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The U.S. Government's Global Hunger & Food Security Initiative

Mali: In-depth Assessment of Extension and Advisory Services

Developing Local Extension Capacity (DLEC) Project

June 2018



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Suggested citation: Developing Local Extension Capacity Project. 2018. Mali: In-depth Assessment of Extension and Advisory Services. USAID.

Acknowledgements

This analysis was compiled for the DLEC project under USAID Cooperative Agreement No. AID-OAA-L-16-0002.

Contributors to this report include J. S. Tata, M. G. Coulibaly, S. Simons, K. Davis and S. Franzel. We thank Dr. Assoumane Maiga and Dr. Assa Kante for additional comments on the document.

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of Digital Green and do not necessarily reflect the views of USAID or the United States Government.

ACRONYMS

| | |
|-------------|--|
| ADB | African Development Bank |
| AIS | Agricultural Innovation System |
| AOPP | Association of Farmers' Professional Organizations (L'Association des Organisations Professionnelles Paysannes) |
| APCAM | Permanent Assembly of Chambers of Agriculture of Mali (Assemblée Permanente des Chambres d'Agriculture du Mali) |
| ASAP | Adaptation for Smallholder Agriculture Programme (Programme d'Adaptation de l'Agriculture Paysanne) |
| C4CP | C-4 Cotton Program |
| CAA | Center of Agricultural Apprenticeship |
| CAADP | Comprehensive Africa Agricultural Development Program |
| CMDT | The Malian Company for Textile Development (La Compagnie Malienne pour Développement des Textiles) |
| CNOP | National Coordination of Farmers' Organizations (Coordination Nationale des Organisations Paysannes) |
| CNRA | National Committee for Agricultural Research (Comité National de la Recherche Agricole) |
| CSCR | Strategic Framework for Growth, Employment and Poverty Reduction (Cadre Stratégique pour la Croissance et la Réduction de la Pauvreté) |
| DLEC | Developing Local Extension Capacity |
| DNA | National Directorate of Agriculture (Direction Nationale de l'Agriculture) |
| DNPIA | National Directorate of Production and Animal Industries (La Direction Nationale des Productions et des Industries Animales) |
| EAS | Extension and Advisory Services |
| FAO | Food and Agriculture Organization of the United Nations |
| FOSCAR-Mali | Forum for Agricultural and Rural Advisory Services of Mali (Forum des Services de Conseil Agricole et Rural du Mali) |
| FFS | Farmer Field School |
| FTF | Feed the Future |
| GFRAS | Global Forum for Rural Advisory Services |
| GIZ | German Society for International Cooperation |
| GRET | Research and Technology Exchange Group (Groupe de Recherche et d'Echange Technologique) |

| | |
|----------|---|
| GWI | Global Water Initiative |
| IAR4D | Integrated Agricultural Research for Development |
| ICRAF | World Agroforestry Center |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| ICT | Information and Communication Technology |
| IER | Institute for Rural Economy (Institut d'Economie Rurale) |
| IFAD | International Fund for Agricultural Development |
| IFPRI | International Food Policy Research Institute |
| ILRI | International Livestock Research Institute |
| IMF | International Monetary Fund |
| INSTAT | National Institute of Statistics (Institut National de la Statistique) |
| IPR/IFRA | Rural Polytechnic Institute of Training and Applied Research (Institut Polytechnique Rural de Formation et de Recherche Appliquee) |
| L4G | Livestock for Growth |
| LOA | Agricultural Orientation Law (Loi d'Orientation Agricole) |
| LMIS | Livestock Market Information System (Système d'Information sur les Marchés à Bétail) |
| NGO | Non-Governmental Organization |
| OMA | Agricultural Market Observatory (Observatoire du Marché Agricole) |
| ORIAM | Network of Agricultural Input Operators in Mali (Réseau des Opérateurs d'Intrants Agricoles) |
| ORTM | Office of Radio and Television of Mali (Office de Radiodiffusion Télévision du Mali) |
| PAPAM | Agricultural Productivity Improvement Project for Mali (Projet d'Accroissement de la Productivité Agricole au Mali) |
| PASAOP | Agricultural Services and Producer Organizations |
| PDA | Agricultural Development Policy of Mali (Politique de Développement Agricole du Mali) |
| PNIP-SA | National Programme for Priority Investment in the Agricultural Sector (Plan National d'Investissement Prioritaire Dans Le Secteur Agricole) |
| PNISA | National Agricultural Sector Investment Program (Plan National d'Investissement Dans Le Secteur Agricole) |
| PNVA | National Agricultural Extension Program (Programme National de Vulgarisation Agricole) |

| | |
|--------------|--|
| PO | Production Organizations |
| RASC | Cinzana Regional Agricultural Research Station (Station de Recherche Agronomique de Cinzana) |
| RRC | Rural Resource Center (Centre de Ressources Rural) |
| SAA | Sasakawa Africa Association |
| SAFE | Sasakawa Africa Fund for Extension Education |
| SAP | Mali's Early Warning System (Système d'Alerte Précoce) |
| SG2000 | Sasakawa Global 2000 |
| SmAT-Scaling | Scaling-up Climate-Smart Agroforestry Technologies for Improved Market Access, Food and Nutritional Security in Mali |
| ToT | Training of Trainers |
| UNDP | United Nations Development Programme |
| UNESCO | United Nations Educational, Scientific and Cultural Organization |
| UNHCR | United Nations High Commissioner for Refugees |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| WFP | World Food Programme |

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INTRODUCTION

Extension and advisory services (EAS) are all activities that provide the information and services needed by farmers and other actors in rural settings to assist them in developing their technical, organizational and managerial skills and practices so as to improve their well-being (Christoplos, 2010; GFRAS, 2011). EAS are viewed as a critical input into agricultural development and are strongly supported by the Comprehensive Africa Agricultural Development Program (CAADP) in its implementation strategy to accelerate African agricultural growth and transformation (African Union, 2014).

In an effort to raise incomes and increase resilience of smallholder farmers and their families in Feed the Future (FTF) countries, the United States Agency for International Development (USAID) funded the Developing Local Extension Capacity (DLEC) project. The DLEC project is led by Digital Green in partnership with the International Food Policy Research Institute (IFPRI), CARE International, the Global Forum for Rural Advisory Services (GFRAS) and multiple resource partners. DLEC is an action-oriented, evidence-based learning project that generates evidence through diagnostic studies and engagement activities, which in turn are used as a catalyst for mobilizing global and country-level communities of practice to advocate for improved EAS. DLEC works with country stakeholders and USAID missions to scale and improve locally relevant, cost-effective and pluralistic agricultural extension systems that bring together information technologies and community-based organizations. By collaborating with USAID missions, host-country governments, public and private EAS providers, rural civil society organizations and host-country research institutes, DLEC helps extension systems become more effective, accountable, scalable and sustainable.

The first stage of DLEC's work includes conducting in-depth diagnostic assessments of local EAS contexts and capacities. This report reviews existing documentation on EAS in the Republic of Mali (Mali) and provides an additional assessment in Annex 2 of the FTF Livestock for Growth (L4G) project. This report also addresses issues cross-cutting to EAS topics, such as women and youth engagement, climate change resilience, food and nutrition security and the use of information and communication technology (ICT). The report offers recommendations for donors, the Government of Mali, implementing partners, the private sector and other stakeholders to strengthen the agricultural extension and advisory services system to better serve smallholder farmers' needs.

CONCEPTUAL FRAMEWORK

DLEC uses an adapted best-fit framework developed by Birner et al. (2009) for designing and analyzing agricultural advisory services. The framework, shown in Figure 1, guides the analysis of this report and determines EAS areas of focus for on-the-ground activities that are within DLEC's manageable interests. We use the framework to guide DLEC's learning agenda because it outlines EAS system parameters and identifies the levers of change within it. In each country, the levers of change will differ. The best-fit framework allows us to analyze a country's EAS system, to begin conversations with local stakeholders to understand the state of their EAS system and where the critical levers for change might be and to analyze and recommend systems change. The framework also enables us to compare across countries and connect country-specific cases to broader learning on EAS, to advance overall learning and to apply this to other donor and government programs and priorities.

The framework identifies characteristics of EAS systems on which policy decisions must be made and the frame conditions to be considered when making decisions. The frame conditions include: the political economy, the business/market and civil society environments, agroecology and the agricultural innovation system (AIS). The framework suggests an impact chain approach to analyze the performance and impact of EAS.

The EAS characteristics shown in boxes F-K of the framework (see Figure 1) are within DLEC manageable interests. Manageable outcomes include the system-level performance areas noted in box L. While, the frame conditions (boxes A–E) are outside the core DLEC manageable interests, this assessment provides an overview of relevant frame conditions. Lastly, the outcomes and ultimate impact at the farm household level (boxes M and N) are outside DLEC manageable interests.

The following EAS characteristics serve as the conceptual framework for this assessment:

- ◆ **Governance structures and policy environment** variables (box F) refer to institutional set-up of EAS, or the “rules of the game.”
- ◆ The **organizational and management capacities and cultures** variables (box G) refer to capacity for provision of advisory services and the way in which the services are managed within the respective governance structures. These are essentially the “players” of the game, their abilities and the way they play.
- ◆ **Advisory methods** (box H) are those which EAS field staff use in interactions with farmers. Advisory methods can be classified according to various aspects, such as the number of clientele involved (individuals, groups); the types of decisions for which advice is provided (specific to the production of certain crops or livestock, managerial decisions, group activities, etc.); and the media used (radio, internet, etc.).
- ◆ **Market engagement** (box I) refers to the market elements that EAS can use to better serve farmers, such as aggregation, finance, price discovery and input and output markets.
- ◆ **Livelihood strategies** (box J) refers to how EAS develops the content to meet the unique needs of farmers and includes how gender roles impact farming livelihood strategies.
- ◆ **Community engagement** (box K) refers to EAS services based on local social institutions, mechanisms to articulate demand and community psychosocial characteristics.

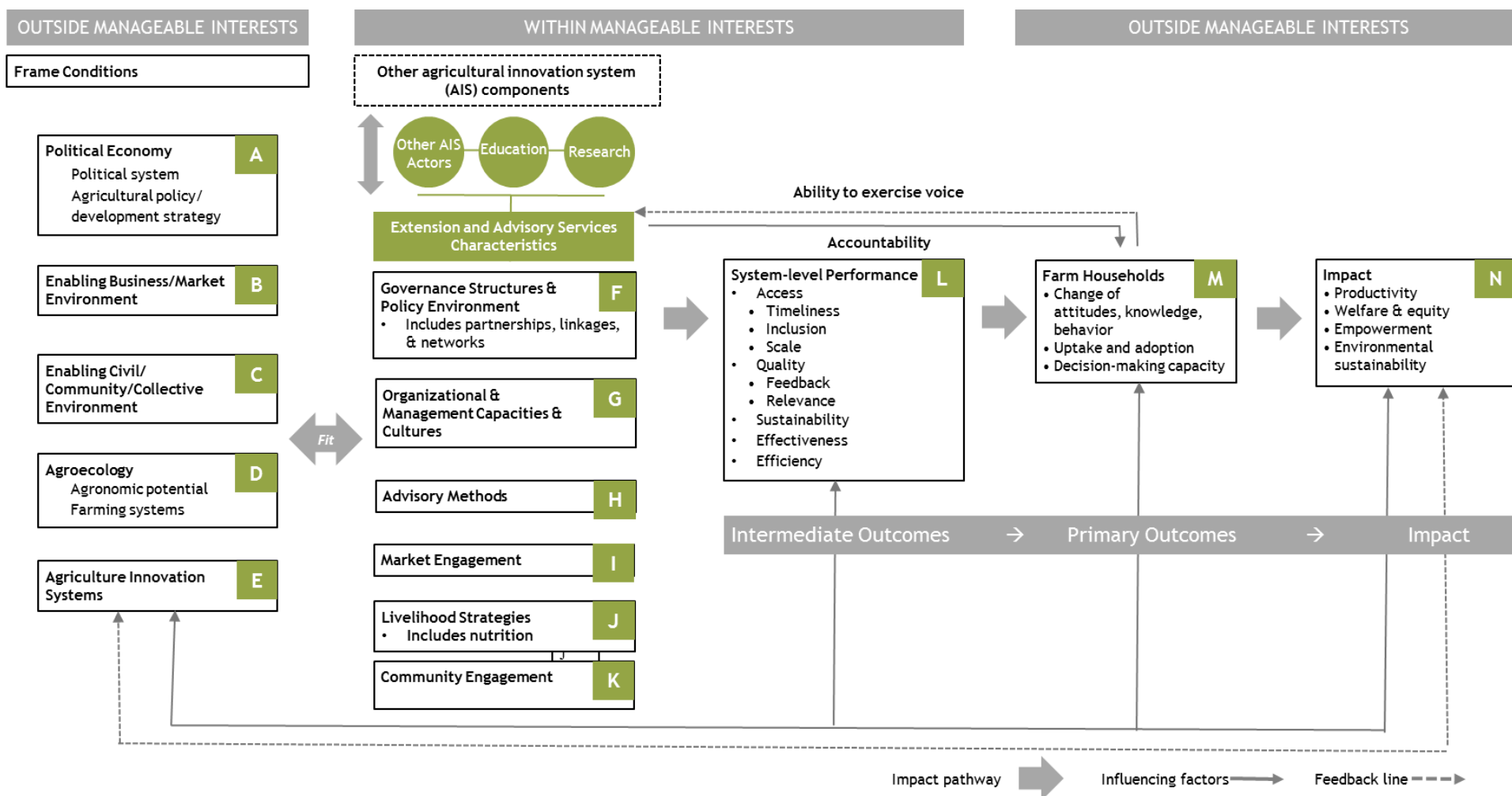


Figure 1. Conceptual Framework for the Assessment

Source: Adapted from Birner, et al. 2009

METHODS

This assessment used a mixed-methods approach of a literature review and 53 in-person and remote interviews conducted with key EAS stakeholders and actors in Mali. The literature review included reports from Malian governmental agencies, foreign governments, donor agencies, donor-financed projects, non-governmental organizations (NGOs), international organizations and universities. This information was supplemented with the in-person and telephone interviews with select key informants in Mali in September 2017. Annex 1 lists the stakeholders in Mali whom the research team interviewed.

