



# FEWS NET

FAMINE EARLY WARNING SYSTEMS NETWORK

## MALI

### ENHANCED MARKET ANALYSIS

### JUNE 2019



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## About FEWS NET

Created in response to the 1984 famines in East and West Africa, the Famine Early Warning Systems Network (FEWS NET) provides early warning and integrated, forward-looking analysis of the many factors that contribute to food insecurity. FEWS NET aims to inform decision makers and contribute to their emergency response planning; support partners in conducting early warning analysis and forecasting; and provide technical assistance to partner-led initiatives.

To learn more about the FEWS NET project, please visit [www.fews.net](http://www.fews.net).

## Disclaimer

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## Acronyms and Abbreviations

ACF	Action Contre la Faim
ACTED	Agency for Technical Cooperation and Development
AOI	Area of Interest
BSS	Baseline
CPS/SDR	Cellule de Planification et de Statistique du Secteur du Développement Rural
CFA	Cash for Assets
CFW	Cash for Work
CH	Cadre Harmonisé
CNSA	Conseil National de Sécurité Alimentaire
CRS	Catholic Relief Services
CSA	Commissariat à la Sécurité Alimentaire
CV	Cash and Voucher
DFSA	Development food security activities
DNSA	Dispositif National de Sécurité Alimentaire
EMA	Enhanced Market Analysis
FFA	Food for Assets
FFW	Food for Work
FEWS NET	Famine Early Warning Systems Network
FSP	Financial service provider
GAM	Global acute malnutrition
GFD	General food distribution
GoM	Government of Mali
ICRC	International Committee of the Red Cross
Ha	Hectare
HEA	Household Economy Approach
INSTAT	Institut National de la Statistique
IPC	Integrated Phase Classification
Kg	Kilogram
KM	Kilometer
LRP	Local and/or Regional Procurement
MAM	Moderate acute malnutrition
MFI	Microfinance Institution
MM	millimeter
MT	Metric Ton
NGO	Non-governmental organization
OMA	Observatoire des Marchés Agricoles
OPAM	Office des Produits Agricoles du Mali
PMT	Proxy Mean Testing
PolINSAN	Politique Nationale de la Sécurité Alimentaire et Nutritionnelle

PNR	National Response Plan
SAM	Severe acute malnutrition
SAP	Système d'Alerte Précoce
SCP	Structure Conduct Performance
SOW	Scope of work
RRA	Rapid Rural Appraisal
RSU	Registre Social Unifié
USAID	U.S. Agency for International Development
US\$	U.S. Dollar
WFP	World Food Programme
XOF	West African CFA franc

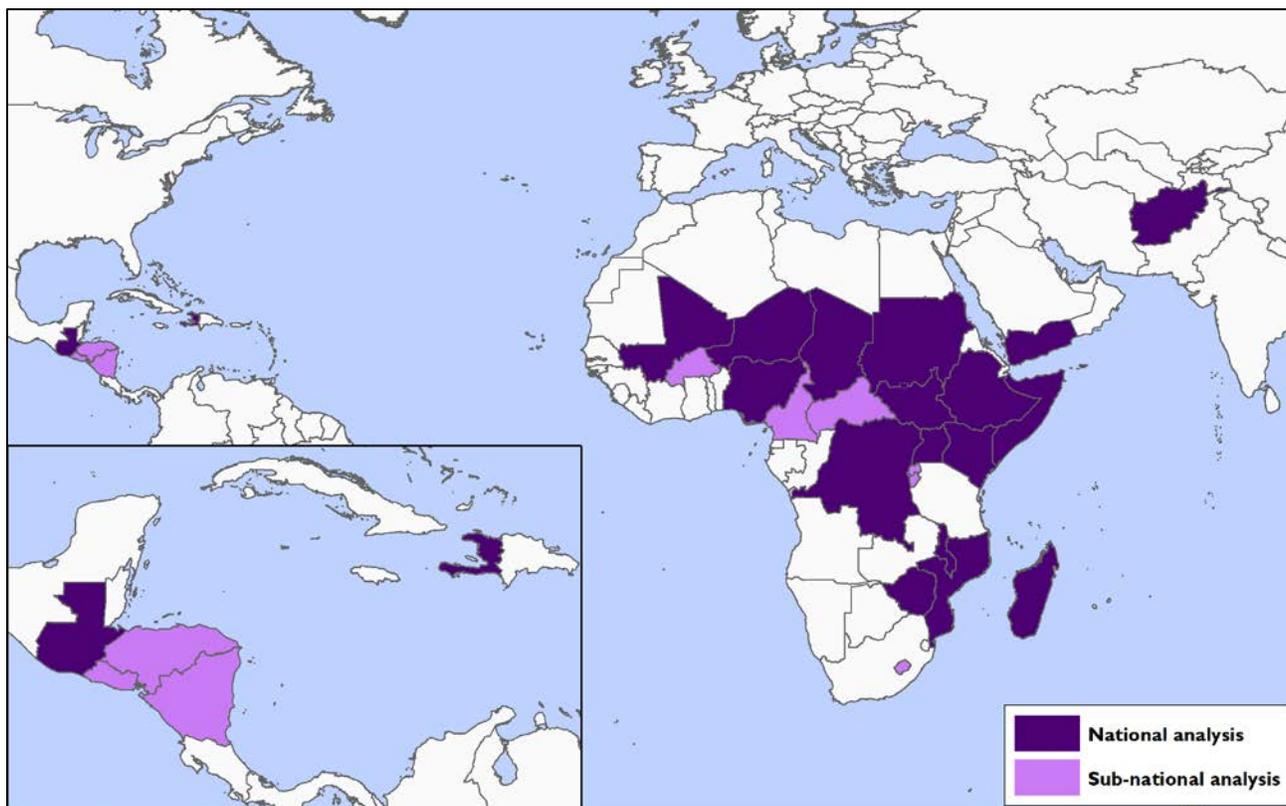
## Preface

The Famine Early Warning Systems Network (FEWS NET) is a leading provider of objective, evidence-based food security analysis. Based on in-depth understanding of local livelihoods, FEWS NET analysts monitor information and data related to weather and climate, crops, pasture conditions, markets and trade, nutrition, and other factors that influence acute and chronic food insecurity in several countries (Figure 1). Along with monthly reports and alerts, FEWS NET produces specialized research products on food security drivers and cross-cutting issues such as climate change and resilience.

In an effort to understand current and to foresee future market anomalies, FEWS NET relies on a broadly defined Markets and Trade Knowledge base that includes Market Fundamentals reports (or context documents), special reports, and databases of historical market information including production, food balance sheets, and prices. The Markets and Trade Knowledge base largely serves as a baseline for the assessment of existence and extent of market-based anomalies that could contribute to food insecurity. The Market Fundamentals reports likewise serve as starting points for providing efficient and effective market-based response decision support for groups developing both emergency programs, including cash and voucher interventions as well as local and regional procurement (LRP), and development programs, including support to food security and nutrition through improving the availability of and access to food and value chain development.

In 2016, FEWS NET's core analytical activities were augmented to include Enhanced Market Analysis (EMA). Under EMA, FEWS NET provides market-based response decision support, including but not limited to assessing the feasibility and potential impacts of food assistance programs (emergency and development) on a given country's local economy through Congressionally mandated analyses. Such support is often referred to as a Bellmon analysis. EMA reporting is progressive in nature, and, when possible, builds on FEWS NET's existing in-depth knowledge of agroclimatology, livelihoods, markets, nutrition, and institutions and networks in support of food security monitoring and analysis in presence and remote monitoring countries.

**Figure 1.** FEWS NET reporting countries



Note: National-level reporting takes places in presence countries, while subnational reporting takes places in remote monitoring countries.

Source: FEWS NET 2018

## Executive Summary

Between February and May 2019, the Famine Early Warning Systems Network (FEWS NET) carried out an Enhanced Market Analysis (EMA) in prioritized communes of Mopti, Timbuktu, Gao, and Ménaka (Figure 2), Mali. Among other uses, the information presented in this report can be used to support the design of food security programs, including but not limited to informing a U. S. Agency for International Development (USAID) Bellmon determination in advance of future food assistance programming in the area of interest (AOI).

Following the scope of work (SOW), the assessment covered four broad themes: (1) households' access to food and income; (2) market Structure, Conduct, and Performance of key staple foods, fish, and livestock; (3) availability of infrastructure and supporting services required for the success of a range of modality options; and (4) the food assistance context, including experiences with different modalities. The assessment was informed by primary and secondary data collection and analysis. Table 1 summarizes the assessment team's key findings.

The ongoing complex emergency in northern and central Mali constrains basic economic activities and the provision of basic services and assistance. The introduction of restrictions on transportation due to insecurity have isolated many communities (particularly in Mopti and Timbuktu) and resulted in increased transportation costs and frequent adjustments to food assistance modality delivery decisions. Existing pressures on land access and use between agricultural and pastoral populations are further aggravated (especially in Mopti). Assistance implementing organizations have underscored a strong need for flexibility in program design and the importance of operating in consortia, rather than alone. The presence of two RAMSAR sites within AOI have not effectively agropastoral activities due to the very limited enforcement capacity of the state, like the enforcement of land-use restrictions in protected forests (*forêts classées*) present throughout Mali.

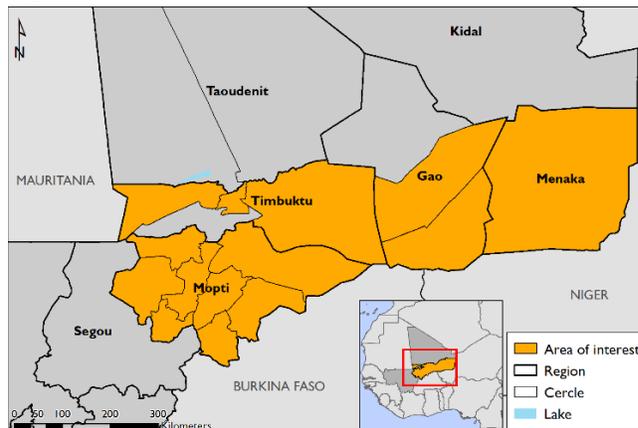
The rural economy in the AOI hinges on agriculture, livestock, and fish production and marketing. However, labor income is the main source of income for very poor and poor households across the majority of livelihood zones in the AOI (Figure 5; Figure 24; Annex 3). Exceptions to these trends are in the northern-most pastoral livelihood zone (ML01), where livestock sales constitute the primary income source and in the Niger River Delta (ML06), where fish and crop sales are significant. Market purchases are an important source of food across the AOI, ranging from 25 percent (ML 09) to 100 percent (ML 01).

Mopti and Gao are the largest markets within the AOI and serve as important coordination and distribution points for both locally produced and imported staple foods. Markets along main transportation routes are generally well integrated within the AOI and with key markets in southern Mali and neighboring countries. Markets along riverine and lakeside areas of northwestern Mopti (Tenenkou and Yourou) and southern Timbuktu are relatively isolated and thin, characterized by fewer buyers and sellers than Mopti and Gao cercles and often face substantial accessibility constraints during the rainy season. Prices vary seasonally, with market actors adjusting their activities for known seasonal events. Markets across the AOI have been affected by insecurity, with resulting increases in transaction and transportations contributing to recent price increases.

Communities near regional and *cercle* capitals have relatively better access to formal financial service providers and mobile network connectivity. While mobile phone use has expanded substantially within the AOI, mobile money agents are not ubiquitous. Informal money traders play a critical role in ensuring the availability of cash liquidity in more remote locations.

Given the diverse and complex assistance needs and response efforts, the Government of Mali (GoM) is in the process of consolidating its policy framework and coordination efforts under the Politique Nationale de la Sécurité Alimentaire et Nutritionnelle (PoINSAN). The National Response Plan (PNR) provides orientation and guidance to annual assistance programming. It is developed based on inputs from the national early warning system (SAP) through consensus between the GoM and the international community (including key donors and nongovernmental organizations [NGOs]) and validated by

**Figure 2. EMA Area of Interest**



Source: FEWS NET

the National Food Security Council (Conseil National de Sécurité Alimentaire). There have been a variety of modality experiences to meet various program objectives in the AOI. Security conditions have proven to be a major determinant of whether an organization decides to intervene in an area, rather than driving modality choice.

**Table 1.** Summary of key findings

Theme	Key findings
Households' characteristics and access to food and income	<ul style="list-style-type: none"> <li>• Typically larger than the six-person reference household used for establishing transfer size.</li> <li>• Heterogeneous household structures (polygamous, monogamous, large families) and traditional gender roles lead to differentiated access and use of resources.</li> <li>• High dependency on labor as the main source of income across most of AOI.</li> <li>• High dependency on market purchases for accessing food across most of AOI.</li> <li>• Conflict disrupts social fabric, livelihoods, and trade flows.</li> </ul>
Market context	<ul style="list-style-type: none"> <li>• Millet and rice (local and imported) are the main staple foods consumed in the AOI and dry beans and cowpeas are the preferred pulses.</li> <li>• Most of the AOI is structurally deficit in staple foods, depending on imports from other areas of the country and neighboring countries, as well as international imports (rice and edible oil in particular).</li> <li>• Gao and Mopti are the two main reference markets and distribution points within the AOI. Reference markets are generally competitive, integrated within the AOI, the rest of Mali, and other relevant regional markets. More isolated/remote markets are face accessibility constraints that can become more acute during the rainy season (Timbuktu market, for example). Traders in geographically isolated areas engage in regular commodity pre-stocking to ensure stable commodity availability.</li> <li>• Market transactions are mainly cash based, although fishermen and rice traders practice bartering.</li> <li>• Households often walk to their regular market, up to two hours. For reaching more distant locations, donkeys, bikes, small boats, and locally available public transportation are used. Restrictions on the movement of motorbikes and pickups negatively affect market access.</li> <li>• Locally-produced cereal prices vary seasonally.</li> <li>• Insecurity along roads, high transport costs, and lack of capital are among the main challenges to trade identified by traders.</li> </ul>
Availability of infrastructure and supporting services	<ul style="list-style-type: none"> <li>• Limited rural road infrastructure and quality result in long transit times, high transport costs, and limited accessibility to some locations. Transportation by boat is common in northern Mopti region and the riverine areas of Timbuktu and Gao regions. Overland travel between Mopti town and Gao town is at least two days for a private vehicle and longer by truck (approximately one week).</li> <li>• Storage infrastructure is available and has the capacity to handle commodities as required for in-kind food distributions. Security concerns related to commodity storage are greatest in Gao, Ménaka, and Timbuktu and relatively low in Mopti (especially the larger urban centers).</li> <li>• Mobile network services are generally available within the urban centers and along the main paved roads of the AOI areas. Mobile-banking applications (e.g., Orange Money) are used in urban areas, with limited adoption in rural areas due to network connectivity constraints and limited numbers of agents.</li> <li>• Formal financial service providers are available in the regional capitals of the AOI. Informal money traders are extensively used by NGOs for cash distributions across the AOI.</li> </ul>
Food assistance context and Experience with different modalities	<ul style="list-style-type: none"> <li>• The PoINSAN is supportive of the use of all food assistance modalities to meet various objectives, but not prescriptive.</li> <li>• Due to the ongoing complex emergency coupled with reoccurring agro-ecological shocks (localized drought and flooding) that have severely impacted livelihoods in recent times in the AOI, there has been a considerable presence of organizations providing food assistance under different modalities (in-kind assistance, cash, and vouchers) even within a cercle, depending on the local realities.</li> <li>• Modality preferences lean toward vouchers among implementing organizations, while beneficiary preferences were mixed. The exceptions are among beneficiaries residing in more isolated areas and displaced populations who favor in-kind assistance.</li> <li>• Sharing of rations is common in Mali, frequently as an act of local solidarity, diluting targeted assistance impacts.</li> <li>• Monitoring information by implementing organizations indicate little or no price impacts related to in-kind (which could depress prices) or cash-based programs (which could have inflationary effects).</li> </ul>

Source: Authors' elaboration

## 1. Introduction to the Assessment

In late 2018, FEWS NET was asked to carry out an EMA and reporting in Mali. Among other uses, the information presented in this report can be used to support the design of food security programs, including but not limited to informing USAID's Bellmon determination in advance of FFP-funded food assistance programming in the AOI.

As follow-on activities to the current DFSA programs in Mali (Harande), USAID expects a new DFSA will be funded entirely with Community Development Funds (CDF). FEWS NET's research aimed to gather evidence for the USAID/FFP design team's analysis of the appropriateness and feasibility for a range of modalities, including local and regional procurement, cash, and vouchers to support related decision-making processes. The EMA results are framed against the FFP Modality Decision Tool (USAID 2018) to inform its first two tiers of questions around appropriateness and feasibility, providing an analysis of the operating environment in a specific subnational area of an FFP country of interest. Annex 1. Methodology provides a summary of EMA research methods.

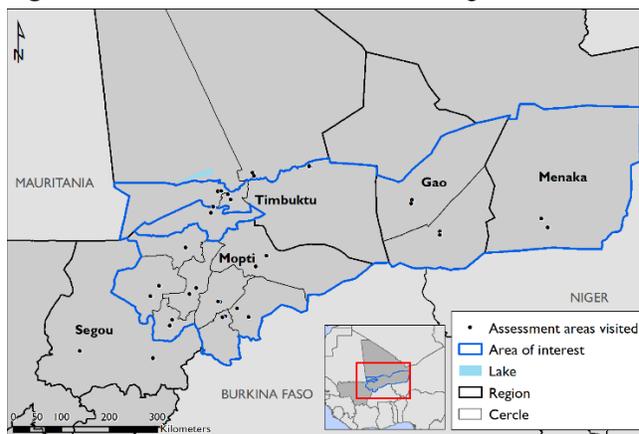
Several research questions outlined in FEWS NET's SOW framed the research and analysis, covering four broad themes: (1) households' access to food, income, and markets in the livelihood zones in the AOI; (2) the marketing context for key food staple foods, fish, and livestock; (3) the availability and state of infrastructure and supporting services required for the success of a range of modality options; and (4) the food assistance context and experiences of stakeholders with different modalities.

The AOI prioritized in the FEWS NET SOW include the cercles of Ansongo and Gao in Gao region; the cercles of Gourma-Rharous, Dire and Goundam in Timbuktu region; and the cercle of Ménaka in Ménaka region in what is considered "northern Mali," as well as the entire region of Mopti, which is considered "central Mali" (Figure 2). These cercles account for roughly 20 percent of the total land area in the country and about 20 percent of the population. The population of the AOI is disproportionality poor, including 44 percent of poor Malians (ENSAN 2018).

The Mali EMA involved a mixed-method approach, combining the collection, review, and analysis of both primary and secondary data from various stakeholders. Preliminary desk research identified relevant sources of information and information gaps to be covered through the field assessment. Field work conducted between April 8–22, 2019 was led by a team composed of FEWS NET staff, local and international consultants, local guides who supported the coordination of field activities, and local data collectors. Market assessments were also carried out by data collectors in the main source markets of the AOI located in Segou and Sikasso. FEWS NET staff did not travel beyond the regional capital communes due to security concerns, but rather relied on data collectors and remote (phone and email) exchanges to gather information from stakeholders in those localities. In the case of Ménaka, the weekly flight was cancelled during the FEWS NET assessment and so all data collected there was done remotely via local enumerators and complemented by secondary data. The assessment was designed to obtain current information from stakeholders (pre-lean season in April 2019) as well as recall data from other relevant reference periods (e.g., post-harvest 2018, lean season 2018, and pre-lean season of 2018), thereby limiting opportunities for the seasonal timing of the assessment to bias the results.

The FEWS NET assessment team visited all prioritized cercles and livelihood zones in the AOI, conducting field work activities in the regional and cercle capitals (chef lieu) as well as in a more remote location (Figure 3). The assessment used Rapid Rural Appraisal (RRA) techniques (such as focus group discussions and key informant interviews) to gather information from a range of stakeholders in Bamako, Mopti, Timbuktu, Gao, and Ménaka regions including, but not limited to, government technical services, local authorities, the current DFSA grant holder, UN organizations, food assistance beneficiary households, traders, transporters, and storage warehouse managers. Annex 2 provides a summary of stakeholders groups interviewed, their location, and the data collection methods used.

**Figure 3.** EMA AOI and locations visited during the assessment



Source: FEWS NET 2019

## 2. General Context in the AOI

### 2.1 Geography and agroclimatology

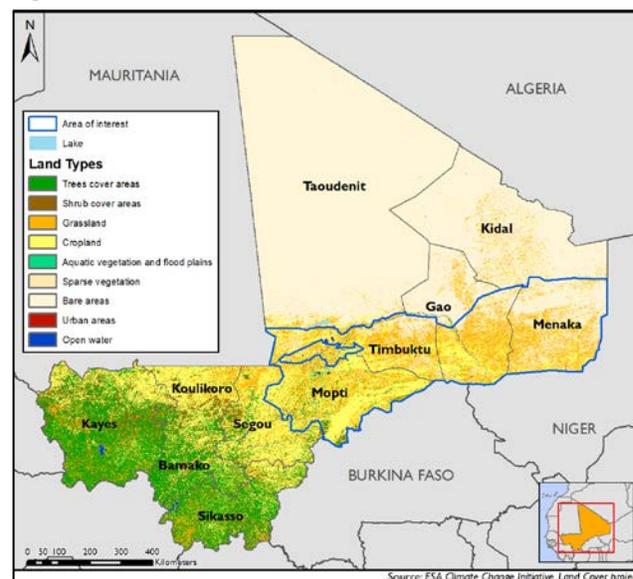
The AOI is characterized by moderate elevation (200 and 500 meters above sea level), high average temperatures between 30°C and 40°C (surpassing 40°C in April and May) and low levels of rainfall (between 200mm and 600mm) (OECD 2014). The coefficient of variation of rainfall (2000-2014) in the AOI is generally inversely related to rainfall levels, and ranges from 11 to 30 percent. The AOI is generally categorized as semi-arid to arid savannah (Figure 4) but is host to unique environments including the Inner Niger Delta floodplains, the largest inland wetland in West Africa. The Inner Niger Delta is rich in natural resources including lakes and flooded grasslands. Local populations depend heavily on the delta for fishing, cattle grazing, and cultivation of rice and other crops (Ramsar 2004).

The seasonal calendar is broadly similar in all zones within the AOI (Annex 3. Mali Livelihoods). The rainy season typically lasts from June to September, the end of which also coincides with the lean season in agricultural areas. The main crop harvest lasts from October to December. Irrigated perimeters in ML06 allow for off-season crops, which are important sources of food and income for farm households. Opportunities for local agricultural labor peak between May and July during land preparation and weeding for the main production season. Market gardening and labor migration occur during the dry season and serve as important sources of food and income once the main harvest is over. Variability in the local agroclimatology context shapes local livelihoods and is an important driver of annual food availability and food access.<sup>1</sup>

### 2.2 Socioeconomic context

Annex 3. provides a summary of the livelihood zones in the AOI. The population in the AOI is estimated at about 3.5 million (Table 2), of which nearly 2.5 million reside within the region of Mopti. Average population density is well below the national average, and most concentrated in Mopti (32 inhabitants per km<sup>2</sup>) (CIESIN 2005; AVDR 2018). Different ethnic groups are present, such as the Bambara, Peuhl, Dogon, Songhai, Bozo, Sarakolé, Touareg, and Arab (Carr et al 2016; Livelihood baselines, SWAC/OECD 2015), and practice distinct economic activities and gender norms. The average household size in Mali varies by source, ranging from 5.7 persons (DHS) to 13.6 persons (ENSA 2018).

**Figure 4.** Mali landcover and use



Source: ESA 2019

**Table 2.** Population size and poverty rate in the AOI, 2016

Region	Cercle	Population	Poverty rate (%)	Poor
Gao	Ansongo	159,176	73	115,721
	Gao	288,586	66	191,333
Ménaka	Ménaka	69,782	73	51,220
Mopti	Bandiagara	382,580	37	139,642
	Bankass	317,394	10	30,787
	Djenne	249,377	16	39,900
	Douentza	297,867	51	151,316
	Koro	436,627	34	146,707
	Mopti	443,394	16	69,613
	Tenenkou	196,889	52	103,170
	Youwarou	128,467	17	21,582
Timbuktu	Dire	133,945	46	62,017
	Goundam	180,527	38	68,239
	Gourma	134,015	76	102,253
<b>National</b>		<b>17,450,391</b>	<b>26</b>	<b>2,844,420</b>

Note: Poverty defined as households in poorest quintile of population. Total population in poverty calculated using national average household size of 6.3.

Source: LandScan Global Population Database 2018; SAP, INSTAT, WFP, FAO, FEWS NET, UKaid, ECHO, Belgique & Mali Cluster SA 2018

<sup>1</sup> Interested readers are encouraged to consult the following resources to learn more about climate change in Mali: [FEWS NET 2012](#); [GoM 2007](#); [Planetary Security 2017](#).

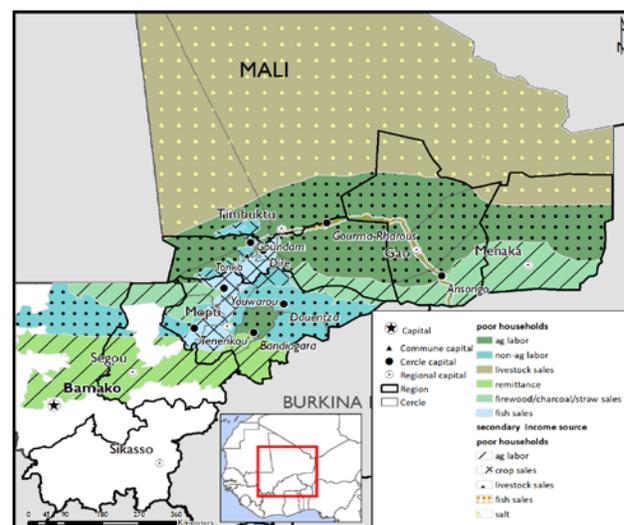
Household size, type, and composition vary by livelihood zone, ethnic group, and wealth group within the AOI. Poor and very poor households in the northern-most pastoral and agropastoral livelihood zones of the AOI are relatively smaller while agro-pastoral and agricultural households in central Mali can reach up to 11 persons (BSS data; World Bank 2015; ENSAN 2018). Polygamy is common in Mali and practiced across the AOI, but relatively less prevalent among poor and very poor households (BSS data and World Bank 2015). Poverty rates within the AOI vary (Table 2), with the most pronounced levels in the northern-most cercles where they are well above national trends (26 percent, ENSAN 2018).

The rural livelihood zones that constitute the AOI in Mali vary between pastoral, livestock-based systems in the north to agro-pastoralism in central Mali (FEWS NET 2014). The transition from north to south reflects differences in the agroclimatology context, the primary determinant of local livelihoods. While the rural economy in the AOI hinges on agriculture, livestock, and fish production and marketing, resource-constrained poor households in the AOI typically rely less on sales of these products for income. Rather, poor and very poor households across much of the AOI participate in these sectors by supplying labor to better-off households (Figure 5). Other important income sources include local petty trade, remittances from both seasonal and long-term migration of household members, and self-employment (e.g., sale of charcoal and firewood, wild grasses, and artisanal products). Exceptions to these trends are in the northern-most pastoral livelihood zone (ML01), where livestock sales constitute the primary income source (> 60 percent) and in the Niger Delta (ML06), where fish and crop sales are significant (jointly > 35 percent).

Incomes are generally diverse and vary seasonally, with more abundant agricultural and shepherding labor opportunities between May and December followed by migration, artisanry, and petty trade in January through April. Demand for labor typically declines during years of poor agricultural production, while insecurity discourages frequent local travel in search of employment. Both can be highly localized or generalized and tend to encourage higher-than-normal migration to domestic, regional, and international destinations, resulting in higher-than-normal remittance income for affected populations.

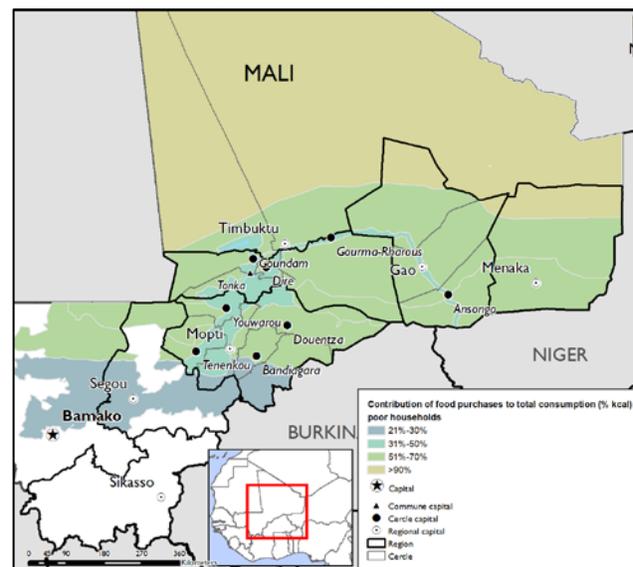
Household expenditures follow seasonal patterns and are similar across the AOI. Food purchases are highest during the lean period from June to December and account for 40

**Figure 5.** Primary income sources among poor households in central and northern Mali



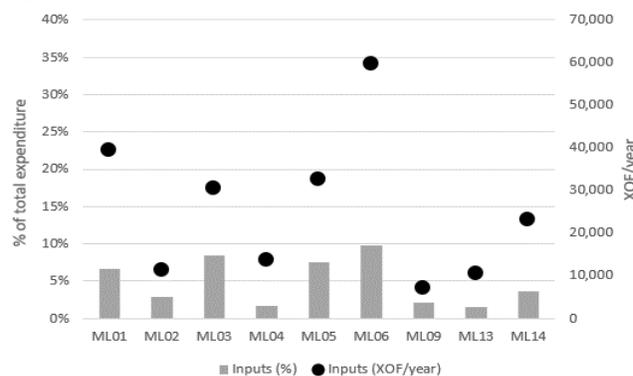
Source: Compiled by authors based on Baseline reports

**Figure 6.** Market dependence among poor households in AOI



Source: Compiled by authors based on Baseline reports

**Figure 7.** Contribution inputs to total expenses, poor households



Source: FEWS NET estimates based on BSS data

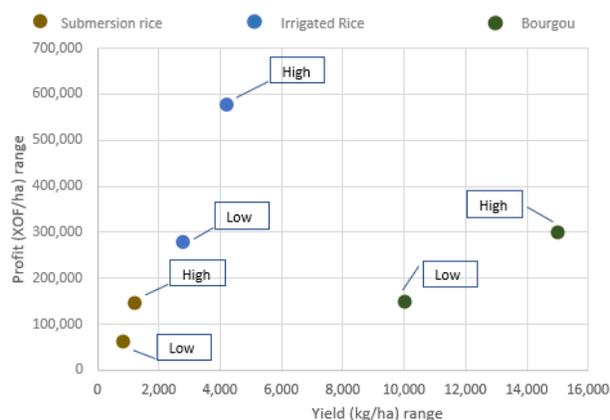
to 70 percent of average annual expenditures in the AOI and 25 (ML09) to 100 (ML01) percent of staple food requirements in the AOI. Although the use of inputs is relatively limited among poor and very poor in the AOI (Figure 7), ranging from less than 10,000 XOF/year in ML 09 to 35,000 XOF/year in ML 06), purchases intensify during the main agricultural season (May to September) and off season (January to June), especially for irrigated rice and horticultural crop production. Livestock fodder and industrial feed purchases are also limited but intensify during the April to June pastoral lean season. Health expenses are notable from July to October when malaria and water-borne diseases are more common.

### 2.3 Bourgou in local livelihoods

Bourgou is a grass used for livestock feed that grows primarily along the floodplains of the Niger River (northern Mopti, southern Timbuktu, and southern Gao regions) where submersion rice is also grown. Bourgou grass is either harvested and sold on the market or remains in the fields (bourgoutières) for pastoralists to graze their cattle (Diarra et al. 2010). There are two main production systems, one that is communal and governed by traditional local customs and norms and a second that is privately operated and maintained. Both face longstanding conflicts over land resource use between agriculturalists and pastoralists (Tobie 2017; Diarra et al. 2010), complicating technical support opportunities, especially to producer groups who operate primarily in communal areas.

It takes approximately three years for a bourgoutière to reach maturity and transplanting stocks from mature fields is a common expansion method (Charancle 1994). Revenues from bourgou sales constitute approximately 15 percent of the revenues of poor households in riverine areas of Tombouctou, Gao, and the inland delta in Mopti (BSS reports). These same households also sell their labor to better-off households for bourgoutière management and harvesting activities. In recent years, bourgou production has become increasingly profitable (Figure 8) due to strong market demand driven by increased exposure to and appreciation for bourgou fodder among livestock owners, relatively poor grazing conditions in some areas, and the expansion of relatively intensive animal fattening units. This has encouraged the conversion of old or abandoned submersion rice production areas (due to inadequate water or crop pests) to bourgou production (FEWS NET 2019), while also creating additional tension among alternative land uses (Diarra et al. 2010) and compromising opportunities for efficient resource management across uses (Figure 9). In addition to its

**Figure 8.** Profitability of *bourgou* versus rice in the Niger River floodplains



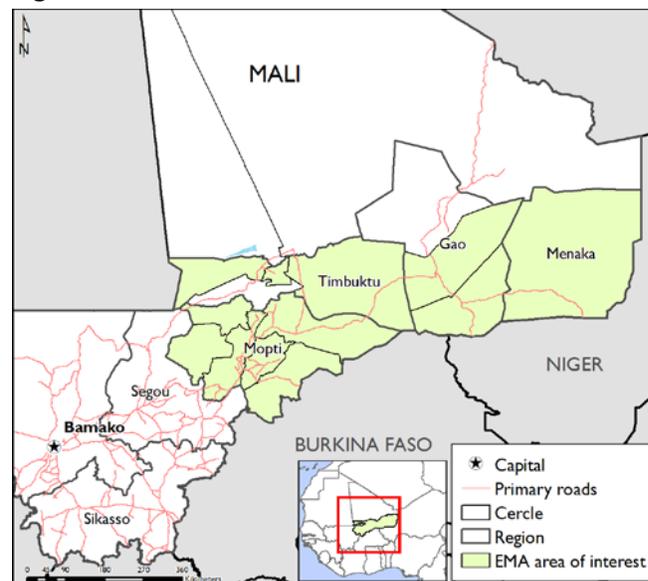
Source: FEWS NET estimates based Fossi et al. 2014 and FEWS NET 2019

**Figure 9.** Cattle in a degraded Bourgoutière in Rharous, Timbuktu region



Source: SAP Mali 2019

**Figure 10.** Road network in Mali



Source: OpenStreetMap 2019

relative profitability, bourgou is more tolerant to variations in water levels than submersion rice. Bourgou is not seen as competitive vis-à-vis rice production in irrigated perimeters of the inland river Delta area (Fossi et al. 2014).

## 2.4 Infrastructure and supporting services

This section provides a broad overview of the infrastructure and supporting services available in the AOI.

### 2.4.1 Physical infrastructure

Central and northern Mali are linked to the rest of the country and region through land and river transportation networks. Earth/gravel roads account for approximately above 70 percent of total road length available in the AOI, contributing to high transport costs and travel time. Physical access constraints are very prominent beyond areas served by national roads that have been maintained in recent years. These include the corridor linking Mopti commune (Sévaré) to southern Mali via the national road, RN6, as well as other parts of southern Mopti served by RN15. However, the road network linking Mopti commune north toward Timbuktu, Gao, and Ménaka is in poor condition. The Mali Logistics Cluster infrastructure assessment indicates that travel between Mopti town and both Timbuktu and Gao can be completed in six hours (Mali DLCA 2018). However, the FEWS NET assessment team found that the travel time between these urban centers takes multiple days, (up to a week) due to the combined effects of the poor state of the roads, checkpoints, restrictions on population movements to specific times of the day, and security escorts. Travel by boat (pinasse) between Mopti and Timbuktu and the broader Niger river delta, and between market towns within Timbuktu and Gao is common. Staple foods are traded along those same corridors and by boat in these areas. The water level of the river and other waterways (and its timing) is therefore critical to ensuring food availability and food access to local populations. Transport services that meet the needs of food assistance programs are generally available in easily accessible areas. However, the costs associated with transportation into insecure areas or those with seasonal access constraints can be prohibitive, leading to extended negotiations between actors and delays in assistance delivery (FEWS NET 2019).

Orange is the main mobile carrier in northern Mali (Table 3), while in Mopti the landscape is more varied with Malitel playing a relatively important role in some communes. Mobile network coverage varies by area but becomes less prevalent away from major roads and in more rural areas (Figure 11). Network connectivity and a limited number of rural agents present challenges for mobile money operators in remote areas (OrangeMoney and MobiCash), where liquidity can also be a challenge among relatively smaller rural agents. Insecurity can also affect network functioning and agent activities.

The availability of storage is generally not a constraint within the AOI and most prominent in Mopti (FEWS NET 2019). OPAM manages various warehouses across the country, including the AOI, that are in good condition, secure, and can be leveraged to support activities (Mali DLCA). Additional storage is also available via private sector actors and development organizations. Larger traders located in the regional capitals within the AOI (Mopti and Gao in particular) have started to expand their own storage capacity by building new warehouses in response to the requirements outlined in recent humanitarian calls for tenders (FEWS NET 2019). However, the quality of new facilities varies considerably and requires careful inspection prior to use.

### 2.4.2 Supporting services

Recent nation-wide expansion in mobile network coverage has facilitated not only the population's access to financial services, but also access to remittances. Financial service providers (FSP) including commercial banks, microfinance institutions (MFI), and mobile money operators are present in the AOI, but generally operate in the regional capitals with a limited presence in rural communes. In 2015, Orange Money had 2.5 million accounts in Mali (double the numbers reported

**Table 3.** Main mobile network operator subscriptions within the AOI

Region	Orange (%)	Malitel (%)
Gao	64	36
Mopti	59	41
Timbuktu	74	26

Source: Authors' compilation

**Figure 11.** Orange network coverage, Mali



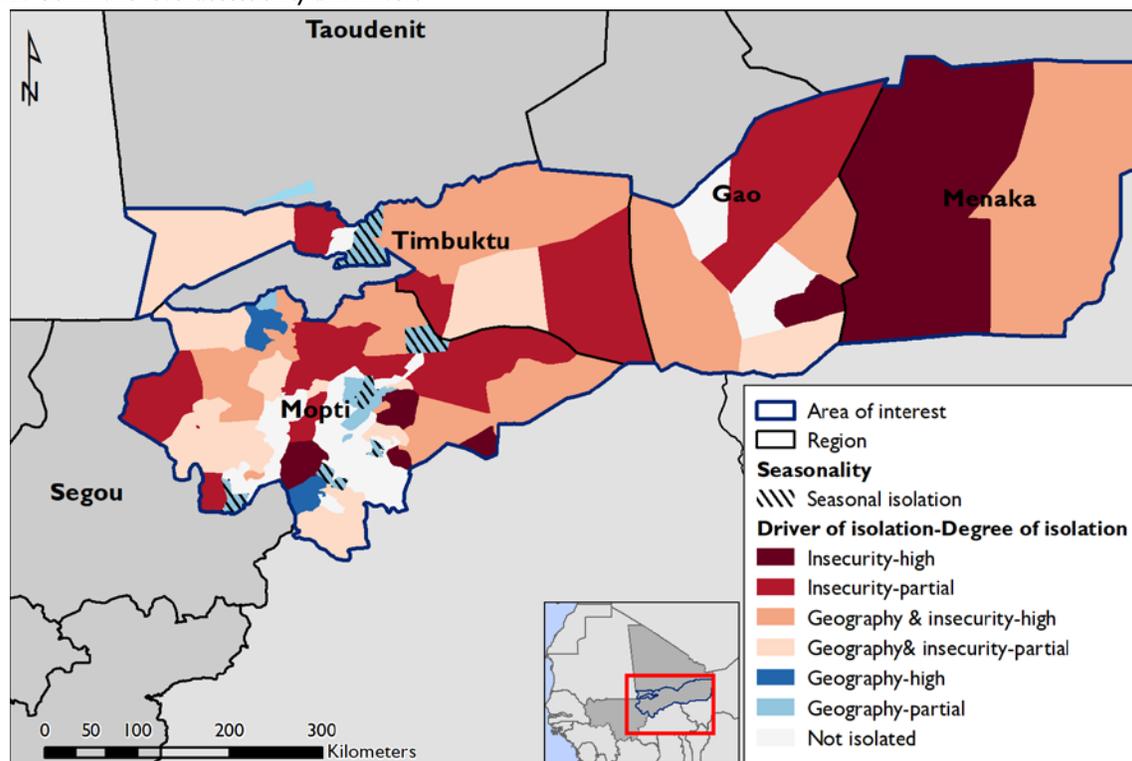
Source: Orange Mali 2019

in 2013) (World Bank 2015). By 2017, 65 percent of the Malian population (over 10 million) were mobile phone subscribers and 11 percent of the Malian population (roughly 1.9 million) were mobile money subscribers (Minischetti 2017), with a relatively higher concentration in southern Mali. While the number of mobile money subscribers has certainly increased in the past two years nationally, the trends in central and northern Mali are believed to lag behind those of national trends (with more emphasis on other money transfers mechanisms). Mali is one of ten countries worldwide where more adults have a mobile money account than a formal financial institution account (World Bank 2018). Other supporting services include WARI, described as a financial and commercial platform to facilitate cash transfers, with agents located countrywide (FEWS NET 2019). However, relative to commercial banks, mobile money operators, and MFIs, informal money traders have a greater presence in rural areas in the AOIs.

## 2.5 Operating context

The ongoing complex emergency in northern and central Mali creates a challenging operating environment. Restrictions on vehicle transportation meant to curb activities by armed non-governmental actors have also limited the physical access of others resulting in a high degree of isolation of many communities. Insecurity along important transit corridors has resulted in a frequent need to revisit food assistance modality delivery decisions. Insecurity also affects supporting services (financial services and mobile network providers) and infrastructure (storage facilities), such as when facilities are destroyed or robbed, or mobile network maintenance teams are abducted. Existing pressures on land access and use between agricultural and pastoral populations have been further aggravated (especially in Mopti region). In this context, implementing organizations have underscored a strong need for flexibility in program design and the importance of local partnerships and operating in consortia, rather than alone. The presence of two RAMSAR sites within the AOI have not been effective in limiting agropastoral activities due to the very limited enforcement capacity of the state, similar to the enforcement of land use restrictions in protected forests (*forêts classées*) present throughout Mali.

**Figure 12.** Commune-level accessibility and drivers



Note: Isolation level was determined by multiple geographic or physical access constraint variables as well as insecurity-related access constraints. Geographic drivers of isolation considered distance from urban center (cercle capital), road condition, water level fluctuations in areas accessibly by river, and flooding, among others. Insecurity-related drivers of isolation considered the incidence of violence in an area, as well as the type (ethnic tensions, violent extremism), and location (within commune or on road/river/path to commune) of violence. Determination of commune isolation level was based on qualitative data from the EMA assessment data collectors based in each cercle as well as FEWS NET technical staff. ACLED security event data were considered as well to complement the understanding of accessibility.

Source: FEWS NET assessment, ENSAN 2018, and ACLED 2019

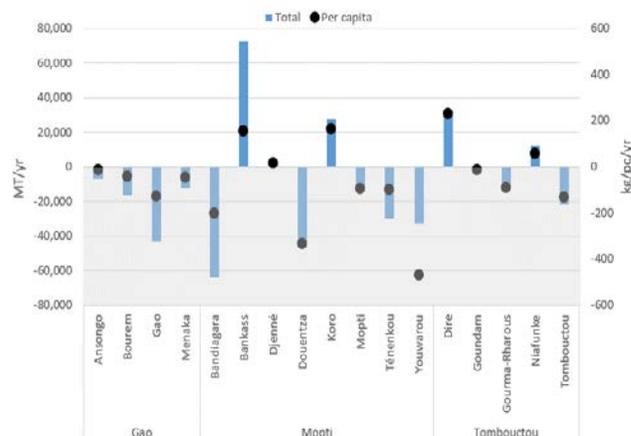
### 3. Market Context in the AOI

This section provides a general overview of the market context in the AOI. While Mali is a major cereal producing country in West Africa, the majority of AOI cercles are deficit in terms of cereal production (Figure 13). Conversely, pastoral populations across the AOI sell large and small ruminants to other areas of the country and region. Annex 4 through Annex 11 provide additional details on the market context in the AOI.

#### 3.1 Market structure

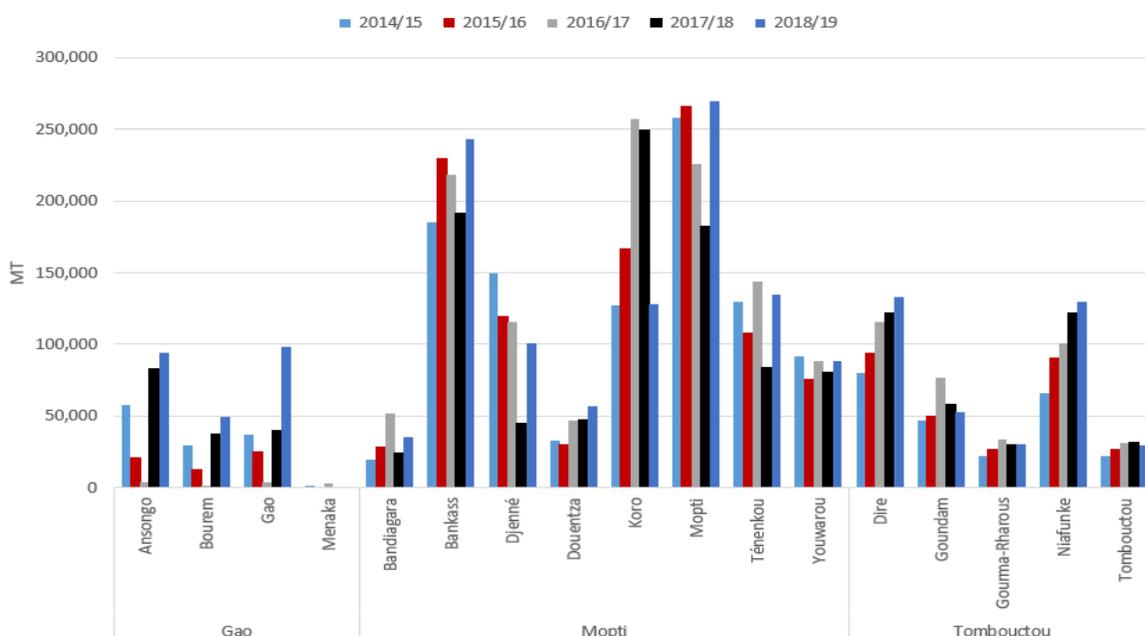
Rice and millet are the dominant cereals produced and consumed in the AOI, followed by wheat, sorghum, maize, and fonio (FEWS NET 2019 and BSS data). Millet and local rice are generally the most preferred cereals in the focus cercles of Mopti and Timbuktu, while imported rice is slightly more preferred in Gao and Ménaka (ENSAN 2018 and FEWS NET 2019). Sorghum is preferred in the relatively higher consumption and production zones of Douentza and Bankass in Mopti region. Cowpeas and groundnuts are consumed and the preferred legumes across the AOI (ENSAN 2018). Most households consume imported, refined, edible oil supplied through Bamako or Algeria, although local edible oils (both industrial and artisanal) are also consumed. Maize production within the AOI is concentrated in the lake areas of Timbuktu and largely destined for own consumption (FEWS NET 2019). Aggregate agricultural production across Timbuktu, Mopti, and Gao regions has increased in recent years (CPS/SDR 2018), driven primarily by favorable rainfall patterns and water levels along the Niger river. However, local variations in water availability (localized droughts and localized excessive flooding), the presence of crop pests and diseases, and insecurity have recently affected localized production patterns (Figure 14). Annex 7. Production Systems Challenges and Risks in Mali EMA AOI.

