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

Guinea: Desk Study of Extension and Advisory Services

Developing Local Extension Capacity (DLEC) Project

October 2017

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Acknowledgements

Written by Ian MacNairn in collaboration with Kristin Davis of IFPRI, this analysis was compiled for the DLEC project under USAID Cooperative Agreement No. AID-OAA-L-16-0002.

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.

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ACRONYMS

AAV	Voluntary Agricultural Agents
AEMIP	Agricultural Education and Market Improvement Program
AET	Agricultural Education and Training
ANPROCA	National Agency Promoting Rural and Agricultural Consulting
APEK	Association for Economic Growth in Kindia
ASTI	Agriculture, Science and Technology Indicators
AVENIR	Extension Learning, Entrepreneurship, and Rural Innovation
CAR	Rural Agricultural Banks
CFA	Financial Community of Africa
CFSAM	Crop and Food Security Assessment Mission
CNFA	Cultivating New Frontiers in Agriculture
CNOP-G	National Confederation of Farmers' Organizations of Guinea
CNSHB	National Research Center on Fisheries and Marine Resources
DAI	Development Alternatives Incorporated
DLEC	Developing Local Extension Capacity Project
EAS	Extension and Advisory Services
ENAE	National Agriculture and Livestock School
ENATEF	National Forestry School
EU	European Union
FAO	United Nations Food and Agriculture Organization
FDFF	Fouta Djallon Farmers Federation
FEWS NET	Famine Early Warning Systems Network
GAS	Guinea Agricultural Services
GDP	Gross Domestic Product
GFRAS	Global Forum for Rural Advisory Services

GoG	Government of Guinea
GRAND	Guinea Rural Agro-Dealer Network Development
ICT	Information and Communication Technologies
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
IRAG	Guinea Agricultural Research Institute
ISAV/F	Valerie Giscard d'Estaing Higher Agriculture Institute-Faranah
ISSMV	Higher Institute of Veterinary Medicine
JSI	John Snow International
M&E	Monitoring and Evaluation
NGO	Nongovernmental Organization
PAD	Project Appraisal Document of USAID
PNIASA	Agriculture and Food Security Investment Plan
PPP	Purchasing Power Parity
R&D	Research and Development
RTF	Rio Tinto Foundation
SAVY	Strengthening Agricultural Value Chains and Youth
SMARTE	Strengthening Market-Led Agricultural Research, Technology and Education
SPRING	Strengthening Partnerships, Results and Innovations in Nutrition Globally
UGANC	Gamel Abdel Nasser University of Conakry
USAID	United States Agency for International Development
WB	World Bank
WFP	United Nations World Food Programme

INTRODUCTION

In Guinea, agriculture is the key livelihood for the majority of the nation's people. Guinea is one of the poorest countries in the world, and there are many challenges for rural agriculture: poor access to agricultural inputs, poor transport infrastructure, lack of investment, past government policies that did not promote agricultural production, the impact of the Ebola Virus Disease outbreak (2014-2015), and under-resourced and under-utilized agricultural extension services. Due to these factors, Guinea's agricultural sector has underperformed in comparison to its actual agricultural potential.

Additionally, there are many opportunities through agriculture to face these challenges. Overall, agricultural extension and advisory services (EAS) and education for farmers are keys to increased overall agricultural productivity.

Rural extension and advisory services are defined by the Global Forum for Rural Advisory Services (GFRAS) as all the different activities that provide the information and services needed by farmers and other players in the innovation system to develop and build their technical, organizational and management capacities, so they can improve their quality of life and well-being (Christoplos, 2010). Therefore, EAS can encompass training for improved inputs and techniques to increase production, improved crop varieties, soil quality, cropping practices for staples and cash crops, minimizing the impact of climate change (e.g., reduced coastal rainfall (Jalloh et al, 2013)), livestock production, post-harvest handling, grain storage and improved marketing techniques/approaches.

Guinea's current EAS system has been underfunded and underutilized, and the government and donors are working together to improve EAS delivery. This report, produced by Feed the Future's Developing Local Extension Capacity (DLEC) project reviews Guinea's EAS system to recommend areas for potential investment by government, donors, nongovernmental organizations (NGOs) and the private sector and will serve to guide investors in EAS. Evidence generated from this desk review will contribute to the knowledge base for best-fit practices to build up EAS in Guinea. The modified DLEC best-fit conceptual framework that appears below guides the DLEC project overall and this report.

The Feed the Future Developing Local Extension Capacity (DLEC) project measurably improves extension programs, policies and services by creating locally-tailored, partnership-based solutions and by mobilizing active communities of practice to advocate for scaling proven approaches. The five-year (2016-2021) project is designed to diagnose, test and share best-fit solutions for agricultural extension systems and services across Feed the Future countries.

Led by Digital Green in partnership with Care International, the International Food Policy Research Institute (IFPRI) and the Global Forum for Rural Advisory Services (GFRAS), 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. The project's diagnostic studies evaluate and analyze local EAS operating contexts and capacities for Feed the Future and aligned countries.

CONCEPTUAL FRAMEWORK

DLEC uses the best-fit adapted framework (Birner et al., 2009) shown in Figure 1 to guide analyses and to determine EAS areas of focus for country engagements that are within DLEC's manageable interests. DLEC uses the framework to guide the project'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 users to analyze a country's EAS system, begin conversations with local stakeholders to understand the state of their EAS system and where the critical levers for change might be and analyze and recommend systems change. The framework also enables users to compare across countries. We use the framework in country engagements to ensure that the learning questions they are designed to answer can be compared across geographies.

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. The framework suggests an impact chain approach to analyze the performance and impact of EAS.

Key for DLEC are the EAS characteristics shown in the framework. Referring to Figure 1, the governance structures and policy environment variables (box F) refer to the 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 used by EAS field staff 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 on which advice is provided (specific to the production of certain crops or livestock; managerial decisions; group activities, etc.); and 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 content to meet the unique needs of clientele and how gender roles impact farming strategies. Community engagement (box K) refers to EAS services based on local social institutions, mechanisms to articulate demand and community psychosocial characteristics.

The frame conditions (boxes A-E) are outside DLEC's manageable interests. The "manageable" outcomes of this framework include the EAS characteristics (boxes F-K) and the system-level performance areas (box L). The outcomes and ultimate impact at the farm household level (boxes M and N) are outside the core DLEC leader award manageable interests.

Further the building blocks for EAS are also useful in framing recommendations for engagement. They are as follows:

- Customer – farmers and their unique needs

- Content – knowledge being shared
- Methods – how information and knowledge is shared
- Provider – who shares information and knowledge

This report also addresses cross-cutting EAS issues, such as women and youth engagement, climate change resilience, food and nutrition security, and use of information and communication technologies (ICTs).