RESULTS

Frame Conditions Related to Extension

Political Economy

Overview

Mali is a landlocked, low-income country with a population of nearly 18 million. By 2020, the population of Mali is projected to increase to 20.9 million (INSTAT, 2012). The population is relatively young, with a median age of 16 years, growing at an average rate of about three percent (World Bank, 2018d). The capital city is Bamako and administratively Mali comprises 10 regions, each under the authority of an elected governor.¹ The 10 regions are further divided into 49 districts

(called “cercles” in French) and 703 municipalities (called “communes” in French). A majority of Mali’s population is concentrated in the south, along the Niger River, where climatic conditions are more favorable for agriculture (see Table 1). Sixty-three percent of the population lives in rural areas; however, this proportion is declining because of migration to urban centers [National Institute of Statistics (INSTAT), 2012].

Mali’s political and economic situation has been very volatile over the past 60 years. The country gained independence from France in 1960. From the mid 1990s until 2010, the economy was growing at approximately five percent per year, but in 2012, a military coup d’état and a deteriorating security situation in the north brought gross domestic product (GDP)

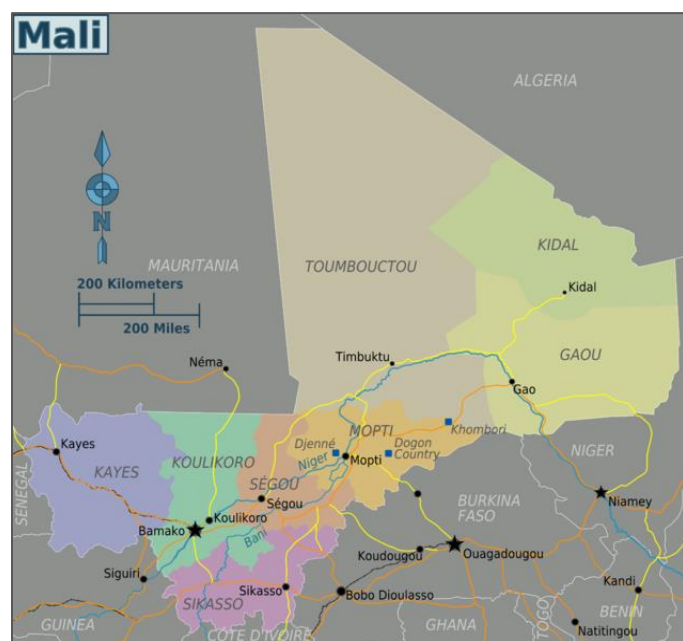


Figure 2. Political Map of Mali

Source: United Nations Cartographic Section

growth down to one percent. The coup d’état, coupled with an armed occupation of the northern region, left the country in a fragile state. In 2013, economic growth slowly resumed but was

¹ Mali’s 10 regions: Kayes, Koulikoro, Sikasso, Ségou, Mopti, Toumbouctou, Gaou, Kidal, Menaka and Taoudéni.

hampered by bad weather and poor crops. Following substantial financial support from the U.S., German and Canadian aid agencies, the economy's growth rebounded to seven percent in 2014.

In 2015, the Government of Mali and two major rebel coalitions signed a peace agreement, bringing hope for stability. By the end of 2015, per capita gross national income was USD \$760. Mali has since embarked on structural reforms and adopted various sound economic policies that have contributed to growth. This has led to increased cotton and mining production, steady investments and a relatively stable macroeconomic environment.

However, over two million people continue to be affected by the armed conflict in the north and hundreds of thousands of people have been displaced both within the country and to neighboring countries. As of June 2017, there were estimated to be over 50,000 internally displaced peoples within Mali, along with 58,000 refugee returnees [United Nations High Commission for Refugees (UNHCR), 2017].

Economy

Agriculture remains the backbone of Mali's economy and holds great potential to contribute to the country's growth. Agriculture accounts for approximately 40 percent of the country's GDP and employs about 85 percent of the labor force. Manufacturing and services are other important contributing sectors. Overall economic growth in Mali from 2014 to 2016 averaged six percent per year and was mainly supported by the robust performance of the agriculture and services sectors [African Development Bank (ADB), 2018; World Bank, 2018d]. The agricultural sector's growth rate exceeded six percent over the period 2006-2010 (Bourdet, Dabitaio and Dembélé, 2011) and increased from seven percent in 2015 to eight percent in 2016 (World Bank, 2017). The service sector's growth was also robust (at about six percent per year since 2014), following renewed dynamism in the ICT sector (World Bank, 2017).

The use of ICTs is expanding rapidly in Mali and has the ability to enhance economic growth, including in the agricultural sector. As of 2016, approximately 10 percent of the population used the internet (World Bank, 2016). However, mobile phone penetration was at 60.5 percent in 2017 and Mali, along with Benin, Côte d'Ivoire, Niger and Senegal, are projected to account for 25 percent of mobile subscriber growth (GSMA, 2017).

There are estimated to be over 800,000 farms throughout Mali, comprised of both family holdings and commercial farms (Republic of Mali, 2013b). Cotton is the major cash crop, accounting for over 80 percent of export earnings, followed by rainfed cereals (mainly rice, millet, maize and sorghum). Other agricultural subsectors such as cashew, mangoes, shea butter and peanut are less developed. Because agriculture is dominated by rainfed farming, it remains vulnerable to environmental and climatic shocks such as drought, unpredictable precipitation, floods and locust invasions. Cereals (rice, millet, maize, sorghum and fonio) contributed 16 percent of total GDP, followed by cotton at 15 percent and livestock at 10.8 percent (Republic of Mali, 2018). Cotton is the most important agricultural export, although amongst all exports it was dwarfed by gold, which accounts for 72 percent of Mali's total exports (Trading Economics, 2018).

At a regional level, Mali is working to create an open economic space through collaboration with the West African Economic and Monetary Union, the Economic Community of West African States and other initiatives such as CAADP. In terms of ease of doing business, Mali ranks 19th out of 43 Sub-Saharan African countries (World Bank, 2018a). Moreover, despite the 2012 political crisis and ongoing insecurity that negatively impacted EAS, the government continues to invest in agriculture

and related services. According to IFPRI, Mali met CAADP's 10 percent agricultural expenditure target between 2004 and 2010 (IFPRI, n.d.). Public agricultural spending as a share of total public spending was 9.4 percent per year from 1995–2003, 11.8 percent per year from 2003–2008 and 8.7 percent per year from 2008–2014 (IFPRI, n.d.).

However, various factors continue to hinder growth of the agricultural sector and economy in Mali. These include the increasingly harsh effects of climate change which has brought drought and erratic precipitation. Corruption also poses barriers. Most recently, Mali ranked 116 of 167 countries on Transparency International's Corruption Perceptions Index (Transparency International, 2016).

Poverty and Food Security

Poverty in Mali is high with nearly 50 percent living under the poverty line of USD \$1.90 a day. The country ranks near the bottom of the United Nations Human Development Index, at 175 out of 188 countries. Over 60 percent of the population is illiterate and life expectancy is low – 58 years of age. [United Nations Development Programme (UNDP), 2016]. Mali's economy is predominantly rural, undiversified and informal and the informal sector provides approximately 80 percent of jobs [World Bank, 2018d; International Monetary Fund (IMF), 2015].

Food insecurity is high in Mali and in 2016, approximately 25 percent of families (over 2.5 million people) were moderately to severely food insecure [World Food Programme (WFP), 2018]. Malnutrition is also an important problem and latest survey data indicates that over 38 percent of children under five were stunted in 2012. There is significant variation by region, with the highest stunting rates in Mopti (46.5 percent), Ségou (40.5 percent) and Sikasso (39.9 percent) (INSTAT, 2014). Chronic malnutrition was also high and in 2013, 44 percent of households and 66 percent of food-poor households had at least one stunted child (Eozenou et al., 2013). During the conflict and 2012 coup, stunting increased significantly, and children aged 0-12 months in 2011–2012 will likely suffer life-long consequences (INSTAT, 2016).

Status of Women

Mali ranks among the lowest for the status of women in Africa. In the UNDP's most recent analysis of gender inequality, Mali places 156 out of 159 countries (2016). Literacy rates overall are very low but also reflect the persistent gender divide: on average, only 22 percent of women over the age of 15 were literate in 2015, compared to 45 percent of men [United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics, 2016].

In Mali, many women struggle under the burden of significant domestic responsibilities, in addition to labor outside the household. They also experience lack of access to finance, land, capital and information, which inhibits their ability to use and benefit from land and agricultural activity. Moreover, under both Islamic and customary law, men hold the primary land rights and women typically only have access to land through male relatives (Jones-Casey et al., 2011).

According to a 2012 USAID gender assessment, women in Mali experience the following issues:

- ◆ Cultural and ethnic norms, in addition to the burdens of poverty, have a significant negative impact on women.
- ◆ Access to finance is unequal, with men regularly benefitting more than women.
- ◆ Women are subjected to many harmful cultural practices including female genital mutilation, early marriage, domestic violence and other forms of gender-based violence.
- ◆ Women's decision-making capacity, voice and agency are very limited.

- ◆ Women’s workloads are significant, with 7-8 hours spent on domestic chores, in addition to labor in the agriculture fields.
- ◆ A majority of women working in agriculture do not receive wages for their labor. Seventy-seven percent of women farmers declared in a government survey that they have never received wages for their labor (USAID, 2012a).

A 2015 addendum to the gender assessment noted that little had changed and that the 2012 coup had “held hostage many efforts” to improve conditions for women. However, the addendum also noted that the government “seems to realize the important role that women and girls have to play and is open to finding new ways to encourage their participation” (USAID, 2015a).

Agroecology

Mali has significant agricultural potential in terms of land and water resources. According to the National Agricultural Sector Investment Program (PNISA), approximately 44 million hectares of land are suitable for agriculture and livestock. However, of total cultivable land, only 12 percent (five million ha) are cultivated and of this, less than 300,000 hectares benefit from irrigation. While lacking in irrigation infrastructure, Mali does have significant groundwater and surface water resources concentrated along the Niger and Senegal Rivers. These rivers, along with their tributaries, form two watersheds that offer an irrigable potential estimated at more than two million ha. In particular, the Inner Niger Delta, which spans more than 30,000 km², holds significant agro-silvo-pastoral potential (Republic of Mali, 2014).

There is important regional variation in the crops grown across Mali (Table 1). Rice is consistently found, but by far the south is more fertile and climate-friendly to agriculture. In the south, a variety of grains, legumes, fruits and other crops are grown, both for subsistence and commercial purposes (Republic of Mali, 2013a).

In addition to agriculture, Mali has the largest livestock population in West Africa after Nigeria. The livestock sector (including fisheries and aquaculture) provides income to about 30 percent of the population and could likely provide more. There are an estimated 30 million hectares of pasture land available, yet only about one-third is utilized, due to limited access to water as well as fire and erosion damage (World Bank, 2018d). Livestock systems include extensive nomadic practices, sometimes associated with oasis agriculture in the far north; extensive transhumance in the north, west and center; and semi-sedentary and sedentary livestock in the center and south. Fish farming is growing increasingly around urban centers and also due to the development of communal fish farming and aquaculture.

In terms of national exports, the livestock sector, including fisheries and aquaculture, is third, behind gold and cotton. In recent years, this sector has contributed about 19 percent of national GDP, with four percent from fisheries alone. Aquaculture and fisheries in Mali produce approximately 180,000 tons of fish per year, much of it coming from the Inner Niger Delta in the Mopti Region. The potential for fish production in Mali is over 200,000 tons per year and the country has an estimated 895,000 hectares of arable land resources for aquaculture. Nevertheless, annual public funding for the fisheries and aquaculture represents just 10 percent of agricultural expenditures and less than two percent of the national budget (World Bank, 2018d; Republic of Mali, 2014).

Forest-based livelihood activities are another component of economic activity in the agricultural sector. This includes both timber products and non-timber forest activities such as beekeeping and

medicinal plant collection. Mali's forest area covers approximately five million hectares and is home to important flora and fauna, much of which is poorly protected (World Bank, 2018b). With sustainable management, however, there is opportunity to improve and increase sustainable forest-based agro-activities.

Agroecological Zones

Mali has four major agroecological zones: the Saharan, the Sahelian, the Sudanese and the Sudano-Guinean (Figure 3).

Agroecological Zones in Mali

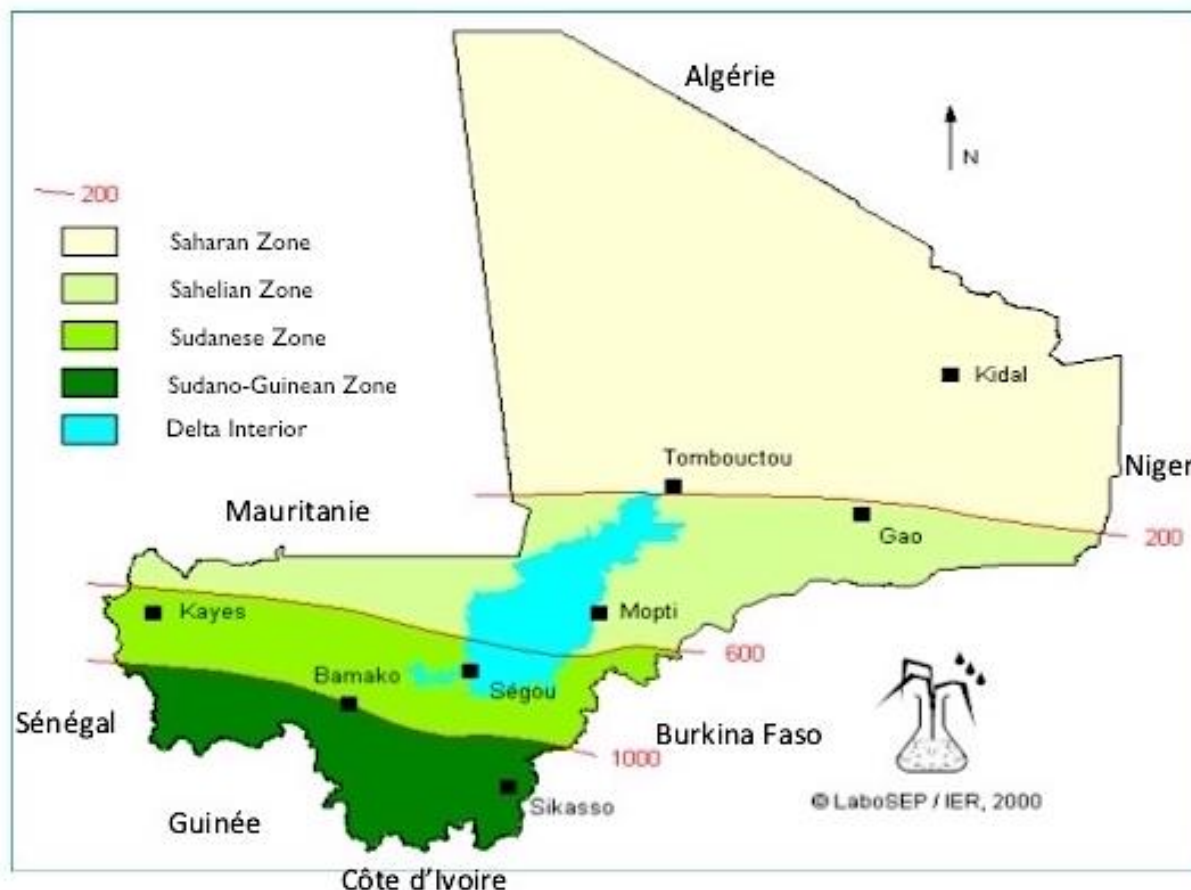


Figure 3. Map of Mali with Principal Agroecological Zones

Source: Laboratoire Sol-Eau-Plantes de Sotuba / Institut D'économie Rurale (IER), 2000

Across these four agroecological zones, there is great variety in climate, rainfall and temperature (see Table 1) which impacts the crops and livestock choices of the population. The southern regions are the most fertile with greater rainfall levels and offer more options for smallholder farmers, both for subsistence needs as well as for economic and market opportunities.

