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GUINEA VALUE CHAIN ANALYSIS

EGGS, SMALL RUMINANTS, MAIZE, RICE, GROUNDNUT

LEO

REPORT #22

Leveraging Economic
Opportunities



October 2015

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ABBREVIATIONS, ACRONYMS, FRENCH-LANGUAGE TERMS

ANAVIG	<i>French acronym</i> for National Association of Poultry Farmers in Guinea
ANPROCA	<i>French acronym</i> for National Agency Promoting Rural and Agricultural Consulting
<i>bas fonds</i>	Lowlands
CAADP	Comprehensive Africa Agriculture Development Program
CDEAO	Communauté économique des États de l'Afrique de l'Ouest (<i>French acronym</i> for ECOWAS)
CIF	Cost, Insurance, and Freight
CNOP-G	<i>French acronym</i> for National Confederation of Farmers' Organizations of Guinea
COPRAKAM	<i>French acronym</i> for Cooperative of Producers for Shea Butter and Honey
CR	Crédit Rural
CRRA	<i>French acronym</i> for Bordo Agriculture Research Center
CSA	Climate Smart Agriculture
DCA	Development Credit Authority
DOC	day old chicks
ECOWAS	Economic Community of West African States
EVD	Ebola Virus Disease
FAO	Food and Agricultural Organization (United Nations)
FTF	Feed the Future
FOB	Free on Board (export price)
FUPRORIZ	<i>French acronym</i> for Federation of Unions of Rice Producers
GAP	Good Agricultural Practice
GCP	Good Conservation Practice
GIE	<i>Groupement d'Interets Economique</i> , farmer group
GNF	Guinean Franc

GOG	Government of Guinea
ha	hectare
IFPRI	International Food Policy Research Institute
IGC	International Grains Council
LEO	Leveraging Economic Opportunities
LTTA	Long Term Technical Assistance
MFI	Microfinance Institution
MOA	Ministry of Agriculture
MOL	Ministry of Livestock
MT	metric tons
PNIASA	<i>French acronym</i> for National Agriculture and Food Security Investment Plan
PPR	<i>Peste de Petites Ruminants</i>
SAREF	SAREF International Corporation
SME	Small to Medium Enterprise
SRI	System of Rice Intensification
STTA	Short Term Technical Assistance
UNAG	National Union of Poultry Farmers in Guinée
USAID	United States Agency for International Development
VCA	Value Chain Analysis
WAD	West African Dwarf (goat)

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I. EXECUTIVE SUMMARY AND KEY FINDINGS

VALUE CHAIN ANALYSIS KEY FINDINGS

Guinea's latest presidential elections, its commitment to the principles of the Economic Community of West African States (ECOWAS; CDEAO in French), and its efforts to implement the Comprehensive Africa Agriculture Development Program (CAADP), have set Guinea on a path towards market liberalization. However, this remains a slow and complicated process with significant resistance from those who benefitted from the status quo. The Ebola Virus Disease (EVD) crisis further slowed Guinea's evolution towards a liberal economy, and, more importantly, added a shock to individuals and households. In the short term, the Ebola crisis left crops rotting and unable to reach markets.¹ In Guinea, 12,000 jobs were lost in the transport sector and over 40,000 jobs in the potato sector (UNDP 2014). It is reasonable to assume that similar levels of job losses occurred in other agriculture sub-sectors and critical cross-cutting service industries.

Guinea is making a comeback from the height of the EVD epidemic. While affected households remain seriously challenged from low levels of productivity and value addition, due to households having lost productive members, overall Guinea is rebounding. The World Bank (2015e) estimated a 0.2 percent economic contraction for 2015, down from pre-Ebola estimates of 4.3 percent positive growth, but an improvement over economic decline at the peak of the EVD crisis.

Women pay the highest price for Guinea's failure to transform its agricultural sector, as they provide a significant amount of labor in production and post-harvest processing. This price is paid in terms of low levels of productivity, high rates of post-harvest losses and animal mortality, and in the enormous drudgery resulting from lack of access to labor saving technologies. While the team found evidence of small machinery and equipment financing, in most of the villages and towns visited, it saw no threshers or shelling machines for rice and maize respectively. Mills and parboiling equipment for rice proved to be of poor quality, small scale, and more labor intensive than what is available in neighboring countries.

Extension services, which are essential to small-scale farmers' and herders' abilities to upgrade, are largely inadequate and obsolete in their content. More seriously, half of the District Regional Livestock and District Regional Agricultural extension workers are scheduled to retire by the end of 2016. Active recruitment is critical to ensure this unit will continue to function after the end of 2018.

There are virtually no private seed markets, though there are government- and CGIAR-supported seed research centers; and the private sector fertilizer market is minimal. The national seed law has yet to be ratified. The same constraint exists in veterinary inputs. The Ministry of Livestock estimates that poultry and small ruminant vaccines reach less than 50 percent of demand. Less than one percent of the small ruminant herd has been vaccinated against the lethal *Peste des Petits Ruminants* (PPR). There appears to be little competition in the provision of agricultural and veterinary inputs, with only one known government licensed import. Not all

¹ Ministry of Agriculture statistics do not indicate a significant drop in production during the Ebola period. The biggest impact appears to be in the reduced mobility of people and their ability to move crops and products from areas of production to areas of consumption.

the constraints to building more competitive agricultural systems are visible, so the sector's challenges certainly exceed what the team observed.

When a society is as richly endowed in natural resources, abundant water, available land, and labor, one would expect to see considerable investment and innovation in the supply of services to all productive value chains. However, the team observed an absence of commercial rice mills, low penetration of input and veterinary services, and an absence of significant commercial investment, (the poultry sector excepted). This leads to the assumption that there are challenges and constraints in the business enabling environment. Guinea has one of the lowest rankings for doing business (169 out of 189 countries) and is close to the bottom of these rankings for starting a business (175 of 189) (World Bank 2015c).

Despite obvious and more difficult to identify constraints, there are significant and transformative opportunities in each of the identified commodity sectors. Principal among those identified include:

- Deeper delivery of private veterinary and agricultural input services into rural communities;
- Reduce bird mortality and increased bird productivity through better genetic control and management of household poultry stocks.
- Facilitation of improved equipment and machinery services for rice, maize and ground nut production
- Stimulating private sector markets for improved seed and domestic seed multiplication
- Supporting the government in developing a more business-friendly enabling environment.

NUTRITION AND VALUE CHAINS

The LEO value chain team was supported by a member of the USAID SPRING nutrition project to bring a nutrition lens to this value chain analysis. Value chain development has the potential to improve all three components of improved nutrition/food security,² by increasing access by large numbers of poor households through increased incomes, increased availability of more and high nutrient quality food stuffs through the development of value chains that contribute to better nutrition, e.g., by increasing the supply of eggs, chickens and small ruminants in the market. Finally a value chain development program can use commercial paths to improve utilization of high nutrient value food stuffs by working with input suppliers to develop extension campaigns around more diverse diets which for the input supplier is a strategy to sell seed inputs and extension services to rural producer households. While untested in Guinea, the team believes that by decreasing women's labor burden by facilitating the introduction of commercial channels of small scale machinery and equipment women will have more time available, and more disposable income with which to ensure their households nutritional requirements are met.

² Defined here as 1) increased access to more nutritious food, an income effect; 2) increased availability of more nutritious food, a supply effect; and 3) increased utilization of more nutritious food, a behavioral effect.

II. INTRODUCTION AND BACKGROUND

In 2015, USAID announced that the Republic of Guinea would join the President's Feed the Future (FTF) initiative. Dependent upon the outcomes of multiple assessments, the geographic focus will most likely range in the swath of communities in the corridor between Conakry and the Southeast of Guinea. As in other FTF countries, all activities will be closely aligned with the CAADP five-year National Agriculture and Food Security Investment Plan (PNIASA).

The Guinea program includes plans for smallholder-agriculture-led growth, and contract and plantation-type farming for cash crops. Nutrition will cross cut all investments, with FTF's focus on linking nutrition-sensitive interventions (e.g., combining horticulture and animal-source protein) with public health-based nutrition services. Homestead food production based on mixed cropping of vegetables with various staple and tree crops has been an integral part of Guinea's agricultural landscape. The nation has a unique agro-climatic endowment for year-round production across the country. However research into yield-maximizing and disease-tolerant varieties of agricultural and livestock species falls well below those of countries that are integrated into market based agricultural systems more effectively.

Given the enormous threat of Guinea's Ebola crisis, USAID Guinea was also concerned about bushmeat's potential as a disease vector, including of a broad category of wild animals from rats and bats to monkeys. Since the Ebola outbreak bush meat consumption has been discouraged, necessitating other protein sources. The emphasis on nutrition and public health, by the GOG and USAID, justified a deeper assessment of viable animal protein alternatives to bushmeat, from market, environment and cultural acceptance perspectives. As gender and women's empowerment are priorities for USAID, it was essential that this assessment should explore current and potential opportunities for women, from production through marketing.

In this context, USAID chose to analyze several food value chains, with a focus on transformative opportunities in an almost, but not yet, post-Ebola Virus Disease (EVD) environment; and special attention to the capacity of value chain actors to anticipate and respond to market opportunities in the face of anticipated environmental and climate change impacts of said opportunities. All commodity under this assessment were to be analyzed with a focus on the greatest transformative opportunities within them, with respect to the degree to which opportunities are available to actors and households regardless of gender. The USAID Leveraging Economic Opportunities (LEO) Project, implemented by ACDI/VOCA was selected to conduct these assessments.

Initially targeted value chains were grains (maize, fonio, sorghum), legumes/complementary pulses (soy, cowpea and groundnuts/peanuts), and animal protein alternatives to bushmeat (including but not necessarily limited to: poultry meat and eggs, small ruminants; commercial and scalable production of small animals such as cane rats, and fresh-water aquaculture). Value chains/sub-sector systems ultimately selected for this study were finalized by the LEO assessment team and discussed with the mission team.

OBJECTIVES

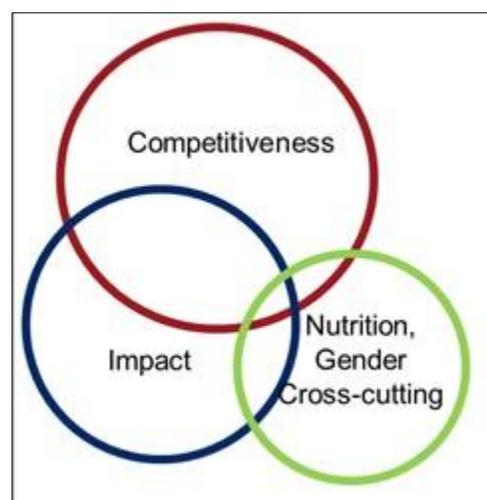
The objectives of the USAID Guinea value chain assessment include:

1. Identify and analyze local, national and regional end markets for the selected food sources or sub-sectors in which Guinea could establish itself or expand upon current efforts, based on current competitive advantage.
2. Conduct a detailed value chain analysis of each of the identified subsectors. This analysis will characterize potential contributions to overall economic growth, number of smallholders and smallholder households that could potentially benefit from investment in the sector and the potential change in household income as a result of investments in the above cited commodity chains disaggregated by gender, youth and vulnerable populations.
3. Integrate key elements of an Emergency Market Mapping Analysis to better understand the impact of the recent Ebola crisis on each of the identified market systems.
4. Apply a climate change lens to each value chain to a) determine to what extent climate factors are impacting production and market systems, and may affect these systems in the future; b) identify critical impacts across the value chain; and c) determine what actions value chain actors may take to adapt to and, where appropriate, mitigate the identified adverse impacts
5. Identify alternative commodity systems in Guinea Conakry that have equal or greater potential to achieve the growth, income, inclusiveness and sustainability objectives of the mission.
6. Identify aggregate and household strategies that can contribute to positive nutritional outcomes and increase access, availability and utilization of more nutrition foodstuffs as a result of investments in identified value chains.³

VALUE CHAIN SELECTION

The VCA team applied a value chain lens as part of the commodity selection process. Figure 1 illustrates the selection framework. The first-order criteria for value chain selection is the growth and competitiveness potential of a particular commodity chain in light of alternative sources from alternative markets. To determine this, the LEO team conducted a competitiveness analysis of potential terminal markets for a set of potential commodities. Potential growth and competitiveness are, however, necessary but insufficient conditions to achieve transformative impact. As such, the LEO team also applied impact and cross-cutting criteria to their selection process. Impact is the potential of investment in a particular value chain to increase incomes of a targeted population, the magnitude of the income effect in terms of households reached, and the time needed to realize these effects. Finally the LEO team applied several cross cutting criteria including the potential nutritional, gender and environmental impacts of investments in the multiple commodity chains under consideration. From a list of twelve commodities under consideration, the LEO team selected five: maize, rice, groundnuts, eggs, and small ruminants (sheep and goats).

Figure 1: Commodity Selection Framework



³ USAID Guinea Value Chain Analysis SOW

END MARKET ANALYSIS

The LEO team conducted an end market analysis (with consideration for production capacity relative to end market demands), which contributed to the competitiveness analysis in the selection process. In each of the selected commodity systems, Guinea has a comparative advantage in the domestic and regional production and trade. In the case of poultry and paddy rice, Guinea cannot compete with imports on price alone, but Guinean consumers prefer and are willing to pay a price premium for domestically produced rice and broilers. With significant increases in production of these and all selected commodities, unit prices would be expected to fall to levels that would make Guinea competitive with imports even on price. Maize is Guinea's third most important crop after rice and cassava, consumed as a *pâte*. It is also a key input for poultry feed. Production improvements are needed to help producers take full advantage of ready and growing end markets. Rice and maize yields are one-third to one-half of the yields that are possible under intensive production using improved seed and inputs. Small ruminants are barely part of a commercial channel, as they function more as a form of household savings and are sold when households require cash and/or during holidays and festivals. High animal mortality and low productivity reduces the value of household savings considerably. Both poultry and small ruminants are an important source of women's savings and income. The end market analysis was guided by <http://www.microlinks.org/good-practice-center/value-chain-wiki/end-market-analysis>. For each of the selected value chains describes the end market analysis in more detail.

VALUE CHAIN ANALYSES APPROACH

The analyses was guided by ACDI/VOCA's value chain analysis approach and methodology,⁸ described on the Microlinks website: <http://www.microlinks.org/good-practice-center/value-chain-wiki/32-value-chain-analysis>. Chapter 3 details the methodology. Following this approach, the LEO team held meetings, individual interviews and focus groups with individuals, producer and marketing groups (*Groupement d'Interets Economique, GIE*), processors, wholesalers, and retailers. In addition to value chain actors in each of the chains, the team interviewed representatives of all of the services on which the value chain performance depends including finance, inputs, equipment, and extension services. The team also met senior representatives of the Ministry of Agriculture, the Ministry of Elevage, and Customs, to better understand the national policy and enabling environment affecting the ability of value chain actors and service providers to take advantage of identified opportunities

The value chain approach allowed the LEO team to identify areas of potentially transformative opportunity within the selected commodity systems and services markets. Key to this approach is the identification of individuals and firms in a position to take advantage of identified opportunities because they possess some combination of the resources, skills, incentives and market power to drive change in a system. We call this key person, persons or firms, a **change driver**; in the Guinean context, these change drivers were difficult to find even in commodity chains with high competitiveness potential, like rice. This analysis further identified the set of constraints that are preventing change drivers from fully taking advantage of identified opportunities.

III. METHODOLOGY AND APPROACH

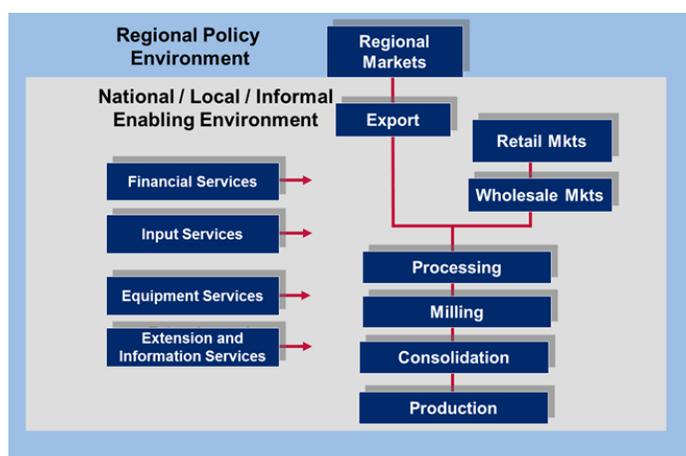
A. VALUE CHAIN APPROACH

In Guinea and elsewhere, donor, NGO and government interventions in the agricultural sector have emphasized improving the production and market outcomes of agricultural products, with the goal of swiftly addressing food security issues and delivering short-term income gains to agricultural households. However, much of this development has been undertaken without adequate consideration of the dynamics of interrelated market systems,⁴ leading to an inefficient use of resources and a lack of enduring impact.

USAID'S Feed the Future Initiative has adopted a value chain approach (figure 2) to accelerating economic growth and reducing poverty, while increasing food security and nutrition of vulnerable groups. This is an ambitious, and not always intuitive set of goals. Implicit in the use of a value chain approach to achieve them are the following:

- Improving the situation for the system's least powerful actors, i.e., small scale farmers can never be sustained unless the value generate by the whole system increases,
- A value chain as a market system with many moving parts, most of which are people, is analogous to a vehicle dedicated to travelling to a destination with higher incomes, greater employment and food security; but where everyone wants to be a driver. It is not always easy.
- Not all commodity chains have significant and equal potential for growth.
- A value chain, like a vehicle, requires a set of services to move forward. In a value chain these services include **inputs, equipment, extension, information and finances** to fuel the value chain as it moves to higher levels of performance, competitiveness and efficiency.
- The ability of value chain actors to take advantage of opportunities requires an enabling environment, including the political economy therein, that encourages investment and reward risk taking by farms and firms throughout the value chain. This is widely the case in Guinea.
- Accelerating growth in value chains, like vehicles, requires a driver or multiple drivers, with the incentives, access to resources, and market power to invest in improved outcomes in the value chain.

Figure 2: Value Chain (Within Market System)

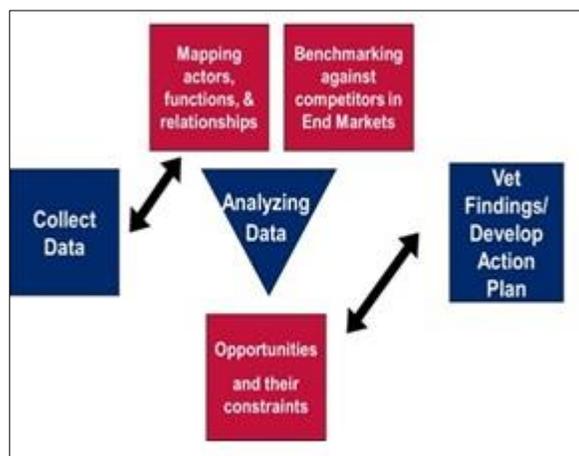


⁴ For more on market systems development, see Campbell, Ruth. (2014). "A Framework for Inclusive Market Systems Development." USAID.

Value chain analysis therefore requires:

- Identification and quantification of one or more end market opportunities;
- Identification of the functions and actors that animate the value chain
- Analysis of the multiple services on which chain performance depends
- Analysis of the political economy, laws regulations, rules and customs that affect actors ability to pursue opportunities;
- Identification of value chain actors and service providers who are already change drivers or could become change drivers under the right conditions

Figure 3: VCA Research Methodology



B. RESEARCH METHODOLOGY

The overall objective of the assessment was to identify potential bottlenecks and opportunities to the feasibility of promoting specific agricultural commodity value chains along the Southern Trade Corridor, i.e., Conakry-Kankan and Conakry-Kissédougou.

The assessment involved the following data collection and analysis phases. As illustrated in figure 3, these phases may overlap, and inform each other.

1. **Desktop research:** The team undertook a desk review of pertinent studies and reports on the target commodity chains with an emphasis on Guinea. This secondary research included a preliminary analysis of the supporting enabling environment. This served to inform design and field work; and complement field findings.
2. **Field visits and key informant interviews:** The Guinea team divided into two sub-teams, the first covering the Southern Corridor from Conakry to Kindia, Mamou, Dabola and Kankan; and the second covering from Mamou to Farana and from there to Kissédougou. See map below and the Annex: List of Interviewees. Both teams conducted meetings with value chain actors, service providers and public agents in, around, and between the above cited communities

STAKEHOLDERS CONSULTED

- Small-, medium- & large-scale producers
- Producer, processor & marketing associations
- Processors
- Traders
- Wholesalers
- Retailers
- Consumers
- NGOs, bi- & multi-lateral donors
- National, regional & sub regional agricultural & livestock officers
- Senior ministerial agricultural & livestock representatives
- Customs
- Input providers
- Equipment dealers
- Financial institutions
- Mining community

3. **Data analysis:** A feasibility matrix was designed to rank the list of agricultural commodities for each province, using USAID objective criteria. The scores were integrated into the final evaluation and ranking of commodities based on the multiple criteria used for the market study. The team gathered and analyzed data to quantify end market opportunities; and pricing and costs along the value chain.
4. **Mission debrief and report review:** Evaluation of the commodities, including the climate screening analysis, were presented to USAID mission staff in a PowerPoint on August 12th and 13th, followed by report drafts. This final report is based on USAID's feedback for the presentation and drafts.

C. COMPETITIVENESS ANALYSIS

For each of the commodities analyzed in this report, the LEO assessment team conducted a competitive benchmarking analysis. This analysis used Porter's Five Forces framework (figure 4), which looks at bargaining or market power of buyers and sellers, potential threats both of substitutes and new market entrants, and rivalry among existing market actors.

Figure 4: Porter's Five Forces



In addition to the Five Forces analysis, the LEO assessment team conducted a

competitiveness analysis based on domestic prices versus those of imports of a like commodity. This analysis, often called a waterfall analysis after its graphical depiction, was carried out for rice and maize. The LEO assessment team was unable to collect reliable data for the other commodities selected. In the case of small ruminants, there team could not find appropriate data for comparison, as the small ruminant sector involves the trade of live animals, and in Guinea, only West African dwarf varieties have known resistance to the *trypanosomiasis* virus. Available data and reports do not capture regional animal trade, or differentiate among species.

D. STUDY AREA

Shortly after arrival in country, the LEO team participated in a series of discussions to determine the geographic focus for this assessment and ultimately for the development of a USAID Feed the Future program. A number of criteria were considered in this process, including areas of existing USAID interventions, particularly in the public health and nutrition arenas; regions of concentration of Guinea's poor and very poor; and areas with high potential for leveraging private sector investment for accelerated economic growth. With Guinea's proximity to the bottom of the economic ladder and a 2013 GDP per capita of \$523.12 (World Bank 2015d), Guinea's poor and very poor are disbursed throughout the country. The areas with the greatest potential to leverage private-sector resources to leverage growth, and the areas where USAID's Global Health program and the President's Malaria Initiative programs, do not have a lot of overlap.

In the final analysis, the LEO value chain assessment team’s coverage area included the Kindia, Mamou, Faranah, Kankan, and N’Zerekore regions. Figure 5 indicates the route covered by the LEO assessment team during its field work.

Figure 5: Study Area



Image Source: FEWSNET (2013b)

E. LIMITATIONS ON DATA COLLECTED

Reports and statistics were assembled whenever possible to support the value chain assessment. However, it should be noted that the availability of quantitative data was extremely limited. Statistics were often from several years—or even a decade—in the past. At multiple junctures in the analysis, the LEO team had to draw inferences from what was absent, e.g., industrial agribusiness investment, significant small- and medium-scale processing, and strong commodity chains (factors that exist despite a set of resource endowments that would lead one to expect a higher level of development).

IV. VALUE CHAIN SELECTION

A. BACKGROUND

The Guinea value chain assessment team was asked to look at three commodity families for further analysis. These were 1) cereals, including maize, sorghum and fonio; 2) legumes, including soybeans, groundnuts (peanuts), and local beans; and 3) animal protein alternatives to bushmeat. The latter was identified as important as part of the initial Ebola response recognizing the role that bats and some monkey species played as both Ebola vectors and as a popular animal protein source. USAID Washington and mission staff also instructed the LEO team to suggest commodities from among these and others that fulfill Feed the Future Guinea priorities, and would enable it to carry out a value chain approach to increase employment, income generation, food security and nutrition.

Markets are limited in their power to drive positive change in the nutritional status of a population. Improved nutrition, and food security, require three things: 1) increased access to more nutritious food, an income effect; 2) increased availability of more nutritious food, a supply effect; and 3) increased utilization of more nutritious food, a behavioral effect. Market systems can deliver improved access and availability; they are less effective and changing behavior.⁵ Appropriate interventions in high growth potential commodity chains can lead to increased incomes for large numbers of individuals and households. The LEO team applied value chain selection criteria that focused on increasing incomes by producing foods that directly or indirectly contribute to greater availability. "Indirectly" refers to animal feed that can contribute to greater access to animal protein.

B. COMMODITY CHAINS CONSIDERED

With these directions, the LEO Guinea team conducted a rapid assessment of several commodities to determine which warranted further study and from there, consideration by, and guidance for USAID Guinea for future programmatic activities. The subsectors or *filières* considered follow:⁶

- **Cereal Grains**
 - Maize
 - Fonio
 - Rice
- **Pulses**
 - Groundnuts (peanuts)
 - Soybeans
 - Pigeon and cowpeas (Nièbe)
- **Livestock**
 - Poultry

⁵ There is some evidence that behavior change information can be integrated into market focused programs. This includes Credit with Education approaches practiced by a number of MFIs and agro-dealer delivery of improved nutrition messaging as a means of selling more inputs. The effectiveness of these was not evaluated in this study however.

⁶ Note: While a number of horticultural crops scored well in the selection matrix, the horticulture sector analysis is being carried out by UC Davis and is not part of the LEO Guinea scope of work.

- Live birds
 - Dressed birds
 - Eggs
- Small ruminants
- Cattle
- Domesticated agouti (cane rat), a substitute for bush meat.
- **Cash crops**
 - Oil palm

C. SELECTION CRITERIA

Each of the above listed commodities were evaluated. The first criterion was whether there were significant levels of production, and or processing of the selected commodity in the Southern Trade Corridor, the geographical area selected for this assessment. Commodities that were not important in this corridor were dropped from consideration. Secondly, commodities were evaluated for the potential income effect of investment in the particular commodity based on the size and growth rate of end markets for it. If there were significant levels of production and processing of a particular commodity in the selected geographical area, and there was significant market demand now and into the future for that commodity, the final selection criteria was whether there any actors, individuals and or enterprises, public or private, who have the potential—i.e. possess the motivation, resources and market power— to drive positive change or upgrading through the commodity system. As noted, without such change drivers, it is very difficult to drive sustainable change in a market system even if demand is strong.

If the above elements are missing, there is no amount of investment that can generate transformative and sustainable change. Once these criteria are in place, further refinement in the selection process can include impact on number of smallholders, income effect, gender, health, nutrition and environmental impact concerns. The team included all of these ‘secondary’ elements in the selection process.

It is important to note that early in the selection process, the presence of change drivers was sometimes difficult to assess without further research in the field. In this event, the team included the selected commodity in our assessment until it could determine if there were potential change drivers, and where these change drivers were located. The remainder of this section summarizes the elimination and selection process carried out by the LEO team.⁷

D. PRELIMINARY ANALYSES

1. CEREALS/GRAINS

Guinea imports all grains and cereals including sorghum and fonio, principally from Mali, Senegal, though Guinea also exports maize to these same countries during peak harvest periods. The table below lists Guinea’s principal cereals imports, with rice overwhelming all other grains. The foreign exchange bill for rice alone is reported as three percent of all imports and estimated at closer to \$300 million dollars annually (per

⁷ Note: the LEO team was asked not to look at horticulture because a UC Davis team was covering horticulture with a different procurement vehicle.

Guinean Ministry of Agriculture), more than 2.5 times the \$197 million reported in trade databases (see table 1).

a. Maize

Imports provide an indication of demand, and thus end market growth opportunity.

As table 1 indicates, maize imports into Guinea have been small, particularly if compared with rice, valued at \$325,000 in 2014, with an annual growth rate of 12 percent during the period 2010-2014 (ITC Trade Map 2015). Net imports may even be smaller given the difficulty in documenting informal maize exports into

neighboring countries. India supplied the majority of imported maize (71 percent), with Argentina and Lebanon supplying the remainder (29 percent) (ITC Trade Map 2015). Landed (CIF) prices suggest positive income opportunities for smallholder farmers, (assuming reasonable yields and a positive cost-benefit for any upgrading needed to compete with imports). Domestic production showed a positive response to increased market demand, growing from 329,000 metric tons in 2000 to 672,000 metric tons in 2013 (FAOStat 2015), primarily due to increased planting rather than improved yields. While these figures are suspect, it is reasonable to assume that maize production is increasing.⁸

If Guinea follows the pattern of other African countries once political stability is achieved, GDP growth and per capita incomes are expected to rise. While the EVD epidemic severely interrupted almost all economic activities from agriculture to mining and slowed Guinea's growth projections, evidence indicates that Guinea is rebounding from the economic effects of the epidemic (World Bank 2015c). As incomes rise, domestic demand for affordable animal protein also rises. Poultry is and will continue to be one of the principal sources of this protein. Commercial scale production of poultry requires maize and a vegetable or animal protein source (soybeans, groundnuts and or fish) as the principal components of poultry feed. Thus, poultry sector growth is likely to continue to drive demand growth for maize in Guinea and the subregion. Demand for maize from Mali and Senegal is likely to increase as greater climactic vulnerability and reduced rainfall reduces the area that can be used for maize production in neighboring Sahelian countries (IFPRI 2012). Maize is also the third most widely consumed crop after rice and cassava and demand for maize meal and flour is likely to increase with urbanization; urban households have less available time for food preparation than rural ones and demand shifts from tubers to more quickly prepared rice and cereals.

Prognosis: Maize is a competitively produced crop in Guinea with expected demand to increase as a derived demand from the poultry sector, and northern neighbors as climate change reduces the maize belts there. The team determined that maize warranted further analysis, and consideration for FTF programs.

Table 1: Cereal Imports, Guinea, 2010-14

Commodity	Imported value 2014 (USD '000)	Annual Growth in value between 2010-2010]	Annual Growth in quantity between 2010-2010]
Rice	197,635	43%	48%
Maize	325	12%	11%

Source: FAOStat

⁸ These figures underscore the data challenge. Assuming an average maize yield of 1.5 tons/ha., it would take 448,000 ha. or 1.8% of all the land in Guinea. There is no evidence that domestic maize production is anywhere near this level. Probably all that can be inferred by this data is that maize production is increasing.

b. Fonio

Fonio is a small grain indigenous to Sahelian zones in West Africa. Its considerable micronutrient and unique amino acid composition make it a popular choice for nutrition and food security reasons. It has high levels of methionine and cysteine, essential amino acids not found in most vegetable protein sources (Alercia n.d.). Fonio thrives in the 800-1,500 mm of annual rainfall zone, which is found in the northern most reaches of Guinea but outside of the area covered by this study. The average annual rainfall in Northern Guinea is between 1250mm and 1500mm in one season. This is relatively high for both fonio and sorghum production. In basic nutrients, fonio has a similar level of protein to brown rice and is slightly higher than milled par-boiled rice.