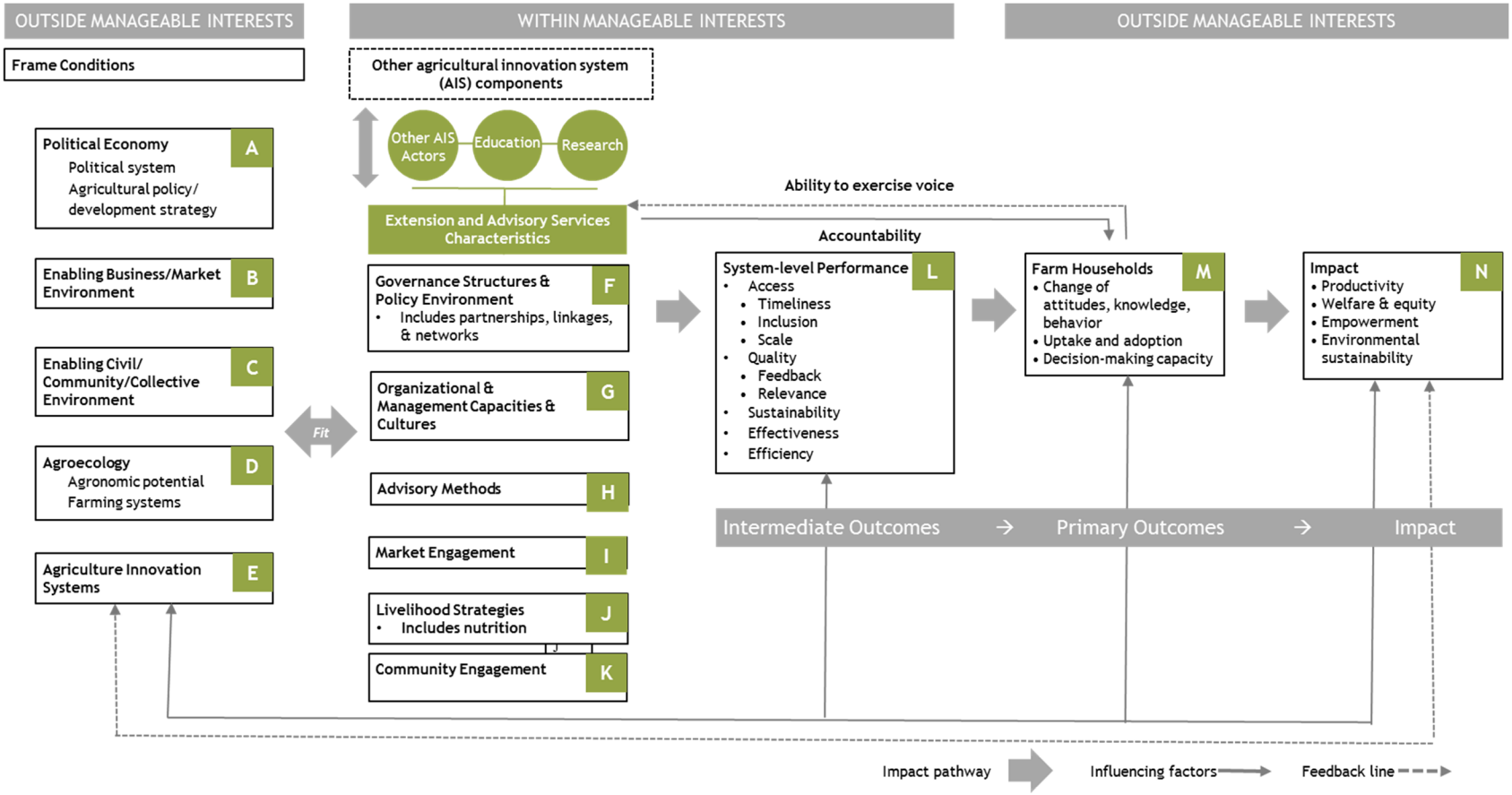

Figure 1. Conceptual Framework for the Study

Source: Adapted from Birner, et al., 2009.

METHODS

This report is based on a desk review in March and April 2017 of existing literature on the status of the Guinean agricultural extension system. The review includes information from donor annual reports, project documents, academic studies and policy/programming documents from government sources, NGOs, universities and private companies. Due to the limited number of academic and programmatic documentation on Guinea, the report relies heavily on key informant interviews. This report does not include any primary data or direct observation of Guinea EAS activities.

RESULTS

Frame Conditions

Figure 2. Map of Guinea

Source: https://en.wikipedia.org/wiki/Guinea

Guinea achieved independence from France in 1958 and was led by President Sekou Toure, until his death in 1984. The country was the sole former Francophone African colony to reject continued French ties. French investment in the country drastically declined, and Guinea chose to align itself with the Soviet bloc. Guinea established its own currency, separate from the regional West African currency (the *Communauté Financière d'Afrique* or CFA). Agricultural market forces and trade were discouraged under this socialist system, with Guinea only beginning to open up economically in the 1980s. Guinea has moved toward more democratic governance over the past three decades, and its agricultural sector has also embraced reforms toward freer market forces and privatization. These historical economic trends put into context the current Government of Guinea (GoG) and private-sector agricultural practices and EAS policy.

Guinea's current population is 12.35 million, with an estimated 63 percent living in rural zones.[1] Guinea's population also skews young, as 61 percent of its citizens are under 35 and 40 percent are under 15 years old (USAID, 2016). Guinea's total land covers 245,857 km^2, and 12.2 percent of the land is arable (FAO, 2012). There are an estimated 1.5 million farming families in-country and a typical farm size per family is 1.5 hectares. Land, therefore, is less of a constraint for increased agricultural production in Guinea than in other more densely populated sub-Saharan African countries. Guinea's population of food-insecure people was estimated in 2013 at over 30 percent (USAID, 2016).

Guinea is divided into four agro-ecological zones (Figure 2): Lower *(Maritime)* Guinea along the coast in the west; Middle *(Moyenne)* Guinea (Fouta Djallon) in the center; Upper (*Haute)* Guinea in the northeast; and the Forest (*Forestiere)* Region (Nzerekore) in the southeast (IFAD, 2008). Each of the four regions has its own distinct agricultural production and social structure systems. Guinea is further divided administratively into seven regions (in addition to Conakry), 33 prefectures and 341 sub-prefectures or communes (303 are rural and 38 are urban).

Guinea's agricultural sector accounts for roughly 20 percent of the national gross domestic product (GDP) and employs 84 percent of the economically-active population, creating a significant demand for effective agriculture extension services. The country's agricultural exports for 2011 accounted for less than five percent of national GDP, and the largest exports were rubber, cocoa bean, coffee and cashew (CFSAM, 2014). Further, as an indication of the level of poverty nationally and its untapped agricultural potential, Guinea's overall fertilizer usage is the lowest in sub-Saharan Africa at one kilogram per hectare, compared to the average for sub-Saharan Africa of eight kilograms per hectare (USAID, 2016).

Ironically, despite such significant poverty levels, there is still high agricultural potential in Guinea due to significant rainfall (average national rainfall annually is 1651 millimeters, from 1200 millimeters per year in Upper Guinea to 4200 millimeters per year in Lower Guinea), good soils, good access to water and a relatively low population density on the land (FAO, 2005).

The main food crops produced in Guinea are rice, maize, fonio, millet, sorghum, cassava, yam and sweet and Irish potato. Rice by far is the main staple, and accounts for roughly 60 percent of the

[1] http://www.fao.org/faostat/en/#country/90

national annual cereal production (FEWS NET, 2013). Rice is primarily grown in the Forest, Upper and Lower regions. Annual maize production levels are usually less than half of the total rice production, with production concentrated in the Middle and Upper regions. The other cereals listed above are produced in much smaller quantities than either rice or maize. Cassava is increasingly popular, cultivated in all four regions of the country and accounts for 70 percent of overall tuber production. Finally, Guinea imports rice on an annual basis to meet its national food security needs (FAO/WFP, 2015).