Table 1. Agroecological Zones in Mali: Area, Rainfall and Primary Livestock and Crops

| Agroecological Zone | Geographic Location | Area (% of country) | Rainfall (mm/year) | Primary Livestock and Crops |
|---------------------|---------------------|---------------------|--------------------|--|
| Saharan Zone | North | 51 | < 150 to 200 | <i>Livestock:</i> cattle, sheep, goats, camels <i>Crops:</i> rice, wheat |
| Sahelian Zone | Center | 26 | 250-550 | <i>Livestock:</i> cattle, sheep, goats, camels <i>Crops:</i> rice, wheat and vegetables |
| Sudanese Zone | South | 12 | 600 - 1,200 | <i>Livestock:</i> poultry, cattle, sheep, goats, bees <i>Crops:</i> Sorghum, millet, rice, wheat, peas, onions, peanuts, sweet potatoes, tomatoes, fonio (a grain), corn, beans, potatoes, mango, citrus, peanut, cashew, shea, néré (African locust bean), sugarcane |
| Sudano-Guinean Zone | Far South | 11 | > 1,200 | <i>Livestock:</i> cattle, sheep, goats, bees <i>Crops:</i> mango, peach, millet, sorghum, fonio, corn, rice, beans, potatoes, beans, peanut, cashew, shea, néré, onion, cotton |

Source: Republic of Mali (2013a)

Impact of Climate Change

Like many places in Africa, climate change has a detrimental impact on agriculture and livelihoods in Mali. Some estimates indicate that up to 80 percent of the population involved in agriculture and dependent on natural resources is seriously impacted by increased drought and expanding risk of desertification (USAID Climatelinks, 2018).

Of all the countries in the Sahel, Mali is will be one of the hardest hit by climate change (PAPAM/ASAP, 2014). Average temperatures are increasing and mean annual rainfall gradually decreasing. Since 1960, average temperatures in Mali have increased by 0.7°C. Models predict that annual temperatures will increase by an average of 1.2 to 3.6 °C by 2060 and of 1.8 to 5.9°C by 2090. Similarly, evapotranspiration is projected to increase, and average annual rainfall is projected to fluctuate even more with an overall potential decrease of 8.7 percent below 1961 levels. At the same time, droughts are expected to extend in duration and floods and storms to be more intense (USAID, 2012b).

Extreme weather, such as droughts and strong winds, has impacted Mali's rainfed farming systems, particularly cotton and maize in the regions of Sikasso and Kayes. Heavy rains after long dry periods caused erosion and flooding, damaging rural infrastructure. Drought in the north has led to migration toward the south, increasing the burden on natural resources in the southern regions. These disruptions to farmer production have led to lower yields, distorted markets and natural resource-based conflict (PAPAM/ASAP, 2014).

The poorest groups in Mali, particularly smallholder farmers, have been hardest hit by the impacts of climate change (Ministry of Environment and Sanitation, 2011). According to a study by the

National Center for Scientific and Technological Research, climate change will have the following impacts on agriculture in Mali:

- ◆ agricultural production gap of between 51 and 1,518 tons of maize by 2025.
- ◆ a decline in cotton yields, with losses ranging up to 3,500 tons by 2025.
- ◆ a decline in rice, millet and sorghum yields, with losses up to 2,524 tons by 2025.
- ◆ decreased rainfall will reduce river levels and fish availability.
- ◆ decreased rainfall and increased drought will present challenges for fodder production, having an impact on the livestock sector (Traoré et al., 2003).

In addition to vulnerabilities the agricultural sector in Mali will face due to climate change, human health impacts are projected to be just as serious:

- ◆ increased food insecurity and malnutrition, especially in vulnerable regions.
- ◆ shifts in vector-borne disease transmission.
- ◆ increased risk of infectious diseases (related to migration, contamination of drinking water and other factors).
- ◆ increased cases of asthma and allergies (USAID, 2012b).

The Government of Mali has taken various steps in response to the impacts of climate change. A 2000 Initial National Communication (2000) identified priority sectors for climate change adaptation and the National Adaptation Programme of Action of 2007 outlined strategies to address sustainable development and poverty reduction for communities most impacted by climate change. The 2002 Strategic Framework for Growth and Poverty Reduction also noted the need for environmental protection and sustainable natural resource management. Lastly, the National Program to Combat Deforestation, which was established in 1988, identifies options for agriculture and rural forestry development projects that reduce demand for timber products such as fuel wood (USAID, 2012b).

In 2014, the government also established the Mali Climate Fund, with support from the UNDP and the governments of Sweden and Norway. This fund aims to finance projects in support of climate and economic development goals. Additionally, in 2011, Mali formed a National Committee on Climate Change comprised of representatives from the private sector, civil society, communities and the government. This committee is responsible for leading stakeholders in climate change focused planning and policy (NDC, 2017).

Agricultural Innovation System

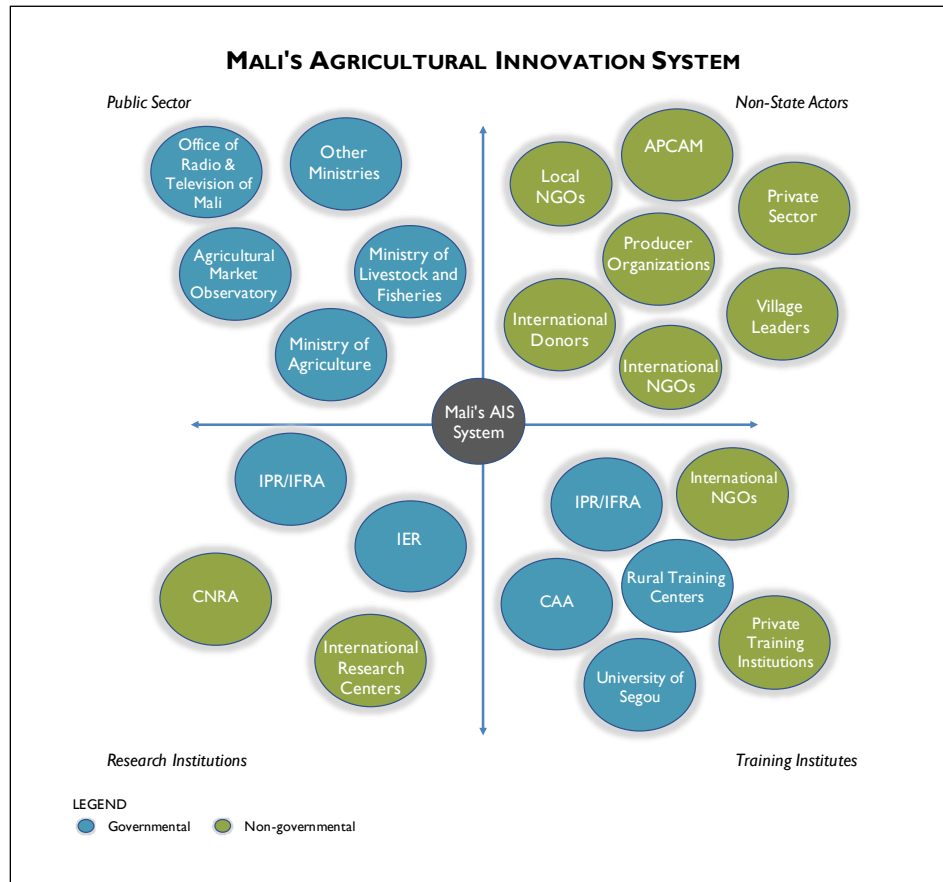
Key Actors

The AIS in Mali comprises four main groups of actors:

- ◆ Public Sector
- ◆ Non-State Actors
- ◆ Research Institutions
- ◆ Training Institutes

Figure 4 depicts the key actors in Mali's AIS which are also detailed further in this section.

Figure 4. Key Players in Mali's Agricultural Innovation System



Source: Authors

Public Sector

According to the Agricultural Orientation Law (LOA), the state and local authorities are the key EAS providers. While coordination between ministries is not strong, the following are the primary ministries in Mali's AIS:

- ◆ Ministry of Agriculture
- ◆ Ministry of Livestock and Fisheries
- ◆ Ministry of Environment
- ◆ Ministry of Energy
- ◆ Ministry of Mines and Water
- ◆ Ministry of Communication
- ◆ Ministry of Economy and Finance
- ◆ Ministry of Territorial Administration and Local Government
- ◆ Ministry of Industry, Commerce and Transport
- ◆ Ministry of State Domains and Land Affairs

The Ministry of Agriculture and the Ministry of Livestock and Fisheries are the principal public actors. National directorates under these two ministries coordinate with regional directorates to

oversee the implementation of national policies. These are the National Directorate of Agriculture (DNA) (under the Ministry of Agriculture), the National Directorate of Production and Animal Industries and the National Directorate of Fisheries (under the Ministry of Livestock and Fisheries).

The DNA is the primary entity responsible for coordination of EAS activities. It aims to provide services and coordinate with other national directorates that offer advisory services, as well as with representatives in regional and cercle offices. Regional Directorates of Agriculture also manage coordination with regional Outreach and Agricultural Councils.

In addition to the Directorate of Agriculture, key governmental units with national EAS functions include the National Directorate of Production and Animal Industries (DNPIA), the National Directorate of Rural Engineering, the National Directorate of Veterinary Services and the National Directorate of Water and Forests (Simpson and Dembélé, 2011). The DNPIA is mandated with national policy and programming for animal production and related industries and has four divisions: pastoral water management, animal products, animal industries and training and documentation (Simpson and Dembélé, 2011).

There are a number of other specialized government and parastatal institutions which also perform EAS functions in geographically or technically targeted areas (see box). Their agents assist and coordinate with the various agencies and actors in their areas (Simpson and Dembélé, 2011).

- | | |
|--|---|
| ● Malian Company for Textile Development | ● Office of the Irrigated Perimeter Baguinéda |
| ● Sélingué Office of Rural Development | ● Upper Niger Valley Office |
| ● Segou Rice Office | ● Mopti Rice Office |
| ● Plant Protection Office | ● Niger Office |

Source: Simpson and Dembélé (2011)

Each of Mali's 10 regions also has a Regional Chamber of Agriculture that receives funding from the national budget. Although the chambers are legal public institutions with financial autonomy, an umbrella organization based in Bamako, the Permanent Assembly of Chambers of Agriculture of Mali (APCAM), oversees coordination of the chambers. The chambers serve to represent farmer organizations (both individual producers and professional organizations) and play a role in providing information and support to farmers in their region.

Research Institutions

Agricultural research in Mali is donor-dependent and most research institutions work closely with international research centers.² Human capital and funding limitations often present challenges. There are over 280 full time researchers in Mali, most with a master's or PhD degree. However, most of the PhD holders are reportedly in their 50s and 60s and may soon retire. Moreover, government spending on agricultural research has declined over the years. In 2014, the government invested 0.4 percent of its agricultural GDP in research, down from one percent in 2000, which is the level recommended by the United Nations and the African Union (Domgho, Traoré and Stads, 2017).

² E.g., ICRISAT, the World Agroforestry Center (ICRAF), the International Livestock Research Institute, the International Center for Research and Development on Livestock in the Subhumid Zone, the Center for Agricultural Research for Development, the National Institute of Development Research and the World Vegetable Center.

While the Institute for Rural Economy (IER) is the Malian government's principal agricultural research institute, a number of research institutions are active in research on issues critical to agriculture:

- ◆ Institute for Rural Economy
- ◆ Rural Polytechnic Institute of Training and Applied Research (IPR/IFRA)
- ◆ Institute of Development Research
- ◆ Soil, Water and Plant Laboratory
- ◆ Food Technology Laboratory
- ◆ National Committee for Agricultural Research (CNRA)
- ◆ Central Veterinary Laboratory
- ◆ Animal Nutrition Laboratory
- ◆ National Institute of Public Health Research
- ◆ Institute of Human Sciences
- ◆ Higher Institute for Training and Applied Research
- ◆ Planning and Statistics Unit

Mali is also a beneficiary of the World Bank-funded West Africa Agricultural Productivity Program. This eight-year (2011-2019) USD \$83.8 million program aims to generate and disseminate improved technologies in priority areas for 13 partner countries, as identified by the West and Central Africa Council for Agricultural Research.³ In Mali, it is managed by the French National Center for Scientific Research and the IER, with the involvement of various U.S., European and Canadian research universities.