Prognosis: The LEO team proposes dropping fonio from a deeper analysis, despite its nutrient value and importance in regions outside of the study area. In Guinea, fonio is a crop used primarily for celebrations and holidays. In rural areas it is also used as a food security crop but primarily by households outside of the study area. Production levels are very low, yield in the 600-800kg/ha. Low production results and prices in 15%-20% higher than local parboiled rice suggest that fonio is not well suited as a food security crop for large numbers of the food insecure.

c. Rice

Rice is the most important cereal crop in Guinea. It is also the largest import item in Guinea's food bill with an estimated annual import value of around \$198.4 million in 2014 (ITC Trade Map 2015). In Guinea, paddy rice is produced in multiple ecosystems including upland, recessionary lowlands (*bas fonds*), and in mangrove environments. The LEO team found no large scale irrigated rice production in Guinea, unlike in neighboring Mali. FAO (undated) reports that Guinea had about 95,000 hectares (ha.) equipped for irrigation as of 2001. Because of its high foreign exchange bill, and importance to food security, rice is the Government of Guinea's second most important priority crop, after oil palm.

Guinean consumers prefer domestically produced rice, which sells at a premium. Imported rice retails for +/- 3,500 GNF/kilo and domestic rice in local sells for 4,000-4,500 GH/kilo (per field work). Guinean consumers also prefer par-boiled rice, which has a higher protein and other nutrient concentration than polished white rice. Artisanal parboiling is an activity that employs large numbers of women. Average paddy yields are 1.5 tons/ha., below global averages and below average yields in Mali (GOG ANASA 2015 and n. d.). Paddy yields are highest in irrigated perimeters but yields in *bas fonds* should be able to meet or exceed 3 tons/ha.

There are no large-scale rice mills in Guinea, though the LEO team learned that there is a medium scale mill operated by a rice-producing GIE. In most developing countries medium to large-sized mills are the principal change driver introducing improved paddy varieties and production practices arising from the need of modern mills to control paddy variety to control the milling characteristics of milled rice. Failure to do so results in increased levels of broken grains and lower milling ratios.

Prognosis: The paddy rice sector has enormous potential in Guinea. For this reason and the importance to the Government of Guinea, under its CAADP process, the LEO team chose to include paddy for further study, and potential inclusion in FTF programs. Guinea's paddy potential however is unlikely to be realized without a significant government commitment to transforming this sector by facilitating private investment in private, medium and large scale mills and plantations linked to smallholder farmers through farmer *groupements* and unions, commercial scale rice mills and a regulatory environment that allows for relatively fast certification of high yielding paddy varieties.

2. PULSES

a. Groundnuts (peanuts)

Guinea is a significant producer of groundnuts. Groundnuts are the dominant leguminous crop, and an important source of available nitrogen in the soil. For this reason, groundnut production in Guinea is an important rotational crop with rice, maize and potatoes. Most of Guinea's groundnuts are consumed as groundnut paste (peanut butter) and used as a principal ingredient in local sauces. Very little groundnut is processed into oil given Guinea's very weak industrial processing capacity. Groundnut hay is one of the highest value sources of small ruminant fodder, though not widely used in Guinea.

West Africa produces about 60 percent of the African continent's groundnut production and 12 percent of world production (ICRISAT undated). West Africa has lost global production share, dropping from 23 to 15 percent of world production. Similarly export share has also significantly decreased by more than 50 percent (from 55 to 20 percent) for groundnut oil. Groundnut production in West Africa continues to expand by 6 percent annually mainly due to area expansion. Groundnut yields in Guinea (600-800kg/ha. are low for the region (averaging 980 kg/ha), and much lower than the world average (1390 kg/ha) (Ngendakumana undated).

Demand for groundnut products is driven by a number of factors. Population and income growth are the primary factors driving end markets for human consumption. However, the most significant factor driving overall global demand for groundnuts is the ever-expanding livestock industry, and the role of groundnut cake and hay as important animal feeds. In semi-arid areas, groundnut haulms (leaves and stems) for livestock feeding must compete with dry cowpea fodder. Groundnut is by far the most nutritive oilseed used in West Africa. The kernels have an average fat and protein content of 75 percent and an energy value of 360 kcal/100g, compared to 60 percent and 430 kcal/100 g for soybeans (Agriculture in Nigeria undated). However, groundnut is also significantly more expensive than soybean. The selling price of groundnut is at least 30 percent higher than that of soybean. For example in July 2001, the world market price of graded regular confectionary groundnuts was US \$800/ton while that of soybeans was \$190/ton. The average global price per ton of groundnut oil, indexed to 2000, was \$775, compared to \$325 for soybean oil. For groundnut and groundnut products to become more competitive, prices must fall, which can happen only if productivity and production increase.

Prognosis: The importance of groundnuts in Guinea as high protein food and feed, strong global demand for groundnuts, and the enormous potential to significantly increase productivity warranted the inclusion of groundnuts as a crop for further analysis, and FTF consideration.

b. Soybeans

Soybeans are high in protein and can be a substitute for fish as an element in poultry feed. Togo has been particularly successful in modifying consumer behavior, illustrated by a mix of cassava (gari), and soy and rice flour, that is widely used to increase the protein levels of traditional manioc-based pates. Soybeans have successfully been introduced as a rotation and intercrop crop with maize and introduction of soybeans for the poultry sector is a possibility for a niche and experimental crop. There is however no commercial production of soybeans in Guinea.

Prognosis: The LEO team dropped soybeans from further analysis because there is no soybean commodity system in Guinea. This could quickly change however if large rice plantation adopted soybeans as a rotation and fertility enhancing crop with paddy rice.

c. Pigeon pea and cowpea

(*Nièbe*) These are important crops from a nutritional and soil enhancement perspective, but their core production zone is well outside of the proposed project area.

Prognosis: Commodity dropped; core production areas are outside proposed project zone.

3. LIVESTOCK AND AQUACULTURE

For the purposes of this report, the LEO team included cattle, goats, pigs (shoats), sheep, poultry and domestic production of agouti (cane rat) for initial consideration. Table 2 indicates some products for sale in a Conakry market. Feed the Future's emphasis on improved food security and nutrition and expected increase in domestic demand for animal protein as a result of increased economic growth, led the USAID Guinea mission and LEO teams to place a high priority on livestock and aquaculture for initial consideration.

Commercial production of livestock, regardless of species, is constrained by the same factors: breeding and controlling for genetic quality access to quality and timely veterinary services, access to feed, and forage, and access to markets. Cattle in Guinea are further vulnerable to *trypanosomiasis*, severely limiting productivity.

The remainder of this section discusses first tier factors to determine whether the particular commodities merit deeper analysis.

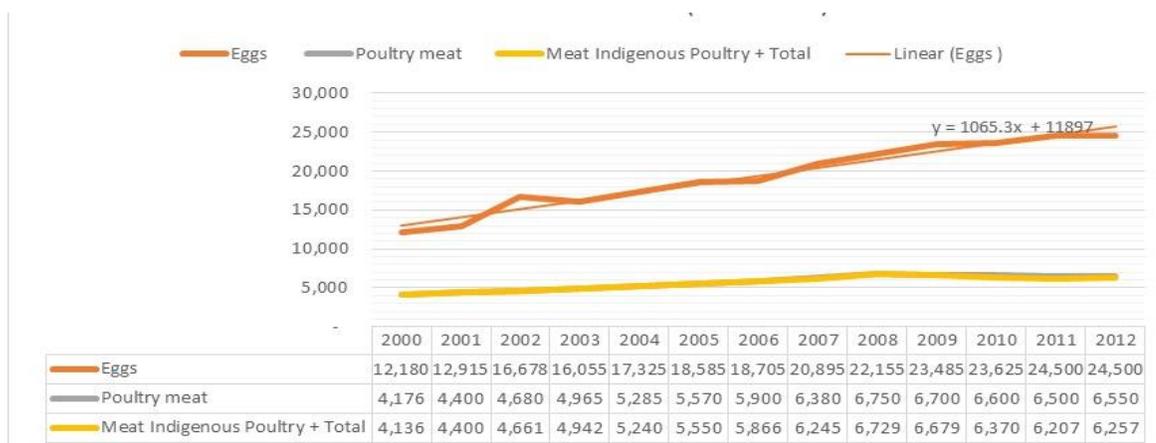
a. Poultry meat and eggs

Poultry is major source of protein in Guinea-Conakry. Imports of live poultry and poultry meat showed significant growth during the period 2000-2014, with live bird imports showing an annual growth rate of 46 percent across that period, and reaching more than \$1.5 million (ITC Trade Map 2015). Major sources of supplies are France (60 percent) and Belgium (33 percent), and Brazil. The average global import price of live poultry was \$37,700/ton FOB in 2014 indicating a price benchmark against which domestic production must be competitive (after accounting for added import costs). Despite relatively high prices for all poultry products in Guinea, excepting imported frozen leg thigh quarters, poultry consumption is the fastest growing source of animal protein in in Guinea, and most of West Africa. Production shows solid growth, indicated in figure 6.

Table 2: Meat Prices, Conakry ("Niger" market), July 2015

Beef	kg.	32,000
Imported chicken (leg thigh quarters)	kg.	25,000
Poultry (live birds)	ea.	55,000- 70,000
Goat Live	ea.	400,000
Sheep live	ea.	500,000
Fish (smoked)	ea.	+/- 15,000
Fresh fish (red carp)	ea.	+/- 10,000
<i>Source: informant interviews</i>		

Figure 6: Poultry Production, Tons, Guinea, 2000-12



Guinea Production (tonnes)

Item	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Eggs	12,180	12,915	16,678	16,055	17,325	18,585	18,705	20,895	22,155	23,485	23,625	24,500	24,500
Poultry meat	4,176	4,400	4,680	4,965	5,285	5,570	5,900	6,380	6,750	6,700	6,600	6,500	6,550
Meat Indigenous Poultry + Total	4,136	4,400	4,661	4,942	5,240	5,550	5,866	6,245	6,729	6,679	6,370	6,207	6,257

Source: FAOSTAT 2015

Eggs are a widely consumed protein source in Guinea Conakry. Official egg imports into Guinea Conakry were valued at \$278,000 in 2014 (ITC Trade Map 2015), though this is likely a wide underestimate with actual imports at two to five times official figures. Major sources of eggs into Guinean market are Netherlands (58 percent) and Spain (42 percent). There are also imports of eggs from Brazil but these are not noted in Custom’s statistics. There is poor control of imported eggs, with wide reports of eggs sold well beyond their expiration dates. Guinea also exports eggs and day-old-chicks (DOC) into Sierra Leone so even accurate figures of egg imports would not likely reflect domestic demand.

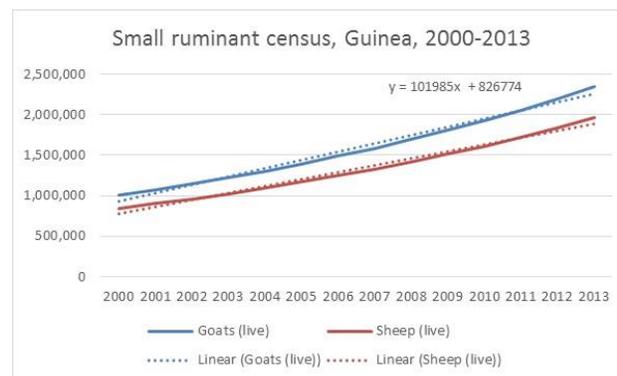
In 2014, the average import price of eggs into Guinea was \$1,589/ton FOB (\$1.11-\$1.35/ dozen) (ITC Trade Map 2015). With avian flu outbreaks in the US and Canada, global egg prices have risen as much as 80 percent. (Handley 2015) While avian flu presents a risk, small-scale commercial layer operations are better able to manage this risk than either household operations where birds have free access to other virus carrying birds, or large scale operations where the cost of infection is much higher. The CIF price of imported eggs is likely 30 percent higher without any duties, suggesting that small scale layer operations could be profitable even with imported feed (again depending on landed cost of feed) (ACDUI/VOCA economist estimate). Domestic production of eggs has increased at an annual rate of 9 percent annually since 2000). Total demand for eggs in the future is expected to rise at an even higher rate, assuming positive income growth.

Prognosis: The LEO team determined that eggs (laying chickens), be included for further research, and FTP’s consideration. NOTE: This excludes dedicated broiler operations, but includes broilers that are by-products of laying operations: spent hens and cockerels.

b. Small ruminants (goats and sheep)

Small ruminants in Guinea are second in importance to poultry as a source of animal protein. Globally the demand for small ruminant meat is growing rapidly even as global demand for pork and beef is falling. Weighted average unit value increased from \$2,702/ton in 2001 to \$6,086/ ton in 2014, in 2014 dollars (ITC Trade Map 2015). A domestic census on small ruminant population has not been taken since 2010,⁹ so figures are likely obsolete. Small ruminant population per Ministry of Livestock (GOG 2015) figures is based on a 6.7 percent annual growth rate for both sheep and goats since 1996, see constant and parallel trend in figure 7.

Figure 7: Small Ruminant Census, Guinea, 2000-13



Source: Minister of Elevage, 2015

Guinea exports small numbers of small ruminants to its northern neighbors and imports from, or more likely through the Gulf States, primarily just before Ramadan and Tabaski. The small ruminant value chain is very horizontal, small ruminant slaughter is carried out at the household level for feasts and celebrations and by artisanal butchers for the thriving kebab market. There is almost no slaughter of small ruminants in the larger abattoirs, as a result there is a negligible market for the skins and hides. Animal mortality is very high from *Pestes de petits ruminants* (PPR). The predominant species of small ruminants in Guinea are resistant to *trypanosomiasis* but have lower weight gain potential. Livestock associations are widespread and could be basis for improving genetic stock and disease prevention.

Prognosis: The LEO team proposed including small ruminants for further analysis and FTF's consideration.

c. Cattle

In Guinea, cattle, unlike small ruminants, comprise a somewhat vertical supply chain. Beef is widely consumed, especially in urban and peri-urban areas. While global values for beef are not growing, domestic demand for beef is likely to expand with incomes for some time to come. Many households producing small ruminants also keep cattle. The constraints to increased productivity and value in the beef cattle market are similar to small ruminants, disease, inadequate supply of vaccines, resulting in high mortality and low weight gain, no fattening activities, contaminated water sources during the dry season, and poorly organized markets resulting in price asymmetry in favor of livestock traders.

Cattle and humans are vulnerable to *trypanosomiasis*. It is estimated that the annual direct production losses in cattle alone amount to between \$6 billion and \$12 billion, while animal deaths may reach 3 million globally annually (Hursey and Slingenbergh n.d.). Despite the growing importance of beef as incomes and populations in urban and peri-urban areas rise, cattle rearing is much less important in the LEO study area. Early

⁹ The team was informed that the FAO had conducted a small ruminant census for the Ministry of Livestock but was unable to secure a copy of this report.

discussions with mission staff also indicated a low interest in looking at cattle perhaps for the same reasons as those identified by the LEO team.

From an intervention perspective, what is good for sheep and goats will also be good for cattle; any interventions in support of better services to the small ruminant sector will likely also benefit the beef cattle value chain even if beef cattle are not included as a priority commodity.

Prognosis: The LEO team proposed excluding of beef cattle from more detailed analysis.

d. Bushmeat: Agouti (domestic production) substitute for bush meat

The LEO team was unable to assess global, regional and or national market demand for agouti. There is commercial production of agouti in Ghana, Nigeria and Côte d'Ivoire. The LEO team learned that there was a pilot commercial-scale agouti farm in Sierra Leone, which was unsuccessful due to lack of access to affordable breeding stock; and insufficient training, feed, and vet services; among other factors (personal communication). Agouti was initially considered for its potential as an alternative to possible Ebola carrying bushmeat species. Unlike in all neighboring coastal countries to the east of Guinea (Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Togo, Benin, and Nigeria, bushmeat is not widely consumed. It is rather narrowly consumed, primarily in the *Zone Forestière* of Guinea for its availability but largely for cultural reasons. After initial conversations with World Health Organization in Conakry, the LEO team determined that bushmeat consumption in Guinea was a much-reduced threat than in Sierra Leone, and its area of primary consumption was outside the proposed LEO value chain assessment zone. Finally the team was unable to confirm that agouti is not a carrier of the Ebola virus.

Prognosis: The LEO team did not propose including agouti in more detailed analysis because it is not widely consumed in Guinea and its principal zone of production and consumption is outside of the proposed project areas.

4. CASH CROPS

a. Oil palm

Only one cash crop was considered for further study: oil palm. Oil palm is the Minister of Agriculture's highest priority crop, followed by rice. Global demand for palm oil is growing in response to continued global demand for it in food and cosmetic oil, and in the form of palm cake as an animal feed. Globally, small holder farmer share of global palm oil supply is growing (Roundtable on Sustainable Palm 2015). Though not without criticism, the Roundtable for Sustainable Palm Oil, has developed both environmentally sustainable and socially inclusive guidelines for industrial oil palm production. Oil palm is a cash and not a food security crop but its potential to contribute significantly to smallholder incomes gives it a high rank in its potential to contribute to improved smallholder access to more nutritious food.

There are two reasons to give consideration to the development of a sustainable oil palm sector. The first is smallholder farmer incomes. Depending on the agroforestry practice, a smallholder farmer can earn \$6,000-\$15,000 per hectare, enough income to remove the access constraint to improved nutrition. Secondly, but related broader investment in the oil palm sector can lift incomes of large numbers of households in areas in which mining is now taking place. USAID might explore co-investment opportunities in this sector with potential palm oil investors and mining companies like Rio Tinto.

Prognosis: Environmental concerns expressed by USAID, and no identified commercial palm oil investor committed to RSPO principles in Guinea, led the LEO team to drop oil palm from further study during this assessment. Investments in sustainable palm oil, especially with cost share by private firms, can be an effective way to increase smallholder incomes with considerable leverage of USAID funds; further analysis might be warranted if a firm committed to RSPO principles were to invest in developing small holder producer networks within USAID's zone of influence.

V. VCA: POULTRY EGGS

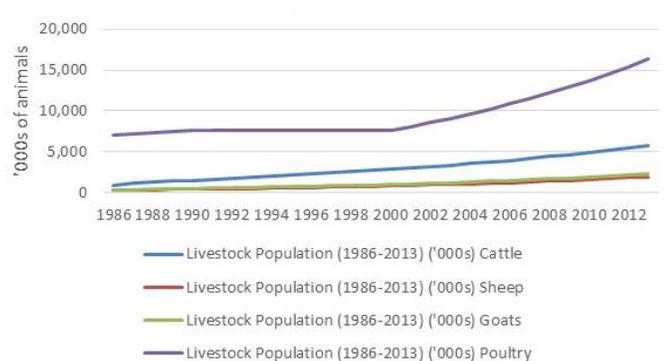
A. OVERVIEW

The commercial chicken egg production sector is expanding quickly due to strong demand, a comparative advantage in egg production, and healthy profit margins for small-, medium- and large-scale poultry producers. The Kindia and Coyah prefectures have become a layer cluster for Guinea but there are small- and medium-scale (<10,000 birds) egg farms in all of the prefectures. The Kindia/Coyah cluster concentrates domestic production of day-old chicks, access to feed inputs, feed mills, and veterinary supplies with a good road network for egg transportation to Conakry as well as overland to Sierra Leone. As noted, the LEO value chain analysis team focused on layer operations because of a relative comparative advantage in the egg market and absence of any comparative advantage in the broiler (dressed meat) market. The poultry meat sector is growing although more slowly, hampered by infrastructure needed to commercially produce, slaughter, process and transport the meat for end markets and much lower costs of imported dressed birds or parts (leg-thigh quarters), as compared to locally produced birds. However, the analysis did include markets for broilers that are a byproduct of laying operations: spent hens and cockerels.

KEY TAKEAWAYS

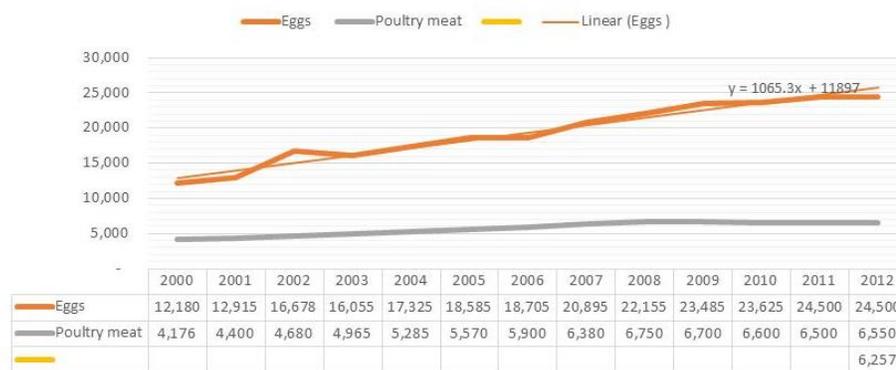
- Fresh eggs are one of the cheapest and readily available sources of animal protein
- Fresh egg demand is growing rapidly (>10%) driven by population and income growth.
- Domestic production of fresh eggs is growing but not keeping up with demand.
- Relatively high feed costs and insufficient access to veterinary supplies are the biggest constraints to growth in the domestic egg market.

Figure 8: Livestock Population, Guinea, 1986-2013



Eggs are an important and relatively competitively priced source of animal protein and therefore have high potential to contribute to maternal and child health.

Figure 9: Egg Production, Tons, Guinea, 2000-12

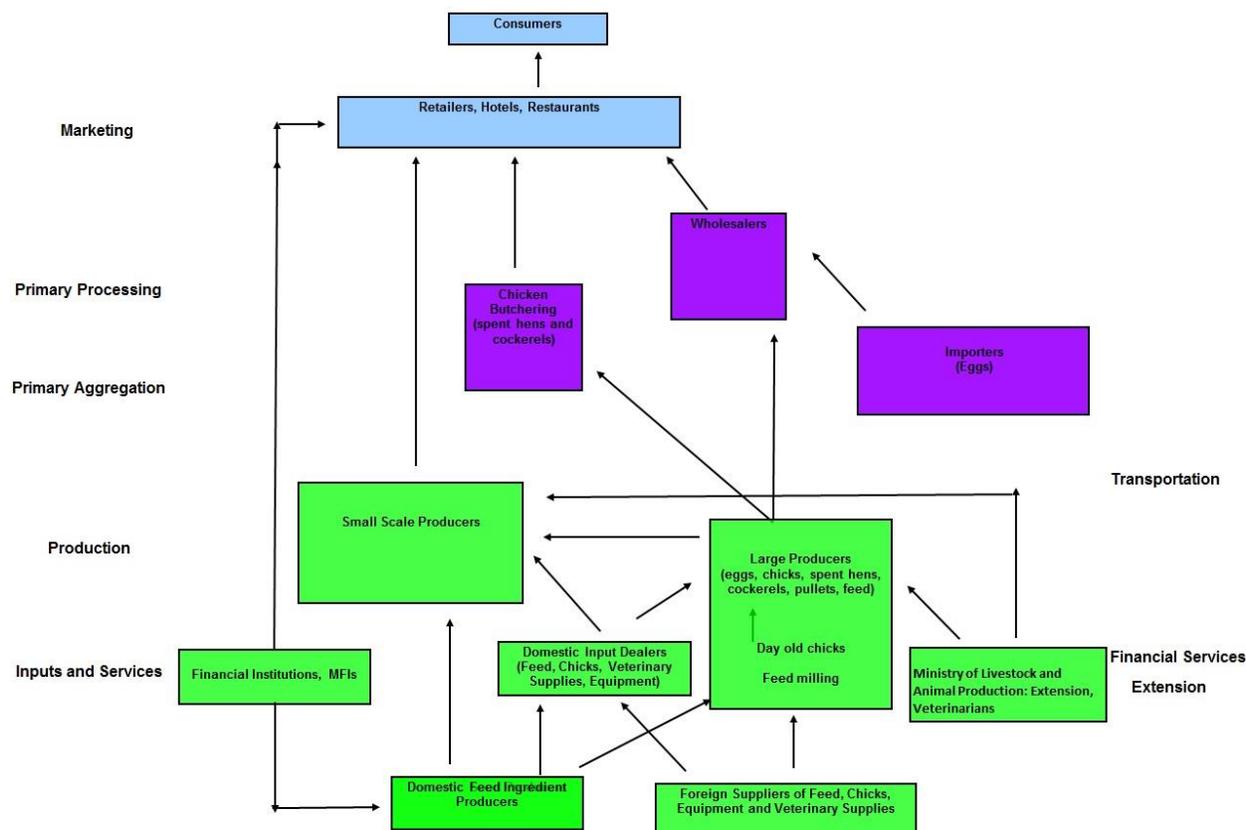


Source: FAOSTAT 2015

The LEO value chain assessment team was unable to estimate the domestic supply of layers or eggs, or growth in the sector. The last reported livestock census was in 2000. Ministry of Livestock statistics report an

estimated annual growth rate of six percent since 2000, for all livestock, as indicated in figure 8. FAOStat (2015) data, depicted in figure 9, indicate faster growth in egg production than meat production since 2000. Regarding productivity, the commercial layer operators interviewed for this assessment reported productivity increases due to improved access to veterinary supplies, and genetic stock of imported birds.

Figure 10: Poultry Egg Value Chain, Guinea



C. END MARKET ANALYSIS

The commercial poultry industry in Guinea is growing to meet consumer demand. Entrepreneurs are currently enjoying large profit margins as the fresh egg industry successfully competes with imported eggs to meet the national demand for eggs. Chicken meat production is not yet commercialized, and the country is heavily dependent on imported frozen chicken parts from Europe, Brazil and India. It will be difficult to develop a domestic broiler industry without significant duties and tariffs to offset the greater competitiveness of imported birds. Guinea has a comparative advantage in fresh eggs, in terms of quality, due to the long shipping time for eggs imported from Europe, South America and Asia. Imported eggs are generally at least two weeks old by the time they arrive. Even under refrigerated conditions, this significantly reduces their shelf life relative to imported eggs. Consumers interviewed are aware that domestic eggs are fresher and appear willing to pay a small price premium for domestic eggs. Imported eggs do not exceed 0.1 percent of the domestic egg market, if livestock ministry estimates are even close to actual figures.

Table 3: Egg Imports, Guinea, 2013-14

Yr	kg	Eggs
2013	23,755	416,746
2014	23,273	408,293

Source: Customs Statistics 2015

1. GLOBAL MARKETS

Guinea is an importer of poultry products ranging from day old chicks, eggs, broilers, chicken feet, and feedstuff, e.g., feed concentrate is from Europe and medicine, from Europe, Senegal and Mali. Egg imports are low, though, confirming that, of all poultry products, Guinea's distance from global egg exporters gives it a comparative advantage in egg production. Guinea does not export chickens or eggs globally but its domestic production is linked to global market prices for eggs, broilers (dressed birds), and feed. Guinea also exports fresh eggs to Sierra Leone and Liberia.

Imports of live poultry (day old chicks) showed significant growth during the period 2000-2014 (ITC Trade Map 2015). As domestic egg production has increased, and at least one domestic hatchery has begun supplying day old chicks (DOC), live bird and egg imports have dropped. The Guinean Customs Authority (2015) reported only 35,600 live birds (DOC) imported for a value of just under \$76,000 in 2014. Imports of eggs in 2014 actually dropped slightly from 2013 levels.¹⁰ Major sources of poultry supplies are France (60 percent) and Belgium (33 percent), and Brazil (ITC Trade Map 2015). The LEO team also noted local sale of Tysons leg-thigh quarters, from the USA. DOC import prices are very high. In 2014 imported hybrid chicks cost between \$1.50-\$2.14/chick, higher than locally produced hybrid DOCs, which cost \$1.00 to 1.25 each (per field work). **This is a clear opportunity for domestic hatcheries, though maintaining strict quality controls to minimize bird mortality is essential.** Layer operators interviewed for this study reported that imported DOCs are perceived to be of higher quality with lower mortality rates. High import prices are a temporary phenomenon, however, and reflect the global avian influenza epidemic, which has not yet infected birds in Guinea. When imported DOC and egg prices fall, as they are likely to do once global markets recover from the current avian influenza epidemic, domestic hatcheries will find themselves under considerable price pressure to compete.

2. REGIONAL MARKETS, KEY REGIONAL TRADE FLOWS

Poultry produced in Guinea occasionally are shipped to regional markets, depending upon proximity and transportation routes. Most notably, Guinea exports some day-old-chicks from a hatchery in Koliagbe, Kindia to Sierra Leone, as discerned by a parallel assessment team in the latter country. Although the LEO team could not verify, anecdotally, some other poultry products are exported to regional markets in Sierra Leone, Liberia and Mali. Feed Inputs for the intensive poultry industry are imported from regional markets including corn during domestic seasonal shortfalls, peanut cake from Senegal and Mali, and fish meal from Senegal. Guinea exports eggs and live birds including DOC to Sierra Leone and Liberia. Most live bird that are exported are produced at the household level by non-commercial producers. Guinea has the most developed layer and hatchery operations in the sub-region, per fieldwork.

KEY TAKEAWAYS

- Guinea has significant potential to become self-sufficient in DOC and egg production.
- The majority of eggs are still produced at the household level, and primarily by women producers.

¹⁰ Reported imports of eggs and live birds seems quite low and offers little basis of historical comparison. Data collected from customs on cereal commodities and agricultural equipment appear accurate and reflect trade database listings of exports to Guinea (e.g., ITC Trademap, FAOSTAT, and UN Comtrade). Trade databases figures on poultry sales to Guinea appear to be unreliable because of product category definitions lump poultry products with non-poultry categories.

3. NATIONAL AND LOCAL MARKETS

While intensive egg production is growing, the chicken meat industry is not; restaurants and super markets and even the central markets still sell frozen imported poultry meat. The broilers and parts are imported from Europe, Brazil and the USA and are sold throughout the country alongside live local birds, including hybrid cockerels. By dressed weight local birds are more expensive but the high labor requirement associated with dressing live birds (slaughter, cleaning and plucking) are too high for most of the rapidly growing food service markets (restaurants and hotels).

Local consumers and their preferences- Although imported broilers are often cheaper than dressed out live local birds, many locals prefer the taste of the indigenous fowl. Domestic consumers prefer the taste of the fresh eggs produced in Guinea over imported eggs, which are sometimes shipped by sea. However, since there are no grading standards in place, egg quality is not the primary factor driving consumer choice. Rather, price appears to be the main factor. In rural markets, most eggs and live birds are reared at the household level by women on a very small -scale level, e.g., less than 20 birds. The layer industry is integrated and most producers, whether households or large farms, produce, aggregate, and wholesale themselves. In rural markets, producers also serve as retailers, selling directly to the final consumer. The biggest constraint to expanding poultry supply in rural markets is the low level of access to timely and quality veterinary supply by producers. The LEO team heard of 50 percent bird mortality rates and reduced productivity (weight gain and laying rates) resulting from poor veterinary care and husbandry.

