODUCTION DATA, MALI AND CÔTE D'IVOIRE

Figure C-1. Maize Production in Mali and Côte d'Ivoire, 2003–2013



Source: FAOSTAT

Figure C-2. Rice Production in Mali and Côte d'Ivoire, 2003–2013



Source: FAOSTAT

Table C-1. Maize Production in Mali and Côte d'Ivoire, 2003–2013

	Mali			Côte d'Ivoire		
	Area Harvested (ha)	Production (mt)	Yield (kg/ha)	Area Harvested (ha)	Production (mt)	Yield (kg/ha)
2003	316,683	451,018	1,424	267,635	600,098	2,242
2004	350,000	459,463	1,313	278,679	619,831	2,224
2005	424,860	634,464	1,493	302,879	640,213	2,114
2006	408,495	706,737	1,730	265,000	638,753	2,410
2007	409,916	689,918	1,683	301,495	531,940	1,764
2008	352,263	695,073	1,973	310,237	630,188	2,031
2009	442,890	1,476,993	3,335	319,232	637,372	1,997
2010	504,362	1,403,576	2,783	324,045	641,610	1,980
2011	924,850	1,298,234	1,404	327,800	621,790	1,897
2012	579,396	1,713,729	2,958	308,839	654,738	2,120
2013	640,526	1,502,717	2,346	340,000	661,285	1,945

Averages, 2004–2013	Mali	Côte d'Ivoire
Production (mt)	1,058,090	627,772
Average Area Harvested (ha)	503,756	307,821
Average Yield (kg/ha)	2,102	2,048

Source: FAOSTAT

Table C-2. Rice Production in Mali and Côte d'Ivoire, 2003–2013

	Mali			Côte d'Ivoire		
	Area Harvested (ha)	Production (mt)	Yield (kg/ha)	Area Harvested (ha)	Production (mt)	Yield (kg/ha)
2003	405,641	931,925	2,297	339,939	659,824	1,941
2004	451,000	718,086	1,592	340,956	681,521	1,999
2005	414,023	945,823	2,284	353,169	703,931	1,993
2006	412,484	1,053,236	2,553	370,000	715,898	1,935
2007	391,869	1,082,384	2,762	356,396	606,310	1,701
2008	482,552	1,624,246	3,366	366,730	679,969	1,854
2009	659,880	1,950,805	2,956	377,365	687,721	1,822
2010	471,800	2,305,612	4,887	394,868	1,206,153	3,055
2011	830,408	1,741,472	2,097	379,694	873,016	2,299
2012	617,109	1,914,867	3,103	385,000	1,561,905	4,057
2013	604,745	2,211,920	3,658	380,000	1,934,154	5,090

Averages, 2004–2013	Mali	Côte d'Ivoire
Production (mt)	1,554,845	965,058
Average Area Harvested (ha)	533,587	370,418
Average Yield (kg/ha)	2,926	2,581