**Figure 13.** Average aggregate cereal balance (MT), by cercle 2014-2018



Source: FEWS NET estimates based on regional government statistics

**Figure 14.** Aggregate cereal production (MT), by cercle 2014–2018



Note: Data from the Direction Régionales D’Agricultures (DRA) of Mopti, Timbuktu, and Gao were used for Figure 13 and Figure 14. The CPS/SDR and DRA in Mali have different assessment methodologies. CPS/SDR conducts “enquête agricole de conjuncture” (EAC), by sampling enumeration areas across the country (the same methodology used by national agricultural statistical units in many other CILSS countries). The sample is representative only at the regional level. On the other hand, DRA conducts field assessment in each commune, and the sum of the communes gives the figures of the cercle. Nevertheless, in order to reduce discrepancies, both use the “carré de rendement” estimation of CPS/SDR. For cercle level analysis, DRA data are required.

Within Mopti region, the Seno zone (Bankass and Koro cercles) is considered the millet basket, while rice production is concentrated in the floodplains of Mopti, Tenenkou, Youwarou, and Djenne cercles. In Tombouctou region, the riverine cercle of Dire and the lakes-side cercles of Niafunke and Goundam are the main cereal production zones. Limited staple food production in Gao region is concentrated in Ansongo and Gao cercles, composed mainly of rice.

The majority of staple food production within the AOI is considered “traditional” and either rainfed or produced in flood recession (riverine or lakeside) areas (authors’ calculation based on CPS 2017 data, GEDUR 2009). Modern production systems, including managed large-scaled irrigated perimeters are present in Mopti (Office Riz Mopti), where they contribute to 17 percent of production, composed entirely of rice. Off-season grain production is concentrated mainly in Timbuktu, where it contributes nine percent of annual production and composed mainly of wheat. Within this context, the delicate balance of local rainfall patterns and the water levels of the Niger River Delta are the key drivers of food and fodder production, with too little rain leading to drought and too much leading to flooding/water logging. Other determinants include the presence and management of pests, which vary geographically (del Rio and Simpson 2014; Henrick et al., 2015), limited availability of locally-adapted seeds (especially in Timbuktu), declining soil fertility due to erosion, land tenure/access constraints, and, most recently, conflict/insecurity.

Mali is a major livestock-producing country in the region in terms of herd size. The regions within the AOI are major livestock producing zones, supplying both national and regional markets. Small ruminant trade generally follows that of cattle and are largely traded locally within the region, but also collected and loaded onto vehicles for longer distance trade, which is largely seasonal during the main annual periods of festivities (Ramadan and Tabaski). Markets are well-supplied although affected by population pressure, overgrazing, and the high cost of livestock feed. The main livestock markets in the AOI are Fátoma in Mopti, Wabaria in Gao, and Gossi and Bambara Maoude in Gourma Rharous. While extensive (grazing) production systems dominate in the AOI, both concentrate and fodder are used as animal feed to complement pasture, especially during years of relatively poor rainfall. *Tourteau du coton* (cottonseed cake) is the most commonly used concentrate, while a variety of different fodders are used including cowpea, groundnut, and rice hay, as well as *bourgou*.

Source: FEWS NET estimates based on DRA statistics

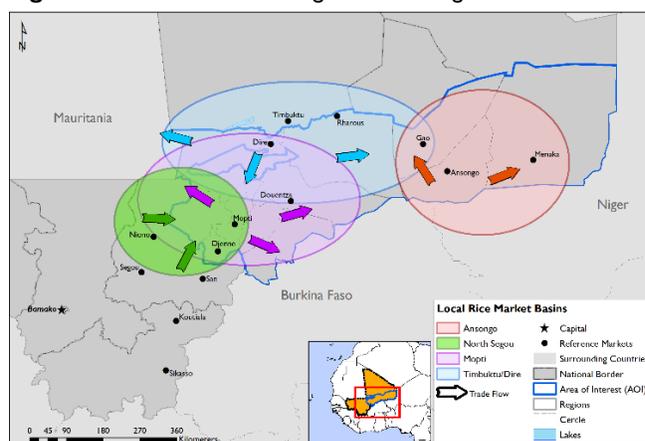
**Table 4.** Key markets serving the the AOI

Markets within the AOI	Source markets
<b>Staple foods</b> <ul style="list-style-type: none"> <li>• Mopti</li> <li>• Djenné</li> <li>• Bankass</li> <li>• Koro</li> <li>• Dire</li> <li>• Timbuktu</li> <li>• Gao</li> <li>• Ansongo</li> </ul>	<b>Domestic</b> <ul style="list-style-type: none"> <li>• Bamako</li> <li>• Koutiala</li> <li>• Sikasso</li> <li>• San</li> <li>• Segou</li> <li>• Niono</li> <li>• Macina</li> </ul>
<b>Livestock</b> <ul style="list-style-type: none"> <li>• Fátoma (Mopti)</li> <li>• Wabaria (Gao)</li> <li>• Sofara (Djenné)</li> <li>• Boni (Douentza)</li> <li>• Bambara Maoude and Gossi (Gourma-Rharous)</li> </ul>	<b>Regional</b> <ul style="list-style-type: none"> <li>• Algeria</li> </ul>

Note: Annex 8 and Annex 9 provide maps of these markets.

Source: FEWS NET 2019

**Figure 15.** Local rice marketing basins serving the AOI



Note: Annex 9 presents marketing basin maps for the other commodities studied.

Source: FEWS NET 2019

**Figure 16.** Rice, flour, and sugar on the market in Gao



Source: FEWS NET 2019

Fishing in the AOI is concentrated around the Niger River and the Lakes area of Timbuktu. Most fishing and aquaculture activities take place between December and May and production levels depend on the water/flood levels and equipment used. Fish are sold fresh, dried, or smoked. Fishing activities are dominated by men whereas marketing activities (trade, processing, and retailing) are carried out almost exclusively by women. Fish trade within the AOI is mainly local, but with some sales to buyers in Bamako.

Given the staple food deficits present, markets in the AOI rely on supplies from other areas of the country, region, and international imports to cover local supply gaps (Table 4). Segou region (mainly Niono and Macina cercles) is a source of additional local rice supply to the AOI. Coarse grain flows into the AOI come mostly from the Sikasso region. Bamako and Burkina Faso supply Mopti with imported rice, wheat flour, and edible oil, while Algeria supplies Gao and Ménaka. Whether or not imported edible oil available on markets is fortified depends on the brand, rather than enforced government regulatory measures (Fintrac 2015 and Sablah et al. 2012). Wheat flour produced in the main industrial mills in Mali are fortified (Boyacioglu 2017), while wheat flour imported from Algeria or produced in artisanal Malian mills is not. Mopti serves as an aggregation and transit point for trade toward the north, while Gao serves a similar role for trade toward Ménaka in the northeast. These trends have resulted in several distinct marketing basins within the AOI that vary to some extent by commodity (Figure 15), but broadly include:

1. Sikasso and Segou which supplies western Mopti with local rice, millet/sorghum, and maize.
2. Mopti which supplies Mopti region and southern Timbuktu region with millet and cowpea and is linked to northern Burkina Faso.
3. Timbuktu which supplies Timbuktu region with local rice and maize.
4. Gao/Ansongo/Ménaka which engage in crop and livestock trade among themselves and with neighboring Niger in particular.
5. Imported and manufactured (processed) goods are traded in three main marketing basins, supplied by Bamako (serving Mopti, southern Timbuktu, and parts of Gao regions), Mauritania (serving northern Mopti and Timbuktu regions), and Algeria (serving the eastern-most part of the AOI).

Markets within the AOI fall into five categories (WFP 2017; FEWS NET 2019; OMA 2019): (1) production/collection markets (e.g., Koro, Diré, Tonka) located in the main production zones, where collectors purchase directly from producers and are most active during the post-harvest period; (2) assembly markets (Bankass) where medium and larger-traders store and aggregate their stocks before selling to wholesalers; (3) wholesale markets (Mopti, Gao) where larger traders own and operate storage warehouses, frequently own their own transportation, and operate closely with suppliers coming from production and assembly markets, as well as importers from Bamako, Algeria, and Mauritania; (4) retail markets located across the AOI where households purchase their goods year-round; (5) and border markets (Ménaka, Ansongo) where Malian traders and those from neighboring countries buy and sell. If production and retail markets generally operate weekly, other market types operate daily, but with one main market day. While some markets may fall into one specific category, many serve multiple roles, which may change between seasons.

Rural retail activities take place in open markets and in small shops selling a variety of food and nonfood products, while permanent market structures are more prominent in urban areas (Figure 16). The number of market actors varies considerably by market type and commodity. There are many market actors across much of the AOI, limiting opportunities for market power. However, the limited number of traders operating on some markets (such as Timbuktu or Ménaka) allow for localized price setting behavior (FEWS NET 2019 and WFP 2017). Men dominate in wholesale trade in cereals and livestock, and women in retail activities. Women play a prominent role in fish trade, including the wholesale level.

**Figure 17.** Riverine transportation between Mopti and Timbuktu



Source: FEWS NET 2019

Transactions are cash based in urban areas, but bartering is important especially between local rice and fish traders in Mopti. The most common forms of transportation to markets is public buses, wagons, donkey, motorcycles, and by foot. Boat and canoe are the most common form of transport in areas of Mopti and Timbuktu regions that are only accessible by river (Figure 17). Average travel time depends on the distance and mode of transport but typically ranges between one and four hours. The main transport constraints cited during the FEWS NET assessment were poor road conditions, cost of transport, roadside insecurity, motorcycle and pickup bans, and curfews.

### 3.2 Market conduct

Since the time of liberalization (early 1980s), market activities across Mali have taken place through well-coordinated networks of traders that are now linked to regional and global markets (Kelly et al. 2012). This still holds in the AOI today, despite recent conflict-related disruptions to market and trade activities (FEWS NET 2019). Information flows even more easily today, as communication via mobile phone facilitates the coordination and delivery of orders between buyers and sellers across even longer distances. Marketing margins are limited (Table 5) due to high transport costs, insecurity, and the population's low purchasing power; therefore, profit is mainly the result of product turnover (WFP 2017). Storage costs, potential spoilage, and product loss discourage traders serving the AOI from keeping large stocks in a centralized location outside of the main urban centers of Ségou, Mopti, Gao, and Timbuktu (FEWS NET 2019).

**Table 5.** Marketing margins across key reference markets

Cercle	Price	Cost	Transport	Margin	
				Value	%
Millet (XOF/kg)					
Bankass	160	140	5	15	10.7%
Youwarou	250	200	15	35	17.5%
Mopti	230	175	10	45	25.7%
Imported rice (XOF/kg)					
Bankass	375	350	5	20	5.7%
Mopti	350	300	10	40	13.3%
Edible oil (XOF/l)					
Bankass	800	600	100	100	16.7%
Youwarou	650	550	15	85	15.5%
Mopti	750	700	50	0	0.0%
Sheep (XOF/head)					
Gao	45,000	35,000	500	9,500	27.14%
Djenne	40,000	35,000	250	4,750	13.57%

Note: All price and cost elements converted to kg equivalent.

Source: FEWS NET 2019

Prices are usually negotiated on the spot between buyers and sellers. Larger wholesalers in the AOI typically set the selling price with their clients but are price takers from their distributors elsewhere. Retailers are also price takers. While the government does not establish or enforce administered prices, it can intervene (via the Ministry of Finance and enforced by the National Directorate for Commerce and Competition [DNCC]) if prices for “primary necessity goods” (imported rice, edible oil, sugar, powder milk, and meat) are perceived to be too high. Authorized importers often receive tax exemptions for a specified quantity and over a well-defined period, typically one to three months. Trade in staple foods on the main reference markets is based on standard units of measurements (e.g., kg, 50-kg bag, 100-kg bag, liter), while local units of measure (e.g., pots or tins) are used on rural markets. Livestock are traded by the head, while fish are traded by the kilogram or in heaps (which vary in size based on the locality).

Traders and transporters make the most out of transportation given high costs in Mali. Trucks (road transport) and boats (river transport) often carry a mix of products and practice backhauling. Wholesalers with their own means of transportation often provide transport service to other traders, so they profit from both sales and transport services. Given the structurally deficit nature of most of the AOI, seasonality in supply depends on seasonality at the source market and the timing of the onset of rains, which hinders transport to some areas of the AOI (Figure 12). However, in most cases, these are known patterns that traders anticipate and adjust for. Many traders serving deficit areas with seasonal physical/geographic access constraints engage in pre-stocking relatively large quantities to ensure no break in supplies.

### 3.3 Market performance

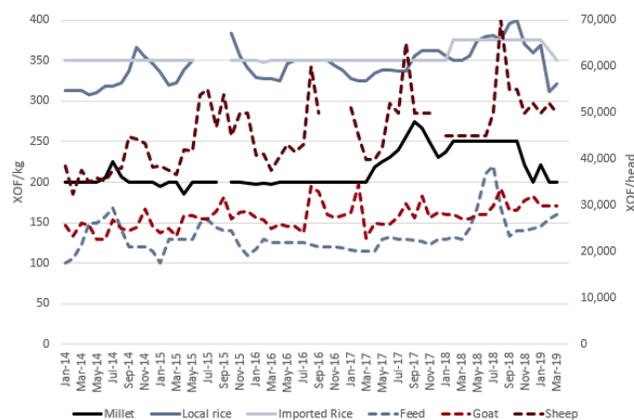
Based on several measures, markets in the AOI perform relatively well. The following section discusses price trends and their drivers, the degree of market integration, and the capacity of markets to respond to increased demand. Compared to other countries in Sub-Saharan Africa, interannual price trends in Mali, including the AOI, are generally stable and generally revert

to the long-term mean, as demonstrated by Mopti, a main reference and assembly market in the AOI (Figure 18)<sup>2</sup>. As discussed below, the relatively high level of variation in prices since 2017 in the AOI is a new trend. Rainfall patterns are typically the main drivers of locally-produced staple food, livestock, and fodder prices in a given year, while international market trends and government price policies influence imported commodity prices.

Four prominent trends emerge from the data. First, there is no long-term inflationary pressure on prices, which can be partially attributed to the XOF currency regime across the UEMOA zone, which is pegged to the Euro. Second, prices for most commodities in Timbuktu Region are consistently higher and more variable than prices in other reference markets in the AOI (Figure 19), while local rice prices in surplus-producing Dire and Tonka are among the lowest in the AOI. These localized trends are driven by Timbuktu’s isolation (accessible only by river most of the year) and the relatively small number of traders present on markets. Third, livestock prices display a higher degree of inter-annual price variation than staple foods, increasing rapidly with demand associated with religious holidays. Finally, prices in the AOI were relatively variable and elevated between 2017 and 2018 (Figure 18 and Figure 20) due to compounding effects of localized poor production and heightened levels of insecurity.

Given that much of the AOI is deficit in terms of cereal production and markets operate in a relatively competitive manner, local staple prices are influenced by production and price trends in key source and aggregation markets, as well as transportation costs. Locally-produced cereals follow distinct seasonal patterns (driven by agroclimatology as well as social/religious events, such as Ramadan and Tabaski). Table 6 presents a summary of the annual price spread observed on the main reference markets in the AOI during the 2017/18 marketing year while Annex 10 presents the standard deviation of prices over five years, both indicators of price variation. Imported commodity and manufactured good (e.g., wheat, wheat flour, and edible oil) prices have remained stable or decreased in the past year. Other factors that can introduce variability to market trends include: (1) the value of regional currencies; (2) price policies in neighboring countries (prices in Algeria are largely subsidized, but the future of that price support is uncertain) (Middle East Monitor 2018); (3) the timing and extent of institutional purchases by OPAM and others which can lead to price

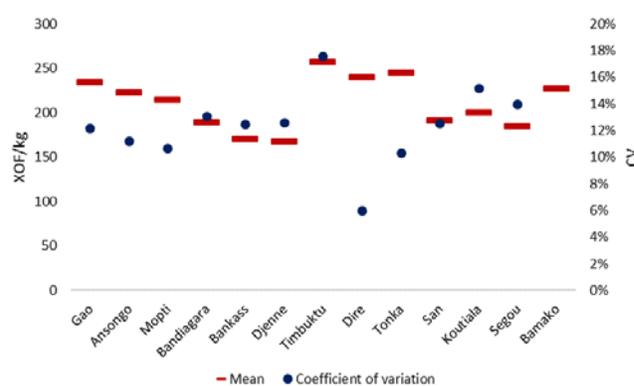
Figure 18. Long-term price trends in Mopti, XOF/kg, 2014-2019



Note: Sheep and goat prices are reported per head, while all other prices are reported in XOF/kg.  
 Note: Feed prices consist of concentrate (*tourteau de coton*).

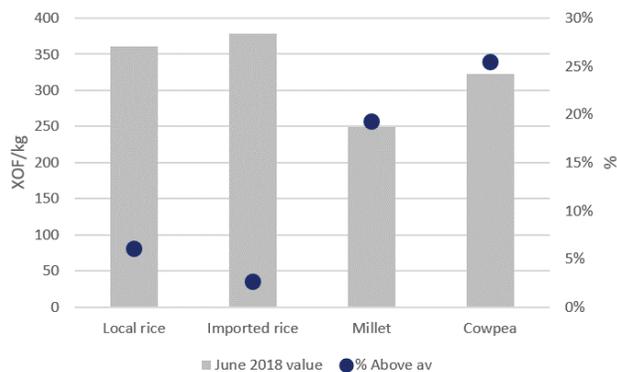
Source: OMA

Figure 19. Millet price levels and variation, 2014-2019



Source: Authors’ calculations based on OMA 2019

Figure 20. June 2018 prices and comparison to average



Note: Average price trends across the AOI are presented for the month of June 2018 (left hand axis). The average percentage increase in prices compared to the 2014-2017 average are also presented (right hand axis).

Source: Authors’ calculations based on OMA 2019

<sup>2</sup> As context, over the 2013-2018 period, the average annual price spread and coefficient of variation of millet prices were 37 XOF/kg and 12 percent in Bankass (Mopti Mali), 84 XAF/kg and 14 percent in Abeche (Chad), and 84 XOF/kg and 21 percent in Maradi (Niger), respectively.

increases of up to 10 to 15 percent (FEWS NET 2012); (4) and the relative sale prices of crops (in years of high cowpea prices, for example, producers may favor those sales over staples during the post-harvest period, maintaining relatively higher cereal prices). Fish prices are driven primarily by local production, while livestock prices are driven primarily by agro-pastoral conditions (which affect livestock body conditions) and demand patterns which vary seasonally according to the timing of prominent religious holidays and according to macroeconomic conditions in relatively higher income coastal countries. For example, demand for livestock declined when the Naira depreciated in 2016 (FEWS NET 2016).

**Table 6.** Annual price spread across primary regional and cercle level reference markets in the AOI

	XOF/kg						XOF/head	
	Local rice	Imported rice	Maize	Sorghum	Millet	Cowpea	Goat	Sheep
Max	125	45	68	95	94	38	22,500	25,000
Min	34	5	25	11	2	2	5,500	5,000
Average	81	26	47	55	43	26	8,612	16,882

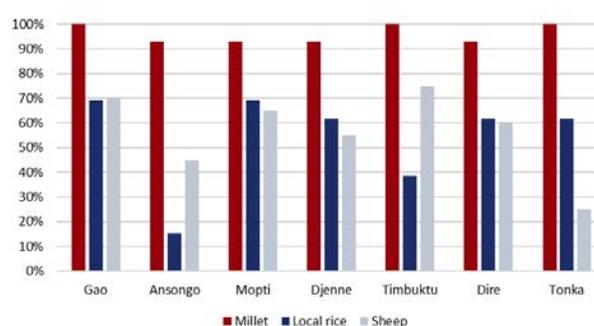
Note: the annual price spread is calculated as the difference (in absolute value) between the highest and lowest prices experienced during the October 2017 to September 2018 marketing year. The data presented are summarized from across reference markets in the AOI. For example, the maximum price spread for local rice was 125 XOF/kg experienced on Dire market, while the minimum price spread was XOF 35/kg experiences on Djienne market.

Source: FEWS NET estimates based on OMA 2019 and SAP 2019 data

Millet is the most widely traded local staple food within the AOI. Millet, sorghum, cowpea, maize, and imported rice and edible oil prices in the AOI are highly correlated with markets in the AOI and with national and regional reference markets, indicating generally well-integrated markets. However, local rice and small ruminant prices are relatively less correlated (Figure 21). In the case of local rice this is due to the relatively lower level of trade (local rice is more destined for own consumption), while small ruminant prices are driven by many characteristics that are not standardized and difficult to capture and compare across localities (e.g., age, breed, body condition). These findings are consistent with other recent market studies within the AOI (WFP 2017).

Within the context of seasonal price and supply variation, the private sector has adopted strategies to ensure markets are adequately supplied throughout the year. For example, in Timbuktu, while local rice is available in the post-harvest period, supplies of imported rice expand during the lean season (Table 7). Similar trends are observed on the market in Gao, where imported commodities offset some of the effects of reduced local availability during the lean season. These same strategies allow traders flexibility to expand their stocks in response to increases in demand. The FEWS NET assessment found that most traders could substantially increase their stocks within one to four weeks, findings that are consistent with other market studies in the AOI (WFP 2017). Prominent constraints to further expanding trader capacity center around whether supplies are adequately available in key source markets and the individual trader's access to credit or financing.

**Figure 21.** Percentage of markets with statistically significant price correlation



Source: Authors' calculations based on OMA 2019

**Table 7.** Quantities traded (MT), post-harvest and lean season

Commodity	Gao		Timbuktu	
	Post-harvest	Lean	Post-harvest	Lean
Groundnuts	20	10	100	1
Wheat flour	70	40	40	40
Wheat grain	1	0	15	1
Edible oil	14	70	50	50
Maize	20	60	2	1
Millet	1,200	600	100	0
Cowpea	15	8	2	1
Imported rice	90	160	2	150
Local rice	8	6	300	5
Sheep*	2,000	300	300	100
Goats*	1,500	200	100	30
Fresh fish+	25	11	<1	<1
Dried fish+	3	1.5	<1	<1

Note: \*Sheep and goat quantities are reported in units (heads) traded. + The post-harvest period for livestock and fish is considered from December to March, while the lean season is considered from April to November.

Source: FEWS NET 2019

Smaller markets within the AOI (and for which long term prices series are not available) are understood to be highly integrated with the larger reference markets. The main difference is that fewer traders serve smaller rural markets, with only a single trader operating in some areas. However, low effective demand coupled with the high frequency of households traveling to more prominent weekly markets (either as vendors or buyers) limit the extent to which individual traders can impose unreasonable prices (whether high or variable). Traders on smaller rural reference markets also participate in seasonal pre-stocking, in anticipation of periods when physical access may be constrained, contributing to stability in prices and availability.

Insecurity has negatively affected several aspects of market structure, conduct, and performance, including production levels, the number of traders operating and households purchasing, and the quantities stored and supplied on markets. This applies to staple foods, fish, and livestock. However, impacts on livestock and livestock product (milk) trade have been especially pronounced since 2017, especially in Mopti region driven by reduced market demand, distress sales, and armed robberies along important trade corridors. Crop production patterns have also been affected. The February 2019 ENSAN data indicate that insecurity negatively affected production for over 20 percent of households in Koro, Douentza, Djenné, and Ménaka, and over 10 percent of households in Gao and Gourma-Rharous during the 2018/19 production season. The Regional Directorate of Agriculture (DRA of) Mopti reports that about 35,000 ha were not planted in 2018/19 due to insecurity. Together these factors have led to a decrease in market activities in general. Some markets have initiated curfews, closing around 14H or 15H rather than the normal time of 17H or 18H. Motorcycle and pickup bans have been put in place in many reference markets to reduce security incidents. These have been introduced and enforced by both state and non-state actors, often with regular communication between the two. Most restrictions ban motorcycle and pickup truck use between the hours of 18H (evening) and 6H (morning). The bans have had a negative impact on marketing activities in some areas, leading to a decrease in market actors present, lower demand because people are scared to come to the market, and lower supplies held by traders. The assessment found that insecurity impacts on market activities in Tenenkou and Douentza have worsened since 2018 and that circulation restrictions are currently most pronounced in these cercles. In other areas of Mopti and the northern Regions, security restrictions have eased a bit at the request of local communities to limit the effects on their day to day economic and social activities.

## 4. Food Assistance Context in the AOI

This section provides a general overview of the food security and assistance context in the AOI. Drivers of food insecurity in Mali are complex, ranging from structural factors like the agroclimatology context (including climate variability) to the more recent violent conflicts which began in the northern-most regions in 2012 and have progressively moved south to the central region of Mopti. In response to the complex and fluid nature of assistance requirements, the GoM, in partnership with multiple international donors and agency partners, is actively working to consolidate the policy framework, reform key structures, and improve operational transparency.

### 4.1 Food security context

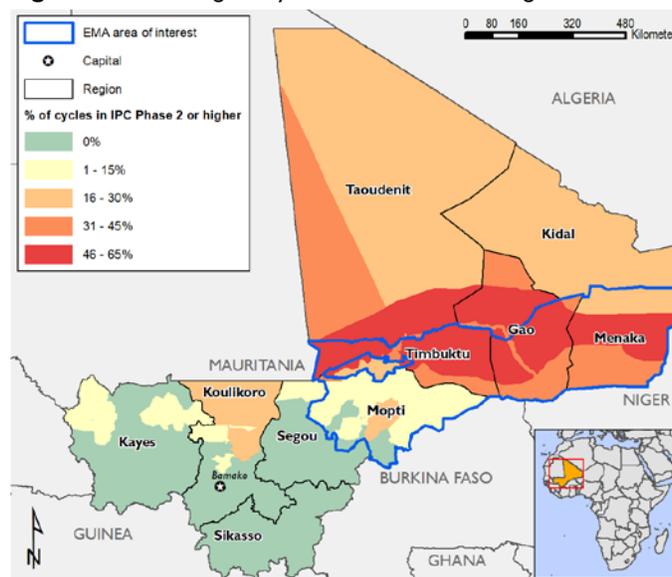
Acute food security needs are persistently greatest in the northern-most part of the AOI (Figure 22). Common structural agroecological hazards in this region vary geographically, but include inadequate rainfall and prolonged dry spells (affecting crop and livestock production, seasonal flooding (especially along the Niger River floodplains), crop pests (insects and granivorous birds), and animal diseases (Dixon and Holt 2010; FEWS NET Livelihood Profiles). Since 2012, conflict and insecurity in the Niger River Delta, the far north, and the Liptako-Gourma border region between Mali, Niger, and Burkina Faso have had compounding effects. Interruptions to basic economic activities and social structures led to market disruptions and upset regular pastoral herd movements, resulted in extensive displacement, and affected households' ability to access food and income. Poverty and malnutrition trends within the AOI are compounding factors (Table 2 and Table 8).

According to FEWS NET reporting, in the past five years, Mali has tended to have areas in Stressed (IPC Phase 2) during the lean season from April through September, but otherwise remains in Minimal (IPC Phase 1) throughout the rest of the year. However, several zones within the AOI have been classified as Stressed (IPC Phase 2) or higher in FEWS NET analysis cycles between 2014 and 2018, but most of the communes located in northern Mali have been classified as Stressed or higher approximately half of the time. Most recently, areas of Mali that experienced flooding, atypical dryness, and increased insecurity in 2018 were classified in Stressed (IPC Phase 2!) during the lean season (FEWS NET 2018). The 2018/19 harvest is expected to be above average, which will likely decrease the overall level of food insecurity in the country during the 2019 lean season (FEWS NET 2019).

### 4.2 Policy and programming context

The GoM has three policy frameworks in place to orient food assistance (Table 9): the Politique Nationale de Nutrition (2013), the Politique Nationale de la Protection Sociale et de l'Action Humanitaire (2015), and the Politique Nationale de la Sécurité Alimentaire et Nutritionnelle (2018). These are in line with the broader 2016–2018 National Development Strategy – Cadre Stratégique pour la Relance Economique et le Développement Durable du Mali (CREDD) which prioritizes peace and security, macro-economic stability, inclusive and sustainable economic growth, social development and access to basic social services,

**Figure 22.** Percentage of cycles in IPC Phase 2 or higher, 2014–2018



Note: IPC Phases for acute food insecurity: 1 = Minimal, 2 = Stressed, 3 = Crisis, 4 = Emergency, 5 = Famine.

Source: FEWS NET 2019

**Table 8.** Prevalence of GAM, SAM, and MAM (%) across Mali

Region	GAM	SAM	MAM
Kayes	8.4	0.9	7.5
Koulikoro	10.6	1.5	9.1
Sikasso	7.7	1.1	6.6
Segou	13.6	2.2	11.4
Mopti	8.9	1.3	7.6
Tombouctou	14.3	2.7	11.7
Gao	14.8	2.4	12.3
Kidal	5.7	1.0	4.7
Bamako	8.6	1.0	8.0

Source: SMART Survey 2017

and institutional development and governance. The PoINSAN's overarching objective is to ensure food security for the Malian population and improve the nutritional status and resilience capacity of the most vulnerable populations, while Mali's social protection efforts serve as a key link between humanitarian and development-oriented activities. A unified beneficiary registry (Registre Sociale Unifié, RSU) has been established through the national social protection program, Jigisémejiri. However, it has yet to be adopted more broadly for targeting or beneficiary tracking (O'Brien et al. 2018; FEWS NET 2019).

Each policy framework has a corresponding government structure charged with implementing and coordinating activities in line with the policy objectives (Ministère de la Santé, Ministère de la Solidarité et de l'Action Humanitaire, and the Commissariat à la Sécurité Alimentaire, respectively). There is currently concerted effort underway to consolidate these policies under the PoINSAN to ensure greater coherence, minimize duplication of efforts, and more efficiently use already scarce human and financial resources. While the PoINSAN articulates some guidance on the use of different transfer modalities (section 6.2.1), it does so in non-prescriptive manner that allows for a maximum level of support from and flexibility to implementing partners and donors (PoINSAN 2018).

**Table 9.** Three parallel policy frameworks governing food assistance in Mali

Policy	Politique Nationale de la Protection Sociale et de l'Action Humanitaire (PNPSAH)	Politique Nationale de Nutrition (PNN)	Politique Nationale de la Sécurité Alimentaire et Nutritionnelle (PoINSAN)
Year introduced	2015	2013	2018 (see note)
Government agencies	Ministère de la Solidarité et de l'Action Humanitaire; Ministère de l'Economie et des Finances	Ministère de la Santé	Primature/Commissariat à la Sécurité Alimentaire (CSA)
Coordination	Le Conseil National d'Orientation Stratégique (CNOS)	Comité Technique Intersectoriel de Nutrition (CTIN)	Conseil National de Sécurité Alimentaire (CNSA)
Implementing organizations	Jigisémejiri, DRDSES, Banque Mondiale	UNICEF, DRS, NGOs	DNSA (CCSPPSA, CSA, SAP, OPAM, OMA), PTFs
Government agencies	Ministère de la Solidarité et de l'Action Humanitaire; Ministère de l'Economie et des Finances	Ministère de la Santé	Primature/Commissariat à la Sécurité Alimentaire (CSA)

Note: As of June 2019, the PoINSAN's operational plan has been approved by the government but has yet to be approved by the National Assembly.

Source: Authors' elaboration based on OPM 2016

The National Response Plan (PNR) provides a practical operational agenda to address annual (short-term) multisectoral assistance needs in Mali under the PoINSAN, including the financial and logistical aspects of interventions, as well as their timing and geographic scope. The PNR is elaborated annually based on inputs from the National Early Warning System (SAP) and validated by the National Food Security Council (Conseil National de Sécurité Alimentaire), presided by the Prime Minister. The Dispositif National de Sécurité Alimentaire (DNSA) is the institutional framework of PoINSAN, and operations are ensured by four structures (Table 10): le Commissariat à la Sécurité Alimentaire (CSA), le Système d'Alerte Précoce (SAP), l'Observatoire des Marchés Agricoles (OMA), et l'Office des Produits Agricoles du Mali (OPAM). The DNSA is currently being restructured in order to better support food security and nutritional crises with support from the European Union (RDNSA).

**Table 10.** Roles of different structures under the PoINSAN

Structure	Role
DNSA	A set of institutional arrangements to help ensure food security objectives are met.
CNSA	The political and decision-making body of the DNSA, providing orientation and supervision to the national food security strategy. The CNSA meets twice per year, on invitation by the Prime Minister.
CSA	Coordinates activities of the DNSA. The CSA serves as the secretariat of the CNSA, attached to the presidency.

Structure	Role
<b>SAP</b>	Monitors the food security situation of the Malian population, provides early warning, and disseminates information to support decision making, including the characterization of vulnerable households (number and geographic targeting) and also orientation to the most appropriate response.
<b>OPAM</b>	Supplies and manages the national security stocks in areas of the country at risk of food insecurity. This includes 35,000 MT of grain that can be used in the case of emergency food assistance needs and an additional 25,000 MT of rice that can be sold in the market in case of break in supplies.
<b>OMA</b>	Monitors market prices and trends and disseminates information to support decision making.

Source: Authors' elaboration based on O'Brien et al. 2018 and PolNSAN 2018

While well-established structures and procedures exist to manage food crises in Mali, the GoM is faced with a number of challenges (Table 11).

**Table 11.** Challenges facing public institutions to efficiently manage food assistance

Challenge	Description
<b>Multisectoral needs</b>	Support needs to displaced and otherwise conflict-affected populations are multisectoral by nature, requiring a level of synergy and coordination across implementing organizations that does not currently exist.
<b>Insecurity</b>	Insecurity presents challenges to providing the most basic social services and emergency assistance to affected populations.
<b>Procedures</b>	Current procedures delay the process of validating the PNR due to frequent changes in government. For example, while the PNR would normally be validated in March, the 2019 PNR (for the 2018/19 marketing year) has been delayed by at least two months due to the resignation of the Prime Minister in April 2019 and dissolution of his government.
<b>Transparency</b>	A lack of transparency at all levels of government presents challenges to the efficient management of food assistance. Measures put into place to circumvent this have created their own set of challenges (e.g., OPAM transportation contracting procedures, working through local NGOs rather than local food distribution committees).
<b>Evaluation</b>	Beneficiary experiences and satisfaction with interventions are not systematically monitored. While this has recently been introduced as part of the CSA's work, PDM reports and data from other implementing organizations are often not available, limiting opportunities to learn from experiences and re-orient activities.
<b>Universal registry adoption</b>	Plans for the RSU are well underway (OPM 2018) and its digital platform has been piloted in southern Mali (RSU 2018). However, implementing organizations are concerned about beneficiary data protection. Furthermore, there appears to be a lack of understanding by other organizations and stakeholders about how they can plug into and leverage this resource.
<b>Food basket</b>	The GoM provides cereals (up to ½ ration) to support annual assistance needs in prioritized areas articulated via the PNR (see Table 12 below for additional details). Other requirements (additional cereals or more diverse commodities) are provided by technical partners.

Source: Authors' elaboration based on OPM 2018 and FEWS NET 2019

### 4.3 Overview of food assistance activities

The GoM, the World Food Programme (WFP), the International Committee of the Red Cross (ICRC), and ECHO are the largest regular food assistance actors in the country. Together with many other actors, they have recently been active in the humanitarian/emergency food assistance space in response to the complex emergency in northern and now central Mali with the USG as one of the leading donors (USAID 2019). Collaboration across organizations is common to ensure flexibility in programming in an unstable environment. While meeting emergency needs is essential, implementing organizations also consider a longer-term approach to food security and livelihoods through programs oriented to livelihoods protection and strengthening, financial inclusion, market-based interventions, and/or school and supplementary feeding programs. For all organizations, the modality, location, scale, timing, and duration of their food assistance programs has been variable.

The Conseil National de Sécurité Alimentaire (CNSA) coordinates food assistance activities in Mali, predominantly in the emergency context (European Commission 2019). In terms of long-term programming, in 2013 Mali introduced Jigisémejiri, an emergency social safety net program that contributes to the food security situation of vulnerable populations in across much of the country through cash transfers, with funding support from the World Bank. Recognizing the unique challenges with

providing such support in central and northern Mali, three sequential efforts were put into place with funding from the European Union to complement on-going in-kind humanitarian response while also engaging and influencing development actors on the importance of moving to long-term and predictable social transfers in the north (European Commission 2019): the 2014 Cadre Commun sur les Filets Sociaux (CCFS), followed by the 2015–2016 Cadre Commun Transferts Sociaux (CCTS), followed by the most recent KEY project (through 2020). The geographic coverage and extension of the national social safety net program has been prioritized based on the level of poverty and vulnerability of local populations (O'Brien et al., 2018), the availability of donor funds, as well as other considerations such as the availability and reliability of supporting services (financial services, technical services).

#### 4.4 Targeting

Assistance targeting with the AOI takes place at two levels: geographic and household. For annual emergency assistance, the main criteria for geographic targeting is the results of the Cadre Harmonisé (CH), with priority to areas facing Phase 3 or higher. Beyond that, many organizations conduct vulnerability assessments, either complementary to or independent of the CH process. Commitments are made by the government and partners via the PNR, with the government committing supporting the needs of 55 percent of households facing CH Phase 3 or higher in most cases (including within the AOI) and up to 100 percent of households in selected cercles of southern Mali. However, international organizations make budgetary decisions prior to the PNR process, resulting in combined assistance commitments often exceeding local needs (Table 12).<sup>3</sup> As a result, although the Malian government commits to providing assistance to a certain number of households, those commitments are often not fulfilled because 100 percent of needs are already met by others. Exceptions include cases of flooding, crop failures, and other natural disasters, which the government responds directly to and effectively. For government's social protection activities, targeting is based on the level of community vulnerability as defined by the Observatoire du Développement Humain Durable.

**Table 12.** Illustrative examples of cercle-level stakeholder assistance commitments

Region	Cercle	Targeted households	Partner coverage commitments (hhlds)	Government coverage commitments (hhlds)	Total commitments (%)
Tombouctou	Dire	5,701	7,806	5,701	237%
	Gourma Rharous	23,164	49,554	10,101	258%
Gao	Ansongo	25,067	27,829	13,723	166%
Ménaka	Ménaka	27,156	38,940	14,867	198%
Mopti	Djenne	64,287	41,955	35,194	120%
	Mopti	96,286	35,048	52,712	91%
	Bankass	25,130	1,404	13,758	60%
	Bandiagara	66,939	27,439	36,646	96%
	Tenenkou	115,975	89,072	63,491	132%

Note: The number of targeted households (hhlds) solely on the basis of the CH process is frequently much lower than the final number used for planning purposes. The final numbers are adjusted upward based on the availability of partner funding to provide additional support to areas they have prioritized.

Note: Response commitment and planning data were available to FEWS NET from the Food Security Cluster. However, consolidated data containing details on actual realized distributions are not currently available.

Source: FEWS NET calculations based on Mali Food Security Cluster data 2019

With respect to household level targeting, most implementing organizations use the Household Economy Approach (HEA) method, although some have explored using Proxy Mean Testing (PMT). While both approaches seek to avoid interference or conflict with community leaders, the HEA method is seen as faster and requiring less resources than PMT (Escot and Miseli 2018). Targeting committees work with implementing organizations to establish and validate beneficiary lists. In the case of community-level cash for asset activities, all households are typically expected to contribute one household member. Some organizations (ACTED) impose an age limit of 18 to 40 years. Some programs require beneficiaries of agricultural or pastoral inputs to have access to a minimum amount of land (e.g., 0.5 ha) or a minimum number of head of livestock (five). Targeting is on the basis of six-member households, regardless of actual household size.

<sup>3</sup> The 2018 year was a special case, when a disagreement between the Ministry of Finance and the CSA over the cost of transporting in-kind assistance led to funds to not be allocated for transporting assistance and assistance not reaching prioritized and targeted communities. This was the first time such a disagreement led to this outcome.

## 4.5 Experience with food assistance modalities

Through its history of managing various food crises, stakeholders in Mali have gained substantial experience with different food assistance modalities. Cash-based programs to support a range of objectives have proliferated since 2012, while in-kind assistance maintains a prominent role in the GoM's assistance strategies and among some donors. In terms of the decision-making process, systematic and regular assessments of modality, feasibility, and appropriateness are not common among implementing organizations. Rather, as in many contexts, the transfer modality is more often pre-determined by the funding organization. In the case of WFP, when it does have flexibility in its program design, the choice of modality is informed heavily by three prominent indicators: the level of market activity, the cost of the food basket based on local market prices, and the security context (FEWS NET 2019). The FEWS NET assessment found that security conditions were often a higher order determinant of whether an organization chose to work in an area, rather than influencing modality choice. The assessment found that while the private sector is certainly aware of when and where assistance is provided (whether in-kind distributions or cash-based programming), market impacts of these activities are very limited.

### 4.5.1 In-kind assistance

The AOI has vast experience with in-kind assistance. Table 13 presents the commonly used rations among key organizations in Mali.

**Table 13.** Illustrative examples of in-kind food assistance activities in the AOI

Element	Half Ration	Full Ration	Partial ration
Implementing agencies	WFP	WFP	GoM (CSA)
Commodities	200g of cereals, 50g of legumes, 25g of CSB, 12.5g edible oil, 2.5 g of salt per person per day	400g of cereals, 100g of legumes, 50g CSB, 25g edible oil, 5g of salt per person per day	9 kg of cereals per month
Frequency of distribution	Half ration, Monthly during the pre-lean season	Full ration during the lean season	Once for the lean season
Length of assistance	3 months (April – June)	3 months (July – September)	3 months (July – September)

Note: It was not possible to map all details for all organizations operating in the AOI. The information presented in the table shows only information available to the FEWS NET assessment team, hence it should be considered as only indicative of the general landscape for this specific modality. The number of beneficiaries and their location depends on the prioritization outlined in the annual PNR. The full ration is based on 2100kcal per day and distributions are made based on a six member household.

Source: FEWS NET 2019

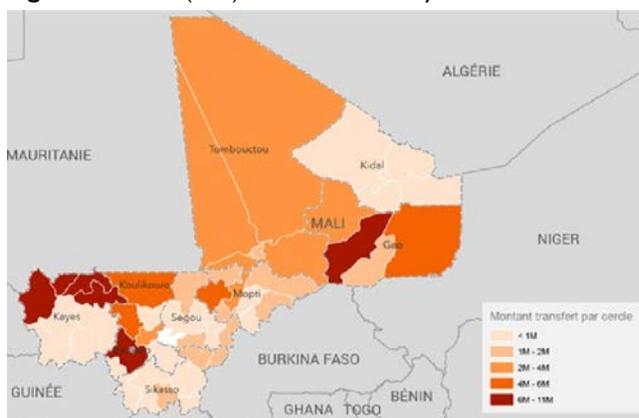
This modality is generally less appreciated by both implementers and beneficiaries interviewed and presents challenges for some vendors as well. Some of the challenges cited relate largely to the complex logistics/supply chain setting for bulk commodities and to the actual distribution process. For example, some NGOs cited delays in the contracting process to identify vendors willing to transport relatively large quantities of in-kind commodities to insecure areas, especially when the burden of risk falls on them. Other challenges relate to the role of local authorities (including traditional community leaders) in the commodity distribution process. For example, even if a specific beneficiary list has been validated, in-kind rations can be redistributed locally by traditional community leaders with the support from targeted households to help ensure community social cohesion and solidarity (FEWS NET 2019). While this practice is most common with in-kind food distributions, household sharing of assistance also takes place with cash programming. The Alliance for Community Resilience end line assessment (2017) found that between 19 and 35 percent of households in their program in northern Mali shared their cash transfers, amounting to values equivalent to approximately five to ten dollars per transfer cycle. These dynamics present challenges for the effective targeting and the monitoring and evaluation of program activities. Commodity appropriateness challenges of the past have been largely overcome with increasing and extensive use of locally and regionally procured pulses and cereals, rather than imported substitutes.

### 4.5.2 Unconditional Cash transfers

Overall, the use of cash and voucher (C&V) for all sectors in Mali is growing. For example, humanitarian C&V funding was up from US\$67M in 2017 to US\$133M in 2018, with C&V for food security representing approximately half of this amount (Calp 2018; OCHA 2018; OCHA 2019). The use of cash transfers by relatively smaller organizations in emergency response programming is perceived as critical in supporting the technical development of national safety net systems, such as Jigisémejiri (which currently only serves about one quarter of the chronically food insecure population of Mali) (O'Brien et al.

2018). While the expansion in the range of delivery mechanisms (notably electronic solutions) has enabled the continuation of food assistance programs in a context of insecurity and poor access (particularly through the use of mobile money and vouchers) many implementing organizations operating in the AOI have reverted to relying on local money traders with local knowledge and relatively easier access for their cash distributions (FEWS NET 2019). Furthermore, until 2015, markets were considered able to support cash transfers, to complement ongoing in-kind distributions. However, since 2015, despite market functionality, many partners have shifted from cash to vouchers due to deteriorating security in northern and central areas. Still, cash predominates within the broader modality across Mali as a whole (74 percent of all cash-based programming was through cash and 25 percent was through vouchers (UN OCHA 2019).