Research in Mali has typically focused on a mix of both cash and subsistence crops and livestock. In 2008, for example, research on rice accounted for 21 percent of total resources devoted to agronomic and livestock research. Other important crops under research included cotton (12 percent), legumes (eight percent), millet (seven percent), potatoes (six percent) and sorghum (five percent). In the livestock sector, sheep and goats constituted 11 percent of total agronomic and livestock research, with cattle (10 percent) and poultry (seven percent) also as notable priorities (Stads and Maiga, 2011).

Training Institutes

There are a variety of EAS public and private training institutes in Mali, including the University of Segou's Department of Agriculture and Animal Medicine that offers formalized training.

Many extension staff obtain training from the public Rural Polytechnic Institute of Training and Applied Research (IPR/IFRA) in Katibougou, which is dedicated to agronomy, forestry and wildlife, livestock breeding and agricultural engineering. The IPR/IFRA began as a research station in 1887 and over the years transitioned into a technical college. In 1996, it expanded into the training and applied research institute it is today (Traoré, 2008). Agricultural extension training at the IPR/IFRA includes a technician's certificate and a master's degree. The IPR/IFRA also supports continuing education for young graduates who wish to set up their own rural business.

³ Benin, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Guinea, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone and Togo

As of 2017, the IPR/IFRA had 114 faculty members, of which nearly 60 percent are graduates of Russian educational institutes. Approximately 470 students were studying at the IPR/IFRA in 2017, including 152 enrolled for the technician's certificate, 237 for engineering and 81 for the master's degree. Students came from many French-speaking African countries, including Burkina Faso, Niger, Gabon, Côte d'Ivoire, Senegal, Mauritania, Chad, Benin, Togo, the Central African Republic, Cameroon and the Comoros Islands (IPR/IFRA, 2018).

The Centers of Agricultural Apprenticeship (CAAs) are another set of public institutions, with three currently located around the country.

1. *The Practical Training Center for Livestock in Sotuba*: This CAA hosts 60 students and offers a three-year program for a Certificate of Professional Aptitude in Breeding.
2. *The Forestry Training Center in Tabakoro*: This center hosts 45 students and offers a three-year training program to Forestry Technical Agents in the areas of forestry and fisheries management.
3. *The Malick Sidibé Vocational Training Institute*: This CAA is currently the only public secondary agricultural training establishment under the supervision of the Ministry of National Education. It was created in 2004 and is available to students as young as 16 years (Ministry of Agriculture, 2017).

Outside of urban areas, there are 53 Rural Training Centers around the country, which under the supervision of the Ministry of Agriculture offer training to farmers. Twelve are co-educational and dedicated to training for young couples, offering the wives of male farmers capacity building in agricultural product conservation and processing, nutrition, hygiene and family planning (Ministry of Agriculture, 2017).

Various private institutions also offer related EAS-related training, with content and methods determined by the National Directorate for Technical and Vocational Education under the Ministry of Education. These institutions all offer four-year training programs for the Agropastoral Technician Certificate.

1. *The Agro-Pastoral Training Center of Bamako*, created in 1986 in Bamako District.
2. *The Agro-Pastoral Center of Ségou* created in 1999 in Ségou.
3. *The Professional Training Center for the Promotion of Agriculture in the Sabel*, created in 1999 and established in the city of Gao.
4. *The Rural Polytechnic Training Center of Kita*, created in 2000 in the city of Kita (Ministry of Agriculture, 2017).

Lastly, the international Sasakawa Africa Fund for Extension Education (SAFE) Program is an initiative affiliated with the IPR/IFRA, the Samanko Agricultural College and the University of Segou. SAFE provides diplomas and degrees of mid-career extension professionals (SAFE, 2018). The SAFE Program is described further below.

Non-State Actors

Various non-state actors are important players in Mali's agricultural innovation system either as funding entities or as implementers, or both. These include bilateral entities, multilateral organizations, United Nations agencies, the private sector, national and international NGOs, civil society organizations, associations, producer's organizations and village leaders. Table 2 highlights the primary international funding entities supporting Mali's agricultural sector.

Table 2. Primary International Donors in Mali's Agricultural Sector

| Bilateral Entities | Multilateral Organizations | United Nations Agencies |
|--|--|--|
| <ul style="list-style-type: none"> ● Belgium ● France ● Germany ● Italy ● Japan ● KfW Development Bank (KfW) ● Luxembourg ● Spain ● United Kingdom ● United States | <ul style="list-style-type: none"> ● ADB ● European Union Delegation ● IMF ● International Fund for Agricultural Development (IFAD) ● Islamic Development Bank (IDB) ● West African Development Bank ● World Bank | <ul style="list-style-type: none"> ● FAO ● International Organization for Migration ● United Nations Children's Fund (UNICEF) ● United Nations Industrial Development Organization ● UN Joint Program on HIV/AIDS ● United Nations Multidimensional Integrated Stability Mission in Mali ● United Nations Population Fund ● UNESCO ● WFP ● World Health Organization |

Private Sector

Given the importance agriculture holds for Mali's economy, the private sector has a major role in its agricultural innovation system. Private sector actors include input suppliers, equipment sellers, contractors, transporters, aggregators, traders, importers, exporters and others. A variety of challenges exist for both the private sector and smallholder farmers, including financing, distribution and input adoption. For example, while Mali's fertilizer market is the fifth largest in West Africa, the rate of nutrient fertilizer application is lower than the regional average and lower than that in other developing countries (Fuentes, Bumb and Johnson, 2011). There are cases of collaboration between the private sector and government in order to facilitate smallholder farmer access to inputs and services. Fertilizer supply companies such as Toguna have coordinated with government agencies to expand access of their fertilizer and to offer credit to smallholder farmers (Traoré, 2008).

International market entry poses other challenges for Mali's agribusiness sector. Agro-processing firms are few, restricting producers' ability to meet export requirements and effectively enter international markets. The agro-processing firms that exist frequently need capacity building and other support (e.g., improved product handling) (Traoré, 2008).

The Network of Agricultural Input Operators in Mali (ORIAM) is one entity addressing the needs of agricultural input suppliers. ORIAM coordinates with APCAM and provides its opinions on issues related to the agricultural inputs sector. ORIAM also shares information with the Agricultural Market Observatory (OMA) that can be of use to producers (CNP Mali, 2018). Other groups representing the private sector in agriculture include the Malian Association of Vegetable and Fruit Exporters, the Federation of Exporters of Livestock and Meat of Mali, the Group for Professional Agro-Food Product Transformation and the Malian Association of Exporters of Picked Products.

NGOs, Associations and Civil Society

In Mali, there are reportedly more than 15,000 organizations dedicated to the agriculture sector (Republic of Mali, 2013b). This includes a diverse set of regional and national NGOs, civil society organizations and associations. There are also various structures for communication and coordination among these organizations, including the following:

- ◆ Regional Executive Committee of Agriculture
- ◆ The National NGO Coordination Secretariat
- ◆ The Drylands Coordination Group
- ◆ Federation of NGOs Involved in Climate Change
- ◆ Coordination of Associations and Women's Organizations
- ◆ Coordinating Council for Actions of National and International NGOs
- ◆ Supreme Council and the National Executive Committee of Agriculture
- ◆ Steering Committees for Coordination and Tracking Development Activities

Producers in Mali are often organized into groups that aim to provide support services to members. Producer organizations are typically focused on crop and livestock value chains and are fairly well organized. The Association of Producer Organizations is one of the leading coordinating bodies. Created in 1993, it represents approximately 130 producer organizations in seven regions across Mali and is involved in the rice, cotton, cereals and livestock sectors.

On the ground, village leaders are another important authority and frequently are at the forefront of resolving land issues that impact the agricultural innovation system. Village leaders are recognized by the government as customary authorities and hold legitimacy with local populations. As such, they often have a key role in natural resource management and agricultural decisions.

Mali's Early Warning System (SAP) is another important entity that supports and impacts the agricultural innovation system. It was created in 1986 and is composed of teams of livestock, water, agriculture and forest experts from government ministries and elsewhere, plus elected officials and representatives of political parties. These teams often exist at village, cercle and regional levels. They collect and share information on precipitation, livestock health, water and other key points with regional and national government authorities. The information is used to better understand the food security situation and to prepare and mitigate for crises. The SAP is frequently also supported by international NGOs (IRIN, 2010).

AIS Supporting Programs and the Extension and Advisory Services System

The following section details specific actors and programs that are integral to Mali's agricultural innovation system, including the extension players.

Public Programs

Fostering Agricultural Productivity Project (PAPAM)

PAPAM, which was launched in 2011, is currently the primary delivery mechanism for public EAS. It is under the coordination of the DNA which has the mandate to provide agricultural extension services in Mali (Simpson and Dembélé, 2011).⁴ The Agricultural and Rural Education Division of the DNA also plays an important role in coordination. PAPAM is funded by the World Bank, IFAD, and the European Union with an amount of USD \$168.1 million. The project is slated to end in 2018. Activities under PAPAM primarily focus on irrigation, water management and sustainable land management. EAS staffing occurs at the national, regional, cercle and commune levels and according to Simpson and Dembélé (2011), each commune has two to three positions for extension staff. However, many positions are vacant at commune and higher levels. PAPAM also works in

⁴ The National Extension Program (PNVA) and the Support Program for Agricultural Services and Farmer Organizations (PASAOP), detailed below under policies, are predecessors to PAPAM.

close collaboration with the multi-donor funded Adaptation for Smallholder Agriculture Programme (ASAP) which is detailed below under International Programs (PAPAM/ASAP, 2014; PAPAM, 2018).

The Malian Company for Textile Development (CMDT)

CMDT is a parastatal company heavily involved in the cotton value chain. The CMDT operates extension services for farmers in cotton-producing areas, in the regions of Sikasso, Koulikoro, Ségou and Kayes. CMDT is 80 percent state-owned with 20 percent of its capital shares held by the National Union of Cooperative Societies. In addition to providing information to farmers on cotton production, CMDT also regularly monitors and provides weather forecast data.

The Agricultural Market Observatory

The government created the OMA in 1998 following a series of restructuring of market information systems. The OMA collects, processes and disseminates price and related data for agricultural products, including fishery products. The OMA also conducts research on marketing and through weekly radio, TV and newspapers, fosters knowledge management and information exchange between producers, traders, processors and exporters inside and outside the country. Trends and other market analyses are not available, and the information is quite static and not necessarily timely.

Mali's National Research System

Mali's national research institutes also play an important role in EAS. In addition to conducting research, agricultural research stations around the country facilitate transfer of data to farmers. The experience of the Cinzana Regional Agricultural Research Station (RASC) provides an illustration. In 1983, RASC was the first station dedicated to research on dryland crops. To facilitate the transfer of research results to farmers, RASC tested farmer familiarity with results obtained on station. RASC also implemented "showcases," technology demonstration, which are described in the Advisory Methods section.

Office of Radio and Television of Mali (ORTM)

The ORTM is one of the most important state media networks. It covers a majority of the country and includes a radio station in each of the regional capitals. The Department of Rural Radio coordinates with the ORTM to provide radio-based EAS activities for farmers.

Nonpublic Programs

Association of Farmers' Professional Organizations (AOPP)

The AOPP was created in 1993 and today, AOPP brings together approximately 130 farmer organizations representing seven regions of Mali. The AOPP is involved in the rice, cotton, cereals and livestock sectors. is also affiliated with the National Coordination of Farmers' Organizations (CNOP) (UPADI, 2018).

Among other things, the AOPP carries out the following types of activities:

- ◆ Training for producers' technical, economic, analytical and negotiation capacities.
- ◆ Organizational management capacity building for member peasant organizations.
- ◆ Implementing pilot projects to demonstrate results to public authorities.
- ◆ Providing space for debate, reflection and collective action by member organizations.
- ◆ Recruiting extension agents to work at the cercle and village levels.

Forum des Services de Conseil Agricole et Rural du Mali (FOSCAR-Mali)

Established in 2012, FOSCAR-Mali is an association of representatives of all public, private and associative corporations involved in the field of agricultural extension and advisory services. Today FOSCAR-Mali has over 200 members and serves as a mechanism for information exchange, knowledge sharing, communication and for identifying opportunities to provide services and to innovate in different EAS fields. FOSCAR-Mali's vision is "high-performance agricultural and rural advisory services for a sustainable agriculture that meets the nutritional, economic and environmental needs and challenges of farmers in Mali." FOSCAR-Mali activities have included a national stakeholder conference, an electronic conference on youth in agriculture and an assessment of agricultural and rural advisory systems in Mali (AFAAS, 2018).

Orange Mali

Orange Mali is one of three telephone service providers in Mali. Orange Mali covers much of the country and provides many services critical to EAS, including mobile phone coverage, internet and a digital money transfer system. These ICT services are important to smallholder farmers and aid in improving business transactions as well as access to weather and price information. In 2016, Orange Mali began a new service called Sandji that provides smallholder farmers with localized rain forecasts on a daily, monthly and seasonal basis (GSMA, 2017).

International Programs

There are a number of international actors in the innovation system supporting or funding extension services in Mali. The following initiatives and programs, led by international actors, support EAS in Mali.

U.S. Government Feed the Future Initiative

The U.S. government FTF initiative in Mali has implemented a variety of programs with important EAS activities, in partnership with the Government of Mali. FTF continues to provide institutional support for local capacity building and EAS. There is close coordination between FTF and the Government of Mali. Past activities included a domestic resource cost analysis to align the PNIP-SA with CAADP recommendations. Today FTF supports Mali's Sectoral Transition Approach as well as development of the National Agricultural Sector Investment Program. In turn, the government has allocated three full-time Ministry of Agriculture employees to support coordination and align with FTF interventions.

To date, FTF has achieved the following results in Mali:

- ◆ Over 378,000 farmers and producers have applied new technologies and management practices on more than 150,000 hectares of land
- ◆ Farmers and producers supported by FTF increased their agricultural sales by more than \$11 million total (FTF, 2018).

USAID Food for Peace Harande Program⁵

Harande is a five-year (2015-2020), USD \$45 million USAID Development Food Assistance Program which aims to improve food, nutrition and income security for over 310,000 inhabitants of the northern Mopti Region. Among other relevant EAS activities, Harande conducts assessments of producer organizations, creates and strengthens village saving and loans groups, uses the farmer field

⁵ Harande means "food security" in Peulh, a local language in Mali.

school (FFS) model to select and build the capacity of farmer trainers and integrates gender and youth mainstreaming approaches (Harande, 2018).