Regarding irrigation, Guinea only has around 95,000 hectares of land under irrigation, mostly devoted to rice (FAO, 2013). Nearly two-thirds of this irrigation capacity is in Lower/Maritime Guinea, and while climate change models have quite a degree of variation, they predict that these coastal zones of Guinea could have annual precipitation decreases of 50-100 millimeters per year (IFPRI, 2013).

Livestock is also a key component of Guinea's economy, with an estimated five million head of cattle and three million sheep/goats (FEWS NET, 2013). Middle Guinea hosts the most livestock-dependent households nationally (a mix of pastoralism and agro-pastoralism), with Upper Guinea second in terms of households dependent on livestock for food security. Livestock transhumance also takes place cyclically, within and across Guinea's above-mentioned zones and regions. Lower Guinea can be a popular destination for pastoralists' herds due to its saline grasses, and livestock is informally traded with Guinea's neighboring countries.

The Ebola outbreak from 2014-2015 led to Guinea's national GDP growth decreasing to only 1.1 percent in 2014 and 0.1 percent in 2015, after averaging 3.4 percent annual growth for the previous three years (2011-2013). However, growth rebounded to 5.2 percent in 2016.[2] Most areas of the country reported Ebola cases, but areas that were severely affected by Ebola included the Forest region and Lower Guinea around the capital Conakry. The World Bank reported further that rural households had 30 percent declines in incomes for areas severely affected. However, nationally, agricultural production was resilient, with mostly stable food prices during the outbreak from early 2014 until declaration of Ebola-free status in December 2015. Guinea has now recovered from these economic losses, and donors (USAID and others) have provided targeted funds to help the country rebuild in health, agriculture and other complementary sectors.

Guinea is classified by the Human Development Report (UNDP, 2016) as a low human development country, and the current rankings list Guinea at 183 of 188 ranked countries, with a life expectancy of 59 years. Further, 35 percent of the population lives below the income poverty line of $1.90/day.[3]

The World Bank's Ease of Doing Business Indicator (2017) ranks Guinea at 163 out of 190 countries, and Transparency International's 2016 perceptions of corruption index lists Guinea at 142 out of 170 countries (the first ranking being least corrupt). Both rankings show that Guinea has made some progress in developing efficient private and public-sector institutions (notably in starting

[2] http://data.worldbank.org/country/guinea
[3] http://data.worldbank.org/indicator/SI.POV.DDAY?locations=GN

a business and enforcing contracts), but still has far to go in creating a conducive operating environment in-country for commercial agricultural development and growth.

Financial service provision within Guinea is weak, but improving. There is no national agricultural development or investment bank, but smaller facilities do exist (e.g., *chambres agricoles* (agricultural facilities), *comptoirs* (banks) and micro-finance institutions).

Guinea's youth (15-24 years) literacy rate is approximately 38 percent for males and 22 percent for females, which is very low and has implications for EAS provision.[4] Per the *Guinea-Conakry Observatoire Statistique 2015*, Guinea currently has four mobile phone companies operating in country, with Orange (5.24 million subscribers), MTN (3.21 million subscribers), Cellcom (2.14 million subscribers) and Intercel (.11 million subscribers) situated as the four providers in a very dynamic and competitive sector.[5] Penetration is higher than expected given Guinea's various poverty level indices, at 87.2 mobile phone users per 100 people and 4.7 percent of the population reported as Internet users (UNDP, 2016).

The Government of Guinea established the Agriculture and Food Security Investment Plan (PNIASA, for its French abbreviation) to run from 2012-2017. This plan has six goals: sustainable development of the rice value chain, diversification for improved food security, increased agricultural exports, an integrated natural resource management sector, improved implementation of agricultural services to support producer organizations, and coordination and management of the PNIASA. The Government of Guinea is also in the process of developing the next PNIASA plan. This new plan will cover agriculture and food security investments once the above plan ends in 2017, as well as provide content for a broader national development plan.

Farmers are organized in-country through farmer groups (*groupements*), then unions and finally, a federation at the national level, the Fouta Djallon Farmers' Federation (FDFF, for its French name *Fouta Djallon Federation des Fermiers*). The FDFF provides some extension services, as will be seen in the results section. However, farmer organizations in Guinea in general are less adept at private-sector operations than other countries in the region due to the past history of controlled markets and economic isolation.

Finally, Guinea has many civil society organizations that bridge the gap between the state and local communities. International and local NGOs helped provide social and humanitarian services during the Ebola outbreak, and have now transitioned to longer-term developmental programming to rebuild and expand through these various sectors. Private-sector entities/agricultural inputs suppliers, such as Saref International[6], Entreprise Tidiane[7] and other companies also helped the country recover economically and agriculturally through increased investments in and access to agricultural inputs and technical advice.

[4] https://www.unicef.org/infobycountry/guinea_statistics.html
[5] https://en.wikipedia.org/wiki/List_of_mobile_network_operators_of_the_Middle_East_and_Africa
[6] Saref International is a service provider created in 1980s mainly supplying mining companies in Guinea.
[7] Entreprise Tidiane Agriculture is an organization in the farm and garden machinery industry Conakry.

The Agricultural Innovation System

The Government of Guinea's agricultural innovation system is mainly composed of research, education, extension, civil society, and the public- and private-sector institutions engaged in agriculture.

The Guinea Institute for Agricultural Research (IRAG)-Conakry is the main agency for research and development (R&D) for agriculture, and has the most research staff and agricultural R&D funding nationally (ASTI, 2014). Broad topics that IRAG conducts R&D on include crops, livestock, natural resources, post-harvest handling and agricultural engineering. IRAG also develops new agricultural technologies, creates and tests new plant varieties for adaptability within Guinea's four regions, and provides technical assistance to farmer groups and individuals.[8] Specific EAS provision by IRAG includes advice on fertilizer dosage, information on phytosanitary techniques and adaptations, and provision of technical assistance through training of the extension staff at the National Agency Promoting Rural and Agricultural Consulting (ANPROCA, for its abbreviation in French). Further broad research with agricultural links and synergies is done at the Gamel Abdel Nasser University of Conakry (UGANC)/Center for Study and Environmental Research and the National Research Center on Fisheries and Marine Resources (CNSHB).

Guinea's only agricultural university is the *Institute Superieur Agronomique Valery Giscard D'Estaing de Faranah* (ISAV/F) and its veterinary university is the *Institute Superieur de Medicine Veterinarie* (ISSMV), located in Dalaba. In addition, there are five national Agricultural Education and Training (AET) centers; four national schools for agriculture and livestock (ENAE in French) are located in Boffa, Kankan, Macenta and Tolo; and one national forestry school (ENATEF in French) in Mamou. These five national schools train roughly 500 students per year, who receive diplomas at the completion of their training. However, the institutions need further public and private investment in staffing, curriculum materials and students to produce more and higher-quality graduates. Further information regarding fees, staffing, curriculum reform and the like was not available.

Overall, there are too few Guinean agricultural Ph.D. graduates. Furthermore, there are estimates that Guinea could lose 90 percent of its aging agricultural Ph.D. holders by 2023 without targeted new agricultural educational investments, from both the GoG and other funders. Women are under-represented in agricultural R&D and EAS in Guinea (ASTI, 2014).