**Figure 23.** Value (US\$) of cash transfers by cercle, 2018



Source: UN OCHA 2019

**Table 14.** Illustrative examples of cash-based food assistance activities in the AOI, 2018

Region	Gao	Gao	Gao	Timbuktu	Mopti
Implementing agencies	Save the Children	ACF	IRC	CRS	CRS
Transfer value (range)	XOF 60,000 (monthly)	XOF 40,000 (monthly)	XOF 45,000	XOF 40,000	XOF 48,000
Frequency of distribution	3	3	3	3 per year (March to May; June to July; July to August)	1

Note: It was not possible to map all details for all organizations listed. The information presented in the table shows only information available to the FEWS NET assessment team, hence it should be considered as only indicative of the general landscape for this specific modality. It is worthwhile to note that implementing organizations cited the WFP food basket as the reference point for establishing the transfer value adopted. These cash transfer examples include cash in envelope delivered by NGOs, cash distributed by money traders (fee based), mobile money.

Source: FEWS NET 2019

CALP (2018) identifies a series of risks surrounding the use cash transfer programming in Mali with insecurity and misappropriation as the most prominent. Agencies were able to identify mitigation measures for most risks including: (1) shifting delivery mechanism as the context changes and using new technologies and electronic systems; (2) relying on trusted local partners; and (3) ensuring local acceptance and being transparent with all stakeholders. However, agency awareness of the risk of beneficiary data protection is low (i.e., limited experience/understanding of issue). While market impacts of cash programs is certainly a risk, there is little evidence of inflationary impacts on markets linked to cash programming.

#### 4.5.3 Vouchers

The use of vouchers in central and northern Mali has increased in popularity among many stakeholders. Restricted value vouchers (in either paper or electronic form) are among the most widely used. Beneficiaries exchange their voucher against a pre-selected list of commodities (e.g., cereals, pulses, edible oil, sugar, pasta), depending on the location. Participating vendors may operate on the local market, or travel to a distribution point. The transfer sizes are broadly consistent with those cited in Table 13 and Table 14. Benefits to this delivery mechanism include more flexible beneficiary choice, rapid payment to vendors (in most cases they register each individual distribution on a mobile application and are reimbursed almost immediately), and reduced opportunities for redistribution by community members. Some challenges include a need for increased beneficiary sensitization about the commodity list and limited engagement local vendors (larger vendors based in large urban centers, including Bamako, are reportedly favored).

#### 4.5.4 Conditional cash (Cash for work/ Cash for assets)

Conditional cash programming is utilized across the AOI as part of social protection activities (Haute Intensité de la Main d'œuvre [HIMO]) offering employment and contributing to rural infrastructure projects, and community-level resilience building activities, among others. These activities range from rural road building activities to digging or maintaining rural

irrigation canals and gardening plots. The daily rates for such work vary geographically between XOF 1,500 and 3,000 per day (Table 15), depending on the specific task/work performed, the local market rate for unskilled daily labor, the overall objectives of the program, and the internal decision-making processes of the implementing organization. Together these factors create challenges for harmonizing cash for work (CFW)/ cash for asset (CFA) rates. The FEWS NET assessment did not reveal any major generalized constraints to ensuring adequate participation in these activities by communities. At the same time, these activities did not (on their own) discourage seasonal or long-term migration, particularly among youth. Rather, complementary activities could be used to encourage and support beneficiaries to invest the income earned to start a small business.

#### 4.5.5 Local and/or Regional Procurement (LRP)

Local cereal purchases (rice, maize, sorghum, and millet) have an extensive history in Mali, with the national cereal marketing board, OPAM, as the most prominent player. Other institutions include the WFP (for cereals and pulses), as well as other NGOs, who support Purchase for Progress and school feeding programs. Fortified and blended flours are available for purchase (e.g., Danaya Cereals, Misola) and used mainly for supplementary feeding projects. While blended flour vendors report being in competition with imported CSB products, implementing organizations cite the relatively high cost of the locally produced options. Purchases typically take place through either an open call for tenders or a closed call for tenders among pre-selected vendors. Selected vendors are often based in Bamako or the other large urban centers. It is worth noting that recent experience suggests that large-scale (over 20,000 MT) and poorly timed calls for tenders have the potential to influence market prices in Mali. Furthermore, traders interviewed during the FEWS NET assessment indicated they had not yet been paid by OPAM for cereals supplied as part of the 2017/18 response (payments were nearly a year late).

**Table 15.** Cash for work/cash for asset daily rates, 2019

Region	Organization	Daily rate (XOF)
Timbuktu	ACF	2,000
Timbuktu	Mercy Corps	1,500 for 45 days
Gao	WFP	1,500
Gao	Save the Children	2,000
Gao	ACTED	3,000

Note: It was not possible to map all details for all organizations listed. The information presented in the table shows only information available to the FEWS NET assessment team, hence it should be considered as only indicative of the general landscape for this specific modality. These rates are for unskilled labor activities. Those requiring skilled labor may be higher (5,000 or 6,000/day).

Source: FEWS NET 2019

## 5. Considerations for Program Design

Findings from this assessment identify several constraints to and opportunities in support of different market-based modalities in the AOI. Overall, appropriateness and feasibility of the different modalities for the delivery of food assistance are strongly related to the fluid nature of the operating environment, beneficiary and organizational preferences, and the availability of key resources (such as road and network coverage) in the operating environment. Based on the information reviewed, all modalities have contributed to improve the food security situation of targeted populations, though vouchers also support the professionalization of market actors, while meeting programmatic objectives.

Several factors relevant for program design were identified through the analysis:

- The broad operational context, with the security context playing a prominent and cross-cutting role.
- Agroecological factors, which either allow for productive activities or restrict them, and determine the seasonality of livelihood activities.
- Social factors, particularly persistent intercommunal conflict affecting trade flows, accessibility, and overall development.
- Spatial distribution of infrastructure and services, which ensures coverage along the main roads/corridors, but presents weaknesses and challenges in sparsely populated areas outside of region and cercle-level capitals.
- Regional dynamics, which are important for trade in goods and services, including the supply of key staples, but are also relevant in cross-border social dynamics and tensions in some locations.
- The food assistance context, with a general trend toward cash-based programming supported by the market context and the policy environment. While this trend has been observed in emergency contexts due to recent events, it will likely be equally or more relevant for long-term development efforts.

### 5.1 Operational context

**Table 16.** Key considerations for program design and implementation related to the general operating environment

Element/aspect	Assessment findings
<b>Conflict/insecurity</b>	The conflict and security situation are persistent within the AOI, yet fluid. For example, while some areas of northern Mali have improved in terms of security conditions since 2016/17, areas of Mopti region have worsened. Safety along key marketing corridors and communities may be highly localized. The presence of new armed groups within the AOI has shifted some of the gender dynamics, requiring a highly localized appreciation of the types of activities that are perceived as acceptable for women to participate in. Existing tension between agriculturalists and pastoralists over land use has been exacerbated. Furthermore, the nature of the context has resulted in delays and additional operating costs, requiring flexibility in future program design and contingency planning. Indeed, flexibility is seen as a core risk-mitigating strategy across assistance modalities within the AOI. Conflict-sensitive programming in this context is imperative.
<b>Limited presence of GoM technical services</b>	Many technical services have resumed operations in the regional and cercle-level capitals of Timbuktu, Gao, and Ménaka after temporarily suspending operations at various times since 2012. Since 2017, technical services operating in Tenenkou, Youwarou, parts of Djenne, and Douentza have been severely disrupted but have not ceased operations and continue to work with local technical partners and implementing organizations. However, local technical services are limited in their ability to move about freely as compared to NGOs and other international partners. While this presents challenges for implementing organizations who typically rely heavily on this critical local resource, it also creates opportunities to collaborate with technical services to fill gaps in essential services (vaccination, extension, etc.).
<b>Importance of partnering with local organizations and engaging with communities</b>	Implementing organizations and the GoM (CSA) stress the importance of engaging with local communities early in the project design phase and working through local organizations/NGOs and product and service providers with local contacts. Knowledge and the resulting ability to navigate the delicate social and security context is also important. This is among the design features of the current DFSA holder in Mali (CARE, Harande) and is also a key feature of the GoM's annual response plan since 2014, facilitating access to areas that would otherwise be inaccessible. This also applies to vendors contracted to support the programs (e.g., food assistance delivery/distribution, agricultural infrastructure development, and rehabilitation).
<b>RAMSAR Sites</b>	Land use restrictions within the RAMSAR sites were not found to be effectively enforced. While the presence of these two sites with the AOI does not negatively impact agricultural production directly, they do present opportunities to support communities through environmental restoration and sensitization activities.

Source: Authors' elaboration

## 5.2 Agroecological factors

**Table 17.** Key agroecological considerations for program design and implementation

Element/aspect	Assessment findings
<b>Wide range of agroecological systems</b>	Context-specific agroecological challenges and risk result in variations in the appropriateness of agricultural household and community asset building activities (Annex 7. Production Systems Challenges and Risks in Mali EMA AOI). For example, areas with fully controlled irrigation (mostly for rice production) are challenged by variation in water levels, management and upkeep of irrigation canals, and the availability of locally appropriate inputs. Areas with uncontrolled submersion rice are at risk of both insufficient rainfall and flooding, and more prone to pests.
<b>Varying availability of grassland and water</b>	While the general environment supports pasture and crop development, the seasonality of rains and other factors influence livestock migration patterns, competition for grassland and water resources, and overall agropastoral conditions. These challenges further reinforce differences in opinion over land use between agriculturalists and pastoralists.
<b>Risk of adverse climatic events, particularly drought</b>	Localized droughts are recurrent risks to productive activities, leading to loss of crops in agricultural and agropastoral areas and reduction of grassland in pastoral areas, with the consequent reduction in production.

Source: Authors' elaboration

## 5.3 Social factors

**Table 18.** Key social considerations for program design and implementation

Element/aspect	Assessment findings
<b>Diverse household structure</b>	Households in the AOI are heterogeneous, with monogamous, polygamous, and female-headed. Among poor and very poor households, male heads of households are most prevalent. Household size often exceeds the standard six member household size commonly used for assistance planning.
<b>Key income sources</b>	While the economic base in the AOI is agricultural and agropastoral, income derived from labor and self-employment represents a considerable proportion of household income for the poor and very poor across most livelihood zones studied.
<b>Seasonal migration</b>	Exode (seasonal and long term) is common across the AOI increases during times of stress (during a year of poor rainfall or in response to conflict). The specific dynamics are highly localized and may vary from year to year.
<b>Persistent communal conflict</b>	Conflicts between pastoralist and agriculturalists are not new, but have intensified, threatening normal life as they can result in widespread death and otherwise disrupt trade flows and livelihood activities.
<b>High awareness about mobile technology and its applications</b>	A large proportion of the population owns or has access to mobile phone technology. Awareness of its use for financial transactions is highest within the regional capitals. Otherwise, traditional money traders are commonly used by households within the AOI, as are common money transfer systems such as MoneyGram and Western Union.

Source: Authors' elaboration

## 5.4 Availability of infrastructure and services

**Table 19.** Key infrastructure and service-related considerations for program design and implementation

Element/aspect	Assessment findings
<b>Road availability and quality</b>	Primary/paved road access is limited within the AOI, driven in part by a lack of maintenance in recent years. Security checkpoints and armed groups disrupt the transportation of bulk goods year-round, while seasonal road access is also a major constraint (especially in floodplain areas).
<b>Storage availability</b>	Storage is generally available in the AOI. OPAM, the private sector, and development institutions have storage facilities in the area, often in relatively close proximity to beneficiaries. However, it is common practice to store products in Mopti cercle or outside the AOI (e.g., Segou) and transport it in for sale (private sector) or distribution (assistance) on demand.
<b>Transport services</b>	Implementing organizations cited challenges with identifying transportation services willing to travel to areas of the AOI experiencing insecurity (due to concerns over merchandise theft, or worse). Programs need to account for additional travel time and the possibilities of delays in the arrival of goods for distribution.

Element/aspect	Assessment findings
<b>Mobile network coverage</b>	Orange is the main network provider in the AOI, although Malitel has an important share of subscribers in Mopti in particular. Network coverage was generally available in the urban centers locations visited, however network coverage decreases rapidly, even in more remote areas of urban communes.
<b>Availability of financial service providers</b>	Financial service agents/branches, microfinance institutions, and mobile service agents are generally available in larger towns across the AOI. In more remote locations, informal money traders and local village savings and loan associations dominate.
<b>Wari and NGO-pay</b>	Different platforms linked to banks facilitate vendor, staff, and occasionally cash transfer payments.
<b>Know Your Customer (KYC) practices</b>	A national ID card is necessary to open a bank account (or to access certain banking services more generally), purchase a phone line, and to set up a mobile money account.

Source: Authors' elaboration

## 5.5 National and Regional dynamics

**Table 20.** Key regional-level considerations for program design and implementation

Element/aspect	Assessment findings
<b>Supply dynamics in southern Mali</b>	Southern Mali supplies both locally produced and imported commodities into the AOI, particularly the southern-most portion of the AOI (Mopti). Furthermore, the AOI supplies southern Mali with cowpeas, horticultural products (mainly onions), and livestock.
<b>Relevance of cross-border trade</b>	Cross-border trade is especially important in the eastern and northern parts of the AOI, with eastern Mopti linked to Burkina Faso, northern Mopti and and Timbuktu linked to Mauritania, and Gao and Ménaka strongly linked to Algeria and Niger.

Source: Authors' elaboration

## 5.6 Food assistance context

**Table 21.** Key food assistance-related considerations for program design and implementation

Element/aspect	Assessment findings
<b>Recommendations by the National Food and Nutrition Security Policy</b>	PoINSAN supports and encourages the use and expansion of all food assistance modalities to meet various objectives without being prescriptive. The PoINSAN's operational plan is pending adoption by the government, but that may provide additional guidance and orientation in the future.
<b>Beneficiary preferences</b>	Beneficiary preferences are varied, both geographically and in terms of residency status.
<b>Preferences of implementing agency/organization</b>	Organizations are/have implemented a range of modalities in the AOI. Preferences are highly contextual, with cash via local money traders and vouchers emerging among the most prominent.
<b>Government capacity to deliver assistance across the AOI</b>	The government provides emergency assistance, based on the PNR, in designated areas that are agreed upon through consensus across members of the Malian food security community, coordinated by the CNSA. International NGOs have received extensive funding to support response efforts in central and northern Mali, allowing the GoM to focus more on the southern areas of the country. Regarding the national social protection program, expansion across central and northern Mali has been delayed by several factors, including insecurity and the resulting lack of technical and supporting services, as well as donor funding limitations. The international community began to fill gaps in these areas, laying the groundwork for GoM to eventually take over their activities.
<b>Impacts on markets</b>	Various monitoring activities indicate limited (or no) market impacts of cash-based programs. However, poorly timed large-scale institutional purchases have been found to put pressure on prices in supply markets.

Source: Authors' elaboration

For the different food assistance modalities considered in this analysis, the following opportunities and challenges were identified.

**Table 22.** Modality-specific considerations for program design and implementation

Modality	Opportunities	Challenges
Agricultural, livestock, and fisheries support activities	<ul style="list-style-type: none"> <li>• Agriculture, livestock, and fisheries are the backbone of the economy in the EMA AOI.</li> <li>• Small ruminant sales are critical to the livelihoods of poor and very poor households in the northern part of the AOI; rice, bourgou, and fish are critical along the Niger river inner delta and floodplains; horticultural crop, legume, and coarse grain sales are important in selected localities in central and southern Mopti.</li> <li>• Track record of successful productivity and income enhancing projects and activities in the AOI.</li> <li>• Limited presence of public services within the AOI.</li> </ul>	<ul style="list-style-type: none"> <li>• Wide range of production systems, requiring solutions that are highly tailored to the local context.</li> <li>• Landholding size is one of several limiting factors to increased production/productivity. Land access and use is highly contentious.</li> <li>• Presence of protected areas in the AOI (RAMSAR sites). Limited enforcement capacity by government, particularly over land and natural resource use.</li> <li>• Inputs must be locally appropriate and received in a timely fashion to be effective.</li> <li>• Opportunities to support women’s economic empowerment may be limited in parts of the AOI requiring high localized strategies.</li> </ul>
Cash (including vouchers)	<ul style="list-style-type: none"> <li>• Longstanding experience with cash transfers in Mali, dating back to 2000—2002 with the introduction of the national social protection program. Increasingly used by implementing organizations, including emergency response, even in isolated areas.</li> <li>• Households and communities in Mali are well accustomed to both formal and informal money transfer systems via both family remittance flows and assistance.</li> <li>• Staple foods available and markets operational year-around in most of the AOI.</li> <li>• Cash transfers perceived as enabler of assistance, even in highly insecure areas.</li> <li>• <b>Voucher specific:</b> Ensures that beneficiaries purchase targeted foods; used in programs to deliver high quality inputs, small stock tools. Appears most preferred by implementing organizations operating in the AOI because of the level of transparency they afford. Platforms such as NGO Pay (Ecobank) allow for real-time monitoring of distributions and commodity selection by beneficiaries and payments to vendors.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Supporting services:</b> Availability and liquidity of formal FSPs constrained outside of major towns.</li> <li>• <b>Beneficiary sensitization:</b> Beneficiaries often request products from vendors that are not on commodity voucher list, creating discord between vendors and beneficiaries (clients).</li> <li>• <b>Vendor duality:</b> Local procurement and voucher tendering processes favor larger vendors in the regional capitals (and even those based in Bamako), while local money traders are typically relatively small scale with strong local ties to beneficiary communities.</li> <li>• <b>Insecurity:</b> Implementing organizations and CaLP (2018) indicate that informal money traders play a prominent role in ensuring the feasibility of cash transfers in contexts of heightened insecurity over other cash transfer delivery mechanisms (e.g., mobile transfers).</li> <li>• <b>Voucher specific:</b> Many stakeholders indicated a preference for expanding engagement with local commodity vendors for voucher programs. Many local vendors who have participated in voucher programs indicated the experience led to an increased level of professionalization and a new revenue source. This may be further developed in the future through a “B-to-B” type approach, such as the one adopted by the WFP to link smaller vendors with larger and more established vendor networks.</li> </ul>

Modality	Opportunities	Challenges
Local and regional procurement	<ul style="list-style-type: none"> <li>Partners and beneficiaries are familiar with this modality.</li> <li>Some beneficiaries prefer in-kind rather than cash citing security concerns with cash and price increases following distributions affecting purchasing power.</li> <li>Locally-produced millet, rice, and cowpeas are available and among preferred commodities across the AOI.</li> <li>The majority of cercles in the AOI are structurally deficit in focus commodities; gaps are regularly filled through supplies from other areas of the country and imports.</li> <li>Supporting infrastructure exists, but availability and reliability varies by cercle and between urban and rural areas.</li> </ul>	<ul style="list-style-type: none"> <li><b>Commodity appropriateness:</b> Edible oil available across the AOI, but unclear that systematically fortified with vitamin A and E. Locality-specific preferences for imported rice, wheat flour, sorghum, and maize.</li> <li><b>Commodity self-monetization:</b> A small portion (especially imported rice or edible oil) sold on markets so beneficiaries can pay for other expenses.</li> <li><b>Logistics and commodity management:</b> Transportation of commodities along insecure corridors increases costs (both for private sector and humanitarians). Context is fluid and requires flexibility.</li> </ul>
FFW/CFW or FFA/CFA	<ul style="list-style-type: none"> <li>Productive community assets are important for long-term development and growth in the AOI.</li> <li>Poor and very poor households report a desire for local income earning opportunities. This may be even more important during years of poor rainfall.</li> <li>Need for infrastructure improvements and developments in the AOI, although specific needs vary.</li> <li>Activities in support of landscape restoration and greening may be particularly useful and welcomed by communities.</li> <li>Can be mechanism to include youth as experiences have demonstrated.</li> </ul>	<ul style="list-style-type: none"> <li><b>Clarity in targeting objectives:</b> FFA/CFA activities often target an entire community and expect participation in asset building among all community households (whether poor or otherwise).</li> <li><b>Timing and extent of seasonal migration depends on many factors:</b> Seasonal migration is a common activity and intensifies during years of poor rainfall and in the context of heightened insecurity. This may limit the availability of poor and very poor households to participate in CFW/FFW or CFA/FFA activities.</li> <li><b>Proximity to beneficiaries:</b> Labor availability is more limited in remote locations or when labor activities take place far from where beneficiaries reside.</li> <li><b>Transfer size:</b> Beneficiaries cited lack of clarity about rationale behind DFSA transfer size/value relative to intensive work required. While 1,500 XOF/day is the standard unskilled daily labor rate in Mali, local realities lead to variation (up to 3,000 XOF/day in some areas).</li> </ul>

Source: FEWS NET 2019

## Annex 1. Methodology

### FEWS NET Enhanced Market Analysis Methodology<sup>4</sup>

The Bellmon Amendment requires assurance that a proposed food assistance program will not result in a significant disincentive to or interference with food production or marketing.<sup>5</sup> Historically, the Bellmon Amendment was mostly applicable to in-kind US food aid that was either distributed or monetized as part of Food for Peace (FFP) Title II programs. Since 2016, with the increased flexibility in terms of the modality options available using US government funds via the 2014 Farm Bill and Food Aid Reform process, FFP has extended this application to include other assistance modalities including local, regional, and international commodity procurement, as well as cash transfer and voucher programs (USAID 2015).

The objective of FEWS NET Enhanced Market Analysis (EMA) is to provide sufficient evidence to relevant USAID policy decision makers and program managers on a range of topics to allow a determination of whether the design of a proposed food assistance program (Emergency or Development) is appropriate and feasible given the local context (Table 23). Local context includes but is not limited to the underlying livelihood and market systems and resulting food security outcomes, government policies and programs, local infrastructure and supporting services, and relevant food assistance experience in focus areas.

Each food assistance modality has the potential to negatively affect production and/or market incentives. An assessment of the likelihood of those negative impacts must therefore be completed to successfully determine the appropriateness of a given proposed modality and transfer distribution mechanisms.

FEWS NET analysts use a livelihoods-based convergence of evidence approach that typically draws on a range of primary and secondary data sources to provide the necessary evidence to inform the decision-making process. The sources, extent/detail, and quality of secondary data available for analysis vary widely from country to country. To this end, FEWS NET EMA builds from existing national-level FEWS NET Market Fundamentals Reports and market databases (production, prices, trade flows, commodity balances), livelihood reporting, agroclimatology information, and food security reporting and analysis with secondary data sources (food security and market reports, poverty mapping reports, income and expenditure studies, among others) and data gathered from stakeholders via a field assessment and stakeholder workshop.

**Table 23.** Key EMA study questions

	<b>Study focus area, typically a subnational geographic area targeted by FFP for future assistance programming</b>	<b>Other areas (national, regional, or international) where commodity procurement might take place for in-kind distributions or transfers</b>
Appropriate	What are local livelihood systems, including key foods consumed, and food and income sources	
	What is the estimated food gap among poor and very poor households?	
	What is the size of local markets (quantities traded), who are the actors, and do they behave competitively?	What is the size of the market (quantities traded), who are the actors, and do they behave competitively?
	What are seasonal variations in supply, demand, and prices?	
	How well are local markets integrated with broader national, regional, and international marketing systems?	What is the size of markets and size of exportable surpluses?
	What are key constraints to expanding supply to local markets?	
Feasible	What existing food assistance programs are underway and what have been their experiences, including key challenges and successes?	What existing procurement efforts are underway and what have been their experiences, including key challenges and successes?
	What is the status of the local enabling environment for the food assistance modalities and transfer distribution mechanisms under consideration (for example, private and NGO storage and transportation capacity)?	What are constraints to the effective and timely procurement and distribution of commodities (for example, physical constraints, policies, storage, and transportation network capacity)?

Source: Authors and USAID/FFP 2018

<sup>4</sup> This section is informed by several key references including “Malawi Best Report 2013, Annex 6 “Methodology for Determining Impact of Distributed Food Aid,” Barrett and Maxwell 2009, “Food for Peace Modality Decision Tool” 2018, ECHO “The Use of Cash and Vouchers in Humanitarian Crises” 2013.

<sup>5</sup> Bellmon Amendment. The language in the Bellmon Amendment refers to “food aid” rather than “food assistance.” The language used in this report was updated to reflect the new and increased flexibility in terms of USAID FFP funding use, which now allows for a much wider range of procurement and distribution options.

## FEWS NET EMA Analytical Approach

### Step 1 CONSULTATION

Carry out consultations with USAID/FFP to understand and elaborate on their preliminary research questions, future program objectives (including geographic targeting and expected outcomes), and initial range of modalities and transfer distribution mechanisms under consideration. This consultative step is repeated in an iterative fashion, as necessary, as USAID's understanding of the study area and context improves and as its priorities are further refined. These consultations take place with key stakeholders within FFP Washington (country backstop officers and the FFP Markets Team) and in the field as well as with other relevant USAID staff (for example, Feed the Future).

### Step 2 REVIEW OF EXISTING RESOURCES

The specific resources reviewed will be informed by the results of the consultation process (Step 1) and the depth and scope of existing FEWS NET resources and expert knowledge. In general, the secondary resources reviewed fall under a number of essential themes (Table 24). The review of secondary sources likewise usually takes an iterative approach that is flexible to changing information needs (Step 1) and the evolving nature of FEWS NET's understanding of key issues and topics.

**Table 24.** Key resources reviewed over the course of EMA studies

Theme	Key information	Useful resources
Livelihoods	Food and cash income sources, preferred foods, size and seasonality of food gap.	Livelihood zone descriptions, profiles, and baseline study reports by <a href="#">FEWS NET</a> , <a href="#">Food Economy Group</a> , <a href="#">Evidence for Development</a> , <a href="#">Save the Children</a> , and others).
Markets	Market structure, conduct, and performance (SCP) in study focus areas including: determinants and level of food availability, market actors and their behavior, price levels and trends (seasonal and interannual) in key reference markets, degree of market integration within broader national or regional context.	FEWS NET Market Fundamentals Reports FAO Crop and Food Security Assessment Mission (CFSAM) reports WFP Market assessments FAO Food Balance Sheets Cash and voucher feasibility studies Other market baseline reports
Food security outcomes	Food security assessment findings (CFSAM, Comprehensive Food Security and Vulnerability Analysis/CSFVA, Vulnerability Assessment Committee reports) and national Demographic and Health Surveys ( <a href="#">DHS</a> ) and income and expenditure study results ( <a href="#">ILO</a> , <a href="#">World Bank</a> , among others).	Demographic and Health Surveys ( <a href="#">DHS</a> ) Income and expenditure study results ( <a href="#">ILO</a> , <a href="#">World Bank</a> , among others)
Policy context	Existing government, United Nations Development Programme (UNDP), World Bank, and other development policies and programs.	National Poverty Reduction Strategy Papers UN Strategy papers
Food assistance program experience	The inventory includes, I/NGO or government agency, location (as specific as possible), modality, expected duration of activity, transfer composition and size.	Current FFP awardee annual reports, Development Experience Clearinghouse ( <a href="#">DEC</a> ) and partner annual and evaluation reports
Infrastructure	Existing road networks, port capacity (if relevant), storage and transportation systems and capacity, availability of information technology (IT)	Previous Bellmon reports and analyses, Digital Logistics Capacity Assessments ( <a href="#">DLCA</a> ), and National Ministry of Transportation Strategy Documents and Annual reports
Enabling environment	Availability of banking and mobile money services in focus areas.	<a href="#">Cell Mapper</a>

Source: Authors' elaboration

### Step 3 FIELD ASSESSMENT DESIGN AND PLANNING

The field assessment design and planning process is informed by Steps 1 and 2, which jointly orient the team to USAID priority research questions and geographic focus areas and reveal information gaps and inconsistencies in existing literature and reports that require clarification and triangulation. Each assessment is different, but nevertheless includes common elements implemented in the context of a rapid assessment that includes in-depth interviews with selected key stakeholders (Table 25).

**Table 25.** Essential elements of FEWS NET EMA field assessment design and planning

Assessment planning element	Notes
<b>Determine assessment team structure</b>	This is informed by expertise required to successfully respond to USAID decision support needs and may include a combination of skills sets, including economists, livelihood specialists, logistics and supply chain analysts, food assistance programming experts, food security experts, and local specialists who are familiar with the study focus area and can help orient the team to local dynamics and facilitate meetings between the assessment team and stakeholders.
<b>Identify markets to visit</b>	This includes the commodity markets, and the physical markets, ports, and border points.
<b>Identify stakeholders to interview</b>	This should be as specific as possible, including stakeholders' institution, geographic location, and function.
<b>Identify potential logistical issues and strategies</b>	This includes but is not limited to security concerns to be discussed with local staff, partners, and hired facilitators/translators.
<b>Design field assessment checklist</b>	Checklists of key topics and questions to discuss are developed for each stakeholder group: private traders, food processors, transporters, implementing partners, farmers, food assistance beneficiaries, warehouse managers, local government officials, and extension agents.
<b>Draft assessment roadmap</b>	This includes a detailed itinerary, a daily agenda of planned interviews, and travel itinerary.
<b>Plan stakeholder workshop</b>	If the assessment includes a consultation workshop, this event (one to three days) must be planned.

Source: Authors' elaboration

#### Step 4 CONDUCT FIELD ASSESSMENT

The FEWS NET EMA field assessments involve filling in data gaps, triangulating secondary data, and holding discussions with identified key stakeholders to ensure a convergence of evidence. While in the field, the assessment team may split into separate groups to maximize geographic or thematic coverage. In principle, the division of responsibilities should happen as early as possible during the design and planning phase.

In some instances, inviting a cadre of stakeholders to a central location to discuss key assessment issues is deemed useful by FEWS NET staff. In those cases, the workshop typically follows the field assessment and serves an additional check on the accuracy of field assessment findings, particularly as they relate to market structure, conduct, and performance, and the experience with specific assistance modalities in a given geographic area.

Likewise, instances arise when physical field visits are not possible due to conflict or other constraints. While not ideal, in this case, FEWS NET staff may still be able to speak with key informants via phone calls to obtain relevant information to meet EMA decision support needs. FEWS NET staff may also hold the stakeholder workshop in a safe location rather than physically entering areas deemed unsafe.

#### Step 5 REPORT WRITING

FEWS NET reports assessment findings according to an outline agreed upon with inputs from FFP staff. The first complete draft is typically submitted within six weeks of completing the field assessment, as outlined in the original activity Scope of Work. FFP staff typically reply with comments, questions, and requests for clarification within two to three weeks of receipt of the initial draft. A final 508-compliant report must be submitted according to an agreed-upon timeline.

## Annex 2. Assessment Areas Visited

The following table presents a summary of the locations visited during the assessment by FEWS NET staff and enumerators.

Cercle	Town/village	Type of questionnaire completed					Assessment completed by
		Market	Household	Community leaders	Vendors	Other stakeholders (technical services, implementing organizations)	
Bamako	Bamako					X	FEWS NET staff
Segou	Segou					X	FEWS NET staff
San	San					X	FEWS NET staff
Mopti	Mopti	X	X	X	X	X	FEWS NET staff and FEWS NET-trained enumerator
Mopti	Fatoma		X	X			FEWS NET-trained enumerator
Youwarou	Youwarou	X	X	X	X		FEWS NET-trained enumerator
Youwarou	Ouro	X	X	X			FEWS NET-trained enumerator
Tenenkou	Tenenkou	X	X	X	X		FEWS NET-trained enumerator
Tenenkou	Sabare		X	X			FEWS NET-trained enumerator
Koro	Koro	X	X	X	X		FEWS NET-trained enumerator
Koro	Koporo-pen		X	X			FEWS NET-trained enumerator
Douentza	Douentza	X	X	X	X		FEWS NET-trained enumerator
Douentza	Kikara	X	X	X			FEWS NET-trained enumerator
Djenne	Djenne	X	X		X		FEWS NET-trained enumerator
Djenne	Gagna		X	X			FEWS NET-trained enumerator
Bankass	Bankass	X	X	X	X		FEWS NET-trained enumerator
Bankass	Bare-Darsalaam	X	X	X			FEWS NET-trained enumerator
Bandiagara	Bandiagara	X	X	X	X		FEWS NET-trained enumerator
Bandiagara	Doucombo		X	X			FEWS NET-trained enumerator
Timbuktu	Timbuktu	X	X	X	X	X	FEWS NET staff
Timbuktu	Kabara		X	X			FEWS NET-trained enumerator
Gourma-Rharous	Gourma-Rharous	X	X	X	X		FEWS NET-trained enumerator
Gourma-Rharous	Sahamar		X	X			FEWS NET-trained enumerator
Goundam	Goundam	X	X	X	X		FEWS NET-trained enumerator
Goundam	Tonka	X		X	X		FEWS NET-trained enumerator
Goundam	Bancani Camp		X	X			FEWS NET-trained enumerator
Goundam	Kaneyé		X	X			FEWS NET-trained enumerator

Cercle	Town/village	Type of questionnaire completed					Assessment completed by
		Market	Household	Community leaders	Vendors	Other stakeholders (technical services, implementing organizations)	
Dire	Dire	X	X	X			FEWS NET-trained enumerator
Dire	Kondi		X	X			FEWS NET-trained enumerator
Gao	Gao	X	X	X	X	X	FEWS NET staff
Gao	Wabaria	X	X	X			FEWS NET-trained enumerator
Ansongo	Ansongo	X	X	X	X		FEWS NET-trained enumerator
Ansongo	Seyna		X	X			FEWS NET-trained enumerator
Ménaka	Ménaka	X	X	X	X	X	FEWS NET-trained enumerator
Ménaka	Ingouyasse		X	X			FEWS NET-trained enumerator

### Annex 3. Mali Livelihoods

While the field assessment focused on prioritized cercles of central and northern Mali, this Annex provides an overview of the livelihood systems present within the broader AOI of Mali (Figure 24), encompassing Segou and Sikasso regions as well), including the main sources of income and food<sup>6</sup>.

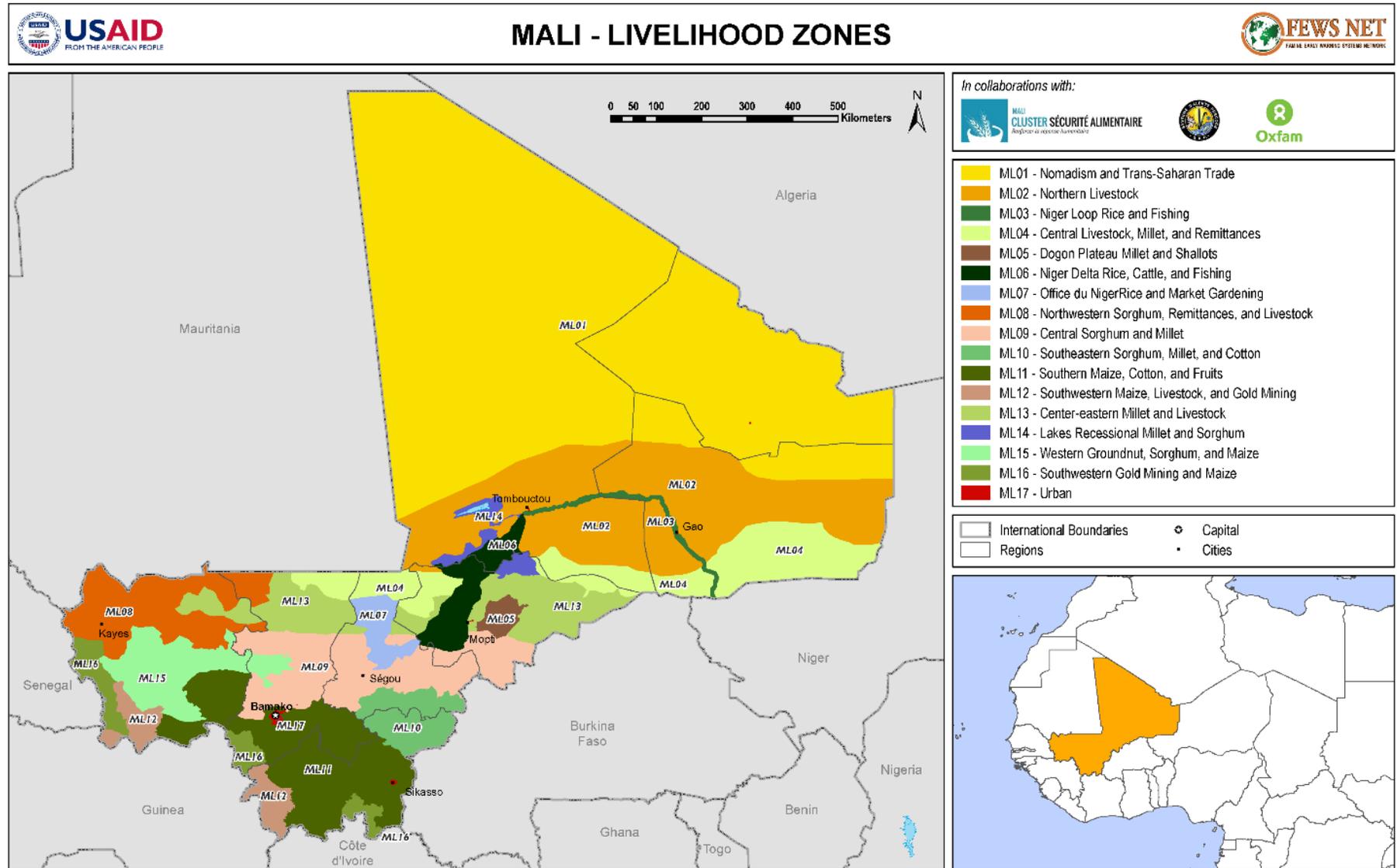
#### Livelihood Systems in Mali Focus Areas

The rural livelihood zones that constitute the AOI in Mali vary between pastoral, livestock-based systems in the north, agro-pastoralism in central Mali, and finally primarily rainfed agriculture further south. The transition from north to south reflects differences in rainfall which is a primary determinant of local livelihoods. Throughout the zones however, the main cash income sources for poor and very poor households in these zones are labor, self-employment, and crop sales; whereas middle and better-off households depend more directly on crop and livestock sales. Therefore, while the zones are largely defined by livestock and agricultural production, the poor and very poor often do not engage in their own production schemes. Instead, they provide labor to middle and better off households or conduct self-employment activities such as the sale of charcoal and firewood, wild grasses, and artisanal products. The review is based on secondary and primary data gathered from a FEWS NET Livelihood Zoning activity in 2014 and Household Economy Analysis (HEA) assessments conducted between 2008 and 2018 by various organizations including Save the Children, Oxfam, System d'Alerte Precoce (SAP) Mali, European Commission (EC), Action Against Hunger (ACF), and the Spanish Agency for International Development Cooperation (AECID).

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<sup>6</sup> Livelihood zoning is a process of dividing a geographic area within which people broadly share the same patterns of access to food and access to markets into distinct livelihood zones. It is the first step in the HEA. The review is based on secondary data complemented by primary data gathered during Household Economy Analysis (HEA) field assessments conducted between 2008 and 2018 and summarized from FEWS NET Livelihood Zone Profiles 2013.

Figure 24. Livelihood zone map for Mali



Source: FEWS NET 2015

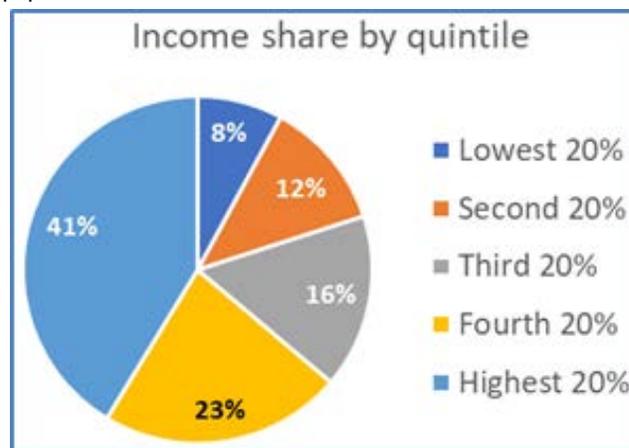
## Socioeconomic Context in the EMA Focus Areas

### Demography, poverty and inequality

Mali is a large, landlocked country in West Africa with a population of approximately 18.5 million people. Rural agriculture dominates livelihoods and defines the socioeconomic context. Nearly 73 percent of the population resides in rural areas, where 86 percent of all employment is in agriculture. Informal activities are prominent in rural areas whereas formal activities are primarily in Bamako. At the same time, population is growing annually at a rate of three percent and the country is urbanizing; and 40 percent of GDP is concentrated in Bamako (World Bank 2015).

While national poverty levels have fallen somewhat since 2001, the poverty headcount ratio (using the \$1.90 a day benchmark) was 43 percent in 2017 (World Bank 2019). Poverty is heavily concentrated in rural areas and in the south, where population density is higher. Despite the decline in the poverty rate, the number of those living in poverty has increased due to population growth. Recent political and security crises have led to slowdowns in economic growth and caused poverty to increase between 2011 and 2013, however strong agricultural growth led to a decline in the poverty rate between 2015 and 2017. Inequality declined in Mali between 2001 and 2010 from a Gini coefficient of 0.40 to 0.33. However, income remains unevenly distributed among the population with the lowest 20 percent of the population controlling only eight percent of income (Figure 25).

**Figure 25.** Share of income earned by each quintile of the population



Source: World Bank 2015

Overall, the country has a low population density – an average of 15 people per square kilometer of land area. Population density varies by livelihood zone, from less than two people/km<sup>2</sup> in the dry areas of the north, to over 50 people/km<sup>2</sup> in the south. Areas with irrigation potential, particularly the Office du Niger Irrigated Rice zone, have higher population density.

Household size is linked both to livelihood systems and wealth. Smaller households tend to be found in areas where pastoralism dominates. The largest household sizes – of up to 25–30 members – are found in the central and southern agricultural areas, where large families are valued for their labor potential. There is a high demand for labor during the planting season in agricultural livelihood zones, thereby creating a preference for family labor (World Bank 2015). Smaller families – seven to eight household members – can be found in fishery, commerce, and livestock dominant zones.

A note on the definition of household. The household is the unit of analysis used in HEA, it is defined as a group of people, related or not, sharing the same meals, cultivating the same fields and/or tending the same animals, and all under the authority of a head of household. The household is composed of a head of household (most commonly a man), his wife (s), their children and any dependents. Households may include married sons with their wife(s) and children. These types of households are common among wealthier households who can support larger households. Wealthier households often include laborers (male and female) who are considered part of the household. The father remains the head of this unit. Poorer households are typically monogamous and range between 6 and 12 members. When a son gets married, he creates his own household, therefore lowering the average household size.

The distribution of poverty varies by livelihood zone. Poverty rates are typically higher in the southern zones where households rely on rainfed agriculture, and lower in northern parts of the country; however, this masks significant variation between zones and within regions. The HEA data supports suggests that annual income in the agricultural zones tends to be lower than annual income in the agro-pastoral zones. The trend can be partially explained by higher reliance on market purchase for food in pastoral zones and therefore a greater need to earn income, particularly among poor households, whereas poor households in agricultural zones can source food both from in-kind payments and own crop production. Additionally, determinants of wealth vary between different livelihood systems – related to land holdings in agricultural zones compared to livestock holdings in pastoral zones – and perceptions of wealth are therefore relative. The 2018 ENSAN report,

on the other hand, suggests that northern regions of Gao, Timbuktu, and Gidal have much lower economic status relative to the southern regions, however, this is based on possession of productive assets rather than cash flow.

### Access to Social Services and Infrastructure

Access to services as well as infrastructure, including health and education, electricity, markets and trade, and banking services, varies across livelihood zones. Access to piped water, electricity, and modern toilet facilities is highest in Bamako given high population density. In rural livelihood zones, access to piped water and electricity tends to be low. In rural areas, access to electricity is only 11 percent on average – and even so concentrated in rural towns and negligible (one percent) in rural villages. The number of households with electricity across rural zones is 25 percent; whereas the number of households with piped water reaches 75 percent as the national average but falls to 49-58 percent in certain regions away from the capital (ENSAN 2018, p.14).

In low population density areas, there is a higher ratio of schools and health facilities relative to the population size, however low quality and access persists. Life expectancy has risen over time, from 55 years in 2010 to 58 years in 2016 (World Bank 2019). However, thirty percent of children under five suffer from moderate or severe malnutrition. As of 2015, only 33 percent of the population had access to improved or shared sanitation facilities, and 64 percent of the rural population had access to improved drinking water sources (USAID 2018). The primary school completion rate has declined since 2011 and was just under 50 percent in 2017. At the same time, primary school enrollment was 80 percent whereas secondary school enrollment was 42 percent. The adult literacy rate is 33 percent. There are significant gender disparities regarding access to schooling – expected years of schooling for women is 6.8, compared to 8.6 for men.<sup>7</sup> Additionally, the proportion of women over 25 with at least some secondary education is less than half that of men over 25 – seven percent compared to 16 percent.

Road infrastructure has improved over time, particularly in zones 8, 9, and 12. These zones have also seen a decline in the incidence of poverty. Trade with neighboring countries is particularly important for the cross-border zones. The proximity to Mauritania in zone 8 facilitates migration to Europe and in turn the prominence of remittances. While not in the EMA focus area, those living in zones 1 and 2 trade livestock in Algeria and Niger, as well as in southern Mali. International road connections to Senegal, Cote d'Ivoire, Burkina Faso, and Niger are somewhat favorable as compared to certain regions within Mali; however limited access to international markets does restrict agricultural sector growth. There is significant trade and migration within the country – transhumant livestock herders migrate their animals south during the dry season, and migrant laborers travel to other zones, urban centers, and neighboring countries in search of agricultural or casual work.

### Drivers of Food Insecurity

Several overarching trends contribute to food insecurity in Mali: agro climatology, low levels of agricultural productivity, and conflict and insecurity (USAID 2018). Fertility rates are high, particularly in rural areas, which exacerbates many of these challenges and places additional pressures on agricultural land and food supply. Poor maternal health and nutrition, high birth rates, and young maternal age are drivers of intergenerational malnutrition. Poor sanitation and hygiene also contribute to high rates of disease, stunting and wasting. Health services in rural areas can be inaccessible and of poor quality which contributes to the poor nutritional status of women and children.

While Mali produces sufficient major food staples (maize, millet, rice, and sorghum) in a good rainfall year to feed its population, uneven food distribution from surplus to deficit areas as well as low purchasing power among the poor contributes to food insecurity among particular segments of the population. Reliance on rainfed agriculture makes production more vulnerable to climate change and variability. It is estimated that only 34 percent of Mali's irrigation potential has been realized; and periodic drought, flooding, crop pests, and plant diseases also negatively affect agricultural production. Seventy percent of Mali's population practices subsistence agriculture with low levels of agricultural productivity due to limited access to labor, land, improved inputs, and markets – a major driver of poverty and food insecurity in rural areas. As a result, many poor and very poor households rely on other sources of income including labor and self-employment.