Adaptation for Smallholder Agriculture Programme (ASAP)

ASAP seeks to improve the climate resilience of 65,000 of the smallholder farmers under PAPAM. The PAPAM/ASAP combined initiative is a six-year (2012-2018) USD \$173.4 million joint coordination that aims to increase the productivity of 1,710,000 smallholder farmers in Mali. It is co-financed by the IFAD, World Bank, European Union, the Global Environmental Facility and the Government of Mali. ASAP works through a variety of activities including support for the integration of climate change adaptation into planning and monitoring at the local level; community-based projects to reduce flood and promote deforestation; and support to update and improve policies and strategies with climate change elements (PAPAM/ASAP, 2014; PAPAM, 2018).

Scaling-up Climate-Smart Agroforestry Technologies for Improved Market Access, Food and Nutritional Security in Mali (SmAT-Scaling)

The SmAT-Scaling Project is a five-year (2014-2019), FTF project with the main goal to “enhance access to and use of tree-based climate-smart technologies through effective scaling-up of proven agroforestry technologies and improved market access, in order to increase food and nutritional security as well as build resilience of farming systems” (FTF, 2015, p 1). The project is implemented by the World Agroforestry Center (ICRAF), in partnership with the Agha Khan Foundation, Catholic Relief Services, World Vision Mali, ICCO-Cooperation and Mali Biocarburant SA, with field support from the Directorate of Agriculture, the Directorate of Water and Forests and IER. The project works in 810 villages in 104 municipalities across the regions of Mopti, Sikasso, Ségou, Kayes, Koulikoro and Timbuktu (FTF, 2015, p1).

Livestock for Growth Project

L4G is a five-year (2014-2019), USD \$14.4 million project implemented by AECOM in the Mopti and Toumbouctou regions. The project is part of the U.S. Government’s FTF Initiative in Mali and aims to strengthen Mali’s livestock sector. The purpose of L4G is to increase inclusive livestock value chain competitiveness by contributing to the following results (1) increased livestock production, (2) increased domestic and export livestock trade, (3) strengthened capacities and systems and an improved enabling environment for the livestock sector. One of the principle activities of L4G is the capacity building of private sector animal health providers as educators to farmers.

The L4G project in Mali “is improving the quality and profitability of livestock production, expanding market access and incentives and including poorer households in value chain development”

Source: Stakeholder interview, September 2017

The L4G project collaborates closely with the Federation of Livestock and Meat Interprofessional Groups of Mali and the National Union of Livestock and Livestock Traders. These organizations have benefited from capacity building in market regulations and livestock marketing. (See Annex 2 for an assessment of L4G’s extension approach.)

Fostering Agricultural Productivity Project for Mali

The Fostering Agricultural Productivity Project for Mali is an eight-year (2010-2018), USD \$151.9 million project, funded by the World Bank, the Government of Mali, International Development Association, IFAD and others. The Ministry of Agriculture is the main implementing agency. The project aims to increase the productivity of smallholder producers in the targeted production systems and areas. Agricultural extension, research and other support activities comprise 39 percent

of the project's work. As of March 2018, the project had supported 221,476 direct beneficiaries (World Bank, 2018c).

C-4 Cotton Program (C4CP)

The C4CP project concluded in April 2018. This four-year (2014-2018), USAID \$14.8 million project aimed to increase food security in the C-4 countries through increased incomes of male and female cotton producers and processors.⁶ Among other elements, the program aimed to promote best practices and lessons learned on women's participation and to strengthen linkages to public and private EAS. Activities under the C4CP project included the design and administration of gender-sensitive training modules to use in capacity building EAS functions (USAID, 2015b).

Green Innovation Centres for the Agriculture and Food Sector Programme

The Green Innovation Centres for the Agriculture and Food Sector Programme is a six-year (2015-2021) initiative funded by the German Federal Ministry for Economic Cooperation and Development and implemented in 14 countries, including Mali.⁷ The program aims to increase farm incomes, boost employment and improve food supply. In Mali, the Green Innovation Centres activities are carried out in collaboration with the Ministry of Agriculture and its regional directorates in the regions of Kayes, Koulikoro, Sikasso, Ségou and Mopti. Among other activities, the program is improving the rice, potato and mango value chains in Mali and using participatory approaches to increase inclusion of women and youth. The program also promotes functional literacy for farmers (GIZ, 2018).

In 2016, the Green Innovation Centres and FOSCAR-Mali agreed to scale up good practices of potato, market garden and rice in 12 areas of Sikasso, Koulikoro, Mopti and Ségou regions. The joint project aims to promote value chains approaches in these crops among 70,000 producers comprised of 50,000 potato and market gardening producers and 20,000 rice producers (AFAAS, 2018).

CGIAR Research Institutions

Various CGIAR research institutions are actively working in Mali in their respective fields with ministerial departments, national research systems and others. In addition to research, they conduct extension activities such as demonstration plots, training, open days and field schools with and for producers and producer organizations. As of 2016, four CGIAR centers had offices in Mali: The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Livestock Research Institute (ILRI), ICRAF and Africa Rice.

Sasakawa Global 2000 (SG2000)

The SG2000 is an agricultural support program for farmers, part of Sasakawa Africa Association (SAA). The SG2000 has been implementing in Mali since 1996 and collaborates closely with the DNA. During its first eight years, the SG2000 focused on improving production and crop productivity through demonstrations, providing financing for inputs and support for Rural Savings and Loan Banks. Since 2004, SG2000 has sought ways to link farmers to output markets by supporting input acquisition, monitoring of yields, marketing education and technical information provision. Other activities of SG2000 include organizing National Seed Fairs and support to farmer organizations and Post-Harvest and Trade Centers. More recently, SG2000 has focused on value

⁶ C-4 refers to the four West African cotton-producing countries: Burkina Faso, Benin, Chad and Mali.

⁷ The program is implemented in Benin, Burkina Faso, Cameroon, Ethiopia, Ghana, India, Kenya, Malawi, Mali, Mozambique, Nigeria, Togo, Tunisia and Zambia.

chain integration and food security objectives. From 2012 to 2016, SG2000 implemented activities in four regions, 12 districts, 52 communes and 320 villages (SG2000, 2018).

Sasakawa Africa Fund for Extension Education (SAFE)

The SAFE is also an SAA initiative, supporting agricultural extension training in educational institutions and offering diplomas and degrees in nine countries. In Mali, the SAFE Program is affiliated with the IPR/IFRA, the Samanko Agricultural College and the University of Segou. The SAFE focuses on building the skills of mid-career extension professionals of 45 years or older (Simpson and Dembélé, 2011). In Mali, SAFE has benefited more than 610 mid-career students since the program began at IPR/IFRA in 2003. Women comprise a rising portion of students in the SAFE Program in Mali. Of 482 total alumni since 2003, 22 percent were women. Of current enrolled students, 24 percent are female (SAFE, 2018). More than half the students in the Mali SAFE program come from either the Ministry of Agriculture or related ministries and offices. A number of students come from NGOs. Many of those who have graduated from this training now hold leading positions in Mali's national agricultural extension system (Simpson and Dembélé, 2011).

Farm Radio International

Farm Radio International is a Canadian-based NGO, registered in Mali since 2011. It specializes in radio-based communication and the use of ICTs to improve agricultural extension. In Mali, Farm Radio International has developed several radio strategies for EAS, including the Radio Participative Campaign and Radio Market Place. In its interventions, Farm Radio International emphasizes the participation of women and young people. Farm Radio International also has put in place a portable “beep to vote” phone usage strategy to assess the level of listeners’ awareness of technology without additional charges.

Radio Action Impact

Radio Action Impact was founded in 2004 as the result of a community radio project carried out by Fanakan Radio Fana, KILABO (a local NGO) and a Canadian non-profit organization, Canadian Crossroads International. Radio Action Impact covers all of Africa and uses a participatory media approach that combines radio with video. This approach has shown a demonstrated impact for programs designed with farmers. It also includes integrated mechanisms for farmers to propose schedules and provide feedback.

Global Water Initiative (GWI)

The recently-concluded GWI program was a nine-year (2008-2017) initiative, funded by the Howard G. Buffett Foundation. It was implemented in Burkina Faso, Guinea, Mali, Niger and Senegal with the aim to improve food security by improving access, management and use of water resources for sustainable agricultural production. In Mali, the program supported advisory services around irrigation with research, analysis and recommendations for adapting advisory services for rice irrigation schemes. The GWI has conducted research in Mali and Burkina Faso on the issues facing smallholder rice farmers in large-scale irrigation models. The initiative also carried out an analysis of farmer organizations around the Sélingué Dam and an economic analysis on the impact of the Sélingué dam on national investment and on local livelihoods (GWI, 2018).

Extension and Advisory Services Characteristics

Governance Structures and Policy Environment

Governance Structures and Coordination

The Ministry of Agriculture and the Ministry of Livestock and Fisheries are the primary government structures involved in EAS in Mali (see Public Sector section above for more details). While the DNA holds primary responsibility for coordination of EAS activities, a number of other agencies support EAS as well (see Box 1.)

The EAS actor map in Mali is very complex. Overlapping extension functions among organizations in the same area appears to be common. There are few or ineffective structures for coordinating activities among them or with research programs. Several specific mechanisms have been established at the national, regional and local levels to improve communication and coordination among research and EAS actors and farmers. The Annual Commune Plans are a bottom-up planning process with the DNA and IER (Simpson and Dembélé, 2011). There are also Monthly Technology Review Workshops, Regional Agricultural Research and Extension Councils and Regional Research User Commissions, led at the national level by the National Committee for Agricultural Research and in the regions, by the DNA offices. Many of these mechanisms do not function regularly or as planned on paper. One of the constraining factors is the lack of funds for implementing meetings.⁸

Policy

Extension services and related policy have evolved significantly in Mali in response to formal and informal strategies and policies. Extension started during the colonial period in 1928 and was focused on animal traction and improved plant varieties (Traoré, 2008). According to Traoré, “The administrative guidelines and system in this approach were based on colonial administrative framework that was heavily centralized and gave no room for farmers’ intervention and participation” (Traoré, 2008, p. 6).

Following independence, Mali entered a socialist period where collective farming and agricultural cooperatives were employed from 1960-1970 (Traoré, 2008). During this time the IER was created. However, there was poor linkage between research, extension and farmers, with little farmer input into the system.

From 1970-2006, a multidisciplinary rural development approach was employed. Here the focus was on geographically-relevant food crops with accompanying credit and inputs (Traoré, 2008). At the same time liberalization and structural adjustments were taking place. This was also the period of training and visit. World Bank support led to a restructuring of the rural development approach and the implementation of the pilot agricultural extension program (PTVA) (Traoré, 2008).

The success of this pilot led to the National Agricultural Extension Program (PNVA) which was created in 1990, with support from the World Bank. The PNVA was rolled out country-wide under the DNA and modeled on the “training and visit” system. It aimed to bring order to the existing extension service models, to build and strengthen partnerships, and to integrate technology transfer – all with the goal of increasing agricultural productivity (Kassambara, 2012). The PNVA included extension as one of its four program components, while the other components focused on research, farmers’ organizations and chambers and rural services.

⁸ Government stakeholder personal interview, September 2017.

The PNVA faced a number of challenges, including finding sufficiently qualified field agents and building their capacity. Specialized technical staff are also sometimes lacking. Remoteness of many villages also makes it difficult to find quality staff and to provide needed services. Other overarching challenges include low managerial capacity of supervisors as well as weak operational capacities and poor coordination at the regional and national levels (Kassambara, 2012).

However, overall positive evaluations of PNVA led to the creation in 2005 of the Support Program for Agricultural Services and Producer Organizations (PASAOP). PASAOP ran for 11 years in three successive phases and was co-funded by the Government of Mali, the World Bank and other donors (Sidebe, 2014; Traoré, 2008). The aim of PASAOP was to decentralize and begin to privatize demand-driven extension services, with producer's financial participation (Sidebe, 2014).

PASAOP was followed by PAPAM (described above under Public Programs) which was launched in 2011 and is the current EAS delivery mechanism in Mali, funded by a number of donor and ending in 2018.

The following are relevant current or recently-concluded policies and laws bearing on the agricultural sector and EAS today:

- ◆ *The 2006 Agricultural Orientation Law (LOA)*: The LOA established a long-term vision for the country based on the promotion of sustainable, modern and competitive agriculture, centered primarily on family farms. The CNOP played a key role in leading the process to create the LOA.

The LOA aims to secure food sovereignty and to make agriculture “the engine of the national economy” (GRET, 2005, p 5). It also outlines the roles of government and other entities, noting that the government services are to be demand-driven, focused on providing technical assistance to farmers and agricultural organizations and committed to setting policies conducive to agricultural growth and market expansion. The law also allows for private provision of extension services. A major objective in the LOA is to be spending 20 percent of the national budget on the agricultural sector by 2022.

- ◆ *National Support Fund for Agriculture*: This fund, created in 2010, aims to prevent or minimize risks, provide farmers with borrowing mechanisms and to establish support for seed production and a quality seed stock. Among other things, the fund offers an interest rate subsidy for producers in order to facilitate access to credit on more favorable terms.
- ◆ *2011-2020 Agricultural Development Policy (PDA)*: The PDA is the strategic framework of the LOA and follows a previous plan (the Master Plan for Rural Development 1992-2010). The PDA adopts a sector-focused approach to agricultural development has the following specific objectives:
 - Reduce rural poverty, ensure food security and guarantee food sovereignty.
 - Ensure sound natural resource management, taking into account climate change.
 - Modernize agricultural production systems and improve the competitiveness of agricultural sectors.
 - Through agricultural research and vocational training, ensure development of technological innovations.
 - Promote farmers' status and build stakeholder capacity (Republic of Mali, 2013b).

