MAPPING SOYBEAN VALUE CHAIN IN MOZAMBIQUE

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**ACRONYMS**

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>CLUSA</td>
<td>Cooperative League of the USA</td>
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<tr>
<td>COPAZA</td>
<td>Cooperativa de Produtores da Alta Zambézia</td>
</tr>
<tr>
<td>DRC</td>
<td>Democratic Republic of Congo</td>
</tr>
<tr>
<td>FBO</td>
<td>Farmer Based Organization</td>
</tr>
<tr>
<td>Ha</td>
<td>Hectare</td>
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<tr>
<td>IIAM</td>
<td>Instituto de Investigação Agrária de Moçambique</td>
</tr>
<tr>
<td>ICT</td>
<td>Information and Communications Technology</td>
</tr>
<tr>
<td>IITA</td>
<td>International Institute of Tropical Agriculture</td>
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<tr>
<td>Kg</td>
<td>Kilogram</td>
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<tr>
<td>MEAS</td>
<td>Modernizing Extension and Advisory Services</td>
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<tr>
<td>MT</td>
<td>Metric Ton</td>
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<tr>
<td>MZN</td>
<td>Mozambique New Metical</td>
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<tr>
<td>NGO</td>
<td>Non-Government Organization</td>
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<tr>
<td>SBS</td>
<td>Sociedade de Beneficamento de Sementes</td>
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<tr>
<td>SIL</td>
<td>Soybean Innovation Lab</td>
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<tr>
<td>SPEED</td>
<td>Supporting the Policy Environment for Economic Development</td>
</tr>
<tr>
<td>SUNS</td>
<td>Soybean Uptake &amp; Network Survey, Wave I</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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EXECUTIVE SUMMARY

The soybean value chain includes various links ranging from input suppliers to smallholder farmers, medium and large-scale farmers, traders/aggregators, soybean processors, and end users. This study consisted of mapping the soybean value chain in Mozambique focusing on three regions including in Northeast (Gurué and Nampula districts), Northwest (Angonia district), and Central Mozambique (Sussundenga and Vanduzi districts). The study attempts to understand the challenges and opportunities facing key soybean value chain actors and provided suggestions needed to strengthen the value chain weak links. This value chain analysis was conducted in the summer of 2018. The methods used to conduct this analysis were literature review on soybean value chain, multiple focus group discussions with smallholder farmers, and a structured interview with key soybean value chain participants including input suppliers, medium and large-scale farmers, traders, and processors) in the three regions.

Three research questions guided the analysis of challenges and opportunities among key soybean value chain participants:

1. What are the weak links of the soybean value chain in Mozambique?
2. What can soybean value chain actors do to enhance the value chain system in Mozambique?
3. How is Information and Communications Technology (ICT) being used to enhance soybean value chain performance in Mozambique?

Results of this analysis indicated that input suppliers in the Northeast region were the most organized among the three regions. The three-seed generation scheme involving well-established medium and large-scale farmers members of the Cooperativa de Produtores da Alta Zambézia (COPAZA) was revealed to be the most effective certified seed multiplication system. This model could be adopted in other districts as a viable community-based seed production model. Unlike the three-seed generation scheme practiced in the Northeast, Angonia district (Northwest region) implements a similar community-based seed production scheme under the supervision of local NGOs. Although this model does not generate certified seeds, it is crucial for the sustainability of improved seeds among smallholder farmers. Surprisingly, some large-scale farmers still utilize self-generated seeds. In the Central region, in spite of the adequate production of certified soybean seeds by well-known commercial seed producers, seed inaccessibility in some of the remote villages is a serious threat to the success of the soybean value chain.

Soybean smallholder producers in Mozambique use a variety of farming practices, depending on their location. While many smallholder farmers in Northeast Mozambique have fully embraced the use of improved seeds with the help of the international donor community and research centers (i.e., IIAM, IITA, CLUSA, and TechnoServe), Northwest and Central region’s smallholder farmers still struggle in their quest for efficiently sustainable soybean production practices. The adoption of improved seeds by the Northeast’s smallholder farmers has helped increase the soybean yield from 1.2 tons/ha (an average for most smallholder farmers) to 1.5 tons/ha. In addition, the poverty status of smallholder farmers in Northwest region combined with the interest in soybean production by the smallholder farmers in Central Mozambique, and the fact that soybean is viewed as a reliable cash crop, are sufficient motivating factors for spurring soybean production among smallholder farmers in these regions.
Established medium, large-scale farmers, and emerging commercial farmers have been successfully producing soybean in Mozambique with the assistance of the international donor community and research centers, recording thus soybean yields of 1.8 - 2.3 tons/ha. Contract farming, however, is not observed among these farmers except for the seed certification program whereby participating farmers return 1.5X amount of seeds at harvest to the donors after having previously received an X amount of seeds. The disappearance of contract farming could be attributed to the fact that the system simply collapsed after being introduced in Mozambique. In Northeast Mozambique, COPAZA members have not only played a major extension role of educating smallholder farmers through soybean on-farm demonstrations but also participated in a certified seed multiplication program as community-based seed producers with the assistance of the international donor community. Unlike Northeast’s farmers, Northwest’s medium and large-scale farmers still utilize a combination of improved and self-generated seeds. They also compete with smallholder farmers and other small-scale aggregators for regional soybean markets, mainly informal trade at the Mozambique-Malawi border.

In Mozambique, there are small, medium, and large-scale traders/aggregators. Small-scale aggregators buy soybean from smallholder farmers and sell it to local markets in the community. Medium-scale traders buy soybean at the farm gate and local markets and sell it to the large-scale traders and/or large-scale soybean processors (i.e., poultry and feed mill firms). Large-scale traders finally, and in some instance, large-scale farmers, playing traders’ role, sell soybean to large-scale soybean processors and/or export it regionally (i.e., Zimbabwe) and/or internationally (i.e., India). Soybean markets extend as far as to the Central region of Mozambique whereby Angonia district’s soybean makes its way to the Central region’s large-scale processors (i.e. poultry firms). However, such trade pattern compete with an informal soybean trade at the border Mozambique-Malawi creating soybean shortage in Angonia district. The soybean trader in Northeast Mozambique is thus a strong value chain link given the high volume of soybean supply in the region and the availability of regional and international markets.

The production of soybean in Mozambique is supported by the ever increasing demand for soy oil, soy cake, and poultry feeds. Poultry firms in Nampula procure soybeans from Nampula and Zambezia provinces’ soybean traders/aggregators. Sussundenga poultry firms, however, purchase soybeans directly from Manica and Tete provinces’ medium and large-scale farmers. While large-scale soybean processors such as poultry and feed mill firms are the strongest links in the soybean value chain, small-scale processors including milk, biscuit, and tofu makers still struggle making them the weakest link in the value chain due to the lack of appropriate processing equipment, inadequate training, inaccessibility to financial credit, and limited market opportunities. On the other hand, medium and large-scale soybean processors, particularly feed mills, have their own challenges including lack of adequate quality and quantity of soybean needed to sustain a continuous feed production, soybean price fluctuation creating uncertainty in soybean supply, and a weak enabling environment.

The report finally finds that the use of ICT at all levels of the soybean value chain is limited to mobile phone use mainly for communications, checking commodity prices, and weather information. A few large-scale input suppliers and processors, however, maintain a website presence for introducing their products to the public without engaging in an aggressive marketing campaign.
1. **INTRODUCTION**

Agricultural value chain encompasses the complexity of inputs generation, agricultural production, processing of agricultural commodities, distribution and marketing of processed agricultural products. Understanding the challenges and opportunities of each link in the chain (i.e., input supply, production, trading, processing, and marketing) and providing adequate information to the value chain stakeholders could be key to improving the value chain. The soybean value chain in Mozambique has had 10 years of significant international donor community investment, which has accelerated growth but also brought market distortions (USAID FTF Inova, 2017).

The mapping of the soybean value chain in Mozambique consists of documenting a range of value-adding activities required to bring soybean commodity from production to the final consumer. Several studies have mapped components of the soybean value chain in Mozambique, however, gaps still exist. As indicated by Walker and Cunguara (2016), the expenditure on soybean R&D in Mozambique has been greater than for any other food crop in the country, yet only a small percentage of smallholder and medium-scale farmers plant soybean. Filling missing gaps could help improve the Mozambican soybean industry.

Several areas that need special attention include understanding strengths and weaknesses of the input distribution system, analyzing Mozambique SUNS’ Wave II data to further understand and characterize soybean adoption limiting factors, documenting the prospects for contract farming in targeted soybean production areas, investigating smallholder farmers’ access to credit, documenting domestic and regional soybean trade patterns including cross-border trade, evaluating processing and storage arrangements, and analyzing various marketing channels for soybeans in Mozambique.

This study attempts to understand challenges and opportunities facing soybean value chain key actors and provide suggestions needed for strengthening soybean value chain weak links. This is done by conducting meetings with key soybean value chain stakeholders in Mozambique.

2. **RESEARCH APPROACH**

2.1 **Methods**

This study was conducted in the summer of 2018 using three methods: a literature review, focus group held among smallholder farms in multiple locations, and interviews of medium and large-scale farmers and other relevant actors in the soybean value chain. The literature review consisted of reviewing studies on the soybean value chain in Mozambique and elsewhere (see, for example Hichaambwa, M., et al., 2014 for soybean value analyses for Zambia; ACDI/VOCA 2016 for value chain assessments of multiple crops in

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Mozambique, including soybean; opperman and Varia, 2011 for soybeans in South Africa; Tinsley, 2009 for soybean value chains in Kenya). Focus groups involved discussions with smallholder farmers on their own experience with various aspects of the soybean value chain. Personal interviews were conducted with input suppliers, medium and large-scale farmers, traders, processors, and marketers of soybeans and soybean products. Interviews consisted of conversational discussions with these stakeholders at their respective sites in the study areas. The questions used to guide the smallholder farmers’ focus group discussions and the interview guides used for input suppliers, medium and large-scale producers, traders/aggregators, and processors are documented in the Appendices section to this report.