In general, these agricultural research and training institutes do not communicate and coordinate well with farmer groups and farmers, nor sufficiently with the EAS system. Ph.D.-level experts from research and universities could support EAS provision, design and management, from developing curricula, content and training, to actual implementation, mentoring and problem solving for improved EAS.

[8] Government agriculture stakeholder personal communication, April 2017.

Extension and Advisory Services System

Governance Structures and Policy Environment

Guinea has a history of state-led EAS and other service provision, and price controls for agriculture. Private-sector market reforms for agriculture have been implemented over the past couple of decades. Beyond the PNIASA, there are no policies or strategies guiding the overall innovation system and especially EAS.

Guinea's EAS system is pluralistic to the extent that government extension services, IRAG, a number of projects, the private sector and NGOs all provide extension services. We highlight each of these below.

Public-Sector EAS Providers

The Government of Guinea's public-sector EAS system to provide agricultural extension services to smallholder farmers in Guinea was initiated by the National Rural Development and Agricultural Extension Service (SNPRV, for its abbreviation in French*)* in 1985. SNPRV had some support from the World Bank, although the focus and amount is unknown. Support is now provided through the ANPROCA. ANPROCA was established in 1994 as the successor to SNPRV and is part of the Ministry of Agriculture. Theoretically, it covers all the communes throughout the country. However, practically, many remote areas of the country are underserved by ANPROCA. Further, ANPROCA is the only governmental agricultural extension service provider.[9]

ANPROCA's mission is to elaborate, implement, follow and evaluate Guinean plans for agricultural technical advice and rural promotion. This goal will be achieved through training, agricultural technical advice provision, developmental research and support to farmers' organizations (Guiella-Narh, 2012). ANPROCA currently has roughly 800 personnel, and they are expected to cover the entire country. The number of farming households per agent in Guinea is near the median for Africa, with higher rates of farmers per agent in Nigeria, Tanzania, Malawi and Kenya, but lower farmer per agent ratios in Ethiopia and the Democratic Republic of Congo (AGRA, 2016). The overall system is generally decentralized in terms of management and control from Conakry. However, ANPROCA agents have difficulty reaching the more remote parts of the country because of the many sub-prefectures with hard-to-reach areas, poor transport infrastructure and difficult movement during the rainy season, and lack of adequate transport for the agents themselves. Many key informants also reported that under-resourced ANPROCA agents have many challenges in providing effective EAS services to Guinea's local NGOs, farmers and others.[10]

ANPROCA is, in principle, accountable to farmers' organizations and farmers. However, this accountability depends on the EAS system working as designed, with adequate funding, motivation and logistics. With the right support and resources, ANPROCA agents can provide adequate agricultural training and technical information. The agents are rooted in their sub-prefectures and know the agricultural characteristics of their respective geographic zones.[11] Agents are known by

[9] Government agriculture stakeholder personal communication, April 2017.
[10] Agriculture stakeholder personal communication, March 2017.
[11] Agriculture stakeholder personal communication, March 2017.

their clientele who can give feedback on their work; however, lack of resources often prevents such feedback.

Regarding the public financing of EAS, the fact is that in many locations ANPROCA agents are not adequately resourced. They typically face a daunting ratio of over 10,000 farmers per agent, their geographic zones have many remote and hard-to access areas and they usually do not receive subsistence costs when traveling, so are therefore are not fully able to provide effective technical assistance to farmers and farmers' groups within their zones.[12]

In addition to links with farmers' groups and individual farmers, ANPROCA has links to local NGOs and the private sector. These links vary based on the region of the country, the density of coverage by the ANPROCA agents and their unique skill set and motivation. Key stakeholders reported that ANPROCA's links with the private sector were weak and needed to be strengthened.[13] Similarly, a number of key stakeholders called ANPROCA "a sleeping giant," that is, a system with high, untapped agriculture potential that can only be met with additional funds or donor support.[14]

ANPROCA agents' level of coordination and collaboration with other agriculture extension stakeholders such as local and international NGOs and farmers was reported to be effective in some areas and not effective in other areas.[15] GoG and donors have identified a need to improve this coordination and improve EAS provisions throughout the country.[16] In some cases where the coordination has been reported to be better, it may be due to specific donor resources and support.

Additionally, for ANPROCA agents themselves, there is little to no official financial incentive for improved coordination and overall performance. Further, the GoG also generally acknowledges the specific need for ANPROCA to be more innovative and improve its coordination if it is to remain viable.

Donor and NGO EAS Providers

A number of donor-funded projects also provide some extension services. However, all of these projects are only in their nascent phase, and do not currently function as parallel or secondary national agriculture extension service providers.[17]

USAID specifically targeted improved EAS, along with other agricultural goals, to increase overall agricultural productivity through its **Guinea Agriculture Services (GAS) Program**. The program goals are to "to enable more Guineans to participate more in, and benefit more from, improvements in the utilization of the country's natural resources for a sustainable increase in agricultural productivity and profitability in the Guinean small-farm sector." (USAID, 2017). GAS activities will run from 2106-2021 and include the projects detailed below.

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[12] Agriculture stakeholder personal communication, March 2017.
[13] Agriculture and donor/project stakeholder personal communication, March 2017.
[14] Donor/project stakeholder personal communication, March 2017.
[15] Agriculture stakeholder personal communication, March 2017.
[16] Government stakeholder personal communication, April 2017.
[17] Government stakeholder personal communication, April 2017.

Overall, USAID/Guinea has prioritized the value chains of horticulture, livestock and rice for its agricultural interventions.

USAID's GAS Program targets the axis of Kindia-Mamou-Faranah for increased agricultural production as its "Zone of Influence," and this axis covers parts of the three regions of Lower, Middle and Upper Guinea.

The **GRAND (Guinea Rural Agro-Dealer Network Development) Project** is implemented by ACDI/VOCA, in partnership with the private-sector entities SAREF International, the Rio Tinto Foundation (RTF), and in collaboration with the Government of Guinea's Ministry of Agriculture and ANPROCA staff.[18] The project runs from 2016-2019 with a budget of one million U.S. dollars (USD). The GRAND Project, in response to Ebola's negative impacts on agriculture and the economy for Guinea, will target agricultural training opportunities, increased access to EAS, improved agricultural R&D, improved agricultural market facilitation, increased credit access for input purchases and increased access to inputs.

Activities are just starting in 2017 and GRAND will establish at least 10 rural agricultural banks (CARs, for its abbreviation in French) to improve input accessibility for farmer groups and individual farmers, with the assistance of village agricultural agents (AAVs, for its abbreviation in French).

GRAND is not limited geographically, and may install CARs in all four regions of the country. For 2017, the project plans to establish two AAVs in each of the 10 CARs, or 20 in total. The AAVs will be recruited from universities or the ENAE. IRAG will technically collaborate with the GRAND Project (e.g., to secure high-yielding rice and maize seed). AAVs will receive a nominal salary and concentrate on working with the CARs to increase collaboration with farmer groups and farmers and increase access to and use of improved inputs, thereby increasing overall agricultural productivity. AAVs will also work with CAR senior staff to liaise with the agricultural producers, and both private- and public-sector actors, including ANPROCA staff. AAVs can also be hired from the Extension Learning, Entrepreneurship and Rural Innovation program (AVENIR**,** for its French abbreviation) pool of trainees, once their 10-month training period is completed (see more information below). Further, AAVs can be roughly seen as junior and complementary EAS agents to the older, more established and generally more educated ANPROCA agents (note that the monthly salary for AAVs is still to be determined).

