



FEED THE FUTURE

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

EXECUTIVE SUMMARY

Development Gateway (DG) and Athena Infonomics conducted an assessment of the digital agricultural ecosystem in Mali between September 2021 and January 2022. The assessment was conducted using DG's Custom Assessment Landscape Methodology (CALM.) The CALM methodology uses a combination of desktop research and mixed data collection methods, including key informant interviews (KIIs,) surveys, and data analysis, to understand the context, collect user needs, and identify the links – or missing links – between key stakeholders in a specific sector.

The goal of the assessment was to broaden USAID/Mali's awareness of current digital products and to recommend potential ICT initiatives, as part of the USAID/Mali's programming efforts to improve agricultural productivity and leverage the agricultural sector as a driver of national economic development. In Mali, the CALM methodology helped the assessment team to understand the national context, policy and institutional framework, and the country's readiness and ability to promote ICT tools. The research also examined key digital infrastructure limits and identified stakeholder priorities within the agriculture sector that ICT solutions could address. A total of forty interviews were conducted in a three month period using questionnaires developed for each actor profile. The interviews supported a review

of ICT implementations, highlighting programming challenges, best practices, and lessons learned.

Key Findings

Agriculture and agro-pastoralism are important pillars of the Malian economy. Estimates from the World Bank suggest that agriculture and fishing contributed to over 36% of Mali's GDP in 2020.¹ Over 80% of Mali's population is engaged in agriculture and associated activities, making this sector crucial for human and economic development.² Despite the magnitude of the agricultural sector, food insecurity remains rampant in Mali. Statistics from 2016 indicate that nearly 25% of families were food insecure, while nearly 40% of children under the age of five suffered from malnutrition.³

1. World Bank, Data. (2020). "Agriculture, Forestry, and Fishing value added (% GDP) - Mali." <https://data.worldbank.org/indicator/NV.AGR.TOTL.ZS?locations=ML>
2. Food and Agriculture Organization. (July 2017) Country Fact Sheet on Food and Agriculture Policy Trends. <https://www.fao.org/3/i7617e/i7617e.pdf>
3. USAID. (2018). Mali: In-depth Assessment of Extension and Advisory Services. <https://www.digitalgreen.org/wp-content/uploads/2017/09/DLEC-Mali-In-depth-Assessment-Extension-Final.pdf>

The Malian agricultural sector has not reached its full potential predominantly as a result of barriers faced by smallholder farmers – including limited access to improved seeds and inputs, low credit opportunities, and weak resilience especially in response to climate change. Mali’s agriculture sector is focused on cotton and cereal production while other agricultural products are underexploited. The assessment revealed that farmers’ access to market opportunities is still narrow and agro-business activities are exacerbated by the country’s current unstable political context.

Government agencies and institutions involved in the Malian digital ecosystem suggest that strong initiatives are undertaken at a high level, but are rarely implemented in practice.

Implementation seems to suffer from a low technical capacity of the institution’s managerial staff. In addition, the lack of clarity in institutions’ roles and responsibilities leads to uncoordinated ICT efforts. Additionally, Mali’s ICT regulatory framework is outdated. Laws and regulations have been published with regards to cybersecurity⁴ and cryptology⁵ mechanisms – including laws around personal data protection.⁶ However, most actors in the ICT environment are either unaware of the existence of these laws or unfamiliar with their exact content.

Women’s groups affirm that women are an intrinsic part of Malian agriculture, but face key barriers to growth. Women mainly focus on horticulture and crop processing where their participation is estimated at 90%.⁷ However, women farmers face constraints primarily related to the socio-cultural environment. Women do not own land in practice, despite 1) the “Agricultural Land Act,”⁸ and 2) the “Agricultural Orientation Law,”⁹ women inherit cultivable areas allocated by male farm managers which are often less fertile and smaller in size as they are shared among women’s associations. Women’s groups further explained that their insufficient knowledge, low literacy, and limited access to formal credit opportunities and improved inputs, significantly limit their ability to improve their livelihoods and also reduce their agricultural potential and productivity.

Other challenges reported at the institutional and organizational levels are related to the shortcomings in the overall technical infrastructure. The national electricity access rate in urban areas is estimated at 40% and 20% in rural areas.¹⁰ KIIs further revealed improper electrical wiring in their office building and noted the absence of basic electrical equipment usually recommended for data centers and technical spaces hosting ICT equipment.