2.2 Study Area

The study was conducted in three regions of Mozambique where soybeans are being grown: Northeast (NE), Northwest (NW), and Central (C) regions (Figure 1). The specific provinces and districts within provinces are listed in Table 1.

The research team traveled to each of the three regions during summer 2018 to conduct a series of in-depth interviews and farmer focus groups to understand the soybean value chain operating in each region. The team met with farmers including smallholder farmers, and medium and large-scale farmers. Focus groups were organized for smallholder farmers in their respective villages, while medium and large-scale farmers were individually interviewed at their residences and/or farms. Appendices B and C include the smallholder farmer focus group protocol and the medium/large-scale farmer interview guide, respectively. The team also interviewed input suppliers, soybean traders/aggregators, and soybean processors in their respective districts. Interview guides for these value chain actors are included in Appendices A (input suppliers), D (traders/aggregators), and E (processors).

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2 Villages that will be referred to in this report are Rotanda, Nhamani and Namurrequale. Rotanda is in Manica Province, Nhamani in Tete Province and Namurrequele in Zambezia Province.
2.3 Research Questions

This soybean value chain mapping was intended to identify and clarify relationships/linkages among the various key soybean value chain participants including input suppliers, producers, traders, processors, and marketers, and their relevance to the soybean industry. Three research questions that were posed in this study are: (1) What are the weak links of the soybean value chain in Mozambique?; (2) What can soybean value chain actors do to enhance the value chain system in Mozambique?; and (3) How is Information and Communications Technology (ICT) being used to enhance soybean value chain performance in Mozambique?

3. MOZAMBIQUE’S SOYBEAN VALUE CHAIN OVERVIEW

Soybean, a newly introduced cash crop to Mozambique, had not been valued at the same level of importance as common bean in terms of household food security in South Saharan Africa. To some extent, soybean was regarded as a woman’s crop and played an important role of gender equity (Rusike, et al., 2013.)

Soybean production is mainly driven by soy-cake demand from the poultry industry (TechnoServe, 2011). There has been a considerable gap between production and consumption of soybeans in Mozambique since 2009. This shortage gap is estimated at about 30,000 metric tons (MT) of soybeans. In fact, the demand for soybeans in 2018 was projected at 120,000 MT against a production of 85,000 MT. This gap is expected to be filled by imports (SPEED, 2015).

Walker and Cunguara (2016) argue that soybean production has taken off in Mozambique in spite of years of stagnation characterized by the doubt that soybean would become a smallholder’s crop any time soon. A rapid expansion of soybean cultivation in Mozambique can, however be attributed to the role of the international donor community, soybean’s potential for transformative structural change in the Mozambican economy, as well as high market demands. Development and the 2011 release in Mozambique of a set of IITA-developed improved varieties of soybean has also been a contributing factor (Boukar, et al., 2012). As noted by Boukar, et al. (2012), the 2011 release was the first release of improved soybean materials in Mozambique. It is evident that soybean has huge growth potential in Mozambique and is becoming a major cash crop for smallholder farmers (SPEED, 2015).

Yet, soybean production practices are generally poor (with exception of commercial farmers), with low input use, limited irrigation, and poor agronomic practices (Opperman and Varia, 2011). According to
SPEED (2015), the soybean industry in Mozambique is characterized by minimal use of mechanization and wide use of family labor. In addition, only a few small farmers are currently emerging as commercial farmers increasing production areas as well as profits.

In terms of soybean farm typology, SPEED (2015) classifies soybean farmers in Mozambique as smallholder, medium-sized, and large-size producers. Large-size producers cultivate on over 20 hectares (ha) and use own production equipment, improved seed varieties, inoculants with a yield of 1.5-2.2 tons/ha. Medium-sized producers grow soybeans on 10-20 ha using mechanization, inoculants and improved seeds yielding about 1.5 tons/ha while smallholder farmers cultivate on 0-10 ha with no mechanization and little use of inoculants with a yield of 1.2 tons/ha.

Besides input supply and production practices, trade is a critical component of the agricultural value chain. Very often, smallholder farmers find it difficult to obtain the right price for their products and struggle to reach the market or find adequate storage (Opperman and Varia, 2011). Cross-border trade flows of common bean, cowpea, groundnuts, and soybean are exasperated by the difference in supply and demand across markets in neighboring countries resulting from differences in population, income growth, food preferences, production costs, technology and weather. Such trading patterns are often informal making it difficult to accurately record trade data (Rusike, et al., 2013). This has been observed in Angonia at the border with Malawi.

Main buyers of soybeans are the poultry industry, which buys soybeans in bulk from farmers without contracting in advance. Targeted provinces for soybean production are Tete, Zambezia, and Manica. The demand for soybean in these Center-North regions is met by domestic production while the demand in the South (Maputo) is met by imports from South Africa, Argentina, India, and Malawi (SPEED, 2015).

Processing soybean in Mozambique presents some challenges, especially for smallholder farmers who may have to do it manually. Nevertheless, some smallholder farmers thresh soybeans using small threshing machines and store the grains at the farm before selling (SPEED, 2015). In addition, international research centers (i.e., IITA) and donor community train farmers on how to process soybeans (Steve Boahen, personal communication, 2018).

The question looming at the horizon is “how to make soybean industry competitive in Southern Africa?” Two views that command some attention are discussed as follows. On one hand, SPEED (2015) outlines four steps that could make Mozambique a net surplus producer of soybeans, namely reducing transport and logistics costs, improving the overall business environment, pursuing farm-level yield improvement, and supporting demand of value-added products. On the other hand, Walker and Cunguara (2016) frame the competitiveness of the Mozambican soybean industry in terms of investment by both the international donor community and the Mozambican government. Such investment has to be sufficient to ensure a robust and sustained rate of growth in production. Both viewpoints recognize that the prospects for increasing soybean production from small to medium-sized farms are conditioned by some prerequisites or priorities.

Among priorities to be met or missing gaps that could help flesh out and sustain the success story of scaling up soybean production in Mozambique, there are: (i) the assurance of a steady supply and
utilization of quality inoculants; (ii) the analysis of the WEAI+ and the Soybean Uptake & Network Survey (SUNS) Waves I and II to understand farmer adoption and disadoption of soybean and soybean impacts; (iii) an evaluation of contract farming; (iv) a study of Mozambique’s regional comparative advantage in soybean production; (v) the enhancement of mechanical and draft power for emergent farmers sustained by farmer and community-based organizations; (vi) conservation farming research (Walker and Cunguara, 2016); and (vii) improved trade mechanisms and regional markets development.

4. SOYBEAN VALUE CHAIN FINDINGS

4.1 The Mozambique Soybean Value Chain Map

Mozambique’s soybean value chain encompasses several actors including input suppliers, producers, traders, processors, marketers of soybean products, and final consumers (Figure 2).

4.2 Mozambique Soybean Value Chain Opportunities and Constraints

This section summarizes opportunities and constraints facing key actors of the Mozambican soybean value chain. Data reported in this section were collected during our focus group discussion with smallholder soybean producers, and during interviews with input suppliers, commercial soybean producers, traders/aggregators, and soybean processors.

4.2.1 Input Suppliers

Input suppliers play a major role in ensuring inputs availability to producers. Common inputs used for soybean production include seeds, inoculants, lime, fertilizer, herbicide, irrigation system, threshers, etc. While these inputs are widely used in developed countries, their use in low-income countries by smallholder farmers is very limited.

Input suppliers interviewed in Vanduzi, Angonia, Gurué, and Nampula were large-scale soybean producers, agro-dealers, international donor community, and government agencies. Agro-dealers were a mix of large-scale seed producers and local input sellers. Entities representing the international donor community were TechnoServe and Cooperative League of the USA (CLUSA). Other contacted research centers included the International Institute for Tropical Agriculture (IITA) and the Instituto de Investigação Agrária de Moçambique (IIAM).

Phoenix Seeds, a commercial seed company located in Vanduzi, Manica Province was interviewed. Phoenix Seeds is a certified seed company that generates pigeon pea, maize, and soybean seeds for sale. The company sells seeds mostly to medium and large-scale farmers in Central and Northern Mozambique and mainly in Angonia and Gurué districts where most soybean production takes place. Phoenix Seeds is satisfied with its operations but wishes to see smallholder farmers understand the importance of utilizing certified seeds. By using certified seeds combined with inoculants and fertilizer, smallholder farmers would be able to increase soybean yield from 1.2 to 2.0 tons/ha.
When asked whether the seed company collaborates with other agriculture service providers, Phoenix Seeds replied that its collaboration with IIAM consists of seed multiplication. Phoenix Seeds receives new seed varieties that have been tested and released by IIAM. After growing them at large-scale, Phoenix Seeds generates certified seeds and sells them to interested farmers. This is the case of the three newly released soybean varieties tolerant to low phosphorus. The original materials were obtained from South China Agricultural University with the support of the McKnight Foundation (Magalhaes Miguel, personal communication, 2018). Unlike most large-scale farmers interviewed, Phoenix Seeds Co. uses ICT (i.e., website) as a mean of promoting business. Mobile phones are used for day-to-day communications.
However, in remote villages, input suppliers are non-existent. Smallholder farmers have to travel miles to access improved inputs. Rotanda farmers residing 60 km away from Sussundenga town in Manica Province, the nearest larger town[^3], is a good example. Even though farmers have expressed interest in purchasing improved soybean seeds which are tolerant to seed shattering and resistant to rust (see Boukar, et al., 2012), they do not since seeds are not available. As a consequence, they generate their own seeds by keeping a part of harvested soybeans.