Lastly, the rise of conflict and insecurity in Mali has contributed to poverty and food insecurity. Armed conflict broke out in northern Mali in January 2012. Despite a successful military operation in 2013, security and government control in the north

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<sup>7</sup> Number of years of schooling that a child of school entrance age can expect to receive if prevailing patterns of age-specific enrolment rates persist throughout the child's life.

has not yet been fully restored. The number of security incidents increased in 2017, including in the center of the country. The persistent instability has resulted in government-imposed security restrictions that limit the free movement of people and goods and threaten continued development and growth. The livelihood zones affected by the conflict include M:01, ML02, ML04, ML06, and ML13, which ML06 around the Niger Delta and ML13 in Mopti being the most affected (ENSAN 2018).

The displacement of population within Mali is most prevalent in Nara, Kidal and Abeïbara cercles with between 3.5 and 4 percent of displaced households in 2018. The proportion of displaced households that have been able to return to their villages of residence is low but stable; they are mainly found in the three northern regions that were occupied during the security crisis, Kidal, Gao and Timbuktu. Overall, the rates of displacement and return are improving although the rate of return for refugee households is still low (ENSAN 2018). The regions of interest covered by this report consist of all or part of 13 rural livelihood zones (Table 26):

**Table 26.** Overview of livelihood zones present in the EMA focus areas

Code	LHZ name	Regions	Dominant system	Population <sup>1</sup>	BSS/Profile Source
ML01	Nomadism and Trans-Saharan Trade	Timbuktu, Gao	Pastoral		ACF, OSA Mauritania, Save the Children, OFDA (2017) <sup>8</sup>
ML02	Northern Livestock	Timbuktu, Gao	Pastoral		Oxfam Mali (2009)
ML03	Niger Loop Rice and Fishing	Timbuktu, Gao	Agricultural		Oxfam Mali (2009)
ML04	Central Livestock, Millet and Remittances	Koulikoro, Segou, Mopti	Agro-pastoral	235,799	Oxfam, Save the Children, EC, and SAP Mali (2012)
ML05	Dogon Plateau Millet and Shallots	Mopti	Agricultural	362325	SAP Mali and EC (2017)
ML06	Niger Delta Rice, Cattle and Fishing	Mopti	Agro-pastoral	1065122	Oxfam, EC, and SAP Mali (2015)
ML07	Office du Niger Rice and Market Gardening	Segou	Agricultural	793553	N/A
ML09	Central Sorghum and Millet	Koulikoro, Segou, Mopti	Agro-pastoral	3042069	ACF, Government of Navarre, AECID (2008)
ML10	Southeastern Sorghum, Millet and Cotton	Segou, Sikasso	Agricultural	1519256	Save the Children (2015)
ML11	Southern Maize, Cotton and Fruits	Sikasso, Koulikoro	Agricultural	3621281	EC, Save the Children (2009)
ML12	Southwestern Maize, Livestock and Gold Mining	Kayes	Agricultural	426833	SAP Mali and EC (2017)
ML13	Center-eastern Millet and Livestock	Kayes, Koulikoro, Mopti	Agricultural	989017	SAP Mali and EC (2018)
ML14	Lakes Recessional Millet and Sorghum	Mopti	Agro-pastoral	284593	SAP Mali and CRS (2017)
ML16	Southwestern Gold Mining and Maize	Kayes	Agricultural	431621	SAP Mali, Oxfam, and ECHO (2014)

- ML01: Nomadism and Trans-Saharan Trade is a vast zone that covers the majority of northern Mali including Timbuktu, Kidal, and parts of Gao. It is comparable to neighboring zone MR01 in Mauritania.
- ML02: Northern Livestock zone cuts across southern Timbuktu and much of Gao, from Mauritania in the east to Niger in the west.
- ML03: Niger Loop Rice and Fishing zone is a small strip that follows along the Niger River within Gao and Timbuktu.
- ML04: Central Livestock, Millet and Remittances is a thin zone that cuts east to west through Gao, Mopti, Segou, and Koulikoro regions in north-central Mali. It borders Niger, Mauritania, and Burkina Faso.
- ML05: Dogon Plateau Millet and Shallots is a small zone located in Mopti region on the elevated Dogon plateau, surrounded by ML13 to the north and ML09 to the south.
- ML06: Niger Delta Rice, Cattle and Fishing zone lies along the inland delta of the Niger river and cuts through the center of Mopti region.

<sup>8</sup> As no baseline profile was conducted for ML01, the quantitative breakdown of food, income, and expenditures in this annex for ML01 instead reflects the neighboring zone in Mauritania (MR01).

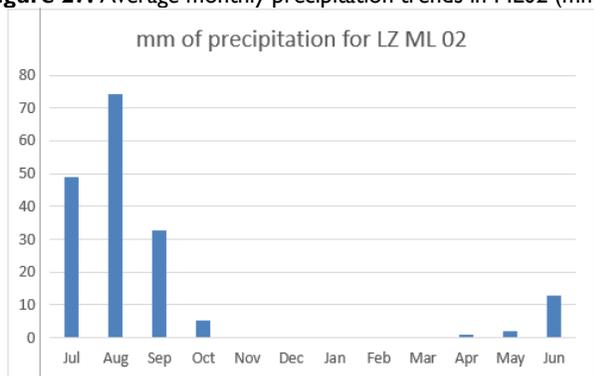


The rainy season typically lasts from June to September, the end of which also coincides with the lean season in agricultural areas. The main crop harvest lasts from October to December. The advent of irrigated perimeters in watercourses in zones 15, 6, 7, 8 allows the exploitation of off-season crops and which are important sources of food and income for farm households. Opportunities for local agricultural labor peak between May and July during land preparation and weeding for the main production season. Market gardening and labor migration occur during the dry season and serve as important sources of food and income once the main harvest is over. Most important hazards include crop pests which occur from May to June and September to November (during the primary periods of land preparation, planting, and harvest), and livestock diseases which peak during the rainy season.

### Specialized Calendars

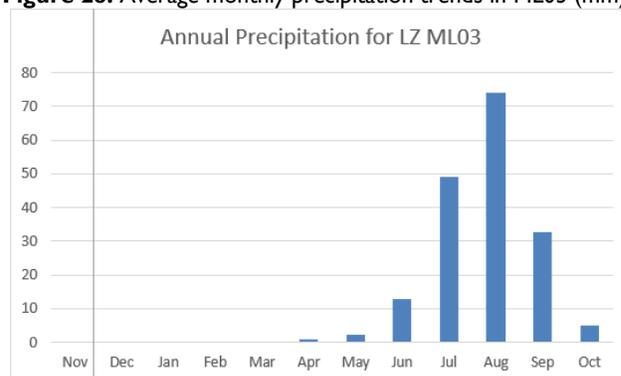
#### Annual precipitation trends for selected livelihood zones.

**Figure 27.** Average monthly precipitation trends in ML02 (mm)



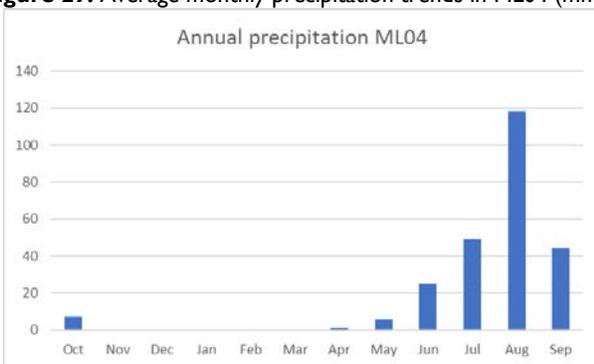
Source: FEWS NET 2019

**Figure 28.** Average monthly precipitation trends in ML03 (mm)



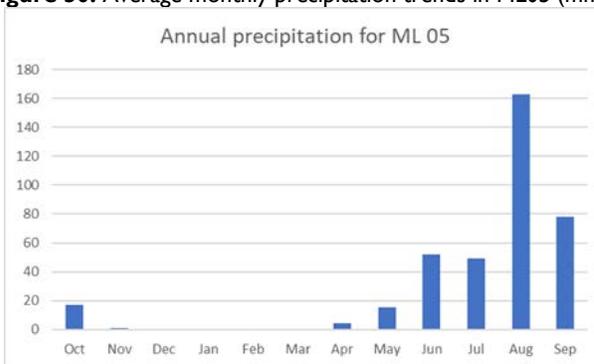
Source: FEWS NET 2019

**Figure 29.** Average monthly precipitation trends in ML04 (mm)



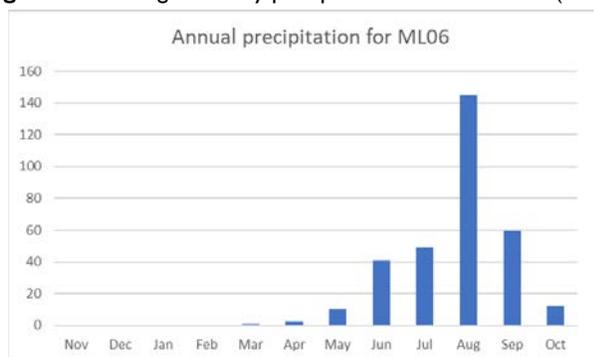
Source: FEWS NET 2019

**Figure 30.** Average monthly precipitation trends in ML05 (mm)



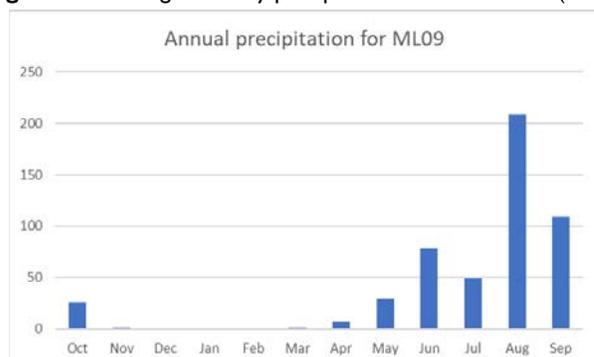
Source: FEWS NET 2019

**Figure 31.** Average monthly precipitation trends in ML06 (mm)



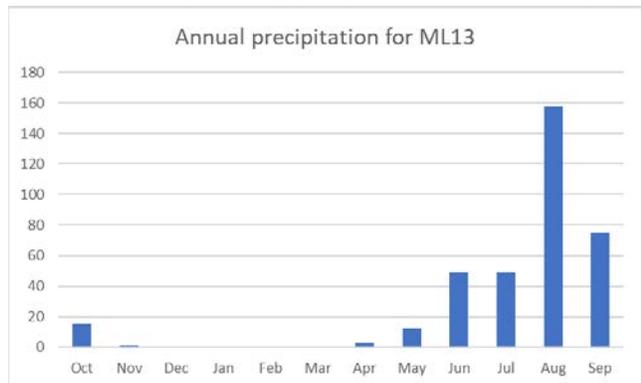
Source: FEWS NET 2019

**Figure 32.** Average monthly precipitation trends in ML09 (mm)



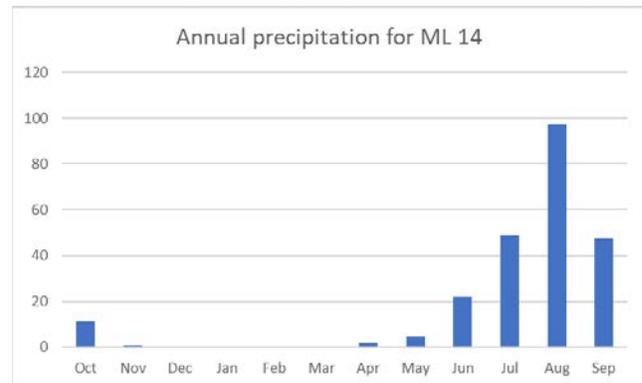
Source: FEWS NET 2019

**Figure 33.** Average monthly precipitation trends in ML13 (mm)



Source: FEWS NET 2019

**Figure 34.** Average monthly precipitation trends in ML14 (mm)



Source: FEWS NET 2019

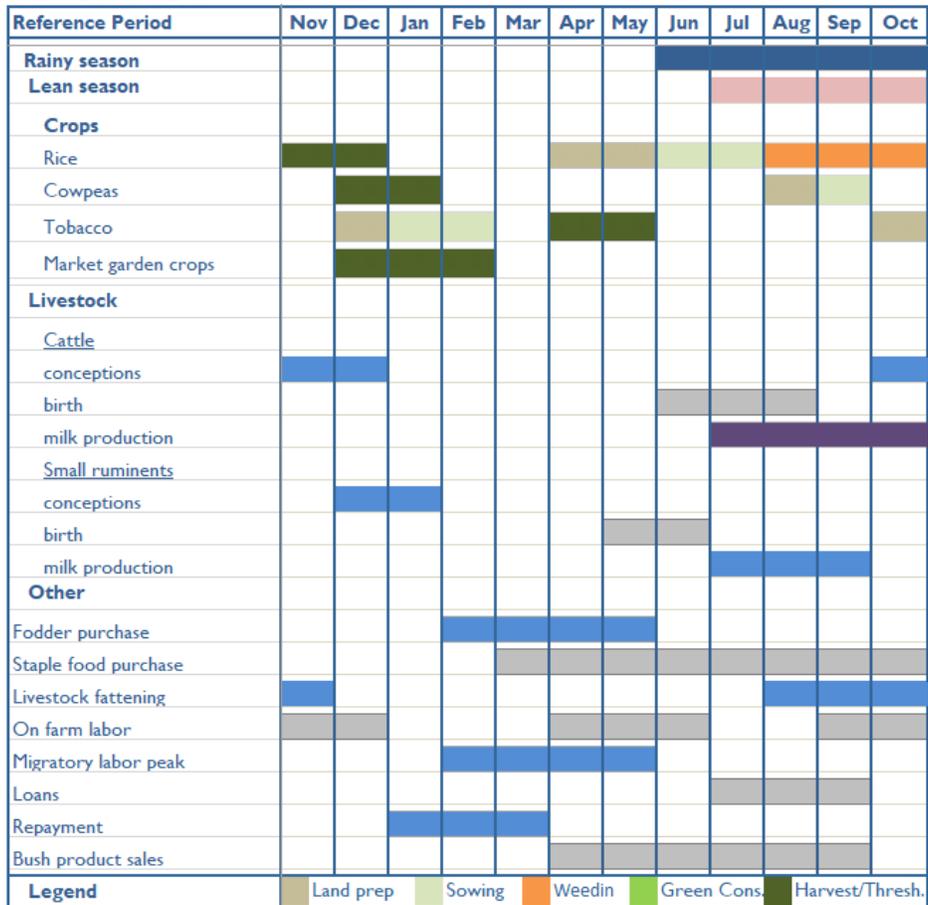
**Livelihood zone specific calendars.**

**Figure 35.** Seasonal calendar for ML 02

Reference Period	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
<b>Rainy season</b>	█											
<b>Lean season</b>									█			
<b>Crops</b>												
Fonio/millet				█								
<b>Livestock</b>												
<u>Camels</u>												
conceptions	█											█
birth	█											█
milk production	█											
<u>Cattle</u>												
conceptions		█										
birth		█										█
milk production										█		
<u>Small ruminants</u>												
conceptions									█			
birth		█										
milk production		█	█									
<b>Other</b>												
Fodder purchase								█				
Staple food purchase	█											
Off farm labor				█								
Migratory labor peak									█			
Loans									█			
Repayment			█									
Bush product sales						█						
<b>Legend</b>												█ Harvest/Thresh.

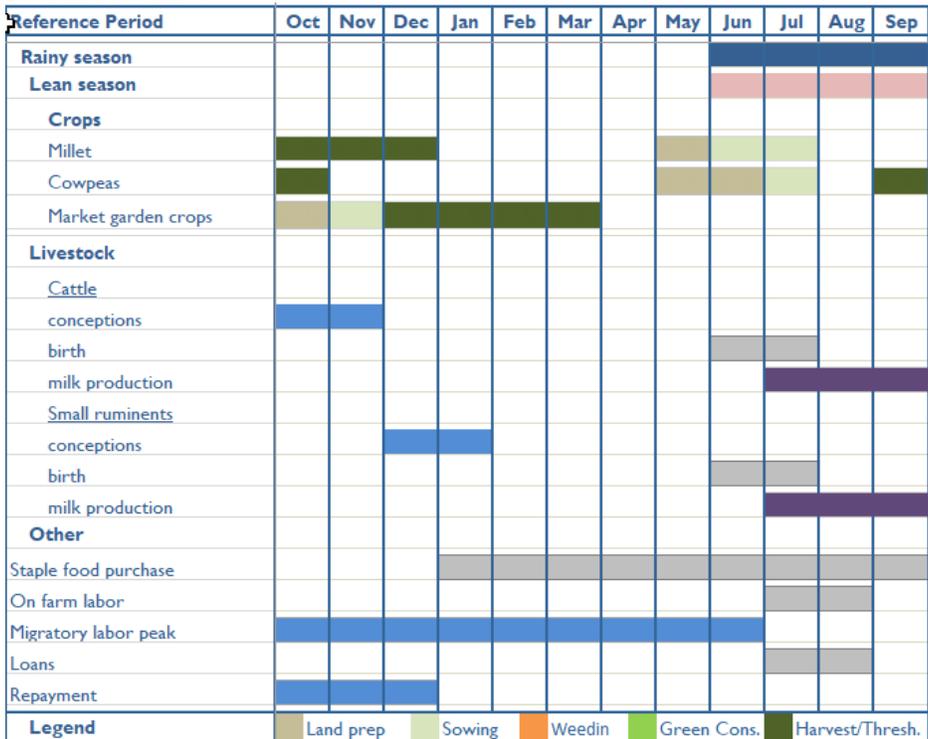
Source: FEWS NET 2019

Figure 36. Seasonal calendar for ML 03



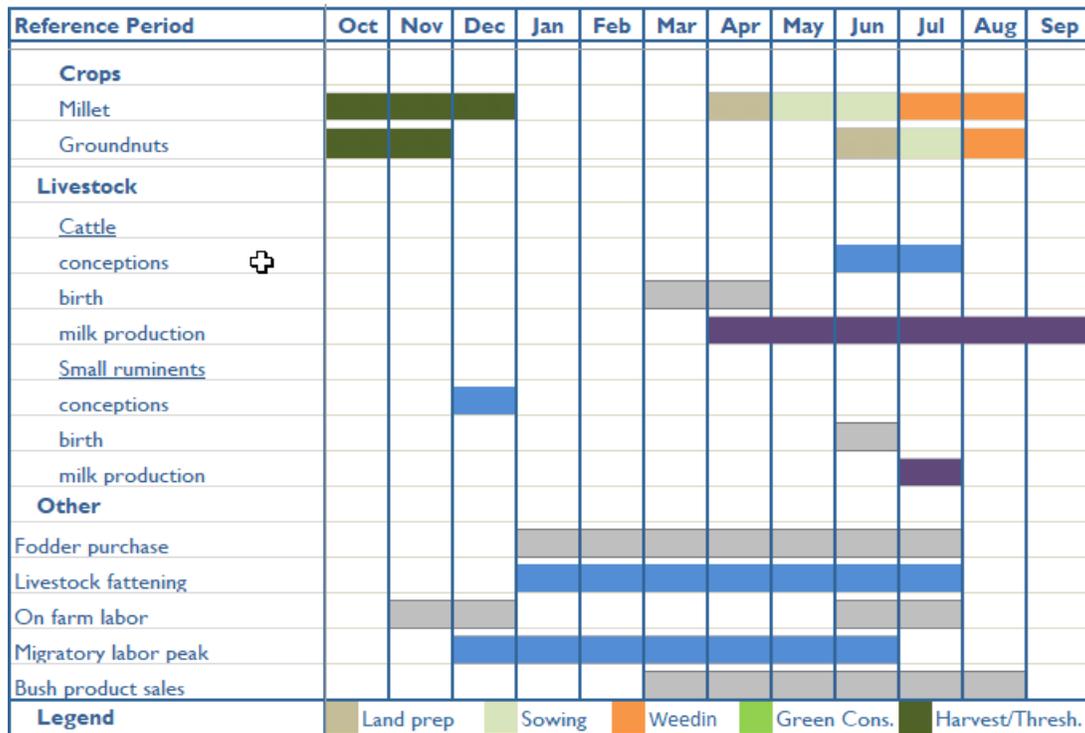
Source: FEWS NET 2019

Figure 37. Seasonal calendar for ML 04



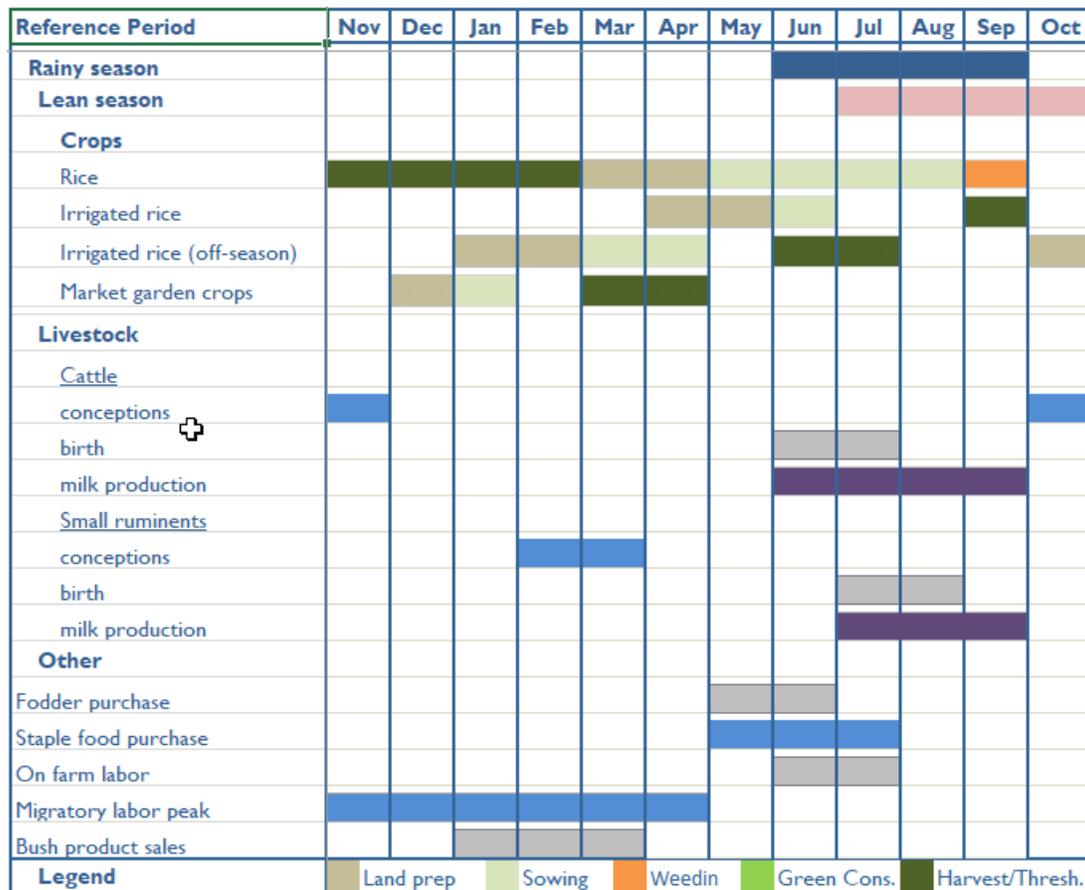
Source: FEWS NET 2019

Figure 38. Seasonal calendar for ML 05



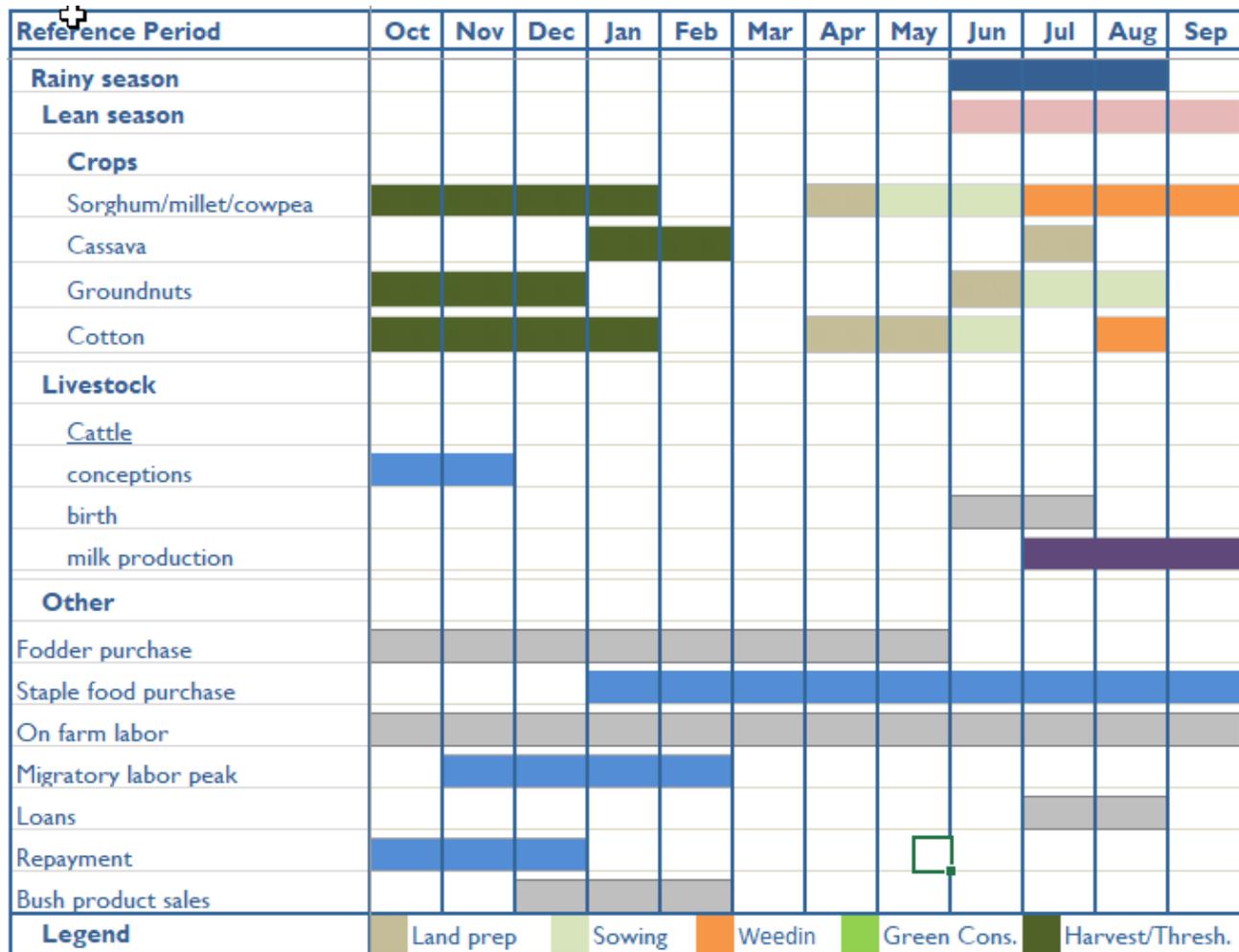
Source: FEWS NET 2019

Figure 39. Seasonal calendar for ML 06



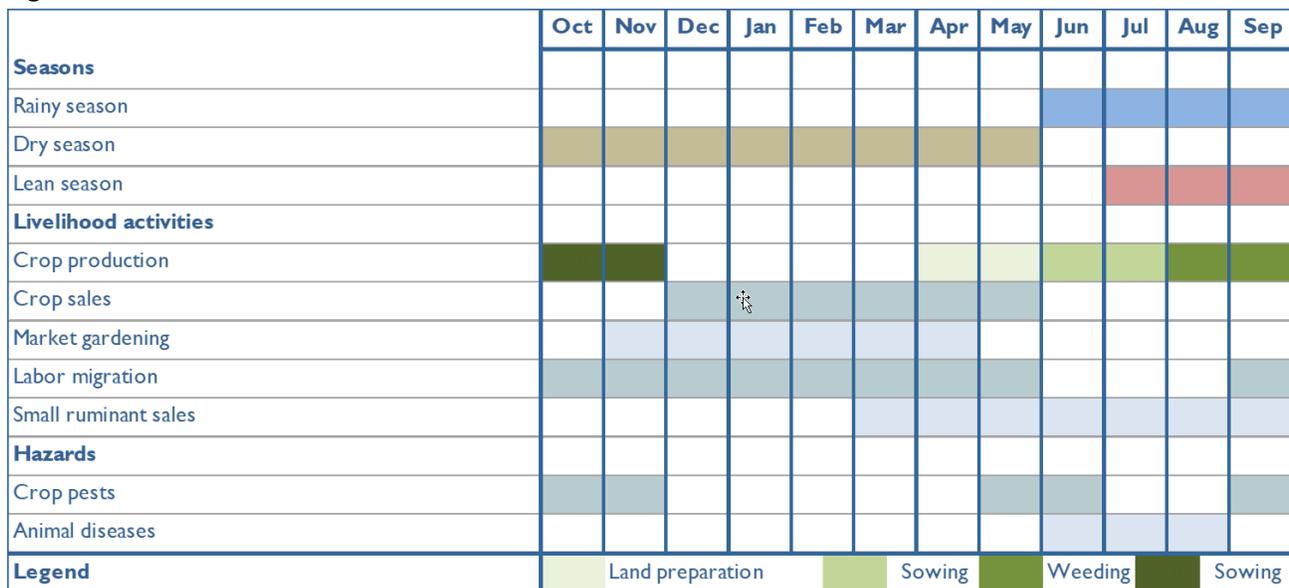
Source: FEWS NET 2019

Figure 40. Seasonal calendar for ML09



Source: FEWS NET 2019

Figure 41. Seasonal calendar for ML13



Source: FEWS NET 2019



sources of income for poorer households. Remittances contribute to incomes of the poor, middle, and better-off, but not the very poor. Migration for agricultural labor within the zone is common, including along the Niger delta during the rice harvest. Market access is generally good during the dry season, but difficult during the rainy season and certain areas are isolated year-round. The frequency of drought in this area increases the vulnerability to food insecurity. The zone knows these difficulties 3 to 4 years out of 10.

**Dogon Plateau Millet and Shallots (ML05):** Distinctive due to its high elevation, this zone receives enough rainfall for cultivation of millet, the main staple, however limited production causes structural food deficits. Agriculture is the primary livelihood, and other key crops include sorghum, rice, peanuts, sesame, and market gardening of shallots which is the main source of farm income. Livestock rearing, exploitation of forest products, artisanal production, market gardening, and tourism are secondary economic activities. Main income sources for all households include labor (local and migratory), crop sales, and wild food sales, whereas crop and livestock sales are more important for the middle and better-off. The market is the primary source of food for all wealth groups. Market access is relatively good and better than that of zone 6. The area is the victim of drought and or floods related to water flows which annihilate the productions one year out of 10.

**Niger Delta Rice, Cattle and Fishing (ML06):** As one of the agropastoral zones in the regions of interest, most households depend on both rice cultivation and livestock rearing. The zone comprises the inland delta of the Niger river whose plains flood annually, resulting in an irrigated area that facilitates the cultivation of rice – the most important crop both for household consumption and sales. The zone is surplus producing and more food secure than the surrounding zones. Livestock rearing of cattle, sheep and goats is a major activity, supplemented by cultivation of bourgou, a grass that serves as livestock feed. Income sources for poorer households are somewhat diverse and include crop sales, fishing, small business, self-employment, and remittances. Market access is relatively worse than zones 4 and 5, and during flooding roads are impassable. Trading is carried out by canoe and declines during the dry season. The area is the victim of low flood and high river floods that cause significant losses of production. The frequency is 2 to 4 out of 10 depending on the case. Present fishermen are adopting migration to the better supplied fishing grounds.

**Office du Niger Rice and Market Gardening (ML07):** This fully irrigated agricultural zone is the breadbasket of Mali for rice production and specializes in market gardening. Households pay a fee to utilize the irrigation system, and agricultural laborers from nearby zones migrate here annually for the rice harvest. During the dry season, most households engage in market gardening of shallots and tomatoes. Other economic activities include fishing, livestock rearing, and commerce in rice. Main staple crops are rice, millet, and sorghum, and main crops sold are rice and vegetables. For poorer households, local agricultural labor is the most important source of income, with crop sales of secondary importance for the poor. Markets are generally accessible year-round but can be cut off during the rains.

**Central Sorghum and Millet (ML09):** Rainfed agriculture and sedentary livestock rearing are the primary livelihoods in this zone, which plays a key role in the national grain and livestock trades, and for seasonal migration. Food crops include sorghum, millet, cowpeas, and maize; whereas groundnuts, watermelon cotton and sesame are main cash crops. Livestock sales are a source of income for the middle and better-off. Other livelihoods activities include gold mining, trade, fishing, and sale of wild foods. Own production is the most important source of food among all groups except for the very poor, who rely more on market purchase. Crop and livestock sales are important sources of income for the middle and better-off, whereas poorer households rely on labor and self-employment (handicraft, firewood, charcoal, wild food sales). Market access is generally good but can be difficult during the wet season due to rivers and muddy roads. Drought is less common in other areas. the frequency is 1 in 10.

**Southeastern Sorghum, Millet and Cotton (ML10):** Agriculture is the primary livelihood in this southern zone, followed by sedentary livestock rearing, gathering of wild products, and commerce. Sorghum, maize and millet are the main staple crops, and legumes include cowpeas, sesame, groundnuts, and soy. Garden marketing is also practiced. Cotton is the main cash crop, followed by peanuts, pepper, and sesame. Population growth has led to deforestation to facilitate the expansion of farmland. Livestock rearing of cattle and small ruminants accompanies agricultural production throughout the zone. Market access is generally good, but poor in some areas during the rainy season.

**Southern Maize, Cotton and Fruits (ML11):** This is a highly productive zone characterized by rainfed agriculture, sedentary livestock rearing, and exploitation of forest products. The location of Bamako has created a peri-urban area where market

gardening dominates. The range of crops grown is diverse, with food crops of maize, sorghum and millet and cash crop of cotton; Garden marketing is also practiced especially tuber (sweet potato, potato). While the viability of cotton production varies from year to year based on CMDT support and regional/international trends, the maize production tends to be inversely related to cotton production. Most households also raise cattle, sheep, and goats. Wild foods are gathered and sold primarily by women. There is some migration within the zone to nearby towns and goldmining sites. Poorer households rely heavily on self-employment for income, followed by local agricultural labor, whereas the better off earn nearly all cash income from crop sales. Access to markets becomes difficult during the rainy season due to flooding. The geographical position of the area shelters it from the infrequent drought but knows a high frequency of flood related to the flows 1 year out of 10.

**Southwestern Maize, Livestock and Gold Mining (ML12):** Despite availability of arable land, this is a food deficit zone due to heavy reliance on migration to nearby zone ML16 for gold mining. Cash income is earned from gold mining activities and sent back home from household members who have migrated permanently to work in artisanal, semi-artisanal, or industrial gold mining. Agriculture is the second most important activity, and maize, sorghum, peanuts, rice, and millet are main crops grown, however agricultural production is far below potential. Cattle raising is the most common type of livestock rearing. Market access is generally good but becomes worse during the rainy season.

**Center-eastern Millet and Livestock (ML13):** Rain-fed millet and sorghum are the main crops grown, however production in the zone typically only covers six months of food needs during a normal year. Millet is dry planted with limited use of improved seeds and fertilizers. Market gardening depends on adequate rainfall from June through September. Livestock rearing primarily consists of transhumant herds of cattle and small ruminants and helps to cover persistent crop production deficits. The main sources of income for poor households are livestock sales, labor (migratory, farm and non-farm), self-employment and crop sales, and main sources of food are in-kind payments and crop production.

**Lakes Recessional Millet and Sorghum (ML14):** The zone is made up of the areas surrounding lakes in north-central Mali. Production potential of the main crops grown – millet, sorghum, rice, legumes, maize, tubers, and wheat – largely depends on the water level during the longer growing cycle facilitated by lake recessions in February to March and rainfall starting in June. At the same time, the zone does face production deficits with own crops typically lasting six to nine months during a normal year. Livestock rearing is a secondary livelihood activity, consisting of transhumant herds with a high concentration of livestock during the dry season. Labor (migratory, farm and non-farm), self-employment and crop sales are main sources of income for poor households. Drought is frequent 4 years out of 10.

**Southwestern Gold Mining and Maize (ML16):** The zone consists of three disconnected areas in western and southern Mali. Rainfed sorghum and maize are the primary crops grown, however crop production deficits are regular and range from moderate to severe as gold mining activities have encroached on available arable land. Farm labor in the zone is primarily supplied by in-migration. Rearing of cattle and small ruminants is common for meat production, and fishing is practiced as a subsistence activity by certain groups. Main sources of income for poor households are gold mining, farm labor, and self-employment, and important foods consumed are maize, sorghum, millet, and cowpeas.

### Income Sources and Expenditures Patterns

The main sources of income for poor and very poor households varies somewhat by livelihood zone, but certain trends are evident (Figure 43). Poorer households rely heavily on labor, including agricultural, construction, and migratory labor, in addition to self-employment. Self-employment consists of the sale of firewood and charcoal, artisanal products, and wild grasses. Households supplement income with a combination of crop sales, livestock and livestock product sales, remittances, and the sale of wild products such as shea butter. In the northern pastoral zones (ML01 and ML02), livestock and livestock product sales are more significant sources of income. Poor households gain more income from crop sales and livestock sales when compared to the very poor, and relatively less from labor and self-employment. These different sources are impacted by the nature of the agricultural season that conditions their intensification.

Labor is the most important source of income for the poor and very poor in all zones except for MR01, the far northern nomadism and trade zone. On average, across the selected zones, it contributes nearly 39 percent of total income for the very poor and 28 percent for the poor. Labor primarily consists of local agricultural labor, and therefore is earned by households during the agricultural production season starting with land preparation in April/May and ending with the harvest months in October/November. Households also supplement agricultural labor with construction labor, which occurs

intermittently year-round, as well as migratory labor in certain zones, notably zones 4, 5, 6, 13, and 14. Migratory labor is both agricultural and non-agricultural to towns or nearby urban areas. In agrarian zones, labor additionally includes cattle keeping.

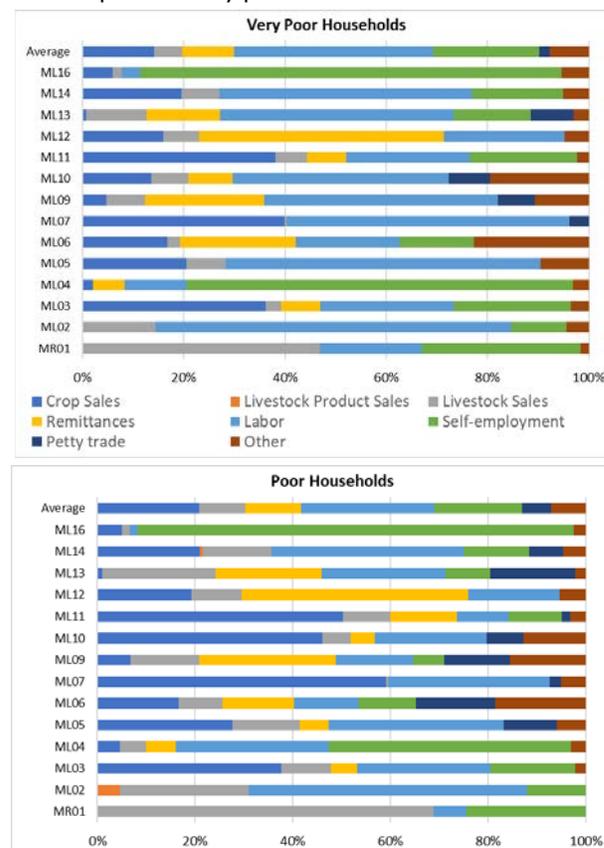
While **self-employment** contributes an average of around 20 percent of total income for poor and very poor households, this is affected by two high outliers in zones 4 and 16. Excluding these outliers, the average is closer to 10 percent. In zone 4 (in northern Segou and Mopti, and southern Gao), there is higher reliance on the sale of charcoal and firewood, wild grasses, and artisanal products, whereas poorer households in zone 16 that fall in a small portion of southern Sikasso along the border with Cote d'Ivoire earn most of their income from gold mining. In all other zones, self-employment is exclusively linked to the exploitation of natural resources for charcoal and firewood production, wild grass sales, and sale of artisanal products using natural fibers. These activities primarily occur during the dry season between the main harvest and the following agricultural production season.

**Crop sales** contribute on average 14 percent of total income for very poor households and 19 percent for the poor. The poor have slightly greater access to land, intra-household family labor and agricultural inputs as compared to the very poor so earn more income from crop production. The crops sold vary by zone but consist of the primary food crops grown, with poorer households able to sell immediately after harvest to end the lean season. In certain zones where cash crops are grown, including shallots in zone 5, rice and onion in zone 7, and cotton and tuber in zones 10 and 11, income from crop sales is more important for poorer households (Figure 43). The contribution of crop sales to total income increases with wealth and is higher for middle and better-off households.

A note on the production of *bourgou*: in zones ML03 (Niger riverine areas) and ML06 (Inner Niger Delta area)<sup>9</sup> households grow and sell *bourgou*, a type of livestock feed which is of crucial importance when pasture becomes insufficient. *Bourgou* grows naturally along the banks and around rice fields and is harvested between November and March. The access rights and the operation of the *bourgou* is subject to official law. Management is the responsibility of the traditional chiefs, the Dioros. The first point of access into the *bourgoutières* is that of Diarafabé (Tenenkou) in November and the last one is in the cercle of Youvarou (Walado) in March. All the others are staggered between these two dates according to the characteristics of the area. The herds thus settle in the Delta until May when they will leave for the dry areas. The *bourgou* is an important source of income because of the fees paid to access to the *bourgoutières* (paid directly to the Dioro) but also through the collection and sale of fresh or dried *bourgou*. In ML06, for example, all wealth groups except the better off, collect and sell *bourgou* as part of their self-employment activities.

The contribution of **remittances** to total income varies significantly by zone depending on the ability of household members to migrate. Here, remittances refer to any money sent back from migrants who are living outside the zone, whether in a nearby zone (as in zone 12, in which case household members migrate to gold mining areas in zone 16), in urban areas within

**Figure 43.** Income sources by wealth group and livelihood zone for poor and very poor households



Source: BSS for each zone (Table 1), compiled by authors

<sup>9</sup> The key areas of *bourgou* production (the *bourgoutières*) are Pondori, Yongari, Mangari, Diassoungari, Galadjiri, Goubé-Bangassi in the *cercle* of Djenné; Kotia, Koubaye, Sendégué, petit Pondori and M'Pimba in the *cercle* of Mopti; Walado-Débo straddling the *cercles* of Mopti and Youvarou; Dogo, Diarafabé, Diondiori in the *cercle* of Youvarou. Movements in the Delta are regulated; the rules and access dates are set at the annual Conference of Bouorgou producers in Mopti (held each November).

the country, or in other countries. Poorer households are more likely to send a member to urban areas or other countries in the region.

**Livestock sales**, primarily of chickens and small ruminants, contribute between six and nine percent on average of total income for poor and very poor households, with the exception of the northern zones where livestock sales are much more significant (and the most important source of income for poorer households in MR01). Livestock product sales on the other hand earn no income for poorer households with the exception of very poor households in ML02 where pastoralism is the primary livelihood. Both livestock and livestock product sales contribute income for middle and better-off households. **Petty trade** contributes only two percent of total income for very poor households but six percent for poor households. Lastly, **other** income consists of a combination of sources depending on the zone, and includes gifts, credit, fishing, sale of wild products such as shea butter or jujube (prominent in zones 5, 6, 9, and 10), and fishing in zone 3, 6, 7.

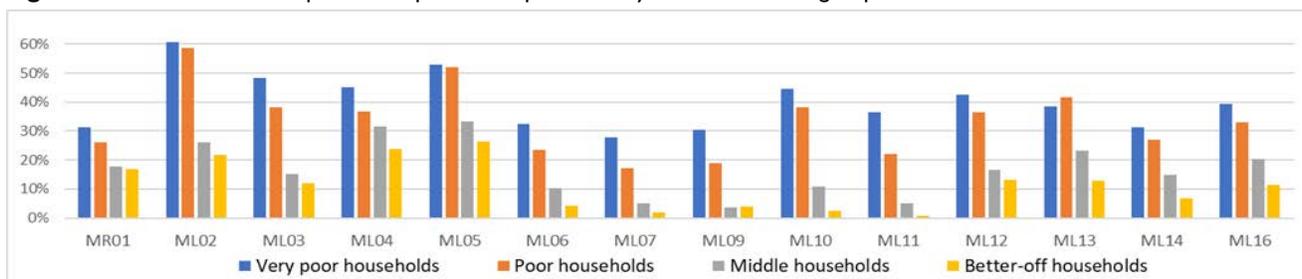
**Figure 44.** Location of *bourgou* producing areas in Mali



Source: Compiled by authors based on World Resources Institute map

The income that poor and very poor households earn is primarily spent on food – including both staple and other food items. The percentage of total expenditure that goes towards staple foods decreases with wealth: an average of 40 percent for very poor, 33 percent for the poor, 16 percent for the middle, and 11 percent for the better off (Figure 45). For the very poor, staple food spending constitutes between 30 and 60 percent of total expenditure depending on the zone, and for the poor between 20 and 50 percent.

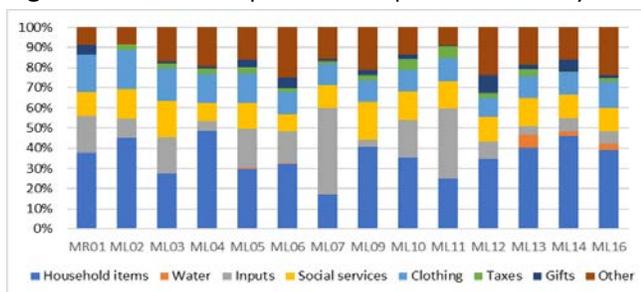
**Figure 45.** Percent of total expenditure spent on staple foods, by zone and wealth group



Source: BSS for each zone (Table I), compiled by authors

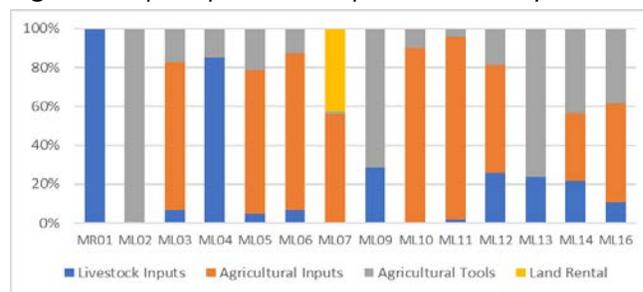
In addition to staple foods, households also spend on other, non-staple foods such as meat, fish, milk, oil, sugar, and legumes. Relative expenditures on non-staple foods increases with wealth, but not significantly. Very poor households spend on average 16 percent of total expenditures on non-staple foods, compared to 18 percent for the poor and 19 percent for the middle and better-off. Households spend additional disposable income on a variety of items – household items, water, inputs, education and health services, clothing, taxes, or gifts, among others. Figure 46 represents the breakdown of non-food expenditures for poor households in all zones. Household items represent the largest non-food expenditure in most zones. The breakdown of input expenditures for poor households is provided in Figure 47, based on available information.