Source: FAOSTAT

Table C-3. Maize Production in Mali by Region, 2004–2014

		Kayes	Koulikoro	Sikasso	Ségou	Mopti	Timbuktu	Gao	Total
2004	Production (mt)	46,552	73,322	310,697	22,612	625	950	0	454,758
	Area Harvested (ha)	52,006	53,302	195,452	14,506	1,037	380	0	316,683
2005	Production	48,293	60,471	318,134	31,399	1,090	76	0	459,463
	Area Harvested	28,871	47,349	150,123	23,221	2,489	12		252,065
2006	Production	70,657	123,573	393,409	32,522	5,958	0	36	626,155
	Area Harvested	61,217	94,853	226,082	22,990	14,492	200	662	420,496
2007	Production	53,593	95,111	525,542	29,273	2,863	354		706,736
	Area Harvested	62,715	71,448	239,697	33,107	5,032	485		412,484
2008	Production	57,889	80,521	501,011	45,556	202	4,739	0	689,918
	Area Harvested	54,384	64,089	257,879	30,971	377	2,216		409,916
2009	Production	101,680	67,837	442,774	44,482	324	5,200	0	662,297
	Area Harvested	66,574	47,901	213,123	21,918	682	2,065		352,263
2010	Production	48,595	94,664	607,260	26,694	1,733	37,242		816,188
	Area Harvested	40,348	56,923	240,512	16,560	998	18,735	0	374,076
2011	Production	56,117	104,539	732,990	26,106	1,661	80	0	921,493
	Area Harvested	33,543	52,668	256,739	17,942	1,130	56	0	362,078
2012	Production	42,441	75,421	634,199	45,960	3,400	0	0	801,421
	Area Harvested	26,695	61,496	370,592	34,788	1,814			495,385
2013	Production	122,382	236,225	1,192,794	98,462	6,337	3,518	2	1,659,720
	Area Harvested	46,889	92,737	401,212	36,032	2,526			579,396
2014	Production	67,285	248,271	1,113,185	55,093	4,478			1,488,312
	Area Harvested	48,662	108,525	446,832	27,109	2,264			633,392
Average Production (mt)		66,893	118,663	646,130	43,555	2,805	5,690	5	883,741
Percentage of Overall Average		7.6%	13.4%	73.1%	4.9%	0.3%	0.6%	0.0%	
Average Area Harvested (ha)		46,990	69,799	280,279	26,464	3,180	3,396	221	430,328
Percentage of Total Area		10.9%	16.2%	65.1%	6.1%	0.7%	0.8%	0.1%	
Average Yield (kg/ha)		1,390	1,523	2,077	1,496	1,058	1,713		2,015

Source: CILSS

Table C-4. Rice Production in Mali by Region, 2004–2014

		Kayes	Koulikoro	Sikasso	Ségou	Mopti	Timbuktu	Gao	Total
2004	Production (mt)	1,024	24,691	103,077	515,461	189,491	74,607	29,866	938,217
	Area Harvested (ha)	758	20,818	60,904	123,626	154,862	23,497	21,176	405,641
2005	Production	3,719	20,141	81,288	429,153	114,358	44,231	25,196	718,086
	Area Harvested	2,493	16,675	19,418	112,341	119,626	22,349	22,013	314,915
2006	Production	1,761	41,621	118,157	513,297	117,744	103,735	42,313	938,628
	Area Harvested	1,979	25,102	59,321	104,097	156,818	36,258	29,056	412,631
2007	Production	7,887	21,066	124,745	520,818	195,632	134,444	48,645	1,053,237
	Area Harvested	6,219	10,741	66,096	108,171	130,245	42,244	44,778	408,494
2008	Production	3,585	31,669	127,605	515,560	247,722	121,403	34,839	1,082,383
	Area Harvested	1,995	12,134	53,180	116,482	140,186	39,108	28,785	391,870
2009	Production	2,905	48,133	158,514	843,924	366,267	161,975	42,528	1,624,246
	Area Harvested	2,813	18,223	60,120	146,850	189,048	38,236	27,262	482,552
2010	Production	4,410	32,354	125,317	635,694	387,260	136,863	72,084	1,393,982
	Area Harvested	4,799	14,640	44,687	141,147	216,001	24,749	80,761	526,784
2011	Production	94,519	92,432	180,655	332,113	346,958	185,811	63,665	1,296,153
	Area Harvested	5,768	18,157	31,520	158,284	193,811	22,865	37,581	467,986
2012	Production	7,147	29,835	104,800	156,991	293,735	84,424	40,791	717,723
	Area Harvested	4,028	21,043	48,536	101,681	170,175	21,385	28,032	394,880
2013	Production	19,140	86,141	98,773	166,373	401,128	0	0	771,555
	Area Harvested	8,131	34,701	33,425	161,741	242,770			480,768
2014	Production	28,786	75,408	129,868	1,212,946	585,767	117,248	61,897	2,211,920
	Area Harvested	18,960	22,776	46,186	266,013	191,079	26,670	33,060	604,744
Average Production (mt)		17,386	47,880	124,972	532,687	305,657	109,013	43,196	1,180,791
Percentage of Overall Average		1.5%	4.1%	10.6%	45.1%	25.9%	9.2%	3.7%	
Average Area Harvested (ha)		5,719	19,419	46,249	141,681	174,976	30,429	36,814	455,287
Percentage of Total Area		1.3%	4.3%	10.2%	31.1%	38.4%	6.7%	8.1%	
Average Yield (kg/ha)		1,465	2,138	2,802	4,086	1,710	3,589	1,461	2,576

