Design of an Information Platform for Foundation Seed Demand (IPFSD) for Seed Trade Association of Malawi (STAM)

By

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INFORMATION PLATFORM FOR FOUNDATION SEED DEMAND & VIT. A MAIZE VARIETIES
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1.0 Executive summary

Pigeon pea yields in Malawi are low and of poor quality. Potential yield averages 2.0 metric tons/ha against the average yield of 0.8 metric tons/ha realised by farmers (ICRISAT, personal communication). One of the causes of the low productivity and low quality is that farmers have limited access to certified seed of improved varieties. Industry stakeholders report that one of the reasons for this is that certified seed producers do not have ready access to foundation seed for production of the certified seed due to poor coordination among the key actors in the industry. The purpose of this assignment was to investigate the current foundation seed situation with the major objective of improving the communication channels on foundation seed requirements. The specific objectives were to understand the current demand for foundation seed, identify challenges in the provision of adequate quantities of foundation seed, and provide recommendations on how this can be improved. The investigation revealed that among a number of factors causing low demand and limited access to foundation seed of improved varieties by seed companies, there is poor coordination in the private/public partnership despite the efforts of Seed Trade Association of Malawi (STAM) in promoting use of certified seed, undertaking policy work on seed trade and regulatory work while acting as an information hub on seed and related issues. The poor coordination makes the private sector unresponsive to public sector efforts, resulting in low demand or limited access to foundation seed by seed companies. The Business Innovation Facility (BIF) undertook to work with STAM to facilitate design and use of an information platform for STAM to improve coordination among the key actors in the seed industry in an effort to improve access to foundation seed. This will ultimately result in an increase in demand for the foundation seed by seed companies.

2.0 Introduction

Smallholder Pigeon pea farmers in Malawi realize low yields of low quality predominantly because of poor agronomic practices and post-harvest handling techniques; low uptake of seed of improved varieties and crop protection technologies. According to ICRISAT (personal communication) potential yield of pigeon peas averages 2.0 metric tons/ha. However, smallholder farmers in Malawi realize on average 0.8 metric tons of relatively poor quality crop per hectare. As such the crop does not obtain a premium price aggravated by the

fluctuating export prices. Therefore, the enterprise does not show its real potential market value. Poor access to certified seed is partly attributed to lack of breeder seed which subsequently leads to lack of foundation seed for production of the certified seed. This exists despite the pigeon pea seed system having a vibrant breeding component propelled by DARS and ICRISAT. The two public breeding institutions also produce foundation seed. Despite the efforts of the public sector, private seed companies seem unresponsive to the vibrant breeding programmes and supply of foundation seed by the public sector although pigeon pea market potential is unquestionable. There is an increasing domestic demand for pigeon peas for food and feed products. The Indian subcontinent presents a huge ready market for pigeon peas. Therefore, an investigation into the unresponsiveness of the private sector to the public sector efforts was conducted with the major objective of improving the communication channels on foundation seed requirements. Specific objectives were firstly to understand the current demand for foundation seed and identify challenges in the provision of adequate quantities of foundation seed. Secondly, to devise and implement an appropriate intervention that will facilitate an increase in demand and supply for foundation seed. The investigation revealed that there is lack of proper coordination in the private/public partnership with respect to foundation seed demand despite the efforts of STAM. STAM, as an umbrella body of the 24 seed companies in the industry, endeavours to promote use of certified seed, work towards a policy environment that facilitates seed trade nationally and across borders, control seed production and marketing while acting as an information hub on seed and related issues. The investigation further revealed that seed companies strongly believe that the efforts of STAM have registered partial success not only because of poor coordination and weak private/public partnership but also partly because of poor governance on the part of STAM, low technology adoption by smallholder farmers, negative side effects of FISP, slackened regulation on importation of parent materials as well as inadequate breeders and absence of breeders' rights, among other setbacks. The Business Innovation Facility (BIF) undertook to work with STAM to facilitate the design and use of an information platform in the pigeon pea seed system as an intervention that seeks to stimulate improved coordination in the private/public partnership in the seed business. It was envisaged that with more accurate and timely information on foundation seed demand, this intervention would result in increased accessibility of foundation seed

3.0 Methodology

An inception interview was conducted with the secretariat of STAM to gather information on the key actors and their roles in the seed industry in April, 2016. The foundation seed producers and consumers who constitute the hub of the private/public partnership in the seed industry were isolated for further investigation into the unresponsiveness of the private sector to the public sector efforts in the seed value chain.