D. WATERFALL/ DEMAND/ GROSS MARGIN

Due to the questionable reliability of egg prices, reflected by field interviews which indicated that import prices are lower than domestic prices, but customs data indicating the contrary, the LEO team chose not to construct a price comparison. In the short term, the global avian influenza epidemic which has not yet affected Guinean poultry producers, is driving egg and dressed bird prices up as much as 50 percent over 2014-2015 prices. In the short term this is a good opportunity for poultry producer.

The biggest constraint to increased poultry productivity has less to do with global poultry and egg prices, and more to do with the lack of adequate veterinary supplies, especially for household producers—which results in high bird mortality rates; and the relatively high cost of feed.

E. CHICKEN EGGS: PORTER'S FIVE FORCES ANALYSIS

Barriers to Entry- Access to capital is a significant barrier to new entrants at every level of the value chain. Another is access to quality inputs. As most inputs for intensive, commercial egg and meat production are imported, producers need a significant amount of capital to get established. Chickens need to be cared for and fed for five months before the first egg is produced. Guinea' also has a relatively high cost and time required to register and establish a business of any type. Furthermore, the costs of securing exclusive rights to land are relatively high and may be hindering even more rapid growth in this sector. Still, barriers to entry do not appear insurmountable, as commercial producers of layers are expanding in number and scale at rates greater than in any of the other sectors that the LEO team investigated. While it is likely that barriers to entry for starting new business are asymmetric, and favor entrepreneurs who are politically well connected,

KEY TAKEAWAYS

- In rural communities most of the eggs and live birds are produced at the household level.
- The biggest constraint to expanded production at this level is the lack of access to veterinary services.

the businesses the team visited appear to be operating without external subsidies. As more farmers enter into the commercial egg production business, egg prices will begin to fall.

There are no additional barriers to entry for household poultry producers. Their primary constraint is the lack of sufficient access to veterinary services.

Threat of Substitution- Guinean commercial egg production is very competitive with the current cost of imported eggs. In addition, many consumers prefer the taste of traditional eggs. Indigenous poultry and much less productive and consumers are changing their taste preferences. However, while local consumers are willing to pay a price premium for domestically produced eggs, they will not pay an unlimited premium. Any factor that causes the global market price of eggs to fall, e.g., recovery from the global avian influenza epidemic, will threaten domestic production.

Bargaining Power of Buyers- There is more demand than supply of local eggs at this time, so the competitive advantage lies with the producer. Local commercial egg production is successfully competing with the cost of imported eggs, driving down imports. Buyers have more bargaining power in the dressed bird market where lower import prices exert competitive pressure on the domestic live and dressed bird markets.

Bargaining Power of Suppliers- In principle, input suppliers for the commercial poultry industry, especially hatcheries, hold asymmetric marketing power. Day old chicks (DOCs) are primarily imported from France and Brazil. Domestic DOCs are produced in Guinea's only private hatchery in Koliagbe. The Koliagbe chick is theoretically identical to the imported chick, however the local farm's reputation is not strong; several layer operators reported high mortality rates from the DOCs in Koliagbe. Even though local chicks are half the price of imported ones, a number of operators expressed preference for the DOCs from France. Thus the Koliagbe's ability to exploit monopolistic selling power still depends on its reputation. Poultry feed comes from a variety of input suppliers so there is good competition among providers; however, the feed input value chain is still evolving with poor quality and inconsistent delivery; i.e., the suppliers have the power. Veterinary medicines are imported and sold by private sector veterinarians with GOG oversight; but there appears to be little or no competition for certified and regulated veterinary products, which gives current suppliers a strong price advantage, unless margins are also controlled¹¹.

Rivalry Among Existing Players- In spite of strong competition, current profit margins are high among producers, so inter-producer rivalry remains strong. This is in part because commercial laying operations still comprise a relatively small segment of the layer market, though growing rapidly. There appears to be little price, and no quality competition amongst commercial layer operators. While the Ministry of Livestock requests that they organize into a registered producer group, the commercial layer operators the team interviewed were not active members of either of the two national associations. While margins remain high, there is little pressure for producers to distinguish themselves in the market based on quality, grading or standards. One area, where collective organization of producers might be advantageous, especially as global egg prices fall, would be to require labeling of imported eggs so that consumers can identify provenance. Another might be in the joint investment in an industrial scale feed mill to take advantage of scale economies in feed production. The lack of collaboration among value chain actors, and between producers and service providers of different functions, is indicative of what the LEO team observed in all the value chains covered.

¹¹ Most veterinary supplies are imported by an individual known as Dr. Charles. The LEO team was unable to meet with him as he was in Mali purchasing supplies. The team was therefore unable to determine if the government exerts control over price margins.

F. VALUE CHAIN FUNCTIONS AND ACTORS

1. RETAILERS

Eggs are sold throughout Guinea in every market the team visited. In small local markets the majority of the eggs were sold fresh by small retailers, usually for GNF 1,000 each. In the larger markets, the eggs were sold in larger quantities ranging from 10 -12 eggs, to a 30-egg flat to a 360-egg carton, i.e., 12 flats. In local markets, eggs are sold mainly by women. At larger markets, male retailers tend to dominate.

2. WHOLESALERS

This segment of the value chain is still evolving. Commercial egg producers currently function as wholesalers, delivering their eggs in bulk to the large buyers: central markets, restaurants, hotels, bakeries, etc., without refrigeration. Local eggs are sold in local markets by producers. There was no observation of a wholesaler buying locally produced eggs and transporting them to larger end markets.

3. PROCESSORS

This level of the egg value chain is also in its infancy. There is not a developed broiler industry and eggs are not processed. Commercial producers collect, clean and pack the eggs on farm without any quality control or phyto-sanitary standards to guide them. There are no standards applied to eggs regarding size or freshness. Development of standards, especially around dating would give domestic producers an advantage over importers.

4. PRIMARY AGGREGATION

There is very little aggregation in the layer industry especially among SME and large scale producers. Most medium and large-scale producers wholesale their own eggs, and smaller-scale commercial producers retail their own eggs. The LEO team did not identify any independent aggregators or collectors.

There appears to be some vertical integration among smaller-scale egg producers through their producer groups (GIEs), unions, districts, federations, and the confederation at the national level. Small-scale production (2,000-5,000 birds) is a commercially viable niche for poultry producers organized into groups to achieve competitive economies of scale in the purchase of inputs and the aggregation of supply into larger markets.

CHANGE DRIVERS

Analysis of the competitive environment in which poultry operators work did not identify potential change drivers among value chain actors.

There are two areas where we observed potential for change agents the first in the area of veterinary supply, the second in the establishment of commercial poultry feed mills.

The lack of veterinary service access especially by household producers results in high bird mortality and low productivity rates. This suggests potential demand for these services. A rapidly aging extension agent population may impede investment in this area.

We identified one commercial feed mill that is also applying for the license to sell veterinary supplies. There are substantial scale economies in feed production.

Further analysis is required to assess the willingness of this and other actors to invest and upgrade the poultry sector in the feed and veterinary services area.

5. PRODUCTION

Household producers: In terms of volume, the sector is dominated by backyard poultry that are basically free range, “passive organic” birds that survive by scavenging their food. Household women and youth protect them from predators, giving them food scraps and water to keep them in or near the compound. At night the birds usually roost near the compound. Their primary purpose is to produce eggs for hatching. Hens usually lay a clutch or 6 to 10 eggs before they become broody and set on the eggs. Free range birds like this can lay from 30 to 50 eggs a year. Thus, a household has to have 10 layers before it will reliably produce an egg per day. Hybrids produce nearly 300 eggs per year per hen. At the household producer level, birds are rarely vaccinated against diseases and have a high mortality rate, especially during the rainy season. Newcastle’s and Infectious bronchitis are major killers.

Commercial producers: There are three types of commercial layer farms in Guinea, indicated by the size of the flock: Small producers are 1,000 hens or less; medium-size flocks are 3,000 hens to 5,000; and large flocks are over 10,000 birds. There is a family owned company that claims to have over 120,000 hens on five separate farms. All of the birds are either imported from Europe. The most common hybrids in Guinea are Isa Brown and Easy Brown. Both hybrid types have sex-linked coloration, meaning brown chicks are female and white ones are male.

Commercial laying flocks are all hens. All commercial farm managers follow intensive poultry management techniques to some degree to protect their investment in poultry industry. All of the producers observed have open sided poultry houses with wire mesh screens to allow air flow and keep out wild birds and predators, and low hanging roofs to restrict heavy winds and rain. Most had tarps to pull down during heavy rains. All the birds were raised on deep litter. No farm had any cages installed. Most had locally made feeders and drinkers. Most of the management could be improved. None of the birds were allowed outside, to prevent disease. All the farms attempted to feed their birds balanced poultry rations, depending on age: starter, grower and layer. Most farms mix their own feed using locally available ingredients, adding imported concentrate for micronutrients. The level of egg production was directly affected by the nutritional balance of the feed. Usually the smaller producers had inferior production levels, around 50 percent whereas the larger producers get up to 80 percent; i.e., about 300 eggs/year/hen.

HYBRID LAYERS

The Isa Brown layer is one of the most common hybrids used by commercial poultry farmers in Guinea. The hybrid was developed by Hubbard, an American-based poultry organization with offices around the world. The hybrid is popular because the hens are docile and, under proper conditions, lay around 300 brown-shelled eggs per year. Originally a cross between the Rhode Island Red and the Rhode Island White, an advantage of this bird is that the females come out of the shell as brown chicks while the males are white. They are part of the “Red sex-linked cross.” This allows breeders to identify the sex of chicks easily. Laying flocks do not need cockerels, which are sorted at hatch and put into a meat value chain. The image below is the female Isa Brown Chicks-red/brown. The male chicks are predominantly white.



Photo: Ferme Avicole Couvoir- ELLA.

SME poultry producer: A. Sidebe is a commercial poultry farmer; the eggs came from his 4,000 hen flock on the road to Kabale, just outside of Conakry. His birds produce 80 flats of eggs a day or 2,400 eggs, about a 60% production rate. He said his birds are about two years old and coming off their top production; he bought them as day old chicks from France. He started his poultry farm following the example of a neighbor and is self-financed. He tried to expand but could not get credit. He buys his feed already mixed from the mill in Coyah; he gets his veterinary medications from the Ministry of Livestock and from veterinary supply shops in Kabale. He said he sells his eggs for 26,000 GNF/tray to retailers. He knows that they retail for about 35,000 to 40,000 GNG for a tray of 30 eggs. He does not use refrigeration to keep them cool as he sells them within a few days of collection. He delivers his eggs to a number of restaurants and to the central market when he has surplus, like today. He does not raise meat birds but is thinking about getting into this in the future.

6. ASSOCIATIONS

The Government of Guinean has supported the organization of two large poultry producers associations in Guinea: National Union of Poultry Farmers in Guinée [UNAG] and National Association of Poultry Farmers in Guinea (ANAVIG). These organizations provide advocacy functions for the membership to the GOG; also members are encouraged to cooperate in a number of ways to improve their production. Minister of Livestock agents actively encourage poultry producers to join one of these associations but most of the producers were interviewed were not part of either of them.

Case Study: Poultry producers association

There are two organizations of commercial poultry producers in the Coyah area. One has 152 members, of which 20 are women and the other has 66 members, including 6 women. The average size of the individually owned flocks is about 2,000 birds; all of the farmers have layers, a few also raise cockerels for meat. Most members buy pre-mixed food, but many have begun mixing their own with imported concentrate. Despite being organized, they rarely cooperate in either buying inputs or in marketing. Some members do organize themselves to buy inputs together, benefiting from an economy of scale. However they are competitors who do not share market information, and market their eggs individually, usually sold to Conakry. The participating farmers receive technical assistance services in a variety of agricultural activities from American farmers who volunteer under USAID's Farmer-to-Farmer program. Although most technical assistance is in the poultry value chain, some volunteers expand into other areas, e.g., rearing pigs.

The two organizations help their members in a variety of ways: they represent the farmers' interests to the Ministries of Livestock and Agriculture; and they serve as a hub for group technical training from the Ministry of Agriculture's Extension service. There is no poultry egg or meat grading done by anyone in the country, including the two organizations. There is no regular market price information and no obvious Quality Differentiated Pricing. The association helps producers access information and vet services, with the latter achieved by pooling their demand to make service provision more efficient. When their birds become ill farmers share information with each other before seeking a veterinarian. Most contact private vets to come to their farms rather than the Ministry. They also contract with the private vets to inoculate their birds against disease.

7. POULTRY FEED MILLS

The LEO team identified one large commercial feed mill belonging to a locally owned agriculture conglomerate on the Kindia-Conakry highway. The feed mill produces and sells three types of poultry mash in its farm store across the street: starters 3,250 GNF/Kg; growers 2,950 GNF/Kg, and layers 3,100 GNF/Kg. The mill

began making poultry feed for its own layer farms three years ago but it decided to sell feed commercially to satisfy the local demand from smaller commercial poultry farmers. He said he had dozens of customers, some with flocks of 500 hybrid hens up to 30,000 hens. The mill is not yet producing broiler feed because there is insufficient demand, but the group is looking to begin making broiler feed once the poultry meat industry evolves.

The manager was not willing to say how many tons of feed he produces a day. He did say that he tries to use as much local feedstuff as he can get to keep costs down but at times he has to import corn from Mali, fish and peanut cake from Senegal, and concentrate from France. A major problem he has is the quality of the local corn, which is often too wet to grind, so he has to dry it first. The farm store sells feed and cardboard egg flats [France]. It is not yet selling veterinary supplies but is applying for a license to do so from the Ministry of Agriculture. In order to sell veterinary supplies, this operation will have to hire a private veterinarian to assist them with the sales of veterinary products.

8. HATCHERIES

The LEO assessment team identified one domestic hatchery, see box below.

Ferme Avicole Couvoir ELIA Koliagbe, Kindia, Poultry Hatchery:

Chicks: Samson Abraham is the manager for this breeding poultry farm, which has 3,800 parent stock laying hens and 392 cocks. The intention was to hatch up to 50,000 chicks a month for sale to nearby poultry farmers. However, about 18 months ago, the electric grid went down, and thousands of incubating eggs were lost. Since then Mr. Abraham has made dramatic changes to improve the management of the poultry farm. He bought and installed a 100kva generator; imported new parent-stock chicks from Europe; developed and adheres to a strict vaccination schedule; and improved bio-security; and the feed mixtures. However, he suffers from a reputation problem; the earlier farm manager had poor bio-security measures in place and produced chicks that were not very healthy and had a high mortality rate. In addition, there was a Chinese hatchery in Koba, not too far away, that had very high mortality with its chicks. It has since closed down. However, the reputation of Kindia chicks being sickly still resonates in the poultry industry. Thus, commercial poultry farmers prefer to import day-old chicks from Europe rather than buying them from Ella, even though the imported birds are the same breed, Isa Brown, and cost approximately twice as much: 12,000 GNF imported versus 6,500 GNF domestic, per chick. Mr. Abraham is now selling his chicks to poultry farmers in Sierra Leone, and Guinean veterinarians, so his reputation is improving.

Feed: Due to the weakness of the poultry input business, Mr. Abraham has installed a feed mill to mix the various poultry rations he needs for starters, growers and layers. He buys domestic feedstuff: corn, wheat, rice bran, soya, peanut, and palm kernel cake. However, due to poor quality of some local products, he sometimes imports or buys imported fish meal (Senegal), calcium and concentrate (France or Holland). Additionally, he sometimes has to import corn from Côte d'Ivoire, and peanut cake from Mali when domestic supplies are low. He changes the rations as necessary, according to the feedstuffs available. He sells the mash mixtures to nearby farmers to assist them in providing a balance diet for optimum egg production.

Veterinary Products: The moisture conditions of Kindia are a breeding ground for poultry diseases, so intensive poultry farmers like Mr. Abraham need to practice strict bio-security and sanitation measures to keep the flocks healthy. Ella has a vaccination schedule that Mr. Abraham adheres to, as he knows that an ounce of prevention is worth more than a pound of cure. Since the local veterinarians are not properly stocked with the vaccines, vitamins and other medicines that he needs, Mr. Abraham buys directly from either Dr. Charles

ESK or Pharmaveto in Conakry. He has trained his local staff how to administer the medicines and vaccines. Most medicine is water-soluble but some must be injected. Ella's day old chicks are vaccinated against Marek's disease [intra-muscular]; they also receive mist spray to protect them from Newcastle's disease and Infectious bronchitis. He advises people buying his chicks to follow up with the regular vaccination schedule, recommended by the veterinarians.

VI. VCA: SMALL RUMINANTS

A. OVERVIEW

Guinea's small ruminant value chain has considerable growth opportunities, coupled with some significant but not insurmountable constraints to upgrading. Sheep and goats have shorter reproductive cycles than cattle, making for quicker income opportunities. However, in Guinea very few farmers raise small ruminants in an intensive manner. Consequently their productivity suffers. Instead of weaning lambs and kids at an early age as is done under more intensive agricultural systems, the young animals are allowed to nurse for up to a year before they are separated from their mothers and then fed forage. Animals fed in this manner gain weight and size slowly. There is no culture of sheep or goat fattening in Guinea, i.e., feeding the animals a mixed ration designed to add weight quickly, maximizing optimum growth. One exception to this is the fattening of rams, generally with hay, for the Ramadan and Tabaski¹² holidays. Credit Rural provides financing for fattening loans.

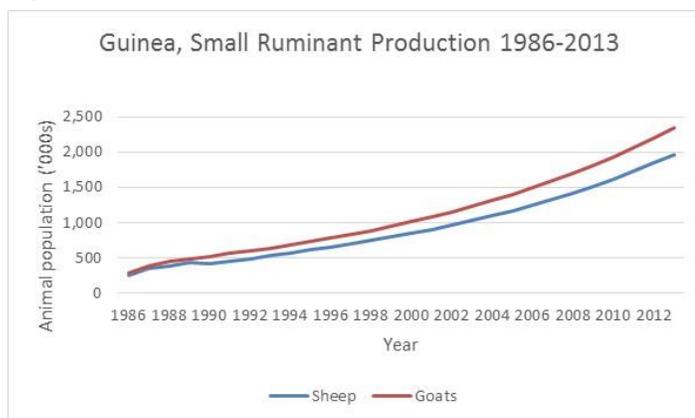
KEY TAKEAWAYS

- Sheep and goat production is profitable even with high mortality and extensive production practices.
- Small ruminants are raised primarily by women and youth.
- Animals are a form of savings to be sold when cash is needed.
- Approximately 30 percent of the national small ruminant herd dies annually from diseases.
- Raising small ruminants in a more intensive manner, using readily available foodstuff that is currently not being used for fattening, would greatly increase productivity.

Production volume: Guinea's small ruminant population is estimated at 2.34 million goats and 1.96 million sheep (GOG Ministry of Agriculture 2015). These figures are based on a constant annual estimated growth rate of 6.7% since 1996. FAO has recently completed an updated livestock census but the data were not available at the time of this study.

Almost all small ruminants are part of small household herds, primarily in agricultural systems in which less than 20 percent of household income comes from animal rearing. The LEO team was unable to identify any large-scale small ruminant herders. Traditional small ruminant production in Guinea is widespread and extensive. The animals are usually tethered to ropes and staked out in grassy areas to graze. They are moved periodically by women and youth to ensure continual access to grazing fodder.

Figure 11: Small Ruminant Production, Guinea, 1986-2013



Source: Ministry of Livestock, Statistics requested by LEO value chain team

¹² Tabaski is the popular term in West Africa for the Islamic holiday Eid ul Adha.

Small ruminants are not readily sold. They are kept as a form of capital and sold when necessity demands. West African Dwarf (WAD) ewes can produce 1 to 1.5 lambs, on average, per year. WAD does/nannies can produce from two to three kids per year. However, under the current extensive system, the young are weaned late so the females give birth every two years rather than annually. During the rainy season small ruminants are tethered in pastures but are brought indoors during heavy rains to protect them from cold and disease. At night they are sheltered to prevent theft. During the dry season they are often left to free range. The males are not castrated, and breed freely.

Due to the prevalence of trypanosomiasis, the WAD varieties of sheep and goats seem to be the only breeds that survive. PPR is the most devastating disease reported by herders, but it is prevented by timely inoculation of PPR vaccine. There are mixed opinions about which species are most vulnerable to PPR.

Gender and Social dimensions: While men dominate ownership of cattle, women are active in the care of small ruminants. Men dominate the marketing. There are no recent surveys of women's control of income from small ruminants. As most livestock including small ruminants are held as a form of savings, animal mortality from disease is a form of sav-

SHEEP AND GOATS HAVE AN ENORMOUS ROOM FOR GROWTH, THROUGH INTENSIFICATION

Using existing genetics, small ruminants could be made much more efficient and profitable through:

- Improved animal husbandry techniques: providing improved food and shelter,
- Reliable access to veterinary services, particularly vaccines.
- Weaning earlier to promote annual reproduction
- Castrating young males
- Fattening prior to sale.

The benefits of these upgrading strategies would accrue disproportionately to women and youth who are principally involved with small ruminant production.

The first two photos below represent West African Dwarf Sheep. The two following are those of West African Dwarf Goats. The last photo is how small ruminants travel to local markets. These varieties survive in West Africa as they are trypanosomiasis tolerant.

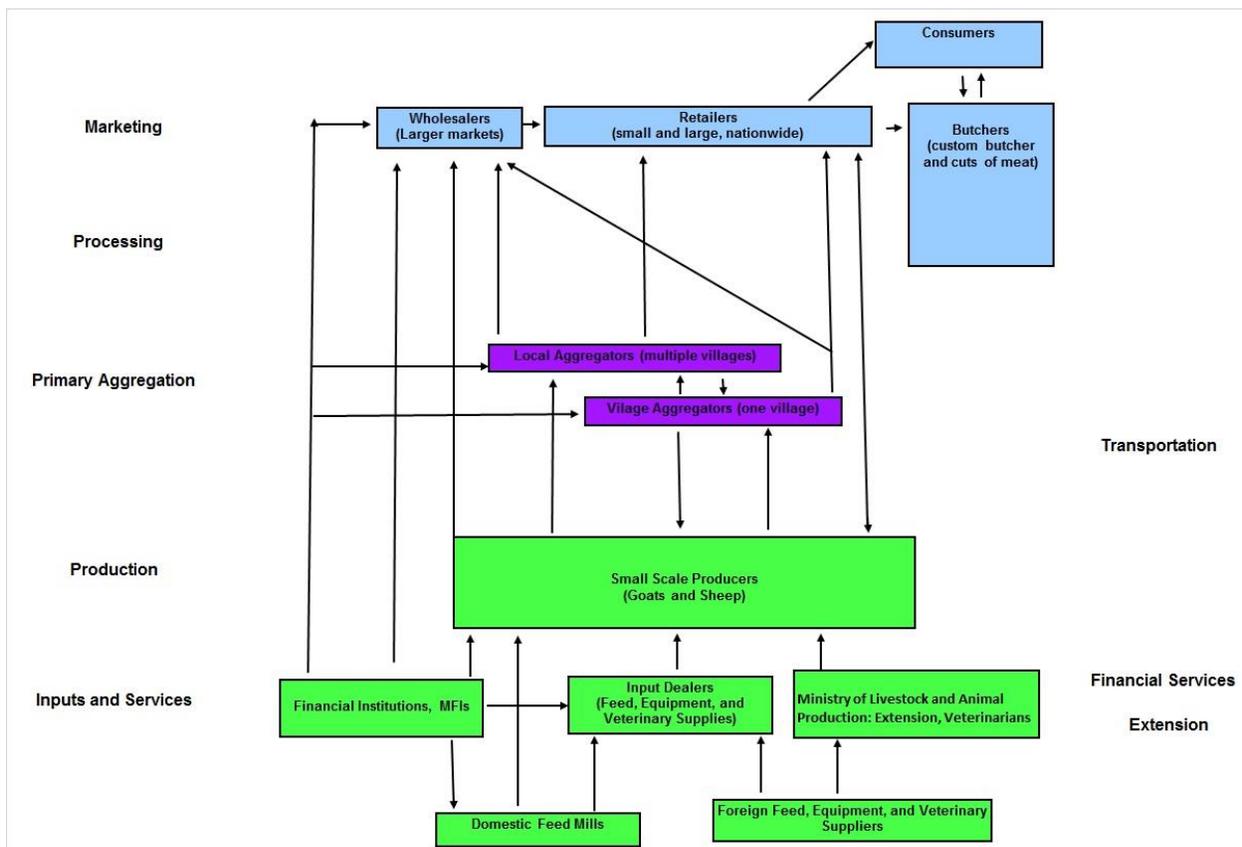


ings loss, as is the opportunity cost of lost income from slow weight gain, and the absence of fattening activities.

Technology: Small ruminant production in Guinea is effectively extensive, with almost no fattening of animals, no specialization of functions, and inadequate access to veterinary services. An estimated 30 percent of all small ruminants die from diseases before they can be marketed. In 2014, just over 38,000 sheep and goats were vaccinated against PPR, the principal killer of small ruminants. This represents less than one percent of animals, out of a total population of over 4 million head.

Marketing/Processing. Small herd size, the absence of commercial fattening, and the lack of adequate veterinary services result in very small marketable surplus. Even with extensive production system practices, especially because of very low input costs, small ruminant production is profitable. The dominant markets for small ruminants are holidays and special events and the ubiquitous grilled meat retailers. Animals sold into the urban centers for holidays and special occasions are purchased by wholesalers in rural communities and sold to retailers who will fatten them briefly on hay. The LEO team was unable to identify any urban traders.

Figure 12: Small Ruminant Value Chain, Guinea



B. END MARKET ANALYSIS

There is very little recent data on the livestock sector to provide an adequate analysis. FAO indicated that it has conducted a livestock census recently and sent it to the GOG, but does not yet have permission to share the report. The most recent data are the census from 2000. Guinea’s Ministry of Livestock statistical report estimates an annual herd increase of 6.7 percent for 2014 for both goats and sheep; with animals numbering

2.1 million sheep and 2.5 million goats. The MOL estimates the 2014 annual meat production of sheep at 8,282 metric tons (MT) of meat, while goats produced about 11,690 MT.

1. GLOBAL AND REGIONAL MARKETS

The global market for small ruminants is robust and growing at a faster rate than the markets for beef or pork. World export prices showed significant growth during the period 2001-2014, increasing from \$4,921 per ton to \$11,009 per ton for sheep cuts (boneless, fresh or chilled) across the period (ITC Trade Map 2015). Imports and exports of sheep and goat meat into/from Guinea are very limited and highly concentrated. There is a moderate level of mutton imports into Guinea from Italy. This is probably going to the higher end restaurants and super markets.

Guinea does not export small ruminant products to global markets. There is some cross border trade of small ruminants exported to regional markets, mainly before religious holidays. For example, Guinea reports some exports of live animals to Ghana. There are also seasonal imports of live animals transshipped through Saudi Arabia for Muslim holidays. These animals are exported live across land borders mainly to the north, and east. In all markets animals were sold by head, not by weight. There is a price premium placed on heavier and healthier appearing animals but this is not an exact process.

With a shift toward more intensive production systems, Guinea has the potential to be a competitive exporter of both live animals and frozen carcasses serving the lower end of the global sheep and goat markets.

2. NATIONAL AND LOCAL MARKETS

Although small ruminants are raised throughout the country, and sold live in all local markets, the major end market is Conakry, which pays the highest prices for live animals to satisfy the urban and suburban desires for animal protein. Table 16 indicates prices for small ruminant and other animal proteins. Nationally, small ruminants are transported from the northern, eastern and southern sections of the country to the area surrounding Conakry, the largest end market.

Table 4: Meat Prices, Conakry (“Niger” market), July 2015

Beef	kg.	32,000
Imported chicken (leg thigh quarters)	kg.	25,000
Poultry (live birds)	kg.	55,000-70,000
Goat (live)	animal	400,000
Sheep (live)	animal	500,000
Fish (smoked)	unit	+/- 15,000
Fish (red carp)	unit	+/- 10,000
<i>Source: informant interviews</i>		

Small ruminants are sold live by head in local markets, in areas that are usually separate from the main markets. Animals are often slaughtered just meters away from where they are sold. Slaughtered goats are often roasted after slaughter to cook the skin, which is also eaten; they are then butchered with meat being sold by weight in the local market. Sheep are skinned before being butchered; skins are dried in an artisanal manner and used domestically or sold. There does not appear to be a tanning industry, though there is evidence of some trade of small ruminant hides.

C. PORTER’S FIVE FORCES ANALYSIS

Barriers to Entry- It is relatively easy and cheap to enter into the current extensive small ruminant market; animals eat readily available forage throughout most of the year. As long as the animals are healthy, they will reproduce, providing herders with good profit margins, as their cost of production is low. Margins are such

that, as long as the animals do not die from diseases, they readily multiply. Adopting intensive herding practices stands to increase revenue by boosting output, though it would add costs via increased inputs of balanced feed rations, and improved structures such as fencing and stables.

Threat of Substitutes- Due to its short reproductive cycle, small ruminants produce animal protein more quickly than cattle. However, poultry and fish have shorter reproductive cycles than small ruminants. It can be argued that if the fish or poultry meat industry could become more efficient, it could serve as an animal protein substitute for small ruminants.

Bargaining Power of Buyers- The public has other sources of fulfilling their animal protein needs, which keeps the cost of small ruminants down, somewhat. The greatest demand for small ruminants is just before local religious festivals, which is when the buyers pay the highest prices.

Bargaining Power of Suppliers- There are many small ruminant herders selling their livestock, usually in very small numbers. As these animals are raised traditionally the only inputs they need are water, vegetation and veterinary supplies. The cost of production is cheap and because the animals multiply relatively fast, suppliers have a competitive advantage.

Rivalry Among Existing Players- Under traditional livestock husbandry, there is competition among every household that produces small ruminants. Most households have a couple head and have to make the decision to multiply their herds or sell off animals for money. Usually eating their own sheep and goats is the last decision, except for religious events or sacrifices. However, there is not much competition among the small farmers raising sheep and goats, nor much cooperation. Small ruminants are raised by women and youth in more of a subsistence/extensive manner; not an intensive, profit oriented, agriculture-as-a-business manner.

D. WATERFALL ANALYSIS

The LEO assessment team did not conduct a competitiveness analysis of Guinea's small ruminant prices. This is principally because it is difficult to compare live animals that may be exported into Guinea with the trypanosomiasis-resistant dwarf varieties, especially as the domestic stock are not marketed by weight. Guinean small ruminant traders do source animals from Mali and Senegal, though the team was unable to verify the quantities of live animals that cross the border into Guinea. The biggest constraint to competitiveness of small ruminants in Guinea is disease. The biggest part of this constraint requires a sufficient supply of veterinary inputs and a supply chain for the delivery of these to the households that need them.

CHANGE DRIVERS

The greatest immediate-value creating impact in the small ruminant supply chain is the improved delivery of veterinary vaccines. Beyond this, producers would benefit from knowledge transfer about improved husbandry practices, effectively doubling the birth rate of animals and increasing their weight gain. All of these services could be provided by rural veterinarians and their trained auxiliaries. Veterinary auxiliaries can be trained in a relatively short time frame and provide employment for women and youth.