Source: CILSS

Table C-5. Millet Production in Mali by Region, 2004–2014

		Kayes	Koulikoro	Sikasso	Ségou	Mopti	Timbuktu	Gao	Total
2004	Production (mt)	44,885	162,470	144,953	402,331	450,155	41,400	14,304	1,260,498
	Area Harvested (ha)	63,108	257,344	156,268	533,159	778,278	77,843	22,889	1,888,889
2005	Production	57,219	161,239	141,534	368,484	239,517	3,873	2,807	974,673
	Area Harvested	53,266	196,892	102,552	387,315	358,906	57,579	28,097	1,184,607
2006	Production	37,610	249,092	139,837	449,971	245,162	19,382	15,354	1,156,408
	Area Harvested	47,457	289,731	132,475	460,743	488,048	41,473	23,064	1,482,991
2007	Production	48,690	148,112	257,503	399,047	247,762	21,880	5,780	1,128,774
	Area Harvested	76,757	185,440	235,789	490,434	447,731	40,236	19,473	1,495,860
2008	Production	30,136	184,409	222,279	426,240	272,922	34,081	5,040	1,175,107
	Area Harvested	43,116	205,507	244,708	512,582	509,422	59,590	11,354	1,586,279
2009	Production	41,660	226,925	317,137	474,595	289,685	51,355	12,552	1,413,909
	Area Harvested	52,381	230,123	236,674	501,864	452,811	85,278	17,077	1,576,208
2010	Production	21,135	183,410	251,175	648,619	294,116	48,860	1,341	1,448,656
	Area Harvested	23,734	178,608	218,245	602,161	344,871	67,188	4,907	1,439,714
2011	Production	28,908	176,635	329,631	517,947	370,409	40,205	6,652	1,470,387
	Area Harvested	26,916	147,196	238,863	414,358	375,992	47,388	6,330	1,257,043
2012	Production	21,065	133,312	167,539	571,480	954,942	37,741	1,371	1,887,450
	Area Harvested	28,880	222,818	136,997	543,946	811,737	37,028	2,773	1,784,179
2013	Production	54,212	294,196	205,708	697,379	490,087	30,348	345	1,772,275
	Area Harvested	60,273	328,352	238,226	741,072	505,721			1,873,644
2014	Production	44,380	91,804	28,786	67,285	0	1,986	4,385	238,626
	Area Harvested	67,582	180,054	148,041	551,582	431,186	49,654	8,938	1,437,037
Average Production (mt)		39,082	182,873	200,553	456,671	350,432	30,101	6,357	1,266,069
Percentage of Overall Average		3.1%	14.4%	15.8%	36.1%	27.7%	2.4%	0.5%	
Average Area Harvested (ha)		49,406	220,188	189,894	521,747	500,428	56,326	14,490	1,546,041
Percentage of Total Area		3.2%	14.2%	12.3%	33.7%	32.4%	3.6%	0.9%	
Average Yield (kg/ha)		814	862	1,114	945	753	599	518	819