In Angonia district, improved seeds are produced by large-scale farmers and community-based seed suppliers[^4]. While large-scale farmers produce seeds for their own use, community-based seed suppliers (i.e., Missao Catolica de Fonte Boa) distribute to smallholder farmers a bag of seeds received from research centers (i.e., IITA and IIAM). After planting and harvesting, smallholder farmers return a bag of seeds to the community-based seed supplier and keep the remaining harvest for sale and for own seeds they will plant during the following growing season. These NGOs, distributing foundation seeds to smallholder farmers in need of improved seeds, replenish their own seed stocks through this scheme and keep giving seeds to other new smallholder farmers in the community.

Unlike the seed certification scheme implemented by a cooperative in Gurué district called Cooperativa de Produtores da Alta Zambezia (COPAZA) (as explained below), the community-based seed supply scheme described above is not a seed certification process and seeds generated through the system are not certified. The seed certification protocol is not observed in this system. The community-based system, however, helps sustain seed multiplication and availability in the community. This model could be adopted by smallholder farmers in other villages and communities (i.e., Rotanda in Sussundenga district and Nhamani in Angonia district).

Input suppliers in Gurué district were the most organized, especially COPAZA’s members who are large-scale farmers. Inputs are also provided by independent local agro-dealers, international donor community, and local Non-Government Organizations (NGOs).

A typical characteristic of 33 Gurué large-scale farmers, members of COPAZA, is to provide technical assistance to small-scale farmers under the supervision of TechnoServe. These proficient large-scale farmers are also certified soybean seed producers and sometimes input suppliers. Under this model, “three seed generation scheme” (Figure 3), six (6) eligible large-scale farmers receive from TechnoServe an amount $X$ of foundation seeds (Generation one—G1), which the farmer plants on 5 hectares of land. At harvest, farmers return $1.5X$ amount of certified soybean seeds (Generation two—G2) to TechnoServe and sell the remaining seeds at a reduced price (45MZN/kg) to a seed processing plant and distribution network Sociedade de Beneficamento de Sementes (SBS) where they own shares. Members of COPAZA are hence SBS co-owners.

Seeds G2 received by TechnoServe from farmers are then given to other 27 COPAZA members for multiplication. The 27 COPAZA members harvest Generation three seeds - G3 - and sell them to SBS at a

[^3]: Chimoio, a larger town than Sussundenga, is about a 2 hour-drive from Rotanda.
[^4]: See Rohrbach, et al., 2002, for a comparison and discussion of community seed production systems.
much reduced price of 35MZN/kg. SBS cleans the seeds (G2 and G3) and sells them to commercial seed dealers at a negotiated price. The seed multiplication process stops with G3 seeds since after the third generation, the seeds are no longer viable. This seed multiplication model has proven to be reliable. It follows rules and regulations of seed certification. As such, the seeds produced under this model are all certified. The model is depicted in Figure 3. These seeds G1, G2, and G3 are referred to as Seeds C0, C1, and C2 respectively (Manuel Tomé Luis Paulo, personal communication, 2018).

In addition to large-scale farmers and seed producers in Gurué district, independent agro-dealers and the international donor community ensure input supply in the district. Large-scale farmers not only produce soybeans for sale but also participate in certified seeds multiplication. Nevertheless, the Northeast region has greater access to agro-dealers and hence, more access to inputs for soybean production than Northwest and Central Mozambique. The international donor community and centers (i.e., IITA, TechnoServe, and CLUSA) have played major roles in developing the input sector for soybean in Mozambique.

Our findings also indicate that most input suppliers in the investigated regions (i.e., Northeast, Northwest, and Central regions) are pleased with current sources of soybean seeds given the price affordability of seeds. Input suppliers believe that smallholder farmers can afford to buy seeds once they receive appropriate training from demonstration plots. This is why extension education and outreach services are very important. Input suppliers have reported that they do not use specialized ICT for their business. They only use mobile phone for communication and also for checking commodity prices in other districts. This could change in the future as the Internet and social media are catching up in Africa.

In summary, as is the case in most Mozambican villages, seed suppliers are limited in number and sometimes are inexistent (Table 2). Small-scale farmers often rely on international donor communities (i.e., CLUSA, TechnoServe, SIL, etc.), local NGOs, and research centers (IITA, IIAM) for their input needs. Even when inputs are available, they are limited to seeds only. In the process, some villages are left out and in some cases they have never heard of the institutions supposed to assist them. This calls for additional extension education and outreach, especially in remote villages. Such functions of extension also are well implemented by large-scale farmers in some districts (i.e., Gurué) through field demonstrations and mentoring with the assistance of the international donor community.

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<tr>
<th>Weaknesses</th>
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<tbody>
<tr>
<td>Input unavailability in remote villages</td>
<td>✓ Work with seed suppliers to provide improved seeds</td>
</tr>
<tr>
<td></td>
<td>✓ Implement community-based seed multiplication scheme</td>
</tr>
<tr>
<td>Rudimentary land preparation</td>
<td>✓ Explore equipment rental</td>
</tr>
<tr>
<td>Lack of soybean threshers</td>
<td>✓ Implement SIL/Ghana manufacturing model</td>
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</table>
Figure 3. Community-Based Soybean Seed Multiplication System

IITA
Foundation seeds to TechnoServe for seed multiplication

TechnoServe
300 kg (X) foundation seeds given to 6 legible farmers

Farmer Seed Producers
6 COPAZA members plant foundation seeds G1 on 5 ha

TechnoServe
450kg (1.5X) certified seeds G2 given back to TechnoServe

Other Farmer Seed Producers
27 remaining COPAZA members plant seeds G2

Farmer Seed Producers
6 COPAZA members plant foundation seeds G1 on 5 ha

Agro-dealers
SBS sells seeds at a negotiated price to seed companies

SBS
SBS buys seeds G2 from farmer seed producers at 40 MZN/kg

Seeds G3
Sold to SBS at reduced price

SBS
SBS buys seeds G3 from farmer seed producers at 35 MZN/kg
4.2.2 Producers

Soybean producers in Mozambique can be grouped into three categories including smallholder, medium-scale, and large-scale producers. Large-scale producers cultivate on over 20 hectares and use production equipment, improved seeds, inoculants with a yield of 1.5-2.2 tons/ha. Medium-scale producers grow soybeans on 10-20 ha of land using mechanization, inoculants and improved seeds yielding about 1.5 tons/ha. Smallholder farmers cultivate on 0-10 ha of land with no mechanization and little use of inoculants with a yield of 1.2 tons/ha.

Smallholder Farmers

Focus groups among smallholder farmers were conducted in Sussundenga, Angonia, Gurué, and Nampula districts. The discussion with farmers focused on various aspects of soybean value chain from the smallholder farmers’ perspective. These aspects were awareness of newly-released soybean varieties, access to inputs, access to credit, production and harvesting, trading, processing, and market outlets.

Scaling up soybean production in Mozambique requires an enabling environment such as utilization of quality inputs (i.e., improved seeds, inoculant, and equipment), empowering of emergent farmers, and adequate regional and international markets.

For Rotanda farmers in Manica province, securing markets for soybean is the upmost priority for scaling up soybean production in the village, followed by the availability and accessibility to improved soybean seeds. This situation is common for most smallholder farmers in Mozambique. A group of smallholder farmers (5 males and 4 females) acknowledged that they were given improved soybean seeds by SIL in 2014. They sowed the seeds, harvested, and kept some soybeans as self-generated seeds for their own use. They were aware of a new soybean variety released by IIAM through an outreach service provided by an IIAM officer posted at the IIAM station in Rotanda.

Rotanda smallholder farmers do not have access to improved inputs (i.e., seeds, inoculant, and fertilizer) for two reasons: (1) soybean seeds are not available in the village or even nearby; and (2) seeds are expensive. They generate their own seeds using a 4-20-76 formula meaning that 4 percent of soybean production is used for family consumption, 20 percent for recycled seeds, and 76 percent for sale.

Rotanda village has no input suppliers. The larger city, Chimoio, is located about 2 hours-drive away. Soybean seeds received from SIL responded well to the local climate conditions with a yield of 1.2 tons/ha. Rotanda smallholder farmers receive seed and technical information from IIAM.

Access to financial credit is inexistent, mainly due to lack of collateral and high interest rate. As expected, Rotanda farmers grow soybeans on a limited area of about 1ha mainly due to lack of nearby markets. Their main source of labor is family labor. Occasionally, they use hired labor but only for weeding. Harvesting and threshing are done manually. Animal traction is used for plowing. Harvested soybean is stored in bags in storage areas located outdoors at the farm.
Smallholder farmers stated that the soybean-enabling environment is inadequate for several reasons including unavailability and unaffordability of improved inputs, lack of markets, and high cost of production.

Rotanda farmers sell their soybeans to traders/aggregators who come to the village to purchase soybeans. Traders contact IIAM technicians and/or extension agents who arrange for meetings between traders and farmers in the village. This process may take up to a week. Farmers are satisfied with this marketing arrangement since they do not have to travel outside of the village given the distance from the nearest large city and given the lack of readily available markets nearby.

In Rotanda, smallholder farmers sell the bulk of the soybeans unprocessed. Unsold soybean is kept in bags at the farm. A small portion of harvested soybeans is processed into cake and soybean milk sold at local markets and sometimes to pupils at local schools.