4. Autorité Malienne de Régulation des Télécommunications/TIC et des Postes (Dec. 5, 2019). *Law No. 2019-056 on the repression of Cybercrime*.

5. Autorité Malienne de Régulation des Télécommunications/TIC et des Postes (May 6, 2016). *Law No. 2016-011 on the rules applicable to the means, modalities, services and systems of cryptology in Mali*.

6. Autorité de Protection des Données Personnelles. (May 21, 2013) *Law No. 2013-015 on the Protection of Personal Data in the Republic of Mali*.

7. Sinai Béré, Women Group of Segou. (Dec. 20, 2021). Interview

8. President’s Office. (April 21, 2017). “Portant sur le Foncier Agricole.” *Journal Officiel de la République du Mali*. <https://www.droit-afrique.com/uploads/Mali-Loi-2017-01-foncier-agricole.pdf>

9. Assemblée Nationale, République du Mali. (2006). “Portant Loi d’Orientation Agricole.” https://nyeleni.org/IMG/pdf/loa_Mali.pdf

10. International Trade Association. (Oct. 18, 2021). “Mali - Country Commercial Guide: Market Overview.” <https://www.trade.gov/country-commercial-guides/mali-market-overview>

Mali currently has a total of three mobile operators: Orange Mali, Moov/Malitel, and Telecel. Orange Mali is the leading mobile operator, with an estimated 12 million subscribers in 2020, which represents an estimated 54.8% of the overall market share. In 2020, Mali's internet users were estimated at 5.74 million, representing 27.9% of Mali's total population; 78.9% of web traffic is registered through mobile phones.¹¹ The GSMA estimates a gender inequality of 74% in affordability and a gender equality of 36.2% in consumer readiness,¹² which is defined as the estimate of awareness and skills needed to add value and use the internet. Orange Mali indicated that most major urban centers (Sikasso, Segou, Bamako) are currently on 4G, while remote rural areas are still on 2G, limiting usage of services that require mobile internet technologies. In 2020, 79.8% of web traffic originated from mobile phones compared to 16% from laptops and computers.¹³ KIIs explained that mobile phones are more affordable than other end-user ICT equipment, which is subject to prohibitively high taxes.

These factors limit digital awareness and become obstacles to digital literacy when combined with the low literacy rates of Mali's adult population. 2021 estimates show a literacy rate of 46.2% for men and 25.7% for women.¹⁴

ICT in the Agricultural Landscape

The assessment revealed ICT products in Mali's agricultural sector that 1) share crop and livestock reference prices to harmonize farmers' profit margins across the country, 2) provide advisory services, and 3) broadcast weather data to support farmers in improving farm overall health and productivity. Emerging ICT solutions introduce new

concepts such as savings, insurance, and farm management, and aim to improve market linkages between potential buyers and sellers.

In addition to challenges already identified, ICT implementers also face cross-cutting challenges that impact a solution's use over time, including irrelevance, limited financial resources, and insufficient level of political will and ownership.

Despite these obstacles, the assessment revealed ongoing efforts and tangible ICT opportunities, which can strengthen the agricultural sector.

At the institutional level, the government is committed to reviewing and updating the ICT regulatory framework, adding new regulations on cybersecurity, cyber crime, and personal data security. Some ICT enablers are currently working to raise ICT awareness, improve digital literacy, and increase uptake within communities – specifically targeting youth.

Digital literacy enablers – A handful of projects aim to promote ICT awareness and use among farmer communities on existing ICT solutions. These projects often include community-based technical centers equipped with computers and an internet connection to provide basic computer skills, raise awareness about the currently available solutions, and promote the use of the internet to access agricultural best practices and tutorials.

Community enablers – Current ICT initiatives propose precision agriculture advisory services and often employ data collection agents in the field. These initiatives benefit from stronger

11. DataReportal. (Feb. 12, 2021). "Digital 2021: Mali." <https://datareportal.com/reports/digital-2021-mali>

12. GSMA. (2019). "Mali | Detail and Analysis." *The GSMA Mobile Connectivity Index*. <https://www.mobileconnectivityindex.com/#year=2019&zonesocode=MLI&analysisView=MLI>

13. DataReportal. (Feb. 12, 2021). "Digital 2021: Mali." Slide 25. <https://datareportal.com/reports/digital-2021-mali>

14. DataReportal. (Feb. 12, 2021). "Digital 2021: Mali." <https://datareportal.com/reports/digital-2021-mali>

community engagement starting from collecting farmers' needs to encouraging and collecting end-user feedback to improve the solution and its associated services

Technology enablers – The Mali Startup Association (MSA) was created in 2020 to promote the use of ICT solutions in a variety of sectors including agriculture and health. MSA is an association of young Malian developers, who already use advanced technologies such as normalized difference vegetation index (NDVI) images and have developed USSD services in local languages.