Source: CILSS

Table C-6. Sorghum Production in Mali by Region, 2004–2014

		Kayes	Koulikoro	Sikasso	Ségou	Mopti	Timbuktu	Gao	Total
2004	Production (mt)	200,611	176,214	168,086	130,010	41,758	10,660	293	727,632
	Area Harvested (ha)	197,991	203,662	175,890	134,934	100,031	9,482	341	822,331
2005	Production	140,268	270,245	127,787	102,469	18,691	3,232	1,391	664,083
	Area Harvested	107,716	177,581	127462	102752	35050	8036	18424	577,021
2006	Production	146,256	178,949	165,378	107,082	18,867	9,495	85	626,112
	Area Harvested	169,154	212,451	179,273	119,141	46,044	14,291	340	740,694
2007	Production	123,334	193,598	313,294	105,647	21,164	10,107	2,536	769,680
	Area Harvested	191,053	236,913	281,097	140,971	49,741	13,051	4,227	917,053
2008	Production	148,533	195,357	402,332	110,030	38,032	4,783	1,723	900,790
	Area Harvested	183,683	222,784	444643	156149	76268	3639	3077	1,090,243
2009	Production	247,310	200,437	384,713	144,255	32,260	13,530	4,697	1,027,202
	Area Harvested	242,971	207,042	305860	161436	55968	10669	7049	990,995
2010	Production	139,696	217,955	359,967	202,146	31,563	14,997	0	966,324
	Area Harvested								1,520,305
2011	Production	219,001	285,633	547,867	275,625	59,109	1,012	96	1,388,343
	Area Harvested	230,527	285,633	456,556	212,019	53,735	17,884	657	1,257,011
2012	Production	119,166	203,655	326,971	134,985	83,904	3,758	275	872,714
	Area Harvested	103,710	283,700	275,608	151,792	45,185	3,042	421	863,458
2013	Production	280,407	331,138	254,775	283,467	45,035	17,383	235	1,212,440
	Area Harvested	292,904	386,820	248,501	274,399	42,894			1,245,518
2014	Production	91,804	273,483	310,153	122,151	20,450	548	1,017	819,606
	Area Harvested	122,018	316,839	326,110	142,165	28,057	1,181	1,155	937,525
Average Production (mt)		165,578	235,045	319,324	158,786	36,908	7,885	1,206	924,729
Percentage of Overall Average		17.9%	25.4%	34.5%	17.2%	4.0%	0.9%	0.1%	
Average Area Harvested (ha)		182,637	258,863	293,901	162,314	48,105	8,974	4,419	1,013,982
Percentage of Total Area		18.0%	25.5%	29.0%	16.0%	4.7%	0.9%	0.4%	
Average Yield (kg/ha)		932	939	1,067	952	757	841	521	955

Source: CILSS

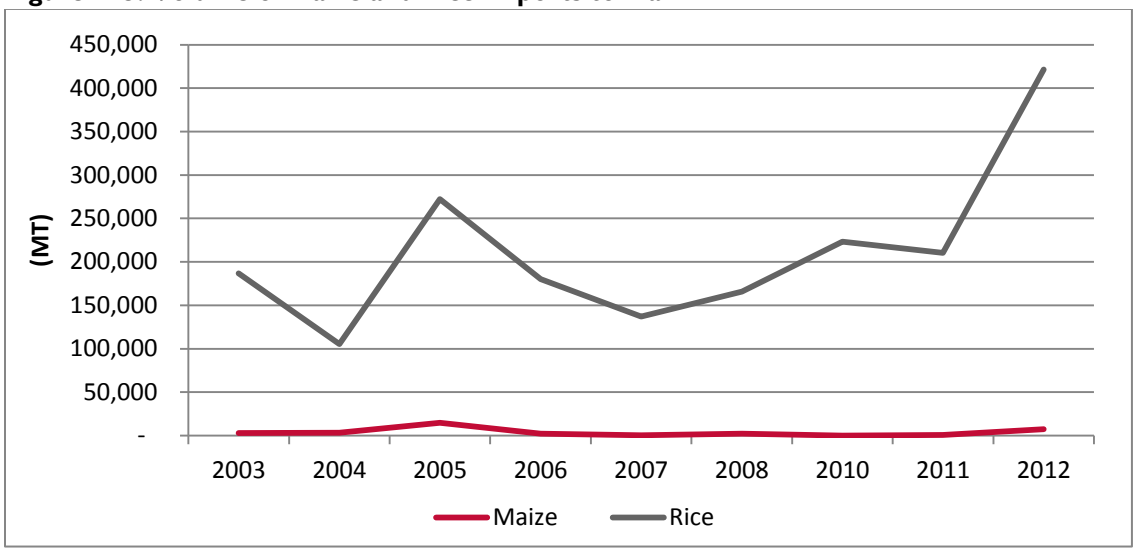
ANNEX D: TRADE DATA

Table D-1. Summary Maize and Rice Import Data, Mali and Côte d'Ivoire, 2003-2012 (mt, $)