A questionnaire (Appendix 1) was prepared to be administered to the pigeon pea foundation seed producers namely DARS and ICRISAT. The same questionnaire was also administered to CIAT, CIMMYT, IITA and Exagris who are the producers of foundation seed of other crops. Another questionnaire (Appendix 2) was prepared to be administered to fifteen randomly selected foundation seed consumers, who are certified seed producers. The fifteen seed companies represented about 62.5% of the twenty-four registered certified seed producing companies in the country. Guided by the questionnaires, the foundation seed producers and consumers were formally interviewed according to schedules in appendices 3 and 4 for a deeper understanding of the current situation in the seed industry with respect to status of foundation seed. All the responses were recorded on the questionnaires. An interview with Mpatsa Farms failed. Therefore, the fourteen seed companies whose data were available for processing represented 58.3% of the twenty-four registered certified seed producing companies in the country. The recorded raw data was then pooled and summarized into meaningful information on the current situation of the seed industry with respect to the status of foundation seed. An attempt was made to collect historic quantitative data on seed production volumes, seed demand and seed sales. This data would be used to substantiate the findings on the current situation in the seed industry particularly on seed demand and supply. Seed companies were very reluctant to disclose this information. Some companies were so honest indicating that they would not disclose this data because it is confidential and forms part of their business advantage. The STAM secretariat indicated that they did not have any reliable sets of such data as seed companies had never been open with this kind of data. Therefore, this report presents findings based on the qualitative data without the associated historic quantitative data on seed production volumes, seed demand and seed sales.

Based on the findings on the current situation, recommendations were made in accordance with the points where blockages lie regarding flow of information and seed. Much as the

recommendations looked different, they had the tendency to lean towards a monumental recommendation on designing an information platform for the seed industry. The design of the information platform involved key actors and their activities. Key actors in the seed industry were the building blocks of the platform. The roles of the key actors determine how the actors are linked up. Therefore, the construction of the platform involved interconnecting the key actors by means of their roles in such a systematic complementarity manner that smoothens flow of information and seed among the actors.

4.0 Results

An interview with the secretariat of STAM revealed that breeders, foundation and certified seed producers, Seed Services Unit (SSU), seed traders and farmers are categories of key actors in the industry. Some of the foundation seed producers are from the public sector while others are from the private sector. All the foundation seed consumers who are the certified seed producers are from the private sector.

Table 1: Key actors and their roles in the seed industry

Sector	Seed system	Key actors and their roles
public	Formal	DARS – Breed, evaluate and release new varieties; produce breeder and foundation seed. CGIAR centers – Breed new varieties, produce breeder and foundation seed. LUANAR – Breed new varieties, produce breeder and foundation seed SSU – Supporting seed systems in seed quality control
	Informal	
Private	Formal	Multinational and local seed companies – Produce and sell foundation and certified seed NGOs – Use foundation seed for certified seed production Agro dealers – sale of certified seed. STAM – Coordination of seed trade to ensure delivery of seed of acceptable quality. Farmers – End users of certified seed of improved varieties for production of grain.
	Informal	Community-based traditional 'local' variety seed producers – produce and bank seed of traditional 'local' varieties. Traders – Sell and exchange seed of traditional 'local' varieties. Farmers – End users of seed of traditional 'local' varieties for production of grain.

DARS Department of Agriculture Research Services, SSU Seed Services Unit; NGO Non-governmental organization; STAM Seed Trade Association of Malawi; CGIAR Consultative Group for International Agriculture Research; LUANAR Lilongwe University of Agriculture and Natural Resources

4.1 An overview of the current situation – problems in the seed industry

According to information captured in Table 1 from personal communication with STAM, there is ample evidence that private/public partnership exists among the actors in the formal seed systems. However, the summary of data collected from the foundation seed producers and consumers through the questionnaires showed a number of breakdown points in the flow of

information and seed among the actors in the seed value chains. Lack of communication and coordination among the key actors are evident breakdown points. As a result, autonomy of the actors is the order of the industry. This condition has given room for opportunistic actors to creep into the industry clogging the pathway for information and seed. All in all, seed companies feel that the industry is characterized by these unfavorable conditions that undermine the mandate of STAM. The industry suffers poor governance and consequently, there is low uptake of certified seed of improved varieties leading to the development of a culture of using farm-served seed among the smallholder farmers. This causes reduced demand for certified seed and subsequently low demand for foundation seed. Other factors like absence of breeders' rights and risk aversion mechanisms as well as negative side effects of FISP, influence of funding institutions, inadequate breeders, low SSU capacity and slackened regulation on importation of parent materials exacerbate the reduction in demand for foundation seed in the poorly governed industry.