**Figure 46.** Non-food expenditures for poor households by zone



Source: BSS for each zone (Table I), compiled by authors

**Figure 47.** Input expenditures for poor households by zone



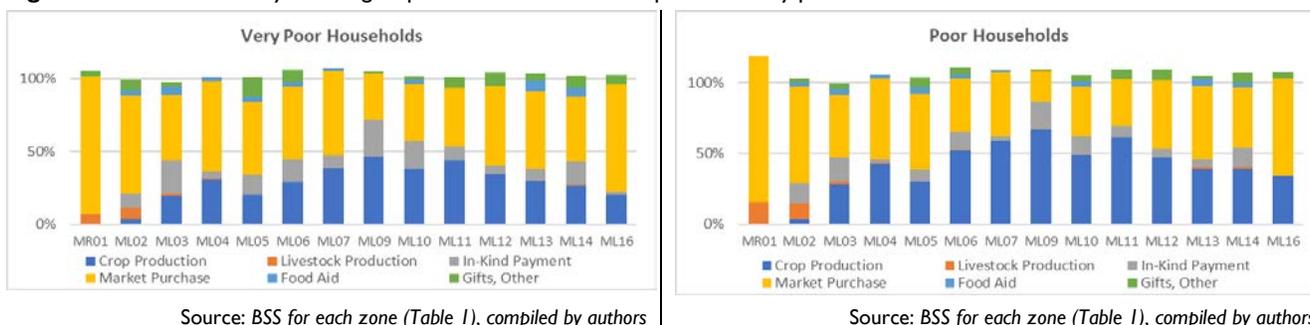
Source: BSS for each zone (Table I), compiled by authors

Note: Livestock inputs include veterinary products, feed, and salt, agricultural inputs include seeds, fertilizers, and pesticides

## Staple Foods, Food Sources, and Food Gaps

The most important source of food for very poor households is market purchase, followed by own crop production. However, on average for poor households and with the stark exception of the northern pastoralist zones where reliance on the market is extremely high, market purchase and own crop production are of nearly equal importance in terms of contribution to total food needs (defined as 2100 kilocalories per person per day). Less important sources of food include in-kind payments, food aid (most commonly school feeding programs, except in zone ML07 where it refers to cereal distributions and ML14 and ML13 where it includes both school feeding and cereals), and gifts of food (*zakat*). The relative importance of different food sources does vary slightly by zone however in general the trend that own crop production contributes a greater amount to total food needs as wealth increases is maintained (Figure 48).

**Figure 48.** Food sources by wealth group and livelihood zone for poor and very poor households



Source: BSS for each zone (Table 1), compiled by authors

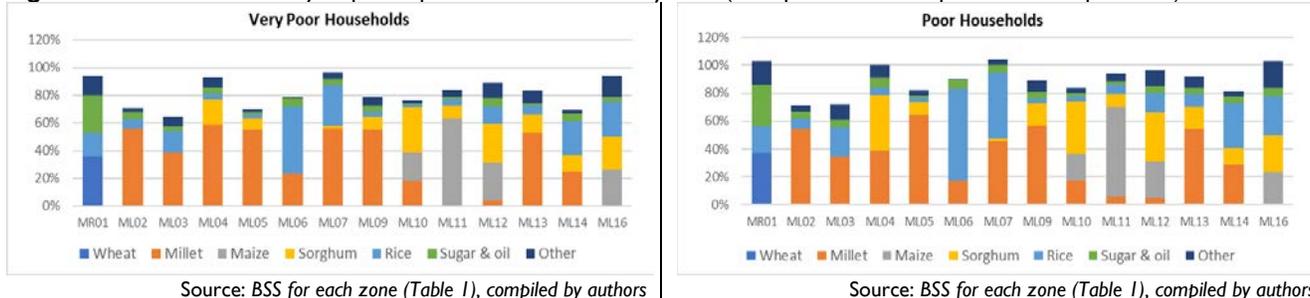
Source: BSS for each zone (Table 1), compiled by authors

Household reliance on different food sources varies seasonally. Own crop production becomes available in most zones starting in October with the main harvest season. During this time, poor and very poor households do not rely on market purchase as they can source staple foods from the recent harvest. Poorer households often also receive in-kind payments for labor during the first few harvest months. The lean season begins in July, when poorer households become more reliant on market purchase. At the same time, market prices for key staples are higher.

The number of months that households can source food from their own production varies by zone. For very poor households, the range is from approximately two and a half months in zone 5 (Dogon Plateau Millet and Shallots) to nearly six months in zone 9 (Central Sorghum and Millet), with an average of four months out of the year. The northern pastoralist zones are exceptions as households' source less than five percent of total food from own crop production; however, livestock production is more prominent. For poor households, the range is from approximately three and a half months in zone 5 to eight months in zone 9, with an average of nearly six months. Among middle and better off households, the average number of months covered by own production is 8.5 and 10.5 months, respectively. In some zones – 7, 9, and 10 – better off households cover at least 100 percent of their food needs from own crop production.

The main staple foods consumed throughout the five regions of interest include millet, sorghum, rice, and maize. In northern pastoralist zones, wheat and wheat flour are the main staples. On average, sorghum and millet are the most important staples produced by very poor and poor households in terms of contribution to total food needs, however this does vary significantly by zone. The primary and secondary staples produced and purchased by zone are listed below in Table 27. Sugar and oil are also purchased in every zone, and together constitute approximately four percent of total food needs for poorer households.<sup>10</sup>

**Figure 49.** Contribution of key staple crops to total food intake by zone (both production and purchase of staple foods)



Source: BSS for each zone (Table 1), compiled by authors

Source: BSS for each zone (Table 1), compiled by authors

<sup>10</sup> The "other" category varies by zone but typically includes legumes (cowpea, soybeans, and groundnut) in addition to pasta and bread in MR01, semolina in ML02, and wild foods (fish, water lily) in ML03.

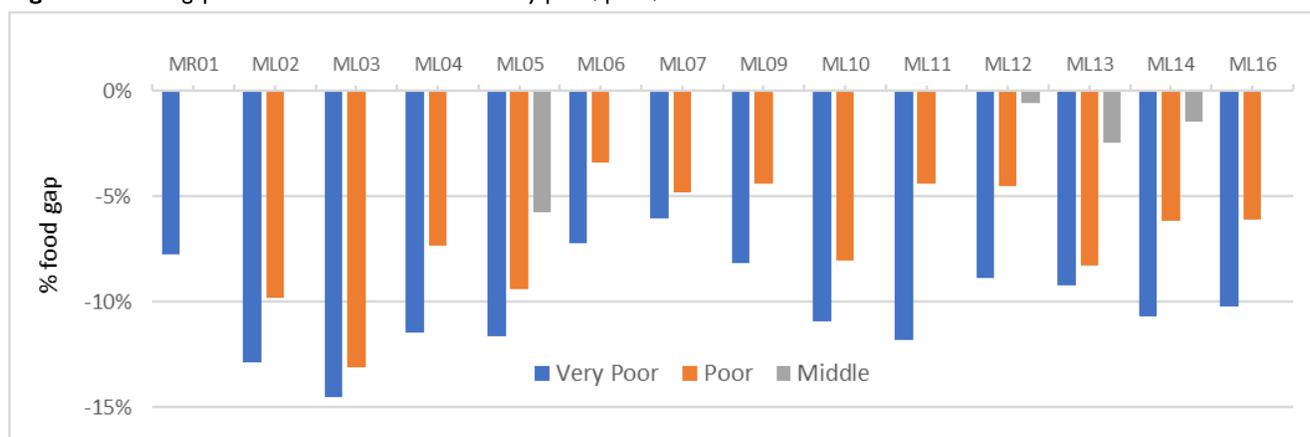
**Table 27.** Staple foods by zone for poor households (contribution to total food needs over 10%)

Zone	Staples produced	Staples purchased
MR01	None	Rice (19%), Wheat Flour (20%), Whole Wheat (17%)
ML02	Millet (3%)	Millet (51%)
ML03	Rice (16%)	Millet (32%)
ML04	Sorghum (22%), Millet (17%)	Millet (22%), Sorghum (18%)
ML05	Millet (23%)	Millet (41%)
ML06	Rice (52%)	Millet (17%), Rice (14%)
ML07	Rice (37%), Millet (18%)	Millet (28%), Rice (10%)
ML09	Millet (43%), Sorghum (16%)	Millet (13%)
ML10	Sorghum (27%), Millet (11%)	Sorghum (11%), Maize (11%)
ML11	Maize (39%)	Maize (25%)
ML12	Sorghum (21%), Maize (12%)	Sorghum (15%), Maize (14%)
ML13	Millet (22%), Sorghum (13%)	Millet (33%)
ML14	Rice (16%), Millet (11%)	Millet (18%), Rice (16%)
ML16	Legumes (12%)	Rice (22%), Sorghum (19%), Maize (15%)

Source: BSS for each zone (Table 1), compiled by authors

There is no food gap against the 2100 kilocalories per person per day benchmark in any of the zones in the regions of interest during the periods analyzed, as even very poor households can meet 100 percent of their food needs whether from own production, market purchase, in-kind payment, food aid, or gifts. However, a food gap does exist for poorer households in all zones when compared to the benchmark of 2400 kilocalories per person per day (Figure 50). This higher benchmark will be used in the forthcoming version 3.0 for IPC analyses. Among very poor households, the food gap compared to the 2400 benchmark exceeds five percent in all zones and ten percent in half of the zones. For poor households, the food gap is between five and ten percent in most zones; and otherwise less than five percent.

Lastly, while livestock and livestock products do contribute some food to middle and better-off households, the contribution for the poor and very poor is negligible and in all cases between zero and two percent of total food needs – only relevant to poor households in zones 4, 13, and 14.

**Figure 50.** Food gap to 2400 kcal benchmark for very poor, poor, and middle households in all zones

Source: BSS for each zone (Table 1), compiled by authors

## Access to Markets

Poor and very poor households in all zones rely on the market to meet their basic food needs. The economy is cash-based, and households use cash income earned through the various activities described in previous sections to purchase staple and non-staple foods in addition to non-food expenditures. The very poor rely on markets for staple food purchases to an even greater extent than the poor given the limited amount of food that can be sourced from own production. Therefore, even among poorer households, the very poor face a greater level of vulnerability to market disruptions particularly during the lean season. Prices face typical seasonal fluctuations – lowest immediately following the harvest in October and highest

during the agricultural lean season from July to September. Access to markets tends to be best around the urban zones of southern Mali, relatively good in the high agricultural potential areas of the south, and poor in all other areas. Physical barriers to accessing markets include poor road infrastructure and large distances to market centers, which in many zones are exacerbated during the rainy season.

**Table 28.** Indicators of physical market access and level of household market dependency

Zone	Level	Physical Barriers	Household market dependency (esp. poor and very poor)
ML01	Poor	Poor road infrastructure	High – sale of livestock and purchase of cereals
ML02	Poor	Poor roads, long distances to market	High – sale of livestock and purchase of cereals (millet)
ML03	Moderate	Rainy season, variable distance to towns	High – purchase of staple cereals; sale of rice & livestock
ML04	Moderate	Difficult in rainy season	High – purchase of staple cereals; sale of livestock
ML05	Moderate	Poor roads, few markets	High – purchase of staple cereals; sale of cash crops (shallots)
ML06	Poor	Flooding	High – purchase of staple cereals; sale of livestock
ML07	Good	Moderate in rainy season	High – purchase of staple cereals; sale of cash crops (rice, vegetables)
ML09	Good	Moderate in rainy season	Moderate – purchase and sale of cereals
ML10	Good	Moderate in rainy season	Moderate – purchase and sale of cereals; sale of cotton
ML11	Good	Moderate in rainy season	Moderate – sale of cotton; purchase of maize
ML12	Good	Moderate in rainy season	High – purchase of staple cereals; sale of livestock
ML13	Good	Moderate in rainy season	High – purchase of staple cereals; sale of livestock
ML14	Moderate	Difficult in rainy season	High – purchase of staple cereals; sale of livestock
ML16	Moderate	Difficult in rainy season	High – purchase of staple cereals; sale of livestock and gold

Source: Baseline profile for each zone (Table 1), compiled by authors

## Risks to Livelihoods and Coping Strategies

The primary risks to livelihoods throughout the regions of interest include insufficient rainfall (both delayed and inconsistent throughout the season), crop pests and diseases, and livestock disease. Human disease – particularly malaria – is another risk that infringes on the ability of poor and very poor households to work and earn cash income. In some areas, high input prices, flooding, or high winds also present risks. Risks and coping strategies specific to each zone are listed in Table 29. In the northern zones of ML01, ML02, ML04, ML06, and ML13 conflict and/or cattle rustling present greater risks, in addition to other common natural risks found in other zones.

Household coping strategies in response to these common livelihood risks – which are both chronic and periodic – either consist of reducing expenditures or attempting to increase sources of income. Throughout all livelihood zones, poor and very poor households will reduce expenditures on non-essential or discretionary household items. Households may also reduce spending on non-staple food items or replace a preferred staple grain with a less preferred and less expensive option. Beyond reducing expenditures, poor and very poor households will look to increase income in ways that vary by livelihood zone depending on the assets and resources available to the household, as well as the timing of the hazard and overlap with seasonal activities (e.g., agricultural labor during harvest season; sale of charcoal, firewood, or brick-making during dry season).

Often, households will augment income generating activities that they already engage in but in some cases may seek out new sources of income. For poorer households, these methods include increasing agricultural or casual labor, firewood sales, brick making, wild food sales, and remittances. Labor migration is often not an option for the very poor, but only for the poor, middle, and better-off, as they have too few active household members and limited resources to send someone to migrate. Middle and better-off households can increase their crop, livestock, and livestock product sales as coping strategies.

**Table 29.** Livelihood risks and household coping strategies

Zone	Major risks	Poorer households increase income from:
ML01	Low water availability, food price spikes, conflict	Livestock and livestock product sales
ML02	Insufficient rainfall, lack of pasture, livestock diseases, cattle rustling, conflict, crop pests	Labor migration, livestock and livestock product sales, local labor, tanning animal skins, charcoal, gifts
ML03	Insufficient rainfall and pasture, broken dams, crop pests, livestock disease, malaria, high cereal prices	Labor migration, remittances, livestock and livestock product sales, credit, fish sales, market crop sales, wild foods
ML04	Crop pests, insufficient rainfall, livestock disease, high winds, flooding	Firewood sales, labor migration, remittances, livestock

Zone	Major risks	Poorer households increase income from:
ML05	Insufficient rainfall, crop pests, high winds, flooding, human diseases, animal diseases	Local labor, wild food consumption & sale, labor migration, gifts, firewood sales, handicraft sales
ML06	Rice pests, insufficient rainfall, flooding, malaria, animal diseases, conflict	Market gardening, local agricultural labor, wild food sales, labor migration; fishing
ML07	Crop pests & diseases, human disease, conflict	Brick making, local agricultural labor; firewood sales, fishing
ML09	Livestock theft, malaria, crop pests & diseases, insufficient rainfall	Labor migration, agricultural or casual labor, handicraft sales, wood & charcoal sales
ML10	Crop pests, late payment/inputs for cotton, insufficient rainfall	Agricultural/livestock labor, domestic work, labor migration,
ML11	Insufficient rainfall, high input prices, crop pests and diseases, livestock disease	Livestock sales, gifts, short-cycle crop sales, credit, green harvest of maize and groundnut
ML12	Flooding, crop pests, insufficient rainfall, livestock diseases	Labor migration, goldmining, livestock sales, gifts, green harvest of groundnuts
ML13	Insufficient rainfall, crop pests, animal diseases, flooding	Labor migration, remittances, credit, agricultural & casual labor, livestock
ML14	Insufficient rainfall, crop pests, animal diseases, flooding	Agricultural & casual labor, credit, sale of firewood, wild foods
ML16	Unstable gold prices, insufficient rainfall, flooding, crop pests	Labor migration, goldmining, livestock sales, gifts, green harvest maize

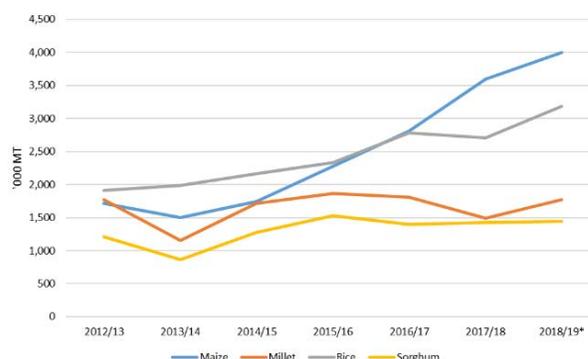
Source: Baseline profile for each zone (Table 1), compiled by authors

## Annex 4. National Market Overview

### Introduction

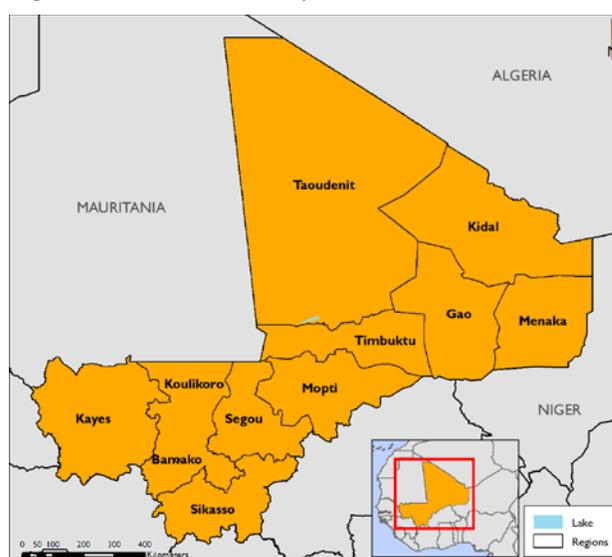
- Mali relies on domestic production and imports to meet staple food needs. Production varies by region but, generally, the southern regions are the most productive, particularly for cereals.
- The main cereals produced and consumed in Mali are millet, sorghum, rice, and maize. Production of all four has increased over the past five years. Maize has outpaced the others and achieved the greatest annual production increases (Figure 51).
- Mali is overall a surplus cereal country, although it imports a considerable quantity of rice each year and minor amounts of coarse grain seasonally (maize, millet, and sorghum) (Table 30). A sizeable amount of informal trade occurs between neighboring countries.
- There are a greater number of monitored markets in densely populated southern Mali and fewer, but still functional, markets in the more sparsely populated north (Figure 52). In general, prices are lowest in producing regions and highest in deficit regions.
- The main harvest takes place between October and January, with off-season harvests of rice occurring between January and June. The main planting season takes place from June to July (Figure 53).
- This national market context summary will focus on the following main commodities: rice, maize, millet, sorghum, cowpeas, edible oil, and livestock (goats and sheep). Particular detail is provided on production, consumption, price trends, marketing, and trade.

**Figure 51.** National cereal production, 2012–2018



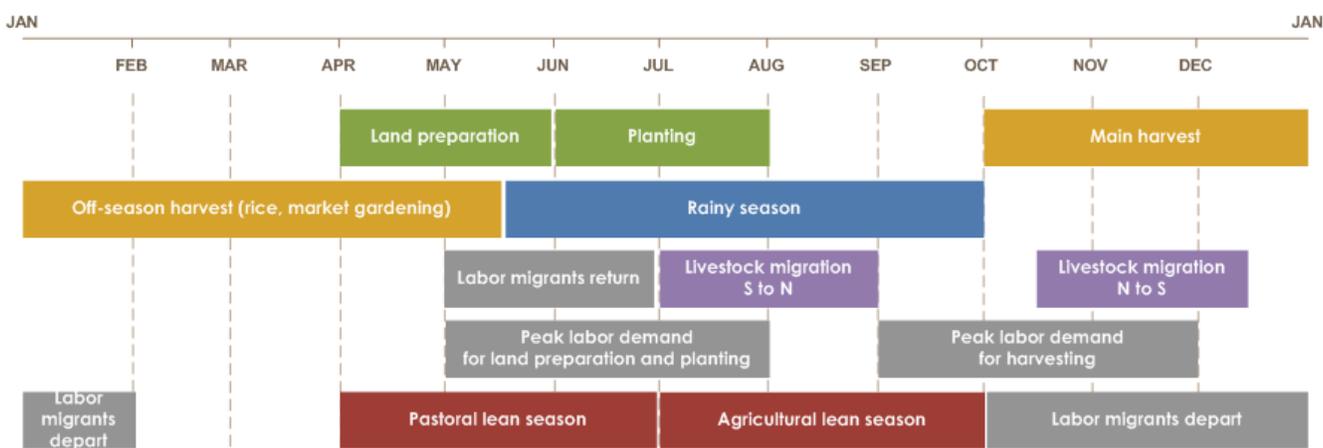
Source: CPS/DSR 2018

**Figure 52.** Mali reference maps



Source: FEWS NET

**Figure 53.** National season calendar



Source: FEWS NET

**Table 30.** National commodity balance, 2013–2017 (MT)

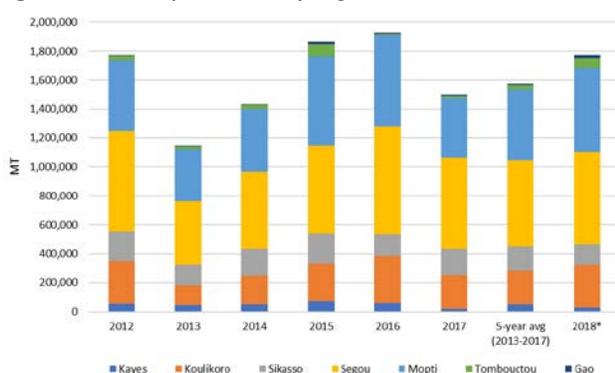
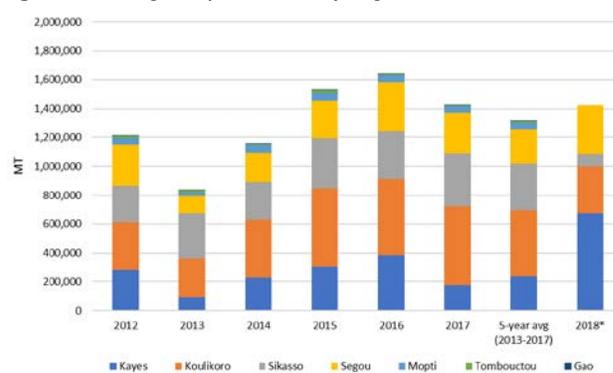
	Rice	Maize	Millet	Sorghum	Cowpeas	Edible oil
<b>Opening Stocks</b>	184,000	392,400	-	174,800	-	-
<b>Production</b>	1,361,434	2,018,337	1,338,250	1,119,632	144,150	87,600
<b>Total Supply</b>	1,545,434	2,410,737	1,338,250	1,294,432	144,150	87,600
<b>Other Uses</b>	-	237,451	157,441	131,721	-	-
<b>Consumption</b>	1,033,456	767,964	1,045,928	890,910	89,091	106,909
<b>Total Demand</b>	1,033,456	1,005,415	1,203,369	1,022,631	89,091	106,909
<b>Domestic Balance</b>	511,979	1,405,322	134,880	271,801	55,059	-19,309
<b>Self-sufficiency</b>	150%	240%	111%	127%	162%	82%
<b>Imports</b>	186,000	921	-	733	-	35,769
<b>Exports</b>	892	5,488	582	-	-	1,331
<b>Total Balance</b>	697,087	1,400,755	134,298	272,534	55,059	15,129

Note: Figures are not in cereal equivalent terms. All cereals are in milled equivalent using a conversion factor of 0.85 except rice, which is 0.55. The following annual per capita consumption figures were used: rice: 58kg, maize: 43.1kg, millet: 58.7kg, sorghum: 50kg, cowpeas: 5kg, edible oil: 6kg.

Source: Authors' estimates based on Source: CPS/DSR 2018, DNSII/INSTAT 2003, Direction Nationale de la Population (DNP) 2019, USAID 2015, USDA/PSD 2019, and COMTRADE 2019 data

### Millet and Sorghum

- Millet and sorghum production in Mali have been increasing but at a more modest rate than rice and maize over the past 25 years (Figure 51). Growth in production is largely attributable to increases in area planted rather than yield increases (Michigan State University 2011).
- Millet production increased each year from 2014 to 2016, reaching just under 2 million metric tons (MMT). After a favorable harvest in 2018, the five-year average production is 1.5 MMT (CPS/DSR 2018) (Figure 54). For the period 2013–2017, average annual sorghum production was 1.3 MMT, with production surpassing 1.5 MMT since 2015 (Figure 55) (CPS/DSR 2018). The seasonal calendar is the same as millet with planting in early summer and harvesting in October, November, and December.

**Figure 54.** Millet production by region, 2012–2018**Figure 55.** Sorghum production by region, 2012–2018

Source: CPS/DSR 2018

- Production of millet and sorghum is concentrated in southern Mali (Figure 56 and Figure 57). Segou and Mopti Regions account for 40 and 30 percent of national millet production respectively. Production in Mopti Region is concentrated in the Séno area of Bankass Cercle. For the past five years, Koulikoro and Sikasso Regions have produced between 50 and 60 percent of Mali's sorghum, followed by Kayes and Segou, which combined account for 40 percent of production (CPS/DSR 2018).

- Grown mostly in the semi-arid central regions, millet and sorghum rely heavily on rainfall. Harvest success is therefore determined largely on annual rainfall. The main harvest occurs between October and December, planting takes place in early summer.

Figure 56. Millet trade flow map

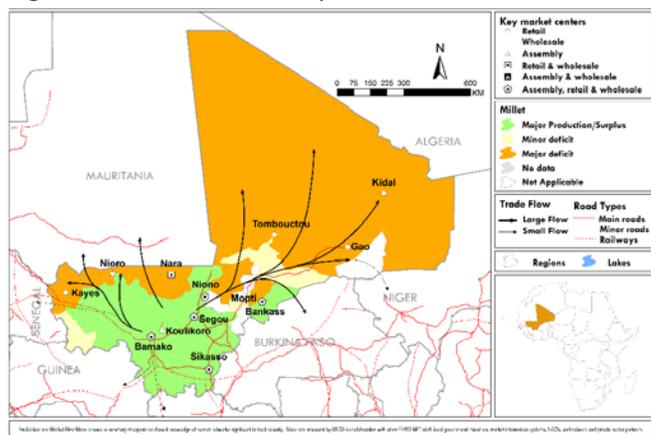
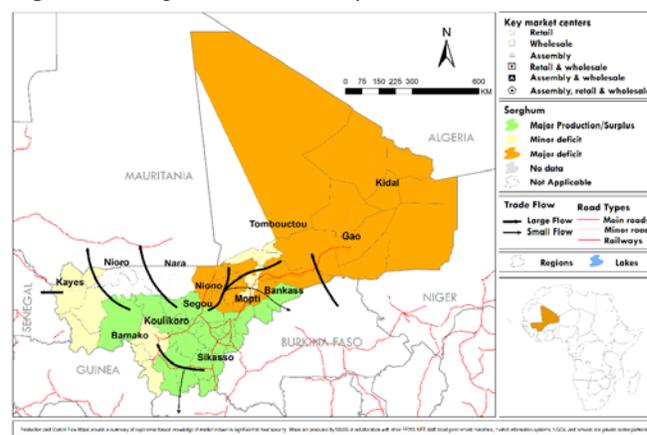


Figure 57. Sorghum trade flow map



Source: FEWS NET

- Millet and sorghum remain the most consumed cereals in Mali, especially among rural and low-income households. On average, national annual consumption of millet was 58.7 kg per person and average national consumption of sorghum was 50 kg per person (USAID 2015). Millet and sorghum are cheaper than rice in markets, in fact they can commonly be purchased for half of the price of rice, making them the staple of choice for poor and very poor households (OMA 2019). The processing of millet and sorghum, before cooking, is done at home or by semi-artisanal milling units in towns, which differs from rice, for example, which is sold ready for consumption.
- Prices follow seasonal variation; lowest prices following the main harvest when household stocks are elevated, and demand is at seasonal low-level, between October and December, and highest prices in the lean season between July and September when households' stocks are depleted, and their market reliance is at its peak. For the period 2016-2018, in the markets where Observatoire du Marché Agricole (OMA), Mali's main market information system, collects millet and sorghum prices, Gao, Timbuktu, had, on average, the highest prices (Figure 58 and Figure 59). Elevated prices in Gao and Timbuktu are attributable to low regional production, access and transport constraints, and insecurity that affects trade flows. Millet and sorghum prices are cheapest in the main millet-producing regions of Mopti, Sikasso, and Segou. In general, prices have been elevated nationwide since mid-2017 due to limited harvest performances in the Sahel in MY 2017/18 and in neighboring countries since MY 2016/17, putting pressure on export demand. Prices have showed signs of returning to normal levels from October 2018. Prices ranged from XOF 125 to 300 over the past five years, millet was slightly more expensive than sorghum, on average (OMA 2019).

Figure 58. Millet price in selected markets, 2013–2019

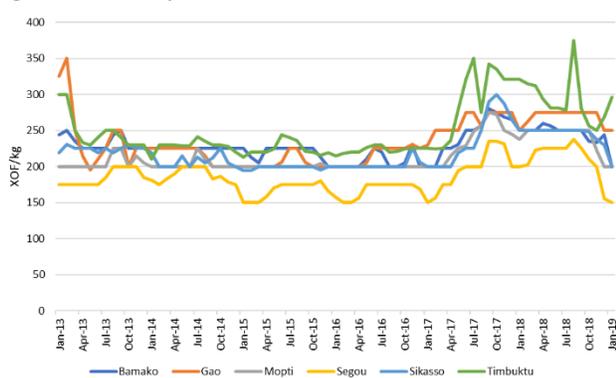
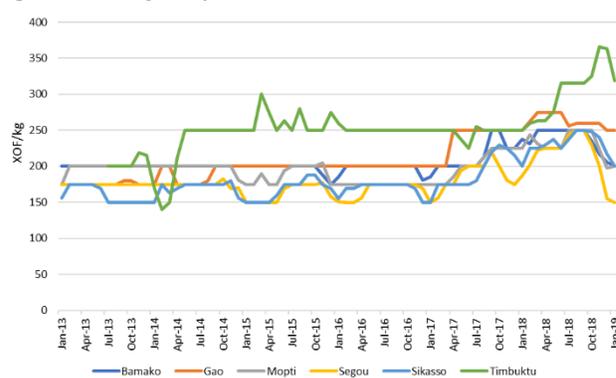


Figure 59. Sorghum price in selected markets, 2013–2019



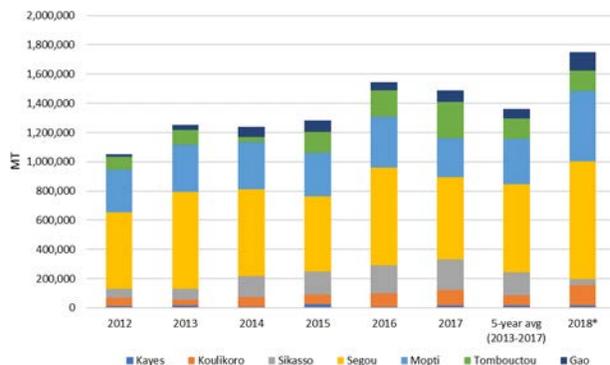
Source: OMA 2019

- There is not a large amount of millet or sorghum imported to or exported from Mali, although a small amount informal trade does occur between neighboring countries on seasonal basis. Mopti Commune plays an important role in millet trade given its placement between southern surplus producing areas and the cereal-deficit north. Many large wholesalers trade and sell to consumers as well as other traders and wholesalers.
- Millet is primarily a smallholder staple crop that households produce for own consumption. In terms of marketing, the main actors are many wholesalers who purchase millet in production zones (Segou and Mopti). Wholesalers then sell large quantities of the product to other wholesalers and large retailers in urban and peri-urban markets throughout the country (USAID 2015). Retailers, mainly women, buy from large and medium traders, sell small quantities in urban, peri-urban, and village markets to local consumers in smaller quantities, usually by the *bol* (Barbelet and Giota 2015).

**Rice**

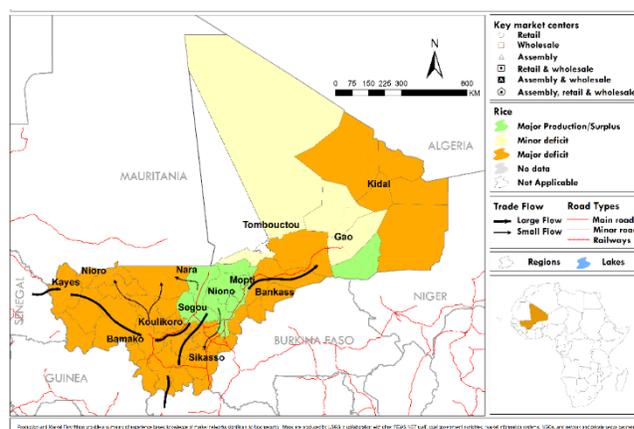
- In Mali, rice is grown in a variety of production systems including full irrigation and rainfed systems. Rice production has improved annually since 2000s and is estimated to have reached over 1.75 MMT for the first time in 2018. The five-year average production of rice for the period 2013 – 2017 is 1.36 MMT. From 2012 to 2018, production has increased by more than 66 percent, or an average annual rate of seven and a half percent (Figure 60). Production increases are due in part to public-led investments in irrigation infrastructure as well as policy changes to the role of the state in rice marketing (Michigan State University 2011).
- The harvest period for irrigated rice is from December to February, off-season rice is harvested between January and May. Segou Region contributes to about 45 percent of total production, due to the large irrigated crop perimeter on the interior Niger Delta, called Office du Niger. Segou Region is followed in production by Mopti, which contributes 20 to 25 percent and Sikasso, and Timbuktu Regions which each contribute 10 percent (Figure 61).
- The latest annual rice consumption per capita was estimated at 58 kg at national level (USAID 2015). Rice is generally consumed by urban households more so than rural households and households typically prefer local rice to imported rice.
- Local rice prices are generally cheapest in production areas and more expensive in non-producing areas of the country. On average, rice prices remained between XOF 275 and 450, sometimes reaching double the average millet and sorghum prices (Figure 62). Local rice prices are typically competitive with imported rice prices (OMA 2019).

**Figure 60. Rice (milled) production by region, 2012–2018**



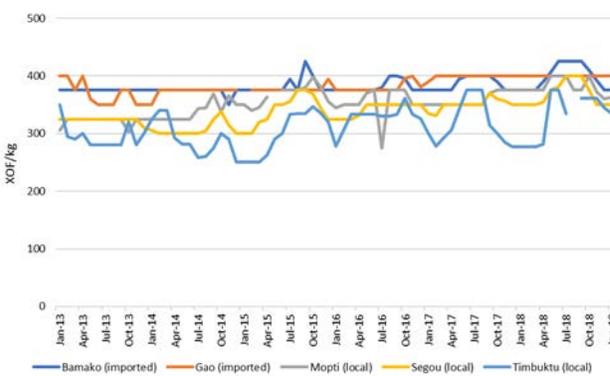
Source: CPS/DSR 2018

**Figure 61. Rice production and trade flows**



Source: FEWS NET

**Figure 62. Rice prices in selected markets, 2013–2019**



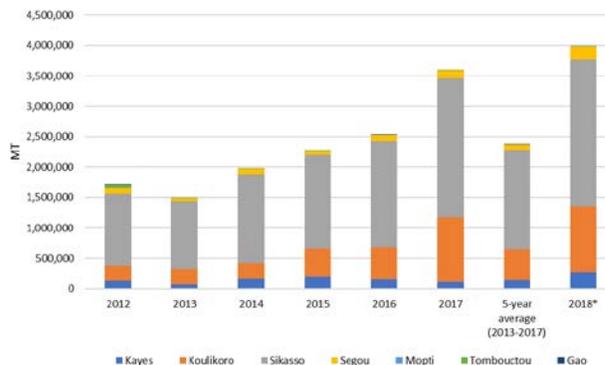
Source: CPS/DSR 2018

- Rice imports have increased, almost doubled from 2013 to 2018 as rice consumption increases. In recent years the majority of imported rice comes from Asia: India and Thailand (COMTRADE 2019). About 5-6 large importers in Bamako dominate the imported rice market.

**Maize**

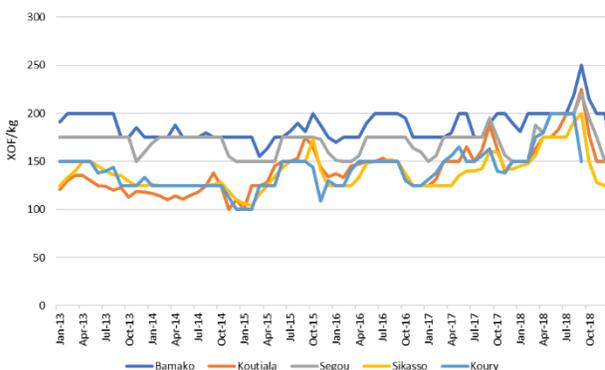
- After being the fourth cereal produced after rice, millet, and sorghum for over three decades, maize production has achieved the greatest annual production increases of all cereals since its introduction following the Sahel droughts in the 1970s (Figure 51). Maize production has maintained an average annual increase of 17 percent for the past ten years and the 2018 harvest was 400 percent greater than the 2008 maize (CPS/DSR 2018). Production of both yellow and white maize has increased every year since 2013 and the average production between 2013 and 2017 was 2.375 MMT (Figure 63). This trend is driven by increased maize consumption in Mali and in neighboring countries, therefore maize production is more profitable than millet and sorghum production.
- Sikasso Region produces almost three quarters of the total production in Mali followed by Koulikoro Region, where total maize production doubled in 2017 and remained above 1,000,000 MT in 2018 (CPS/DSR 2018).
- Maize follows millet, sorghum, and rice as the fourth most consumed cereal in Mali. Consumption per capita was estimated at 43 kg per year nationally, although this could be slightly underestimated given recent qualitative accounts. Both production and consumption of maize have increased greatly in the past 10 years. Demand from the livestock sector is one of the greatest drivers of increased production. While most maize is consumed by humans, about 30 percent is used as feed in the livestock sector (USAID 2015). Additionally, the Government of Mali (GoM) has promoted maize as a rotational crop in the cotton production cycle because it benefits from the residual fertilizer left from cotton and additionally because maize has a higher yield and a shorter cycle than millet and sorghum.
- Maize prices are relatively stable, prices remained between 125 and 250 XOF/kg with an average price of 180 XOF/kg in main monitored markets for the past 3 years (Figure 64).

**Figure 63. Maize production by region, 2012–2018**



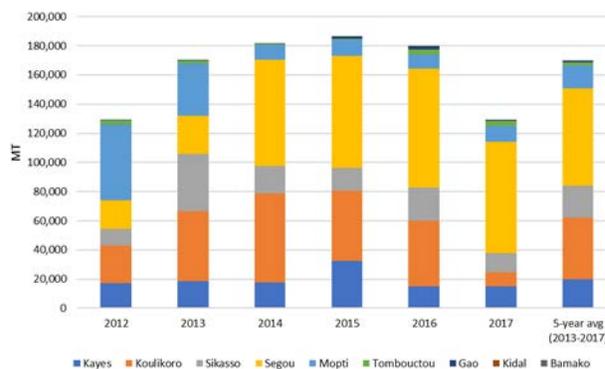
Source: CPS/DSR 2018

**Figure 64. Maize prices in selected markets, 2013–2019**



Source: OMA 2019

**Figure 65. Cowpea production by region, 2012–2017**



Source: CPS/DSR 2018

- Traders who deal in other cereals (i.e., millet, sorghum, and rice) trade maize. Maize trade is centered in Sikasso Region because it is the main producing region.

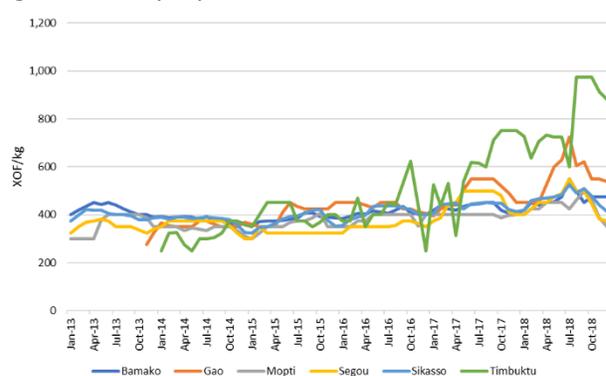
**Cowpeas**

- Cowpea production in Segou and Koulikoro Regions accounts for two thirds of national production. Kayes and Sikasso Regions contribute, on average, 12 percent each to national cowpea production. Average cowpea production for the

period 2013 to 2017 is estimated to be 170,000 MT (Figure 65). Cowpeas are rainfed, cash crops which are harvested March through May. Cowpea sales are highest during the off-season.

- Annual cowpea consumption was estimated at 5 kilograms per person (DNSI/INSTAT 2003). Cowpeas are typically added as part of a sauce or consumed with meat that is accompanied by rice, millet, or sorghum.
- In most markets monitored, cowpea prices ranged between XOF 300 – 600 per kg with exceptions in Timbuktu and Gao markets where prices reached more than XOF 700 at the end of 2018 (Figure 66). There are no formal imports of cowpea as the country is close to self-sufficient on the national level. There is some small-scale informal export of cowpeas to Burkina Faso (USAID 2015).

**Figure 66.** Cowpea prices in selected markets, 2013–2019



Source: OMA 2019

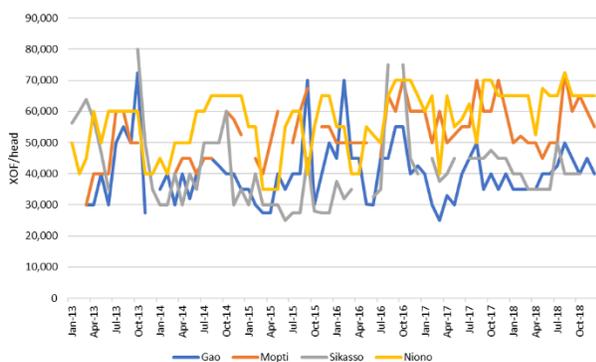
### Edible Oil

- Edible oil as well as regional and international imports (Table 30)(USAID 2015). Local production includes both industrially refined oils (such as HUICOMA's Soléor brand, made predominantly from local cottonseed) and artisanally processed oils (ground nut and shea) (Kelly et al. 2010). Imports include both refined edible oils sourced from neighboring coastal countries in West and North Africa (palm, such as Dinor from Côte d'Ivoire) as well as Europe and South East Asia (Malaysia and Indonesia) (COMTRADE 2019).
- The VAT has historically been placed at 18 percent for both local and imported edible oil. As of early 2019, this VAT was removed, in an effort to help stimulate the edible oil and livestock feed sectors (CommodAfrica 2019; Le Wagadu 2019).
- Fortification of edible oil remains voluntary in Mali as of 2016. However, HUICOMA has been engaged with national and international partners (such as Hellen Keller International and GAIN Health) to improve fortification technology/infrastructure and coverage (Siby 2012).
- The most consistently available edible oil on markets is refined imported palm oil followed by industrially manufactured cottonseed oil. Several large oil importers (based in Bamako) dominate the market, working through network of wholesalers and local agents to market their imported products around the country (USAID 2015). While importers based on Bamako largely serve the southern-most regions, other localized trading networks serve the northern-most regions.
- Unrefined (and non-fortified) shea butter is also available on markets but is typically sold by the heap or by weight, although the prices are reported to be broadly similar to those of refined oils.

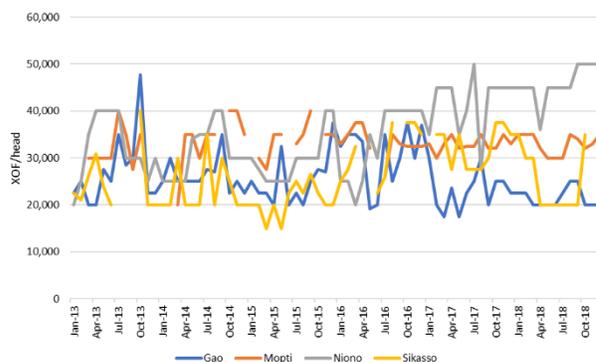
### Livestock

- With one of the largest small ruminant populations in the Sahel region, Mali is estimated at 11.3 million head of sheep and 15.8 million head of goats (ILRI 2011). Livestock systems in Mali are pastoral and depend on mobility to adapt to feed and water shortages during the year. There are greater numbers of livestock in the north than in the south (FEWS NET 2010). Meat consumption is greater among better off households than it is among poor households.
- Milk consumption decreases from north to south. Poor households in northern Timbuktu, Gao and Ménaka Regions consume more milk than typical middle and better-off households in all other parts of the country. Levels of milk consumption are closely tied to the size of livestock holding. Less milk is consumed by households in the center of the country than in the large Sahelian band because of lower livestock holdings. Milk is consumed more widely in the north because of greater numbers of livestock but also because of dietary habits; households in the south do not generally consume sheep and goats' milk, unlike their northern counterparts (FEWS NET 2010).