		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Mali											
Maize	Volume	3,011	3,549	14,633	2,127	525	2,127		159	650	7,378
	Value	$83,029	$746,950	$2,385,392	$523,083	$159,398	$758,759		$150,141	$296,511	$3,079,492
Avg. Import Price		$28	$210	$163	$246	$304	$357		$942	$456	$417
Rice	Volume	186,675	105,390	272,372	180,208	137,143	165,716		223,137	210,393	421,554
	Value	$38,531,863	$21,076,033	$60,070,973	$45,548,712	$39,855,925	$66,169,659		$50,026,622	$44,914,351	$87,810,148
Avg. Import Price		$28	$210	$163	$246	$304	$357		$942	$456	$417
Côte d'Ivoire											
Maize	Volume	6,756	2,197	33,361	5,695	2,986	6,782	29,734	16,636	6,932	23,788
	Value	$1,783,054	$996,697	$7,435,307	$1,529,092	$1,379,507	$3,493,403	$8,826,692	$5,893,103	$3,052,609	$8,740,555
Avg. Import Price		$264	$454	$223	$269	$462	$515	$297	$354	$440	$367
Rice	Volume	735,757	715,379	808,205	903,215	808,781	756,680	1,105,900	837,938	935,012	1,267,720
	Value	$157,307,736	$214,715,707	$253,657,911	$291,522,440	$326,090,253	$468,269,736	$597,300,977	$460,190,159	$567,934,108	$684,532,365
Avg. Import Price		$214	$300	$314	$323	$403	$619	$540	$549	$607	$540

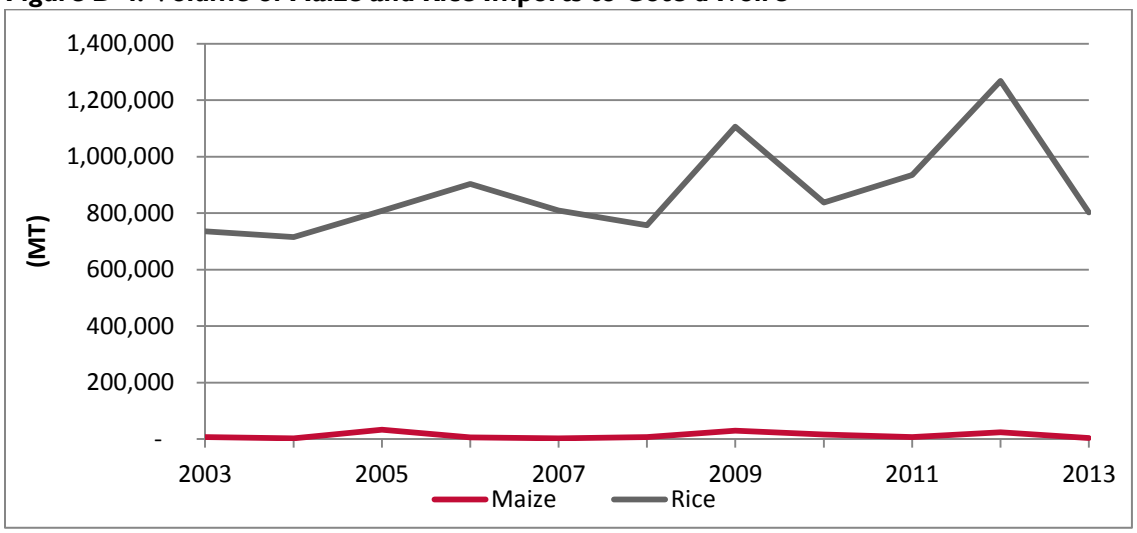
Source: COMTRADE

Figure D-3. Volume of Maize and Rice Imports to Mali



Source: COMTRADE

Figure D-4. Volume of Maize and Rice Imports to Côte d'Ivoire



Source: COMTRADE

Table D-2. Volume and Value of Maize Imports to Mali by Country of Origin, 2002–2012 (mt, $)

		2003	2004	2005	2006	2007	2008	2010	2011	2012
Argentina	Volume			2,943	93	26	182	128	51	6,630
	Value			$576,863	$23,296	$10,716	$118,258	$60,184	$25,138	$2,575,221
Burkina Faso	Volume		3,414		1,935	160			120	62
	Value		$731,475		$480,798	$12,823			$19,764	$9,652
China	Volume									49
	Value									$17,040
Côte d'Ivoire	Volume	2,589	88	5,785	95	215	372	10	405	538
	Value	$72,266	$4,123	$702,729	$4,766	$13,563	$67,986	$5,171	$34,896	$53,472
France	Volume		2			6	230	.2	.3	9
	Value		$1,647			$2,813	$94,709	$178	$1,072	$204,261
Senegal	Volume	.1		5,870	5	89	1,343	6		
	Value	$499		$1,101,001	$14,223	$50,129	$475,168	$1,941		
South Africa	Volume	.6		.3		22		14	58	58
	Value	$742		$817		$58,253		$74,136	$210,630	$207,001
Togo	Volume	420								33
	Value	$9,371								$12,822
Total (World)	Volume	3,011	3,549	14,633	2,127	525	2,127	159	650	7,378
	Value	$83,029	$746,950	$2,385,392	$523,083	$159,398	$758,759	$150,141	$296,511	$3,079,492
Average Import Price ($/mt)		$28	$210	$163	$246	$304	$357	$942	$456	$417