- ◆ *2011-2015 National Programme for Priority Investment in the Agricultural Sector (PNIP-SA)*: This five-year agricultural investment plan aligned with the CAADP and focused on strategic investments in agriculture value chains. It also included cross-cutting elements aimed at strengthening nutrition education (Republic of Mali, 2014). The PNIP-SA was partially supported by FTF and other members of the donor community (FTF Multi-Year Strategy, 2011).
- ◆ *2011-2020 National Agricultural Sector Investment Program (PNISA)*: The strategic goals of PNISA include the following:
 - Strengthen the capacity of relevant actors, involved in agricultural development activities, with emphasis on monitoring and evaluation.
 - Invest in the land tenure, natural resource management and irrigation and water management systems.
 - Establish measures to promote the production and the competitiveness of agro-silvo-pastoral and fisheries sectors.
 - Provide training and research in support of production systems and EAS.
 - Provide better social protection to address cyclical food and nutrition insecurity.
- ◆ *The 2012-2017 Strategic Framework for Growth, Employment and Poverty Reduction (CSCR)*: This recently-concluded framework outlined policies and programs to reduce poverty, promote a seven percent growth rate and accelerate progress toward the Millennium Development Goals. Among other objectives, the CSCR focused on job creation, income-generating activities and equitable access to services. Improving food security through expanded agricultural production and improved access to food was a central focus of the CSCR (IMF, 2013).

Organizational and Management Capacities and Cultures

The section above on public actors in EAS discussed some of the human resource constraints in Mali. Both quantity (sufficient numbers) and quality are lacking, especially subject matter specialists. Supervisors have low managerial capacity (Kassambara, 2012).

In Mali, a set of three laws classify public sector extension employees into three general categories: A for the Engineers, B for senior technicians and C for technical staff.⁹ The government also requires that NGOs, associations, projects and programs providing extension services must adapt their technical, administrative and research supervision to this system.

Government staff, numbering 839 in 2009 (Table 3), constitute the most prominent extension provider in terms of numbers and geographic and technical coverage (IFPRI/FAO/IICA, 2011). Overall, the number of public-sector extension agents and field support staff in the field is very low, despite recruitment efforts and support from international and local NGOs. It is becoming more common for extension to use farmer extension agents as part of the system to reduce cost and reach more farmers, although many do not have the requisite qualifications.

The Worldwide Extension Study also noted that in 2009, pre-service training for public extension workers primarily was available at various agricultural training centers in Mali. At the time, forty staff

⁹ Law #82-98 (September 1, 1983), Law #82-100 (December 23, 1982) and Law #82-99 of 23 December 1982.

(22 with a bachelor’s degree and one with a PhD) provided in-service training to public extension staff. Additionally, 12 ICT Support Staff (with bachelor’s degrees) provided support in the use of multimedia resources and advanced communication and information tools (IFPRI/FAO/IICA, 2011). See Table 3 for further information on education levels of Mali’s public extension staff.

Most public staff have their primary degree from IPR/IFRA, which also offers a four-year degree in agricultural extension through SAFE. The DNA’s Agricultural and Rural Education Division organizes short-, mid- and long-term training opportunities; however, these are not very regular (Simpson and Dembélé, 2011).

The Worldwide Extension Study also found very high workloads among extension staff. A supervisor would cover an average of 15 to 16 villages instead of the standard government-established set of 6-8 villages (IFPRI/FAO/IICA, 2011).

Table 3. 2009 Education Levels of Human Resources in Mali’s Public Extension Service

| Major Categories of Extension Staff | Secondary School diploma | | 2-3 yr. Agriculture diploma | | B.Sc. degree | | M.Sc./Ing. Agriculture degree | | Ph.D. degree | |
|-------------------------------------|--------------------------|-----|-----------------------------|-----|--------------|-----|-------------------------------|---|--------------|---|
| | F | M | F | M | F | M | F | M | F | M |
| Senior Management Staff | | | | | | 11 | | | | |
| Subject Matter Specialists | | | | | | 128 | | | | 2 |
| Field Level Extension Staff | 41 | 295 | 7 | 303 | | | | | | |
| ICT Support Staff | | | 1 | | | 11 | | | | |
| In-Service Training Staff | | 4 | | 13 | | 22 | | | | 1 |
| Total Extension Staff: 839 | 41 | 299 | 8 | 316 | | 172 | | | | 3 |

Source: IFPRI/FAO/IICA Worldwide Extension Study, 2011

The gender balance among extension agents varies but numbers of female agents in the CMDT, DNA, SAFE and other programs tends to be low – typically between 10 and 25 percent.

Moreover, youth inclusion is a problem. Government stakeholders interviewed for this assessment noted that much of the existing extension staff is aging and the government will face challenges in effectively replacing them.¹⁰ Estimates indicate that the average age for field staff is approximately 50 years of age (Simpson and Dembélé, 2011). Moreover, government stakeholders estimated that approximately 2,000 agents of the Ministry of Agriculture retired in 2017, whereas recruitment only expected to bring in 500 agents.

Other overarching challenges in Mali’s extension system that the government stakeholders noted included the following:

¹⁰ Government stakeholders, personal interviews, September 2017.

- ◆ An inadequate curriculum that lacks important pedagogical elements such as effective communication.
- ◆ An imbalance in specialty areas of technical staff, with most having a background in agronomy or agroforestry.
- ◆ Insufficient resources to perform EAS work (e.g. motorcycles, fuel money, laptops).
- ◆ A limited career plan that does not encourage or motivate agents to improve performance.
- ◆ NGO-supported extension agents' jobs are limited to project funding cycles.
- ◆ Extension agents who pursue postgraduate studies and obtain doctoral levels are typically classified as researchers.¹¹

Other research has identified weak points in the governance and management of Mali's EAS in the areas of communication, monitoring, evaluation and capitalization of achievements. Findings included poor linkages or gaps between extension workers' work plans, activities and results. Extension workers also reportedly faced challenges in effectively marketing agricultural products and their services were often misaligned with the agricultural calendar (Kouriba, 2015).

However, some good practices also exist. The L4G project have had success in their EAS work with regard to hands-on training and practices delivered directly to farmers and livestock producers (this could be taught to government extension agents), capacity building for facilitators (field agents/lead farmers) and organizational capacity building. Their approaches could be replicated and scaled in additional organizations and geographic locations.

Advisory Methods and Approaches

This assessment identified the following methods and approaches being used in EAS in Mali:

1. Demonstration Plots and Showcase Methods

In 1983, the Regional Agricultural Research Station Cinzana began showcasing new technologies through demonstration plots. These plots are installed along major highways with signage explaining the technologies. This method was seen as advantageous because it did not require initial producer buy-in. This was a new extension method in Mali at the time, but other research centers and extension service providers began using it.

2. Integrated Agricultural Research for Development Approach

In an attempt to address the weaknesses in previous approaches and to breathe new life into relationships with researchers and other development actors, the Forum for Agricultural Research in Africa adopted the Integrated Agricultural Research for Development (IAR4D) concept. The IER and other research centers in Mali use this approach, which aims to center research and subsequent development and dissemination of innovations and technologies on the problems posed by food security, poverty and agricultural development. The IAR4D approach allows for research to be used to address agriculture and value chain needs. USAID and the World Bank used the IAR4D concept in extension aspects of the West Africa Agricultural Productivity Program, which ran from 2007 to 2013.

¹¹ Ibid.

3. Farmer Field Schools

The FFS method is a field-based adult education model. FAO has been a leader in promoting the FFS approach and introduced it in Mali in 1996 (Ton et al., 2010). The FAO reported that by 2017, Mali had 52 FFS master trainers and 1,773 facilitators, of which 12 percent were female. It is reportedly used in 180 municipalities of five of Mali's 10 regions (FAO, 2018a). The FAO reports that of 85,054 farmers trained in Mali since 2001 with the FFS method, one-third have been women (FAO, 2018b).

The Government of Mali gives the FFS approach high priority and in 2016, the DNA organized a workshop for all Regional Directors of Agriculture, Program Focal Points and Division Chiefs.¹² In addition to use of the FFS approach in government extension services, it is also used in a number of donor-funded initiatives including the USAID Harande and Feed the Future LAG projects.

4. Champion Farmers/Farmer to Farmer Extension

The champion farmers (producteurs champion) approach is a type of farmer-to-farmer extension approach, in which farmers train their peers. SmAT-Scale works with about 4,500 champion farmers in Mali, training them in such topics as climate-smart agricultural practices, diffusion techniques and business planning. The champion farmers are members of producer groups and train their fellow members. This approach is used by partner organizations in the SmAT-Scale Project, including ICRAF, Catholic Relief Services, World Vision and the DNA. Field agents of the partner organizations backstop champion farmers in the field (ICRAF, 2017). The USAID Harande Development Food Aid Program also uses farmers to train other farmers and integrates this within the FFS approach.

5. Rural Resource Centers (RRCs)

Rural Resource Centers are hubs for training and demonstrations managed by grassroots organizations with support from extension services. The SmAT-Scaling project has helped community organizations establish 14 RRCs in Sikasso, Mopti and Toumbouctou Regions. Because the project focuses on tree products, these RRCs tend to focus on developing tree product value chains. A typical RRC comprises a tree nursery, demonstration plots, a training hall, a library and an office. Accommodation, catering facilities and processing units may also be included depending on available resources and opportunities. These RRCs help develop networks of nursery groups in areas neighboring the center and provide farmers with opportunities to receive training, exchange experiences and access to input suppliers, processors, traders and other value chain actors. The RRCs partially fund their activities through sales of planting material and training services.

6. Agricultural Entrepreneurship

Agricultural entrepreneurship methods are used by extension agents to provide more in-depth training to farmers to enable them to understand, analyze and manage the dimensions of a company or venture, including a farm. These methods combine learning and practice with a sharing of experience. Agricultural entrepreneurship methods aim to improve competitiveness across various links in the value chain. GIZ uses this approach in its programs in Mali.

7. Value Chain Approaches

Value chain-focused approaches are also used by extension services in Mali, including in USAID and other donor-funded projects. Extension agents use these methods with farmers involved in

¹² Government stakeholder personal interview, September 2017.

commercial aspects of agriculture. The agents incorporate identification and analysis of relevant value chains as well as monitoring of market information. They also develop and maintain business relationships that support success.

8. Radio Programming

Mali has been using radio programs since the 1960s to reach its rural residents. This includes programs aimed at improving literacy and for expanding agricultural extension. Radio campaign methods are recognized in Mali and other locations for achieving results five times more effective than conventional extension approaches, in part because “on average, two thirds of rural households in Africa listen to radio every day” (Perkins, Ward and Leclair, 2011). Radio is often an effective and inexpensive way to reach farmers in rural Mali who may otherwise be disconnected from other communication services.

Of note is the African Farm Radio Research Initiative and the Participatory Radio Campaign study that included 25 radio stations in five sub-Saharan African countries, including Mali, that had a reach of 40 million farmers.¹³ This study identified several important knowledge management and learning factors:

- ◆ Farmers in active listening communities of the radio campaign were nearly 50 percent more likely to accept agricultural practices to help improve their food security than listeners in passive listening communities.
- ◆ Farmers in active listening communities were ten times more likely to adopt a practice than farmers who did not have access to rural radio programs.
- ◆ Farmers demonstrated a better understanding of agricultural innovations as a result of listening to radio programs.
- ◆ Of producers in active listening communities, 96 percent improved their knowledge around technologies promoted in the area through the radio campaigns (Perkins, Ward and Leclair, 2011).

Today, Mali uses radio among its rural listeners for a number of development objectives, including literacy and agricultural extension. The ORTM delivers programs through the radio, which cover agriculture, livestock breeding, the environment and other topics. The programs use testimonials, success stories, best practices and national policy guidelines as mediums to deliver information to rural farmers.

In addition, Mali’s National Rural Radio uses a participatory approach for its regular agriculture program. Several villages in the same area are invited to join a group to discuss an agricultural problem common to all. Following a participatory diagnosis, with the accompaniment of technical staff, the participants develop and arrive at a solution.

9. Radio Community Listeners Clubs

Radio programs in Mali also use Community Listeners Clubs as a participatory, inclusive and iterative approach to reach farmers in the same region. Radio stations typically carry out formative studies with the communities to identify those most willing to adopt promoted good practices. In this sense, Community Listeners Clubs can serve as an effective social and behavior change tool. This approach has been used in the Green Innovation Centres.

¹³ Other countries included Ghana, Uganda, Malawi and Tanzania.

10. Participatory Media Methods

In Mali, participatory media methods have been used for information sharing in extension services. They are also used to promote indigenous knowledge, along with adaptation and adoption of innovations and good practices. For example, from 2004 to 2006, the Alliance of Community Radios of Mali (ARCOM), in partnership with KILABO, Canadian Crossword International and the Coalition des Alternatives Africaines Dettes et Developpement implemented several projects using participatory media campaigns in various regions of Mali.

Today innovative participatory media methods are prevalent in EAS services in Mali. Access Agriculture, an international NGO, uses videos and smart phones for farmer-to-farmer information sharing.

11. Video and Television

Access Agriculture also uses videos for outreach and the Ministry of Communication and ICRISAT use television programs as an EAS method to reach farmers.

Market Engagement

Smallholder farmers in Mali face a number of challenges in effectively entering agriculture and livestock markets, both at regional and international levels. A key regional government stakeholder noted that farmers in Mali are exploited by the market and need to learn how to more effectively participate in the market.¹⁴ Among the challenges are lack of information, poor linkages to markets, post-harvest losses, insufficient technology, lack of access to finance, inability to respond to climatic variation and high transaction costs. Specific barriers to entering international markets include farmers' ability to meet post-harvest transport, production and packaging requirements. These and other factors lead to reduced productivity and disincentives for market entry.

Various government and donor-funded initiatives have taken steps to address market engagement:

- ◆ In 1989, Mali set up the national information system known as the Agricultural Market Observatory. Today this is managed by APCAM. Initially, the Observatory was responsible for collecting cereal prices, but later it re-oriented to also disseminate commercial information to users. It collects and provides information on price changes in the agricultural market and the factors underlying these changes. The Agricultural Market Observatory also promotes exchanges between producers, traders, processors and decision-makers inside and outside the country (CTA, 2008).
- ◆ The DNPIA monitors livestock markets and industries and uses this information in its policy and program work.
- ◆ To address challenges in the lending process, Mali's National Bank for Agricultural Development offers support to farmers during loan application and management stages.
- ◆ In an effort to better identify producers and their needs, the Regional Chambers of Agriculture are in the process of creating a registry of producers.

¹⁴ Government stakeholder personal interview, September 2017.