Guinea has a network of private veterinarians. These actors could drive change within the small ruminant (and poultry) system with training and initial buying down of risk.

E. VALUE CHAIN FUNCTIONS AND ACTORS

1. RETAILERS

Small ruminants are sold at the retail level along the roads, as roasted meat/brochettes, in local and big city markets as butchered meat and throughout the country as live animals. In the latter case, retailers pay cash to buy each head, and sell for cash to regional wholesalers (who sell them at larger markets for higher prices). The team found very little evidence of retailers taking out credit to purchase animals. There are livestock GIEs which, with MOA extension support, do encourage herders to consolidate their animals to facilitate pick up for wholesalers.

2. WHOLESALERS

The wholesale actors in the value chain are small and large-scale traders who travel to local markets, buy as many head of sheep and goats that they can pay for in cash, and transport them to national markets for resale. There are small unions of these traders, who assist each other when animals get sick. As with retailers, there is very little credit involved at this level. There is no intensive animal fattening program.

CASE STUDY: TRADER

M. A. Camara is a small ruminant trader in the Conakry livestock market, which is detached from the central market. It is an area designated by the government, away from other agricultural products. The market has about 200 head of sheep and goats, all individually tethered on 4-to-6-foot ropes staked along a grassy area on a hillside near the road. The animals are kept in groups of four or five animals. Chopped grass is piled inside an old truck tire for them to eat, and a bucket of water is also within reach of all the animals. M. Camara has 12 goats and sheep, which he bought in various markets, including Mamou and Dalaba. He paid cash for the animals and transported them by truck to Conakry for sale. He does not keep the animals for more than a few days. He is not trying to fatten them, only to keep them healthy until he sells them and returns up country to buy more stock.

Sheep: He pays from 100-250 thousand GNF per head for males, and sells from them for 500 thousand to one million GNF, depending on the season. For females, he pays about 100-200 thousand GNF per head and sells them for 400-800 thousand GNF per head.

Goats: He pays 90-120 thousand GNF/head for males and females. He sells them for 400-800 thousand GNF/head, charging same price for males and females, unless the female is pregnant. Pregnant females sell for slightly more. The goat prices are more stable throughout the year than those for sheep.

He thinks his markup is justified, as he has to pay in cash to the seller, provide round-trip transportation, and pay any veterinary charges that may occur. There is a Ministry of Livestock veterinarian who inspects all the small ruminants in the market daily. However, if any animal falls sick he must call another vet and pay for his transportation and the necessary medicine. He said the abattoir was about 100 meters away. Many of the small ruminant buyers guide the animals by their ropes there, where they are slaughtered for a price. If needed, a nearby butcher will either buy them for resale or cut them up for hire for resale by weight. Most of Mr. Camara's buyers are small ruminant retailers in the central market.

3. PROCESSORS

The processing actors provide a very basic traditional role in Guinea: they provide services to slaughter small ruminants near the livestock market; skin, dress and roast the carcass; and butcher it for the client or for retail

sale. There is no modern packaging or refrigeration, except in super markets. There is no cold chain for the transport of cut meat from abattoirs and butchers to retail outlets.

SMALL RUMINANT MARKETING ASSOCIATION

Mamadou Bah Diallo is the Director of Community Affairs and Livestock for the Association des Vendeurs de Petit Ruminants, an association of small ruminant livestock vendors based in Conakry. The Association's market for sheep and goats is strong, especially during festivals. Many of their members are youth, who are very active in goat and sheep marketing. They operate in many weekly markets like Labe, Kindia, Kundara and Telimele.

Their constraints include transportation and customs, as this association often imports animals from Mali. Taxes on their ruminants are excessive and cut into their profit margins. The Association does not have access to infrastructure where they can feed, fatten immunize and sell their animals. The lack of water across Guinea is a challenge for goat and sheep traders who are members of this association.

4. PRODUCER ASSOCIATIONS

Small ruminant producers in Guinea are exclusively small farmers; few have more than five head. There are GIE (producer groups and federations) that encourage aggregation of live animals for wholesalers to pick up and deliver to larger markets.

CASE STUDY: LIVESTOCK PRODUCER ASSOCIATION

Soja, Préfecture de Mamou. In Mamou, a livestock producer group (GIE) has 37 members, both men and women. While they are not part of a clear commercial supply chain, they are aware of traders in Conakry who purchased larger quantities of animal before Tabaski, and during Ramadan. They know that these traders did some fattening, though they don't know what 'fattened' animals are fed or for how long. This GIE is supported by the DRE. The group does not keep regular books, or calculate income statements or balance sheets. They are glad for the service and access to veterinary supplies that they get through the DRE and its contracted veterinarian, but this is not enough to meet their needs. They estimate that at least 50 percent of their animals are not vaccinated for *Peste de petits ruminants (PPR)*. They are aware of a Mr. Charles, the largest importer of veterinary products, but access remains a big constraint—especially on-time access. Animal mortality rate ranges from 15-50 percent. They do not know what their animal productivity index is. An additional constraint they face, especially during the dry season, is the lack of clean water for their animals. This means the animals have to seek out watering holes that are drying up, and the producers believe, are a source of disease. Their small ruminants do not pass through regular abattoirs, but are slaughtered by local butchers for the kebab sellers, or by households who purchase animals for special occasions. They have had issues with control of the genetic quality of their stock but there were no artificial insemination (CHECK) services available. The members feel that there is a need for sanitary livestock parks to facilitate trade and veterinary services, and help them manage their stock better. Goats sell for 250-400,000 GNF, depending on weight, and sheep sell for between 300-700,000 GNF, depending on time of year and animal size. Rams sell for a higher price.

5. PRODUCERS

Small ruminant producers in Guinean are either agriculturalists who depend primarily on agricultural crop income, agro-pastoralists who earn at least 25 percent of their income from rearing small ruminants, or pastoralists who earn most of their income from rearing small ruminants and cattle. In the LEO study areas, almost

all rearing of small ruminants is carried out by agro-pastoralist or agriculturalist households. These households are producing small ruminants, a small number of chickens as layers and meat, and one or more of maize, rice and groundnuts. The LEO team found no significant demographic differences between

CASE STUDY: YOUNG LIVESTOCK PRODUCER

Mamadou N'Diaye is a 17-year old high school student and sheep farmer in Mamou town in the Kindia region. He maintains a livestock operation on his father's compound, and raises both small ruminants and poultry. His major successes have come from the small ruminants. His father is a local government worker who made the initial investment of five sheep three years ago. Unfortunately they all died under the care of a herder. As his father had no access to credit, he used his own money and bought more sheep, which have since multiplied. The young man currently tends nine sheep. He feeds them natural forage around the farm as they are tethered to a rope tied to a stake in the ground. He moves the stakes a few times a day so the animals have plenty to eat. He also brings them water. At night he brings them inside a shelter to protect them from the weather and thieves. He does not regularly vaccinate any of his livestock and receives little technical outreach advice from local extension agents. He sells the sheep periodically, and recently sold one for 350,000GNF/head for the post-Ramadan sacrifice. He estimates the current value of his flock is over three million GNF.

households with a small number of sheep and goats, and other primarily agricultural households.

VII. VCA: MAIZE

A. OVERVIEW

Guinea is experiencing growth in its agriculture sector despite the 2013 outbreak of the Ebola virus, which contributed to wiping out GDP growth in 2014. Agricultural sector performance was not severely impacted by the Ebola outbreak on the aggregate level, though many individual households left their farms, and, in many cases, could not find markets for harvested crops. Maize in Guinea has considerable growth opportunities. Eaten as a secondary starch and used as feed for poultry, Guinea's maize production has grown by over 13 percent since 2011 (GOG ANASA 2015 and n.d.).

Traders in Kankan, the center of Guinea's maize trade, and other markets, both import and export maize in and out of Guinea. The rapidly growing poultry layer subsector, based primarily in Kindia and Conakry's suburbs, is the fastest growing market for maize. Climate change is shrinking the maize production belts in the Sahelian countries to the north, creating an enormous potential market for Guinea (IFPRI 2012 and 2015). This opportunity can be realized only through a process of commercialization of production supported by a vibrant private sector inputs market (especially seed).

KEY TAKEAWAYS

- Despite low yields, maize production is currently profitable in Guinea, largely due to import customs and duties
- Domestic demand growth for maize as food and poultry feed exceeds 6% annually.
- Climate change will increase demand for maize imports in Sahelian countries, a potential opportunity for maize producers in Guinea.
- This demand growth can be met through greater intensification requiring improved seed and appropriate input or through increased imports.
- There is a small percentage of more commercially oriented maize farmers who purchase fertilizer and other inputs who could serve as the bases for a lead or nucleus farmers type intervention
- Aflatoxin is a likely but unmeasured problem.

1. COMMODITY DESCRIPTION

Maize is Guinea's number three crop overall behind rice and fonio, but it is the second most important crop in terms of production volume, in the prefectures selected for the LEO value chain assessments (Kandia, Mamou, Faranah, KanKan and N'Zerekore) (GOG ANASA 2015). Table 5 indicates production of key crops in these areas. Guineans overwhelmingly prefer yellow maize to white, which confers marginally higher beta-

Table 5: VCA Crop Cultivation Area in Target Districts, 2015

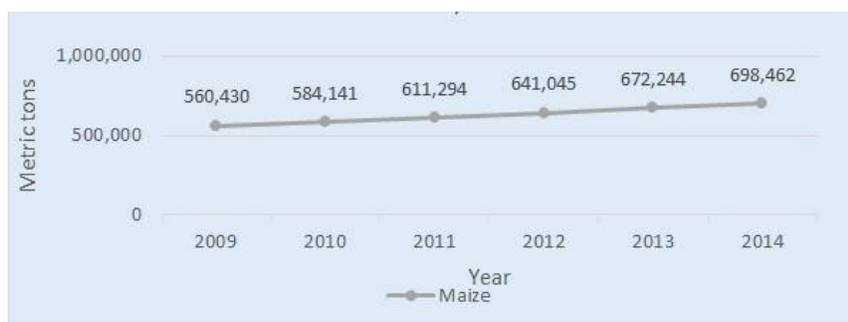
REGIONS	Riz	Fonio	Maïs	Manioc	Arachide	Igname	Pomme de terre	Superficie totale
FARANAH	241,772	42,658	67,547	16,517	104,096	-	-	472,590
KANKAN	346,833	58,217	114,111	45,526	119,321	11,052	-	695,061
KINDIA	274,650	79,989	53,603	24,062	105,256	-	-	537,559
MAMOU	87,633	99,899	50,942	25,955	35,806	-	2,338	302,572
N'ZEREKORE	381,301	19,862	82,293	23,314	23,061	1,167	-	530,998
ENSEMBLE	1,332,189	300,625	368,496	135,374	387,540	12,219	2,338	2,538,780

Source: Minister of Agriculture, Republic of Guinea, 2014 General report of the 2014-15 agriculture season

carotene content, a nutritional advantage over white maize for food and feed. Most producers recycle previous year's seed rather than purchasing seed on the market. The LEO team was unable to find any hybrid maize varieties and the most commonly available seed multiplied through the Government research centers was *Opatampa*, an open pollinated maize variety developed in Ghana. A poorly developed seed supply chain results in reduced availability of seed and reduced fertility of multiplied seed, further discouraging farmers from purchasing seed. Guinea has not yet developed national policies for the implementation of the CDEAO/ECOWAS Seed Law, likely the driving constraint to upgrading the seed supply chain. Guinea's customs office reported a single import of maize seed of 230.7 tons in 2013. The LEO team was unable to identify the importer (Direction Generale des Douane 2014).

Virtually all maize production is rainfed cultivated by over 693,000 smallholder farmers. Just over 2 percent, amounting to 15,800 farmers, reported using fertilizer on their maize crop. Though small in percentage terms, maize farmers investing in fertilizer could form a pool of farmers from which a lead or nucleus farmer initiative could be developed.

Figure 13: Maize Production, Guinea, 2009-14



Source: Ministry of Agriculture, Agence National de la Statistiques Agricoles et Alimentaires , 2015

Guinea's maize production has grown at a rate of almost 4 percent annually since 2009, an increase primarily due to increased planting (GOG ANASA 2015 and n. d.). During the same time period, average maize yields have increased by 50 kg/ha. In 2014, 538,000 hectares of maize were planted with an average plot size of 0.7 ha. Women were reported as the principal farmer on roughly 12 percent of all farms nationally, a rate that is almost twice as high for the prefectures of Labé and Mamou.

Given relatively high levels of humidity during the harvest season in the study area, the LEO team would expect significant levels of aflatoxin. The team was unable to identify any domestic aflatoxin testing capacity for maize or groundnuts. This will become more of a challenge if Guinea begins exporting larger quantities of maize into regional markets.

C. END MARKETS

1. GLOBAL MARKETS

Long-term market predictions indicate that global demand for all cereals will outpace expected increases in production; resulting in relatively robust market prices for all cereal commodities including maize, rice, wheat, sorghum (IFPRI 2015). In the shorter term, however, global maize prices have been falling since the third

quarter of 2012, as indicated in figure 14 (Index Mundi 2015). Guinea maintains a high (39.4%) level of tariffs and duties on imported cereals.¹³ These duties operate as an inefficiency subsidy, enabling Guinean grain farmers to earn a positive return despite lower global prices for maize.

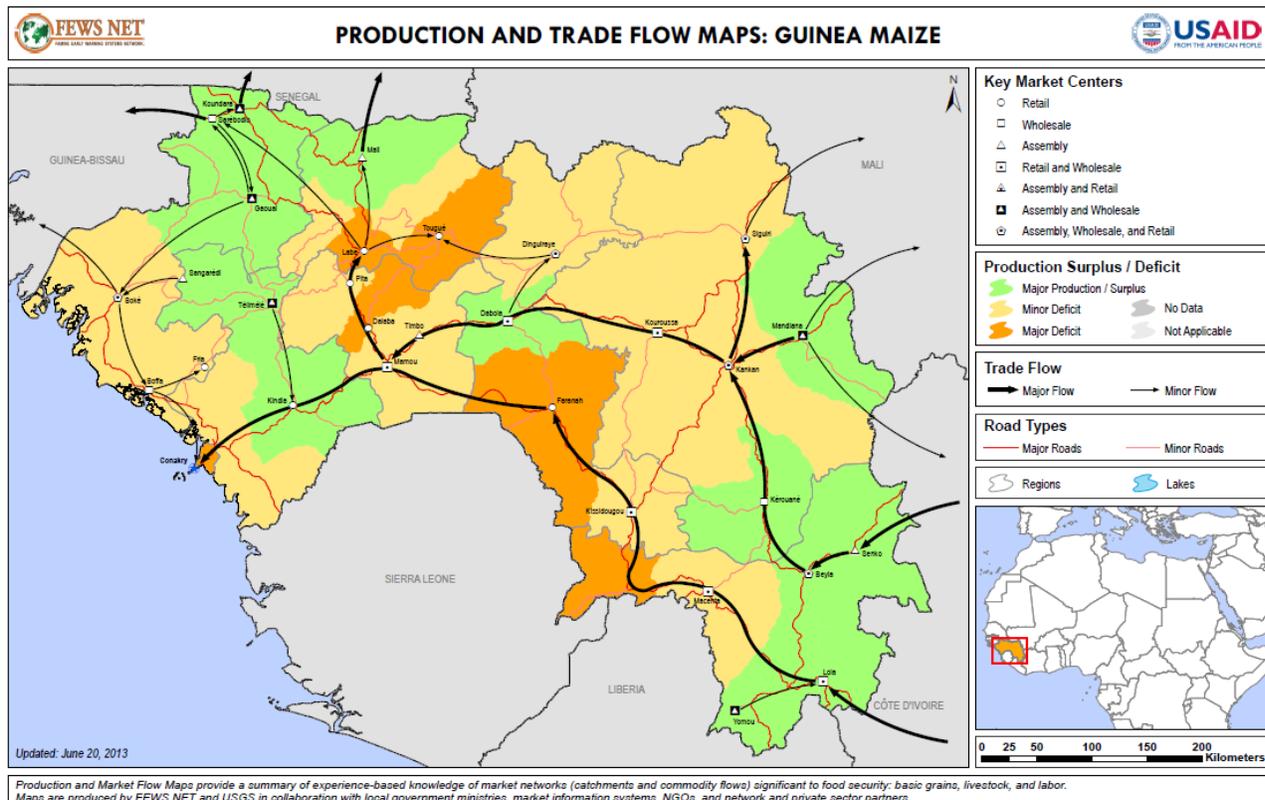
At July 2015 U.S. and Guinean maize prices, domestic maize enters retail markets at a slightly lower price than imported maize. This is reflected by relatively low maize imports. Maize imports into Guinea were valued at \$325,000 with an annual growth rate of 12 percent from 2010-2014 (ITC Trade Map 2015). The major sources of imports are India (71 percent) and Argentina (29 percent). As table 6 indicates, the competitive margin of domestic maize is small. Even with relatively high tariffs, imported maize could become cheaper than domestically produced maize. Again, this speaks to the importance of intensifying maize production to increase the relative competitiveness of domestic production.

Figure 14: Yellow Maize Market Prices, 2010-15



Source: <http://www.indexmundi.com/commodities/?commodity=corn&months=60>

Figure 15: Maize Trade Flow, Guinea



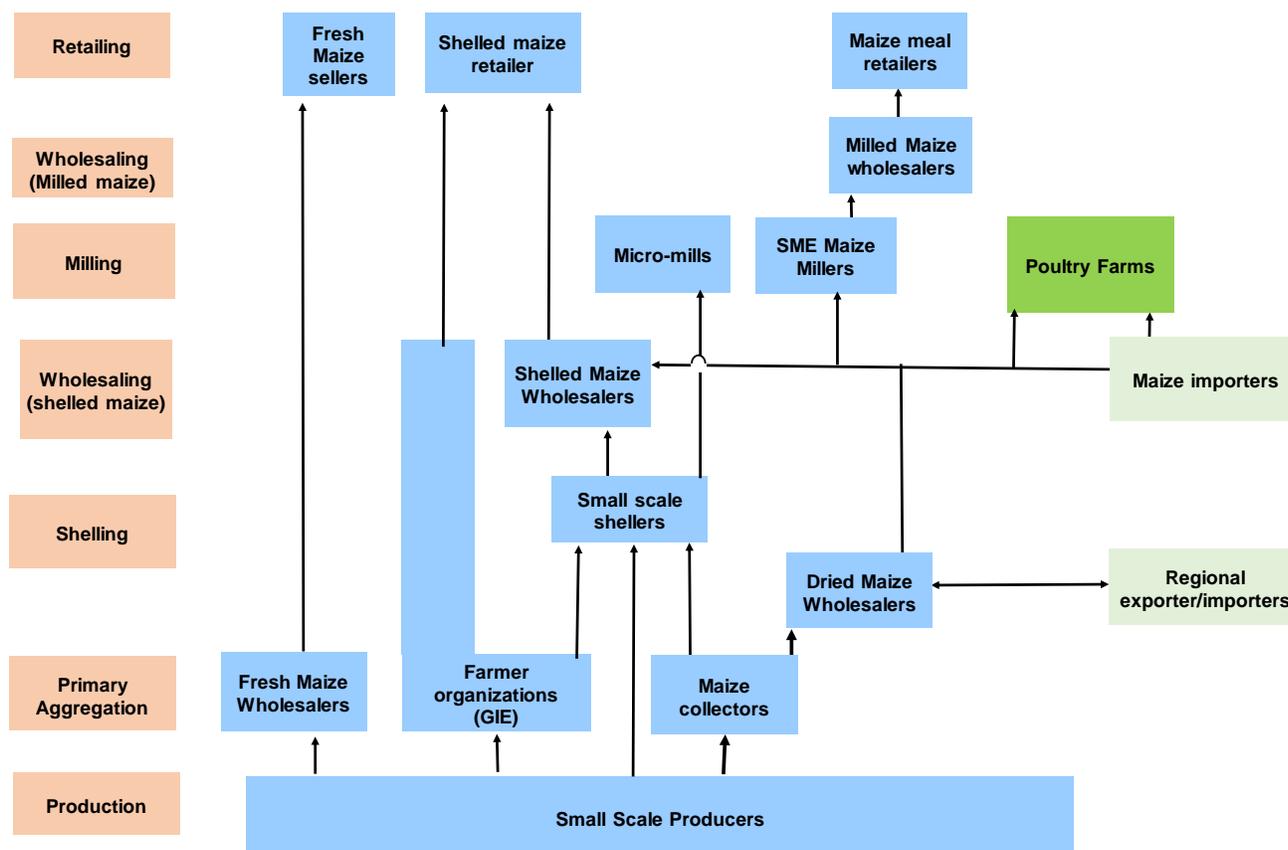
¹³ Republic of Guinea, WT/TPR/S/153, page

2. REGIONAL MARKETS

Guinea's low level of maize productivity (+/-1.25 tons/ha) does not make Guinea competitive in global markets for maize. However, even at relatively low yields, maize production is commercially viable (with low inputs) and allows Guinea to export maize into the sub-region. As figure 15 (FEWSNET 2013c) indicates, there are major maize trade flows between Guinea and neighboring countries. Guinea shows imports from and exports to neighboring countries, depending on the agricultural season. During the lean season and the early harvest period, large quantities of maize flow into Guinea from Côte d'Ivoire via the markets of Lola and Beyla (between August and October. After the maize harvest in Guinea (between November and February), maize flows into Côte d'Ivoire and Mali (Kankan-Bamako trade route). Throughout the year, maize is exported to Guinea-Bissau, through Boké and Saréboïdo, and to Senegal, through Koundara and Mali (in Mali prefecture).

The impact of climate change on maize production in the West African region will reduce the productive area that can be planted to maize in Mali, Senegal and Burkina Faso in the next few years (IFPRI 2015). IFPRI models estimate potential increase in maize yields in Guinea of 92 percent between 2010 and 2050, rising from 1.2 tons/ha to 2.3 tons/ha. With access to improved seed and the appropriate mix of inputs to enable farmers to optimize yield, this could increase to over three tons/ha. IFPRI models predict total production to increase by 127 percent.

Figure 16: Maize Value Chain Map, Guinea



3. NATIONAL AND LOCAL MARKETS

Domestic maize consumption was estimated at 707,873 metric tons in 2013. This represents 13.64 percent growth from 2011-12, throughout the country. As the illustrative income statement in table 6 indicates, maize production, even with the purchase of seed and inputs can be quite profitable. The profit margin of 48 percent, however, does not include the principal operator's labor.

Major internal trade flows go from the surplus markets in the southeast westwards (Nzérékoré-Kissidougou-Mamou-Conakry, Nzérékoré-Kissidougou-Mamou-Labé, Kankan-Mamou-Conakry, and Kankan-Mamou-Labé) and northwards (Lola-Beyla-Kankan-Siguiri) (FEWSNET 2013c). There is a major flow from Mandiana prefecture in Haute Guinée feeding into the Kankan-Mamou and Kankan-Siguiri trade routes; flows from the surplus areas of coastal Guinea are minor as these surpluses are more limited due to lower production.

Kankan and Beyla are two key markets in the maize domestic and cross-border trading systems (FEWSNET 2013c). Beyla is a key market receiving trade flows coming from Côte d'Ivoire and the surplus of producers in Guinée Forestière region. Kankan is the largest wholesale market in the country for maize, where stocks are accumulated after the harvest period; large traders supplying the Conakry market source maize from the Kankan market and Ivorian and Malian traders come sell their supplies there.

In Guinea, maize is sold by road sellers, market women in weekly markets; and in regional and national markets by a small number of large-scale wholesalers and their network of collectors. In domestic markets, maize is roasted whole as a snack, processed into flour; and cooked as a soft porridge that is mixed with sour milk in rural Guinea. This dish is very popular during the Ramadhan fasting period and end of Ramadhan celebrations. Maize is also cooked as a thick porridge and eaten with meat and vegetable sauces as a “fufu,” which is a staple dish in neighboring Côte d'Ivoire.

In addition, as noted, maize is the principal input into poultry feed. Guinea's annual GDP growth was around 5 percent a year before the Ebola crisis struck the country (World Bank 2015b). Guinea's per capita incomes are expected to rise once the Ebola crisis abates and the country's mineral prices rebound. As incomes rise, demand for animal protein will also rise. Poultry will continue to be one of the principal protein sources. Growth in demand for feed alone is likely to continue to drive demand growth for maize in Guinea, and in neighboring countries. To meet this demand, Guinea will either have to increase maize imports or increase domestic production through intensification.

Table 6: Maize Farm Income Statement, Guinea

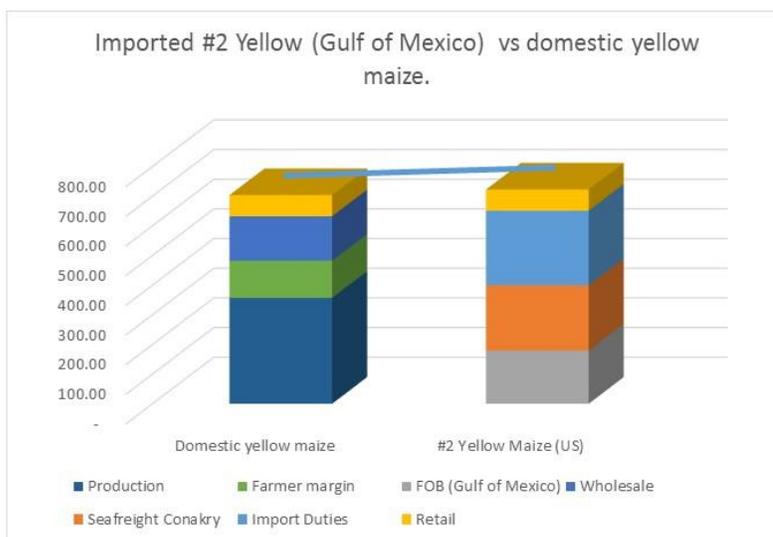
1. Revenue		
3,000 kgs Maize @ 2,500 GnF kg		7,500,000
2. Expenses		
Engrais 250kg 5 @135,000		675,000
Labor Chaines		320,000
Herbicide 4 @35,000		140,000
Main d'oeuvre (Land preparation)		1,800,000
Semence 50kg @ 4,000		200,000
Total Expenses		3,135,000
Net Profit		4,365,000
Profit Margin		58%

Source: Institute de Recherch de l'Agriculture de la Guinée--Bordo, Seasonal Pro-forma Income statement

D. WATERFALL ANALYSIS

As the cropping budget in table 6 (below) indicates, maize production can be quite profitable even with relatively extensive production technologies. As stated above, part of the relatively strong domestic maize prices results from the enforcement of relatively high import duties (42 percent) on maize imports. With growing demand for maize in Guinea and more rapidly increasing demand for maize as a result of climate change with Guinea's northern neighbors, will Guinea be able to compete. (With current tariffs, yes.) As figure 17 illustrates, domestic maize is cheaper than the landed (CIF) cost of #2 yellow maize, Gulf of Mexico. High import duties however place a penalty on consumers. One of the fastest growing maize consumers is the poultry sector which would benefit from lower maize prices. Currently, Guinean maize producers do quite well. To meet the growing demand from the poultry sector and its Sahelian neighbors, Guinea will have to invest in improved maize productivity and more intensive production systems.

Figure 17: Maize Waterfall Analysis, Guinea and Gulf of Mexico



Source: LEO team interviews and Comtraded data <http://comtrade.un.org/data/>

E. MAIZE: PORTER'S FIVE FORCES ANALYSIS

Barriers to Entry – There are few barriers to entry for domestic maize producers. For the very small number of maize farmers who operate larger farms, getting access to production rights was not mentioned as a problem. There are more barriers to entry as farm size expands, requiring a more intensive mix of inputs and production technologies. There are very few tractors in Guinea so animal traction establishes a *de facto* upper bound on farm size for most farmers. Strengthening input and equipment service markets is a precondition to entry by new, or expansion by existing farmers.

Threat of Substitutes – Cassava is the principal substitute for maize as an edible starch, but maize has much higher protein levels and is superior as both food and feed. Millet, sorghum and fonio are produced in smaller quantities than maize, but are more expensive and traditionally only consumed on special occasions. Fonio is not as suitable as maize as an animal feed. Rice is considered a superior commodity to maize. While rice bran is a desired component in poultry feed and has a higher protein content than rice, the Guinean milling sector is too primitive to generate commercial volumes of rice bran.

KEY TAKEAWAYS

With current import duties, Guinean maize farmers can do quite well. In order to benefit the growing poultry sector and to take advantage of expanding demand from Guinea's northern neighbors, Guinea will have to shift to more intensive cultivation systems including improved seed access.

Bargaining Power of Buyers – Like most commodities, maize is a seasonal crop. Given the low levels of storage infrastructure in Guinea, seasonal price variation is relatively high. Buyers have asymmetric bargaining power over producers during the harvest season when supplies of maize are high. This situation reverses later in the year when domestic maize stocks diminish.

Bargaining Power of Suppliers – With low levels of storage infrastructure, most producers have very little bargaining power. Intuitively, supplier bargaining power accrues to suppliers who can store maize, holding it until prices rise just before the minor maize harvest. As the landed cost of imported maize is higher than domestically produced maize, it can be assumed that domestic maize traders have greater bargaining power over buyers, except during the peak harvest period. Wholesalers of processed maize products, like poultry feed and maize grits and flour, have a relatively strong bargaining position as the only close substitutes are imports whose landed costs seems consistently higher than domestically processed products.

Rivalry Among Existing Players – Wherever or whenever maize buyers have more bargaining power, they can set producers competing with each other to sell. There is little evidence of this happening at a significant level in the maize market. In general, cereal markets are quite atomistic and competitive, with large numbers of buyers sourcing product from a large numbers of sellers. Despite the absence of a strong market price information service, the national producers' organization disseminates weekly prices at multiple markets, (see annex). Except during periods of short term glut or scarcity, the market power of value chain actors is relatively symmetric.

The greater rivalry in the sector is between Guinean maize farmers and maize producers in countries with globally competitive maize yields. At current low domestic yields, Guinean farmers could lose their competitive position against their global rivals if global maize prices fall further, or if Guinea were to reduce its tariff barriers.

F. VALUE CHAIN FUNCTIONS AND ACTORS

1. RETAILERS

Maize is sold at retail levels on roads, through producer groups, in local, regional and national markets and at mini-markets and supermarkets in Conakry and major cities of Guinea. Women represent a large percentage of sellers at the market level in rural and open air or 'wet' markets. Retailers in regional and Conakry markets purchase primarily from wholesalers. At the small rural market level, retailers may purchase directly from farmers or small-scale millers. Almost all retailing is on a cash-and carry basis.

2. WHOLESALERS

Maize wholesalers in Guinea include private individuals, cooperatives, women's groups; and agriculture federations, which are comprised of GIEs and, unions. Larger commercial wholesalers often have a network of collectors/agents who purchase maize from individual farmers as well as from the GIE and unions. Most wholesalers buy and sell on cash, and avoid taking credit, though *Crédit Rural*, reports some marketing loans for wholesalers.