Winrock's **SMARTE Project** activities include agricultural education and training, EAS and R&D to promote inclusive agricultural productivity growth, improved nutritional outcomes and enhanced livelihood resilience and an improved policy environment. The project focuses on the USAID Zone of Influence axis between Kindia-Mamou-Faranah and runs from 2016-2021, with a budget of USD $13 million.

CNFA's SAVY Project focuses on value-chain linkages and systems for market and input provision, by undertaking agriculture input supply services, financial inclusion and market

[18] Agriculture stakeholder personal communication, April 2017.

facilitation. The project runs from 2016-2021 with a budget of USD $11million and also targets USAID's Zone of Influence along the Kindia-Mamou-Faranah axis.

Winrock and CNFA, under their collaborative SMARTE and SAVY projects, are also establishing the **AVENIR program**. This program aims to train a new cadre of young agriculture extension agents. AVENIR agents will possess more of a private-sector, entrepreneurial and business-oriented approach than that of traditional agents. They will provide technical advice on the provision of improved seeds or other inputs, and improved plant varieties.

AVENIR targets and recruits youth, between the ages of 18-35, who have graduated from the national agricultural schools to participate in a 10-month training program. After the training, graduates should be self-supporting or be hired by EAS providers. One of the challenges for AVENIR will be to inculcate in the trainees the idea that they should be an entrepreneur and self-employed, rather than an employee with an existing organization. The AVENIR youths typically are selected because they have an entrepreneurial or business orientation. They must also show that they are interested in completing the technical sessions that target business activities in-country, which are market- and production-focused in the agricultural sector. The training includes topics such as production, market facilitation, financial marketing and input supply. The trainee youths will work with clients, such as microfinance institutes, banks, agro-input dealers, farmers' groups and individuals, agribusinesses and mobile phone operators. These commercial enterprises will also benefit through new technology, increased access to information and internal capacity building through the skills of the AVENIR agents themselves once they have completed the 10-month training.

This training will typically use NGO offices, private facilities, ICT facilities, agro-dealer offices or other informal sites, and the organizational structures where the AVENIR agents are eventually placed, at least in the initial years. Eventually GoG training sites and collaboration with the GoG institutes may take place.

During the 10-month training period, AVENIR agents will develop a proposed business/enterprise along the value chain, and be mentored by both SMARTE and SAVY staff and the organizations where they are housed for the training period. At the end of the 10 months they will implement the business plan, rather than looking for another institution to hire them. There will be no financial support from the project for trainees once they finish the 10-month course, except for those receiving a bonus for the best business plan. This fact will likely mean that some trainee graduates will flourish while others will not, and how this plays out will impact future intake groups of trainees and overall project success.

The expectations from the AVENIR program is that the GoG will take this approach and mindset to provide training and mentoring for future graduates of the national agriculture schools. This step will spread the impact and scalability of the AVENIR approach of equipping private advisors, and could significantly improve the overall academic program provided by the ENAE and ENATEF schools and lead to greater employment in the rural sector. However, this dynamic process will take time, and further GoG and donor investments will likely increase its breadth and impact.

Winrock and CNFA will both train 320 agents each over the life of the project, with cohorts of 40-50 per year per organization, and training starting in 2017. Their target areas will include the axis of

Kindia-Mamou-Faranah, and also expand north and southeast to Labe and Beyla, respectively. The target for the program is at least 40 percent female trainees. This requirement is in contrast to ANPROCA, which is mostly staffed by male agents, most of whom are older. Recruitment for the youth was undertaken by Vision Consulting and curriculum development by Dare to Innovate/Oser-Inover. These two Conakry-based organizations may be useful for additional initiatives in recruitment of individuals and EAS/agriculture content development that aim to expand EAS provision in Guinea.

The AVENIR initiative trains young people to work with an entrepreneurial mindset. The program will have a significant challenge to reorient these trainees to a more private-sector, market-oriented and risk-taking focus (as opposed to the guaranteed jobs in the past under ANPROCA), but many interviewees believed that the initiative can be successful with proper training and support from the NGOs and from current private-sector entities within Guinea. ANPROCA and the GoG are also willing to collaborate with AVENIR volunteers; for example, ANPROCA offices can be used to co-locate AVENIR trainees. Additionally, while ANPROCA and the AVENIR program have different approaches, financial incentives, technical knowledge and mindsets, they can collaborate, and, if done properly, both EAS systems could benefit from this interaction.

The possibility that the AVENIR and ANPROCA approaches could clash was raised with key informants. AVENIR trainees would be much younger and likely more supportive of private-sector approaches than ANPROCA staff. Also, AVENIR trainees will be self-dependent for employment and must charge fees for their services, whereas ANPROCA staff are employed by the state and should not officially use fee-for-service payments for technical assistance or trainings that they provide. One key informant believes that AVENIR and ANPROCA in theory could clash, but in practice probably will not, because ANPROCA have so few staff on the ground nationally, and are unlikely to block or conflict with AVENIR trainee efforts and approaches.

Overall, AVENIR, even if it achieves small successes, should spur changes and competition with ANPROCA that should make ANPROCA agents more responsive to farmers' groups or other clients, and more effective overall in EAS provision. An example of this could be a graduated AVENIR agent arriving in a zone and being more mobile in reaching farmers. This competition could then influence the ANPROCA agent, previously less mobile, to be willing to travel to reach more farmers near their own plots.

For AVENIR's approach to be successful and more sustainable, ANPROCA will need to be truly collaborative. ANPROCA must also not be threatened by AVENIR's emphasis on youth, entrepreneurship, charging fees for service and using new approaches that may focus more on market-oriented solutions, leading to increases in overall agricultural productivity, rather than traditional methods . Again, the mindset of the average nascent Guinean businessperson and farmer will need to change significantly by being more aware of private-sector competition and opportunities, and using a fee-for-service model. However, Guinea's farmers generally have little experience with private-service provision and paying for EAS services, and change will take time. This change can be enhanced with innovative training materials, effective social and behavior change techniques, market-friendly approaches, improved ICT (e.g., videos for training farmers) and other forms of technology. The poorest farmers may also have less access to EAS with these future changes than slightly better off farmers. This presents a danger that benefits will accrue to the wealthy, the only ones who can pay for the services.

Besides collaboration with ANPROCA, AVENIR will also collaborate with OIC International; ACDI/VOCA; Saref International; Development Alternatives Incorporated (DAI) and JSI.

A total of 640 trainees will complete this course at the end of five years, in a country that will have over 13 million people by the end of the project in 2021. For the project to have more impact and sustainability, it will have to scale up at a much larger rate, and reach other areas of the country, such as Conakry, Kankan and N'Zerekore.

Note that the AVENIR program from SMARTE and the SAVY and AAV programs from GRAND are in their nascent project implementation phase. These attempts at improving overall EAS delivery within target areas of Guinea should only be fully and fairly judged, and modified as needed, after at least two years of project implementation, in 2019. Additionally, effective collaboration with established and functional Guinean farmers' groups should make project activities more successful and sustaining.