Source: COMTRADE

Table D-3. Volume and Value of Rice Imports to Mali by Country of Origin, 2002–2012 (mt, $)

		2003	2004	2005	2006	2007	2008	2010	2011	2012
Brazil	Volume	2,785	384	369	1,970		572	11,123	11,695	24,851
	Value	$478,398	$76,372	$83,063	$384,081		$205,444	$2,467,481	$2,542,987	$7,641,371
China	Volume	338	2,943	11,320	1,949	1,964	18,355	29	9	80
	Value	$73,545	$445,987	$2,202,984	$877,585	$983,111	$6,189,195	$53,468	$4,144	$17,008
Côte d'Ivoire	Volume	871	2,773	1,917	1,369	35,370	50	62	3	27,601
	Value	$173,413	$665,386	$372,646	$98,302	$11,592,131	$17,980	$12,368	$1,359	$5,409,280
India	Volume	127,622	58,934	83,829	41,007	34,355	35,680	12,051	24,565	142,491
	Value	$26,594,780	$11,343,273	$17,422,285	$11,762,754	$8,016,899	$12,585,954	$2,444,379	$5,216,502	$28,735,870
Myanmar	Volume	3,097			1,811			75,565	61,417	51,296
	Value	$589,574			$355,692			$14,360,049	$13,011,968	$10,244,580
Pakistan	Volume	656	1,444	19,478	64,831	22,141	22,173	28,290	5,844	59,084
	Value	$135,387	$355,269	$3,899,432	$16,326,662	$6,084,255	$7,538,572	$5,547,374	$1,195,710	$11,917,961
Senegal	Volume	4,359	2,058	4,671	3,202	10,900	395	163	357	24,774
	Value	$860,599	$441,611	$1,055,743	$677,101	$2,487,317	$130,771	$37,015	$78,076	$4,854,660
Thailand	Volume	21,970	23,019	79,012	16,870	16,327	66,739	62,115	55,674	22,958
	Value	$4,681,666	$4,934,777	$16,963,193	$4,096,257	$3,785,907	$24,607,242	$11,970,705	$12,055,563	$5,342,977
Vietnam	Volume	13,294	5,917	65,379	35,833	9,622	2,054	8,379	45,645	50,423
	Value	$2,470,661	$1,312,530	$15,993,544	$8,186,125	$2,648,279	$738,806	$2,643,172	$9,695,163	$10,106,268
Total (World)	Volume	186,675	105,390	272,372	180,208	137,143	165,716	223,137	210,393	421,554
	Value	$38,531,863	$21,076,033	$60,070,973	$45,548,712	$39,855,925	$66,169,659	$50,026,622	$44,914,351	$87,810,148
Average Import Price ($/mt)		$206	$200	$221	$253	$291	$399	$224	$213	$208

Source: COMTRADE

Table D-4. Volume and Value of Maize Imports to Côte d'Ivoire by Country of Origin, 2004–2013 (mt, $)