There are no national-level associations of wholesalers per se, except for The National Confederation of Farmers' Organizations of Guinea (CNOP-G).

3. PROCESSORS

Maize is processed manually at the village level. At the town level, maize is processed by small mills owned by women's groups, and cooperatives and federations. There are some small and medium-scale processors in Conakry and Kindia, to which federations can sell their maize. However, the team was not able to locate any statistics on maize processing in Guinea. Farm Lands of Africa Ltd., from India, is planning the development of agro-processing facilities to accompany large-scale production-rice mills, and a maize and soybean processing plant powered by biomass plants. All products will be sold into the domestic market, or to neighboring West African countries (e.g., cattle feed to Senegal).

4. PRODUCTION

As stated above, maize is the third-largest grain produced in Guinea, by volume. There are over 600,000 maize producers in Guinea with an average maize plot size of 0.77ha (GOG ANASA 2015 and n. d.). Yields are low, with a 2014 average of 1.25 tons/ha. Less than three percent of maize producers use fertilizer. With weak equipment markets, animal traction, and the amount of land, what a pair of oxen can plow in a day is the upper limit for most maize farmers.

There is an emerging group of SME maize farmers, most of whom also grow rice. These farmers own or access tractor services and purchase improved seed, fertilizer and crop protection inputs. Almost all of these SME farmers are members of the same GIEs and unions as their neighbors.

While there are no large-scale commercial maize plantations, Farm Lands of Africa Ltd. claims to be developing a 70,000 ha. project in Guinea to grow rice, soy and maize.¹ Soy and maize would be grown using South American expertise. Land has been secured under rolling 20-year leases with rental payments taking the form of a land development program, a large-scale out-grower scheme, and free or subsidized inputs

Producer groups engaged in maize production include women's groups, CNOFA-G, GIE and unions. These organizations provide marketing, technical assistance, and processing services for women's groups and producers. The federations also purchase and supply seeds and other inputs for producers. Most maize producers also grow groundnuts, cassava, yams or rice, and rely on their sales to finance future production.

THIERNO SALIMATOU BAH, MAIZE FARMER KOLIAGBE VILLAGE, KINDIA REGION

Ms. Bah has a small maize farm adjacent to her house. Her biggest challenge is with parasites destroying her maize, which she can address by intensifying insecticide use. Ms. Bah produces maize for consumption, and stores surplus maize in local containers. She uses peppers to prevent the insects from eating her stock. She does not use fertilizer as the soils on her land are rich.

Ms. Bah's farm is more for family consumption than commercial production. She can easily expand her maize farm to commercial production by using more of her land, and securing labor and technical extension assistance.

VIII. VCA: RICE

A. SUMMARY AND DESCRIPTION OF THE SECTOR

Rice is the most important cereal crop in Guinea. It is also the largest import item in Guinea’s food bill with an annual import value of around \$300 million (per fieldwork). Guinea imports almost 20 percent of its domestic annual rice requirements, totaling over 290,000 tons in 2014; a 23 percent increase over the previous year (ITC Trade Map 2015). Rice imports will increase over time as demand outpaces increase in supply. Because of its high foreign exchange bill, and importance to food security, rice is the Government of Guinea’s second most important priority crop, after oil palm.

KEY TAKEAWAYS

- Guinea imports about 20% of its rice
- Production through post-harvest technologies are non-existent or inefficient
- Guinea’s production increases are due to increased land planted
- Commercial transformation of the sector will require a shift to more intensive technologies and processes at all levels of the chain
- Currently there are no critical drivers of this transformation process

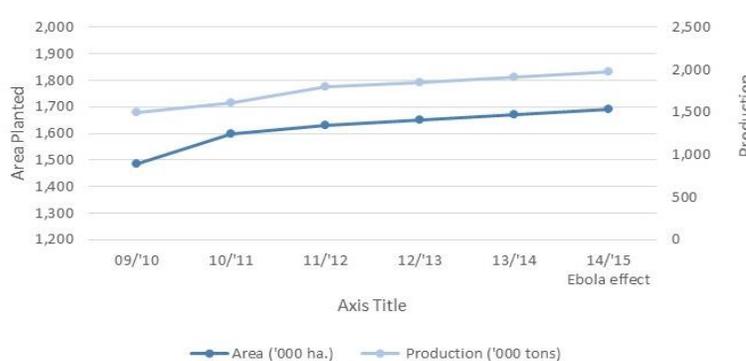
The paddy rice value chain, like most of the other commodity systems analyzed in this study, is relatively weak; uses minimal and very low level production, processing and transformation technologies; a minimal level of inputs, and shows little or no coordination or cooperation among actors performing different functions throughout the value chain. Weak coordination and communication across value chain actors makes it difficult for producers to learn how to respond to what consumers want.

Over the past decade, rice has become the fastest growing food commodity in Sub-Saharan Africa. Over the next 8 to 10 years, it is expected that steady growth will continue. Imports meet a significant share of this demand and without intensification the import bill of these countries will continue to rise.

Guinean paddy producers produce numerous strains of paddy rice developed for the different environments in which production occurs. In Guinea, paddy rice is produced in multiple ecosystems, listed with percent of total cultivated rice land in parentheses: upland (63%), non-irrigated flooded lowlands (19.5%), non-irrigated plains (10%), mangroves (4.2%), irrigated lowlands (3.2%), and irrigated plains (0.3%).

Land in Cultivation: The area in paddy production in the prefectures covered by this assessment, Kindia, Farana, Mamou, Kankan, and N’Serekore, totals, 1.3 million ha., or 79 percent of Guinea’s total paddy production area. Guinea produced over 1.9 million tons of paddy in 2014, a slight increase over previous years, and due primarily to an increase in acreage planted. In Guinea, land under rice cultivation has increased by over 10 percent annually (GOG ANASA 2015 and n. d.).

Figure 18: Rice Plantings and Production, Guinea, 2009-14



Productivity: Average paddy yields were 1.17 tons/ha, in 2015 (GOG 2015) compared to national average yields in Mali of 2.5 tons/ha., and the global average of 4.3 tons/ha. in 2010 (FAOStat 2011). Paddy yields are highest in irrigated perimeters, but production yields in well-managed *bas fonds* should be able to meet or exceed three tons/ha. In the expansive and largely underutilized plains, paddy can be cultivated under sprinkler irrigation systems, which require lower infrastructure and can produce yields of six to seven tons/ha. The System of Rice Intensification (SRI) has the potential to increase rice yields significantly. However, it is not widely practiced, in part due to high labor costs, a particular constraint in West Africa, where wages tend higher than in many Asian countries. As Guinea has relatively abundant labor and high unemployment, limited introduction of SRI warrants consideration in Guinea.

Table 7: Rice Production, Guinea, 2009-14

Variable	09/'10	10/'11	11/'12	12/'13	13/'14	14/'15 Ebola effect
Area ('000 ha.)	1,484	1,598	1,630	1,650	1,671	1,691
Yield (tons/ha.)	1.01	1.01	1.1	1.12	1.15	1.17
Production ('000 tons)	1,499	1,614	1,793	1,852	1,913	1,971

Source: Republic of Guinea, Ministry of Agriculture, Agence National des Statistiques Agricoles et Alimentaire, 2015

Government equipment subsidies are generally appreciated by their direct beneficiaries but discourage investment in equipment by private dealers and suppliers; an equipment voucher program would be a more effective way to subsidize equipment without inhibiting private service delivery.

Technologies: With the exception of Sierra Leone, and perhaps Liberia, Guinea is behind most of its neighbors, and far behind the world, in technologies used for rice cultivation, harvesting, post-harvest handling and milling. As shown in Table 8, over two-thirds of the cultivated rice land in the four prefectures selected for the LEO assessment is cultivated by hand (GOG ANASA 2015). However, most of this is in the N'Zerekore prefecture. Mechanical cultivation is highest in the Kankan prefecture (51%) followed by Faranah (39%) and Kindia (19%). Mechanical cultivation is conducted by walk behind tillers and tractors.

With Guinea's low rice yields, abundant labor and minimal uses of mechanization, limited introduction of the System of Rice Intensification (SRI), warrants consideration.

Nationally, 84 percent of all rice farms reported using no fertilizer and 69 percent used no crop protection inputs (GOG ANASA 2015). The percentage of Guinean rice farmers reporting use of improved seed is only 0.2 percent. In addition to using domestically multiplied maize seed, Guinea imported 35.5 tons and 636 tons of rice seed in 2013 and 2014, primarily from India. Assuming a dense planting density of 80kg/ha, 636 tons of seed could plant 8,000 hectares of paddy.

Table 8: Rice Cultivation Technologies, Guinea VCA Target Regions, 2014-15

REGIONS	Manual		Animal traction		Mechanical		Total	
	Area	%	Area	%	Area	%	Area	%
FARANAH	114842	47,50	32881	13,60	94049	38,90	241772	100,00
KANKAN	123473	35,60	47169	13,60	176191	50,80	346833	100,00
KINDIA	218720	79,64	3845	1,40	52085	18,96	274650	100,00
MAMOU	77993	89,00	8062	9,20	1577	1,80	87632	100,00
N'ZEREKORE	364056	95,48	1144	0,30	16101	4,22	381301	100,00
Total	899084	67%	93101	7%	340003	26%	1332188	100%

Source: MOA, Rapport Generale de L'Enquete Agricole 2014-2015

The LEO team was unable to find statistics on threshing equipment, but observed very few threshers during the field study. Almost all harvesting and threshing is done manually, resulting in a high level of broken grains, and introduction of stones and foreign matter. Importation of equipment is growing but cautiously. Government equipment subsidies discourage the emergence of private equipment markets, and rarely establish involve facilities for maintenance and repair, so subsidized equipment generally has a short life span.

Most of the rice milling in Guinea is carried out by very simple mechanical mills lacking sorters, or cleaners. Most of these mills have a capacity of one to two tons/hour, but operate below that milling in small batches for private clients (see miller text box in the “Actors” section). The result is a milled rice with a high level of broken grains and foreign matter requiring further cleaning, a labor intensive task carried out by women.

Gender: Women are active in all functions within the rice value chain. Artisanal parboiling is an activity that employs large numbers of women. The dominant form of parboiling that the LEO team observed however was very small scale, fuel and labor intensive and dried in a manner that introduces a high level of small stones and foreign matter. Much more efficient parboilers to be used by small women’s groups are widely available in Nigeria, and Burkina Faso. In the LEO assessment prefectures (see table 9), women are listed as the principal operator on almost 10 percent of all paddy fields, though the percentage of women who list agriculture as the principal activity is greater than men, 81 percent against 78 percent. Women however have less access to inputs and formal sources of credit, especially subsidized fertilizer than men.

Consumption: Guinean consumers prefer domestically produced rice, which sells at a premium over imported rice. Guinean consumers prefer parboiled rice, which has a higher concentration of protein and other nutrients than polished white rice.

Table 9: Rice Production Gender Breakdown, Guinea VCA Target Regions, 2014-15

REGIONS	Masculin		Féminin		Total	
	Superficie	%	Superficie	%	Superficie	%
FARANAH	230758	95,44	1014	4,56	241772	100,00
KANKAN	32 768	94,50	19065	5,50	346833	100,00
KINDIA	244269	88,94	30381	11,06	274650	100,00
MAMOU	68977	78,71	18656	21,29	87633	100,00
N'ZEREKORE	341142	89,47	40159	10,53	381301	100,00
ENSEMBLE	885146	90,53	109275	9,47	1332189	100,00

Source: MOA, Rapport Generale de L'Enquete Agricole 2014-2015

KEY TAKEAWAYS

- Building a competitive domestic rice industry will require investment throughout the paddy supply chain, but especially in access to high yielding seed, fertilizer, and crop protection inputs.
- The absence of improved equipment technology may be driven by household yields that barely cover own consumption and leave little to market.

B. END MARKET ANALYSIS

1. GLOBAL MARKETS

Guinea is not, nor will it be in the near to medium term, an exporter of paddy rice into any markets; though there may be transshipment of rice through Guinea into its landlocked neighbors. Global rice markets affect Guinea on the import side. Guinea's rice imports are increasing. The foreign exchange bill for rice alone is reported as 3 percent of all imports, and estimated at closer to \$300 million annually (see table 10) (GOG Customs 2014)¹⁴. Between 2013 and 2014, imports increased 23 percent. Demand growth will continue to outstrip domestic production, increasing the foreign exchange burden of imports for some time to come. Guinea's demand growth for paddy will increasingly depend on imports without a shift towards more intensive production systems.

Guinea imports a wide range of rice and rice products but the bulk of imports are either for 25 percent broken white rice, and parboiled rice. This is primarily from India, Pakistan, Myanmar, or transshipped through the Emirates from unidentified origins (GOG Customs 2014, ITC Trade Map 2015). Comparing the costs of domestic versus imported rice clearly requires comparing similar products.

For most widely consumed grades of rice, imported rice is 15 to 40 percent less expensive than domestic rice. Rice imported by Guinea is mostly poorer quality rice (greater than 25 percent broken, or 100 percent broken) sold at a discount over world prices; though there is a growing market for cleaned packaged white rice (either 5 percent or 25 percent broken grains.)

Globally, demand for rice is rising faster than demand for other staples and this will likely drive an upwards price shift for milled rice for years to come. This is driven by the following:

- Rice is a staple for nearly half of the world's seven billion people.
- Growth in demand is driven by rising population, incomes, and urbanization. Population and urbanization continue to shift consumer preference to rice over other grains and starches.
- The International Grains Council (IGC) expects global rice consumption in 2014-15 to increase around 482 million tons, up about 1.2 percent from around 477 million tons in 2013-14; due to expected increased consumption in Asian countries, sub-Saharan Africa, and the Americas.

Rising global demand is expected to outpace global supply, which will drive up the prices of imported rice in the medium term. This will strengthen incentives for domestic production.

Table 10: Rice Imports, Guinea, 2013-14

Year	Guinea rice imports	
	Quantity (tons)	USD
2013	235,657	237,573,743
2014	290,713	294,300,174

Source: DIRECTION GENERALE DES DOUANES, requested data.

Table 11: Rice Stocks, Guinea, 2009-14

Republic of Guinea, Rice stocks	
Year	Beginning Stocks MT ('000s)
2009	50
2010	50
2011	75
2012	90
2013	145
2014	130

<http://www.usda.gov/wp/>

¹⁴ Sources within the Ministry of Agriculture suggested that actual imports of rice are in the area of \$300 million/annually

2. REGIONAL MARKETS

All West African countries are net importers of rice, so very little paddy flows into Guinea from neighboring countries. However, Mali probably exports small quantities of milled rice into Burkina Faso and Mauritania. Despite the importance of rice to the Guinean economy, domestic production will not keep up with domestic demand, let alone regional demand, over next few years without a dedicated shift to more intensive production and processing systems.

Estimated Annual Rice Consumption, Republic of Guinea (2013), ('000 Tons)

Production + Imports + beginning stocks – ending stocks
 $1,852 + 236 + 14 - 130 = 2,103$

3. NATIONAL AND LOCAL MARKETS

Three factors influence demand for rice in a country: population growth rate, urbanization and income growth. Because rice is considered a superior starch, as incomes rise, households will shift from tubers like cassava and taro towards rice. Urbanization also will increase demand for rice because urban households spend more time working outside the household and have less time to prepare food. The cooking time for rice is less than that for cassava so urbanization will likely drive a further demand shift towards rice. Urbanization puts a double demand on the domestic rice sector because, as the demand for rice increases, the number of households in rice production will likely fall. Current estimates of urbanization is over 3.8 percent annually, suggesting a doubling of the urban population in the next generation (18 years). Regarding population growth, at current growth rates (2.5%), Guinea’s population will double in 28 years. Guinea’s annual per capita rice consumption is estimated over 170 kg per capita (United Nations 2014). Based on population alone, demand for rice will double in 27 years.

KEY TAKEAWAYS

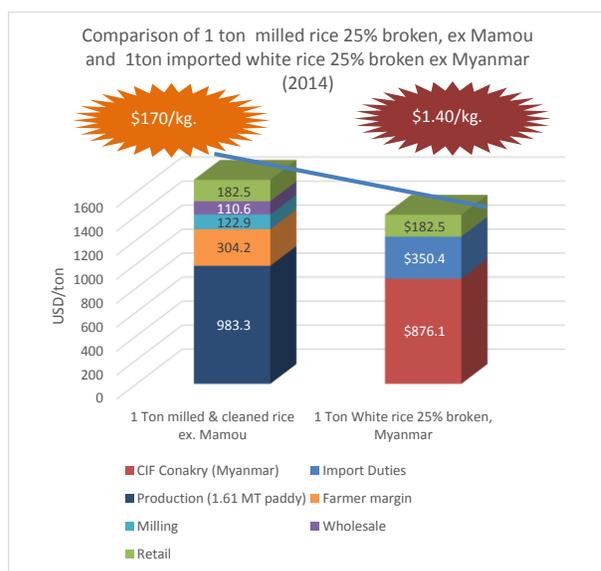
- Without a significant shift towards intensification of rice production, Guinea’s domestic production will continue to stagnate;
- Domestic demand for rice will continue to grow at close to 6% annually, doubling in 12 years.

C. WATERFALL ANALYSIS

Figure 19 illustrates a comparative waterfall analysis. Guinea is not competitive in rice production. In the past three years, productivity has risen from 1.01 to 1.1 ton/ha of paddy, primarily as a result of increased fertilizer use. Global yield averages are four times as high. As a result, imported rice sells in local markets for approximately 80 percent of the cost of domestically produced rice, and this is with a substantial import duty (40 percent).

Significant investment in increased productivity and milling efficiency is essential if Guinea has a chance of becoming competitive, even with the benefit of high import tariffs. Expected increases in global prices will help Guinea’s competitiveness but will hurt its forex bill. The very low levels of land under irrigation are a concern. The highest rice yields require a high degree

Figure 19: Rice Waterfall Analysis, Milled, and White Broken, 2014



Source: Custom's Authority Data and field interviews

of water control that only irrigation can ensure. Irrigation infrastructure investment for rice production costs in the range of \$4,000-\$10,000/ ha. This is a level generally outside the range of private investors.

D. PORTER'S FIVE FORCES

Bargaining Power of Suppliers The economic agents in Guinea's paddy rice value chain enjoy the advantage of a domestic consumer that prefers local parboiled rice over imported rice, and willingly pays 15 to 25 percent higher price for it. If it were not for high duties, the price gap would be greater, and consumer preference would be expected to favor the less expensive imported rice. Domestic parboiled rice prices are comparable to yellow maize prices. As long as strong tariffs remain, market power remains with domestic suppliers.

Threat of New Entry Guinea desperately needs new entrants in the paddy rice sector—new entrants that can bring industrial production technologies, high yielding seed varieties, mechanized traction and commercial milling—if it hopes for domestic production to keep pace with growing demand. In this sense new entrants are more of an opportunity than a threat. New entrants will not be a threat to current small-scale producers until, or rather unless, domestic production begins to exceed domestic demand. This is not expected for a long time to come. The absence of industrial-scale rice producers in Guinea today begs the question as to why there are none. Current barriers to entry in the form of barriers to accessing appropriate land and costs, and delays in registering a business, as well as uncertainty about Guinea's longer term stability, may well be keeping new entrants out.

KEY TAKEAWAYS

- High import duties and consumer preference for local rice protects domestic producers;
- Mid- to longer-term competitiveness of the domestic rice industry requires an opening and expansion of private seed and input markets as well as incentives for large-scale commercial production and milling centers.

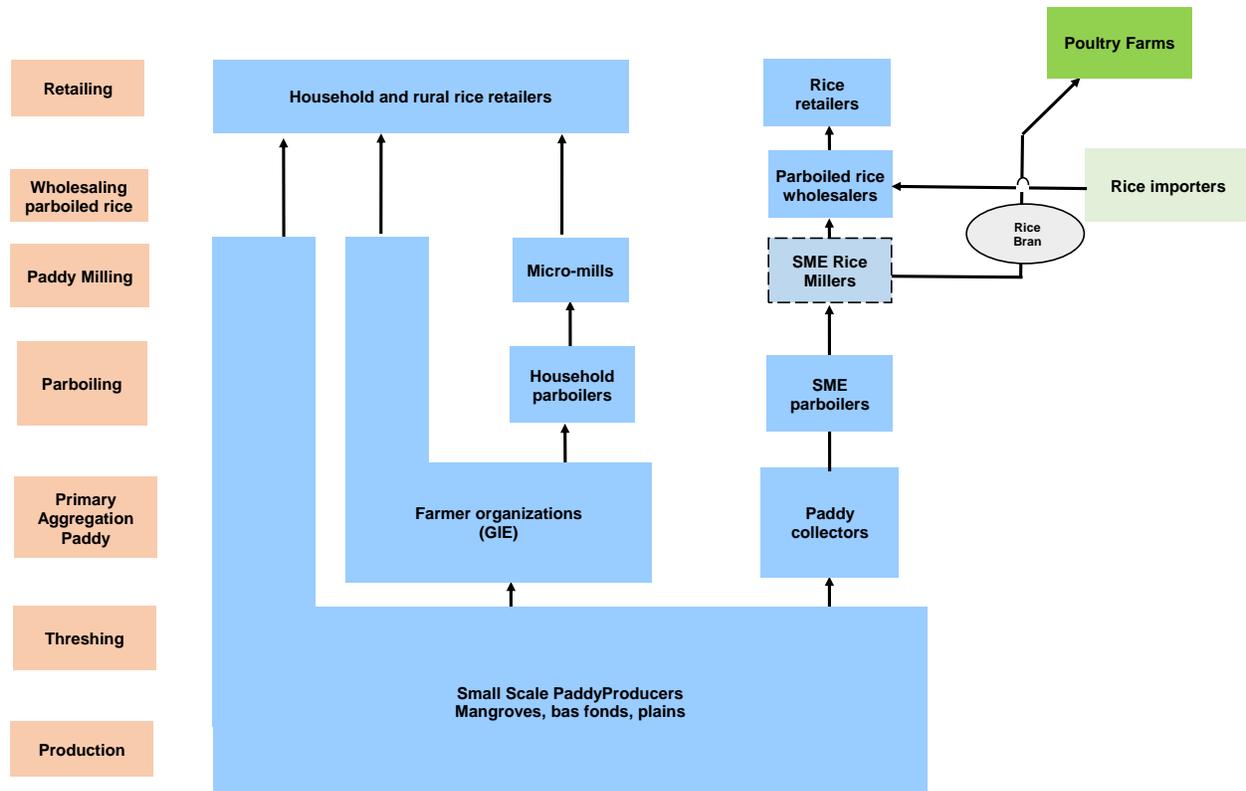
Bargaining Power of Buyers Domestic rice prices are driven by low levels of productivity. Imported rice prices are lower than domestic rice, but well above global averages, as a result of high duties placed on imported cereals. Consumers have little bargaining power to drive down price.

Threat of Substitutes Guinean rice is currently threatened by cheaper global exports. With one-fourth of the average global paddy productivity, and costly inputs, it is consumer preference for domestic parboiled rice, and the relatively high duties and tariffs, which limit imports. Guinea will continue to increase rice imports unless there is a significant policy shift to attract private investment in improved rice production from seed to milling.

Rivalry among Existing Players There is no evidence that rivalry among producers or other value chain actors in the rice sector is driving down prices. Almost all rice producers are small scale using basic technologies. Inputs and equipment services are seriously limited and the lack of competition (rivalry) in these services is driving up the cost of them to farmers. Though the LEO team did not find any commercial threshing services, the team was anecdotally informed that there were mechanical threshing service providers, and that they charged one bag of paddy for every six bags threshed paddy. In neighboring Mali, with a much more robust threshing service market, threshers charge one bag of threshed paddy for every nine bags threshed.

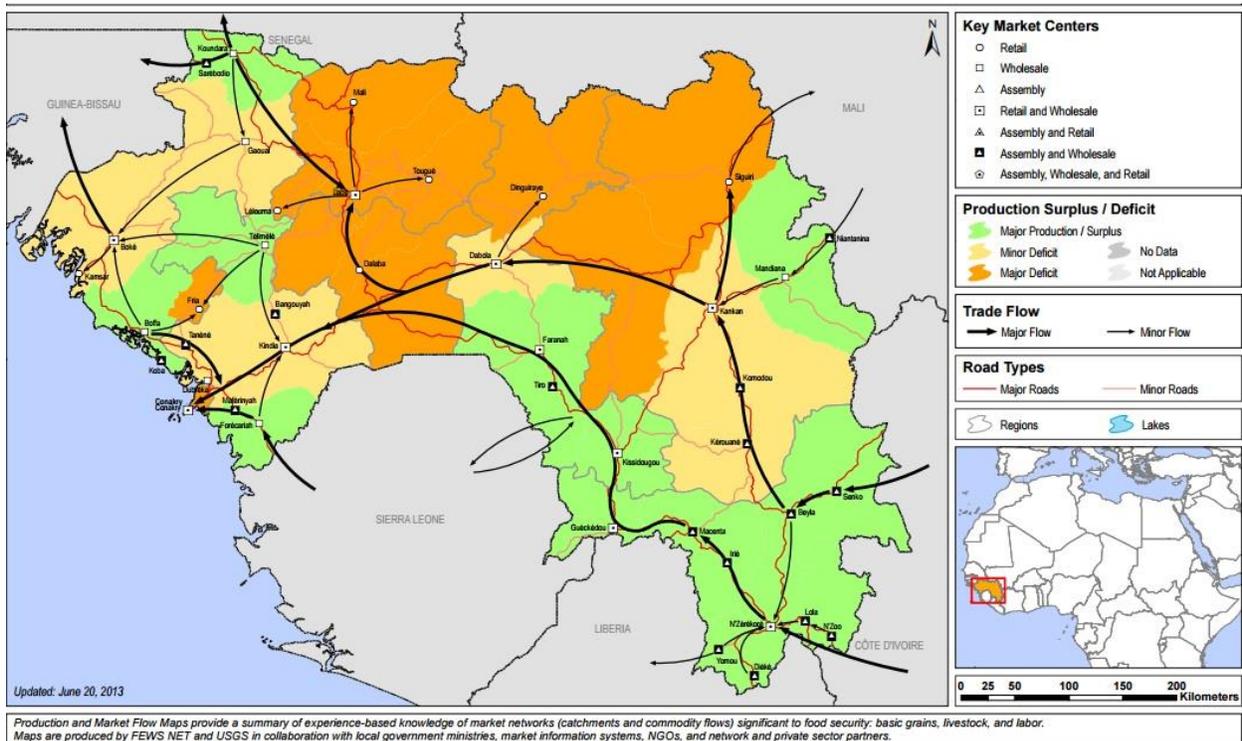
E. VALUE CHAIN MAP

Figure 20: Rice Value Chain Map, Guinea



The paddy rice value chain in Guinea is dominated by very small-scale actors using very low levels of technology. The largest number of these producers produce on less than one hectare of land and their expansion is limited by the amount of land that they can cultivate in a day. As the map indicates, most producers thresh their own paddy, on the field. There are a number of producer organizations, some of which provide services in addition to basic aggregation, including parboiling and milling services. There is also a much smaller number of more commercially oriented rice farmers growing on larger plots, using a tractor rather than animal traction, and selling to regional wholesalers with access to more industrial parboilers. Some of the better-organized producer organizations also provide tractor, threshing, parboiling and milling services to their members. The dashed line in the map for commercially SME millers (8 to 20 MT/hr. capacity) indicates that the LEO team could not identify any, though SME and large-scale millers are often the key change driver in the rice value chain. A number of small millers sell the husks and bran to poultry operators as floor cover and feed respectively.

Figure 21: Rice Trade Flow Map, Guinea



F. ACTORS

1. RETAILERS

The predominant rice retailer is a small shop keeper in a rural or urban setting who sells a range of consumer food and household items. Rice is sold in bulk without packaging, allowing customers to see the product and purchase in any quantity desired (see text box below). There is a much smaller but rapidly growing number of modern retail shops that sell well-packaged and labeled products. The rice sold by these retailers is cleaner and freer of stones, rice powder and husks. With the exception of one union mentioned below, that is fully integrated from harvest to wholesale, all of the packaged rice that the team found in retail shops was imported.

2. WHOLESALERS

Most rice wholesalers deal in multiple commodities, selling maize, fonio, groundnuts, and, in some cases potatoes. Wholesalers purchase from village-level collectors who in turn buy from small farmers. Larger wholesalers purchase paddy or milled rice from individual GIEs or unions, depending on whether the GIE or union mills its own paddy. Wholesalers own or rent storage facilities to hold their stock. In some instances, unions with excess storage capacity rent out warehouse space to wholesalers. Wholesalers are the principal agents who move large volumes of paddy from surplus production zones to

Small scale private rice mill



Source: LEO Assessment team

deficit zones, see figure 21 (FEWSNET 2013e). Large-scale importers comprise another group of wholesalers. Most of the importers contacted during this study also sell domestic rice.

3. MILLERS

Most rice mills are very small scale using small diesel mills that can process 500 to 1,000 kg/hour. These mills lack cleaners and sorters, so they are unable to separate broken from whole grains, fail to remove stones, and a significant amount of chaff and bran get mixed in with the milled rice. The rice milled in these mills requires substantial manual winnowing after milling. Figure 21 shows a mix of broken and whole grains, discolored grains and foreign matter from a small-scale mill. A few donor- or government-supported unions have access to improved rice mills. The one identified by the LEO team was a gift to a GIE. These mills tend to have a higher capacity, two to four MTs/hour; and come with a blower to remove chaff and powder, a cleaner to remove stones and foreign matter and a sorter to separate broken from whole grains. The unions owning these improved mills tend to be integrated vertically, and parboil and package the milled rice in consumer-ready one and five kg bags. The team did not audit this cooperative so it is not clear whether they are covering depreciation and amortization of the initial investment and will therefore be able to sustain the mill over time. The LEO team was unable to identify any SME scale *mini-rizeries*, at the 8-20 MT/hour capacity. Commercial-scale mills are the most common change driver in the rice sector. Commercial scale millers begin to insist on varietal control from their farmers to reduce broken grains. As a result, they begin to develop more complex relationships with farmers and begin offering embedded pre-financing of seed and other input services.