Winrock's Agriculture Education and Market Improvement Program (AEMIP) Project (2013-2017), partnering with Purdue University, helps EAS provision nationally by building the ISAV/F's institutional and organizational capacity through 1) curriculum and faculty strengthening, 2) applied research capacity, especially toward climate change adaptation, and 3) management strengthening with various agricultural actors in Guinea, in both the public and private sectors (USAID-Winrock, 2014). AEMIP complements SMARTE directly and the other organizations' projects indirectly. AEMIP is currently closing out. The project's total budget was USD $7.5 million.

John Snow International (JSI) multi-country project Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) runs from 2011 to 2017. SPRING's goal is to improve nutrition outcomes for women, infants and young children, by improving social and behavior change for nutrition and improved use of nutrition-sensitive agricultural practices. SPRING was originally awarded in 2011 (Guinea only in 2015) with up to a USD $200 million ceiling for JSI and its partners in 10 countries, and was extended to 2017. SPRING's Guinea program value totaled USD $1,164,478 for the years 2016-2017.

The Improved Livelihood and Agricultural Development Program (ILADP) will be implemented by OIC International in collaboration with mining operators in mining zones through a global development alliance. Objectives for this project are to 1) increase agricultural sector productivity, 2) expand market access for improved technologies and agricultural producers, and 3) increase access for business development services and finance.

Private-Sector EAS Providers

EAS providers operating in the non-public sector include private companies, farmer-based organizations and local NGOs.

Private-sector providers include large commercial agriculture-based companies such as Saref International and Entreprise Tidiane, and agro-input dealers (some independent and some supported by ACDI/VOCA under its GRAND Project, described above). The quality of EAS

service delivery by these private-sector entities varies widely, and they typically have a vested interested in promoting sales and usage of inputs that they stock.[19]

Not many local NGOs provide EAS. The Association for Economic Growth in Kindia (APEK for its abbreviation in French) is a local NGO that has existed for 20 years. It is based in Kindia and provides inputs and agricultural training to family-run farms. It covers areas within Lower Guinea, has over 15 staff with monthly salaries between USD $270-$540, and supports Kindia Agriculture Bank and Kilissi Agricultural Research (in Kindia, Koba and Boffa). One advantage of APEK is that it can provide inputs on time for upcoming cropping seasons, but at times local seed production can be delayed due to many factors faced by resource-poor farmers (e.g., poor transport or poor information dissemination). APEK could likely benefit from studying the AVENIR program and implementing new techniques or approaches that show promise.

The Fouta Djallon Federation des Fermiers (FDFF), unions and *chambres d'agricole* also are involved in EAS, especially training. The FDFF, together with the French Fund for Aid and Co-operation, started the Timbi Madina agricultural development project in 1988 (Schmidt et al., 1998). The project was focused on organizing producers while mastering supply and commercial distribution circuits and giving producer groups financial autonomy by putting sufficient working capital at their disposal for implementing the supply programs.

In 1995, the SNPRV took over the guidance of the groups and the FDFF concentrated on training and facilitation work (Schmidt et al., 1998). The collaboration between the FDFF and the SNPRV was formalized in an agreement where SNPRV renders technical advice to the potato and onion growers, and the FDFF supplements the training of the advisors in its fields of competence. Similarly, the FDFF entered into a contract with the Bareng Agricultural Research Centre for joint on-farm experimentation (Schmidt et al., 1998).

Organizational and Management Capacities and Cultures

Overall EAS provision in Guinea is less dynamic than many other developing countries due to past state influence and public-sector dominance, inadequate infrastructure and economic disadvantages[20], poor governance, corruption and the Ebola outbreak.[21] USAID and key regional agricultural stakeholders have acknowledged the shortcomings of ANPROCA and have in the past and currently fund agricultural extension services to target farmer organizations and NGOs more effectively.

ANPROCA is integrated into the Ministry of Agriculture. As far as incentives go, salaries are low (usually under USD $200 per month), and typical extension agents lack resources (e.g., transport, fuel, communication) to adequately support their sub-prefecture/commune-level catchment areas. They also may collect 'informal' fees-for-service from clientele to supplement their government salaries.[22]

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[19] Agriculture stakeholder personal communication, March 2017.
[20] Guinea uses the Guinea franc as its currency, while bordering Senegal, Mali, Guinea-Bissau and Cote D'Ivoire all use the more stable and more widely used West African CFA franc.
[21] Agriculture stakeholder personal communication, March 2017, and see Transparency International ranking mentioned above under Frame Conditions.
[22] Agriculture stakeholder personal communication, March 2017.

ANPROCA agents typically hold either a university degree or an agricultural diploma from one of the national AET centers, but some only have a secondary school education. In general, the ANPROCA agents usually have a more technically specialized education than AVENIR trainees, and, of course, more experience. Functional skills such as communication or group development are not well-covered. The GFRAS has just developed the 'New Extensionist Learning Kit' that focuses on functional skills and could be useful to upgrade capacity of the agents.

Further, many ANPROCA agents are close to retirement age, since there has been limited hiring in the past 30 years or so. From an estimated 1,115 agents in 2011, the number is now down to 800 agents in 2015, meaning that fewer agents are available to cover the whole country (USAID PAD, 2016). The GoG will need to replace these older agents, if national staffing is to be maintained at 800 or increased.

For AVENIR personnel (and other EAS providers), organizations, such as Dare to Innovate, produce training curricula and design improved monitoring and evaluation (M&E) systems to measure overall EAS provision and agricultural production. Further, most Guinean organizations use M&E systems to provide feedback on the effectiveness of EAS provision, although this could be improved through increased standardization and professionalization.[23]

Currently there are limited to no incentives for extension agents in Guinea. There is also no regulation or certification system in place for the pluralistic providers. GFRAS also provides guidance toward regulation, certification and professionalization.

EAS Methods

The following methods are used in the Guinean context by ANPROCA and other EAS providers: demonstration plots, farmer field days, one-on-one visits between extension agents and individual farmers, organizing and training farmer producer groups, use of lead farmers as models to other farmer groups, farming as a business model, training agro-inputs dealers, use of video and mobile phone technology to disseminate information (especially for those not literate or numerate) and radio and hotlines/call centers for appropriate how-to approaches.

Message content includes provision of market information and digital weather station data, integrated pest management techniques, GIS mapping information from drones, how to use solar and treadle pumps, nutrient-sensitive crops and/or postharvest management, such as mango drying information.

Farmers obtain information from other farmers, other agricultural stakeholders, ANPROCA staff, agro-input dealers, radio, video, mobile phones and from actors along the chain of producer groups-unions-federations-confederation (the National Confederation of Farmers' Organizations of Guinea). Theoretically, AVENIR trainees, once they graduate, will also provide information, but on a fee-for-service basis. NGOs and public-sector agriculture research centers also devise ways to get price and market information to farmers through radio, television, tablets and other similar fora.

[23] Agriculture stakeholder personal communication, April 2017.

The key challenges are embracing and supporting market-friendly private-sector approaches by farmer groups and individual farmers, training effectiveness, coordination/collaboration and sustainability. As mentioned above, there is limited coordination between farmer groups, research and universities and EAS providers, thus limiting the ability to more widely disseminate the appropriate cropping and marketing information.

Under the AVENIR program for both SMARTE and SAVY, targeting of client farmers is based on gender, language and/or preferred crops. AVENIR's goal to have 40 percent of the agents be female to better reach female farmers should help, once the training is completed. However, local contexts vary quite a bit within Guinea, and this contribution may be more evident in some areas than other areas. Further, the national female adult literacy is lower than male adult literacy, with implications for targeting strategies and EAS methods, such as use of farmer demonstration plots or video.