Rotanda farmers were also asked to document any market outlets (i.e. local, central, retail, wholesale, soybean mills, soybean processors, poultry firms, etc.) where they naturally sell soybean and soybean products. Given the fact that the village is isolated far from major cities, only local markets (i.e., farmers markets and elementary schools) service the village.

ICT is not used by smallholder farmers with the exception that farmers use mobile phones for communication. They receive agricultural news from the radio, IIAM, and Extension agents. Agricultural service providers (i.e., IIAM and Extension Service) transmit needed technical information (i.e., weather, disease outbreaks, etc.) to farmers through face-to-face meetings.

Besides Rotanda village in Sussundenga district, the team conducted a focus group with Nhamani smallholder farmers in Angonia district. Findings from our discussion with 15 smallholder farmers (7 women and 8 men) are reported as follows.

In 2014, Nhamani smallholder farmers received improved soybean seeds (from SIL/IIAM) which they planted and thereafter generated their own seeds. They received another batch of improved seeds from IIAM in 2017. Unfortunately, the 2017 harvest was poor due to drought since they planted soybean late in the season. Smallholder farmers in this village receive technical information from IIAM. They intercrop soybean with maize. Nevertheless, they sometimes plant soybean by itself resulting in a higher yield.

Access to inputs is difficult not because of unavailability of it but mainly due to unaffordability by smallholder farmers. Even though improved soybean seeds are available in Angonia, smallholder farmers cannot afford to buy seeds because they are expensive for them to buy. This is a rational decision in the sense that soybean price paid by traders/aggregators to smallholder farmers is low, making the cost of production higher than the total revenue received by smallholder farmers from selling soybeans. Smallholder farmers used inoculant only once when it was distributed as part of the Soybean Success Kit by SIL/IIAM. Access to credit is a new concept to smallholder farmers in Nhamani village.

In terms of access to credit, smallholder farmers stated that they were not aware of financial credit. In terms of soybean production and harvesting, smallholder farmers cultivate soybeans on less than 1
A hectare of land yielding 1.0 tons/ha on average. Their main source of labor is family labor. Hired labor is not needed due to scarcity of arable land in the village. Soybean is harvested and threshed manually. Grains are stored in bags outside at the farm in designated storage areas.

Like Rotanda smallholder farmers, Nhamani farmers also stated that the soybean-enabling environment is inadequate. According to these smallholder farmers, factors limiting soybean upscaling are unaffordability of improved inputs (i.e., soybean seeds, inoculant, and fertilizer), lack of irrigation system, lack of Extension education programs, and lack of accessible markets (Table 3).

Soybean is harvested and threshed manually. It then is sold to aggregators in 50 kg bags at the farm gate. Nhamani village does not have market outlets. Traders/aggregators buy soybeans from smallholder farmers at the farm state. Smallholder farmers then sell soybeans to traders/aggregators who have much more market power than smallholder farmers. Smallholder farmers are not satisfied with this kind of market arrangement given that the price offered by aggregators is low. Artisanal processing consisting of soybean milk, cake, and porridge is done at a small scale in the village for home consumption.

The use of ICT by smallholder farmers in Nhamani village is limited to mobile phone communication. Mobile phones also are used to acquire information on weather and commodity prices. In addition, smallholder farmers listen to the radio to acquire market information.

Another focus group was conducted in Gurué district with smallholder farmers in Namurrequele village. Results of the discussion with 13 smallholder farmers (7 females and 6 males) are detailed as follows. Most Mozambican smallholder farmers do not use improved seeds and inoculant. However, Namurrequele smallholder farmers are an exception. Not only have they been introduced to new improved varieties of soybean by IIAM, IITA, CLUSA and large scale farmers; they also utilize improved seeds and inoculant on their farms leading to an exceptional soybean yield of 1.5 tons/ha. Namurrequele smallholder farmers stated that they received a 50 kg bag of foundation seeds from IITA, and returned two bags of seeds to IITA as a scheme for seed multiplication, a community-based seed producers model already used by large-scale farmers in Gurué with the difference that Namurrequele recycled seeds are not certified.

Surprisingly, even though organized as a local farmer-based organization (FBO), access to credit is still difficult for this FBO due to lack of collateral. Namurrequele smallholder farmers produce soybeans on an area of approximately 5 hectares for a comfortable yield of 1.5 tons/ha. They receive technical assistance from CLUSA, IITA, and IIAM. Family labor remains their main source of labor. Hired labor consists of mechanical plowing and planting.

Harvesting and threshing are still done manually. As usual, soybean is stored outdoors in specified storage areas. Unlike other villages (i.e., Rotanda and Nhamani), Gurué smallholder farmers have readily available markets either through traders/aggregators who purchase soybeans at the farm gate or through local markets in Gurué. A formula that is utilized for soybean use is 4-7-89 whereby 4 percent of produced soybean is used for personal consumption, 7 percent for recycled seeds, and 89 percent for sale.
Soybean is processed into soybean milk, oil, or porridge for both sale and household consumption. As indicated by most smallholder farmers, the soybean-enabling environment is still inadequate. Constraints are soybean low price, training in seed production, and no access to credit.

Table 3. Smallholder Farmers: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited use of quality inputs</td>
<td>✓ Improve the soybean value chain enabling environment including utilization of quality inputs</td>
</tr>
<tr>
<td>Poor production practices</td>
<td>✓ Demonstrate and teach good soybean production practices using the services of large-scale farmers</td>
</tr>
<tr>
<td>Market inaccessibility</td>
<td>✓ Develop and improve local, national, and regional markets</td>
</tr>
<tr>
<td>Limited access to Extension education services</td>
<td>✓ Encourage Extension education services through government and private sector</td>
</tr>
</tbody>
</table>

**Medium and Large-Scale Farmers**

Medium and large-scale farmers in the Northwest region’s Angonia district procure certified soybean seeds from large agro-dealers (i.e., AgroSikadzakokha). However, most farmers reported that they generated their own seeds afterward. In addition to soybean, farmers grew maize, common beans, pigeon peas, cowpeas, and sometimes vegetables.

The particularity of the Gurué (Northeast region) large-scale farmers is their membership in COPAZA. As COPAZA’s members, farmers receive assistance from the international donor community (i.e., IITA, TechnoServe, CLUSA), and agro-dealers, which provide foundation seeds in the process of seed certified multiplication. As a part of their production practices, farmers utilize sometimes improved certified seeds, inoculants, and fertilizer. In addition to soybeans, they grow other crops such as maize, common beans, pigeon peas, cowpeas, and horticultural products. Pigeon pea is the most grown crop in Mozambique due to a market-ready export to India.

Contract farming is not observed among Gurae farmers except for seed certification whereby they return 1.5X amount of seeds at harvest to the donors after having previously received an X amount of seeds.

Medium and large-scale farmers reported a yield of 1.8 to 2.3 tons/ha. When asked if growing soybean would reduce the production of other commodities, they confirmed that it was not the case. This is different from for smallholder farmers who are constrained by land, labor and/or equipment, and thus are more likely to reduce production of other commodities to grow soybeans (see Findeis, et al, 2018).

Most extension and outreach service support is provided by private organizations including the international donor community (i.e., IITA, TechnoServe, and CLUSA) and agro-dealers. Medium and large-scale farmers ranked TechnoServe first followed by CLUSA and IITA in terms of technical assistance and outreach service.

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5 Actually, increasing the production of soybean would increase the total revenue as soybean has become a cash crop in Mozambique.
In order for them to be successful, large-scale farmers in Gurúé expressed training needs in seed production and certification. Constraints encountered in soybean production are labor shortage during harvest, and a high cost of production.

When asked about why they still grow soybean, they replied that soybean was still a cash crop. Soybean is a good source of income especially when the market price is high. As opposed to smallholder farmers, medium and large-scale farmers have access to financial credit through the assistance of the international donor community (TechnoServe). However, some farmers acknowledged that they would not deal with financial institutions due to many loan requirements. In addition, banks are not eager to serve farmers, invoking the risky nature of the agricultural business.

Gurúé’s farmers have no problem selling soybeans. Soybean buyers are readily available. There are markets in the Gurúé area, and traders/aggregators buy soybeans from farmers at the farm gate and sell in Gurúé market. Other traders buy soybeans to be exported to Asia. The major constraint facing producers is low price that is dependent on (domestic and world) supply and demand for soybeans. Soybean processing at the farm level consists only of threshing. While most soybean is harvested manually, threshing is mechanized (Table 4.)

Some large-scale farmers are advocating for a price support program by the government (like other cash crops such as tobacco) and also for the Servicio de Informacao de Mercados Agrícolas (Agricultural Statistics Service) to help them with their farm business. Large-scale farmers complaints about the cost of production being high due to the high price of farm equipment.

The use of ICT is limited to mobile phone, mainly for communication and price determination. This applies to both smallholder and large-scale farmers. The use of ICT will only intensify in the future with the improvement of this technology in Africa given the fact that even a few years ago, ICT was not widely used.