Milled rice sample from small private mill



Source: LEO Value chain assessment

4. PARBOILERS

Most of the parboiling in Guinea is carried out by women paddy farmers, or women who contribute labor to their husbands' farms. Once paddy is threshed, it is bagged and stored in the house or, in some cases, in a grain storage structure within the household compound. Paddy is parboiled in small batches in traditional cooking pots called *marmites*, for household use; and to convert to cash as part of a household liquidity management strategy in which temporary surplus and livestock are used as savings and sold when the household needs cash. From the post-harvest to processing perspective, parboiling offers two additional advantages. Paddy rice grains are very susceptible to cracking and breaking (fracturing). Fracturing reduces the value of milled rice by 30 to 50 percent. Minimizing post-harvest fracturing generally requires harvesting at very precise moisture levels (15.5-18 percent depending on variety), to minimize fracturing. Milling is the second point at which rice grains fracture. The biggest cause of fractured grains from milling is the miller's inability to control for the variety of paddy being milled. Every variety of paddy has its own milling characteristics,

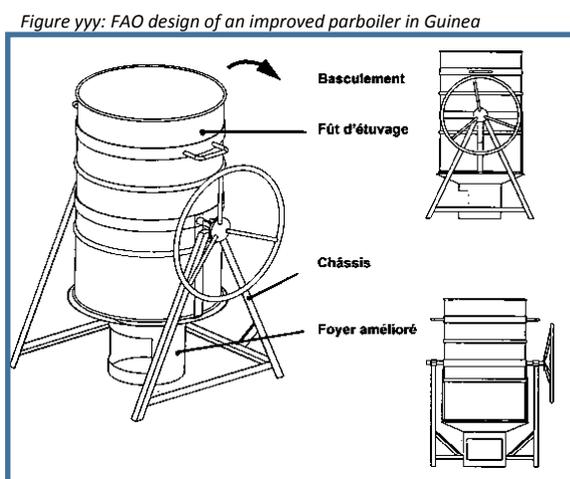
Figure 22: Rice Parboiling Equipment



Source: APRAO/FAO

and mixing varieties results in poorly milled rice with a high rate of broken grains. While the LEO team did not find improved parboiling equipment, FAO has been working in Guinea to introduce improved small-scale parboilers similar to the design in figure 23. These parboilers are simple and inexpensive enough for an individual small-scale parboiler or a women's parboiling GIE to own. FAO's estimated gross margins from parboiling ranged above 60 percent, but for small amounts. These simple but improved parboilers can save women a considerable amount of labor and drudgery while earning a respectable profit. One of the constraints to the expansion of these improved parboilers is the absence of a developed supply chain for equipment developed by domestic blacksmiths, welders and machinists for more sophisticated equipment.

Figure 23: Improved Rice Parboiling Equipment, Guinea



Source: <http://www.fao.org/wairdocs/x5430f/x5430f07.htm> Rice Transformation in Guinea

5. PRODUCERS

Almost all paddy rice in Guinea is produced by small-scale farmers on less than one hectare of land. The LEO team found no large scale irrigated rice production in Guinea, unlike in neighboring Mali, though there is at least one large paddy producers union with over 30,000 members

For the most part, land is cultivated using animal traction. A pair of oxen can plow 0.25-0.5 ha. per day of paddy fields depending on the soil structure and how wet it is. Animal traction is the major constraint to expansion for most small-scale paddy farmers because plowing services are scarce or unavailable in most places. In the plains and receding flooded areas, farmers generally broadcast seed, though some do transplant from nurseries. Broadcast seeding uses about 80kg of seed/ha and yields 800kg to 1.2 tons of paddy/ha.

Most paddy farmers in the plains or *bas fonds* cultivate two crops a year; rotating rice with maize, potatoes, and/or groundnuts. There is a slowly emerging set of producers who are operating on a larger and more commercially viable scale. These farmers have acquired more land to cultivate. Once a farmer acquires more than a few hectares, she or he must switch to mechanical traction using either a walk behind moto-cultivator or a small tractor for yet larger plots. Farmers who acquire a tractor quickly learn to maximize this asset by offering tractor services (plowing, hauling) to neighboring farmers. These larger commercial farmers become service providers offering extension services, and tractor services. The LEO team did not find any larger farmers who were pre-financing inputs to their neighbors, but this is a possible next step in this evolutionary process. Each of the larger producers interviewed during this assessment were members and leaders of their GIEs and unions, and provided services to other members, and occasionally to members of other GIEs within the same union.

KEY TAKEAWAY

Larger and more commercial farmers within the Union structure could develop into more formalized extension and input service providers to other members of their GIE and Unions.

Mme. Diakit . Parboiler and paddy farmer. Madame Diakit  is a small-scale rice farmer and parboiler. She parboils her paddy because consumers prefer parboiled rice, and parboiling helps reduce broken grains during the milling process. Like most small-scale paddy producers, she parboils her own paddy because there are no commercial parboilers that she is aware of. Most of the parboiling is done in very small quantities in 20-40 liter marmites. These marmites are ubiquitous throughout West Africa and are artisanally manufactured from recycled aluminum. One of the sources of this recycled aluminum is old car batteries. It is not known to what extent heavy metals from the batteries remain in the marmites, or whether these metals leach into the products prepared in this marmites. In neighboring Mali, parboiling is a small-scale commercial activity run by women who purchase paddy from farmers and parboil it in 200-liter steel drums. Once she parboils her paddy she keeps some for her household and sells the rest for cash. She estimates that her family consumes about 500kg of milled parboiled rice per year.

Madame Diakit  grows paddy on a small plot in a *bas fonds*, and estimates her plot is about one half a hectare. She also plants *riz coto* (upland rice). She does not buy seed but uses seed that she saves from the previous year's harvest. She broadcast plants using about 50kg of seed paddy, which is a bit more than recommended for a plot of that size (50-80kg/ha). From what she plants, she harvests about 500 kg. This is not enough to fulfill her family's needs in rice but she still sells some from time to time to meet cash needs, and purchases rice later in the year with funds from other activities. Madame Diakit  does not usually use fertilizer nor any crop protection inputs; they are too expensive and she does not have access to inputs distributed by the DRA.

Table 12: Rice Production Income Statement, Guinea

Compte d'exploitation pour la production d'un hectare(1) de Riz					
N°	Désignation	Unité	Quantité	Prix unitaire	Prix Total
I	intrant agricole				
1	semence	kg	80.00	5,000.00	400,000.00
2	Engrais organique (Fuente)	sacs	-		-
3	Engrais NPK	kg	200.00	2,700.00	540,000.00
4	Herbicide total+ selectif	L	10.00	30,000.00	300,000.00
5	Emballages	sacs	40.00	3,000.00	120,000.00
	Sou-total				1,360,000.00
II	Petit outillage agricole				
1	Houes	Forfait	10.00	35,000.00	350,000.00
2	Brouettes				-
3	Pulvérisateur à dos		1.00	200,000.00	200,000.00
4	Moto Pompe				-
	Sou-total				550,000.00
III	Main d'œuvre				
1	herbicideage	h/j	1.00	150,000.00	150,000.00
2	labour (charrue)		4.00	100,000.00	400,000.00
3	Herssage	charrue	2.00	100,000.00	200,000.00
5	Application fumure	h/j			-
6	semis riz et épendage NPK	h/j	2.00	30,000.00	60,000.00
7	irrigation	h/j			-
8	Entretien avec Herbicide selectif	h/j	1.00	150,000.00	150,000.00
9	Récolte/ Transport bottes	h/j	20.00	30,000.00	600,000.00
10	Battage/Vanage/Ensachage	h/j	20.00	30,000.00	600,000.00
11	Transport	sacs	40.00	5,000.00	200,000.00
	Sou-total				2,360,000.00
	Chffres d'Affaires				4,270,000.00
	Résultat Gros				1,910,000.00
	Marge Gros				81%

RICE PRODUCERS UNION

The Federation des Unions de Producteur de Riz (FUPRORIZ) was founded in 2009 with six producer unions. They now have 118 rice producer unions throughout the Kankan region, and 3 unions in the Faranah region. FUPRORIZ currently has 39,000 members who manage about two hectares each. They are managed by a fifteen-member administrative council and a technical oversight committee.

FUPRORIZ's technicians learn and address their producers' technical needs related to input use, processing, equipment, training, packaging, and storage on an annual basis.

FUPRORIZ has both government and private sector partners. Ministry of Agriculture technical agents oversee and advise FUPRORIZ on their production methods. The private sector and rice buyers oversee their rice processing. FUPRORIZ contracts shipping of their rice with the Syndicate of Transportation.

FUPRORIZ purchases seeds for their members; and process and sell their members' rice as a federation, dividing the proceeds among their members.

Local consumers purchase rice on short-term credit, enabling FUPRORIZ to sell their rice in a timely fashion. FUPRORIZ sells its rice to the World Food Program under their Local Purchases Program. WFP distributes the rice to people displaced to the Ebola crisis.

FUPRORIZ has problems with poisonous weeds, and seeds that are not adapted to Kankan's eco-system. They have difficulty managing water in the rice plains, which causes flooding of their rice crops. They need to introduce mechanized equipment to reduce their workload and increase their production and revenue. This causes women producers to have to work harder to produce their rice. FOPRORIZ needs storage facilities to keep their surplus rice.

Local buyers do not purchase the variety of paddy rice that FOPRORIZ's members often produce. Despite these constraints, FOPRORIZ is very ambitious, and would one day like to export their rice throughout the sub-region. FOPRORIZ has issued an RFA for a company to prepare 30 ha of land in Kankan. FOPRORIZ is trying to purchase a processing machine to process their rice.

In addition to the World Food Program, FOPRORIZ partners with a consortium of Italian NGOs, various government departments, and private companies. FORPRORIZ has a line of credit with RAFOC/Sigruiiri, and has plans to purchase a rice mill.

IX. VCA: GROUNDNUTS

A. OVERVIEW

In Guinea, groundnut production is the fourth most important crop in terms of area planted, after rice maize, and fonio (GOG ANASA 2015 and n. d.). In 2014, 422 thousand tons of groundnuts were produced by 677 thousand farmers, with average yields of 790kg/ha (Table 13). Groundnut production has increased at an average rate of 7 percent annually, predominantly from an increase in area planted, and in response to market and government signals to plant more. The regions included in this assessment, Kindia, Faranah, Mamou Kankan, and N’Zerelore, are responsible for two-thirds of all groundnut production in Guinea.

KEY TAKEAWAYS

- Groundnuts are an important food and feed crop.
- Guinea’s groundnut productivity is low but profitable due to barriers against groundnut imports.
- Production could be increased significantly through optimal plant spacing, improved seed access and appropriate input use.
- Within the groundnut system, *input suppliers* are the most likely change driver.

It is important to realize that there is not an either or decision regarding groundnut production in Guinea. Farmers who produce groundnuts have not chosen not to produce maize, rice, or fonio. Groundnut production, rather, is an important part of a larger rotation scheme practices by farm households. Most farmers are aware that groundnut production boosts soil fertility, as well as serving as a cash crop.

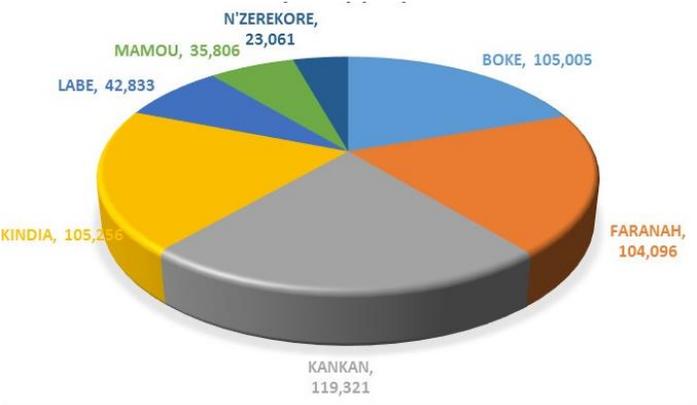
Table 13: Groundnut Production, Guinea, 2009-15

Variable	09/'10	10/'11	11/'12	12/'13	13/'14	14/'15 Ebola effect
Area ('000 ha.)	400,131	442,775	470,372	477,156	484,037	535,378
Yield (tons/ha.)	0.75	0.75	0.75	0.75	0.75	0.79
Production ('000 tons)	300,098	332,081	352,779	357,867	363,028	421,703

Source: Republic of Guinea, Ministry of Agriculture, Agence National des Statistiques

Groundnut is rich in oil and protein, and has a high energy value. It can be eaten raw, roasted or cooked; and the flour is an ingredient in many foods. In Guinea, groundnuts are consumed raw, roasted as a paste in sauces, and as a cooking oil. When peanut oil is extracted, its principal byproduct is groundnut cake, which is a valuable input and animal protein substitute in poultry feed. Groundnuts provide 13 different vitamins, especially A, the B group, C and E, along with 26 essential trace minerals, including calcium, iron, zinc and boron, and dietary fiber (Nutrition Data 2015). Relief agencies supply groundnut pastes to alleviate malnourishment in droughts and famines, particularly for children. Ground\nut hay is a valuable hay for fattening sheep, though not widely used in Guinea.

Figure 24: Groundnut Plantings by Region, Ha, Guinea, 2014



Groundnut is prone to the fungus *Aspergillus flavus* that produces aflatoxin, a group of toxins that occurs naturally and can be harmful to humans and animals in large amounts. While Guinea is not a net exporter of groundnuts, if production efficiency grew significantly, aflatoxin levels would be a concern for exporters. Aflatoxin levels may well become a concern for the poultry sector as aflatoxin in poultry reduces food intake and weight gain. Guinea does not have domestic aflatoxin testing capacity. Aflatoxin levels can be mitigated with better post-harvest handling techniques.

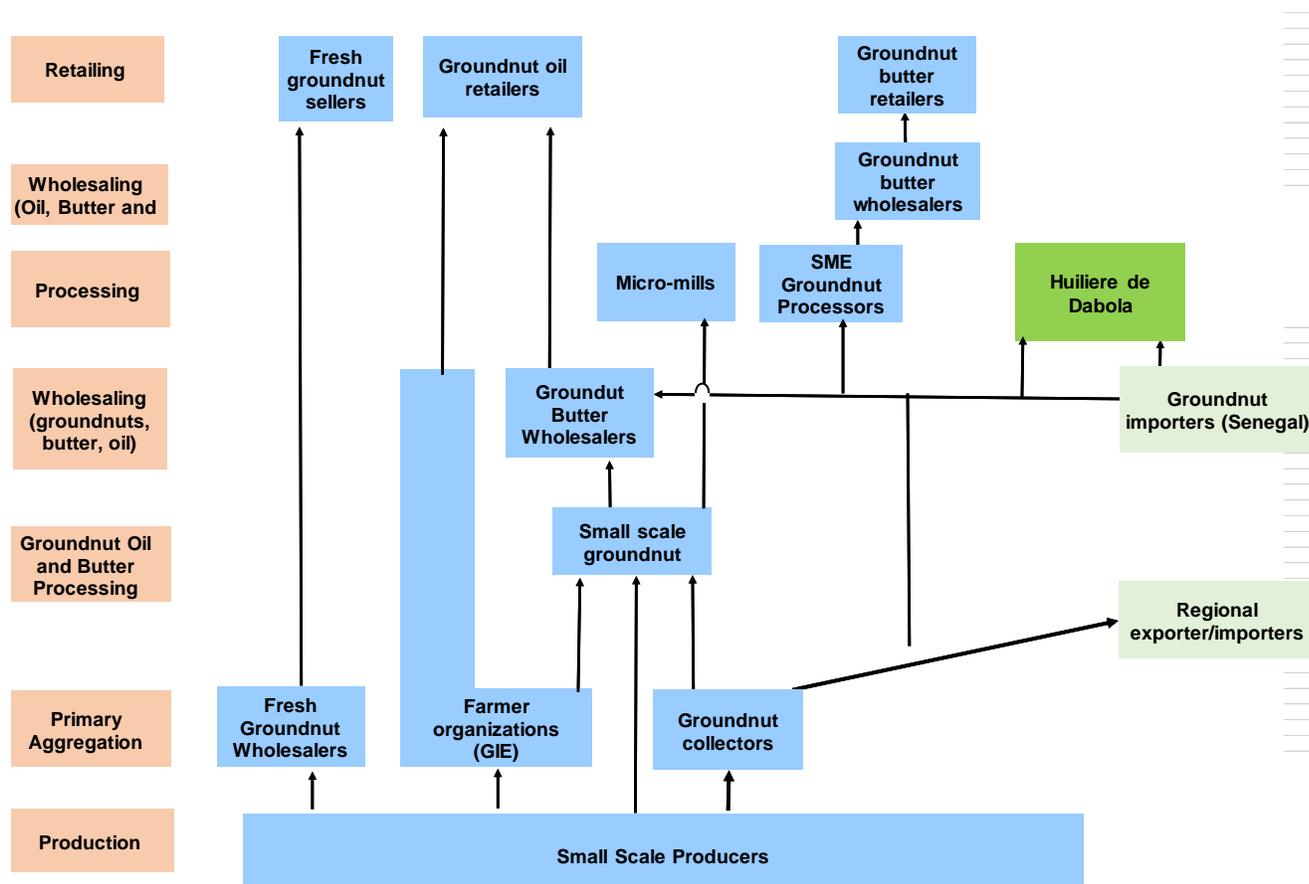
Although sub-Saharan Africa has 40 percent of the total area planted with groundnut, it produces only 25 percent of total world production and nut quality is poor (ICRISAT 2015). Yields are half of the 1.8 metric tons a hectare in Asia, and an average global yield of 1.56 metric tons a hectare in 2010. The MOA reports groundnut yields in Guinea as 0.75 tons/ha over the past five years, though for the 2014-15 season, yields reached 0.79 tons/ha (GOG ANASA 2015 and n. d.). Consistent across all crops, there does not appear to be an adverse Ebola impact on yields, but rather on farmers being able to move their product from the field to market. In the West Africa region, one of the main reasons for low yields and poor quality is drought. This is not the case in Guinea however, where low yields result from poor crop spacing and the lack of fertilizer use. In a recent MOA study, no groundnut farmer reported using fertilizer, particularly phosphate, on their groundnut crop (GOG ANASA 2015). There is a common assumption that because groundnuts are nitrogen fixing, they do not require fertilizer, though phosphate application has been demonstrated to boost groundnut yields.

Similar to maize and rice, the team found minimal use of animal or mechanical traction with most fields cultivated by hand. Though Guinea has abundant land, the farm size constraint appears to be the amount of land that a farm household can till in a single day.

Guinea is not a net exporter of groundnuts; it imports from Mali and Senegal. It does, however, export to Liberia and Sierra Leone. The trade volumes in groundnuts into Guinea from Senegal, and out of Guinea into Liberia and Sierra Leone, are not nearly as well documented as customs figures from sea and airports. Thus, the LEO team could not estimate net flows.

B. VALUE CHAIN MAP

Figure 25: Groundnut Value Chain Map, Guinea



C. END MARKET ANALYSIS

1. GLOBAL MARKETS

Guinea produces most of its groundnuts. A small percentage of its groundnuts are imported from neighboring Senegal. Guinea's producers in Dabola, Faranah and other regions of Guinea export a percentage of their groundnuts to neighboring Sierra Leone and Liberia. Groundnut is grown on nearly 23.95 million ha worldwide with the total production of 36.45 million tons and an average yield of 1520 kg/ha in 2009 (FAOStat 2011). China, India, Nigeria, USA and Myanmar are the major groundnut growing countries. Groundnuts have historically been one of Senegal's

Figure 26: Groundnut World Market Prices



Source: IMF Primary Commodity Prices as posted on IndexMundi <http://www.indexmundi.com/commodities/?commodity=peanuts>

gal's principal exports in unshelled, shelled and expressed oil form. Developing countries in Asia, Africa and South America account for over 97 percent of world groundnut area and 95 percent of total production. Production is concentrated in Asia (50% of global area and 64% of global production) and Africa (46% of global area and 28% of global production), In Guinean like most of the world, groundnuts are grown mostly by smallholder farmers under rainfed conditions with limited inputs.

2. NATIONAL AND REGIONAL MARKETS

Groundnut is among the main crops produced in Guinea, both economically and nutritionally. Groundnuts are widely consumed whole, shelled, processed into paste and expressed as peanut oil and oil cake for the poultry feed industry. Domestic groundnut cake is the most widely consumed substituted for animal protein in poultry production. The parastatal Huilerie de Dabola is the single largest buyer of groundnuts in Guinea. The government of Guinea is promoting groundnut production to allow the Huilerie de Dabola to reach full capacity with target production of 100,000 liters of oil annually.

As figure 28 shows, the main groundnut growing areas are: Boke, Kankan, Dinguiraye, N'zerekore and Faranah (FRWSNET 2013c). Annual groundnut production is increasing at an average of 7 percent (GOG ANASA 2015 and n. d.). This increase is mainly due to the rising number of producers involved; almost all households in Guinea cultivate some groundnuts in all agricultural zones

Figure 27: Groundnut Global Yields

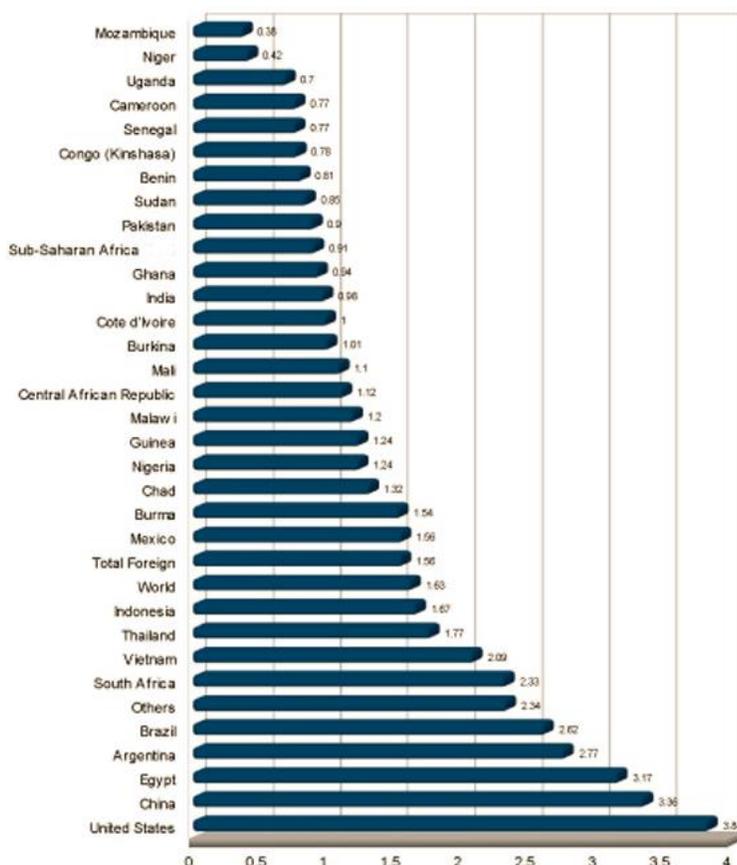
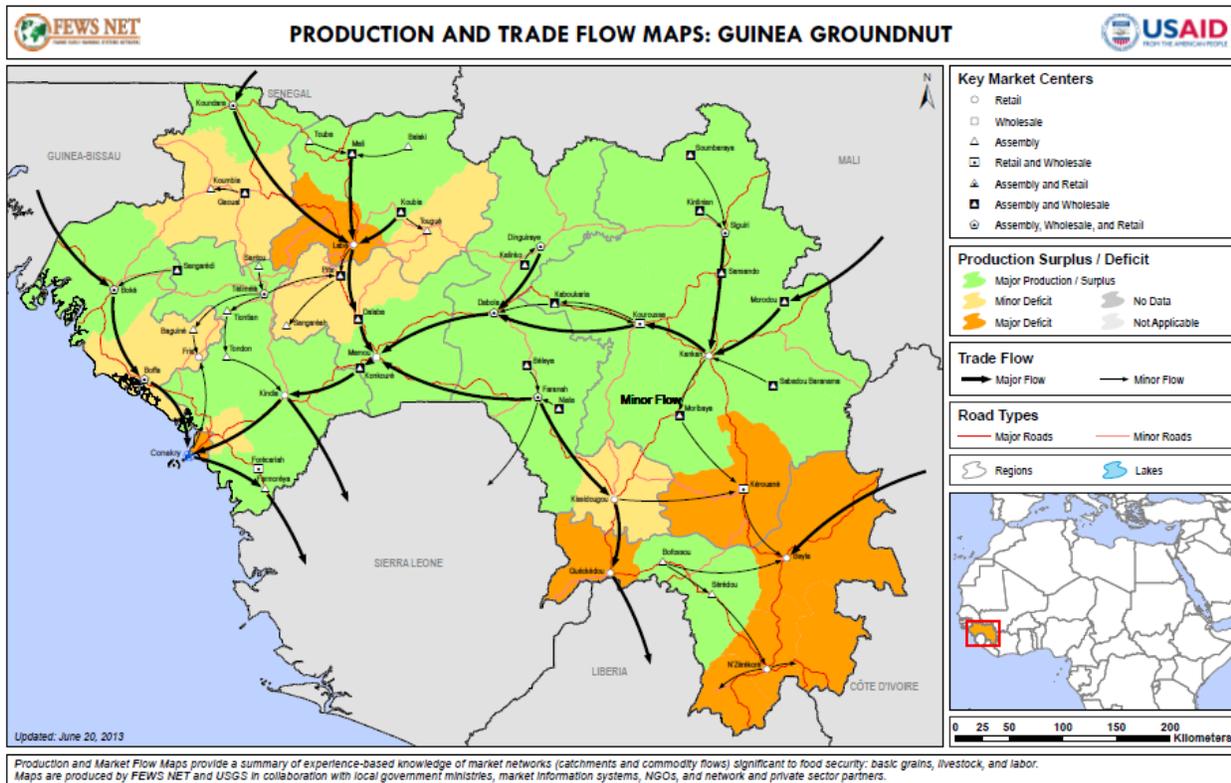


Figure 28: Groundnut Trade Flows, Guinea



3. LOCAL MARKETS

Groundnuts are sold locally by individual producers to federations and Guinea’s national groundnut oil company, Huiliere de Dabola. Federations like the Cooperative des Producteurs d’Arachide de Karite et de Miel (COPRAKAM) assist farmers in marketing and adding value to groundnuts. Groundnuts are widely grown in Dabola, where the groundnut oil factory is located, and other regions of Guinea. COPRAKAM links groundnut farmers to the processing factory in Dabola. Many women’s groups engage in groundnut processing. Groundnuts are processed into groundnut butter, which is one of the most viable small-scale processing activities in Guinea. In Dabola, the Guinea value chain research team visited two small scale groundnut processing firms. Groundnut butter is sold to families, workers at nearby gold mines, and to producer federations for sale into Conakry and other towns.

D. WATERFALL/GROSS MARGIN ANALYSIS

The LEO team was unable to collect reliable production cost data for groundnut production, processing and marketing in Guinea. In 2014, Guinea reported an estimated 830 tons of groundnut imports, primarily from Senegal, for an average price of \$1,038/ton (GOG Customs 2014 and ITC Trade Map 2015). This cost was substantially higher than domestic groundnut prices at harvest (see table 14). The scarcity of storage facilities near the farm gate cause

groundnut prices to rise substantially however and seasonal variation can double prices at the farm gate. Poor storage, and tariffs and duties, help ensure the profitability of domestic groundnut production. Without these, the long term profitability of groundnut production without improved production practices, is in question.

With improved practice, quality seed and appropriate fertilizer, Guinea could increase its yields by 60 to 80 percent, which would make Guinea a competitive ground nut producer. Additional farmer income from the sale of groundnut hay for sheep fattening would further improve profitability of groundnut production, but it is not currently used.

KEY TAKEAWAYS

- At current low levels of productivity the absence of a market for peanut hay for sheep fattening, the profitability of Guinea's groundnut production depends on sustaining import duties;
- Improved agricultural practice (plant spacing), with improved seed and input use could raise groundnut productivity 60 to 80 percent.

Table 14: Groundnut Prices, Guinea, July 2015

Item	Low	High
Wholesale (shelled)	7,000	7,500
Shelled (at harvest)	5,000	5,500
Farmgate (at harvest)	3,000	4,000

Source: Field Interviews, LEO, July 2015

E. PORTER'S FIVE FORCES

Barriers to Entry – There are no known barriers to entry in groundnut production, though lack of access to quality seed, information on good agricultural practices, and inputs continues to constrain yields.

Threat of Substitutes – The only potential substitute for groundnuts is soybean, which is not widely consumed or produced in Guinea. Guinea does import soybean cake for the poultry industry, and, at times when global prices of soybean cake are low, demand for imported over domestic groundnut cake is expected to rise. For human consumption, there are no clear substitutes for groundnuts.

Bargaining Power of Buyers – Falling global groundnut prices transfer bargaining power to buyers, as does the inadequate supply of storage facilities, which obligates growers to sell off their stocks quickly after harvest when domestic supplies are high. High import duties effectively level the playing field for producers except during times of depressed global prices. In the medium to long term, however, global groundnut prices continue to rise, offering further protection to growers and diminishing buyer bargaining power.

KEY TAKEAWAY

The Huilerie de Dabola is a potential change driver in that it wishes to source more supply to approach full production capacity. Currently production can continue to expand without intensification which will reduce incentives for the Huilerie to invest in improving farmer productivity, however.

Bargaining Power of Suppliers – Groundnut sellers with storage capacity and access to short term liquidity have substantially increased bargaining power because they can hold onto stocks until market prices rise several months after peak harvest. High import duties further protect sellers from relatively more competitive groundnut producers in the region, like Senegal and Nigeria.

Rivalry among Existing Players – There is no effective price rivalry among competitors. All groundnuts produced in Guinea are produced by smallholder farmers who lack the volumes that would allow them to exploit scale economies to reduce production costs. The same holds true for processing into groundnut paste. Almost all of this processing is very small scale with no single processor controlling sufficient volumes to impact price. At the peanut oil extraction level there is only one large scale industrial oil processor, with no internal competition.

F. VALUE CHAIN FUNCTIONS AND ACTORS

1. RETAIL

Groundnuts are sold onsite at processing facilities, and by producer federations at their marketing facilities. Groundnuts are sold at retail levels on roads, through producer groups; in local, regional and national markets; and at mini-markets and supermarkets in Conakry and major cities of Guinea. Women represent a large percentage of sellers at the market level.

2. WHOLESALE

Groundnut wholesalers in Guinea include medium-to large-scale commercial traders, cooperatives, women's groups, and agriculture federations, which are comprised of many groups. Commercial traders generally have a network of collectors who purchase directly from individual farmers or from their GIE or union. These groundnuts are sold to buyers in Conakry, Boke, Labe, Nzerekore and other major cities as well as exported into Sierra Leone and Liberia

3. PROCESSING

The vast majority of Guinea's ground nut processing is carried out at the village level using basic technologies, either manually using large mortars and pestles or mechanically using small diesel extractors. Women dominate the artisanal and small scale processing of groundnuts. There is only one industrial scale peanut oil processor, the parastatal Huilerie de Dabola, owned by the Government of Guinea and a French consortium (COPEOL) Current production is about 500,000 liters of oil but the Huilerie, with government support hopes to double that output over the next five years.¹⁵ The Huilerie de Dabola is the principal producer of groundnut cake, a sought out input for poultry feed. There are also an important number of artisanal oil extractors that use the oil extract for artisanal soap production.

GROUNDNUT PROCESSOR

Groupement Wakaly acquired three processing machines from the Association d'Entrepreneurs de Belgique Groupement after winning a contest sponsored by the Belgians. The group processes groundnuts into peanut butter, and maize into maize flour. Their processing capacity is ten sacks/day. They sell peanut butter at 500 GNF/kilo.