- ◆ Public-private partnerships are a key strategy promoted by the government and in various programs funded by international donors.
- ◆ Under the L4G project, producers receive capacity building in various aspects of market participation, including production planning and financing. (See Annex 2 for more details on the L4G project.)
- ◆ Under the C4CP program, farmers have received training and support for improved cotton processing and post-harvest management, in order to improve commercial viability.
- ◆ Also, under C4CP, a cotton seed initiative also had great success in improving farmers' incomes. This seed marketing approach was later adapted to other crops. Stakeholders interviewed emphasized this project as a source of employment for young people and women.¹⁵
- ◆ Under an initiative entitled Agricultural Enterprise Clusters, implemented by the International Fertilizer Development Center, producer groups improve farm management through business management and group marketing approaches.
- ◆ The Radio Market Place is another activity of Farm Radio International that seeks to address market entry challenges by facilitating linkages between entrepreneurs' and banks and financial institutions.
- ◆ The Green Innovation Centres, in partnership with FOSCAR-Mali, also run an initiative called "On the Market" that supports value chain analysis and promotes commercialization of agricultural products.

**Public-Private Partnerships
Under the SmAT-Scaling Project**

A partnership with Olvea, a bulk supplier of vegetable oils based in France, has helped facilitate the certification of shea nuts in Mali, improve the revenue of 3,000 Malian women who are certified processors and build the financial, management and governance of five women's producer organizations. Olvea also committed to purchase 500 tons of certified shea nuts from the producer organization in 2017, up from 60 tons in 2015.

Source: Djalalou-Dine, A. et al. (2017)

Despite these steps by the government and international donors, there remains much to be done to better promote market engagement through EAS.

Livelihood Strategies

In Mali, key livelihood strategies include crop and livelihood diversification, along with various forms of migration or pastoralism. Rural communities also have developed adaptive capacities over the years from experience with previous instances of extreme weather like the drought in the Sahel of the 1970s and 1980s (Giannini et al., 2016).

However, many interviewees in this assessment noted the need to address livelihood strategies more directly and to better integrate climate change adaptation measures in EAS delivery. There is overwhelming evidence that climate change effects – especially unpredictable precipitation and extreme weather – have had a detrimental impact on smallholder farmers' livelihoods in Mali. A 2014 Climate Vulnerability Mapping that used a vulnerability index of 18 indicators found that high

¹⁵ Stakeholder personal interviews, September 2017.

levels of poverty across the country effectively render all of Mali's regions and population highly vulnerable to climate change (USAID, 2014).

Moreover, while diversification is an important livelihood strategy, unpredictable and extreme weather along with changes in rainfall have made diversification more challenging. This, combined with the fact that much of Mali's agriculture is rainfed, presents even more obstacles to sustainable livelihood strategies (Giannini et al., 2016). Additionally, a study that analyzed health, livelihoods and sociodemographic data from 2006 and 2012 found that those farmers in Mali that used agriculture primarily for subsistence and sought other livelihoods strategies were more vulnerable to climate change and food insecurity because they were less likely to use mechanized agricultural techniques (Bakhtsiyarava, Grace and Nawrotzki, 2018).

The Government of Mali has also recognized the need to integrate climate change information and adaptation measures into EAS and other state services. For example, the National Policy on Climate Change notes the need for "strengthening research for development, extension and technology transfer and information generation and appropriate data; information, public awareness, training and capabilities" (Republic of Mali, 2011, p 20-22).

Community Engagement

Malian extension providers do not have detailed strategies for EAS community engagement for the most part and could benefit from tailored approaches that address social inclusion elements such as gender, youth, marginalized ethnic groups and other vulnerable populations. During interviews, key informants noted various aspects of community engagement including demand-responsive extension services and participation of farmers in the management of regional Outreach and Agricultural Councils.¹⁶ However, overall community engagement in Mali is frequently defined by the structures concerned (e.g., project parameters, donor requirements, etc.).

In particular, gender-sensitive and youth-inclusive community engagement approaches are needed in EAS. Women in Mali face a number of inequities in agriculture including limited access to finance, increased workloads, limited decision making and lower opportunities for wage labor (USAID, 2012a). Engaging with women and men in EAS thus requires not only addressing agricultural, market and finance needs, but also attention to norms that can help shift behaviors more positively for women. For example, when engaging men in EAS, agents could also address and integrate messaging to further men's understanding of women's workloads or women's ability to learn and manage business matters. In Mali, this appears to be occurring in EAS delivery primarily through international programs such as the USAID Harande Program, the C4CP project, Farm Radio, the SAFE program and the L4G project.

Mali could also benefit from more youth-inclusive engagement approaches in EAS. The aging EAS agent pool¹⁷ and field staff with an average age of approximately 50 years (Simpson and Dembélé, 2011) indicate recruitment problems in terms of attracting youth to EAS. Moreover, youth and young adults between the ages of 15 and 40 represent 40 percent of Mali's population, and unemployment rates for youth in rural areas are extremely high (FAO, 2017). Some interviewees in

¹⁶ Stakeholder personal interviews, September 2017.

¹⁷ Government stakeholders, personal interviews, September 2017.

this assessment also talked about shifts over the years since the 1960s in how EAS has engaged with young producers, promoted peer learning or motivated youth to innovate.¹⁸

The government has recognized the need to engage young men and women and has taken some steps to address this. The Ministry of Agriculture, in collaboration with the FAO, implemented a program from 2014-2016 entitled “Youth at Work: Reducing Rural Poverty.” The program aimed to create attractive employment opportunities for rural youth, with activities also targeting girls and young women (FAO, 2017).

The FAO has also developed and implemented an approach called the Junior Farmer Field and Life Schools (JFFLS) which addresses the needs of vulnerable rural youth in Mali, providing them with capacity building in agricultural, business and life skills. The JFFLS approach, for example, combines training on crop disease with human health information (FAO, 2017).

CONCLUSIONS AND RECOMMENDATIONS

This assessment finds a number of strengths in the EAS systems in Mali, as well as some weaknesses that represent opportunities for action. The following are entry points or drivers of success for improving the extension system in the country.

1. Commitment of the Government of Mali to agriculture as evidenced by its high level of investment.
2. Donor interest and support for EAS.
3. A significant number of competent stakeholders in EAS, including many international technical experts and researchers.
4. Coordination structures in place that could be consolidated and used for more efficient EAS planning and delivery.
5. A wide variety of well-established advisory methods including FFS and innovative uses of radio and other ICTs.
6. Opportunities to scale and increase sustainability through the use of ICT.

Below are recommendations for improving the EAS in Mali with suggested action steps for each. Further validation of this assessment and the recommendations with stakeholders in Mali would be useful before taking action. The suggested lead and support actor(s) are indicated following each recommendation.

Governance Structures and Policy Environment

1. Develop an EAS Coordination Framework

Lead: Government of Mali

Support: International donors, private sector, research and training institutions

Develop, pilot, adapt and implement a formal framework to coordinate strategic direction of different EAS actors for integrated delivery. This is an important step to aligning EAS in Mali as well as to reduce inefficiencies that arise from overlapping service delivery, different approaches, and conflicting information delivery. With greater coordination of EAS actors, training content

¹⁸ Stakeholder personal interviews, September 2017.

and their modes of service delivery, resources could be used more efficiently to reach those in need and through models that reduce costs.

2. Conduct EAS Financing Study

Lead: Ministries of Agriculture, Livestock and Fisheries, Science and Research and Finance

Support: FOSSCAR-Mali, National Bank for Agricultural Development, private sector actors, donors

An EAS financing study will yield options that the government can utilize to best fund EAS delivery.

- Financing Study: Conduct a study on strategies, best practices and lessons learned for financing EAS, including through private sector engagement.
- EAS Financing Actors: Develop a pool of potential financing actors and include them in subsequent relevant activities (e.g. stakeholder mapping, consultations for a national policy, etc.).

3. Carry Out Stakeholder and Information Mapping

Lead: Ministry of Agriculture, Ministry of Livestock and Fisheries

Support: FOSSCAR-Mali

A stakeholder and information mapping exercise that is gender-sensitive, youth-inclusive and multi-sectoral will provide a useful baseline from which the government and other counterparts can then use in developing a national policy. The activity will identify and map stakeholders, tools and laws, regulations and strategies relevant to EAS in Mali and in the region, as well as their use, efficiency, methods and adoption rates. This will be the first step to develop an EAS policy (below).

4. Develop and Implement a National Policy on Pluralistic EAS

Lead: Government of Mali

Support: FOSSCAR-Mali, GFRAS, donors

A national policy on pluralistic EAS will aid in developing, coordinating and rolling out an effective EAS system based on multiple service providers.

- Cross-Country Learning: Develop learning groups and knowledge sharing mechanisms (e.g. online knowledge platforms) to identify and apply to the national policy experiences and best practices from other countries and regions.
- Socialization of the Policy: Implement capacity building and raise awareness with key stakeholders to socialize the national policy.
- Political Dialogue: Coordinate regular political dialogue sessions to discuss fund needs, public expenditure capabilities, EAS policies and overall objectives of the national policy.

Organizational and Management Capacities and Cultures

5. Develop a National EAS Capacity Building Plan

Lead: IPR/IFRA, Ministry of Agriculture, Ministry of Higher Education and Scientific Research

Support: FOSSCAR-Mali, GFRAS, international donors, SAFE, private sector, L4G

There is a need for better coordinated and planned EAS training and capacity strengthening, building on good practices such as those developed by L4G (Annex 2). Developing a unified

national capacity building plan will aid in achieving this. We recommend that the plan include, at a minimum, the following elements:

- a) Gender-sensitive and youth-sensitive training to promote the sustainable modernization of EAS services, tailored to meet the needs of smallholder farmers.
- b) A common set of necessary technical and functional skills (such as knowledge management, social and behavior change communication and facilitation skills).
- c) Practical modules that the Centers of Agricultural Apprenticeship can use.
- d) The establishment of Departments of Agricultural Extension Education at Mali's agricultural universities and training institutes.

6. Develop and Implement an Action Plan to Increase Use of ICT in EAS

Lead: Government of Mali, ORTM

Support: FOSSCAR-Mali, farmers' organizations, IPR/IFRA, LAG, donors

There are more ways EAS providers could integrate and expand the use of ICT to more efficiently deliver services to farmers and to obtain their feedback and monitor EAS:

- Conduct a National Study on ICT: Establish an advisory group to document the use of ICTs in the EAS, agriculture and nutrition domains. Identify how different sectors use ICT; for example, rural and peri-urban farmers, youth and male and female farmers.
- Develop an Action Plan to Promote ICT Through EAS: The advisory group would develop an action plan to better promote knowledge-sharing along with the scaling of successful ICT use in EAS for experience sharing, knowledge management and monitoring. They should incorporate lessons from the planned LAG baseline study on how producers use market information under the LMIS.
- Implement Action Plan: In coordination with the DNA, donor institutions, farmers organizations, and other stakeholders, take steps to integrate and implement the components of the action plan.

Market Engagement

7. Promote Market Participation through EAS

Lead: Ministries of Agriculture and Livestock and Fisheries, Ministry of Communication, farmers' organizations
Support: Green Innovation Centres, FOSSCAR-Mali

Given Mali's rural youth unemployment rate, the important role of agriculture in the economy, and other factors, EAS is a useful medium for promoting greater market participation. This could include business and financial literacy training, training on monitoring and negotiating market prices, or opportunities to develop useful market linkages.

- Identify Best Practices and Develop Training Content: Conduct consultations with key stakeholders, including those identified in the stakeholder mapping exercise, to identify best practices and develop training content relevant for promoting market participation through EAS.

- Training Delivery: In coordination with key actors of the national capacity building plan, develop a plan to deliver training and build capacity of different groups (e.g. youth, subsistence and smallholder farmers, female farmers, etc.) for more effective market participation.

8. Scale ICT Use to Promote Market and Value Chain Participation

Lead: Radio Action Impact (Mali) and Farm Radio International, Office des Radios et Television du Mali, relevant Directorates of the Government of Mali

Support: LAG, Green Innovation Centres, donors, private sector

ICT also offers excellent opportunities to improve market and value chain participation. This could include for example, mediums for delivery of training on business skills or systems for real-time climate data sharing so as to improve seasonal planning and reduce losses.

- Lessons Learned for ICT in EAS: Carry out an analysis of the lessons learned from using ICT in EAS in Mali, the region and elsewhere, to promote market and value chain promotion.
- Scaling Plan: Identify all current uses of ICT in Mali and develop a plan to scale positive practices based on the analysis of lessons-learned. Engage donor institutions and the private sector to leverage financing for ICT activities.

Livelihood Strategies and Community Engagement

9. Develop a Livelihoods-Focused Climate Change Protocol for EAS

Lead: Ministry of Livestock and Fisheries, Ministry of Agriculture, Ministry of Environment

Support: International donors, UNDP, climate-focused NGOs

Develop and roll out training materials for EAS agents to be able to build capacity and increase adoption of climate adaptation and sustainable natural resource management practices, particularly as they relate to farmers' livelihood strategies. Ensure materials are gender and youth-sensitive and address each group's particular livelihoods and social inclusion needs.

10. Integrate Best-fit Practices for Gender Equality in the EAS Systems

Lead: Ministry of Livestock and Fisheries, Ministry of Agriculture, Ministry of Environment

Support: UNWomen, UNDP, gender-focused NGOs, international donors

Women are an important part of Mali's labor force and there are a number of best practices that could be used to integrate gender equality principles in Mali's EAS systems.

- Conduct Gender Analysis: Through a literature review and interviews with community, regional and national stakeholders, identify the primary gender-related elements impacting men and women of various ages in the rural, agricultural sector.
- Integrate Lessons Learned into EAS Curriculum and Activities: Design and deliver ongoing professional development to EAS agents on gender-sensitive EAS delivery, as well as approaches for engaging men and boys to empower women and girls in activities related to both subsistence and commercial agriculture.

- Establish Feedback Loops for Monitoring and Adaptive Management: This is important to ensure desired practices for EAS agents to engage women and men are being used effectively and adapted when barriers or opportunities present themselves.
- Monitor Gender Balance and Establish Incentives to Recruit Women: Establish regular mechanisms to monitor the proportion of women in agricultural education and extension programs including at IPR/IFRA, through the SAFE Program and at the CAAs. Develop incentives to recruit more women, particularly in field positions in extension programs.