**Figure 67. Sheep (male) prices in monitored markets, 2013–2019**

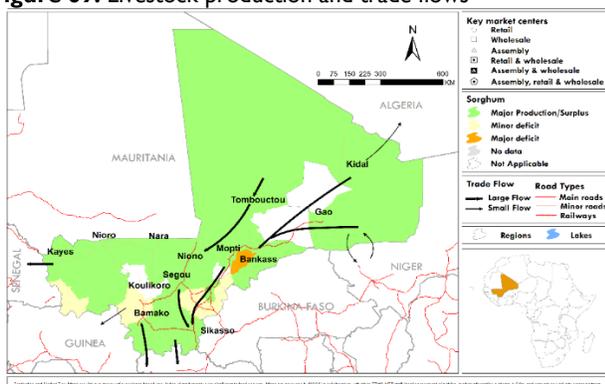


**Figure 68. Goats (male) prices in monitored markets, 2013–2019**



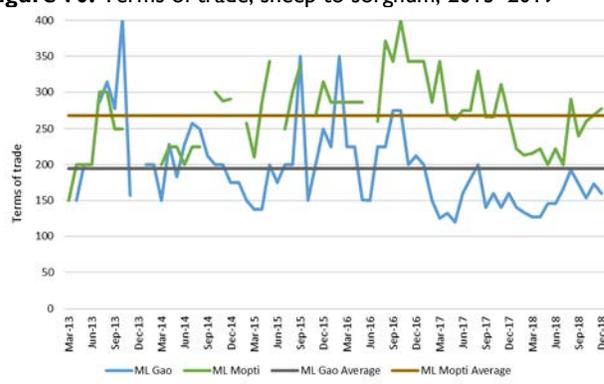
Source: SAP 2018

**Figure 69. Livestock production and trade flows**



Source: FEWS NET

**Figure 70. Terms of trade, sheep to sorghum, 2013–2019**

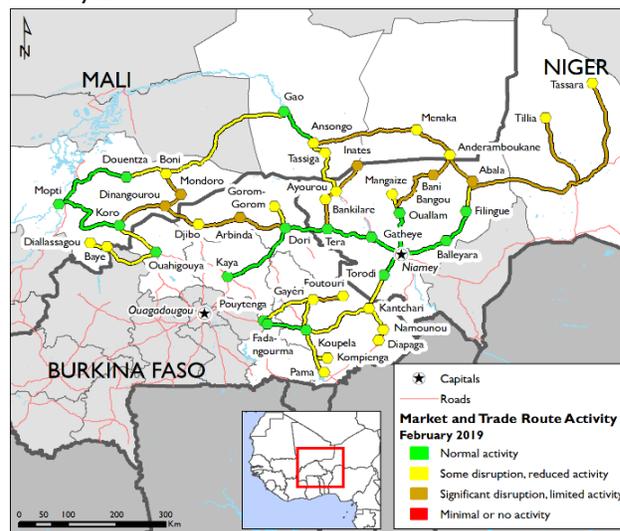


Source: SAP 2018

- Goats and sheep are an important livelihood and source of cash income, for the households that can afford them, and the principal form of savings/investment. Small ruminant ownership varies by area, but typically very poor households own between 0 and 5 goats and between 0 and 3 sheep. Poor households own anywhere between 1 and 7 goats and between 0 and 5 sheep. For comparison, middle and better off households own between 10 and 40 goats and between 5 and 15 sheep (FEWS NET 2010).

- Sheep and goat prices peak between August and October, on an annual basis, and also at the times of the Tabaski Festival (Figure 67 and Figure 68). Sheep are more expensive than goats in monitored markets (SAP 2018). Sheep to sorghum terms of trade have been below-average since the end of 2017, which are the result of a combination of factors. First, increased cereal prices, the lack of stable livestock prices due to insecurity, conflict, poor pasture in MY 2017/18, and finally, limited export opportunities, specifically in Gao, which typically exports livestock to Niger and Nigeria (Figure 69 and Figure 70).

**Figure 71. Liptako-Gourma Region market functioning, February 2019**



Source: FEWS NET

**Liptako-Gourma Region**

- While production at the national level has increased over the past five years, certain areas of Mali have become insecure due to conflict. Market and trade functioning have been affected across northern and central Mali and, more broadly, across the tri-border Liptako-Gourma Region of Burkina Faso, Mali, and Niger (Figure 71).

## Annex 5. Volumes Traded on Selected Markets of Mali EMA AOI

**Table 31.** Estimated weekly goats traded on reference markets in EMA AOI

Market	Commue	Region	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	October to March	June to August	300	200	-33%
Wabaria	Gounzoureye	Gao	September to February	March to August	1,500	225	-85%
Ménaka	Ménaka	Ménaka	November to June	July to October	850	650	-24%
Bandiagara	Bandiagara	Mopti	August to September	October to May	600	300	-50%
Marché Bétail (Bankass)	Bankass	Mopti	December to May	August to November	900	500	-44%
Djenne	Djenne	Mopti	February to May	July to September	150	60	-60%
Marché Kikara	Gandamia	Mopti	April to October	November to March	210	100	-52%
Koro	Koro	Mopti	August to September	October to May	1,000	500	-50%
Mopti	Mopti	Mopti	April to September	October to March	30	25	-17%
Tenenkou	Tenenkou	Mopti	January to June	July to December	70	50	-29%
San	San	Ségou	October to June	July to September	370	80	-78%
Marché à Mouton (Koutiala)	Koutiala	Sikasso	September to October	May to June	1,000	350	-65%
Sikasso Médine	Sikasso	Sikasso	June to August	September to May	300	300	0%
Diré	Diré	Tombouctou	December to May	June to November	800	500	-38%
Goundam	Goundam	Tombouctou	February to May	June to January	600	325	-46%
Rharous	Rharous	Tombouctou	April to July	August to November	763	235	-69%
Grand marché (Yobou-Tao)	Tombouctou	Tombouctou	January to March	April to December	12	4	-67%
Tonka	Tonka	Tombouctou	October to February	March to September	300	200	-33%

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 32.** Estimated weekly sheep traded on reference markets in EMA AOI

Market	Commune	Region	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	October to March	June to August	400	300	-25%
Wabaria	Gounzoureye	Gao	September to February	March to August	2,000	250	-88%
Ménaka	Ménaka	Ménaka	November to June	July to October	1,000	700	-30%
Bandiagara	Bandiagara	Mopti	August to September	October to May	1,000	500	-50%
Marché Bétail (Bankass)	Bankass	Mopti	December to May	August to November	2,000	800	-60%
Djenne	Djenne	Mopti	February to May	July to September	100	50	-50%
Marché Kikara	Gandamia	Mopti	April to October	November to March	150	80	-47%
Koro	Koro	Mopti	August to September	October to May	5,000	2,000	-60%
Mopti	Mopti	Mopti	April to September	October to March	70	30	-57%
Tenkou	Tenkou	Mopti	January to June	July to December	100	80	-20%
Marché à Bétail de Douentza	Urbaine de Douentza	Mopti	September to March	April to August	1,031	700	-32%
Garbal	Youwarou Homboloré	Mopti	June to August	October to September	250	160	-36%
San	San	Ségou	October to June	July to September	450	200	-56%
Marché à Mouton (Koutiala)	Koutiala	Sikasso	September to October	May to June	1,200	500	-58%
Sikasso Médine	Sikasso	Sikasso	June to August	September to May	1,000	600	-40%
Diré	Diré	Tombouctou	December to May	June to November	1,000	400	-60%
Goundam	Goundam	Tombouctou	February to May	June to January	800	430	-46%
Rharous	Rharous	Tombouctou	April to July	August to November	1,355	643	-53%
Grand marché (Yobou-Tao)	Tombouctou	Tombouctou	January to March	April to December	12	6	-50%
Tonka	Tonka	Tombouctou	October to February	March to September	250	150	-40%

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 33.** Estimated weekly imported rice quantity traded on reference markets in EMA AOI

Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Washington	Gao	Gao	MT	January to March	July to September	90	160	78%
Marché central de Ménaka	Ménaka	Ménaka	MT	January to March	July to September	60	110	83%
Bandiagara	Bandiagara	Mopti	50 kg bag	January to March	July to September	16,000	16,000	0%
Bankass	Bankass	Mopti	MT	January to March	July to September	40	25	-38%
Koro	Koro	Mopti	50 kg bag	January to March	July to September	16,000	16,000	0%
Mopti	Mopti	Mopti	MT	January to March	July to September	600	600	0%
Tenenkou	Tenenkou	Mopti	MT	January to March	July to September	5	10	100%
Douentza	Urbaine Douentza	Mopti	50 kg bag	January to March	July to September	35,000	38,000	9%
San	San	Ségou	MT	January to March	July to September	40	30	-25%
Koutiala	Koutiala	Sikasso	MT	January to March	July to September	50	38	-24%
Sikasso Centre	Sikasso	Sikasso	MT	January to March	July to September	900	900	0%
Rharous	Rharous	Tombouctou	MT	January to March	July to September	5	13	160%
Grand marché (Yobou-Ber)	Tombouctou	Tombouctou	MT	January to March	July to September	2	150	7400%

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 34.** Estimated weekly local rice quantity traded on reference markets in EMA AOI

Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	MT	January to March	July to September	100		-100%
Washington	Gao	Gao	MT	January to March	July to September	8	6	-27%
Bandiagara	Bandiagara	Mopti	50 kg bag	January to March	July to September	19,000	20,000	5%
Bankass	Bankass	Mopti	MT	January to March	July to September	30	5	-83%
Djenne	Djenne	Mopti	MT	January to March	July to September	30	7	-77%
Koro	Koro	Mopti	50 kg bag	January to March	July to September	19,000	20,000	5%
Mopti	Mopti	Mopti	MT	January to March	July to September	3,000	3,000	0%
Tenenkou	Tenenkou	Mopti	MT	January to March	July to September	300	400	33%
Douentza	Urbaine Douentza	Mopti	100 kg bag	January to March	July to September	45,000	47,500	6%
Homboloré	Youwarou	Mopti	100 kg bag	January to March	July to September	27,500	37,500	36%
San	San	Ségou	MT	January to March	July to September	40	25	-38%
Koutiala	Koutiala	Sikasso	kg	January to March	July to September	650	320	-51%
Sikasso Centre	Sikasso	Sikasso	MT	January to March	July to September	500	300	-40%
Diré	Diré	Tombouctou	MT	January to March	July to September	35	15	-57%
Goundam	Goundam	Tombouctou	MT	January to March	July to September	10	3	-70%
Rharous	Rharous	Tombouctou	MT	January to March	July to September	17	50	194%
Grand marché (Yobou-Ber)	Tombouctou	Tombouctou	MT	January to March	July to September	300	5	-98%
Tonka	Tonka	Tombouctou	MT	January to March	July to September	35	#N/A	#N/A

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 35.** Estimated weekly millet quantity traded on reference markets in EMA AOI

Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	MT	January to March	July to September	1,500	2,000	33%
Washington	Gao	Gao	MT	January to March	July to September	1,200	600	-50%
Marché central de Ménaka	Ménaka	Ménaka	MT	January to March	July to September	30	55	83%
Bandiagara	Bandiagara	Mopti	100 kg bag	January to March	July to September	16,500	20,000	21%
Bankass	Bankass	Mopti	MT	January to March	July to September	60	20	-67%
Djenne	Djenne	Mopti	MT	January to March	July to September	20	5	-75%
Koro	Koro	Mopti	100 kg bag	January to March	July to September	16,000	20,000	25%
Mopti	Mopti	Mopti	MT	January to March	July to September	600	250	-58%
Tenenkou	Tenenkou	Mopti	MT	January to March	July to September	40	50	25%
Douentza	Urbaine Douentza	Mopti	100 kg bag	January to March	July to September	20,000	23,000	15%
Homboloré	Youwarou	Mopti	100 kg bag	January to March	July to September	27,500	30,000	9%
San	San	Ségou	MT	January to March	July to September	300	150	-50%
Koutiala	Koutiala	Sikasso	MT	January to March	July to September	85	37	-56%
Sikasso Centre	Sikasso	Sikasso	MT	January to March	July to September	200	100	-50%
Diré	Diré	Tombouctou	MT	January to March	July to September	1	0.5	-50%
Goundam	Goundam	Tombouctou	kg	January to March	July to September	400	400	0%
Rharous	Rharous	Tombouctou	MT	January to March	July to September	12	23	88%
Grand marché (Yobou-Ber)	Tombouctou	Tombouctou	MT	January to March	July to September	100	#N/A	#N/A
Tonka	Tonka	Tombouctou	MT	January to March	July to September	80	#N/A	#N/A

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 36.** Estimated weekly cowpea quantity traded on reference markets in EMA AOI

Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	MT	January to March	July to September	50	500	900%
Bandiagara	Bandiagara	Mopti	100 kg bag	January to March	July to September	37,500	40,000	7%
Bankass	Bankass	Mopti	MT	January to March	July to September	70	20	-71%
Diré	Diré	Tombouctou	MT	January to March	July to September	0.1	0.5	400%
Djenne	Djenne	Mopti	MT	January to March	July to September	0.5	0	-100%
Washington	Gao	Gao	MT	January to March	July to September	15	8	-47%
Goundam	Goundam	Tombouctou	kg	January to March	July to September	150	100	-33%
Koro	Koro	Mopti	100 kg bag	January to March	July to September	37,500	40,000	7%
Koutiala	Koutiala	Sikasso	MT	January to March	July to September	8	2	-75%
Marché central de Ménaka	Ménaka	Ménaka	MT	January to March	July to September	6	11	83%
Mopti	Mopti	Mopti	MT	January to March	July to September	12	7	-42%
Rharous	Rharous	Tombouctou	MT	January to March	July to September	2	3.5	75%
San	San	Ségou	MT	January to March	July to September	30	0.5	-98%
Sikasso Centre	Sikasso	Sikasso	MT	January to March	July to September	100	100	0%
Tenenkou	Tenenkou	Mopti	MT	January to March	July to September	5	7	40%
Grand marché (Yobou-Ber)	Tombouctou	Tombouctou	MT	January to March	July to September	2	1	-50%
Douentza	Urbaine Douentza	Mopti	100 kg bag	January to March	July to September	48,000	47,500	-1%
Homboloré	Youwarou	Mopti	100 kg bag	January to March	July to September	40,000	50,000	25%

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 37.** Estimated weekly edible oil quantity traded on reference markets in EMA AOI

Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Ansongo	Ansongo	Gao	Carton	January to March	July to September	25,000	25,000	0%
Bandiagara	Bandiagara	Mopti	20-liter Jug	January to March	July to September	12,500	12,500	0%
Bankass	Bankass	Mopti	Liter	January to March	July to September	2,000	2,000	0%
Diré	Diré	Tombouctou	Liter	January to March	July to September	1,000	1,000	0%
Washington	Gao	Gao	Liter	January to March	July to September	14,000	70,000	400%
Koro	Koro	Mopti	20-liter Jug	January to March	July to September	12,500	12,500	0%
Koutiala	Koutiala	Sikasso	Jug	January to March	July to September	200	80	-60%
Marché central de Ménaka	Ménaka	Ménaka	Liter	January to March	July to September	15,000	30,000	100%
Rharous	Rharous	Tombouctou	Liter	January to March	July to September	30,000	45,000	50%
Sikasso Centre	Sikasso	Sikasso	Liter	January to March	July to September	10,000	800	-92%
Tenenkou	Tenenkou	Mopti	Liter	January to March	July to September	1,000	1,000	0%
Grand marché (Yobou-Ber)	Tombouctou	Tombouctou	MT	January to March	July to September	50	50	0%
Tonka	Tonka	Tombouctou	Liter	January to March	July to September	2,000	2,000	0%
Douentza	Urbaine Douentza	Mopti	Liter	January to March	July to September	43,000	33,000	-23%
Homboloré	Youwarou	Mopti	20-liter Jug	January to March	July to September	1,100	1,350	23%

Note: Estimated quantities traded as reported by stakeholders participating EMA focus group discussion.

Source: FEWS NET 2019

**Table 38.** Estimated weekly fish quantity traded on reference markets in EMA AOI

Product	Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Fresh fish	Ansongo	Ansongo	Gao	kg	March to April	December to February	6	3	-47%
Fresh fish	Gao (Daniel Boiteux)	Gao	Gao	MT	December to March	April to November	22	11	-50%
Fresh fish	Djenne	Djenne	Mopti	MT	November to March	June to September	5	1	-80%
Fresh fish	Marché Kikara	Gandamia	Mopti	kg	October to March	April to September	1,000	325	-68%
Fresh fish	Mopti	Mopti	Mopti	MT	October to March	April to September	200	100	-50%
Fresh fish	Tenenkou	Tenenkou	Mopti	MT	July to February	March to June	10	5	-50%
Fresh fish	Grand marché de Douentza	Urbaine de Douentza	Mopti	kg	November to March	July to October	300	100	-67%
Fresh fish	Marché Homboloré	Youwarou	Mopti	kg	June to August	January to August	1,250	600	-52%
Fresh fish	Ségou	Ségou	Ségou	MT	March to October	November to February	5	2	-60%
Fresh fish	Sikasso Médine	Sikasso	Sikasso	MT	January to May	June to December	8	3	-63%
Fresh fish	Diré	Diré	Tombouctou	MT	October to February	March to September	1.5	1	-33%
Fresh fish	Goundam	Goundam	Tombouctou	kg	October to February	March to September	6,300	1,470	-77%
Fresh fish	Rharous	Rharous	Tombouctou	kg	December to April	June to September	560	70	-88%
Fresh fish	Yobou-Tao	Tombouctou	Tombouctou	kg	December to March	April to November	100	20	-80%
Fresh fish	Tonka	Tonka	Tombouctou	MT	November to May	June to October	8	3	-63%
Smoked fish	Ansongo	Ansongo	Gao	kg	December to February	March to April	5	2	-60%
Smoked fish	Gao (Daniel Boiteux)	Gao	Gao	MT	December to March	April to November	2	1	-43%
Smoked fish	Djenne	Djenne	Mopti	MT	November to March	June to September	2	0.5	-75%
Smoked fish	Marché Kikara	Gandamia	Mopti	kg	October to March	April to September	1,000	400	-60%
Smoked fish	Mopti	Mopti	Mopti	MT	October to March	April to September	100	20	-80%
Smoked fish	Tenenkou	Tenenkou	Mopti	MT	July to February	March to June	220	150	-32%
Smoked fish	Grand marché de Douentza	Urbaine de Douentza	Mopti	MT	November to March	July to October	25	15	-40%
Smoked fish	Marché Homboloré	Youwarou	Mopti	kg	June to August	January to August	2,125	1,625	-24%
Smoked fish	Ségou	Ségou	Ségou	MT	March to October	November to February	40	18	-55%
Smoked fish	Sikasso Médine	Sikasso	Sikasso	MT	January to May	June to December	15	6	-60%
Smoked fish	Diré	Diré	Tombouctou	MT	October to February	March to September	0.8	0.4	-50%

Product	Market	Commune	Region	Unit	Period 1 (Month to Month)	Period 2 (Month to Month)	Quantities Traded (period 1)	Quantities Traded (period 2)	Percent variation
Smoked fish	Goundam	Goundam	Tombouctou	kg	October to February	March to September	2,100	1,000	-52%
Smoked fish	Rharous	Rharous	Tombouctou	kg	December to April	June to September	5	2	-60%
Smoked fish	Yobou-Tao	Tombouctou	Tombouctou	kg	December to March	April to November	30	10	-67%
Smoked fish	Tonka	Tonka	Tombouctou	MT	November to May	June to October	10	4	-60%
Dried fish	Ansongo	Ansongo	Gao	kg	March to April	December to February	1	1	0%
Dried fish	Gao (Daniel Boiteux)	Gao	Gao	MT	December to March	April to November	3	1	-55%
Dried fish	Djenne	Djenne	Mopti	MT	November to March	June to September	1	0.2	-80%
Dried fish	Marché Kikara	Gandamia	Mopti	kg	October to March	April to September	150	90	-40%
Dried fish	Mopti	Mopti	Mopti	MT	October to March	April to September	60	30	-50%
Dried fish	Tenenkou	Tenenkou	Mopti	MT	July to February	March to June	25	10	-60%
Dried fish	Grand marché de Douentza	Urbaine de Douentza	Mopti	MT	November to March	July to October	5	2	-60%
Dried fish	Marché Homboloré	Youwarou	Mopti	kg	June to August	January to August	4,000	1,500	-63%
Dried fish	Ségou	Ségou	Ségou	MT	March to October	November to February	52	20	-62%
Dried fish	Sikasso Médine	Sikasso	Sikasso	MT	January to May	June to December	4	2	-50%
Dried fish	Diré	Diré	Tombouctou	MT	October to February	March to September	0.5	0.3	-40%
Dried fish	Goundam	Goundam	Tombouctou	kg	October to February	March to September	1,680	780	-54%
Dried fish	Rharous	Rharous	Tombouctou	kg	December to April	June to September	155	62	-60%
Dried fish	Yobou-Tao	Tombouctou	Tombouctou	kg	December to March	April to November	20	8	-60%
Dried fish	Tonka	Tonka	Tombouctou	MT	November to May	June to October	6	2	-67%

## Annex 6. Cercle Level Production and Balance in Mali EMA AOI

**Table 39.** Gross Production by cercle, 2014/15–2018/19, MT

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Gao	Ansongo	Fonio	0	0	0	0	0	0
Gao	Bourem	Fonio	0	0	0	0	0	0
Gao	Gao	Fonio	0	0	0	0	0	0
Ménaka	Ménaka	Fonio	0	0	0	0	0	0
Mopti	Bandiagara	Fonio	855	1,652	1,050	276	835	934
Mopti	Bankass	Fonio	3,999	3,884	1,477	3,054	2,793	3,041
Mopti	Djenné	Fonio	211	267	240	100	83	180
Mopti	Douentza	Fonio	0	0	28	0	2	6
Mopti	Koro	Fonio	2,806	3,507	3,294	3,198	2,375	3,036
Mopti	Mopti	Fonio	7	127	93	106	153	97
Mopti	Téniengkou	Fonio	0	0	0	0	12	2
Mopti	Youwarou	Fonio	0	0	120	0	0	24
Tombouctou	Dire	Fonio	0	0	0	0	0	0
Tombouctou	Goundam	Fonio	0	0	0	0	0	0
Tombouctou	Gourma-Rharous	Fonio	0	0	0	0	0	0
Tombouctou	Niafunke	Fonio	0	0	0	0	0	0
Tombouctou	Tombouctou	Fonio	0	0	0	0	0	0
Gao	Ansongo	Maize	0	0	0	0	0	0
Gao	Bourem	Maize	0	0	0	0	0	0
Gao	Gao	Maize	0	0	0	0	0	0
Ménaka	Ménaka	Maize	0	0	0	0	0	0
Mopti	Bandiagara	Maize	38	75	50	47	83	59
Mopti	Bankass	Maize	1,949	1,691	774	381	486	1,056
Mopti	Djenné	Maize	323	325	222	97	102	214
Mopti	Douentza	Maize	0		75	18	28	30
Mopti	Koro	Maize	305	260	372	495	427	372
Mopti	Mopti	Maize	1,738	1,057	1,322	961	592	1,134
Mopti	Téniengkou	Maize	331	270	55	350	470	295
Mopti	Youwarou	Maize	0	0	20	0	0	4
Tombouctou	Dire	Maize	0	0	0	0	0	0
Tombouctou	Goundam	Maize	380	518	300	994	1380	714
Tombouctou	Gourma-Rharous	Maize	0	0	0	0	0	0
Tombouctou	Niafunke	Maize	0	0	160	150	150	92
Tombouctou	Tombouctou	Maize	0	158	0	0	0	32
Gao	Ansongo	Millet	1,406	838	1,507	6,081	4,330	2,832
Gao	Bourem	Millet	0	0	0	0	0	0
Gao	Gao	Millet	190	322	67	748	826	430
Ménaka	Ménaka	Millet	1,369		2,734			2,051
Mopti	Bandiagara	Millet	14,378	23,256	44,180	20,785	30,023	26,524
Mopti	Bankass	Millet	158,175	188,090	194,289	161,522	212,087	182,833

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Mopti	Djenné	Millet	52,821	37,881	30,500	21,591	40,675	36,694
Mopti	Douentza	Millet	22,685	23,826	32,607	39,802	41,863	32,157
Mopti	Koro	Millet	117,160	142,785	224,821	220,594	113,610	163,794
Mopti	Téniengkou	Millet	29,318	28,163	42,228	30,164	50,060	35,987
Mopti	Youwarou	Millet	5,122	8,022	3,027	4,743	11,050	6,393
Tombouctou	Dire	Millet	1172	1522	3201	2692	2218	2,161
Tombouctou	Goundam	Millet	92	342.95	1182	618	993	646
Tombouctou	Gourma-Rharous	Millet	3718	5277	9378	5137	7505	6,203
Tombouctou	Niafunke	Millet	6810	16793	21608	24026	33357	20,519
Tombouctou	Tombouctou	Millet	563	845	1758	717	558	888
Mopti	Mopti	Millet	73,020	88,111	61,653	66,838	73,861	72,697
Gao	Ansongo	Rice	55,266	19,773	2,053	72,758	85,622	47,094
Gao	Bourem	Rice	29,242	11,763	1,458	36,825	48,596	25,577
Gao	Gao	Rice	36,821	24,162	3,506	38,505	97,192	40,037
Ménaka	Ménaka	Rice	0	0	0	0	0	0
Mopti	Bandiagara	Rice	3,890	1,764	4,500	2,497	2,568	3,044
Mopti	Bankass	Rice	12,761	11,960	7,222	8,540	8,152	9,727
Mopti	Djenné	Rice	81,189	77,821	82,537	20,654	55,783	63,597
Mopti	Douentza	Rice	9,819	5,120	10,306	5,307	10,011	8,113
Mopti	Koro	Rice	3,413	2,819	3,492	2,765	1,741	2,846
Mopti	Mopti	Rice	176,083	161,397	152,033	103,997	182,699	155,242
Mopti	Téniengkou	Rice	99,153	77,475	99,890	51,000	76,189	80,741
Mopti	Youwarou	Rice	86,754	66,620	84,603	73,903	75,354	77,447
Tombouctou	Dire	Rice	66659	82624	90052	103176	116562	91,815
Tombouctou	Goundam	Rice	31779	41142	45359	41335	43980	40,719
Tombouctou	Gourma-Rharous	Rice	16556	19768	20983	22593	21437	20,267
Tombouctou	Niafunke	Rice	56823	73045	72846	92826	91022	77,312
Tombouctou	Tombouctou	Rice	21630	25731	29090	30983	29034	27,294
Gao	Ansongo	Sorghum	1,328	462	199	3980	3918	1,977
Gao	Bourem	Sorghum	0	0	0	0	0	0
Gao	Gao	Sorghum	385	381	88	875	630	472
Ménaka	Ménaka	Sorghum	79		92			86
Mopti	Bandiagara	Sorghum	300	1,670	2,500	955	1,938	1,473
Mopti	Bankass	Sorghum	8,606	24,014	14,950	17,534	19,360	16,893
Mopti	Djenné	Sorghum	14,973	3,420	2,417	2,554	4,029	5,479
Mopti	Douentza	Sorghum	90	669	4,113	2,064	4,691	2,325
Mopti	Koro	Sorghum	3,734	17,053	25,158	22,005	10,254	15,641
Mopti	Mopti	Sorghum	7,654	15,595	11,085	10,447	12,246	11,405
Mopti	Téniengkou	Sorghum	914	1,927	2,050	1,906	7,730	2,905
Mopti	Youwarou	Sorghum	76	475	908	1,520	1,860	968
Tombouctou	Dire	Sorghum	64	0	3900	2323	3745	2,006
Tombouctou	Goundam	Sorghum	1400	0	13290	3080	215	3,597

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Tombouctou	Gourma-Rharous	Sorghum	331	780	1014	765	371	652
Tombouctou	Niafunke	Sorghum	2356	0	6305	4552	4546	3,552
Tombouctou	Tombouctou	Sorghum	65	109	324	68	173	148
Gao	Ansongo	Wheat	6	10	0	4	7	5
Gao	Bourem	Wheat	494	805	0	301	553	431
Gao	Gao	Wheat	0	0	0	0	0	0
Ménaka	Ménaka	Wheat	0	0	0	0	0	0
Mopti	Bandiagara	Wheat	0	0	0	0	0	0
Mopti	Bankass	Wheat	0	0	0	0	0	0
Mopti	Djenné	Wheat	0	0	0	0	0	0
Mopti	Douentza	Wheat	0	0	0	0	0	0
Mopti	Koro	Wheat	0	0	0	0	0	0
Mopti	Mopti	Wheat	0	0	0	0	0	0
Mopti	Téniengkou	Wheat	0	0	0	0	0	0
Mopti	Youwarou	Wheat	0	0	0	0	0	0
Tombouctou	Dire	Wheat	12,565	9,821	18,796	13,841	10442	13,093
Tombouctou	Goundam	Wheat	13,370	7,595	16,756	12,339	6370	11,286
Tombouctou	Gourma-Rharous	Wheat	1,580	1,146	2,149	1,583	936	1,479
Tombouctou	Niafunke	Wheat	52	245	184	136	437	211
Tombouctou	Tombouctou	Wheat	80	150	159	117	176	137

Note: Rice expressed in milled equivalent.

Source: FEWS NET estimates based on CPS/SDR, DRA, INSTAT, and DNPpop data

**Table 40.** Estimated cereal requirements by cercle, 2014/15–2018/19, MT

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Gao	Ansongo	Fonio	2,654	2,733	2,813	2,893	2,975	2,814
Gao	Bourem	Fonio	2,340	2,410	2,481	2,551	2,623	2,481
Gao	Gao	Fonio	4,817	4,962	5,107	5,252	5,400	5,108
Ménaka	Ménaka	Fonio	1,095	1,128	1,161	1,194	1,228	1,161
Mopti	Bandiagara	Fonio	923	950	977	1,005	1,034	978
Mopti	Bankass	Fonio	779	802	825	849	874	826
Mopti	Djenné	Fonio	613	632	650	668	688	650
Mopti	Douentza	Fonio	726	747	769	791	814	769
Mopti	Koro	Fonio	1,067	1,099	1,130	1,163	1,196	1,131
Mopti	Mopti	Fonio	1,086	1,118	1,150	1,183	1,217	1,151
Mopti	Téniengkou	Fonio	480	494	508	523	538	508
Mopti	Youwarou	Fonio	319	329	338	348	358	339
Tombouctou	Dire	Fonio	592	609	627	645	663	627
Tombouctou	Goundam	Fonio	817	841	865	890	915	866
Tombouctou	Gourma-Rharous	Fonio	599	617	635	653	672	635
Tombouctou	Niafunke	Fonio	947	975	1,003	1,032	1,061	1,004
Tombouctou	Tombouctou	Fonio	687	707	728	749	770	728

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Gao	Ansongo	Maize	291	300	309	318	327	309
Gao	Bourem	Maize	257	265	272	280	288	272
Gao	Gao	Maize	529	545	561	576	593	561
Ménaka	Ménaka	Maize	120	124	127	131	135	127
Mopti	Bandiagara	Maize	1,538	1,583	1,629	1,675	1,724	1,630
Mopti	Bankass	Maize	1,299	1,337	1,376	1,415	1,456	1,377
Mopti	Djenné	Maize	1,022	1,053	1,083	1,114	1,146	1,084
Mopti	Douentza	Maize	1,210	1,246	1,281	1,318	1,356	1,282
Mopti	Koro	Maize	1,779	1,831	1,884	1,938	1,994	1,885
Mopti	Mopti	Maize	1,810	1,863	1,917	1,972	2,028	1,918
Mopti	Ténenkou	Maize	799	823	847	871	896	847
Mopti	Youwarou	Maize	532	548	564	580	597	564
Tombouctou	Dire	Maize	4,185	4,306	4,432	4,559	4,688	4,434
Tombouctou	Goundam	Maize	5,775	5,942	6,117	6,291	6,470	6,119
Tombouctou	Gourma-Rharous	Maize	4,237	4,360	4,488	4,616	4,747	4,490
Tombouctou	Niafunke	Maize	6,695	6,889	7,091	7,293	7,500	7,094
Tombouctou	Tombouctou	Maize	4,859	5,000	5,147	5,293	5,444	5,148
Gao	Ansongo	Millet	8,899	9,167	9,435	9,702	9,976	9,436
Gao	Bourem	Millet	7,848	8,084	8,320	8,556	8,798	8,321
Gao	Gao	Millet	16,155	16,641	17,127	17,613	18,110	17,129
Ménaka	Ménaka	Millet	3,673	3,783	3,894	4,004	4,117	3,894
Mopti	Bandiagara	Millet	66,384	68,352	70,319	72,339	74,416	70,362
Mopti	Bankass	Millet	56,075	57,737	59,398	61,105	62,859	59,435
Mopti	Djenné	Millet	44,138	45,446	46,754	48,098	49,478	46,783
Mopti	Douentza	Millet	52,231	53,779	55,327	56,916	58,550	55,360
Mopti	Koro	Millet	76,789	79,065	81,341	83,678	86,080	81,390
Mopti	Ténenkou	Millet	34,504	35,527	36,549	37,600	38,679	36,572
Mopti	Youwarou	Millet	22,983	23,664	24,345	25,045	25,764	24,360
Tombouctou	Dire	Millet	7,401	7,615	7,839	8,062	8,291	7,842
Tombouctou	Goundam	Millet	10,213	10,509	10,817	11,126	11,441	10,821
Tombouctou	Gourma-Rharous	Millet	7,493	7,711	7,937	8,163	8,395	7,940
Tombouctou	Niafunke	Millet	11,840	12,183	12,541	12,898	13,265	12,545
Tombouctou	Tombouctou	Millet	11,093	11,414	11,749	12,084	12,427	11,754
Mopti	Mopti	Millet	78,127	80,443	82,758	85,136	87,580	82,809
Gao	Ansongo	Rice	15,453	15,917	16,382	16,847	17,323	16,384
Gao	Bourem	Rice	13,627	14,036	14,446	14,856	15,276	14,448
Gao	Gao	Rice	28,051	28,895	29,739	30,582	31,446	29,743
Ménaka	Ménaka	Rice	6,377	6,569	6,761	6,953	7,149	6,762
Mopti	Bandiagara	Rice	32,212	33,167	34,121	35,102	36,109	34,142
Mopti	Bankass	Rice	27,209	28,016	28,822	29,650	30,501	28,840
Mopti	Djenné	Rice	21,417	22,052	22,687	23,339	24,008	22,701
Mopti	Douentza	Rice	25,344	26,095	26,846	27,618	28,410	26,863

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Mopti	Koro	Rice	37,261	38,365	39,469	40,603	41,769	39,493
Mopti	Mopti	Rice	37,910	39,034	40,157	41,311	42,497	40,182
Mopti	Téniengkou	Rice	16,743	17,239	17,735	18,245	18,768	17,746
Mopti	Youwarou	Rice	11,152	11,483	11,813	12,153	12,501	11,820
Tombouctou	Dire	Rice	12,056	12,406	12,770	13,134	13,507	12,775
Tombouctou	Goundam	Rice	16,638	17,120	17,622	18,124	18,639	17,629
Tombouctou	Gourma-Rharous	Rice	12,207	12,561	12,930	13,298	13,676	12,934
Tombouctou	Niafunke	Rice	19,289	19,848	20,430	21,012	21,609	20,438
Tombouctou	Tombouctou	Rice	13,999	14,405	14,827	15,250	15,683	14,833
Gao	Ansongo	Sorghum	3,171	3,267	3,362	3,458	3,555	3,363
Gao	Bourem	Sorghum	2,797	2,881	2,965	3,049	3,135	2,965
Gao	Gao	Sorghum	5,757	5,930	6,103	6,277	6,454	6,104
Ménaka	Ménaka	Sorghum	1,309	1,348	1,388	1,427	1,467	1,388
Mopti	Bandiagara	Sorghum	5,535	5,699	5,863	6,032	6,205	5,867
Mopti	Bankass	Sorghum	4,676	4,814	4,953	5,095	5,241	4,956
Mopti	Djenné	Sorghum	3,680	3,789	3,898	4,010	4,126	3,901
Mopti	Douentza	Sorghum	4,355	4,484	4,613	4,746	4,882	4,616
Mopti	Koro	Sorghum	6,403	6,593	6,782	6,977	7,177	6,786
Mopti	Mopti	Sorghum	6,514	6,707	6,900	7,099	7,303	6,905
Mopti	Téniengkou	Sorghum	2,877	2,962	3,048	3,135	3,225	3,049
Mopti	Youwarou	Sorghum	1,916	1,973	2,030	2,088	2,148	2,031
Tombouctou	Dire	Sorghum	4,427	4,555	4,689	4,823	4,960	4,691
Tombouctou	Goundam	Sorghum	6,109	6,286	6,471	6,655	6,844	6,473
Tombouctou	Gourma-Rharous	Sorghum	4,482	4,612	4,748	4,883	5,022	4,749
Tombouctou	Niafunke	Sorghum	7,083	7,288	7,502	7,716	7,935	7,504
Tombouctou	Tombouctou	Sorghum	5,140	5,289	5,444	5,600	5,759	5,446
Gao	Ansongo	Wheat	938	967	995	1,023	1,052	995
Gao	Bourem	Wheat	828	852	877	902	928	877
Gao	Gao	Wheat	1,704	1,755	1,806	1,857	1,910	1,806
Ménaka	Ménaka	Wheat	387	399	411	422	434	411
Mopti	Bandiagara	Wheat	615	633	651	670	689	652
Mopti	Bankass	Wheat	520	535	550	566	582	551
Mopti	Djenné	Wheat	409	421	433	446	458	433
Mopti	Douentza	Wheat	484	498	513	527	542	513
Mopti	Koro	Wheat	711	733	754	775	797	754
Mopti	Mopti	Wheat	724	745	767	789	811	767
Mopti	Téniengkou	Wheat	320	329	339	348	358	339
Mopti	Youwarou	Wheat	213	219	226	232	239	226
Tombouctou	Dire	Wheat	1,399	1,440	1,482	1,524	1,568	1,483
Tombouctou	Goundam	Wheat	1,931	1,987	2,045	2,104	2,163	2,046
Tombouctou	Gourma-Rharous	Wheat	1,417	1,458	1,501	1,544	1,587	1,501
Tombouctou	Niafunke	Wheat	2,239	2,304	2,371	2,439	2,508	2,372

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Tombouctou	Tombouctou	Wheat	1,625	1,672	1,721	1,770	1,820	1,722

Note: Rice expressed in milled equivalent.

Source: FEWS NET estimates based on CPS/SDR, DRA, INSTAT, and DNPpop data

**Table 41.** Estimated cereal balance by cercle, 2014/15–2018/19, MT

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Gao	Ansongo	Fonio	-2,654	-2,733	-2,813	-2,893	-2,975	-2,814
Gao	Bourem	Fonio	-2,340	-2,410	-2,481	-2,551	-2,623	-2,481
Gao	Gao	Fonio	-4,817	-4,962	-5,107	-5,252	-5,400	-5,108
Ménaka	Ménaka	Fonio	-1,095	-1,128	-1,161	-1,194	-1,228	-1,161
Mopti	Bandiagara	Fonio	-196	454	-85	-771	-324	-184
Mopti	Bankass	Fonio	2,620	2,499	430	1,747	1,501	1,759
Mopti	Djenné	Fonio	-434	-405	-446	-583	-617	-497
Mopti	Douentza	Fonio	-726	-747	-745	-791	-812	-764
Mopti	Koro	Fonio	1,318	1,882	1,670	1,555	823	1,450
Mopti	Mopti	Fonio	-1,080	-1,010	-1,071	-1,093	-1,087	-1,068
Mopti	Ténenkou	Fonio	-480	-494	-508	-523	-527	-506
Mopti	Youwarou	Fonio	-319	-329	-236	-348	-358	-318
Tombouctou	Dire	Fonio	-592	-609	-627	-645	-663	-627
Tombouctou	Goundam	Fonio	-817	-841	-865	-890	-915	-866
Tombouctou	Gourma-Rharous	Fonio	-599	-617	-635	-653	-672	-635
Tombouctou	Niafunke	Fonio	-947	-975	-1,003	-1,032	-1,061	-1,004
Tombouctou	Tombouctou	Fonio	-687	-707	-728	-749	-770	-728
Gao	Ansongo	Maize	-291	-300	-309	-318	-327	-309
Gao	Bourem	Maize	-257	-265	-272	-280	-288	-272
Gao	Gao	Maize	-529	-545	-561	-576	-593	-561
Ménaka	Ménaka	Maize	-120	-124	-127	-131	-135	-127
Mopti	Bandiagara	Maize	-1,505	-1,519	-1,586	-1,636	-1,653	-1,580
Mopti	Bankass	Maize	358	100	-718	-1,091	-1,043	-479
Mopti	Djenné	Maize	-748	-776	-894	-1,032	-1,059	-902
Mopti	Douentza	Maize	-1,210	-1,246	-1,218	-1,303	-1,332	-1,262
Mopti	Koro	Maize	-1,519	-1,610	-1,568	-1,517	-1,631	-1,569
Mopti	Mopti	Maize	-332	-965	-793	-1,155	-1,525	-954
Mopti	Ténenkou	Maize	-518	-593	-800	-573	-496	-596
Mopti	Youwarou	Maize	-532	-548	-547	-580	-597	-561
Tombouctou	Dire	Maize	-4,185	-4,306	-4,432	-4,559	-4,688	-4,434
Tombouctou	Goundam	Maize	-5,452	-5,502	-5,862	-5,446	-5,297	-5,512
Tombouctou	Gourma-Rharous	Maize	-4,237	-4,360	-4,488	-4,616	-4,747	-4,490
Tombouctou	Niafunke	Maize	-6,695	-6,889	-6,955	-7,166	-7,373	-7,016
Tombouctou	Tombouctou	Maize	-4,859	-4,866	-5,147	-5,293	-5,444	-5,122
Gao	Ansongo	Millet	-7,704	-8,455	-8,154	-4,534	-6,296	-7,028
Gao	Bourem	Millet	-7,848	-8,084	-8,320	-8,556	-8,798	-8,321

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Gao	Gao	Millet	-15,994	-16,367	-17,070	-16,977	-17,409	-16,763
Ménaka	Ménaka	Millet	-2,509	-3,783	-1,570	-4,004	-4,117	-3,197
Mopti	Bandiagara	Millet	-54,163	-48,584	-32,766	-54,672	-48,896	-47,816
Mopti	Bankass	Millet	78,374	102,140	105,747	76,189	117,415	95,973
Mopti	Djenné	Millet	760	-13,247	-20,829	-29,745	-14,904	-15,593
Mopti	Douentza	Millet	-32,948	-33,527	-27,611	-23,085	-22,966	-28,027
Mopti	Koro	Millet	22,797	42,302	109,757	103,827	10,489	57,834
Mopti	Mopti	Millet	-16,060	-5,548	-30,353	-28,324	-24,798	-21,017
Mopti	Téniengkou	Millet	-9,584	-11,588	-656	-11,960	3,872	-5,983
Mopti	Youwarou	Millet	-18,630	-16,846	-21,772	-21,013	-16,371	-18,926
Tombouctou	Dire	Millet	-6,405	-6,322	-5,118	-5,774	-6,406	-6,005
Tombouctou	Goundam	Millet	-10,135	-10,217	-9,812	-10,600	-10,597	-10,272
Tombouctou	Gourma-Rharous	Millet	-4,333	-3,225	35	-3,797	-2,016	-2,667
Tombouctou	Niafunke	Millet	-6,052	2,091	5,826	7,524	15,089	4,896
Tombouctou	Tombouctou	Millet	-10,614	-10,696	-10,255	-11,475	-11,953	-10,999
Gao	Ansongo	Rice	18,813	-3,658	-15,109	28,263	35,763	12,814
Gao	Bourem	Rice	4,504	-6,743	-13,542	7,976	14,854	1,410
Gao	Gao	Rice	-5,222	-13,914	-27,565	-6,709	28,813	-4,919
Ménaka	Ménaka	Rice	-6,377	-6,569	-6,761	-6,953	-7,149	-6,762
Mopti	Bandiagara	Rice	-12,509	-7,658	-5,999	-9,474	-8,841	-8,896
Mopti	Bankass	Rice	-16,945	-15,760	-15,813	-15,643	-17,210	-16,274
Mopti	Djenné	Rice	13,813	23,236	22,478	34,213	32,425	25,233
Mopti	Douentza	Rice	-11,934	-10,142	-8,811	-8,408	-10,409	-9,941
Mopti	Koro	Rice	-36,345	-37,808	-38,773	-40,097	-41,457	-38,896
Mopti	Mopti	Rice	3,418	12,193	15,675	22,658	29,772	16,743
Mopti	Téniengkou	Rice	-16,723	-17,199	-17,709	-18,220	-18,725	-17,715
Mopti	Youwarou	Rice	-10,125	-10,592	-11,405	-11,952	-12,245	-11,264
Tombouctou	Dire	Rice	29,272	38,821	43,062	50,835	58,762	44,150
Tombouctou	Goundam	Rice	3,065	8,388	10,500	7,503	8,628	7,617
Tombouctou	Gourma-Rharous	Rice	-1,943	-305	80	709	-385	-369
Tombouctou	Niafunke	Rice	15,942	25,440	24,734	36,540	34,824	27,496
Tombouctou	Tombouctou	Rice	-588	1,549	3,209	3,960	2,318	2,089
Gao	Ansongo	Sorghum	-2,042	-2,874	-3,193	-75	-225	-1,682
Gao	Bourem	Sorghum	-2,797	-2,881	-2,965	-3,049	-3,135	-2,965
Gao	Gao	Sorghum	-5,430	-5,607	-6,029	-5,533	-5,918	-5,703
Ménaka	Ménaka	Sorghum	-1,242	-1,348	-1,309	-1,427	-1,467	-1,359
Mopti	Bandiagara	Sorghum	-5,280	-4,280	-3,738	-5,220	-4,558	-4,615
Mopti	Bankass	Sorghum	2,640	15,598	7,755	9,809	11,215	9,403
Mopti	Djenné	Sorghum	9,047	-882	-1,844	-1,840	-701	756
Mopti	Douentza	Sorghum	-4,279	-3,915	-1,117	-2,991	-895	-2,639
Mopti	Koro	Sorghum	-3,229	7,902	14,602	11,727	1,538	6,508
Mopti	Mopti	Sorghum	-8	6,548	2,522	1,781	3,107	2,790

Region	Cercle	Crop	2014/15	2015/16	2016/17	2017/18	2018/19	Average 2014/15-2018/19
Mopti	Téniékou	Sorghum	-2,100	-1,324	-1,305	-1,515	3,345	-580
Mopti	Youwarou	Sorghum	-1,852	-1,569	-1,258	-796	-567	-1,209
Tombouctou	Dire	Sorghum	-4,373	-4,555	-1,374	-2,848	-1,776	-2,985
Tombouctou	Goundam	Sorghum	-4,919	-6,286	4,826	-4,037	-6,661	-3,416
Tombouctou	Gourma-Rharous	Sorghum	-4,201	-3,949	-3,886	-4,233	-4,706	-4,195
Tombouctou	Niafunke	Sorghum	-5,080	-7,288	-2,142	-3,846	-4,071	-4,485
Tombouctou	Tombouctou	Sorghum	-5,085	-5,197	-5,169	-5,542	-5,612	-5,321
Gao	Ansongo	Wheat	-933	-958	-995	-1,020	-1,046	-991
Gao	Bourem	Wheat	-408	-168	-877	-646	-458	-511
Gao	Gao	Wheat	-1,704	-1,755	-1,806	-1,857	-1,910	-1,806
Ménaka	Ménaka	Wheat	-387	-399	-411	-422	-434	-411
Mopti	Bandiagara	Wheat	-615	-633	-651	-670	-689	-652
Mopti	Bankass	Wheat	-520	-535	-550	-566	-582	-551
Mopti	Djenné	Wheat	-409	-421	-433	-446	-458	-433
Mopti	Douentza	Wheat	-484	-498	-513	-527	-542	-513
Mopti	Koro	Wheat	-711	-733	-754	-775	-797	-754
Mopti	Mopti	Wheat	-724	-745	-767	-789	-811	-767
Mopti	Téniékou	Wheat	-320	-329	-339	-348	-358	-339
Mopti	Youwarou	Wheat	-213	-219	-226	-232	-239	-226
Tombouctou	Dire	Wheat	9,281	6,908	14,494	10,240	7,308	9,646
Tombouctou	Goundam	Wheat	9,433	4,469	12,198	8,384	3,251	7,547
Tombouctou	Gourma-Rharous	Wheat	-74	-484	326	-198	-792	-244
Tombouctou	Niafunke	Wheat	-2,195	-2,096	-2,215	-2,324	-2,137	-2,193
Tombouctou	Tombouctou	Wheat	-1,557	-1,544	-1,586	-1,670	-1,671	-1,606

Note: Rice expressed in milled equivalent.