Video has been utilized by JSI/SPRING (in collaboration with Digital Green) in many West African countries, and now in Guinea. SPRING has established three hubs for video production, and these community videos are in their pilot phase at locations within Faranah. For content, nutrition is combined with agriculture, and nutritional messages have been successful in advocating sweet potato leaf and cowpea (niebe) consumption.

Radio is another helpful tool for agricultural information dissemination and even farmer feedback, and many different organizations in Guinea use rural, smaller local community and commercial radio for these purposes. Overall access to radio nationally is quite good, with varying options for farmers depending on their home location accessibility. For example, Radio Rurale is a hybrid between commercial and state radio and has 40 stations throughout Guinea, providing good coverage for agricultural and nutritional messages. Community radio is smaller and less powerful than Radio Rurale, but provides many similar messages. Commercial radio stations also exist; however, educational messages must be paid for. Farm Radio International (FRI) is present in Guinea and collaborates with SPRING to hone the radio and other ICT messaging for improved effectiveness of outreach. FRI has done so by surveying communities to determine existing radio equipment, ideal broadcast times, human resources, viable and existing on-air topics, scheduling and listeners' radio habits to improve overall service delivery.

Market Engagement

Market engagement in the context of EAS is concerned with farmers' access to credit, market-related advice, market linkages, quality inputs, group development and output markets. Key highlights regarding market engagement in Guinea are:

- Aggregators are rare in Guinea, and the closest similar role player to the aggregators is a "*locataire*," or renter. They tend to be aggressive businesspeople who can control more market share and/or dominate other players along the value chain. Processors are rare too, generally poorly equipped, operate in weak markets for processed goods like horticulture, lack adequate packaging for processed goods, and often see limited pay-off. One informant reported success with farmers in Labe aggregating potatoes successfully for sale at other markets.[24] Winrock also provides training for improved aggregation under various projects, and this will be in coordinated with ANPROCA in new projects.

[24] Agriculture stakeholder personal communication, April 2017.

Farmers' groups and unions also help with aggregation. In some areas, aggregation can be a challenge where aggregators and adequate storage facilities do not exist, or local farmers do not want to collaborate. This case is typical of areas that are less developed economically and where private-sector forces and market penetration are nascent or weak.

- Quality certification and standards are generally weak, but have been strengthened for the export of pineapples to Europe; the Ministry of Agriculture and International Commerce provides certification and standards for these services.
- Traceability is only available for exports, particularly mangoes and pineapples (note Guinea's main agricultural exports are rubber, coffee, cocoa and cashew).
- Price discovery occurs in Guinea by sharing price information via cellphones and radio. Cellphones can specifically help in determining where inputs are and how much they cost, and this information dissemination can be useful for price negotiation. Regional coordination occurs to help in price determination, but some market inconsistencies related to information and price dissemination do occur.
- Postharvest handling is less important for rice than other, more perishable, crops. However postharvest handling is still relevant for many farmers and needs to be targeted and upgraded to improve overall agricultural productivity.
- Financial services exist in Guinea, but are generally rudimentary. Mobile money services are available through MTN and Orange. Also, while rural credit facilities exist in towns, there is a definite need for financial service expansion.
- Input supply is private-sector driven, and fertilizer for rice is heavily subsidized by the GoG (where available). In general, input supply does not meet market needs. Further, government input subsidies (e.g., for rice) can lead to poor targeting where the subsidies are not reaching the poorest farmers or farmer groups.
- Farmers/producers generally can also be reluctant to embrace new ideas or technologies ("risk averse"), are usually not business-minded, have limited labor resources and lack adequate support systems.

CNFA targets market engagement, under its SAVY Project, by developing the value chains of rice, horticulture (pineapple, okra, potato and vegetables) and beef cattle. The project will initially work with other private or public EAS providers, with the goal of AVENIR agents eventually providing EAS themselves, after completing the training.

Finally, consumer markets are usually centralized in urban areas within Guinea (there are limited opportunities for legal and illegal exports to neighboring countries like Senegal, Mali, Sierra Leone, Liberia or Ivory Coast, and also Europe), value quantity over quality, and generally undervalue where products are originally produced. For instance, if mangoes are known to be of a higher quality from Mali than Guinea, local markets within Guinea do not reward or preserve that distinction when they import the mangoes, so no bonus is paid for that perceived higher quality. Markets generally lack that ability to reward higher quality items. These value-chain details and market constraints help show the real and significant market engagement challenges within Guinea.

Livelihood Strategies

For EAS to improve livelihoods as opposed to simply improving agronomic knowledge, service providers must be aware of the different needs of all types of farmers (men, women, youth, elderly, laborers and pastoralists). These needs could include issues such as markets, nutrition, climate resilience, mechanization and others, and include providing complementary information (e.g., on nutrition), focusing on the agricultural activities most common for different types of farmers (e.g., poultry rearing or vegetable cultivation with women), or holding different types of events that are particularly engaging or accessible for that type of farmer (e.g., women-only events).

For Guinea, one key issue for livelihood strategies is the need to diversify away from rice as the national staple and improve domestic rice production intensification to compete with cheaper imported rice (usually produced and exported from Asia). The national diet, from a nutritional standpoint, should include the consumption of more maize, yams, cassava and sweet potatoes and more fruits/vegetables to lead to a more diverse and nutritious diet.

Private-sector companies, like Saref International or Entreprise Tidiane. provide EAS, but it is usually based on what inputs they can provide and their own commercial interests rather than what a particular farmer or farmer group needs or wants. However, commercial enterprises do rely on farmers buying what they are selling for a sustainable business model, and therefore they must listen and respond to farmers' preferences. Smaller farmers generally are less powerful than larger farmers in advocating for preferences.

Traders are more responsive to whom they sell to rather than whom they buy from, which are small farmers. However, traders will work with farmers on crop choice simply because they cannot sell what farmers cannot or do not choose to grow. EAS agents from the private sector are usually extension and inputs providers, and information tends to complement and promote the inputs that they sell.

Farmers' groups can provide information for EAS providers, but farmer inputs on their needs can increase. Winrock's AEMIP Project, for example, has contacted farmers for input into research priorities for Guinea's agricultural institutions, ISAV/F in particular. This step can be time-consuming to collect farmer and farmer group input, but will improve EAS content and overall relevance.

Public-sector EAS providers and content creators at IRAG and ISAV/F need to improve their coordination, but they typically do not regularly dialogue with farmers, meaning that farmers' needs and options are not fully met.

AVENIR aims to mitigate the fact that women are not content creators by targeting 40 percent female participation for its trainee program. Female trainees are thought to improve communication and coordination with female farmers, and their corresponding unique needs and perspectives. Other vulnerable populations with unmet needs include ethnic minorities throughout Guinea. Finally, nutrition is often overlooked within livelihood strategies. SPRING and Digital Green are addressing this through their pilot videos that combine agriculture and nutrition topics and messages, and this will be integrated into EAS provider content.

Community Engagement

Finally, EAS is concerned with community engagement, that is, land size and distribution, education levels, gender roles, demographics including age, community organizations (e.g., producer organizations) and capacity to collaborate.