The success and sustainability of digital products rely on the ability of those products to adjust to the local context and their flexibility to respond to circumstantial factors and risks.

Recommendations

The following recommendations aim to support sustainability of ICT solutions in agriculture in Mali. At the policy level, coordination is critical to combat the siloed initiatives across stakeholder groups. At the user level, the recommendations aim to promote the implementation of ICT solutions that are relevant to users and affordable and flexible enough to adapt to Mali's context. Finally, recommendations for improved ICT product uptake require mutual accountability among relevant stakeholders and strong local partnerships to further incorporate ICT initiatives along the agricultural value chain. Specifically, these recommendations identify opportunities to increase private sector participation and to lower investment risks for all stakeholders.

1. Convene a multi-stakeholder group to coordinate ICT efforts – In an effort to respond to the many siloed initiatives in this sector, it is important to establish a multi-stakeholder digital working group (MSDG,) along with a powerful knowledge sharing platform where all stakeholders can share lessons learned and best practices to inform future implementations and avoid duplication of efforts.

2. Develop a database to centralize key project information – The multi-stakeholder group should advocate for development of a central, online database that would be available to all ICT implementing partners and include the project's expected results, actual results, challenges, lessons learned, and best practices, with other relevant datasets as appropriate.

USAID/Mali Role: **Leading**

Given USAID's involvement in the agricultural sector, USAID/Mali can lead a digital working group¹⁵ mirroring similar activities implemented in other USAID Missions. For example, the Sahel Regional Mission's established a digital working group and a multi-stakeholder coordinating group on mobile money.¹⁶ For the suggested database, USAID and the MSG can develop templates for ICT implementers and upload them to an online database that will be the go-to-source for baseline information on ICT agricultural activities.

15. USAID. (n.d.). "Digital Ecosystem Fund 2020 Activities." *USAID Digital Strategy 2020-2024*. <https://www.usaid.gov/sites/default/files/documents/DEF-Factsheet.pdf>

16. USAID. (May 2016). *Mobile Money Consultative Group Overview*. https://www.marketlinks.org/sites/default/files/resource/files/MMCG_overview_May2016.pdf

At The Policy Level

3. Implement ICT solutions that are adaptable to the context – the Mali context analysis faces some key challenges that ICT solutions should address to be sustainable, including difficulties that limit users uptake such as high illiteracy rates, low digital literacy, low technical capacity, and limitations in infrastructure and mobile network coverage.

4. Implement ICT solutions that are relevant to the user's needs and priorities – ICT implementation should start with the user, prioritizing their needs and priorities at the onset. Therefore, the first step is to collect end-user data that can be combined with a partner's strategic objectives. Implement ICT solutions that are affordable – ICT implementations tend to fail because the financial resources needed to maintain the product overtime are unavailable.

USAID/Mali Role: **Advisory**

Relevance – USAID/Mali should ask its implementers to conduct a feasibility study prior to each ICT implementation to present expressed end-user needs, potential challenges and their associated mitigation measures, high-level training plans for the local workforce, and required end-user equipment.

Adaptability – When USAID supports the development of ICT solutions, USAID/Mali should recommend that their ICT implementers opt for solutions that operate in low bandwidth environments, include USSD and IVR technologies, where possible, and offer an offline functionality to reduce internet dependency.

Affordability – USAID/Mali should encourage its implementing partners to identify existing ICT solutions that have viable business models, which will enable them to continue beyond engagement

with USAID activities. In rare instances where implementing partners are developing an ICT solution, USAID/Mali should strongly encourage the implementers to make use of open-source software when possible.

USAID/Mali should recommend that its implementers give preference to local technical capacity or search within the West Africa region for the appropriate expertise. Local or regional expertise will help reduce the challenges related to language barriers and the significant maintenance costs compared to services procured internationally.

At The User Level

5. Implement ICT solutions that are sustainable – Adaptability, affordability, and relevance are key sustainability factors for ICT implementations. For projects looking to deliver a new ICT tool, greater sustainability is achieved when the implementers promote local ownership and mutual accountability. For initiatives supporting an existing product, sustainability can be achieved through the development of a strong business model that is capable of generating recurrent financing to sustain the initiative over time.