Table 4. Medium and Large-Scale Farmers: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>International donor community’s</td>
<td>✓ Support Gurúé farmers’ transition from international donor community-supported to independently sustained soybean producers through good management practices</td>
</tr>
<tr>
<td>dependency</td>
<td>✓ Expand this model to other soybean production areas (i.e., Tete and Manica provinces)</td>
</tr>
<tr>
<td></td>
<td>✓ Investigate contract farming and causes of its failure</td>
</tr>
<tr>
<td>Use of both certified and recycled</td>
<td>✓ Support the use of a full range of improved inputs including certified soybean seeds using increased yield argument</td>
</tr>
<tr>
<td>seeds</td>
<td></td>
</tr>
<tr>
<td>Limited use of inoculant, lime,</td>
<td>✓ Convince large-scale farmers of the benefits of using inoculant and other related inputs</td>
</tr>
<tr>
<td>fertilizer, and herbicide</td>
<td></td>
</tr>
<tr>
<td>Soybean harvested manually</td>
<td>✓ Establish and/or support a leasing program through group action (i.e., Farmer based organizations, etc.)</td>
</tr>
<tr>
<td>Lack of agricultural statistics data and services</td>
<td>✓ Work with the Ministry of Agriculture and Food Security as well as research centers to make agricultural statistics data available to farmers</td>
</tr>
</tbody>
</table>
4.2.3 Traders

Soybean traders play a major role of servicing both soybean producers and processors. Traders can import soybeans to meet domestic soybean processors’ demand and/or aggregate domestic production whenever needed and hence referred to as aggregators.

There are small, medium, and large-scale soybean buyers and sellers in Mozambique. Small and medium-scale traders purchase soybean directly from farmers (i.e., at farm gate and in local markets) and sell it to the large buyers. Large-scale traders in Angonia and Gurué buy soybeans from local markets and nearby farmers and export it to Asia (i.e., India). Some large-scale farmers also play the role of aggregators when soybean is needed in high volumes by large-scale buyers (i.e., feed mills).

There also exists an informal soybean trading pattern occurring in Angonia whereby soybean is sold at a high price across the Mozambique-Malawi border. According to USAID FTF Inova (2017), such trading could be estimated at 15 percent of all Mozambican soybean production.

Due to price fluctuation, traders in Angonia complained that the 2018 soybean price was low and this negatively affected their profit. Large-scale traders sometimes use storage facilities to keep their grains and sell when the market price is favorable. They would not sell even in small volume due to logistics issue. The average soybean sale per season per trader amounts at 800 MT.

Large-scale traders have access to finance through commercial banks. It is a personal decision to deal or not with banks mainly based on high interest rate charged by commercial banks. Most traders do not need training given that their occupation involves simply buying and selling. The majority of traders buy and sell soybeans domestically. Exporting would require an export license and other transportation logistics. Unlike smallholder farmers who can sell across the border, given that traders move large volumes of soybeans, they cannot sell illegally to Malawi buyers.

Traders do not use specialized ICT since their market is well established. Their clients are already known and are almost the same from year-to-year. Soybean is sold unprocessed, usually after threshing. Price is determined by the world and domestic markets through the forces of supply and demand. Constraints encountered by traders in Angonia consist mainly of soybean shortage. Several factors contribute to the shortage including poor quality seeds used by smallholder farmers, limited use of improved inputs (i.e., inoculants, fertilizer, and irrigation), and informal sale of soybeans across the border at a high price. Table 5 describes constraints and opportunities facing soybean aggregators/traders.

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor infrastructure making soybean trading expensive</td>
<td>✓ Improve access to the farm gates by providing adequate roads</td>
</tr>
<tr>
<td>Poor or inexistent storage facilities</td>
<td>✓ Assist farmers in the search and implementation of better storage facilities</td>
</tr>
<tr>
<td>Weak soybean regional markets</td>
<td>✓ Investigate informal cross-border trade pattern to better understand local collaborative/cooperative behavior among Mozambique-Malawi soybean traders&lt;br&gt;✓ Investigate the weakness of soybean regional markets</td>
</tr>
</tbody>
</table>

Table 5. Soybean Primary Aggregators/Traders: Weaknesses and Opportunities
4.2.4 Processors

Large-Scale Processors

Soybean processors transform soybeans into soybean meal, oil, and various soybean products for human consumption. Other soybean processors such as feed manufacturers further process soybean meal into animal feed. In Mozambique, there are small and large-scale processors. Large-scale processors, mainly poultry feed firms, are major buyers of soybeans. The poultry feed industry has a consistent and growing demand for soybean that is higher than domestic production. According to TechnoServe and SPEED (2016), the estimated demand for soybean in Mozambique in 2018 was 120,000 MT compared to an estimated domestic supply of 85,000MT.

Two major poultry firms (i.e., Abilio Antunes in Manica Province and Novo Horizontes in Nampula Province) interviewed in summer of 2018 provided their perspectives on the soybean value chain as follows. Soybean is processed into soybean cakes and crude oil as a major ingredient in poultry feed. Most of the production is utilized in-house while a small portion is sold domestically as well as exported to neighboring countries. Most soybean purchases (90%) come from Tete, Zambézia, and Gurué and the remaining (10%) is purchased locally.

Soybean is acquired through large purchases from medium and large-scale farmers who deliver the produce to the poultry firms as well as through well-established Angonia, Gurué, and Zambézia traders who deliver soybeans to the firms. Annual soybean purchases for large-scale processors (i.e., poultry industry and feed mill firms) range from 500 to 10,000 MT.

A contract farming scheme, supposed to secure soybean supply to these processors has collapsed. Hence, soybean supply is secured through large-scale producers, traders, and FBOs. Processors also purchase soybeans from smallholder farmers provided that they have acceptable quality and quantity of soybeans (i.e., a minimum of 1 MT).

Common constraints facing large-scale processors include lack of adequate quality and quantity of soybeans to sustain continuous feed production, soybean price fluctuation causing uncertainty in soybean production and hence affecting feed production, and a weak enabling environment (Table 6). It is very important to empower emerging commercial farmers, who should step up to the task of producing consistent volumes to fill the gap.

Most large-scale processors have access to financial credit through commercial banks. Some processors are financially self-sufficient and therefore do not need financial credit. Even though large-processors did not indicate specific training needs, they are however, aware of changing technology and are eager to learn new ideas on processing and feed quality. Soybean feed mill managers, on the other hand, expressed training interest in grain grading, storage, and quality control.

The use of ICT is limited to Internet presence online with minimum or little advertisement given that soybean products (i.e., cake, oil, feeds) are known to local buyers. Some firms, however, do not have
websites. Most advertisement is done locally at the farmers’ markets and face-to-face encounters since the market is well established and secure.

Table 6. Soybean Large-Scale Processors: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
</table>
| Limited supply of locally produced soybean | ✓ Encourage local soybean production to support local large-scale processors, which will minimize soybean transportation costs  
|                                        | ✓ Organize smallholder farmers capable of consistently delivering 1 MT of soybeans to already committed poultry firms |
| Soybean shortage                       | ✓ Ensure market coordination among soybean producers and traders in order to minimize shortage  
|                                        | ✓ Organize smallholder farmers to secure local steady soybean supply to processors |
| Inadequate grain grading               | ✓ Provide requested training in grain grading and storage                      |
| Poor product quality control           | ✓ Provide requested training in grain processing, feed quality, and quality control |

**Small-Scale Processors**

Small-scale/artisanal processors are also actors in the soybean value chain even though they represent a small portion of overall soybean purchases in the system. Small-scale processors interviewed in Gurué and Nampula gave an account of their operations as follows.

Often time, small-scale soybean processors are their own soybean suppliers since they also produce soybeans to sustain their processing operations. Others acquire soybean supply from the market or directly from farmers at the farm gate.

In Gurué, small-scale processors acquire on average 500 kg of soybeans annually for processing. Most soybean is processed into food products (i.e., bread, cake, soybean milk, tofu, yogurt, biscuits, coffee, etc.) for human consumption. Soybean is ground into flour at milling facilities before being further processed.

Some artisanal processors are organized into a cooperative with the help of the international donor community (i.e., TechnoServe). As members of a cooperative (i.e., Associacao de Namurrequele), processors who also are smallholder farmers sell their soybeans to the cooperative. The average quantity of soybeans used annually for processing at the cooperative varies between 0.5 and 1 MT.

Due to lack of collateral, artisanal processors do not have access to financial credit. Training needs include learning adequate soybean processing operations and skills, food handling and safety, leadership and management skills. Artisanal processors’ use of ICT is limited to mobile phones for local communication and commodity price inquiry. The excuse given for not using ICT is that their soybean products are sold locally and already known in the village.
Constraints encountered by soybean artisanal processors are poor management (of the cooperative), difficult access to financial credit due to lack of collateral and high interest rate, weak and limited market, lack of appropriate processing equipment, and poor transportation means. Alleviating these constraints could help increase the capacity of artisanal processing operations (Table 7).

Table 7. Soybean Small-Scale Processors: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of adequate processing equipment</td>
<td>✓ Organize small-scale processors into a cooperative in order to take advantage of collective actions including acquiring equipment, processing facility, financial credit, etc.</td>
</tr>
<tr>
<td>Lack of processing facility</td>
<td>✓ Work with the municipality to locate vacant facility in the community to be used for free or at a nominal fee</td>
</tr>
</tbody>
</table>
| Limited access to financial credit | ✓ Train processors on financial credit application  
✓ Help them secure loan through a third party’s collateral and/or collective cooperative assets mechanism |
| Limited soybean processing skills  | ✓ Train small-scale processors processing skills for diverse soybean products |
| Inadequate food safety compliance  | ✓ Organize training in food safety                                             |
| Limited leadership and management skills | ✓ Provide leadership and management training                        |
| Limited soybean product markets    | ✓ Work with processors to open up local markets                               |

4.2.5 Marketers

According to Merriam-Webster (2018), a marketer is defined as person or company that advertises or promotes a good or a service. It is also defined as a person that deals in a market specifically by selling a product or a service. In the context of this report, the second definition is utilized.

Soybean product marketers are therefore wholesalers and retailers who service final soybean consumers (i.e., animal and human consumption). They service soybean end-users domestically and internationally. While soybean traders/aggregators mainly handle soybean commodities from producers to processors domestically and sometimes internationally, soybean marketers usually sell processed soybean products to the final consumer (i.e., humans and livestock) domestically and/or internationally.