For EAS service providers to be effective, they need to interact with community members and groups for dialogue and sharing information. These community groups are the key point of contact for effective EAS at the grassroots level.

Social institutions within communities can include schools, religious centers, athletic clubs and many other groups (community-based organizations or NGOs), based on commonalities or membership criteria. Farmers' groups show a wide variety in terms of size (~10-200, with a rough average of 25-50 per group, but dependent on what type of producers are primarily within a group), and in terms of gender, with all-male farmer groups, all-female farmer groups and mixed farmer groups.[25] These groups typically have adequate levels of social capital. SAVY in particular works with farmers' groups and promotes savings and internal lending practices. Some of these institutions are more formal and structured, and others are more informal. EAS providers should take these factors into account for actual service provision by maintaining good communication and feedback with local communities, and the many varied institutions within the local communities.

Considering gender, men and women farmers often complete different tasks, and these roles will vary within different regions of the country. Generally speaking, men make many farming decisions and manage cattle, while women manage sheep, goats and poultry. Men also typically manage larger plots for vegetables and women manage smaller plots.

Effective community engagement by EAS providers should take these factors into account, and also realize that same sex or integrated farmer groups may both be utilized for unique EAS presentations, based on the characteristics and composition of the group. The planned training of the 40 percent female AVENIR trainees should help in the long run in expanding the cadre of female EAS providers, and that should also improve communication and effective approaches with female farmers. One informant noted that male trainers may be effective for some crops and female trainers for other crops, when targeting women farmers.[26] Further, EAS providers should look for ways to encourage these women farmers reached by the female agents to participate in these training/education/mobilization settings. All-female groups may be one successful approach. Developing and encouraging supportive husbands for female farmer training may also be another successful approach, but these gender norm changes can take time to take hold.

Farmer demand can be articulated through farmer groups, but also through participatory radio and video programs, mobile phone networks, dialogue with agro-inputs dealers, dialogue with ANPROCA and AVENIR and other EAS personnel, (for instance under Winrock's AEMIP

[25] Government stakeholder personal communication, April 2017.
[26] Private expert personal communication, April 2017.

Project) and other channels. Farmers' voices and empowerment can only help in improving the quality of EAS providers and their content.

Finally, psychosocial dimensions that should be considered for improved community engagement can include gender and social status, religious differences from the majority Muslim population with other groups, ethnic differences, political preferences, and many other factors. EAS should again consider these factors in designing and improving overall service delivery.

RECOMMENDATIONS

Based on the limited literature review and the interviews of key informants, what follows are some preliminary recommendations to improve EAS providers and service delivery in Guinea. These could be further refined and tested with a more in-depth study and/or a stakeholder validation meeting; however, these are not currently planned. The recommendations are based on current assets in-country, which include the following drivers for success:

- agricultural potential within Guinea due to good soils, rainfall and plentiful water sources
- unrealized research and applicability/coverage potential of the agricultural research and training institutes (ISAV/F, IRAG, ENAE and ENATEF)
- existing cadre of EAS agents (ANPROCA, AVENIR, AAV and others) and EAS donor supporters (e.g., USAID, European Union (EU))
- agro-input dealers (some supported through GRAND and other projects) for reaching greater scale
- farmers' groups, unions and federations due to their organized vertical nature
- piloting of ICT approaches

Based on these drivers, the recommendations for making EAS in Guinea more effective, relevant, sustainable and scalable are below. These recommendations apply to all key EAS stakeholders: public- and private-sector EAS service providers, donors, local and international NGOs, and farmers and farmer groups. The suggested lead actor or actors is included in parenthesis at the end of each recommendation.

Governance Structures and Policy Environment

1. Set up more formal links and communication between EAS and research (IRAG, ISAV/F, UGANC and CNSHB), education (ENAE and ENATEF), private-sector institutions, NGOs and farmers' groups (e.g., APEK or FDFF) to ensure research is practical, demand-driven, relevant and more oriented toward improving farmers' production and livelihoods. This step could be done through committees or advisory councils that meet regularly and include representatives of the different sectors. (ANPROCA with the mentioned institutes)
2. Set up specific collaboration between farmers' groups, donor project activities and ANPROCA agents. Guinean farmers' groups, unions and confederations can be

effective and functional structures and this should improve overall EAS provision to farmers and lead to overall increases in agricultural productivity, market function and profitability. (FDFF, ANPROCA, donor projects)

3. Set up agricultural working groups for better donor coordination of EAS, patterned on existing ones in Ethiopia, Mozambique and Tanzania. (Ministry of Agriculture with donors)

Organizational and Management Capacities and Cultures

4. Refresh the cadre of public-sector EAS providers through a combination of new ANPROCA recruits, cross-pollinating new staff from AVENIR agents or AAVs from the GRAND Project, and developing other alternate and effective providers of EAS to agricultural producers in Guinea. This process involves investing significant short- medium- and long-term resources into ANPROCA. (GoG/Ministry of Agriculture budget and/or donor funds)
5. Linked with the recommendation above, strengthen organizational capacity of ANPROCA to perform better in terms of M&E, professionalization, operational procedures, financial management, use of ICTs, knowledge management and advocacy. (ANPROCA with donors and GFRAS)
6. Institute a semi-private EAS service through allowing better-off commercialized farmers pay for ANPROCA services, while poorer areas with farmers growing staple crops still receive services for free or at a subsidized cost. At the same time, incoming ANPROCA staff should receive training similar to the AVENIR curriculum, so that they are more private-sector- and market-oriented. (ANPROCA with support from the AVENIR program)
7. Professionalize all extension actors, including agro-dealers, through regulation and certification of providers, which includes formative training and continuous education. (Ministry of Agriculture with educational institutions and GFRAS)
8. Support AVENIR and AAV trainees following graduation in the form of operational funds, mentoring, materials and/or transport. (international NGOs, ANPROCA, private-sector stakeholders)

EAS Methods

9. Scale up the use of video for EAS service delivery, especially to target illiterate or semi-literate and women farmers. (SPRING, Digital Green and other providers)
10. Use radio and video approaches for improved communication with and feedback from farmers and agro-dealers. (SPRING, Digital Green and radio stakeholders)
11. Provide specific livestock information via ICT methods in Lower, Middle and Upper Guinea. (ANPROCA, radio and video EAS providers, ENAE)

Market Engagement, Livelihood Strategies and Community Engagement

12. Prioritize and develop key agricultural value chains regarding aggregation, quality, traceability, price discovery, post-harvest handling financial services and input markets. This process will also include training on value chains and functional skills, such as group development for all extension agents. (ANPROCA, USAID projects, Ministry of Agriculture, GFRAS)
13. Strengthen and expand cadre of agro-input dealers, applying lessons learned from the ACDI/VOCA GRAND Project. (GRAND, Ministry of Agriculture)
14. Develop a strategy for content design/delivery that incorporates farmers' demands and needs more fully. This content can be achieved through the SMARTE, SAVY, GRANDE and AEMIP Projects incorporating farmer feedback into their project implementation and the Ministry of Agriculture providing incentives for ANPROCA agents to increase collaboration with and feedback from agricultural producer organizations. (USAID projects, Ministry of Agriculture, ANPROCA, producer organizations, educational institutes)
15. Add climate change, nutrition and agriculture, and gender advocacy into regular EAS training, curricula and implementation. (EAS providers, educational and research institutions, donor projects)

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