11. Promote Youth Inclusion and Employability through EAS

Lead: Ministry of Agriculture, FAO, National Youth Council of Mali

Support: Youth-focused NGOs, international donors, private sector

An aging group of extension agents across Mali and low recruitment numbers for EAS agents are two indicators of challenges related to inclusion and participation of youth in EAS. High youth unemployment in rural areas also means that employability is critical for rural youth.

- Conduct a Youth-Focused Inclusion Analysis: For this reason, it is imperative to conduct an inclusion analysis with interviews and focus groups at community, regional and national levels with youth and adults to assess the challenges, opportunities and desires of Mali's youth.
- Develop a Recruitment Plan to Increase Youth Participation in EAS: Use the results of the analysis to establish incentives and coordinate with EAS training and implementation actors to actively recruit more youth into EAS services. This may include great use of ICT, social media, or market incentives to attract youth and demonstrate EAS and related work as viable employment opportunities.
- Consider Expanding the Use of FAO's Junior Farmer Field and Life Schools: Rural youth not only need employment options but also critical life skills that will help them succeed inside and outside the home. An approach like the JFFLS could not only help benefit the agricultural economy and subsistence farming, but also help build resilience capacities and address other key challenges that youth living in poverty experience.

Mali's extension and advisory services have been through many changes over the decades. The end of PAPAM and the existing frameworks and institutions supporting agriculture and extension in Africa offer an opportunity to shape Mali's extension services for the future, while addressing issues of gender equity and youth inclusion and facing climate change. This report, part of a DLEC series assessing extension and advisory services in Feed the Future and related countries, offers an assessment of the current situation based on the best-fit framework, and recommendations for improving the services in Mali to better meet the needs of producers and other actors in the value chain.

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ANNEX I. LIST OF STAKEHOLDER ORGANIZATIONS INTERVIEWED

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| Public Sector |
| National Department of Agriculture |
| Mopti Rice Office |
| National Directorate of Livestock and Fisheries |
| Regional Directorate of Agriculture in Koulikoro |
| Regional Directorate of Mopti |
| International Donor-Funded Programs |
| Green Innovation Centres |
| IFDC |
| USAID Harande Program |
| USAID Livestock Technology Scaling Program |
| USAID LAG Project |
| Global Water Initiative |
| Sasakawa Global 2000/SAFE |
| Private Sector |
| Green Elephant |
| Madougou SA |
| Baramuso |
| Farmers' Organizations |
| Interprofessional Mango |
| Federation of Producers of Yanfolila |
| Association of Professional Farmers Organizations |
| Interprofessional Potato Organization |
| Civil Society |
| FOSCAR-Mali |
| Carrefour Women and Development in Mali |
| Coordination of Women's Associations and Organizations |
| ICT - Private Sector |
| Orange Mali |
| ICT - Public Sector |
| ORTM |
| ICT - International Public Organization |

| |
|--|
| Farm Radio International |
| ICT - Civil Society |
| AgriProFocus |
| Radio Action Impact |
| Live Your Dream |
| Research Institutions |
| IER |
| IPR/IFRA |
| CNRA |
| ICRAF |
| ILRI |
| Financial Institution |
| National Bank for Agricultural Development |

ANNEX 2. AN ASSESSMENT OF THE EAS SYSTEM IN THE MALI LIVESTOCK FOR GROWTH (L4G) PROJECT

Objective

This report is an in-depth assessment of the Mali Livestock for Growth (L4G) project and the approaches it uses for extension and advisory services (EAS). This includes the project's strengths, achievements and the factors affecting achievements.

Methods

The project was assessed using literature review, participant observation and interviews conducted with key informants. Interviews were conducted in-person or by telephone in September 2017 with member checks conducted via email. A sample of project beneficiaries (members of a farmer field school group) were also interviewed and various project activities were observed during a trip to Mopti.

Background

As noted in the main body of the report, Mali has the largest livestock population in West Africa after Nigeria, and the livestock sector provides significant livelihood options and income to some 30 percent of the population.

Given Mali's strong commitments to improving food and nutrition security, USAID selected it as a Feed the Future country. On September 30, 2014, USAID awarded AECOM International Development the five-year L4G project.¹⁹ The L4G project complements the core component of USAID's Livestock Value Chain Project, which is part of the U.S. Government's Feed the Future Initiative in Mali aiming to increase inclusive agricultural sector growth.

L4G provides technical assistance to support the sustainable development of a competitive, inclusive livestock production sector within USAID/Mali's Feed the Future Zone of Influence. Overall, L4G aims to generate positive impacts on poverty and malnutrition, in line with Feed the Future goals. In most regions, the L4G project employs field agents to provide extension and advisory services. However, in Toumbouctou, it partners with a local NGO, AMRAD, because AECOM is not able to operate there for security reasons.

L4G sees to increase inclusive livestock value chain competitiveness in Mali by contributing to three results:

1. **Improved Livestock Production**, including modernization of animal health delivery systems, by developing and disseminating messages about good livestock management practices and issues; enhancing technology innovation, dissemination and management; assisting pastoralists/livestock farmers to improve water points for livestock; promoting improved grazing and pastureland or rangeland management practices for sustainable livestock production; and improving community literacy and numeracy among livestock producers.

¹⁹ Agreement #AID-688-C-14-00004.

2. **Increased Domestic and Export Livestock Trade** by improving vertical linkages, building trust and sustainable market relationships, strengthening horizontal linkages to achieve economies of scale, improving producer capacity for identifying and achieving market requirements, linking and improving access to financial services, and improving access to business development services at local levels and linking livestock value-chain stakeholders to the national and sub-regional policy dialogue.
3. **Strengthened Capacities and Systems and an Improved Enabling Environment for the Livestock Sector** by providing training to key national livestock stakeholders, including to the public and private sectors, as well as to civil society; coordinating exchange visits with Malian and other west African projects, and by organizing activities to increase the capacity of civil society actors for policy analysis and advocacy.

L4G Extension and Advisory Services Approach in Mali

In its delivery of EAS, L4G coordinates with key stakeholders in Mali, including the government, farmers groups, and international actors. L4G interacts closely with the OMA and works in line with government policies including those on livestock vaccination and seed certification. The project also works with big farmer organizations, such as the Livestock Promotion Association in Sahel and Savane and thus is able to channel farmer issues to the government. L4G also works with ILRI and CARE to incorporate successful technologies and approaches. As an example, L4G collaborates with the USAID Harande Program and staff from CARE on basic training around nutrition and hygiene. L4G has also worked with ICRAF on various training components for their farmers.

The farmer field school approach is the main paradigm that the L4G project uses for EAS delivery. In May 2017 L4G organized a three-day workshop to formally implement FFS in all of its project zones. The FFS model embodies “a participatory approach [for] diffusing new science-based knowledge and information to farmers” (Rola, Jamias and Quizon, 2002, p. 261). Gallagher (2003) describes the fundamentals of the FFS approach. At its core, the approach involves “groups of people with a common interest, who get together on a regular basis to study the ‘how and why’ of a particular topic” (p. 5). These discussions occur ideally *in situ*, in the field, with the field as the teacher and at least one knowledgeable trained facilitator providing information on an as-needed basis around with the topic of interest during dialogue with other participants. Agro-ecosystem analysis by the farmers themselves is a critical component of the classical FFS model. This analysis distinguishes FFS from traditional, formal classroom learning, which more rigidly positions teachers as the only knowledge-holders and students as passive recipients of information in a classroom setting away from the field. Similarly, the FFS curriculum “follows the natural cycle of its subject [i.e., from] ‘seed to seed’ or ‘egg to ‘egg’” (p. 6). Similarly, “there are no lectures – all activities are based on experiential (learning-by doing), participatory, hands-on work” (Gallagher, 2003, pp 5-6).

In the L4G project, FFS groups meet regularly during the production cycle and use hands-on learning activities for experimentation and engagement that aim to improve skills and knowledge for helping farmers adapt practices to their specific contexts. The L4G FFS model trains lead farmers who, in turn, train other farmers using a Training of Trainers (ToT) approach. Field demonstrations take place on the land of the lead farmers. In general, each lead farmer is expected to train another 25 farmers, with training activities typically scheduled to follow production cycle activities (AECOM, 2017).

Overall, L4G uses FFS for three objectives:

1. Seed Production and Storage: This involves production and storage techniques for high quality seeds for farmers who sell forage seeds.
2. Forage Production and Storage: L4G demonstrates techniques such as production of fast-growing varieties as well as forage production, postharvest and processing techniques. This includes experimentation with cowpea and moringa plants that can be used to provide food for family as well as animal consumption.
3. Animal Nutrition: L4G recruits animal nutritionists to train farmers on animal fattening techniques.

In addition to the FFS content mentioned above, L4G also provides producers with financial literacy and business plan training. The L4G project is measuring gains in these efforts by comparing outputs of producer organizations and individual farmers who participate in the FFS activities with those who do not.

Achievements

L4G staff in Mali identified three elements as the most productive aspects of their EAS work: (1) hands-on training and practices delivered directly to farmers and livestock producers, (2) capacity building for facilitators (e.g., field agents/lead farmers) and (3) organizational capacity building and ToT approaches that afford scaling up services to reach as many farmers as possible.

These three key elements broadly align with components I and II of the L4G project: *Component I Livestock Production* and *Component III (3) Strengthened Capacities and Systems and an Improved Enabling Environment for the Livestock Sector*. Component I includes several productivity innovations for livestock, including improved animal vaccination programs and farmer knowledge around this issue, techniques of animal fattening and delivery of more animals to slaughterhouses. Component III includes not only inter-organizational exchanges by L4G personnel with other Malian and West African livestock projects, but also capacity-building at the national level, along with evaluations of Strengths, Weaknesses, Opportunities and Threats.

The project has also conducted vaccination campaigns, assisted farmers to sell and buy animals, provided seed and conducted training. Furthermore, the project is making efforts to address market and vertical linkages needs. For instance, L4G negotiated a vertical linkage with a cattle slaughterhouse in Kayes, Mali and continues to work to develop this relationship to provide a wider market for improved livestock. Additionally, to increase producer organizations' access to financing, L4G organized a finance-café to bring together finance organizations for information sharing, networking and coordination. During FY2017, twenty-five producer organizations received microfinance loans to fund animal fattening activities. L4G staff also participated in an international conference to address barriers to trade in order to increase Malian access to still wider livestock markets.

Together with Farm Radio International and ILRI, and in collaboration with the Government of Mali, the project launched a Livestock Market Information Systems (LMIS) in 2017, which is scheduled to go live in 2018. This will attempt to improve upon the current Agricultural Market Observatory described in the main report. The LMIS should be demand-driven, accessible and sustainable, and the project is exploring ways to make it so. A business model is being developed and the project is thinking about how to productize the data collected in the LMIS. One effort in this regard is the

conducting of a baseline study, which will gather information on how producers and other participants in livestock markets access, collect and act on livestock market information in the area.²⁰

Challenges

While interviews with L4G beneficiaries indicated a general high level of satisfaction with service delivery, this assessment also identified challenges that the project faces. Among these are barriers to trade; poor access to finance, particularly for women; a disconnect with formal lending institutions; access to pasture land and water and a need for more strategic planning and action by the Ministry of Livestock and Fisheries.

At the national and international levels, L4G staff identified various barriers to trade. A major problem is illegal rent seeking by law enforcement who seek payments from farmers and livestock producers. Unstable currency fluctuations affecting imports and leading to transportation shortages are also important, as they limit the reach of L4G livestock and other products. To a large extent, because these issues involve actors and entities outside of Mali, L4G has a limited ability to directly affect outcomes.

At both the domestic and international levels, L4G beneficiaries most frequently identified problems accessing finance as a major concern²¹ This particularly affects women whose socioeconomic circumstances tend to decrease access and participation overall. Many women are unable to expand their businesses as they do not meet requirements, such as having land or asset titles, to secure loans at commercial banks. While microfinance is available, the loan amounts are quite small and not always adequate for smallholder farmers' needs.

Access to formal lending institutions is another challenge. In FY2017 (results as of Q3), 25 producer organizations borrowed \$66,030 for animal fattening (an average of \$2,641.20 each). However, they primarily borrowed through microfinancing institutions since bank loans were rarely available. While collateral is an issue, particularly for women, the primary challenge is that banks in Mali are not used to dealing with livestock issues or with nomadic pastoralists as customers. Banks in Mali have a general risk aversion against issuing loans in the livestock sector due to livestock sector fluctuations as well as fears of loan non-repayment. Additionally, many banks also do not have local branches outside of big towns and cities.

The general lack of access to formal banking puts financial stress on family members, farmer's associations and community resources when would-be borrowers seek out funds, or they resort disadvantageously to money lenders. This underscores the importance of microfinancing for agricultural success in marginalized regions, although even microfinance leaves many (especially women) still unable to obtain financing.

Access to pasture land is also a problem, as there is a growing conflict between crop producers and livestock farmers for space. While extension agents aim to deliver vaccines in remote areas, there are shortages in government supply, and livestock disease continues to be a problem. Similarly, access to water also is a major problem for livestock, and shortfalls remain despite new well drilling and improvements to existing water sources.

²⁰ See here for more information: <https://www.malipages.com/appele-offre/etude-de-reference-sur-le-projet-pilote-de-lapplication-mobile/>

²¹ Stakeholder group interview, September 2017.

The L4G beneficiaries also reported a thirst for more knowledge. Many expressed a desire for more literacy and numeracy training. In response to inter-project trade tours organized by L4G with other Malian and west African projects, beneficiaries expressed interest in more exchanges. Similarly, although few were yet aware of the LMIS, at an information workshop they expressed interest in how such a system could improve decision-making. They noted that not only could this system supplement, or supplant, the current informal means of market-information access, it could possibly do so at reduced cost.

Lastly, interviewees noted the lack of an official national strategy for livestock, and that the government had not opened up enough livestock corridors.

Conclusions and Recommendations

In light of this assessment, we make the following recommendations for how the L4G project can strengthen extension services within the project and the country at large.

1. Through the proposed national capacity building plan partners, share good practices on directly training livestock producers, how to build capacity of facilitators and organizational capacity building.
2. Share the lessons from the planned L4G baseline study on how producers use market information under the LMIS with FOSCAR-Mali and participate in the proposed advisory group (see main report) to develop and implement an action plan to increase use of ICT in EAS.
3. Work with the EAS fraternity in Mali to promote sustainable and scalable approaches to EAS using lessons learned in the project.

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