Beside large-scale processors who take advantage of the size of their operations and benefits associated with it, small-scale soybean processors and soybean marketers are very limited in the scope of their operations. Without a considerable enabling environment, these soybean marketers will not succeed. Hence, enhancing this segment of the soybean value chain and improving local, regional, and international markets for soybean and soybean products will facilitate soybean scaling up in Mozambique (Table 8).
### Table 8. Soybean Marketers: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limited advertisement/promotion of soybean products</td>
<td>✓ Promote the consumption of soybean products through advertisement and other monetary incentives</td>
</tr>
<tr>
<td>Limited supply of soybean products in the school lunch program</td>
<td>✓ Encourage the incorporation of soybean products in the school lunch program</td>
</tr>
</tbody>
</table>
| Limited value addition of soybean products in the diet | ✓ Encourage the use of soybean as a significant ingredient in the Mozambican diet  
✓ Introduce SIL nutritional technologies and products into Mozambique to support soybean scaling up  
✓ Initiate collaborative partnerships between SIL nutrition researchers and research centers and Mozambican universities’ researchers |

## 5. DISCUSSION

This report provides an analysis of the soybean value chain in Mozambique. The study was conducted in the summer of 2018. The analysis involved multiple focus group discussions with smallholder farmers and a structured interview with soybean value chain key participants (i.e., input suppliers, medium and large-scale farmers, traders, and processors) in Northeast, Northwest, and Central Mozambique. The specific districts include Nampula, Gurué, Angonia, Vanduzi, and Sussundenga. Three research questions helped guide the assessment of soybean value chain in Mozambique:

- What are the weak links of the soybean value chain in Mozambique?
- What can soybean value chain actors do to enhance the value chain system in Mozambique?
- How is Information and Communications Technology (ICT) being used to enhance soybean value chain performance in Mozambique?

We will first discuss the results of our analysis in the three study areas: Northeast, Northwest, and Central Region; then we report on ICT as a tool for enhancing the performance of the soybean value chain in Mozambique.

As indicated in our introductory statement, understanding the challenges and opportunities of each chain in the soybean value chain system and providing adequate information to the value chain stakeholders could be the key to improving the soybean value chain in Mozambique. This was the essence of the soybean value chain mapping analysis.

### 5.1 Northeast Region

The assessment of the soybean value chain indicates that in the Northeast region (Gurué and Nampula districts), input suppliers were the most organized among the three regions, especially in Gurué where the COPAZA certified seeds multiplication scheme is implemented. This community-based seed production model could be adopted in other districts since it has proven to be successful. As indicated in
SUNS Wave I (Findeis, et al., 2018), the scale of soybean production in Northeast Mozambique is on average larger than elsewhere in Mozambique. Gurué smallholder farmers have been introduced to new improved varieties of soybean by IIAM, IITA, and CLUSA. Consequently, they have adopted improved seeds on their farms yielding an exceptional production of 1.5 tons/ha, higher than the average yield (1.2 tons/ha) for most Mozambican smallholder farmers. In addition, the accessibility to markets has contributed to the success of soybean production in the district.

Medium and large-scale farmers in the Northeast region (Gurué) not only produce soybean with a yield ranging between 1.8 and 2.3 tons/ha but also participate in a certified seed multiplication program as community-based seed producers with the assistance of the international donor community and centers (CLUSA, TechnoServe and IITA).

Gurué medium-size traders have the advantage of buying soybeans from the farm gate and local markets and selling it to large-scale traders, who in turn sell it to large-scale soybean processors (i.e., poultry firms and feed mills) and/or export it overseas (reported as mostly to India). A high soybean production combined with a readily available market make the trading value chain link strong, particularly in Northeast Mozambique.

The production of soybean the Northeast region is further spurred by poultry industries with their increasing demand for poultry feeds. Gurué soybean production makes its way to Nampula through well-established soybean traders. Nevertheless, small-scale soybean processors remain the weakest link in the soybean value chain given the constraints they face (i.e., poor management skills, difficult access to financial credit due to lack of collateral and high interest rate, weak and limited market, lack of appropriate processing equipment, and lack of transportation equipment).

### 5.2 Northwest Region

Results of the soybean value chain investigation for the Northwest region (Tete Province) are discussed as follows. In spite of the availability of improved inputs through agro-dealers, improved inputs (i.e., certified seeds and inoculants) are not commonly used by large-scale farmers. Surprisingly, some large-scale farmers utilize self-generated seeds. A community-based seed multiplication scheme is implemented by local NGOs in Angonia. Even though this seed multiplication model does not generate certified seeds, it is still crucial to the sustainability of improved seeds among smallholder farmers. Initial foundation seeds provided by IITA and IIAM to local NGOs help refresh and replenish seed stocks, which are provided to smallholder farmer seed producers.

As documented by SUNS Wave I (Findeis, et al., 2018), Northwest (Angonia) households tend to be poorer than those in other regions are. As such, smallholder farmers, seeing the benefits of soybeans as an important source of income, are catching up to their Gurué counterparts with a higher rate of soybean adoption. Yet, some farm communities in the district still need to be introduced to local NGOs and the international donor community that provide improved inputs (i.e., community-based seed production model) and technical assistance.
Large-scale farmers on the other hand utilize a combination of certified and self-generated seeds. Soybean markets for these farmers extend as far as the Central region where there is a high demand for soybeans by large-scale processors. Nevertheless, an informal trade of soybeans at the border Mozambique-Malawi creates soybean shortage in Angonia making it difficult for traders to satisfy the demand for soybean in the district and elsewhere.

While small-scale processors in Angonia experience the same constraints facing most small-scale processors in Mozambique, Angonia large-scale processors—mainly feed mill firms—have their own challenges including lack of adequate quality and quantities of soybeans to sustain continuous feed production, soybean price fluctuation causing uncertainty in soybeans supply and feed production, and a weak enabling environment.

### 5.3 Central Region

Input suppliers in the Central region (Manica Province) comprise of agro-dealers and commercial seed producers. Commercial seed producers believe that smallholder farmers are able to buy seeds provided they receive appropriate training such as Extension education and demonstration plots. Seed inaccessibility in some remote villages remains a serious threat to the success of the soybean value chain in the region. This, combined with the fact that smallholder farmers in the Central region appear to be attracted by other income-earning enterprises (i.e., forest products, other legumes, and vegetables) are an indication of a weak link in the value chain. This situation is even intensified by the fact that Central region farmers have the lowest soybean adoption rates despite their interest in soybean production (Findeis, et al., 2018).

Large-scale processors in Central Mozambique, mainly major poultry firms are vertically integrated firms with a good influence on soybean processing activities including soy cake, oil, and poultry feeds. Their largest supply of soybeans comes from the Northeast region. These firms including large-scale farmers in other regions have the advantage of accessing financial credit through commercial banks and to some extent, they are financially self-sufficient. On the other hand, small-scale processors and smallholder farmers still need assistance in all aspects of their business operations in order to strengthen weak links in the value chain.

### 5.4 Information and Communications Technology as a Tool for Enhancing Soybean Value Chain

Finally, and perhaps surprisingly, we find that the use of ICT at all levels of the soybean value chain is limited to mobile phone use mainly for communications, checking commodity prices, and weather information. Nevertheless, most recently, IIAM started using mobile phones for agronomic data collection and analysis with farmers using ClimMob software under the supervision of public extension officers (Magalhaes Miguel, personal communication, 2018). A few large-scale input suppliers and processors also maintain a website presence for introducing their products to the public without engaging in an aggressive marketing campaign. The main reason given for not utilizing ICT was that most goods sold by respective
soybean value chain participants are locally or domestically traded and obviously known to the public. Table 9 provides some suggestions aimed at improving the ICT sector.

Table 9. Soybean ICT: Weaknesses and Opportunities

<table>
<thead>
<tr>
<th>Weaknesses</th>
<th>Opportunities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of ICT limited to mobile phone use mainly for communication, price, and</td>
<td>✓ Provide ICT training at all levels of the soybean value chain</td>
</tr>
<tr>
<td>weather information</td>
<td>✓ Design agricultural statistics database in collaboration</td>
</tr>
<tr>
<td></td>
<td>✓ with the Ministry of Agriculture and Food Security to be shared with key</td>
</tr>
<tr>
<td></td>
<td>✓ value chain actors</td>
</tr>
<tr>
<td></td>
<td>✓ Encourage mobile data access as appropriate tool for</td>
</tr>
<tr>
<td></td>
<td>✓ agricultural data dissemination across districts</td>
</tr>
</tbody>
</table>

6. **LESSONS LEARNED AND FUTURE ACTIONS**

6.1 **Input Supply**

*Lessons Learned*

Input suppliers are non-existent in some remote villages of Central Mozambique. Most smallholder farmers generate their own seeds due to the unavailability and unaffordability of improved seeds in the villages. Improved soybeans inaccessibility is thus a serious threat to the success of the soybean value chain in the region. The *three-seed generation scheme* involving well-established medium and large-scale farmers members of the *Cooperativa de Produtores da Alta Zambezia* (COPAZA) is the most effective certified seed multiplication system in the country. A similar community-based seed production scheme implemented in Northwest Mozambique does not generate certified seeds, but it is crucial for the sustainable use of improved seeds among smallholder farmers.

*Actions*

- Ensure improved seeds availability and accessibility in remote villages where soybean is produced
- Facilitate partial farm mechanization through equipment rental mechanism by smallholder farmers
- Introduce soybean threshers into the farming communities using the SIL/Ghana thresher manufacturing model
- Generate soybean cost of production and profitability educational materials for the farming community in Mozambique in collaboration with SIL researchers, IITA, IIAM, researchers from Mozambican universities, and the private sector.