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Argentina	Volume	798	18,694	4,429	1,957	4,852	8,795	7,216	1,310	15,280	559
	Value	$316,186	$3,658,628	$919,289	$888,445	$2,036,559	$2,849,094	$2,851,738	$773,833	$5,319,193	$509,258
Brazil	Volume										753
	Value										$712,426
France	Volume	.7	1	.7	1	11	7,801	1	4,401	6,253	1
	Value	$1,707	$3,614	$2,445	$4,379	$56,244	$1,860,674	$4,110	$1,431,388	$1,580,270	$4,843
Ghana	Volume	.7		.1	101	157	3	49	3		30
	Value										
Paraguay	Volume						11,546	7,170			
	Value						$3,014,989	$1,620,021			
South Africa	Volume	1,367	2,149	1,264	926	1,711	1,537	2,198	1,217	2,199	2,429
	Value	$658,899	$1,043,942	$606,575	$483,441	$1,369,564	$1,068,386	$1,410,804	$844,411	$1,809,501	$2,480,392
Spain	Volume		48			50					
	Value		$17,995			$25,006					
Ukraine			3,425								
			$604,108								
USA	Volume		9,043				51	.2	.9		
	Value		$2,106,751				$32,289	$157	$1,120		
Total (World)	Volume	2,197	33,361	5,695	2,986	6,782	29,734	16,636	6,932	23,788	3,800
	Value	$996,697	$7,435,307	$1,529,092	$1,379,507	$3,493,403	$8,826,692	$5,893,103	$3,052,609	$8,740,555	$3,748,143
Avg. Import Price ($/mt)		$454	$223	$269	$462	$515	$297	$354	$440	$367	$986

Source: COMTRADE

Table D- 5. Volume and Value of Rice Imports to Côte d'Ivoire by Country of Origin, 2004-2013 (mt, $)

		2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
China	Volume	69,267	30,525	57,875	99,478	28,131	38,526	28,120	5,004	.1	1
	Value	$15,367,140	$8,643,849	$17,936,127	$34,968,557	$11,791,499	$18,018,009	$11,809,785	$2,305,001	$279	$6,024
Egypt	Volume	14,315	33,515	6,966	12,111	4,148		5,499	.1		.6
	Value	$4,543,920	$11,437,650	$2,370,346	$4,862,185	$1,844,937		$3,688,656	$48		$285
India	Volume	18,599	75,055	103,167	163,834	12,829	7,245	779	11,518	368,376	142,134
	Value	$4,397,475	$21,458,988	$29,649,021	$57,428,343	$5,968,189	$2,666,576	$331,114	$5,284,689	$167,494,245	$71,954,277
Indonesia	Volume		49,902								
	Value		$15,336,465								
Myanmar	Volume		29,197	53,203		20,338	176,252	76,259	118,181	119,235	25,928
	Value		$7,989,008	$14,904,093		$11,734,173	$63,074,980	$30,311,906	$59,311,558	$51,580,338	$10,901,688
Pakistan	Volume	3,121	69,118	144,511	88,484	89,831	56,350	113,442	24,449	35,153	54,411
	Value	$1,663,959	$18,891,552	$40,064,975	$27,857,530	$54,472,519	$22,651,663	$47,308,180	$12,501,423	$15,359,572	$26,959,850
Thailand	Volume	352,826	208,026	307,213	317,730	479,957	467,656	414,430	411,382	284,860	250,193
	Value	$113,303,828	$72,565,313	$110,275,238	$149,800,041	$303,187,588	$313,714,174	$276,808,032	$288,315,140	$218,617,303	$193,326,132
Uruguay	Volume				6,253		18,751	6,100	10,655	751	
	Value				$2,902,114		$9,660,254	$2,387,502	$6,332,731	$216,272	
USA	Volume	46,351	16,217	19,999	2,352	15,002	20,938	4,765	1,901	9,892	5,186
	Value	$16,129,498	$6,600,239	$11,081,512	$804,761	$9,413,016	$14,025,793	$3,286,889	$742,019	$7,350,569	$4,350,171
Vietnam	Volume	204,818	296,629	208,874	113,457	97,615	281,355	177,254	336,519	421,446	306,783
	Value	$59,028,365	$90,703,407	$64,680,048	$45,105,337	$65,792,291	$136,106,386	$79,462,049	$185,226,923	$209,327,396	$156,647,941
Total (World)	Volume	715,379	808,205	903,215	808,781	756,680	1,105,900	837,938	935,012	1,267,720	802,847
	Value	$214,715,707	$253,657,911	$291,522,440	$326,090,253	$468,269,736	$597,300,977	$460,190,159	$567,934,108	$684,532,365	$472,495,167
Average Import Price ($/mt)		$300	$314	$323	$403	$619	$540	$549	$607	$540	$589

Source : COMTRADE