The group, which makes 350,000 GNF per season, is packaging their groundnut butter. They struggle to source packaging materials and spare parts for the processing machines in Dabola. Their mechanic travels from Dabola to repair their machines. Wakaly's Operations Manager, Madame Coumba Mara, has trained her son on machine maintenance, and has encouraged the group's members to train their youth to repair the machines to assure their continuous operation.

¹⁵ <http://mosaiqueguinee.com/2015/06/10/huilerie-de-dabola>

4. AGGREGATION

Aggregation of groundnuts in Guinea is carried out by the same set of actors as for all commodities. The dominant aggregation is carried out by the GIEs, and the unions of GIEs. There is also a substantial level of aggregation by small scale-traders, and by collectors who work as agents for larger commercial traders.

5. PRODUCTION

All groundnut production in Guinea is carried out by smallholder producers on small plots of land with an average farm size of 0.72 ha. These growers produce groundnuts in rotation with other crops. They use no commercial inputs, improved seed or fertilizer on their groundnut crops, though there are some who spray against pests. Almost all groundnut producers cultivate manually without the aid of animal traction or machinery.

Cooperative des Producteurs d'Arachide de Karite et de Miel (COPRAKAM) is a producers union of groundnuts, honey and shea butter producers. They have 110 groups representing 3,873 members, including 2,371 women producers. COPRAKAM is committed adding value to groundnuts, honey and shea butter, and improving market access for its members.

COPRAKAM links groundnut farmers to Huiere de Dabola, Guinea's only industrial-scale processing factory. In 2014, COPRAKAM distributed sixty tons of inputs to its members, which the Chambre d'Agriculture in Conakry provided on a loan basis. The farmers harvested and reimbursed COPRAKAM with 378 tons of groundnuts, which were provided to the Huilerie de Dabola to process into groundnut oil. In 2015, COPRAKAM received six tons of inputs from the Chambre d'Agriculture, which they donated to their members.

X. SERVICES

This section summarizes the set of services essential to transforming the performance of the commodity sectors covered in this report. These services include: inputs (veterinary, seed and other agricultural), equipment, extension, ICT, financial, and transportation services. Most of these service markets can be analyzed as their own value chains that intersect with the commodity chains analyzed in the previous section of this report.

Analyzing service markets as their own chain is essential to understanding why service markets operate well below their potential and far below the level required for the rapid transformation of the commodities covered.

Too often donors and governments keen on the rapid distribution of inputs, loans, and or equipment, procure these services outside of Guinea, and distribute them to farmers, bypassing domestic supply chains. As a result, when the project distributing goods and services ends, there are no after-sales repair and maintenance services, and no actors to continue to develop and distribute those services that were perceived as so important to the donor.

Following a market systems approach, the LEO team has attempted to understand the value chains that move essential goods and services from conception to their final consumer, e.g., farmers, traders and/or processors.

The LEO team observed that, with the exception of the financial services market which is reasonably robust, even if it serves a small percentage of the market, service markets are very weak, concentrated in peri-urban centers, with little or no active marketing to producers. There is minimal use of even basic equipment like threshers and shellers, and very few service providers who operate either on a cash or in-kind payment basis. There is very little provision of embedded services in which buyers offer extension, equipment, and pre-financed input services in order to secure larger volumes of better quality from their farmer suppliers. This suggests either very low levels of trust among value chain actors, and/or an expectation that these services will be offered by the government or NGOs, and thus there is no reason for private actors to enter this space.

The LEO team observed a number of policy bottlenecks to the improved provision of services. While service markets have been privatized, the LEO team identified only one registered and certified importer of veterinary products, and a similar virtual monopoly in the provision of agricultural inputs. There is an enormous seed bottleneck. While all ECOWAS (CDEAO) member states have ratified a common seed law; this law needs to be adapted to the local environment and in a manner that creates incentives for greater private sector investment in this market.

Throughout Guinea the overwhelming burden of weak service markets is borne on the backs and shoulders of women; as women provide most of the labor in basic transformation. Thus the absence of threshing, selling, and improved parboiling, equipment; and the lack of improved oil presses, all contribute to women's

KEY TAKEAWAYS

- Transformation of agricultural value chains requires robust accessible and available services;
- Women bear the principal brunt of weak service markets;
- There are apparent policy constraints in seed and inputs markets that limit competition;
- Private supply of locally made small scale equipment, threshers, shellers, presses, parboilers,..., is very weak;
- Private sector extension services are almost non-existent and public extension services are rapidly aging.

drudgery and take their scarce time away from food preparation and child care to spend hours each day performing tasks that could be achieved in a fraction of that time. The remainder of this section summarizes our understanding of these services.

A. SEED

Most of the seed available in Guinea are varieties developed and or multiplied by government research centers, (*Centres de production semencières*, CPC), SPECIA), with support from Consultative Group (CGIAR) centers, the FAO, and Sasakawa Global 2000. In some cases, the seeds being multiplied are 40-year-old varieties from neighboring countries e.g. *Opatampa* (white maize). The LEO team was unable to identify any improved high

yielding hybrids certified or in the process of certification. The largest input importer in Guinea, SAREF is not importing seed for food security crops (maize, rice and groundnuts). They stated that the processes for importing and obtaining certification these crops are not clear; though they would be interested in carrying and even supporting maize seed varietal testing and trials.

A 2006 USAID report stated that improved seed selection was only used on 7 percent of planted fields. There are a few unions that are authorized to multiply seed for the CPC, there is no evidence that any of this seed enters commercial channels.

Parliamentary ratification of the Seed Law's regulations and policies is a precondition for greater private sector participation in improved seed value chain. In some ECOWAS countries, regulations allow an enterprise to import seed certified elsewhere, for the enterprise's own use, as long as the certification rules are equal to or stricter than the ECOWAS rules,. This enterprise is still required to conduct trials and tests to obtain eventual certification. In the interim however, the enterprise can begin importing and multiplying the improved seed. Ghana and Nigeria have approved a number of high-yielding, open-pollinated and hybrid seed varieties. If these seeds could be introduced to, tested by, and multiplied (where trials succeed) by APROCA Unions, rapid scale up of improved seed would be possible.

KEY TAKEAWAY

Support to the Ministry of Agriculture in creating a process of drafting, and vetting policies and regulations to implement the Seed Law may be an opportunity for a quick win with the USAID mission.

CENTRE REGIONAL DE RECHERCHE AGRONOMIC DE BORDO (CRRA)

The Bordo Agriculture Research Center produces maize to finance its operations and trains farmers. They produce seeds and sell them to the Regional Seed Center in Kankan. Their research officers train producers on how to produce and multiply seeds.

CRRA maintains experimental farms with the Ministry of Agriculture's extension service, which trains farmers on producing seeds, and technical farming methods.

CRRA introduced two maize varieties: BRK473 (yellow) and *Opatampa* (white). Acquiring improved maize seeds is a big challenge that maize farmers in Kankan face to improve their maize yields. CRRA envisions Kankan farmers being well trained on how to plant improved seeds. Provision of inputs and supplying adequate quality and quantity of these inputs are a big challenge. CRRA links different maize value chain actors, such as producers and buyers, and communicates how producers can sell their maize to the market. For example, CRRA introduced maize farmers to a Federation of Poultry Producers in Mandiana.

The maize yields in Mandiana and Siguiri prefectures are 2.5 to 3 tons/ha. In the Kigneran sous prefecture yields are 4 tones/ha because they use improved seeds and organic inputs. CRRA would like to improve maize varieties to improve food security and child nutrition in Kankan region.

Constraints to producing maize in Kankan include the lack of mechanized tilling, threshing and de-husking equipment, and a lack of technical expertise among farmers. Insects also ravage maize that is stored, and poor roads are preventing farmers in high-yielding Kigneran to sell their maize; presenting added challenges.

The International Institute for Tropical Agriculture in Nigeria is experimenting with improved and enriched maize varieties. The Ebola virus outbreak has prevented CRRA from collaborating more with this project.

B. AGRICULTURAL AND VETERINARY INPUTS (NON-SEED)

Guinea has privatized its inputs sector. Private firms can apply for a license to import agricultural and veterinary inputs. Certified input companies are free to sell throughout the country. In addition to licensed input importers, there are a large number of unregistered "suitcase" importers who bring unapproved inputs for their own use or for sale to others. Despite the liberalization of the inputs sector, the LEO team could identify only one licensed agricultural inputs company, SAREF; and one licensed veterinary service importer, a Doctor Charles. SAREF and Dr. Charles have a retail presence in most of the regions visited. While input services are defined as private, in each regional and district agricultural and livestock office (Direction Régionales d'Élevage and Direction Régionales de l'Agriculture), the LEO team found a private input and veterinary supply office, in locations far removed from market centers where one would expect a private service provider to locate. The LEO team was unable to obtain a clear explanation of this pairing of public extension offices and private input providers.

The managing director of SAREF was enthusiastic about, and had a clear vision on how to establish a national network of decentralized agricultural input shops, which would be managed as a private business by retiring government extension offices since they possessed the technical qualifications (an agronomy degree) required to provide reasonable extension services (see box below).

SAREF – AREF ABOUKHALIL, DIRECTOR-GENERAL, ENGINEER HAWADI CAMARA

SAREF is Guinea’s largest agriculture input supplier since 1981. It also works in petroleum equipment, public health supplies and agricultural equipment. Their agriculture inputs include fertilizer, herbicides and insecticides. SAREF does not sell and multiply seeds due to the vague regulatory environment, a lack of cool chain for the proper storage of seeds, and conservation and storage issues. SAREF’s principal supplier is the agro-industrial company ALM, who is based in France and maintains a West Africa regional office in Abidjan, Cote d’Ivoire. SAREF’s main competitors are suitcase input sellers based in Conakry’s largest market, The Medina.

SAREF maintains a network of distributors at most *préfectures*, including one distributor in Nzerekore, Forest Region who grosses over \$1 million/year in input sales. SAREF trains their distributors and their sellers on technical aspects of using agriculture inputs. These distributors then train farmers throughout Guinea on how to use their products. SAREF has training materials of how to apply their inputs to maize, groundnuts and potatoes.

The government of Guinea by applies low customs duties of 2.5 percent to agricultural inputs, which is low compared to customs’ taxes of 10 percent in neighboring Cote d’Ivoire. SAREF does not offer credit to his distributors or farmers due to the complexity of collecting payments from farmers, whose income is seasonal and variable.

Mr. Aboukhalil believes that farmers’ lack of training and not following the proper application of SAREF’s inputs is hindering Guinea’s agriculture production, which is at least one ton lower per hectare for than other West Africa countries.

SAREF is keenly interested in expanding its input and extension outreach and would like to train agriculture producers in proper usage of inputs before they purchase them. Improper use of inputs reduces yields, increases input use beyond optimal levels and contributes to negative environmental externalities.

Mr. Aboukhaili has submitted a proposal to the Ministry of Agriculture offering to start a national training program to train government agriculture agents on the verge of retirement to operate private rural agricultural input shops and extension service centers.. These agents, many whom are on the verge of retirement, would then train farmers’ groups (Groupements Interet Economiques or GIE) leaders and model farmers. To date, he has not received a favorable response.

Guinea’s strong network of GIEs, cooperatives, unions, federations and the national confederations is a structure with which rural agri-input service providers could rapidly achieve outreach and scale. In a number of francophone countries with equally strong producer associations, Farmer field schools and other extension dissemination strategies have been very effective at scaling up private extension service delivery.

Vaccination rates below 50 percent, long distances between veterinary service providers, high mortality rates from Newcastle’s disease for poultry, the risk of avian flu reaching Guinea, and PPR, would suggest that Dr. Charles would share SAREF’s interest in discussing the development of deeper penetration of veterinary services, including extension. The challenge for a donor investing in this space, given the virtual monopoly of both these actors, would be how to expand the depth into rural communities and the quality of services

KEY TAKEAWAY

The two private sector agricultural and veterinary supply importers, are a powerful potential change driver if they were convinced to invest in establishing rural service delivery centers in a way that did not strengthen their monopoly position.

offered by rural service centers, while ensuring that new rural input service centers were independent and free to procure inputs from other providers as competition in this sector emerges. This might not be so difficult to achieve. These two firms have no real competition at this time. Establishing rural centers under their direct management requires a higher level of investment, and the maintenance of the rural centers as subsidiaries on their balance sheets; and effectively rules out access to donor funds to offset some of the startup costs of private rural service centers. Providing technical support and training to autonomous rural input firms moves start-up costs off the balance sheet of SAREF or Doctor Charles, and makes it possible to build these under a sort of private public partnership initiative.

C. FINANCIAL SERVICES

Guinea has a robust and diverse set of financial institutions, including commercial banks, microfinance institutions (MFIs), cooperative savings and loan institutions (mutuels), and non-bank financial institutions, principal of which are the insurance companies. Financial service penetration into rural communities is relatively deep at least to the district (sous-prefecture) level. Financial institution penetration in agricultural markets is much weaker however. This is consistent across most of the continent.

KEY TAKEAWAYS

- There is a considerable unmet demand for financial service in the rural and agriculture sector in Guinea.
- The Development Credit Authority may have greater flexibility to support initiatives better suited to agricultural lending than the current Ecobank agreement.

Commercial banks: One commercial bank, Ecobank Guinea, has negotiated a Development Credit Authority agreement with USAID Guinea. Ecobank holds a number of DCAs with USAID missions. Most of these are considerably underutilized and the DCA in Guinea is no different. Guinea's first private-sector bank, BICIGUI, has the widest branch network in the country and is providing agricultural equipment financing for medium scale enterprises. They also have made poultry sector loans.

In the MFI space, Crédit Rural (CR) and FinaDev are both making agriculture loans. Crédit Rural holds around 60 percent of the MFI market and provides trade, production, processing and equipment lease financing loans.

Given the size of rural production units, village based savings and loan initiatives are well suited to the savings and credit needs of rural communities. This assessment did not include a survey of all financial institutions so the team did not identify the extent of VSLAs. While CR's 45,000 loans out of 300,000 clients, the credit and formal savings gap can be estimated. CR's ratio of borrowers to savers of 15% is prudent. If the same ratio were applied to the population dependent on agriculture (70% of 12.5 million), estimated loan demand would exceed 1.3 million; a significant credit gap. Unmet savings demand is much greater and widely understood. The lack of reliable and trustworthy savings options are the reason that livestock, chickens, small ruminants and cattle, as well as temporary agricultural surplus are the dominant form of savings despite high mortality and post-harvest loss rate.

Given the sizable credit and savings gap in the agricultural sector, there is a sound rationale for expanding upon existing financial service delivery. The DCA mechanism has become more flexible over time with coverage of MFIs, leasing and even insurance services. Despite the very low utilization rate of the Ecobank DCA, this mechanism has considerable potential to incentivize improved financial service delivery in Guinea.

D. EXTENSION SERVICES

Agricultural and livestock extension services are provided by a decentralized pool of public and private sector providers. The actual number of extension agents covering agriculture and livestock, therefore, is difficult to ascertain. The LEO team was informed that there were a number of female agriculture and livestock agents providing extension services, but these numbers could not be aggregated from the multiple service providers. The broad consensus however is that the number of public sector extension service providers is far below any optimal estimate. ANPROCA, the National Agency Promoting Rural and Agricultural Consulting, APROCA has 1,446 extension staff, 621 with a secondary school background and 825 with a 2-3 diploma. Half of these agents are scheduled to retire by the end of next year. Assuming that 70 percent of Guinea's population is linked to agriculture (1.25 million), there are about 865 agriculturalists per extension agent. This number could increase to as much as double in the next year if retiring agents are not replaced.

As part of advisory support to be provided to farmers, the government gave 586 motorcycles to the agricultural entities in 2012. With these motorcycles, the National Rural Development and Agricultural Advisory Agency was able to equip and deploy 531 specialized agricultural advisers and technicians throughout the country to train, monitor and supervise producers.¹⁶

ANPROCA, however, is not the only provider of agricultural and or livestock extension services. The National Confederation of Farmers' Organizations of Guinea (CNOP-G), created in 2000, brings together farmer organizations (GIEs), their unions, districts, and federations. As of 2012, it was comprised of 15 federations with 191 federal unions and 6 non-federal unions, bringing together a total of 520,000 farmer members from all agricultural subsectors. CNOP-G is now positioned as a key partner for the government and other development partners engaged in agriculture. It represents, coordinates, informs and mobilizes its members, as well as defending their interests and engaging in sector policy dialogue. In addition, the CNOP-G includes a Collège de Femmes, which seeks to tap into the enormous potential of women as players in value chain operations. The CNOP-G member organizations

KEY TAKEAWAYS

- Agricultural and livestock extension is rapidly shrinking due to resignations and retirement; 50 percent will retire in 2016.
- Private sector firms have the incentive but little experience in delivering extension services.
- ICT (especially FM radio and mobile networks) is a largely underutilized resource for extension delivery.
- Filling the enormous knowledge gap in agricultural extension will require efforts from multiple public and private actors to develop innovative and cost-effective approaches

Table 15: ANPROCA Extension Agents by Region, Guinea, 2014-15

Régions	Cadres et Agents		Conseillers Agricoles	Communes urbaines/rurales couverts
	2014	2015	2015	
Boké	126	89	62	37
Kindia	186	196	169	45
Mamou	78	72	53	36
Labé	89	55	28	53
Faranah	88	71	48	42
Kankan	117	78	51	58
Macenta	112	91	71	39
N'Zérékoré	109	80	60	24
Zone Spéciale Ratoma	7	11	7	3
Direction Générale	114	109	-	-
Total	1026	852	549	337

¹⁶ October 2012 IMF Country Report No. 12/296

serve, amongst other things, as an extension network. None of the CNOP members were aware of community level extension approaches like Farmer Field Schools (FFS) (*champ écoles paysannes*), but these could fit easily within the CNOP structure, which could expand these to the national level.

On the private sector side, the decentralization of veterinary and input service providers created a network of private agents who offer a wide range in quantity and quality of extensions services to Guinea's farmers and livestock operators. The *veterinaires auxiliares* are an example of a powerful technology transfer force for livestock extension.

In addition to weak and weakening extension services, the link between agricultural value chain workers, extension and research is weak; and research, which is almost exclusively public, is equally weak.

USAID is committed to strengthening research-extension links and is currently implementing a project in this area under its Farmer-to-Farmer (F2F) program, implemented by Winrock and based in Faranah.

Private sector extension delivery is nascent in Guinea. SAREF, the largest private sector provider, has submitted proposals to the Minister of Agriculture to provide extension services, though no agreements have been reached. None of the private veterinary or input companies have ongoing extension programs.

Information and Communication technologies remain a vastly underutilized resource for the efficient delivery of extension information. Guinea has a broad network of private, community, rural and public (state owned) FM radio stations, which in many countries is a well-recognized and potentially powerful extension delivery tool. Mobile telephony is widespread, with a penetration rate of over 70 percent according to SotelGui. Despite a largely illiterate rural population, mobile voice messaging is used by private extension service providers to deliver messages simultaneously to large numbers of farmers.

E. EQUIPMENT SERVICES

The LEO team observations of Guinea's equipment and equipment services markets are that they are very weak with very low levels of market penetration, and that the good intentions of subsidized equipment distribution programs by the Government and multiple donors have worsened this situation. Secondary research

Figure 29: FM Radio Station Reach, Guinea

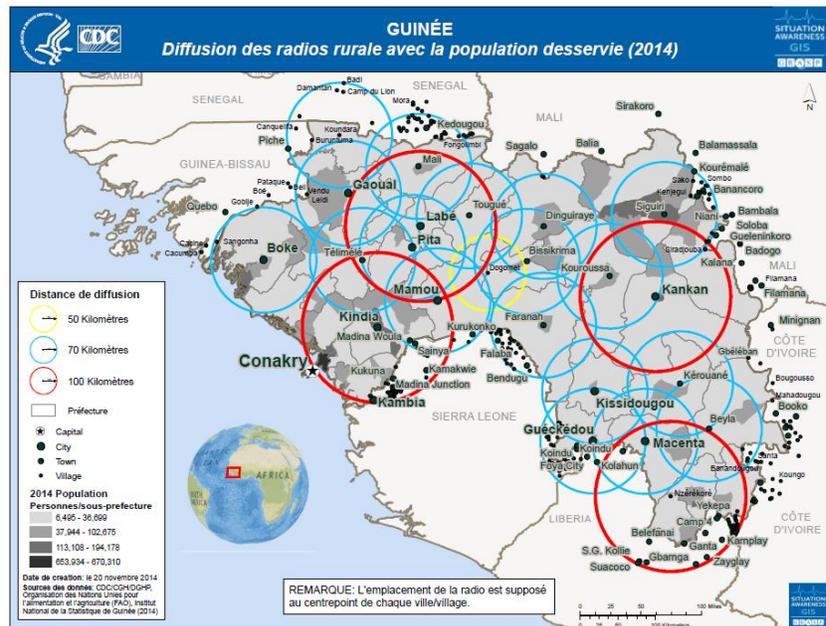


Figure 30: FM Radio Stations in Guinea, August 2015

FM radio stations in Guinea	
Private	34
Community	10
Rural	20
Public (state owned)	2

conducted as part of this study noted the introduction of improved palm oil presses, mechanical threshers for paddy, improved par-boilers for women's groups, rice mills with cleaners, and sorters, as a partial list. All of these observed technologies were part of a partnership between the Government of Guinea, and or an international organization, and a member groupement of CNOP-G.

What was clearly missing from the agricultural landscape was a functioning machinery and equipment supply chain for imported and particularly locally manufactured equipment and equipment services. Equipment markets are weak both for imported and domestically manufactured machinery and equipment.

Donor and NGO largesse consistently seemed to ignore the basic problem in equipment markets, i.e., the equipment supply chain is not working well. Instead of addressing the problem, the development response was to ignore it through the direct importation and distribution of a range of equipment that could either be directly sold to farmers or purchased by fee-for-service providers who could then provide needed services on a cash or fee-for-service basis.

One measure of excess demand for equipment services is the cost that value chain actors are willing to pay for services provided relative to the cost for the same service in more competitive equipment markets. Commercial paddy threshers who bring a mechanical thresher into paddy fields and thresh on a fee for service basis charge 50 percent more for this service than threshers in Mali. The team noted similar margins for milling services.

In addition to higher prices for services from a non-competitive equipment market, the quality of machinery and equipment used to provide services is generally low, unless the equipment is owned and operated by a donor or NGO supported group. Figure 31, a photograph of milled parboiled rice shows unmilled grains, chaff, off-color grains, and foreign matter mixed in with the par-boiled rice. The LEO team found similarly poor quality rice mills in a number of villages visited during this study.

Strategies to strengthen equipment markets might include:

- Ensuring that barriers to importing machinery and equipment are lifted
- Subsidizing equipment via vouchers for the purchase of equipment based on buyer's choice,
- Sponsoring design and innovation competitions for blacksmiths and machinists
- Encouraging equipment dealers to offer demonstrations to actual farmers
- Linking equipment consumers into feedback on design
- Securing multi-donor commitment to 'do no harm' to domestic equipment markets

KEY TAKEAWAYS

- There is enormous unmet demand for labor saving and quality enhancing machinery;
- Machinery and equipment supply chains are very weak
- Strengthening the equipment supply chain is more important than giving away equipment.
- Women will be the principal beneficiaries of stronger equipment service markets

Figure 31: Domestic Rice with Poor-quality Processing



Source: LEO value chain assessment

XI. POLITICAL ECONOMY

The LEO value chain assessment team investigated the political economy only where it clearly has an impact on the performance of the agricultural sector. In this space the LEO team observed a number of positive indicators. The Ministry of Agriculture staff members at the senior management levels were versed in market development principles and understood the importance and challenges of attracting investment. An up-to-date agricultural census provided a frank assessment of the crops sector. Privatization of agricultural and veterinary services is evident well down to the sous-prefecture level. Statistics provided by the Customs Authority were also up to date, available upon request to the LEO team, and were essentially accurate. This was a pleasant surprise where import statistics are often underreported by Customs.

Relatively recent and rapid growth in the poultry sector is a healthy indicator of liberalization and the potential for similar growth in other sectors. There are private veterinarians and agricultural input suppliers, at least in the regional capitals.

But much is missing from the agricultural landscape, which points to the absence of a facilitative political environment. The LEO team could not identify a single medium- to large-scale rice plantation or mill. Perhaps more due to the very low level of productivity there is a remarkable absence of labor saving machinery and equipment.

While the provision of veterinary and input supplies is privatized, the LEO team was only able to identify one licensed input supply company and one certified veterinary supply importer. This suggests a bottleneck at the licensing agencies.

Land registration and titling exist, and women can own land, but in reality very few women have title to their land and not much agricultural land is titled.

While Guinea has made significant progress in liberalizing its economy it still ranks close to the bottom of the World Bank's (2015c) *Doing Business In* series. Guinea ranks 169 out of 189 in doing business overall and 175 out of 189 in starting a business. This alone is a major barrier to the emergence of enterprises in the services sector, which is needed to animate the agricultural sector.

Guinea is not unique among many developing economies that have the right laws in place but the wrong policies that prevent individuals and firms from taking advantage of opportunities. The Seed Law mentioned elsewhere in this report is an example. Guinea has not certified any high-yielding hybrid or open-pollinated seed in the last decade. Yet it has one of the lowest agricultural yields across commodities for which higher yielding seeds are available in other ECOWAS/CDEAO countries. There are no policy guidelines or regulations that would enable a seed importer or developer to introduce new seed varieties with any confidence that they could obtain certification or have intellectual property rights protection.

An effect of a political economy characterized by uncertainty and serious risks and consequences for initiative is that there is a surprisingly low level of trust and cooperative behavior across groups of value chain actors. Within the strong farmer organization confederation, CNOP-G, the team observed very little innovation unless the group or union was being supported by an NGO or the government. When the risks to innovating are high, innovation stops.

Many of the barriers to current innovation and investment are the invisible remainders of the status quo. While the team did not attempt to assess the cost or extent of corruption, a number of traders complained of

payments that they have to make to import goods across land borders. The absence of robust competition in the inputs and veterinary supplies market suggest hidden barriers suggested by the *Doing Business* indicators.

There are enormous opportunities for growth in Guinea's agricultural sector. There are a number of value chain actors who recognize these constraints and are prepared to invest in efforts that address them, and make such opportunities a reality. There remains an enormous cost in a status quo that seeks rents from transactions that have not even generated a return. Alleviating most of these is not a precondition for investment in the agriculture sector; alleviating even some of them, should have an immediate and visible effect on the behavior of firms awaiting the signal to do things differently, better, and at much higher levels of productivity.

XII. GENDER IMPLICATIONS

Women, with few exceptions, participate at all levels and perform almost all functions within agricultural and livestock value chains. From pre-planting through harvest and post-harvest transformation, and in ensuring that agricultural products move from areas of local surplus to deficit areas, women contribute labor, take risks, manage resources, own enterprises; and participate in the management and governance of households their farmer and/or livestock associations and on the governing bodies of regional and even national organizations. At the national level, the highest-level representative of the agricultural sector is the Honorable Minister Jacqueline Sultan.

While women participate in all the above functions, not all women do and few women have equal access or control over productive resources than men. Women have far less control over the acquisition of seed, fertilizer and crop protection inputs; they are often not involved in decision making concerning the division of land parcels and how scarce resources will be invested to optimize the productivity of land and labor. A national study indicated that 78.5 percent of women are considered or consider themselves ‘supportive labor’ on productive enterprises controlled by men (Politique Nationale Genre, 2011). As Table 28 indicates, women-headed households represent 11.5 percent of all agricultural households.

Relegated to the more menial labor tasks across the value chain, women disproportionately bear the brunt and the load of Guinea’s failure to take advantage of drudgery saving technologies. This brunt is quickly reflected in poor maternal and child health. Women engaged in agricultural labor have less time for child care, and less time for breast feeding.

In a society deeply stratified along ethnic and historical settlement lines, for women in any group, the perception of women is not unlike the perception of less favored ethnic groups. As an example customary rights to land in many communities is restricted for the descendants of slaves, members of groups who settled after the first group, and women. These perceptions and limitations are for the most part customary and social. Within the legal system, women are guaranteed the same rights as men in the legal framework, criminal law, civil law, labor law, social security, and land tenure. Policy, defined as the interpretation and execution of the law, is different however.¹⁷

KEY TAKEAWAYS

- Women bear the brunt of Guinea’s missed opportunities to transform its agricultural sector.
- The majority of women in agriculture work in support roles.
- Guinea’s poorer progress towards maternal and child health is a reflection of the lack of appropriate labor-saving technologies.
- Women are underrepresented in agricultural and livestock extension.
- Both the equipment and the gender balance of extension agents are relatively easy to fix.



¹⁷ Ministère d’Etat des Affaires Sociales, de la Promotion Féminine et de l’Enfance, Politique National Genre, January 2011.

In several traditionally livestock-rearing communities, women receive cattle as a form of dowry. The Quran assures women the right to control assets given as dowry. Practice differs, however and all decisions about cattle, including the decision to slaughter and or sell, are made by male relatives.

Women appear less represented in agricultural and livestock

support institutions, including extension staff. The consequence of this is that women have diminished access to extension messaging and value-added services. A notable exception is the CNOP-G *College des Femmes*, an important initiative by farmer organizations to close the gender gap.

Illustrative intervention strategies include but are not limited to:

- Strengthening equipment and equipment service chains to reduce women's labor from high drudgery tasks
- Support active recruitment of women as agricultural input and veterinary auxiliary agents
- Embedding nutrition and maternal and child health messaging into agricultural input marketing and farmer organization development training materials

Table 16: Agricultural Household Head Gender, Guinea, 2015

REGIONS	Sexe masculin		Sexe féminin		TOTAL	
	Effectif	%	Effectif	%	Effectif	%
BOKE	105 956	94,51	6 158	5,49	112 114	100,00
FARANAH	91 941	95,66	4 174	4,34	96 115	100,00
KANKAN	144 852	95,86	6 254	4,14	151 106	100,00
KINDIA	126 792	88,97	15 715	11,03	142 507	100,00
LABE	83 011	81,14	19 291	18,86	102 302	100,00
MAMOU	76 216	77,32	22 360	22,68	98 576	100,00
N'ZEREKORE	206 109	85,63	34 584	8,60	240 693	100,00
ENSEMBLE	834 877	88,50	108 536	11,50	943 413	100,00

XIII. ENVIRONMENT/CLIMATE

SMART AGRICULTURE

Elements in common from a quick review of climate change definitions indicate that climate change itself is a permanent condition. There is broad agreement that, since the mid-20th century, the rate of climate change is greater than that which can be explained by natural phenomena alone; and that human behaviors have had a significant impact, especially those associated with the increased levels of atmospheric carbon dioxide produced by the use of fossil fuel. This acceleration in subsequent climate changes affects all natural and human systems including agriculture, global food security, sea levels, coastlines, water resources, human health, human settlements, energy, industry transport and trade. Two critical climate change elements will affect Guinea. The first is worldwide increases in temperature. All parts of Guinea are likely to experience a 1-1.5 degree Celsius (C) increase in the maximum average the warmest month of the year. And, sea levels will rise (IFPRI 2012).