6.2 **Soybean Production**

*Lessons Learned*

Smallholder farmers in Northeast Mozambique have fully embraced the use of improved seeds with the help of the international donor community and research centers. Central region’s smallholder farmers
have the lowest soybean adoption rates despite their interest in soybean production. A higher poverty rate among Northwest’s smallholder farmers could be an incentive for smallholder farmers in this region to adopt soybean as a new reliable cash crop. Medium and large-scale farmers have been successfully producing soybean in Mozambique with the assistance of the international donor community and research centers. Contract farming, however, is not practiced given its past failure. In Northeast Mozambique, COPAZA members have not only played a major extension role of educating smallholder farmers but also have participated in a certified seed multiplication program as community-based seed producers. Unlike Northeast’s farmers, Northwest’s medium and large-scale farmers still utilize a combination of improved and self-generated seeds.

**Actions for Smallholder Farmers**

- Improve the soybean value chain enabling environment including utilization of quality inputs, use of better soybean production practices, and accessibility to local, national, and regional markets.
- Encourage the extension education endeavor through well-established medium and large-scale farmers.
- Improve local, national, and regional markets
- Continue to document the limiting factors for soybean adoption by smallholder farmers (SUNS I and II)

**Actions for Medium and Large-Scale Farmers**

- Support the medium and large-scale farmers’ transition from international donor community-supported to independently sustainable soybean producers (starting with the Northeast region)
- Expand this farmers’ transition model to other soybean production areas including Tete and Manica provinces.
- Encourage the use of a full range of improved inputs by farmers including improved seeds, inoculant, lime, fertilizer, and herbicide so as to obtain high yields.
- Provide much needed training in seed production and certification as requested by farmers themselves
- Provide requested agricultural statistical data and services
- Adopt the COPAZA’s *three-seed generation scheme* to other districts as a viable community-based seed multiplication model
- Investigate the prospects for contract farming failure in targeted soybean production districts and provide solutions and/or other alternative farming arrangements

**6.3 Soybean Primary Aggregation/Trading**

*Lessons Learned*

Small-scale aggregators buy soybean from smallholder farmers and sell it to local markets in the community. Medium-scale traders buy soybean at the farm gate and local markets and sell it to the large-scale traders and/or large-scale soybean processors (i.e., poultry and feed mill firms). Large-scale traders, on the other hand, and occasionally, large-scale farmers (playing traders’ role), sell soybean to large-scale soybean processors and/or export it regionally and/or internationally. However, the national trade
pattern sometimes competes with an informal soybean trade observed at the border Mozambique-Malawi creating soybean shortage in neighboring districts. The soybean trade in Northeast Mozambique is a strong value chain link given the high volume of soybean supply in the region as well as the availability of regional and international markets.

**Actions**

- Improve the soybean value chain enabling environment (i.e., adequate roads) consisting of accessibility to farm gates by small-scale aggregators
- Improve storage facilities in order to allow soybean traders to better control soybean supply and price fluctuation
- Investigate the informal cross-border trade pattern observed in Angonia district in order to better understand the local collaborative/cooperative behavior among Mozambique-Malawi soybean traders/aggregators

### 6.4 Soybean Processing

**Lessons Learned**

The production of soybean in Mozambique is supported by the ever increasing demand for soy oil, soy cake, and poultry feeds. Poultry firms in Nampula procure soybeans from Nampula and Zambézia provinces’ soybean traders/aggregators. Sussundenga poultry firms, however, purchase soybeans directly from Manica and Tete provinces’ medium and large-scale farmers. Even though large-scale soybean processors such as poultry and feed mill firms are the strongest link in the soybean value chain, they have their challenges including lack of adequate quality and quantity of soybean needed to sustain a continuous feed production, soybean price fluctuation creating uncertainty in soybean supply, and a weak enabling environment. On the other hand, small-scale processors still encounter several constraints including the lack of appropriate processing equipment, inadequate training, inaccessibility to financial credit, and limited market opportunities.

**Actions for Small-Scale Processors**

- Organize small-scale processors into a cooperative in order to take advantage of collective actions
- Help small-scale processors secure artisanal processing equipment as well as a processing facility with the assistance with the local municipality
- Help small-scale processors access financial credit using several mechanisms including the provision of the third party’s collateral and/or collective cooperative assets mechanism
- Provide requested training in soybean processing operations, food handling and food safety, leadership and management skills
- Develop and expand local and national markets for artisanal soybean products

**Actions for Large-Scale Processors**

- Ensure the supply of locally produced soybean in order to minimize soybean procurement costs (to the processors, mainly poultry and feed mill firms) due to transportation logistics
- Encourage steady and consistent soybean production in Mozambique in order to sustain soybean processing operations
- Organize smallholder farmers capable of consistently delivering a minimum quality soybean volume of 1MT to the poultry firms
- Provide requested training in grain grading, storage, quality control as well as grain processing and feed quality.

6.5 Soybean Marketing/Market Outlets

Lessons Learned

Soybean product marketers are wholesalers and retailers who service soybean end-users (i.e., animal and human consumption) domestically and/or internationally. While soybean traders/aggregators mainly handle soybean commodities from producers to processors, soybean marketers usually sell processed soybean products to the final consumer. Beside large-scale processors who take advantage of the size of their operations and benefits associated with it, small-scale soybean processors and soybean marketers are very limited in the scope of their operations. Without a considerable enabling environment, these soybean marketers will not succeed.

Actions for Soybean Marketers

- Promote the consumption of soybean products in Mozambique through advertisement and other monetary incentives
- Encourage the incorporation of soybean products in the school lunch program
- Encourage soybean use as a significant ingredient in the nutritional value addition of the Mozambican diet
- Introduce SIL nutritional technologies and products to support the soybean development/scaling up in Mozambique
- Initiate collaborative partnerships between SIL nutrition researchers and Mozambican universities as well as research centers (i.e., IITA and IIAM).

6.6 Information and Communications Technology

Lessons Learned

The use of ICT at all levels of the soybean value chain is limited to mobile phone use mainly for communications, checking commodity prices, and weather information.

Actions

- Provide training on the ICT use at all levels of the soybean value chain
- Team up with the *Ministerio da Agricultura e Segurança Alimentar* (Ministry of Agriculture and Food Security) to develop a nationwide system for agricultural data distribution to stakeholders using ICT
- Encourage mobile data access as an appropriate tool for agricultural data dissemination across districts

7. REFERENCES CITED


Merriam-Webster. 2018. merriam-webster.com


Walker, T., and B. Cunguara. 2016. Taking Stock of Soybean R&D and USAID’s Feed the Future Program in Mozambique. USAID-MEAS.
8. APPENDICES

Appendix A. Interview Guide for Soybean Input Suppliers

MAPPING SOYBEAN VALUE CHAIN IN MOZAMBIQUE
SURVEY QUESTIONS
INTERVIEW GUIDE FOR SOYBEAN INPUT SUPPLIERS
July 15, 2018

INTRODUCTION: Hello! My name is ___________________. We are from Soybean Innovation Laboratory (SIL). SIL is assessing soybean value chain in Mozambique. We would like to talk to you about your experiences in soybean value chain. We are asking your permission to record this conversation. The information collected during this study is confidential and only used for research purpose. We thank you for volunteering your time and accepting to participate in this discussion.

Name of Enumerator: ___________________ Date: ___________________

Name of Respondent: __________________________________________

Position: __________________________________________________________________________

Contact Information: __________________________________________________________________

1. How do you identify yourself? [seed supplier, community-based seed producer, input supplier, specify type of inputs]
2. What types of soybean inputs do you sell?[seed, inoculum, chemical fertilizer, equipment, other]
3. How do you procure your soybean inputs? [source of input supply]
4. How well are you satisfied with the current source of soybean inputs? [not satisfied, satisfied, very satisfied]
5. If not satisfied with current source of soybean inputs (distribution/purchasing system), how would you improve the system?
6. To whom do you sell your soybean inputs? [small-scale, medium, large-scale farmers]
7. What is the mode of payment from your customers? [cash, credit, in nature, other]
8. Do you collaborate with any entities? [international donor community, government agencies, others]
9. In your opinion, do you believe that smallholder farmers can buy (afford) on their own soybean inputs? Why/why not?
10. If smallholder farmers are not able to purchase their own soybean inputs, what do you suggest as a way of making soybean input available to them?
11. Do you use ICT for your business? What are the reasons for using mobile phone? [Mobile phone to call, collect prices, YouTube, etc.]. Do you believe that ICT has improved your business?
Appendix B. Smallholder Farmers’ Focus Group Discussion Questions

Mapping Soybean Value Chain in Mozambique
Focus Group

Smallholder Farmers’ Focus Group Discussion Questions
July 15, 2018

Awareness of Newly Released Soybean Varieties
1. Have you heard about improved soybean varieties?
   a. What have you heard about the new improved soybeans? [look, taste, yield, fertilizer needs]
   b. Are you aware of how many new varieties of soybeans have been released? If yes, by whom? [IIAM, IITA, others]
   c. Have you seen these new improved soybeans before at your farm? If yes, where did you buy or acquire them?

Access to Inputs
2. Do you use improved soybean seeds at your farm?
   a. Have you seen new improved soybeans at your farm before?
   b. If yes, where did you buy them?
   c. How well did they grow? Yield?
   d. Where do you receive seed/technical information? [IITA, IIAM, community-based seed producers, other input distributors]
   e. If you did not use improved soybean seeds, explain why not.