Source: FEWS NET estimates based on CPS/SDR, DRA, INSTAT, and DNPpop data

## Annex 7. Production Systems Challenges and Risks in Mali EMA AOI

**Table 42.** Crop production risks and challenges, by cercle, EMA AOI

Production System	Region	Cercles	Risks	Challenges
Irrigated rice (full control over water supply and flow)	Mopti	Tenenkou, Youwarou, Djenné, Mopti, Douentza	Low river water levels, crop disease (rice yellowing), crop pests (foliage and grain eating birds and caterpillars).	Low use and level of adaptation of inputs (seeds and fertilizers), limited quality and quantity of adapted crop production tools, quality and maintenance of irrigation canals and associated facilities.
	Timbuktu	Diré, Goundam, Timbuktu, Niafunké et Gourma Rharous		
	Gao	Gao, Ansongo, Bourem		
Controlled submersion rice	Mopti	Djenné, Mopti	Low river water levels, crop pests (foliage and grain eating birds and caterpillars), early water recession.	Low use and level of adaptation of inputs (seeds and fertilizers), limited quality and quantity of adapted crop production tools, quality and maintenance production facilities (flood-protection dykes, water detention structures).
Uncontrolled submersion rice	Mopti	Tenenkou, Youwarou, Djenné, Mopti, Bankass, Douentza*	Insufficient rainfall, low river water levels, crop pests (foliage and grain eating fish, birds, and caterpillars), early water recession, flooding.	Low use and level of adaptation of inputs (seeds), limited quality and quantity of adapted crop production tools.
	Timbuktu	Diré, Timbuktu, Niafunké, Gourma Rharous, Goundam*		
	Gao	Gao, Ansongo, Bourem		
Rainfed millet and sorghum	Mopti	Bankass, Koro, Djenné, Douentza, Tenenkou, Youwarou, Mopti, Bandiagara	Insufficient rainfall (uneven coverage and early cessation of rains), crop pests (foliage and grain eating birds, caterpillars, grasshoppers, aphids)	Low use and level of adaptation of inputs (seeds and fertilizers), limited quality and quantity of adapted crop production tools, soil degradation (erosion, poor soil nutrients), limited knowledge of improved crop production techniques that are adapted to the area (composting, row planting, intercropping, crop rotation)
	Timbuktu	Goundam, Niafunké, Gourma Rharous, Diré*, Timbuktu*		
	Gao	Ansongo, Bourem*, Gao*		
	Ménaka	Ménaka		
Flood recession millet, sorghum, and rice	Mopti	Douentza, Mopti, Bankass*, Djenné*, Youwarou*	Insufficient rainfall (uneven coverage and early cessation of rains), crop pests (foliage and grain eating birds, caterpillars, grasshoppers, aphids), insufficient water levels in lakes and ponds	Low use and level of adaptation of inputs (seeds and fertilizers), limited knowledge of improved crop production techniques that are adapted to the area (composting, row planting, intercropping, crop rotation)
	Timbuktu	Diré, Goundam, Niafunké, Gourma Rharous, Timbuktu*		
	Gao	Gao*, Ansongo*		
Horticulture	Mopti	Bankass, Koro, Djenné, Douentza, Tenenkou, Youwarou, Mopti, Bandiagara	Limited water captured with retention structures (dams, ponds, lakes, and wells), crop pests (caterpillars, aphids), field and crop destruction by livestock.	Availability of water access points, plot management, limited quality and quantity of adapted crop production tools, Low use of improved inputs (seeds, fertilizers, pesticides), limited knowledge of improved crop production techniques that are adapted to the area, post-harvest storage, processing, and conservation methods, producer (and producer group) marketing skills to improve profits.
	Timbuktu	Diré, Goundam, Timbuktu, Niafunké, and Gourma Rharous		
	Gao	Gao, Ansongo, Bourem		
	Ménaka	Ménaka*		

\*Areas with very limited production (negligible at the cercle level).

Source: Authors' elaboration with inputs from ENSAN (2019)

**Table 43.** Livestock production risks and challenges, by cercle, EMA AOI

Livestock production system	Region	Cercles	Risks	Challenges
Transhumant	Mopti	Bandiagara, Bankass, Koro, Tenenkou, Youwarou, Djennée, Mopti, Douentza	Insufficient forage, limited availability of water drinking points, livestock diseases (such as foot and mouth, lumpy skin disease, and others), theft, high cost of livestock concentrate feed.	Poverty of pastoralists, limited availability of watering points, pasture access, cost of livestock feed (forage and concentrate), conflict between agriculturalists and pastoralists, limited access to veterinary services and medicines/vaccinations.
Transhumant and nomadic	Timbuktu	Diré, Goundam, Timbuktu, Niafunké, and Gourma Rharous	Insufficient forage, limited availability of water drinking points, livestock diseases (such as foot and mouth, lumpy skin disease, and others), theft, limited availability and high cost of livestock concentrate feed, high rates of livestock death.	Poverty of pastoralists, limited availability of watering points, pasture access, cost of livestock feed (forage and concentrate), conflict between agriculturalists and pastoralists, limited access to veterinary services and medicines/vaccination, limited availability to government technical services/extension.
Transhumant and nomadic	Gao	Gao, Ansongo, Bourem	Insufficient forage, limited availability of water drinking points, livestock diseases (such as foot and mouth, lumpy skin disease, and others), theft, limited availability and high cost of livestock concentrate feed, high rates of livestock death.	Poverty of pastoralists, limited availability of watering points, pasture access, cost of livestock feed (forage and concentrate), conflict between agriculturalists and pastoralists, limited access to veterinary services and medicines/vaccination, limited availability to government technical services/extension.
Transhumant and nomadic	Ménaka	Ménaka	Insufficient forage, limited availability of water drinking points, livestock diseases (such as foot and mouth, lumpy skin disease, and others), theft, high cost of livestock concentrate feed, high rates of livestock death.	Poverty of pastoralists, limited availability of watering points, pasture access, cost of livestock feed (forage and concentrate), conflict between agriculturalists and pastoralists, limited access to veterinary services and medicines/vaccination, limited availability to government technical services/extension.

Source: Authors' elaboration with inputs from ENSAN 2019

**Table 44.** Potential activities to support agropastoral livelihood systems in the Mali EMA AOI

Activity	Cercles	Notes
Hydro-agricultural infrastructure development	Ansongo, Gao, Gourma-Rharous, Diré et Tombouctou Cercles	This is less feasible in the floodplain areas of Youwarou et Tenenkou because supporting service providers are less willing to travel to these areas due to insecurity
Soil quality improvement activities	Bandiagara	
Rehabilitation of abandoned plots and flood protection dykes in submersion rice production areas	Across the regions de Tombouctou et Gao and in Djenné cercle	Particularly well suited to CFW/CFA activities.
Development and rehabilitation of horticultural crop production plots	Across AOI	This is an activity that can support women's income earning opportunities in many places.
Rehabilitation of dams and other water retention infrastructures	Bandiagara (Plateau Dogon)	Many structures exist, especially for horticultural crop production, but have not been well maintained.
Support to horticultural crop (eg. tomato, onion) post-harvest handling, processing, and storage in areas with high levels of losses	Bandiagara, Diré, Ansongo	
Replanting <i>bourgou</i> plots	Riverine areas of Mopti, Timbuktu, and Gao	Given the ongoing conflict over land tenure and use, community <i>bourgoutières</i> should be prioritized.

Activity	Cercles	Notes
Distribution of locally adapted local rice seeds	Tenenkou, Djenné, Gourma-Rharous, Bourem and Ansongo.	Especially among poor households that have experienced crop production shocks or losses.
Restoration or rehabilitation of degraded pastures using seeding plants	Timbuktu, Gao, and Ménaka regions	
Small ruminant herd reconstitution	Tombouctou, Gao et Ménaka regions	For poor households. However, must ensure locally relevant minimum viability thresholds are met. In other areas of the Sahel, this is are 3–5 Tropical Livestock Units per household in pastoral areas and 1–2 TLU per household in agricultural and agropastoral areas. Below these thresholds, livestock herd sizes cannot be maintained in the long run.
Support to livestock vaccination	Across livestock producing areas of the AOI	
Fish farming	Inner Niger River Delta	Support to fishing households in particular via fish ponds.
Poultry production	Across Mopti region	Focusing on short-cycle production. As with small ruminants, must ensure locally appropriate minimum viability thresholds for poultry are met.

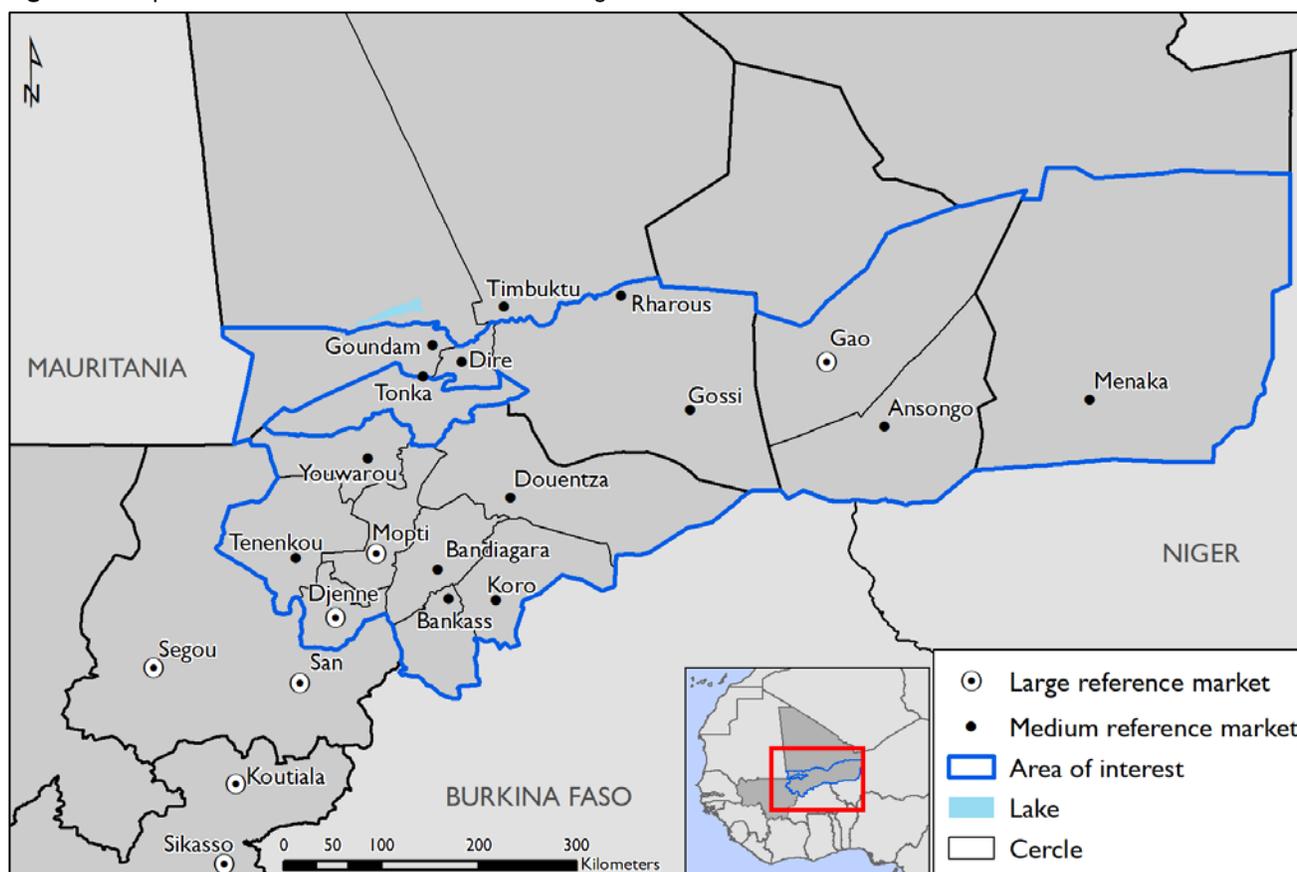
Notes: These geographically differentiated opportunities for building resilience and supporting rural development emerged from various discussions during the EMA assessment with various stakeholder groups, including technical services and NGOs, households, and local authorities. These activities are likely feasible throughout the identified geographic areas so long as they are designed and implemented in close collaboration with local communities and stakeholder groups from the beginning. This level of collaboration will ensure the program design takes into consideration the local socioeconomic and security conditions and will also ensure local community support at various phases of the implementation of the activity components. All activities should consider involving local vendors (be it for supplying goods or services, to the extent possible, as they are familiar with the local operating environment. This can be leveraged to ensure the success of the activity, even in conflict or unstable conditions. The ability to navigate the local security and socio-economic context may also contribute to local vendors offering their services at a lower cost than vendors who may know less about the local context. Supporting local vendors also has a positive secondary impact of supporting their level of professionalization.

Source: Authors' elaboration

## Annex 8. Mali EMA AOI Market Overview

The Area of Interest is served by multiple marketing basins, which vary by commodity but in general, the prominent marketing basins are concentrated around Mopti, North Segou, Sikasso and Koutiala, Gao and Ménaka, and Timbuktu (Figure 72). The level of market integration for a given commodity in this analysis is determined by level of price correlation<sup>11</sup> as well as prominent trade flows identified within each marketing basin. Generally, cowpea, millet, sorghum, and maize prices in the AOI are highly correlated with markets in the AOI with national and regional reference markets indicating generally well-integrated markets. Local and imported rice and small ruminants demonstrate relatively weak price correlation compared other products studied (Figure 21). The dynamics and reasons for observed price trends are explained in more depth below. Readers are encouraged to review the following accompanying annexes: Marketing Basin Maps (Annex 9. Mali EMA AOI Marketing Basin), Price Trends (Annex 10. Price Trends), and Price Correlation (Annex 11. Price Correlation, Mali EMA AOI Reference Markets).

**Figure 72.** Map of the main reference markets in and serving the AOI



Source: FEWS NET 2019

Millet is the most widely traded local staple food across the AOI, with sorghum playing a more limited role. The Lakes area of Timbuktu is an exception, where sorghum is more widely consumed. Millet and sorghum are generally substitutes, with some notable seasonal trends in some areas where local millet is consumed most prominently during the post-harvest period and sorghum or maize from other areas of the country becoming increasingly important as the lean season approaches and progresses. Sorghum importation into the AOI and consumption may increase during years of poor agropastoral conditions but is used primarily for livestock feed. Some areas of Mali are known for having relatively higher quality millet than others (cleaned with low dust content), such as the Seno zone (Bankass and Koro cercles of Mopti) and Koutiala (Sikasso region). Caravans of nomads and pastoralists from northern Mali are known to travel to the surplus producing areas of Mopti during

<sup>11</sup> Prices were considered correlated if the correlation coefficient was significant at the five percent level.

the post-harvest period to purchase millet in large quantities when prices are relatively low. A similar dynamic is developing with Algerian traders in Gao, travelling to purchase millet for different processed goods in Algeria.

The main millet and sorghum markets in the AOI are Djenne, Bankass, Koro, Mopti, and Gao. Millet is traded in particularly large volumes throughout the AOI and markets are well-integrated. Millet and sorghum prices display the highest level of correlation and integration across all commodities studied. There are four main millet and sorghum marketing basins in and serving the AOI (Annex 9; Figure 76); the San and Sikasso marketing basin and the North Segou marketing basins serving Mopti region and parts of Timbuktu region. The Mopti and Bankass marketing basins serve Mopti region. Finally, the Gao marketing basin serves Gao and Ménaka Regions, and both exports and imports to and from Niger. Prices in key reference markets within each of the marketing basins are highly correlated, demonstrating integration. Millet prices even in relatively more isolated markets in the AOI, such as Gao and Ansongo, are highly correlated with markets within the AOI and key national reference markets outside the AOI.

Millet prices generally range between 175 and 250 XOF/kg over the past five-year period in the AOI. Exceptions include Djenne market, where prices were below average and Timbuktu, where prices were consistently over 300 XOF/kg for the period March 2017 to August 2018. In general, millet prices in the AOI trended upwards starting from January 2018 and remained relatively elevated until the end of 2018. Average coefficient of variation fell between the range of 8 and 13 percent.<sup>12</sup> Timbuktu market had the highest coefficient of variation in prices at 18 percent and Dire market had the lowest coefficient of variation at six percent. Sorghum prices in the AOI are generally between 150 and 250 XOF/kg. Timbuktu market, where prices reached over 350 XOF/kg for three months at the end of 2018, displayed higher than average prices for most of 2018. Sorghum price variability dynamics are similar to millet, with the observed coefficient of variation ranging from about 7 to 13 percent.

### Local rice

Local rice trade is robust, but dynamics vary considerably based on local production. In rainfed rice production areas, this is driven by annual rainfall and in the flood recession areas, this is driven by the flood level of the river for off-season rice production. Secondary factors affecting local rice production include presence of pests and availability of locally adapted seeds. Local rice is sold on retail markets and consumed as milled rice. Parboiled rice is also available, with Djenne (in Mopti region) as a well-known source.

Compared to other staple foods in the AOI (such as sorghum, millet, maize, and cowpea) local rice price correlation across markets in the AOI is relatively low. There are multiple reasons for these trends. First, unlike other staple foods, local rice is primarily grown for household or local consumption in the AOI (except for a few surplus-producing areas). Second, production and local supply is highly seasonal. Aside from a few self-sufficient areas, availability from local production does not last longer than three to four months, after which consumers often substitute consumption to other commodities that are purchased on markets, such as millet or imported rice. Mopti is the main aggregation and distribution market within the AOI with Djenne market playing a similar role but to a lesser degree, high price correlation was observed between Djenne and Mopti markets, further indicating integration. For this reason, Mopti market is well-integrated both with key reference markets in surplus producing areas (Koutiala, Segou, San) as well as with Gao market.

There are four main local rice marketing basins serving the AOI (Annex 9; Figure 73). Two marketing basins supply Mopti region: North Segou region marketing basin and the Mopti region marketing basin, both of which supply Mopti region. The third main marketing basin is the Timbuktu and Dire marketing basin; local rice from the Niger River floodplains supplies the rest of Timbuktu region, Mauritania, Gao region, and northern Mopti region. High price correlation was observed between Dire, Tonka, and Timbuktu markets, providing further evidence of integration. The final main local rice marketing basin is the Ansongo marketing basin; local rice from Ansongo supplies Gao and Ménaka regions and high correlation is observed between Gao and Ansongo markets, indicating integration.

Local rice prices in the AOI, for the period 2014 to 2019, typically fell between 300 and 400 XOF/kg. Prices in Gao and Ansongo markets are consistently elevated compared to other markets, because they are structurally deficit, their production does

<sup>12</sup> Coefficient of variation (standard deviation divided by the mean) is used as the main indicator of price variation when comparing across markets and commodities. The price spread (the difference, in absolute value terms, between the highest and lowest value over a given period) is also used as an indicator of variation across markets for the same commodity.

not last more than six months. Local rice prices in Gao reached more than 450 XOF/kg for multiple months between October 2016 and October 2017. Among selected markets within the AOI, Dire has the lowest prices. The coefficient of variation of local rice prices for the period 2014 to 2019 was between four and eleven percent. Djenne, Dire, and Tonka markets have the highest coefficients of variation. This is likely due to fluctuating annual (even seasonal) production of local rice. There are no major differences in the prices for the different types of local rice (irrigated, submersion, riverine etc.). The main difference is if the local rice is parboiled, which commands a price premium.

### **Imported rice**

Imported rice trade is coordinated by large importers who work with a well-coordinated distribution network (based within Mali and the broader region). There are three main imported rice marketing basins serving the AOI. The first is the Bamako marketing basin, where large importers in the capital supply Segou, Timbuktu, Mopti and on to Gao region. Imported rice prices in Gao and Mopti are relatively correlated, indicating integration between the two markets. The Burkina Faso marketing basin supplies east Mopti region, and the Algeria marketing basin supplies Gao and Ménaka regions. Traders supplying rice from Algeria also trade in various other commodities (wheat flour, biscuits, sugar, powdered milk, edible oil, dates, pasta etc.).

Imported rice prices are the least correlated across all staple foods of interest. There are multiple reasons for low imported rice price correlation between markets. First, imported rice sold in Mali comes from different sources with unique types of rice of varying quality, tariffs, and transport costs. Additionally, importers and traders deplete imported rice stocks at different rates, which will affect the selling price.

Imported rice prices exhibit low variability due to their nature of being driven by stable international markets, government support through tax abatements and subsidies, and relatively coordinated marketing channels. Prices over the past five years within the AOI have trended between 350 and 400 XOF/kg. Variation of imported rice prices is low compared to other staple foods, not reaching more than five percent within the area of interest.

### **Cowpea**

Cowpeas are supplied to the AOI mainly from domestic production, with some quantities imported from Niger into Gao and Ménaka and from Burkina Faso into Mopti region. Cowpea prices are highly correlated within the AOI as well as with national and regional reference markets. Key reference markets within the AOI for cowpea trade are Bankass, Koro, and Mopti. Available data indicates that Bankass and Mopti are well-integrated with markets in the AOI, particularly other reference markets in Mopti region and Gao, Ansongo, and Timbuktu markets (Annex 9, Figure 79). There are five main cowpea marketing basins serving the AOI, prices are highly correlated within marketing basins, within the entire AOI, nationally, and regionally to a certain degree, demonstrating market integration. The Bankass marketing basin serves Koutiala, Bamako, and the rest of Mopti region with cowpea supplies from Bankass and Burkina Faso. Regionally, markets in northern Burkina Faso are integrated with those in the AOI with significant volumes being traded between the two countries and thus correlated prices. The Macina marketing basin serves Djenne and Tenenkou cercles, the nearby Mopti marketing basin serves multiple markets within Mopti region as well as Timbuktu region. Another marketing basin is centered around Koro, a main cowpea producer, and supplies Mopti and Douentza markets. The Niger marketing basin supplies cowpea to Ménaka, Gao, and Ansongo markets.

In general, cowpea prices in the AOI are stable and fall between 175 and 225 XOF/kg. Similar to other staples, prices in Timbuktu were consistently above average but the difference in cowpea price between Timbuktu and other AOI markets is particularly high. Timbuktu market's high and variable prices are driven primarily by its isolation; accessible only by river for most of the year, as well as the relatively small number of traders present on the market. Cowpea coefficient of variation in prices is around 11 percent across sample markets. Timbuktu market is an anomaly in terms of price variability as well, with a coefficient of variation of 41 percent over the five-year period.

### **Maize**

Relative to other commodities, maize is relatively minor within the AOI in central and northern Mali. Most maize supplies in the AOI are generally sourced from surplus-producing areas of Sikasso and Segou regions where maize plays a relatively more prominent role in local staple food consumption (Annex 9,

Figure 75). There is some maize production within the floodplains of the Lakes areas of Timbuktu, but it is minor and production is primarily for household consumption. Maize is traded in relatively smaller volumes compared to other cereals.

Mopti and Djenne are the main maize reference markets within the AOI and are well-integrated with local, national, and regional markets. One of the main maize marketing basins in the AOI is the Mopti marketing basin, which supplies Timbuktu region and, to a smaller degree, Gao region. The second main marketing basin is the Koutiala and Sikasso marketing basin, which supplies Mopti region. Available data demonstrate that maize prices in Koutiala, in surplus producing Sikasso region, are highly correlated with prices within the AOI, demonstrating high volumes of trade and integration between the markets. The third main marketing basin serving the AOI is the Burkina Faso marketing basin, which supplies maize to Mopti region. Maize prices in Bobo Dioulasso, Burkina Faso are highly correlated with prices in the AOI, particularly Mopti and Djenne, demonstrating integration and trade between the markets. The final main marketing basin in the AOI is the Gao marketing basin, which is relatively small with limited volumes traded to Ansongo.

Maize prices typically remain between 150 and 250 XOF/kg within the AOI. Mopti and Djenne markets in Mopti Region display the lowest prices of selected markets, which can be explained by the fact that Mopti is the main maize producing region in the AOI, contributing around 86 percent of maize production in the AOI. These markets in Mopti region are also in closest proximity to the key source markets in Segou and Sikasso region. As with the other staple foods studied, prices in Timbuktu are significantly higher, typically between 250 and 350 XOF/kg and reaching over 350 XOF/kg for the period between November 2018 and January 2019. The coefficient of variation in prices is the highest in Bandiagara (18 percent), followed by Tonka (14 percent) and Timbuktu (13 percent). Gao and Ansongo demonstrated less price variability, with a coefficient of variation of nine and five percent, respectively.

### **Manufactured products**

Manufactured products consumed across the AOI include wheat flour, edible oil, pasta, and biscuits, among others and are primarily imported from regional and international markets, although some industrial processing takes place in southern Mali. There are three marketing basins for manufactured products: one served by Bamako, one served by Algeria, and one served by Mauritania (Annex 9, Figure 77). Price changes for these products from Algeria are mainly affected by physical market access, such as road conditions during the rainy season and increased border surveillance in times of heightened insecurity. There are limited price changes for goods coming from Bamako due to the role of the government in setting and enforcing prices through subsidies or other agreements between government and industry.

Most wheat flour available on markets is imported, about 80 to 90 percent, therefore prices are determined by international trends, tariffs, and pricing policies in neighboring countries like Algeria and Mauritania. The remaining 10 to 20 percent of wheat flour is produced domestically (USAID 2015). Wheat flour prices in the AOI ranged between 275 and 400 XOF/kg in April 2019, comparable to local and imported rice prices. April 2019 wheat flour prices were similar or lower than April 2018 prices.

Main types of imported edible oil available on markets in the AOI are refined palm oil, imported from neighboring coastal countries, as well as refined sunflower, soy, and olive oil imported from Algeria and Mauritania. Additionally, there is domestic semi-artisanal production of groundnut and cottonseed oil. Fortified edible oil is not common in Mali. Edible oil prices in the AOI ranged between 600 and 850 XOF/kg in April 2019. Dire, Gao, and Tonka markets exhibited the lowest prices (between 500 and 650 XOF/kg) in April 2019. All prices were similar or lower than April 2018 prices. The lowest edible oil prices were observed in wholesaler markets. Across almost every market in the AOI, markets with fewer than 10 edible oil wholesalers saw prices greater than 750 XOF/liter whereas markets with between 10 and 35 wholesalers saw prices 750 XOF/liter and below. Although more readily available, refined and imported edible oil prices tend to be 100-300 XOF/liter higher than locally produced artisanal and semi-industrial edible oils.

### **Small ruminants**

Sheep prices across key reference markets in Mopti region are well integrated. There are four main marketing basins serving the AOI. Mopti marketing basin is supplied by key livestock reference markets in Timbuktu and Mopti region. As evidence, sheep prices in key reference markets in Timbuktu region (Timbuktu, Dire, Goundam) and Gao are well-integrated in general and specifically with all reference markets in Mopti region (Annex 9, Figure 78). The second main marketing basin is the Niger and Benin marketing basin. Prices in key livestock reference markets in Niger (Ayorou, Maine, Matameye, and Tounfafi) are

highly correlated with prices in Ménaka due to large trade flows mainly to Niger from northeast Mali. The North Segou marketing basin supplies Niono market with small ruminants from Tenenkou, Goundam, and Niafunke. Finally, Mopti region supplies Sikasso and Bamako with small ruminants in the Bamako and Sikasso marketing basin.

Goat trade is more local than sheep and cattle trade, therefore regional goat markets appear less integrated than sheep markets as reference markets in Senegal and Niger do not demonstrate price correlation with markets in the AOI. Ménaka, Gao, and Ansongo goat prices do not show correlation with other markets. However, goat prices are especially well-integrated within Mopti region across the main 8 chef-lieu markets and Dire, Niafunke, and Goundam goat prices are correlated with other markets within the AOI, particularly markets within Mopti.

As expected, small ruminant prices are more variable than staple foods. Within the area of interest, the average coefficient of variation in prices was 18 and 20 percent for goat and sheep, respectively. Goat is almost always cheaper than sheep. In general, goat prices in the AOI fall between 15,000 and 30,000 XOF per head, whereas sheep prices fall between 30,000 and 60,000 XOF per head. In sampled markets, sheep prices demonstrate greater degree of variation. For example, the coefficient of variation in Gourma-Rharous, a key livestock reference market, is over 30 percent. Goat prices in Timbuktu region (Dire, Tonka, Niafunke, and Timbuktu town) are more variable compared to Mopti, Gao, and Ménaka regions for both sheep and goats. For sheep markets, Gourma-Rharous and Niafunke markets have the highest degree of price variability within the AOI, 30 and 25 percent respectively. The relatively high degree of price variability in Timbuktu region is due to the degree of isolation and the small number of traders present on markets, similar to staple food markets.

### **Livestock/small ruminant feed**

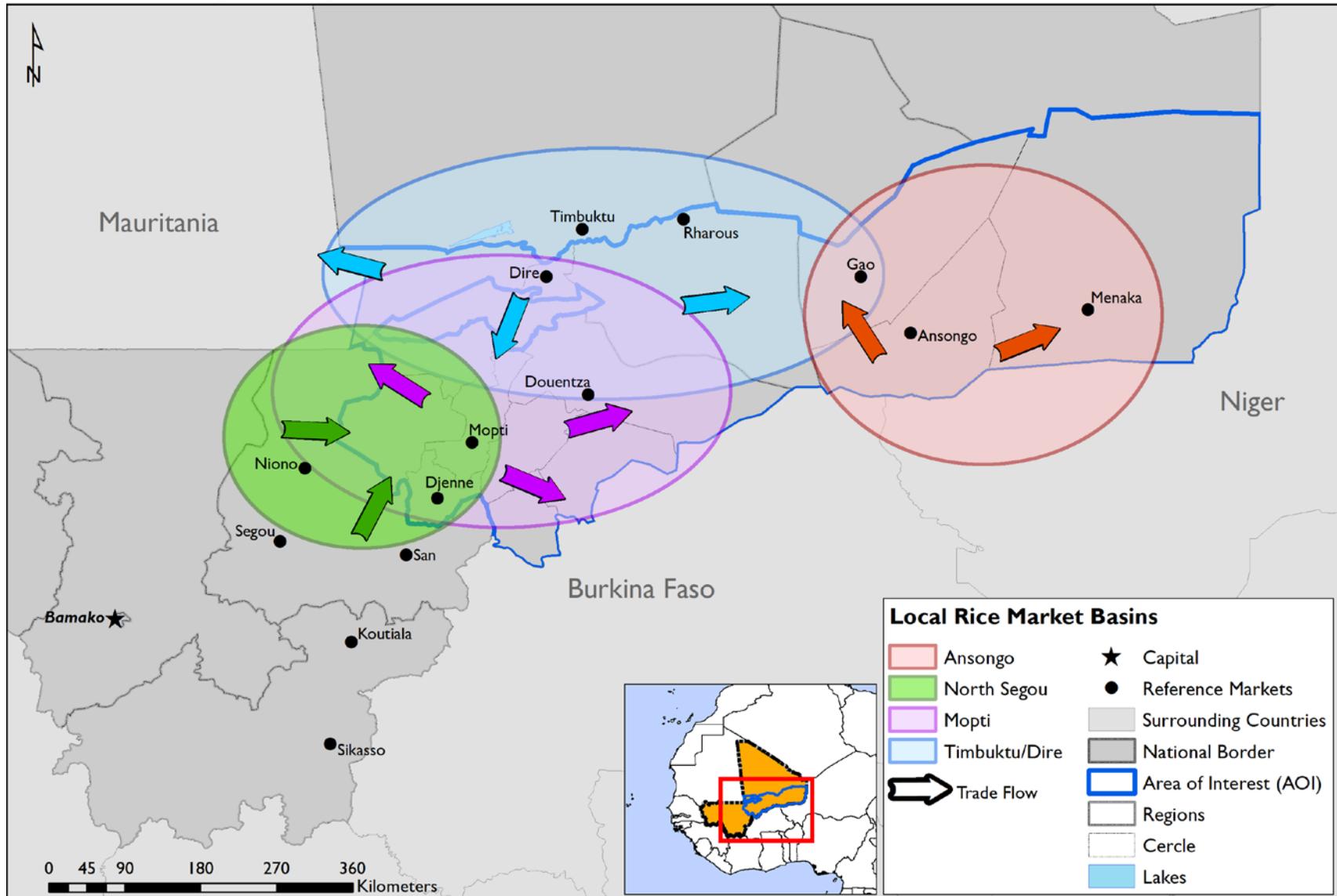
Livestock feed used in the AOI include both concentrates and fodder.<sup>13</sup> The most common type of livestock concentrate is cottonseed cake (*tourteau du coton*) imported primarily from the cotton producing areas of southern Mali (Sikasso, Segou, and Koulikoro). Livestock fodder in the AOI consists of cowpea, groundnut, or rice hay as well as *bourgou*. Concentrate feed prices were relatively stable during the period 2014 and 2019, ranging between 150 and 200 XOF/kg in markets in the AOI (OMA 2019). April 2019 *bourgou* and hay prices in the AOI ranged between 100 and 300 XOF/heap. *Bourgou* prices in Gao and Ménaka region where production is capacity is relatively limited were significantly more expensive; between 750 and 1000 XOF/heap. Livestock concentrate feed is typically sold by traders linked with southern Mali whereas livestock fodder is typically traded by producers. *Bourgou* and other fodder prices are determined by production levels (driven primarily by rainfall patterns and water levels in a given year) as well as demand dynamics. Demand can also be heavily influenced by the agroecological context, as poor rainfall can lead to limited pasture availability and increased demand for purchased feed. Together this means that years of lower livestock feed production may experience the highest market demand, resulting in important price variation one year to the next. Within the AOI, *bourgou* is mainly available in Mopti, Djenne, Tenenkou, Youwarou, Bankass, Goundam, Niafunke, Dire, Tombouctou, Gourma-Rharous, Gao, Ansongo, and around the ponds in Ménaka. In Bankass, limited quantities of *bourgou* are available along the Sourou floodplain. However, the markets of Bankass, Bandiagara, and Koro markets in southern Mopti region do not have substantial *bourgou* available for purchase in an average year, with straw, leaves, and crop residues (e.g., fane de niébe) playing a more prominent role.

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<sup>13</sup> The general English term of “livestock feed” translates directly to “aliment de bétail.” However, in Mali the term “ailment de bétail” is generally used specifically in relation to industrially-processed concentrate feed while fodder is referred to as “fourrage.”

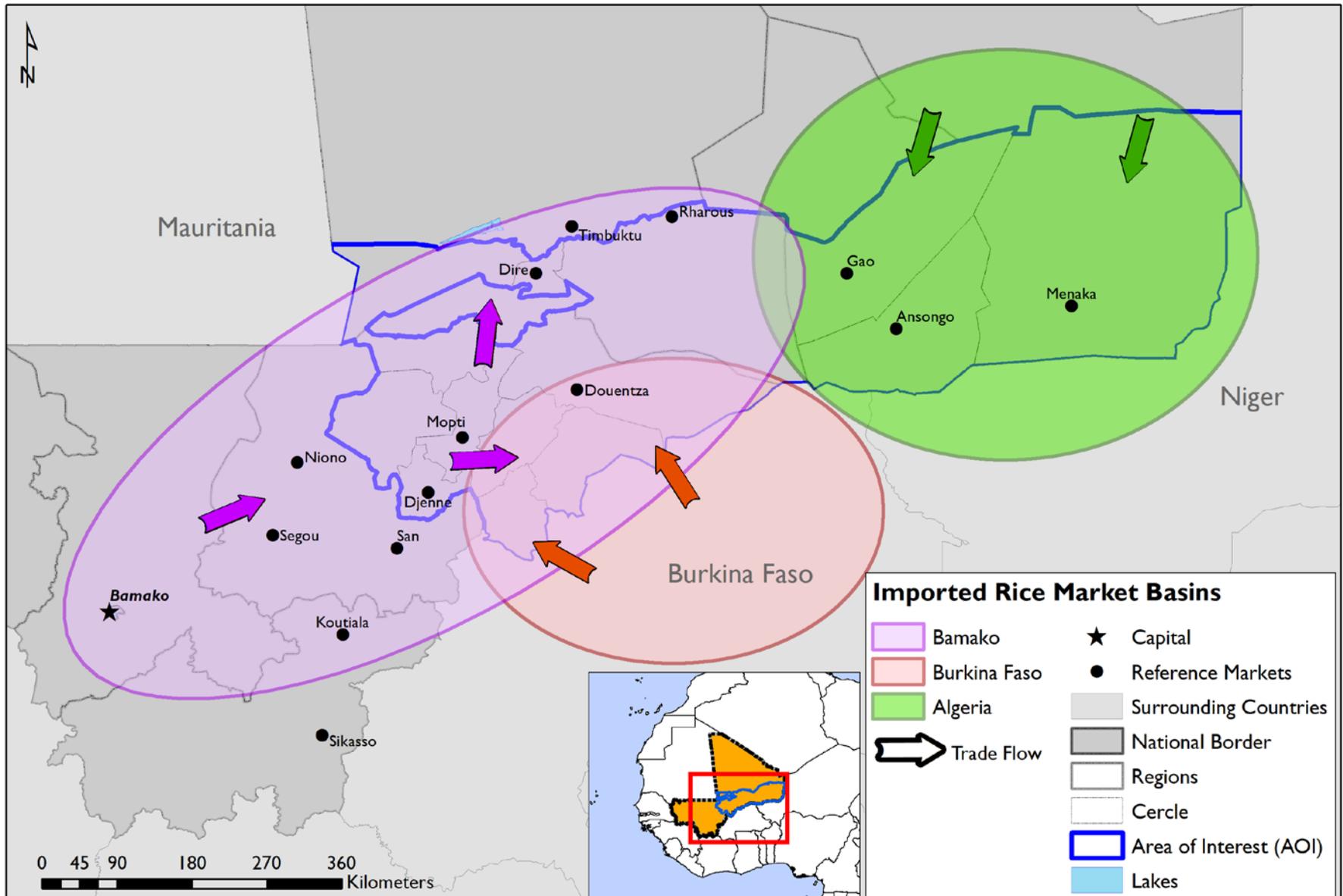
### Annex 9. Mali EMA AOI Marketing Basins