Climate Smart Agriculture (CSA) is defined as agricultural practices that sustainably increase productivity and system resilience while reducing greenhouse gas emissions.

KEY TAKEAWAY

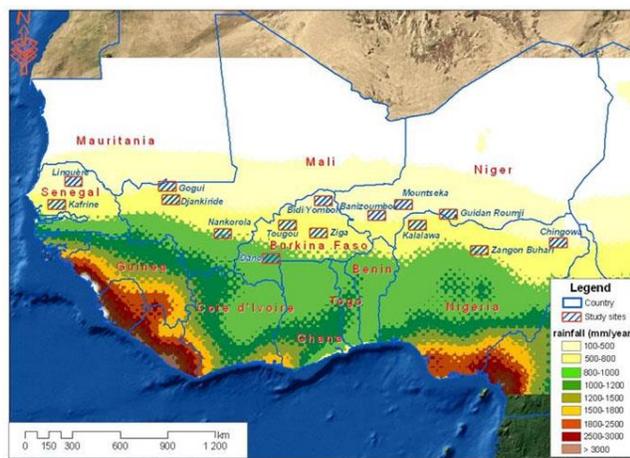
Guinea's agricultural challenge is whether it can adapt to meet increasing regional demand for grains and pulses through increased intensification of production while mitigating the adverse environmental impacts of intensification schemes.

Conakry, the capital of Guinea, and Guinea's extensive mangrove areas, are particularly vulnerable to rising sea levels. Farther north in Senegal the increased use of captured water for irrigation has resulted in greater salinity of the mangrove systems and rendered them less suitable for rice production. It is difficult and perhaps inappropriate to look for silver linings in the face of rapidly changing global climate systems—but it is logical to assume that not all environments are, or will be affected equally. As the West Africa rainfall map above, indicates Guinea receives some of the highest rainfall on the continent. It has two production season corresponding to heavy and lighter rainfall period.

In Senegal, Mali and Burkina Faso, maize, sorghum and millet zones run roughly from south to north as rainfall levels fall. For some years now, these cropping lines have been moving south shrinking the millet belt, as some farmers are now planting millet where they formerly produced sorghum. To their south many farmers are shifting from maize to sorghum production as rainfall levels fall forcing the maize belt further south.

Analyzing multiple climate change models, IFPRI (2012) projects that Guinea's maize yields will rise 127 percent by 2050' twenty percent will be from additional area planted, and 97 percent from increased productivity.

Figure 32: Rainfall Levels, West Africa



While Guinea still imports small amounts of maize from Mali and Côte d'Ivoire seasonally, it is, despite very low productivity, a net exporter. Demand for maize from the north will only increase. Guinea's climate smart agricultural challenge is whether it can adapt to meet this increasing regional demand through increased intensification of maize and groundnut production using higher-yielding varieties and a more intensive use of inputs, green and otherwise, while mitigating the adverse environmental impacts of intensification schemes.

Climatic Adaptation: This refers to the set of measures that allow people and systems to adjust, in response to, or in anticipation of, changed conditions. This includes taking advantage of positive conditions while reducing or mitigating the impacts of negative ones. In Guinea, adaption includes accelerating the process of testing and certifying improved high-yielding seed varieties, including drought resistant ones, should Guinea's rainfall patterns change in ways not currently anticipated; accelerating intensification schemes through increased availability of, and knowledge how to use, yield maximizing inputs; and the creation of incentives for private investment in improved storage infrastructure so that Guinean value chain actors can store in appropriate conditions while minimizing aflatoxin risk.

Mitigation: Mitigation reduces the magnitude of human activity on the climate and ecosystems. It seeks to reduce the levels of emission of gases contributing to global warming through means such as reducing deforestation, increasing soil organic matter, managing animal wastes in ways that minimize emissions, introducing technologies that allow for reduced tillage systems, intercropping, establishing windbreaks to minimize dry season wind erosion and constructing physical structures that minimize chemical run-off into watersheds.

While there are a few NGO programs working with producer groups to teach Good Conservation Practice (GCP), Guinea has virtually no experience in intensification systems and currently the preconditions for intensification are missing, e.g., robust seed and input markets, storage infrastructure that meets CDEAO/ECOWAS standards, and knowledge transfer and intensification financing schemes. What is in place are the input companies, large traders, and strong producer networks through the CNOP-G system. These actors hold the key to whether Guinea can intensify its production systems to meet growing regional demand for agricultural commodities that require more rainfall than its northern neighbors currently receive. These actors are also key to ensuring that the set of adverse environmental externalities are mitigated through good and climate smart agricultural practice.

Illustrative activities to ensure this could include:

- Assisting the Ministry of Agriculture in drafting Seed Law policies that accelerate the process of testing and certifying higher yielding cereal and legume varieties
- Development and delivery of good conservation practice and good agricultural practice (GCP & GAP) strategies, by input providers for Groupement members
- Integration of intensification and GAP into Farmer Field Schools through the CNOP-G system
- Identification of measures that increase incentives for private sector investment in improved storage infrastructure to absorb local surplus, including where appropriate, drying facilities
- Improved animal husbandry practices including fattening, that take better advantage of Guinea's comparative advantage in resource endowments

XIV. NUTRITION AND VALUE CHAIN DEVELOPMENT

The LEO value chain assessment team benefitted from the participation of a nutrition consultant from the USAID SPRING project, Ms. Sarah Hogan, who provided valuable insights and perspectives. Additionally, this provided the SPRING team in Guinea an opportunity to understand strategies that the LEO value chain assessment could use to more effectively address nutrition challenges in Guinea.

That Guinea still faces numerous nutritional challenges is clear. As Figure 34 indicates, Guinean households spend almost two-thirds of their household budget on the consumption of cereals and tubers, principally to acquire enough calories to survive. An NGO, Search for a Common Ground, recently conducted a survey of urban youth in Conakry, and found that the principal concern of this group was that they were chronically hungry. While the rate of children under five years of age who are moderately or severely underweight has fallen slightly over time, from just over 20 percent in 1994 to 16 percent in 2012, over one-third of the under 5 population demonstrates moderate to severe stunting, a rate largely unchanged in the last twenty year (see figure 35) (Countdown to 2015 Secretariat n.d.). Stunting is not only a measure of diminished physical growth; stunting also affects the emotional and intellectual development of a child with social and economic impacts that will be felt for a generation.

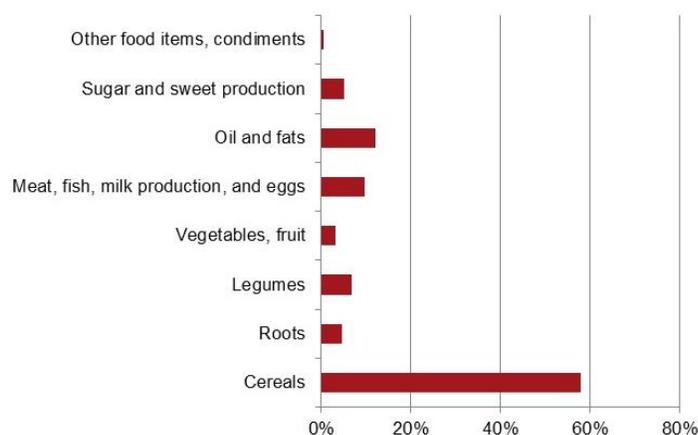
KEY TAKEAWAYS

- Stunting remains a significant problem
- Markets are powerful tools to address access and availability constraints
- Behavior change messaging to improve utilization can be underwritten by consumer goods and or agricultural inputs companies
- Producer/marketing groups through the CNOP-G system can effectively reach large numbers with nutrition appropriate messaging.

Value chains and Nutrition Market systems are an important, even necessary part of an integrated nutrition strategy. Market systems alone, however, are insufficient to address the multiple and complex challenges to significant improvement of the nutritional status of the Guinean population or even its most vulnerable, mothers, and infant children. From a market systems, perspective nutrition/food security has three critical elements, access, availability, and utilization.

Access refers to the ability of people and households to secure a basket of food stuffs that meet or exceed their nutritional requirement for both calories and nutrients, and align with their cultural preferences, in a timely way on an ongoing basis. Access can be achieved either through income, trade or consumption of one's own-production. There is, however a growing body of evidence that household production of a more diverse basket of food stuffs is mostly used to generate income than to enrich the household's consumption mix.

Figure 33: Monthly Household Food Expenditure, GNF, Guinea

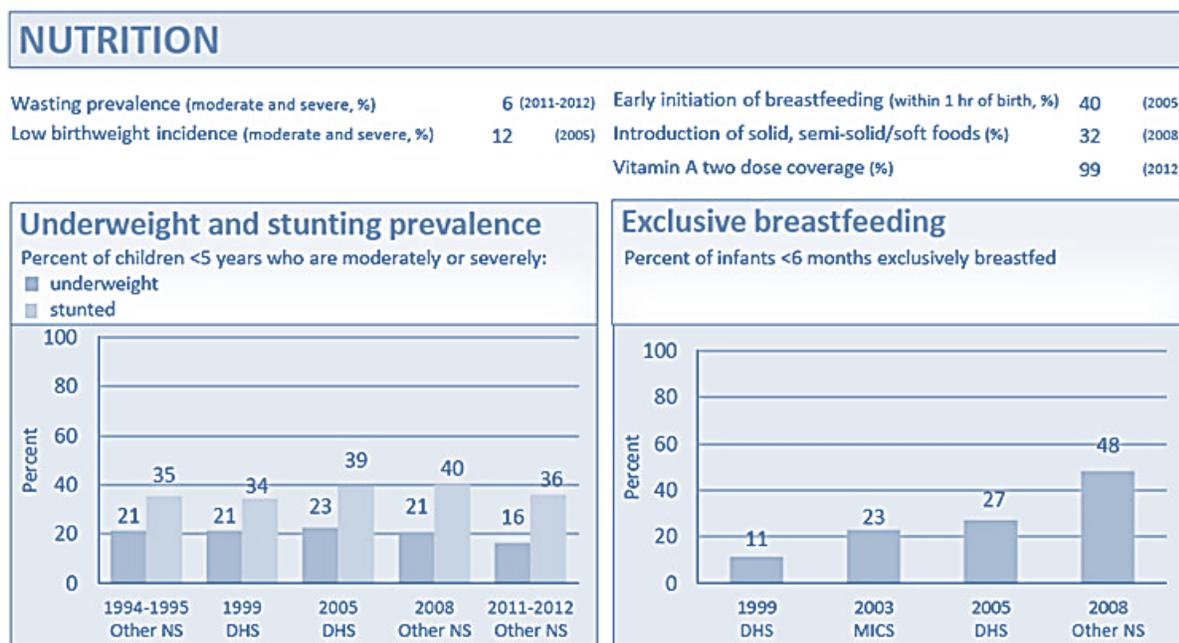


Availability addresses the issue of whether an optimal basket of foodstuffs can be purchased or produced on an ongoing basis, once people and households have the means to acquire or produce it.

Utilization refers to consumer choice and preference; and the body’s ability to take up nutrients. The latter is affected by overall health and dietary composition, among other factors. As for the former, will households consume a more nutritious basket of foodstuffs assuming they have the means and a more nutritious basket is available? Utilization is heavily influenced by culture and behavior. Culture and behavior can and do change however. Utilization as it refers to the mix of foods, and the nutritional contribution of each to the overall health of an individual, is outside of the domain of what markets and market systems can reliably address.

Markets and market systems are a powerful mechanism to ensure that the largest numbers have access to food. First, overall economic growth will drive up incomes and higher income decreases the percentage of the household income dedicated to food. Increasing agricultural productivity lowers the cost of those foods and, again, the percentage of the household budget that has to be dedicated to food. More importantly, increased incomes and cheaper food benefit everyone. Availability is enhanced via the production of a more nutritious and diverse bundle of food stuff in response to greater consumer demand and purchasing power. Increasing utilization of more nutritious food is more challenging through market mechanisms but utilization, which is largely a matter of preference, can be indirectly enhanced through educational programs directed towards specific communities. To the extent that nutritional educational programs result in greater production of nutritious foods and this results in greater sales of vegetable seeds, and inputs, input dealers may respond to commercial incentives to underwrite the costs of educational messaging about more nutritious foods.

Figure 34: Maternal and Child Health and Nutrition Indicators, Guinea



Source: *Countdown to 2015 Maternal, Newborn and Child Health: Fulfilling the Health Agenda for Women and Children, The 2014 Report*

Guinea's national network of producer and livestock groups provides easy access to scale for interventions designed to educate farmers about improved nutritional behaviors. Outreach to CNOP-G membership with commercial underwriting of improved nutritional messaging can ensure the sustainability of messages to improve utilization. Village based savings and loan groups (VSLAs) are another demonstrated market mechanism at the microenterprise level, which uses a core business activity, savings and lending, to generate a forum for women to discuss health and nutritional messaging.

There is a gender link to malnutrition. Women, especially mothers of young children, are particularly vulnerable to malnutrition, in part due to the greater nutritional requirements of proper ante- and post- natal care, in part because of women's greater role in feeding their families, and in part due to their greater poverty. As cited elsewhere in this report, women's lack of access to labor saving technologies, contributes to women's poverty, and women's poverty contributes to malnutrition of women and their children. Addressing the equipment constraint would increase women's incomes through increased volumes processed, and also would free up women's labor to access better pre- and post-natal care.

Illustrative strategies to improve the nutritional outcomes of targeted households include:

- Facilitate significant productivity and income gains by participating farmers.
- Work through input companies to promote nutritional diversification messaging as an input marketing strategy.
- Facilitate investment in and dissemination of nutritional messaging through the CNOP-G system, with commercial underwriting.
- Facilitate development of the equipment value chain to promote access to processing equipment for women.

XV. CONCLUSION

Conducting a market systems analysis in Guinea in 2015 is complicated. Market systems analyses attempt to understand how and why market systems are functioning. To do so, the LEO value chain team gathered information to assess Guinea's potential competitiveness in selected commodity systems, identify all the categories of value chain actors in each of the selected commodity chains the functions they perform and the services on which these actors depend. All this is then analyzed in the context of a political enabling environment that determines how quickly and successfully market actors might be able to take advantage of identified opportunities. In order to better understand the impact of the political economy on opportunities in the agriculture sector, the research team had to look for what was missing from the agricultural landscape. For a country to be as well and richly endowed in human, natural and mineral resources as Guinea, and yet have such low levels of investment (domestic and foreign) productivity and incomes, something must be very wrong.

Guinea continues to suffer from a history of political instability and regimes whose impact on the economy, and on the livelihoods and incomes of Guineans, has been as great as had it suffered from decades of civil war. But Guinea has taken important and significant steps towards the liberalization of its economy; in the agricultural sector it has privatized many public services, reduced subsidies, passed significant land reform measures, and improved reporting and collection of customs and duties.

Guinea still has a long way to go to create a business enabling environment that informs Guineans, and the world, that Guinea is ready to do business if that business is good for Guinea and its people. Guinea still has one of worst rankings for starting up a business and doing business. In the agricultural sector, there is little commercial investment in testing and certifying improved seed varieties while Guinea has one of the lowest levels of agricultural productivity in the world. There remain significant bottlenecks in the importation of agricultural and veterinary inputs. Less than 1 percent of Guinea's rice fields use improved seed, and less than 2 percent of farmers reported using fertilizer. There is almost no use of labor saving technology from cultivation through harvesting and processing. Travelling across the country, it is harshly apparent that women disproportionately bear the burden of underdevelopment for they are the first line in the absence of labor saving technologies. Progress, or lack thereof, towards critical Millennium Development Goals, particularly around stunting, is just one measure of this.

And then came the Ebola epidemic. The Ebola virus was a serious setback in this process. It stopped investment flows, mines closed, and the movement of people from surplus to deficit areas came to a halt. Harvested crops could not find a market. The epidemic effectively shut the country down for a year and the clock measuring Guinea's economic progress—following a set of political and economic reforms—stopped. The short-term (2014) impact on gross economic output, is in the order of 2.1 percentage points, reducing growth from 4.5 percent to 2.4 percent, and costing Guinea over \$150 million. The fiscal impacts are also large, US\$120 million (1.8 percent of GDP) for Guinea. The epidemic did not have as great an impact on agricultural production, however, and recent Ministry of Agriculture statistics show little or no decline in productivity. Guinea is rebounding.

On the bright side, there is nowhere for Guinea to go but up. On an even brighter note, if the Ministry of Agriculture is any indication, the Government of Guinea is aware of prior shortcomings, committed to accelerating growth, and looking for assistance as it moves forward. This is a clear but time bound opportunity for development partners with the knowledge and experience in market-led, pro-poor growth. The opportunity is time-bound because capital is impatient. If Guinea is not quicker at attracting direct investment than other

nations with similar endowments, capital will go elsewhere—even domestic capital will. Today Guinea ranks 175th out of 189 countries in starting a business (World Bank 2015c), so capital has many other options.

Guinea has an enormous opportunity to transform its agricultural sector from a primarily extensive one to a primarily intensive one in response to continued expected demand growth, both domestically and from Guinea's northern neighbors as climate change reduces the land area that can be used to grow corn, rice and groundnuts. This transformation can only be driven by transformative expansion in the agricultural services sector, e. g., improved seed, access to agricultural and veterinary inputs, extension, equipment and financial services.

The LEO value chain assessment team identified significant opportunities for upgrading in the grains, pulses, poultry and small ruminants sectors. Opportunities that, if taken advantage of, can have a rapid and positive impact on the incomes of poor households, improve their access to more food of better quality, and provide significant employment, particularly for youth.

Despite the enormous power of markets to transform systems, generate wealth and reduce poverty, transformation requires people with the right combination of skills, resources, and market power to take advantage of opportunities and invest in upgrading markets. We call these people change drivers; without them, transformation is not possible. During the LEO value chain analysis, the assessment team continually looked for market actors with the skills, resources, market power and incentives to make change happen. In the agricultural commodities investigated by the LEO team, most of the potential change drivers identified are in the services sector.

A significant improvement in the provision of veterinary services has the potential to double the available supply of chicken and eggs, and increase the supply of small ruminants by 30 percent. The certification and dissemination of high yielding seeds, combined with improved input use, can increase rice and maize yields two to three fold. Increasing agricultural productivity is a prerequisite for generating widespread demand for labor-saving technologies. Strategies to increase the private provision of extension services is an urgent priority. In the next year half of the current agricultural extension agents will retire. By 2018, without a significant replacement, there will be no more extension agents. There are a growing number of successful extension service models linked to input companies and more successful or *lead* farmers. The assessment team would encourage further exploration of these by the USAID Guinea mission.

Transformative expansion of services cannot happen without the support of government—not in the provision of services, and certainly not in the direct subsidy of inputs disconnected from market demand or downstream supply of spares and services to sustain them. For markets to thrive and drive growth, reduce poverty, and indirectly improve nutrition and society's ability to anticipate and respond to change, governments must become investment facilitators, while protecting the safety and welfare of the populace.¹⁸ Here there is an important and timely opportunity for USAID.

The government of Guinea, like all other members of ECOWAS, has a Seed Law based on the ECOWAS/CDEAO framework. This seed law needs an operations manual; a set of policies and regulations that govern the implementation of the law. These policies must provide clear guidelines on the importation,

¹⁸ Government always has the additional role of protecting and ensuring the health, safety and welfare of its people so facilitation must also come with regulations.

testing, certification, multiplication and commercial distribution of improved seed varieties; and these guidelines must be structured to incentivize commercial investment and provide intellectual property protections, without comprising Guinea's sovereignty.

There is nowhere to go but up. With a little help, the mobilization of private and public capital, and a political environment committed to growth and poverty reduction, USAID's investment of Ebola recovery funds (and other funding allocations) should be able to leverage significant gains.

XVI. ILLUSTRATIVE INVESTMENTS

The LEO team analyzed several grain, legume and animal product commodity chains in Guinea. For the most part these chains were weak; characterized by low productivity, low levels of technology, animal traction and extensive rather than intensive production systems. The consequence of extensive production systems is an absence of inputs, equipment and services essential to transforming agriculture systems from extensive to intensive.

Transforming agricultural systems within limited time frames require a clear and measurable economic opportunity to drive change and growth, a policy and enabling environment that encourages investors to pursue identified opportunities, and perhaps most importantly, individuals, firms, and or associations that are aware of the opportunity, and possess the skills, and power within a market system to drive change and can access the resources essential to pursuing a particular opportunity.

The illustrative interventions in this section are driven by the recognition that:

- Guinea’s primary opportunity in most of its agricultural systems is a shift towards greater intensification
- Economic agents in services sectors to agriculture and livestock are the principal change drivers because they will be the first to benefit from greater intensification
- Producer, trade and marketing groups through the CNOP-G provide a mechanism for rapidly reaching scale for change drivers in the services sector
- While Guinea is a country of very small farms, it has a growing number of successful medium-sized farmers who have acquired the skills and resources to upgrade their own farms, and who have begun to share their skills and access to equipment with their neighbors
- There are a few potential quick wins in the policy and enabling environment that should improve input providers’ abilities to take advantage of identified opportunities

- 1. Support the Government of Guinea’s Ministry of Agriculture in securing ratification of its Seed Law, and developing implementation policy guidelines for it.** A functioning seed law that clarifies, simplifies and accelerates the process of testing and certification of new seed varieties is a precondition for upgrading seed stock, and privatizing the seed sector to ensure that domestic and international actors have clear incentives to invest in the seed sector. The experience of neighboring countries in drafting rational seed policies with USAID trade hub support can be applied to Guinea. Without improved seed, there will be little incentive to invest in intensification by producers, or in storage by traders.

Cost: Low	Intervention: STTA	Leverage: 1:1.2 million rice and maize farmers	Duration: <6 months
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- 2. Support the Government of Guinea in testing for aflatoxin, and establishing relevant controls.** Aflatoxin will be a significant barrier to increasing the scale of exports of maize and groundnuts to neighboring countries that will be more seriously affected by climate change, and represent ready export markets.

Cost: Medium	Intervention: Co-financing and equipping laboratories, training	Leverage: high; 1: ~600,000 small-holder maize and groundnut farmers.	Duration: 18 mos.- 2 years.
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3. **Facilitate increased investment by input and veterinary supply companies to establish geographically disbursed service and extension centers.** Decentralization and relatively recent changes in government policy towards privatization have opened the door for increased private sector investment in agricultural and veterinary inputs and extension messaging. Tying distribution and extension services to the CNOP-G infrastructure reduces risks for private services providers and provides a vehicle for relatively rapid scale up. The de facto monopoly in the in the agricultural inputs and veterinary service markets creates a dilemma for USAID, however, and any efforts to facilitate increased investment should create opportunities for future competition in this market. This investment should be cost shared under a GDA type mechanism.

Cost: Medium	Intervention: GDA type cost share in establishing rural ag and veterinary input and extension services. Opportunities for youth and women's employment as ag and veterinary agents. (no bricks and mortar)	Leverage: 1:300,000 smallholder farmers and livestock owners.	Duration: 3-4 years
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4. **Strengthen the equipment and equipment service supply chain.** Weak equipment and equipment service markets perpetuate the exploitation of women and agricultural laborers; reduce productivity and value chain actor incomes; and increase post-harvest losses. Donor and NGO programs in the equipment space have focused on giving improved machinery and equipment to beneficiary groups rather than strengthening equipment and equipment service markets. In so doing, these subsidy heavy interventions have weakened equipment markets. Innovation grants, limiting equipment subsidies to vouchers that can be redeemed with local equipment providers, technical assistance in business management to equipment manufacturers, support to equipment importers to overcome unofficial customs delays and payments; and facilitated financial capital flows for the purchase of inventory and equipment by services providers and other value chain actors are ways in which the equipment value chain could be strengthened.

Cost: Low	Intervention: STTA	Leverage: 1:250,000 smallholder farmers and service providers.	Duration: 3-5 years
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5. **Facilitate increased capital flows for agricultural investment.** Current capital flows to the agricultural sector fall far short of demand estimates. Intensification of production, through improved inputs, a shift from animal to mechanical traction, and accelerated investment in harvest and post-harvest service provision, all require capital. Accelerating this process requires accelerating capital flows to value chain actors in the sector. Multiple mechanisms exist to achieve this including:
- Exploration of a DCA within financial institutions with more aggressive ag lending portfolios
 - Support for embedded financial service deliver from wholesalers and input companies;
 - Expanding Village-based Savings and Loan Association groups (VSLAs) within or parallel to the CNOP-G system.

Cost: Medium; < \$2 million	Intervention: Short and long term TA to financial institutions; TA and risk sharing with lead farmers and input suppliers providing embedded services.	Leverage: 1:300,000 smallholder farmers. Assumption is that 25% of smallholder farmers in the zone of influence will benefit.	Duration: <6 months
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6. **Facilitate private sector underwriting of nutritional messaging targeted to CNOP-G GIE members, particularly women.** Consumer goods and input companies that market products or services to small-scale farmers, and extractives companies seeking to strengthen their social license to operate, all have plausible incentives to underwrite the costs of nutritional messaging. Message content itself can be developed in a competitive process by local firms and delivered over radio and television, as well as within-store promotional and educational materials focused on driving behavior change.

Cost: Low	Intervention: STTA in behavior change and marketing; cost share in message delivery	Leverage: 1:2.4 million assuming that behavior change messaging has an impact on 20% of households	Duration: 2 years
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7. **Promote competition to innovate within cooperative and/or associative groups.** Guinea’s strong associative network via the CNOP-G and its livestock equivalent is a powerful way to achieve scale in service distribution. They are much less effective at encouraging innovation and competition among their members to realize higher and higher levels of performance. This is true of associative groups in many cases. At the same time, within some groups, the team observed the emergence of lead farmers who are significantly more productive than their neighbors. Encouraging internal innovation among members of groups can result in rapid uptake of new technologies by members as they learn of, and adopt another member’s success. Support to lead farmers to deliver embedded services, promotion of commercial Farmer Field Schools, and the establishment of internal competitions—especially with input company buy in—all strengthen competition and innovation within groups.

Cost: Medium; <\$3 million	Intervention: STTA, LTTA, training, organization of competitions and fairs with public recognition.	Leverage: 1:> 600,000 farmer members of CNOP-G	Duration: 3-5 years.
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8. **Provide leadership to development partners and sectoral working groups around market development principles, to minimize donor and NGO efforts that undermine private actors.** As the USAID mission moves away from direct relief towards more sustainable market development approaches, it and other like-thinking donors will have to recognize that the direct subsidies of relief-driven benevolence can easily undermine domestic service providers, and occasionally drive them out of business. Sensitizing other development partners (DPs) and government partners on the vulnerability of market actors to direct subsidies is essential for these actors to take on the risk of providing services that more powerful public and NGO actors are offering for free.

Cost: Low	Intervention: ongoing leadership	Leverage: Strategy is to mitigate implementation risk of DP undermining funded activities	Duration: ongoing
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ANNEXES

ANNEX A: TEAM MEMBERS

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ANNEX B: AGRICULTURAL PRICES AT PRINCIPAL MARKETS, GUINEA

MINISTÈRE DE L'AGRICULTURE
Bureau de Stratégie et de Développement (BSD)

SIPAG

Système d'Information sur les Produits
Agricoles en Guinée
BP : 5146



Programme National d'Appui
aux Acteurs des Filières Agricoles (PNAFAA)

Bulletin hebdo N°31 PNAFAA du 03 août 2015

Evolution des prix de détail (consommation) de quelques produits agricoles à Conakry (Madina, Tanènè aviation ou marché forestier) et sur les marchés des Capitales Régionales du pays.

Marchés	Produits	Prix/kg semaine précédente (en FG)	Prix au kilo ou litre ce jour (en FG)	Taux d'accroissement Prix (%)
Boké	Riz Local étuvé	5500	5500	0,00
	Riz Importé	4000	4000	0,00
	Maïs Net	5000	5000	0,00
	Oignon importé	8000	8000	0,00
	Huile de palme	9000	9000	0,00
	Pomme T. locale	8000	8000	0,00
	Fonio net	7000	7500	+7,14
Labé	Riz Local étuvé	5500	5500	0,00
	Riz importé	4500	4500	0,00
	Huile de palme	10 000	10 000	0,00
	Maïs Net	6500	7000	+7,69
	Oignon importé	6000	6000	0,00
	Oignon local	5000	5000	0,00
	Pomme de terre loc.	4000	4000	0,00
Mamou	Riz Local étuvé	5550	5550	0,00
	Riz Importé	5350	5550	+3,73
	Maïs Net	5200	5200	0,00
	Oignon importé	5850	5550	-5,12
	Huile de palme	10450	10 450	0,00
	Pomme T. locale	6000	5000	-16,66
Faranah	Riz Local étuvé	5330	4880	-8,44
	Riz importé	5000	4000	-20,00
	Maïs net	4500	4500	0,00
	Oignon local	6000	6000	0,00
	Huile de palme	10 000	10 000	0,00
	Oignon importé	10 000	10 000	0,00
	Pomme de terre locale	8000	9000	+12,50
Kankan	Riz Local étuvé	6000	6000	0,00

	Riz Importé	5000	5000	0,00
	Oignon importé	8000	8000	0,00
	Igname	4000	4000	0,00
	Huile de palme	10 000	10 000	0,00
	Piment sec	44 000	44 000	0,00
	Pomme de terre locale	10 000	10 000	0,00
	Fonio	6000	6000	0,00
	Mil paddy	2500	2500	0,00
	Sorgho	5000	6000	+20,00
	Aubergine	4000	5000	+25,00
N'zérékoré	Riz Local étuvé	5700	5200	-8,77
	Riz Importé	4700	4700	0,00
	Huile de Palme	7000	7000	0,00
	Hévéa	2200	2200	0,00
	Mil	2100	2100	0,00
	Sorgho	3600	3600	0,00
	oignon importé	9000	9000	0,00
	Pomme de terre locale	12 000	12 000	0,00
Kissidougou	Riz Local étuvé	5000	5000	0,00
	Oignon local	7000	7000	0,00
	Riz Importé	4000	4000	0,00
	Oignon importé	9000	9000	0,00
	Pomme de terre locale	10 000	10 000	0,00
	Huile de Palme	9000	9 000	0,00
Conakry Tanènè (Marché forestier)	Produits	Prix/kg semaine précédente (en FG)	Prix au kilo ou au litre ce jour (en FG)	Taux d'accroissement du prix (%)
	Riz local étuvé	6000	6000	0,00
	Riz importé	4000	4000	0,00
	Maïs net	5000	5000	0,00
	Oignon importé	7000	7000	0,00
	Fonio net	8000	8000	0,00
	Mil	6000	6000	0,00
	Sorgho	5000	5000	0,00
	Huile de palme	9 000	9000	0,00
	Pomme terre locale	7000	7 000	0,00
Conakry (Madina)	Riz Local étuvé	6000	6000	0,00
	Riz Importé	4000	4000	0,00
	Mil	6000	6000	0,00
	Sorgho	10 000	10 000	0,00
	Maïs Net	5000	5000	0,00
	Oignon importé	7000	6000	-14,28
	Huile de Palme	10 000	10 000	0,00
	Pomme terre locale	8000	8000	0,00

Source: Données de prix SIPAG