3. What are other inputs do you use at your farm?
   a. Do you use other improved inputs beside improved soybean seeds? [inoculant, fertilizer, lime, herbicide, threshers, irrigation equipment, others]
   b. Where do you acquire these inputs? [input suppliers, government subsidies, NGOs, FBOs, IIAM, IITA, other input distributors]

Access to Credit
4. How do you pay for your farm inputs? [Cash/Credit/Loan System]
   a. Are you able to borrow money to buy farm inputs? If yes, where and how [commercial banks, rural microfinance, local moneylender, others; lending/borrowing conditions and arrangements (interest rate, amount, payback years)]. If no, why not? [Access to credit constraints]
   b. How well do these borrowing options serve your needs? [Do they work, are they reliable source of credit, do they require collateral, how much is the interest rate, are they formal or informal loan system?]

Production and Harvesting
5. How much acreage of soybean do you cultivate/grow? [Establish that most smallholder farmers grow soybean on 0-10 ha of land with a yield of 1.2 tons/ha]
   a. What is the area of your farm? [0-10 ha] and yield [1.2 tons/ha]
   b. Where do you receive technical assistance? [TechnoServe, CLUSA, IITA, IIAM, others]
   c. What is the main source of your farm labor? [Family labor]
d. Do you agree that more and more smallholder farmers are now emerging as commercial farmers with increased acreage and profit? If yes, why? If no, why not?

e. How do you harvest soybean? [manually or mechanization?]

f. How do you thresh your soybean? [manually or mechanization?]

g. Where do you store your soybean after threshing before marketing it? [at the farm, at the storage facility]

h. Do you believe that there is adequate soybean enabling environment? [Favorable infrastructure, favorable government policy, government subsidies, favorable investment climate, etc.]

TRADING OPERATIONS
6. From production to processing, how do you think soybean commercialization is organized? [Who is who and doing what in this sector?—Assemblers, storage facilitators, brokers, millers, and others]

   a. Where do you sell your soybean? [Focus on traders—aggregators, brokers, middlemen, and others; who are they? Do they exist?]

   b. Are you satisfied with current types of marketing/trading arrangements/outlets you are involved in?

   c. If not satisfied, what are your suggestions to make it more efficient?

PROCESSING OPERATIONS
7. How do you process your soybean after harvest? [Machinery, storage facility, quantity, soybean products]

   a. After harvesting your soybean, how do you process it? [Small threshing machines, manually, FBOs, etc.]

   b. Do you sell your soybean immediately after threshing or you store it before marketing it?

   c. What additional processing do you do after threshing? [Artisanal/commercial soybean products: grilled grains, flower, milk, oil, etc.]

MARKET OUTLETS
8. Beside traders/aggregators, what are other market outlets for soybean? [Local markets, retail, wholesale, central markets, soy mills, soy processors, poultry, other livestock producers, etc.]

   a. What are existing market outlets where you sell your soybeans?

   b. Do you take your soybean to the market outlets or is it bought by aggregators from your farm? [Implication for transportation costs]

   c. Who does buy the highest proportion of your soybeans? Aggregators or established market outlets?

   d. Are you satisfied with existing marketing channels? If not, what would be your preferences?

ICT USE
9. Do you use ICT for your business? [mobile phone to call, collect prices, YouTube, etc.]

   a. Do you use a mobile phone for your business?

   b. What are the reasons for using mobile phone?

   c. Do you believe that ICT has improved your business?
Appendix C. Interview Guide for Medium and Large-Scale Soybean Producers

Mapping Soybean Value Chain in Mozambique
Survey Questions
Interview Guide for Medium and Large-Scale Soybean Producers

July 15, 2018

INTRODUCTION: Hello! My name is ____________________. We are from Soybean Innovation Laboratory (SIL). SIL is assessing soybean value chain in Mozambique. We would like to talk to you about your experiences in soybean value chain. We are asking your permission to record this conversation. The information collected during this study is confidential and only used for research purpose. We thank you for volunteering your time and accepting to participate in this discussion.

Name of Enumerator: ___________________________________ Date:_________________________________________

Name of Respondent: ____________________________________________

Position: ______________________________________________________

Contact Information: __________________________________________________________________________________

I. INPUT ACQUISITION
1.1 What is the size of your farm? [10-20ha: medium-size; >20ha: large-scale]
1.2 What types of inputs do you use on your farm?
1.3 How do you procure your inputs?
1.4 Who is your input supplier?
1.5 Did you save some soybean grains as your own self-generated seeds?

II. PRODUCTION PRACTICES
2.1 Besides soybean, what else do you grow? [common bean, maize, cowpea, others]
2.2 Are you linked to any international donor community? [IITA, CLUSA, TECHNOSERVE, others]
2.3 Did you sign any production contract with any firm/agency? [contract farming]
2.4 What is the soybean yield at your farm?
2.5 Growing soybean, does it mean growing less of something else like common beans, maize, etc.? [Specify]  
2.6 Do you receive any extension service? If yes, from whom? [private, government agencies, [Specify]
2.7 What agency/entity would rank first in providing extension service? [Agriculture Department, CLUSA, TECHNOSERVE, others]
2.8 What type of extension service do you need to be successful? [Input use/selection training, production practices, trade, marketing, other]
2.9 How do you use your soybean production? [% sold, saved, donated, consumed, used for seeds, and processed] Are you currently satisfied with price received from selling your soybeans? Why/Why not?
2.10 What are the constraints you encounter in soybean production? What are suggestions to address these constraints?

2.11 Do you have access to financial credit? If yes, how? [Formal, informal, harvest consignment arrangement, others]. What do you use the credit you receive for? [buy inputs, other]

2.12 If you do not have access to financial credit, explain why?

III. TRADING
3.1 How do you market your soybean? [sell to aggregators, process, sell to processors]
3.2 What are the soybean marketing constraints you encounter?
3.3 What do you suggest to address these marketing constraints?

IV. PROCESSING
4.1 How do you do threshing of soybean at your farm? [Manual or mechanization?]
4.2 Do you do any processing of soybean at your farm besides threshing? Specify.

V. ICT USE
5.1 Do you use ICT for your business? [Mobile phone to call, collect prices, YouTube, etc.]
5.2 What are the reasons for using mobile phone?
5.3 Do you believe that ICT has improved your business?
Appendix D. Interview Guide for Soybean Traders

MAPPING SOYBEAN VALUE CHAIN IN MOZAMBIQUE
SURVEY QUESTIONS
INTERVIEW GUIDE FOR SOYBEAN TRADERS
July 15, 2018

INTRODUCTION: Hello! My name is _____________________. We are from Soybean Innovation Laboratory (SIL). SIL is assessing soybean value chain in Mozambique. We would like to talk to you about your experiences in soybean value chain. We are asking your permission to record this conversation. The information collected during this study is confidential and only used for research purpose. We thank you for volunteering your time and accepting to participate in this discussion.

Name of Enumerator: __________________________________ Date: ______________________

Name of Respondent: __________________________________________________________

Position: ______________________________________________________________________

Contact Information: __________________________________________________________________

1. How do you identify yourself? [aggregator, trader, middleman, marketer, other]
2. What is your role (task) in soybean value chain and how do you operate? [sell locally, nationally, regionally]
3. Where and how do you acquire soybean/soybean products? [from smallholder farmers, local markets, buying arrangement or contract]
4. How much of soybean do you sell and what frequency? Are you satisfied with the price you receive?
5. Do you have adequate storage facility? How do you store your soybean after buying it (and before selling it)?
6. Do you do any processing of soybeans? If yes, what type of processing? [milk, oil, tofu, other]
7. Do you export soybean/soybean products anywhere/neighboring countries? [Cross-country trading and how]
8. What types of problems do you encounter in marketing soybeans?
9. Do you have easy access to financial credit? If yes, what company/agency? [Formal, informal, other]. If no, why not?
10. Do you have any training needs to promote your business? If yes, in what areas?
11. Are you satisfied with the current status of your business? Why/Why not?
12. Do you use ICT for your business? What are the reasons for using mobile phone? [Mobile phone to call, collect prices, YouTube, etc.]. Do you believe that ICT has improved your business?
Appendix E. Interview Guide for Soybean Processors

MAPPING SOYBEAN VALUE CHAIN IN MOZAMBIQUE
SURVEY QUESTIONS
INTERVIEW GUIDE FOR SOYBEAN PROCESSORS
July 15, 2018

INTRODUCTION: Hello! My name is ___________________. We are from Soybean Innovation Laboratory (SIL). SIL is assessing soybean value chain in Mozambique. We would like to talk to you about your experiences in soybean value chain. We are asking your permission to record this conversation. The information collected during this study is confidential and only used for research purpose. We thank you for volunteering your time and accepting to participate in this discussion.

Name of Enumerator: _______________________________ Date: _______________________________

Name of Respondent: _______________________________

Position: ____________________________________________________________________________

Contact Information: ___________________________________________________________________

1. How do you identify yourself? soybean processor
2. Why do you buy soybean? [to process, other]
3. Where and how do you acquire soybean/soybean products? [smallholder farmers, other]
4. How much soybean do you buy? [quantity and frequency]
5. Do you have any contract with soybean producers? Why? Why not?
6. What soybean products do you make? [oil, milk, flour, other]
7. Where do you sell soybean products after processing? Any export? [nationally, Malawi, Zimbabwe]
8. What types of problems do you encounter in processing and marketing soybeans? [processing equipment, price issues]
9. What suggestions do you have to improve your processing operations?
10. Do you have easy access to financial credit? If yes, what type of credit and how?
11. Do you have any training needs to enhance your processing operations? If yes, in what areas?
12. Do you use ICT for your business? What are the reasons for using mobile phone? [mobile phone to call, collect prices, YouTube, etc.]. Do you believe that ICT has improved your business?