USAID/Mali Role: **Advisory**

Accountability mechanisms should be put in place at the early stage of a project by identifying the short-term activities, which can be funded by the project, and the long-term activities that should fall under the local partner's responsibility. This approach should be clearly articulated through sustainability plans developed at the outset. Jointly setting clear guidelines early in the project and getting users progressively accustomed to the role they play in maintaining implementation will help avoid unsuccessful initiatives that are heavily dependent on donor funding and involvement. Short-term

activities include equipment purchase and overall infrastructure support, while long-term activities are those that require continuous funding after the project ends.

For initiatives that support providers with an existing solution, USAID/Mali should recommend a local benchmarking study to ensure that the selected local partners have a solid business model and the technical, human, and financial resources required to successfully maintain the solution over time. Short-term activities that could be funded include initial licensing fees and capacity strengthening activities. Long-term activities can include license renewal fees, refresher training, and business development efforts to reach the expected results and expand outreach.

Partnerships

6. Strengthen strategic local ICT partnerships –

Although the assessment did not reveal a specific incubator/accelerator program or organization, the Mali Startup Association (MSA) seems to have the basic expertise required to support ICT products and implementations; and therefore, should be a key partner in building the digital ecosystem going forward.

USAID/Mali Role: **Enabler**

Provided that MSA's advertised expertise is confirmed, USAID/Mali can support MSA members in advanced ICT training through exchange studies or immersion programs. With the appropriate support, MSA can be a strategic partner that brings the comparative advantages of knowing the sector and its challenges, and can act as a link between farmers, agro-business companies, and government institutions.

7. Supporting the private sector – Supporting agro-businesses is important as they are critical in building the digital ecosystem. Agro-business dealers are interested in market trends and demands to help their overall business model and selling strategies. This is especially true of companies selling improved seeds and other inputs in response to climate change in countries with high agricultural potential.

USAID/Mali Role: **Enabler**

The private sector can be involved in two ways: 1) agro-business dealers looking for high potential markets and 2) private financial institutions to facilitate access to credit. Extending partnership alliances to the private sector will help address the fragility of public sector agencies and institutions due to their limited financial, technical, and human resources. Therefore USAID/Mali's role would be to provide advisory services to commercial service providers on how to develop or alter their business models in the Malian context so that they are sustainable and can reach the target population. USAID/Mali can also connect them to other partners in the ecosystem that could help with sustainability.

8. Lower agricultural investment risks – Use AgCelerant¹⁷ as an example to lower investment risks. AgCelerant is a research and development initiative with ICRISat and Manobi that aims to reduce investment risks across the value chain based on data collected using satellite imagery at the farm level. The farm-collected data can be used to identify a farm's needs in terms of inputs, irrigation, and agricultural practices. This information could help other actors across the value chain to target their interventions. With the appropriate irrigation mechanisms and the use of improved

17. agCelerant. (n.d). "Phygital Agriculture." <https://www.agcelerant.com/phygital-agriculture/>

seeds, farms should increase their productivity and lower the risk associated with formal credit opportunities

USAID/Mali Role: **Advisory**

With this approach, USAID/Mali's role would primarily be coordination, which could include:

- Advise the hiring of local agents to cross reference the data collected through products already using satellite imagery;
- Safely share the data with private sector investors and development partners (once cross-referenced and validated) to provide a better understanding of demand, and also to identify needs and priorities that could address farm health and production;
- Identify farms with high productivity potential, to include in a pilot project with financial institutions. Focusing on these farms can reduce investment risks and encourage financial institutions to facilitate access to formal credit.

9. Improve community participation – The assessment revealed that community participation and involvement in current ICT implementation is a key success factor as it can alleviate several challenges such as high illiteracy rates, end user reluctance, and travel restrictions imposed by the current security challenges.

ICT partners already implementing this localized approach noted that basic computer and software training may be needed upfront and emphasized that turnover rates are high among relay agents – specifically as agents are also rather mobile and looking for better financial opportunities.

USAID/Mali Role: **Advisory**

USAID's role would be mainly advisory – USAID/Mali should advise its implementing partners to factor basic computing skills into a project and recommend that their project treat field agents as key personnel, securing a multi-year commitment (of 2 to 3 years, for example) for all field agents who received training for a specific project.

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