Figure 73. Local rice marketing basins serving the EMA AOI



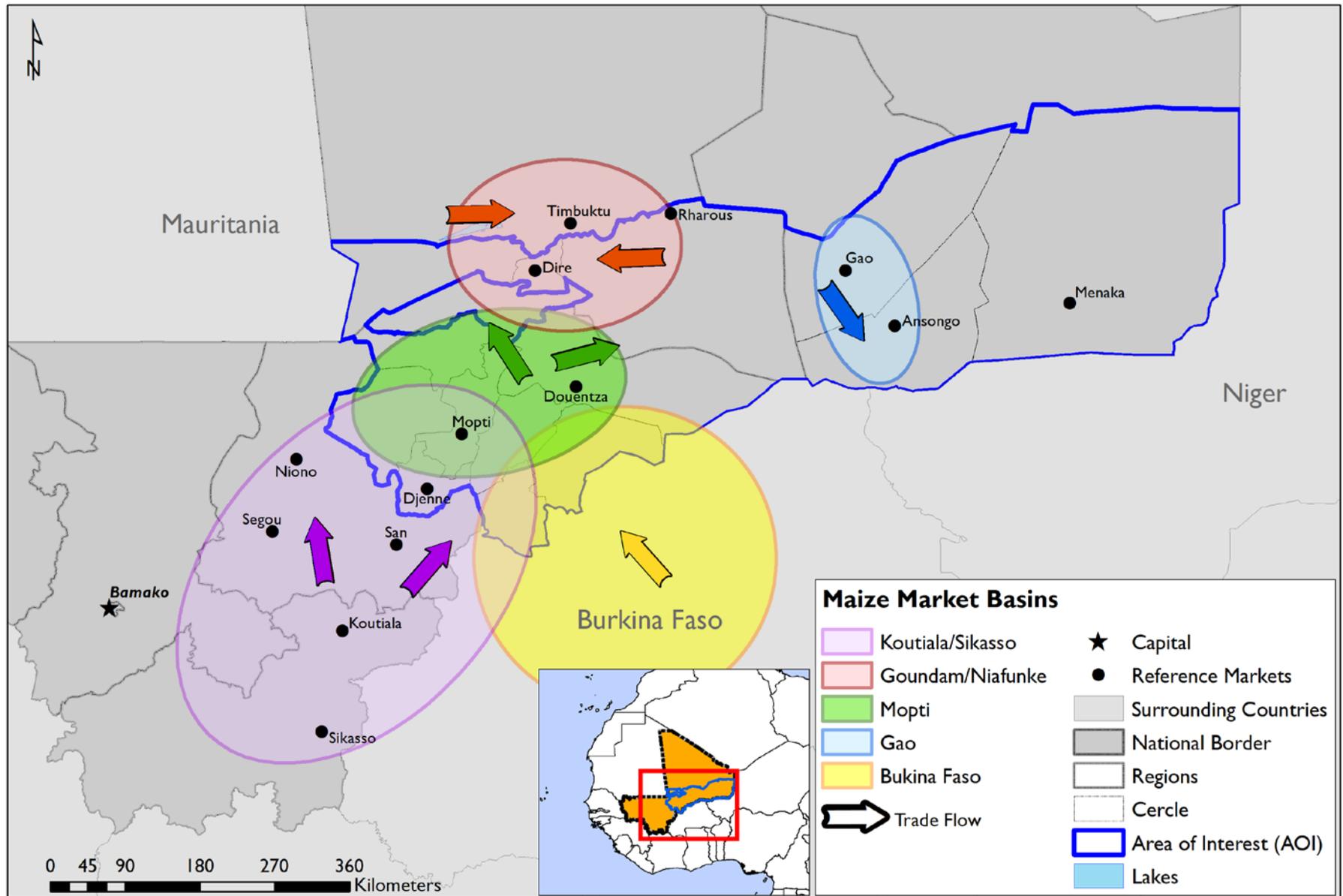
Source: FEWS NET 2019

Figure 74. Imported rice marketing basins serving the EMA AOI



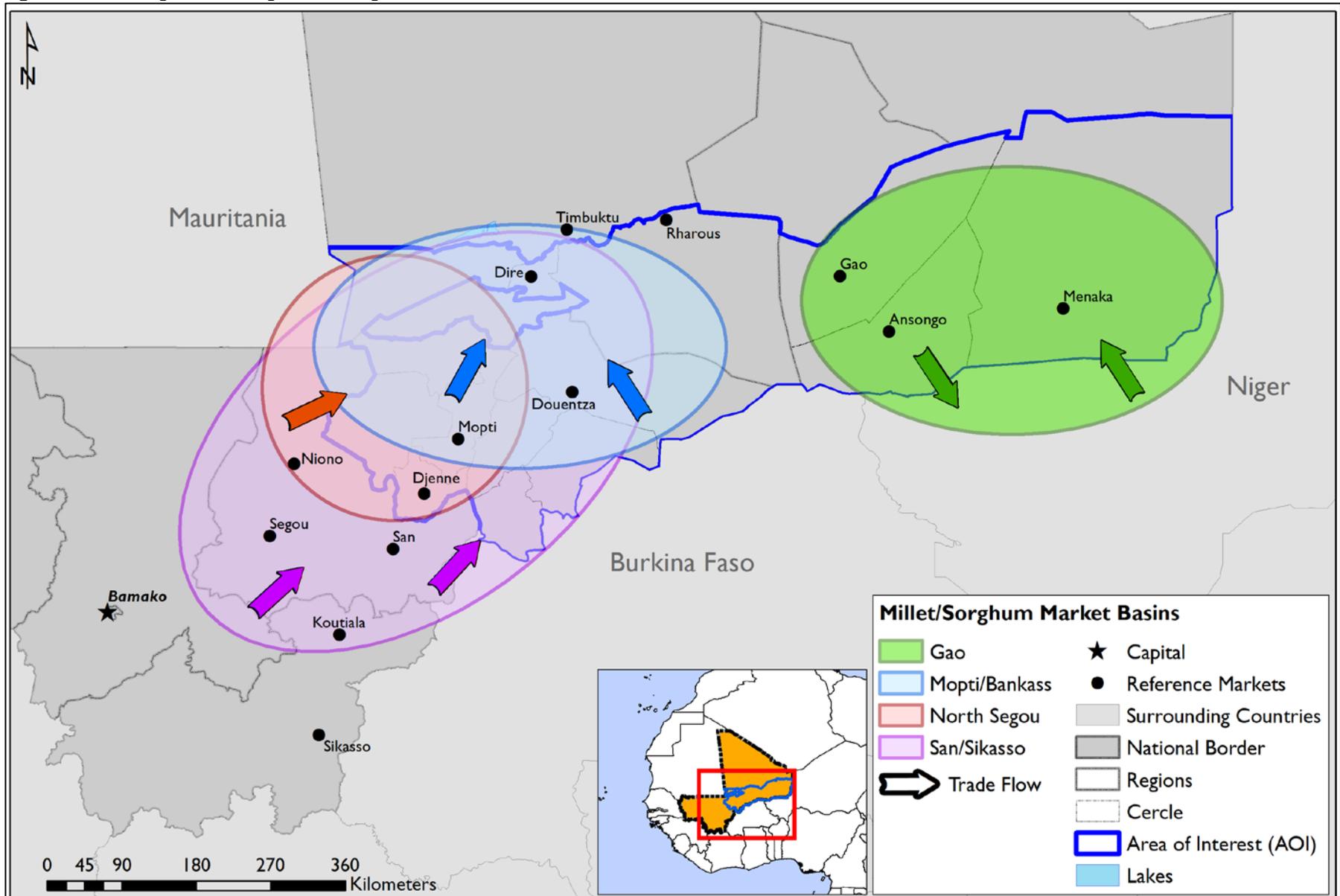
Source: FEWS NET 2019

Figure 75. Maize marketing basins serving the EMA AOI



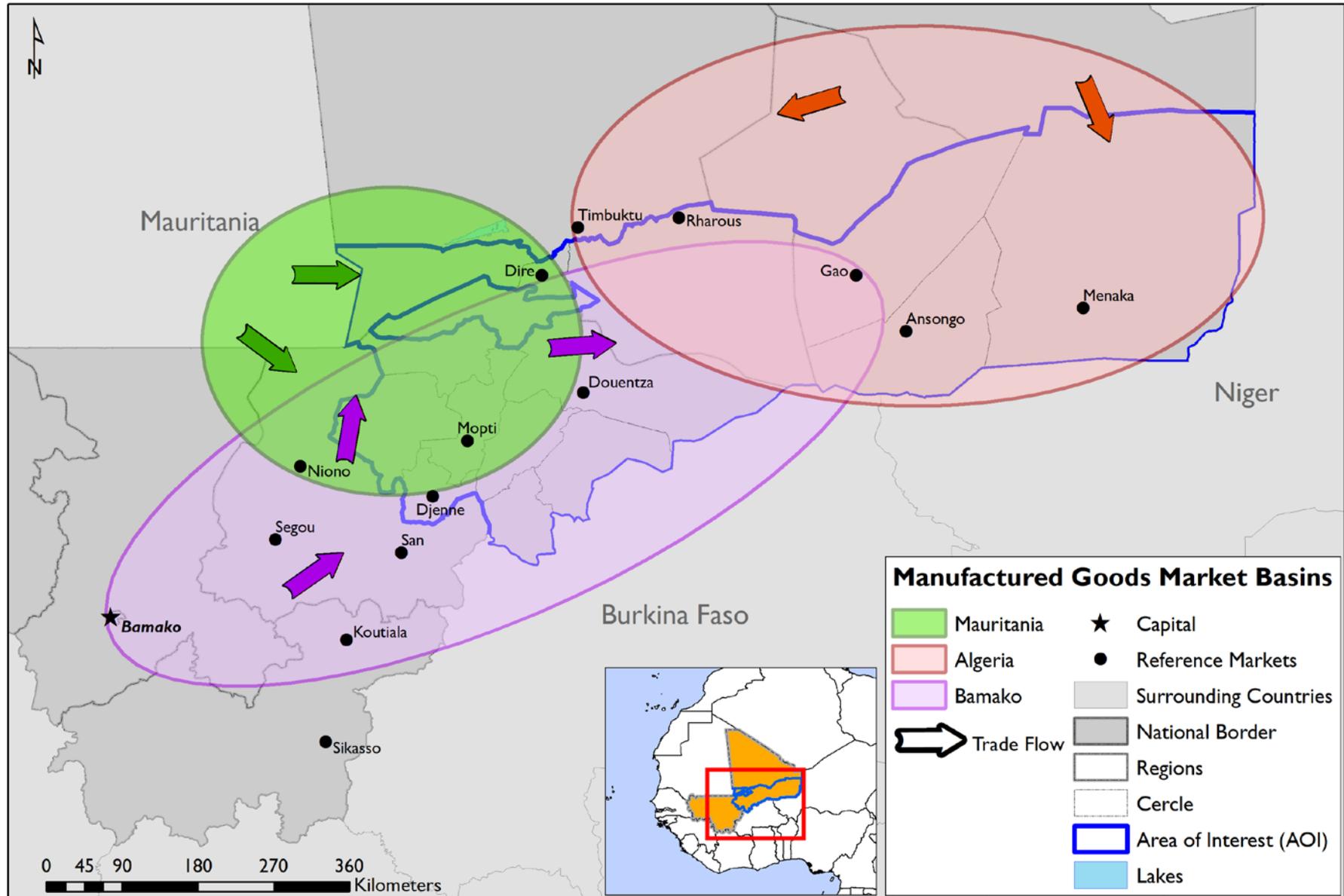
Source: FEWS NET 2019

Figure 76. Millet/sorghum marketing basins serving the EMA AOI



Source: FEWS NET 2019

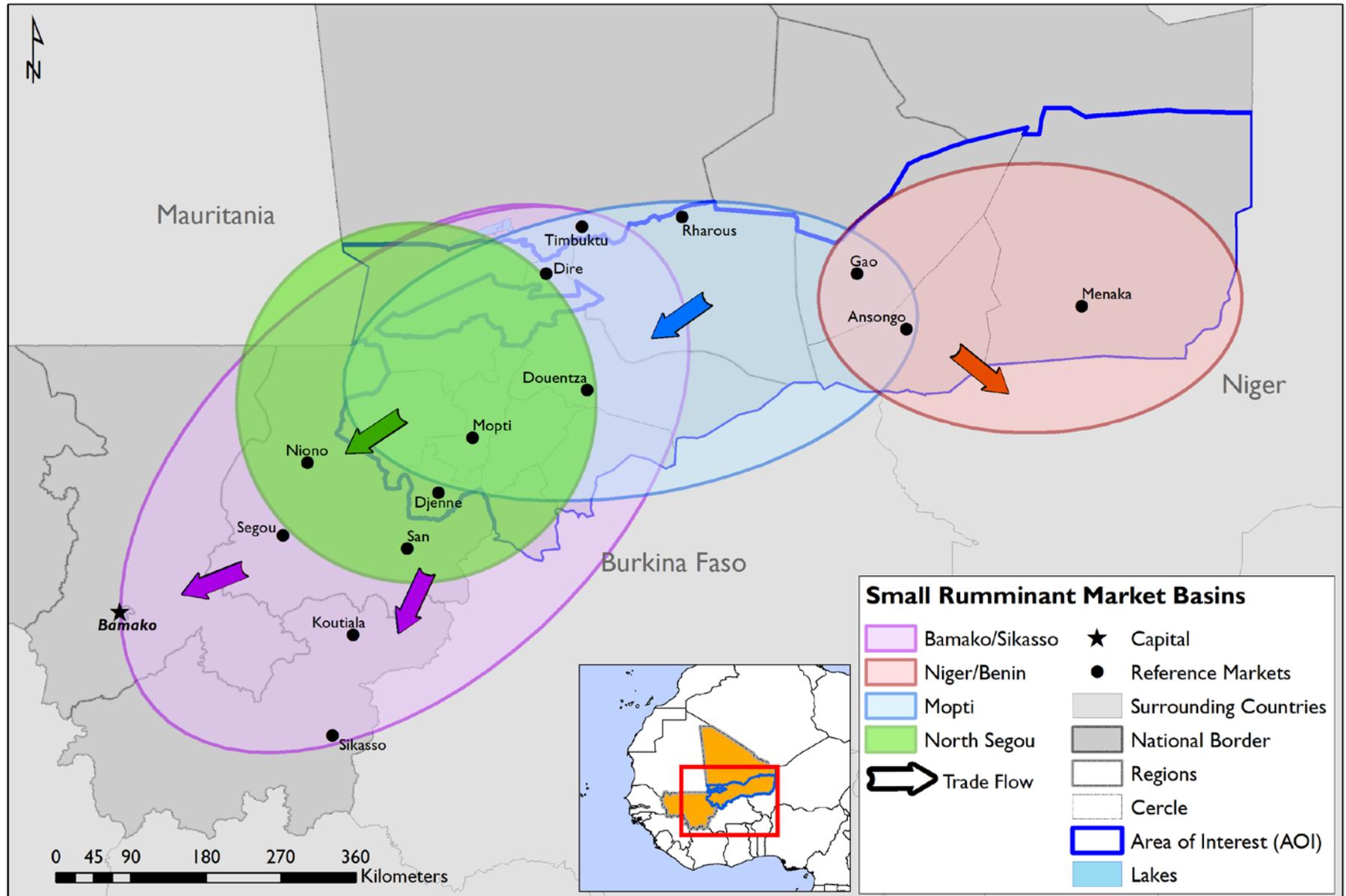
**Figure 77.** Manufactured goods marketing basins serving the EMA AOI



Note: This includes a range of processed goods including but not limited to wheat flour, edible oil, pasta, and biscuits.

Source: FEWS NET 2019

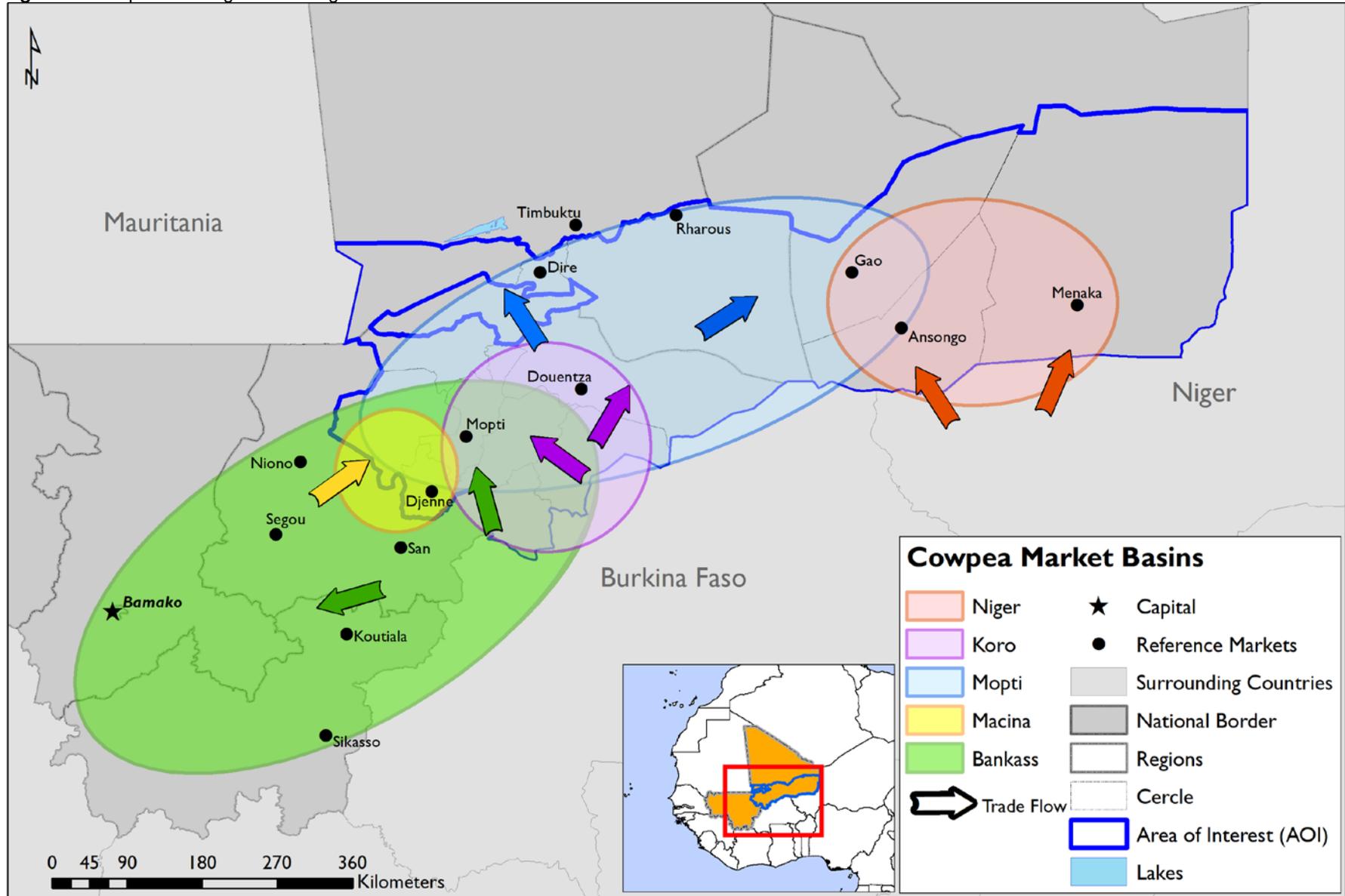
Figure 78. Small ruminant marketing basins serving the EMA AOI



Note: This includes sheep and goats.

Source: FEWS NET 2019

Figure 79. Cowpea marketing basins serving the EMA AOI



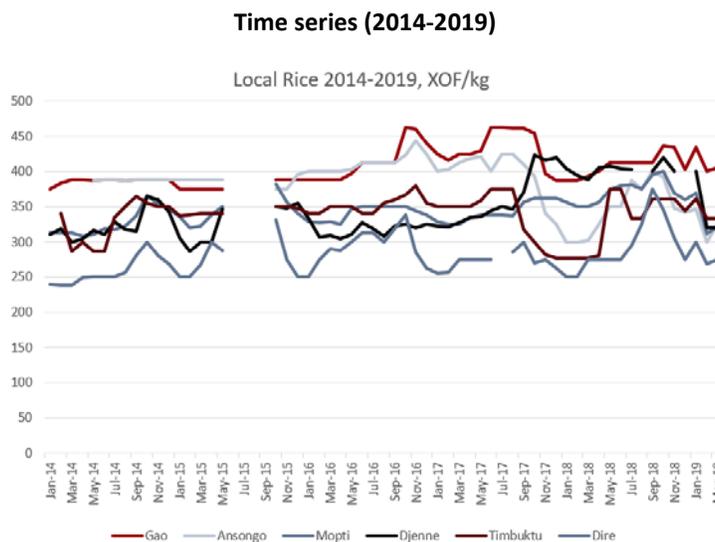
Source: FEWS NET 2019

### Annex 10. Price Trends, Mali EMA AOI Reference Markets

**Figure 80.** Local rice price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Ansongo	27	367	43	300	425
Segou	27	359	18	331	400
Timbuktu	27	335	36	277	375
Mopti	27	354	23	312	400
Youwarou	27	312	24	275	380
Douentza	25	384	23	340	410
Tenenkou	24	375	29	329	434
San	27	364	20	342	400
Koutiala	27	367	20	328	398
Tonka	27	302	28	260	357
Goundam	23	319	26	275	362
Gourma	22	379	21	345	400
Niafunke	23	354	30	303	417
Djenne	25	375	38	320	423
Dire	26	283	29	250	375

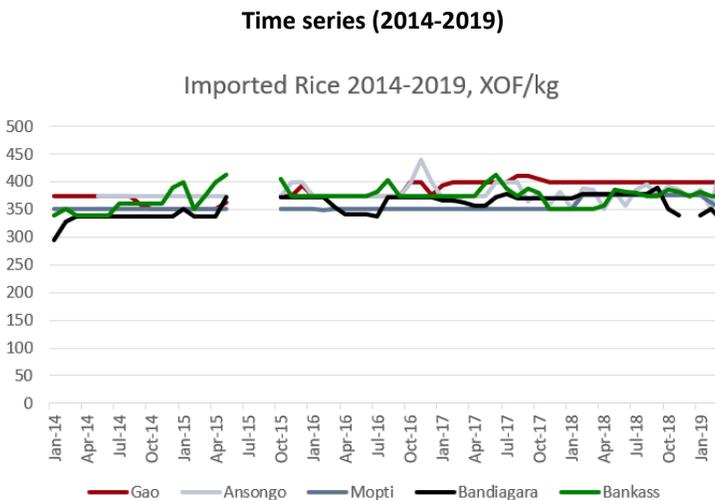


Source: FEWS NET estimates based on OMA 2019, SAP 2019 data

**Figure 81.** Imported rice price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Niamey	27	404	88	150	450
Gao	27	401	3	394	410
Ansongo	27	379	20	350	443
Ménaka	24	466	28	424	510
Mopti	27	362	12	350	375
Bandiagara	26	366	14	330	390
Bankass	27	375	15	350	413
Douentza	25	356	10	350	375
Koutiala	27	444	63	375	500
Gourma	23	384	18	350	400
Bamako	27	391	18	375	425
Dakar (SN)	26	298	8	283	325
Thailand	25	222	11	209	258
Gao*	27	420	24	387	463



Note: \* denotes local rice.

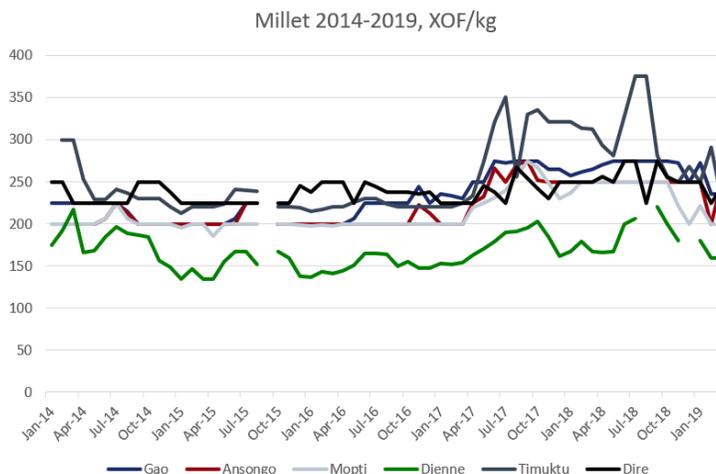
Source: FEWS NET estimates based on OMA 2019, SAP 2019, SIM Senegal 2019, and World Bank 2019 Data

**Figure 82.** Millet price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Gao	27	514	68	350	622
Ansongo	27	451	77	350	642
Ménaka	24	534	65	400	600
Mopti	27	408	44	250	500
Bankass	27	365	37	295	425
Youwarou	26	463	97	260	700
Douentza	25	407	36	375	450
Tenenkou	25	487	81	352	658
San	27	362	38	325	450
Koutiala	27	432	45	291	487
Segou	25	448	50	350	500
Timbuktu	27	687	168	300	975
Dire	26	510	78	343	750
Goundam	24	460	113	300	687
Niafunke	23	542	101	415	765
Bobo					
Dioulasso (BF)	26	394	42	313	512
Bamako	27	452	32	406	550

**Time series (2014-2019)**



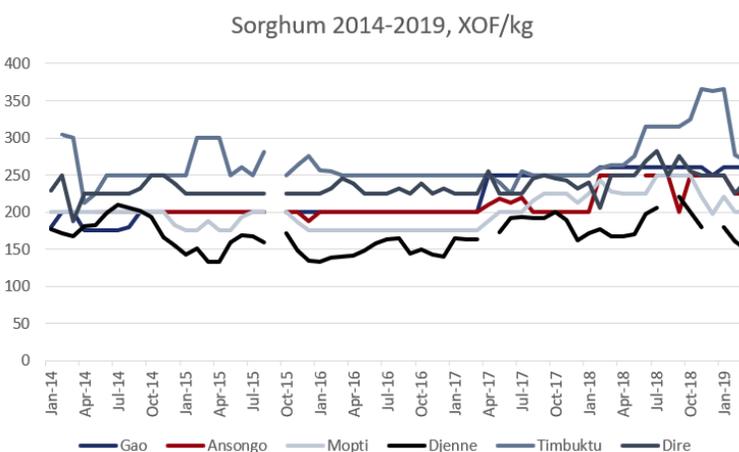
Source: FEWS NET estimates based on OMA 2019, SAP 2019, and SONAGESS 2019 data

**Figure 83.** Sorghum price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Djibo	27	197	21	165	235
Tintane	19	376	89	267	554
Bamako	27	223	23	185	250
Gao	27	249	18	200	261
Ansongo	26	223	23	200	250
Mopti	27	216	23	175	250
Djenne	24	180	17	150	220
Youwarou	27	229	26	196	275
Tenenkou	24	240	22	185	280
San	26	196	27	150	225
Koutiala	27	193	30	131	231
Segou	26	198	31	150	250
Timbuktu	27	278	41	225	366
Dire	27	243	17	205	282
Tonka	27	231	22	187	300
Goundam	24	201	42	150	289
Niafunke	23	245	36	200	310

**Time series (2014-2019)**



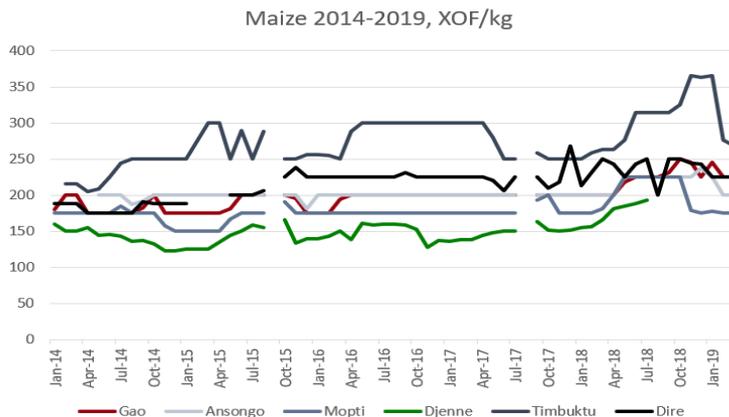
Source: FEWS NET estimates based on OMA 2019, SAP 2019 data

**Figure 84.** Maize price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Bamako	27	192	20	150	250
Bobo					
Dioulasso (BF)	27	155	15	137	180
Gao	27	222	51	200	462
Ansongo	27	217	43	200	425
Mopti	27	195	35	175	337
San	27	183	42	150	350
Koutiala	27	168	47	125	368
Segou	27	182	39	150	350
Timbuktu	27	293	40	250	375
Dire	27	232	19	200	285
Tonka	26	213	28	150	300

**Time series (2014-2019)**



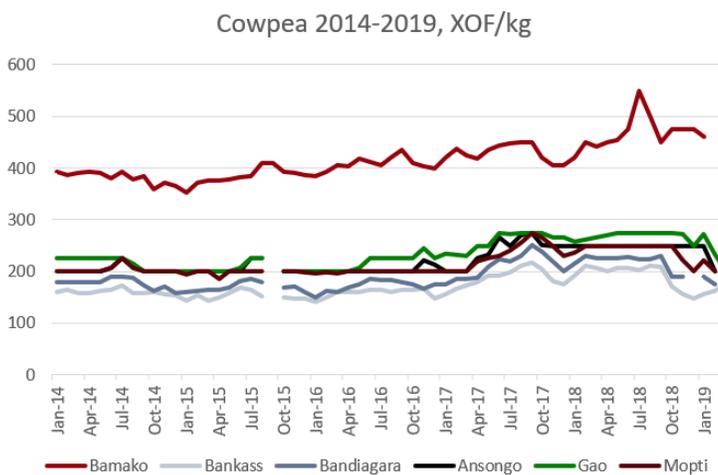
Source: FEWS NET estimates based on OMA 2019, SAP 2019, and SONAGESS 2019 data

**Figure 85.** Cowpea price trends, 2014–2019, XOF/kg

**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Gao	27	514	68	350	622
Ansongo	27	451	77	350	642
Ménaka	24	534	65	400	600
Mopti	27	408	44	250	500
Bankass	27	365	37	295	425
Youwarou	26	463	97	260	700
Douentza	25	407	36	375	450
Tenenkou	25	487	81	352	658
San	27	362	38	325	450
Koutiala	27	432	45	291	487
Segou	25	448	50	350	500
Timbuktu	27	687	168	300	975
Dire	26	510	78	343	750
Goundam	24	460	113	300	687
Niafunke	23	542	101	415	765
Bobo					
Dioulasso	26	394	42	313	512
Bamako	27	452	32	406	550

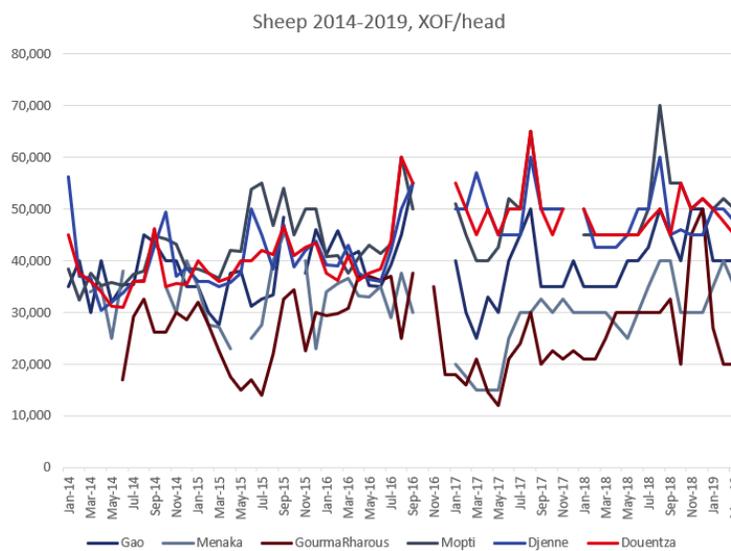
**Time series (2014-2019)**



Source: FEWS NET estimates based on OMA 2019, SAP 2019, and SONAGESS 2019 data

**Figure 86.** Sheep price trends, 2014–2019, XOF/kg**Summary statistics (2017-2019)**

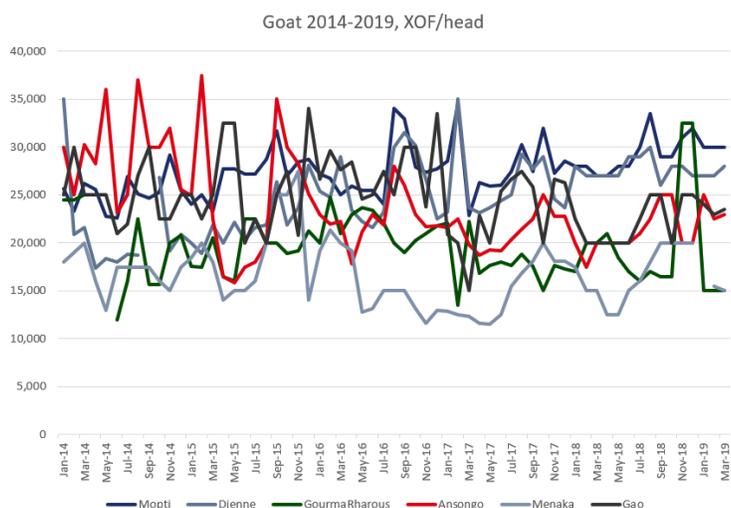
Market	Obs	Mean	Std. Dev.	Min	Max
Gao	27	39,093	6,454	25,000	50,000
Ansongo	27	33,759	4,554	25,000	40,000
Bourem	27	28,148	7,325	17,500	40,000
Ménaka	27	28,889	7,183	15,000	40,000
Timbuktu	27	46,630	7,010	37,500	60,000
Dire	27	47,963	6,543	30,000	55,000
Goundam	27	46,259	6,703	27,500	65,000
Gourma	27	24,963	8,408	12,000	50,000
Niafunke	27	41,000	12,812	20,000	60,000
Mopti	26	49,596	6,678	40,000	70,000
Bandiagara	24	49,792	5,126	41,000	65,000
Bankass	24	53,479	6,332	45,000	72,000
Djenne	26	48,577	4,743	42,500	60,000
Douentza	26	48,923	4,523	45,000	65,000
Koro	26	50,115	6,850	40,000	70,000
Tenenkou	26	42,769	5,078	35,000	55,000
Youwarou	26	45,481	4,417	40,000	57,500
Kati	24	52,188	10,687	38,000	75,000
Niono	24	62,604	7,128	40,000	72,500
Sikasso	22	41,040	6,384	22,000	50,875
Ayrou	26	54,721	8,156	43,000	72,813
Tounfafi	26	62,911	8,882	51,650	92,500
Dakar	25	65,497	9,087	41,750	80,000
Maine	26	53,294	9,058	39,281	69,875
Matameye	25	52,597	8,058	40,000	74,750

**Time series (2014-2019)**

Source: FEWS NET estimates based on OMA 2019, SAP 2019, SIMA 2019, SIM Senegal, and SONAGESS 2019 data

**Figure 87.** Goat price trends, 2014–2019, XOF/kg**Summary statistics (2017-2019)**

Market	Obs	Mean	Std. Dev.	Min	Max
Mopti	27	28,797	2,490	22,833	34,500
Bandiagara	27	25,709	2,226	21,938	30,000
Bankass	27	27,596	2,828	22,500	34,000
Djenne	27	26,942	2,588	23,100	35,000
Douentza	27	26,953	2,965	21,625	35,000
Koro	27	25,431	3,283	20,800	34,000
Tenenkou	27	26,435	2,574	22,000	32,500
Youwarou	27	24,754	2,176	20,600	28,000
Timbuktu	27	22,832	2,170	18,500	27,500
Dire	27	28,587	4,339	21,500	37,500
Goundam	27	24,533	4,563	17,500	35,000
Gourma	27	18,658	4,521	13,500	32,500
Niafunke	27	24,738	6,631	17,500	40,000
Ansongo	27	21,383	2,082	17,500	25,000
Bourem	26	17,170	2,874	12,300	22,500
Ménaka	26	15,843	2,938	11,500	20,000
Gao	27	22,687	3,014	15,000	27,500
Kati	24	33,554	4,900	25,000	45,000
Niono	24	43,896	5,548	27,500	50,000
Sikasso	23	28,658	6,834	18,000	37,500
Ayrou	26	31,040	2,846	27,000	37,250
Tounfafi	26	27,609	4,238	22,450	42,500
Dakar	25	25,267	3,572	17,425	35,000
Maine	26	24,255	5,120	13,733	33,375
Matameye	25	18,671	3,783	13,750	26,817

**Time series (2014-2019)**

Source: FEWS NET estimates based on OMA 2019, SAP 2019, SIMA 2019, SIM Senegal, and SONAGESS 2019 data

## Annex 11. Price Correlation, Mali EMA AOI Reference Markets

**Table 45.** Local rice Price Correlation in AOI and relevant national reference markets 2017–2019

	Bamako	Gao	Ansongo	Segou	Timbuktu	Mopti	Youwarou	Douentza	Tenenkou	San	Tonka	Goundam	Gourm Rhahous	Niafunke	Djenne
<b>Bamako</b>	1														
<b>Gao</b>	0.2991	1													
	0.1296														
<b>Ansongo</b>	0.3715	0.7718*	1												
	0.0564	0													
<b>Segou</b>	0.8624*	-0.0099	0.1181	1											
	0	0.9609	0.5573												
<b>Timbuktu</b>	0.4338*	0.5950*	0.6219*	0.1247	1										
	0.0238	0.0011	0.0005	0.5356											
<b>Mopti</b>	0.6398*	-0.0738	-0.0635	0.7395*	0.0069	1									
	0.0003	0.7143	0.753	0	0.9727										
<b>Youwarou</b>	0.7354*	0.1509	0.1319	0.8448*	0.0855	0.8220*	1								
	0	0.4526	0.5121	0	0.6716	0									
<b>Douentza</b>	-0.1413	-0.8364*	-0.7421*	0.1696	-0.3534	0.2063	0.0055	1							
	0.5006	0	0	0.4177	0.0831	0.3225	0.9791								
<b>Tenenkou</b>	0.6042*	-0.1302	0.0024	0.7045*	0.0244	0.9066*	0.8018*	0.3038	1						
	0.0018	0.5443	0.9911	0.0001	0.91	0	0	0.1489							
<b>San</b>	0.7553*	-0.1139	-0.0145	0.7986*	0.3778	0.7345*	0.6720*	0.3869	0.7091*	1					
	0	0.5715	0.9426	0	0.052	0	0.0001	0.056	0.0001						
<b>Tonka</b>	0.7175*	0.1012	0.0424	0.7124*	0.3903*	0.6501*	0.7100*	0.207	0.5192*	0.8002*	1				
	0	0.6155	0.8335	0	0.0442	0.0002	0	0.3208	0.0093	0					
<b>Goundam</b>	0.3912	0.4076	0.5797*	0.4342*	0.2253	0.3746	0.5963*	-0.2757	0.4117	0.2157	0.3554	1			
	0.0649	0.0536	0.0037	0.0384	0.3014	0.0782	0.0027	0.203	0.051	0.3228	0.0961				
<b>Gourma</b>	0.2409	0.6417*	0.6636*	0.0981	0.3855	0.3376	0.3648	-0.5353*	0.4037	0.0518	0.0948	0.6514*	1		
	0.2801	0.0013	0.0008	0.6642	0.0765	0.1244	0.095	0.0102	0.0695	0.8191	0.6746	0.0014			
<b>Niafunke</b>	0.8420*	0.0986	0.2315	0.8006*	0.2039	0.7473*	0.7362*	-0.1129	0.6561*	0.6166*	0.6387*	0.4136	0.2029	1	
	0	0.6545	0.2879	0	0.3506	0	0.0001	0.6079	0.0009	0.0017	0.001	0.0557	0.3777		
<b>Djenne</b>	0.3292	-0.2372	-0.372	0.5147*	-0.3897	0.8659*	0.6366*	0.2924	0.7835*	0.4526*	0.3325	0.1016	0.2016	0.5276*	1
	0.1081	0.2535	0.0671	0.0085	0.0542	0	0.0006	0.1757	0	0.0231	0.1044	0.6613	0.3941	0.014	

Note: \* denotes statistically significant correlation at the 5% level.

Source: FEWS NET estimates based on OMA2019, SAP 2019, SIMA 2019, SIM Senegal 2019, and World Bank 2019 Data

**Table 46.** Imported rice Price Correlation in AOI and relevant reference markets 2014–2019

		Regional/international			Mali					
		Senegal	Thailand	Niger	Gao	Ansongo	Mopti	Bandiagara	Bankass	Koutiala
Regional/ International	Dakar_SN	1								
	Thailand	0.3620*	1							
		0.0041								
	Niamey_NE	-0.1843	-0.5779	1						
	0.1481	0								
Mali	Gao	0.7546*	-0.017	0.0514	1					
		0	0.9001	0.699						
	Ansongo	0.3764*	0.4114*	-0.0625	0.1693	1				
		0.0046	0.0022	0.6501	0.2166					
	Mopti	0.2695*	-0.033	0.1488	0.4520*	-0.0628	1			
		0.039	0.8074	0.2606	0.0003	0.6487				
	Bandiagara	0.3687*	-0.1357	0.2194	0.5393*	0.0339	0.2999*	1		
		0.0044	0.3188	0.0979	0	0.8075	0.0222			
	Bankass	0.1041	0.3060*	-0.0899	0.0429	0.1526	0.0117	0.3390*	1	
		0.4326	0.0206	0.4984	0.747	0.266	0.9296	0.0092		
Koutiala	-0.1053	-0.0483	0.0484	-0.135	-0.1218	-0.286	0.182	0.2389	1	
	0.4275	0.7213	0.7159	0.3082	0.3757	0.0281	0.1716	0.0684		

Note: \* denotes statistically significant correlation at the 5% level.

Source: FEWS NET estimates based on OMA2019, SAP 2019, SIMA 2019, SIM Senegal 2019, and World Bank 2019 Data

**Table 47. Millet Price Correlation in AOI and relevant reference markets 2014–2019**

Mali															Regional	
	Bamako	Gao	Ansongo	Mopti	Bandiagara	Bankass	Djenne	San	Koutiala	Segou	Timbuktu	Dire	Tonka	Burkina Faso	Mauritania	
Mali	Bamako	1														
	Gao	0.6765*	1													
	Ansongo	0.7928*	0.9081*	1												
	Mopti	0.7913*	0.8596*	0.8670*	1											
	Bandiagara	0.8047*	0.8821*	0.8644*	0.9327*	1										
	Bankass	0.7442*	0.7985*	0.7453*	0.9039*	0.9451*	1									
	Djenne	0.5668*	0.6061*	0.6486*	0.6297*	0.6572*	0.5945*	1								
	San	0.8404*	0.6792*	0.7378*	0.8470*	0.8572*	0.8283*	0.7103*	1							
	Koutiala	0.7696*	0.7924*	0.8227*	0.8756*	0.8533*	0.8008*	0.5383*	0.7173*	1						
	Segou	0.7895*	0.7702*	0.7387*	0.8761*	0.8601*	0.8019*	0.7400*	0.8604*	0.7882*	1					
	Timbuktu	0.6998*	0.7689*	0.7832*	0.7915*	0.8229*	0.7819*	0.6490*	0.7896*	0.6537*	0.7336*	1				
	Dire	0.3755*	0.4577*	0.5098*	0.5067*	0.4446*	0.4642*	0.4098*	0.4371*	0.4339*	0.4146*	0.3568*	1			
	Tonka	0.6595*	0.6699*	0.7050*	0.6615*	0.6528*	0.6115*	0.4628*	0.6220*	0.4970*	0.5948*	0.6719*	0.4275*	1		
	Djibo_BF	0.4802*	0.5808*	0.5632*	0.6361*	0.7669*	0.8038*	0.5098*	0.6364*	0.5783*	0.5778*	0.5804*	0.3059*	0.3874*	1	
	Adel Bagrou_MR	0.0494	0.3386*	0.2448	0.2637	0.3003*	0.3239*	0.1941	0.1977	0.0947	0.2229	0.4415*	-0.0864	0.4747*	0.2917*	1
		0.7229	0.0131	0.09	0.0564	0.0289	0.018	0.168	0.156	0.5001	0.1087	0.0011	0.5384	0.0004	0.0324	
	Regiona															

Note: \* denotes statistically significant correlation at the 5% level.

Source: FEWS NET estimates based on OMA2019, SAP 2019, SIMA 2019, SIM Senegal 2019, and World Bank 2019 Data

**Table 48. Cowpea Price Correlation in AOI and relevant reference markets 2017–2019**

	Gao	Ansongo	Ménaka	Mopti	Bankass	Youwarou	Douentza	Tenenkou	San	Koutiala	Segou	Timbuktu	Dire	Goundam	Niafunke	Bamako	BF
Gao	1																
	0																
Ansongo	0.7811*	1															
	0																
Ménaka	0.5500*	0.3178	1														
	0.0054	0.1301															
Mopti	0.6401*	0.5941*	0.1555	1													
	0.0003	0.0011	0.4682														
Bankass	0.4776*	0.6402*	-0.1746	0.7480*	1												
	0.0118	0.0003	0.4145	0													
Youwarou	0.0908	0.1905	-0.2935	0.3496	0.1917	1											
	0.6593	0.3514	0.174	0.08	0.3482												
Douentza	0.4083*	0.5553*	0.4311*	0.7278*	0.5031*	-0.0471	1										
	0.0428	0.004	0.0354	0	0.0104	0.8269											
Tenenkou	0.3274	0.4515*	-0.2938	0.5514*	0.6637*	0.0621	0.1903	1									
	0.1101	0.0235	0.1635	0.0043	0.0003	0.7731	0.3623										
San	0.5665*	0.7596*	0.4726*	0.6716*	0.5831*	0.112	0.7705*	0.1868	1								
	0.0021	0	0.0197	0.0001	0.0014	0.5858	0	0.3713									
Koutiala	0.7906*	0.6798*	0.0185	0.8090*	0.7210*	0.3229	0.357	0.5378*	0.4834*	1							
	0	0.0001	0.9315	0	0	0.1076	0.0798	0.0056	0.0106								
Segou	0.5549*	0.5417*	-0.1698	0.4732*	0.6587*	-0.1134	0.1545	0.6670*	0.2776	0.7374*	1						
	0.004	0.0052	0.4387	0.0169	0.0003	0.5977	0.471	0.0004	0.179	0							
Timbuktu	0.6651*	0.5449*	0.7577*	0.6091*	0.1677	0.1185	0.4862*	-0.1458	0.7009*	0.4239*	0.0648	1					
	0.0002	0.0033	0	0.0007	0.403	0.5642	0.0137	0.4869	0	0.0276	0.7584						
Dire	0.246	0.2346	-0.027	0.4016*	0.4584*	0.058	0.1863	0.2572	0.3968*	0.3778	0.4213*	0.2252	1				
	0.2257	0.2486	0.9004	0.042	0.0185	0.7831	0.3725	0.2145	0.0447	0.0571	0.036	0.2687					
Goundam	0.4163*	0.5355*	0.1852	0.6766*	0.5984*	-0.1996	0.7183*	0.2439	0.7725*	0.4323*	0.1809	0.4004	0.4558*	1			
	0.043	0.007	0.3977	0.0003	0.002	0.3612	0.0001	0.2507	0	0.0349	0.4088	0.0525	0.0252				
Niafunke	0.5185*	0.4874*	0.8249*	0.5256*	0.0617	-0.1606	0.6221*	-0.0959	0.7166*	0.2096	-0.0348	0.8453*	0.1995	0.4263*	1		
	0.0113	0.0183	0	0.01	0.7798	0.4752	0.0015	0.6633	0.0001	0.337	0.8778	0	0.3615	0.0425			
Bamako	0.5491*	0.5487*	0.6625*	0.3583	0.343	-0.1649	0.6122*	-0.0367	0.5342*	0.3473	0.1059	0.4488*	-0.0245	0.4924*	0.6790*	1	
	0.003	0.003	0.0004	0.0665	0.0799	0.4207	0.0011	0.8618	0.0041	0.0759	0.6143	0.0189	0.9054	0.0145	0.0004		
Burkina Faso	0.6061*	0.5805*	0.2168	0.7460*	0.7306*	0.0216	0.5044*	0.3339	0.7344*	0.6841*	0.4144*	0.5246*	0.6373*	0.7432*	0.5514*	0.4478*	1
	0.001	0.0019	0.3205	0	0	0.9182	0.0119	0.1108	0	0.0001	0.0441	0.0059	0.0006	0	0.0078	0.0218	

Note: \* denotes statistically significant correlation at the 5% level.

Source: FEWS NET estimates based on OMA2019, SAP 2019, SIMA 2019, SIM Senegal 2019, and World Bank 2019 Data

Table 49. Goat Price Correlation in AOI and relevant reference markets 2014–2019

Mali		Regional																
	Mopti	Bankass	Djenne	Douentza	Tenenkou	Youwarou	Timbuktu	Goundam	Gourma	Niafunke	Ansongo	Ménaka	Gao	Kati	Niono	Ayorou	Matameye	Dakar
Mali	Mopti	1																
		0																
	Bankass	0.6919*	1															
		0																
	Djenne	0.2357	0.4185*	1														
		0.0629	0.0006															
	Douentza	0.5684*	0.6951*	0.4509*	1													
		0	0	0.0002														
	Tenenkou	0.4222*	0.2544*	0.3094*	0.3450*	1												
		0.0006	0.0442	0.0136	0.0056													
	Youwarou	0.5398*	0.6144*	0.4815*	0.6448*	0.5417*	1											
		0	0	0.0001	0	0												
	Timbuktu	0.0381	-0.152	0.0053	0.0442	0.2715*	0.0948	1										
		0.7668	0.2343	0.9671	0.7311	0.0314	0.4599											
	Goundam	0.2682*	0.3111*	0.1574	0.4301*	0.4176*	0.4497*	0.0992	1									
		0.0351	0.0138	0.2217	0.0005	0.0007	0.0002	0.4432										
	Gourma	-0.0827	-0.1844	-0.1456	-0.044	0.0436	0.0561	0.1184	0.4053*	1								
		0.5264	0.1549	0.2628	0.7362	0.7387	0.6679	0.3634	0.0013									
	Niafunke	0.2891*	0.3750*	0.079	0.4526*	0.1284	0.3461*	0.0889	0.2579*	0.0471	1							
		0.0215	0.0025	0.5384	0.0002	0.316	0.0055	0.4882	0.043	0.7187								
Ansongo	-0.1002	-0.1842	0.0348	-0.1836	-0.1299	-0.1069	0.1968	-0.2512	-0.0475	-0.1482	1							
	0.4347	0.1485	0.7865	0.1497	0.3101	0.4043	0.1221	0.0489	0.7162	0.2465								
Ménaka	0.0956	-0.0943	0	0.0595	-0.0965	0.1257	0.0709	-0.1904	0.1216	-0.0127	0.3778*	1						
	0.4599	0.4658	0.9999	0.646	0.4556	0.3303	0.5839	0.1416	0.3545	0.9218	0.0025							
Gao	-0.0325	-0.1725	0.1206	-0.1608	0.1685	-0.0043	0.0214	-0.0334	0.1624	-0.081	0.0764	0.0835	1					
	0.8004	0.1764	0.3466	0.2079	0.1867	0.9734	0.8676	0.7967	0.2113	0.5279	0.5516	0.5188						
Kati	-0.1601	0.1023	0.1529	0.0032	0.1483	-0.0125	-0.2303	0.1242	0.0582	-0.0989	-0.0427	0.1038	0.1122	1				
	0.2217	0.4368	0.2436	0.9809	0.2583	0.9246	0.0767	0.3487	0.6643	0.4523	0.7458	0.43	0.3935					
Niono	0.4090*	0.6115*	0.2739*	0.3703*	0.2012	0.4667*	-0.0525	0.2650*	-0.1292	0.2474	-0.1831	-0.1633	-0.2709	-0.1296	1			
	0.0012	0	0.0342	0.0036	0.1232	0.0002	0.6906	0.0425	0.3336	0.0567	0.1613	0.2125	0.0363	0.3238				
Regional	Ayorou	-0.0398	-0.0719	0.7815*	0.0829	0.1075	0.1351	-0.0265	-0.0551	-0.048	-0.1167	0.3010*	0.1606	0.2255	0.1729	-0.0777	1	
		0.7586	0.5786	0	0.522	0.4055	0.295	0.8381	0.6731	0.7158	0.3663	0.0174	0.2163	0.078	0.1864	0.5549		
	Matameye	-0.0445	-0.2363	-0.0806	0.3324*	-0.2487	-0.2256	-0.0966	-0.3867	-0.0132	-0.2064	0.4433*	0.5412*	0.1475	0.1136	-0.3257*	0.2316	1
		0.7336	0.0668	0.5368	0.0089	0.0533	0.0804	0.4591	0.0023	0.9212	0.1105	0.0003	0	0.2565	0.3873	0.0111	0.0725	
	Dakar	-0.2433	-0.5069	-0.0161	-0.4479	-0.2726	-0.404	-0.0061	-0.3126	0.0626	-0.356	0.4750*	0.1847	0.2206	0.0915	-0.4826	0.3812*	0.6053*
	0.0588	0	0.9019	0.0003	0.0335	0.0012	0.9626	0.015	0.6374	0.0049	0.0001	0.1577	0.0876	0.4908	0.0001	0.0024	0	

Note: \* denotes statistically significant correlation at the 5% level.

Source: FEWS NET estimates based on OMA2019, SAP 2019, SIMA 2019, SIM Senegal 2019, and World Bank 2019 Data

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