4.1.1 Poor governance

According to the seed companies, poor governance on the part of STAM as a mother body of the seed industry is the root cause of lack of coordination. The mandate of STAM is to control seed production and marketing; promote the use of certified seed; work towards a policy environment that facilitates seed trade nationally and across borders; and act as an information hub on seed and related issues. However, government policy on liberalization of seed production and sale undermines STAM's mandate to control seed production and sale as shrewd opportunistic seed producers and traders crowd the seed market making the role of enforcing seed regulations difficult for STAM. Additionally, despite the seed regulatory mandate given to STAM, STAM was not vested with statutory provisions to enforce the seed regulations. Therefore, STAM does not have full control on seed production and sale, resulting in poor governance of the seed industry. This is evidenced by the symptoms of autonomy in the business operations among the actors. An example of symptoms of autonomy is on the pricing of foundation seed**.** Although DARS committee on foundation seed production suggests prices of foundation seed, other foundation seed producers do not copy those prices. Other producers are guided by their own gross margin analyses to determine prices of their foundation seed. Most of the times, foundation seed producers negotiate prices with the buyers taking advantage of the seed situation on the market at that particular time.

Foundation seed producers also consider current market prices of certified seed to determine the price of foundation seed. FISP prices for certified seed negotiated by STAM lobbying committee are pegged high considering the research and seed production costs the multinational seed companies incur. These ''artificially high'' prices of certified seed have a lot of influence on the foundation seed prices as it is generally believed that foundation seed costs more than certified seed does. However, the prices of certified seed particularly of legumes are sometimes higher than those of foundation seed, a symptom of distortion in the market structure due to the ''artificially high'' prices of certified seed. The autonomy has given ways to opportunistic producers and traders to creep into the industry crowding the market and clogging the information and seed pathway. Certified seed producers procure foundation seed from various foundation seed producers (Table 2). Seed companies have to make direct enquiries on the availability of the foundation seed from known producers. The enquiries are not necessarily formal. Phone calls, emails, personal contacts are usually the media of communication. These enquiries are normally made in August or September, just three months before planting commences. If the seed is available, orders are made, invoices prepared, mode of payment agreed upon and the foundation seed is collected. Sometimes a representative of the seed company can just walk in and pay for the seed and take it away. In this way, some foundation seed lands in the hands of opportunistic certified seed producers aggravating the problem of limited accessibility of foundation seed to registered certified seed producers. In the event of inadequate foundation seed on the market due to low production which is fuelled by lack of information on foundation seed demand, individual opportunistic producers of foundation seed (Table 2) become alternative suppliers.

Table 2: Producers and suppliers of foundation seed

Producers of foundation seed	**Description**	**Example**
Local public research institutions	Public sector	DARS
International public research institutions	Public sector	CIAT, CIMMYT, ICRISAT, IITA.
Specialised seed companies	Private sector	MUSECO, ExAgris
Multinational seed companies' own breeding facilities	Private sector	Seed Co, Monsanto
Individuals	Opportunistic producers	Names withheld

Seed companies say that these individual opportunistic producers are mostly retired or serving public servants and other experienced individuals who operate from their homes. They are neither legitimate members of STAM nor registered seed multipliers. They usually

have certificates testifying that their seed is in compliance with the required seed production procedures and quality standards. Whether those certificates are genuine or not, leaves a lot to be desired. In essence, these opportunistic foundation seed traders crowd the market, clog the information and seed pathway and worsen the state of incoordination, poor governance and autonomy in the seed industry.

4.1.2 Lack of communication on foundation seed demand and supply

Seed companies have indicated that STAM organizes workshops on current developments in the seed industry. STAM also organizes training sessions on seed handling especially for agro dealers and administers informative press statements to the seed industry. However, STAM as an information hub for the seed industry does not have the necessary facility like a web site to act as a platform for sharing important information on seed supply and demand. Foundation seed producers do not have a formal platform for communicating to buyers on the available foundation seed stocks. Some new foundation seed producers like MUSECO and ExAgris are not well known yet and their products may not be ordered although highly demanded. Additionally, considering the large volumes of carryover seed and that STAM is mandated to work towards a policy environment that facilitates seed trade nationally and across borders, many seed companies say that there is very little facilitation of exports for certified seed by STAM or government agencies. The little volumes of certified seed for export implies low volumes of foundation seed demanded for production of certified seed. This keeps the demand for foundation seed low. Due to lack of communication on foundation seed demand and supply, buyers have to find out if the seed is in stock by making phone calls, personal visits or sending emails. The risk associated with this is that satisfaction of demand is uncertain. Producers of foundation seed are not certain whether all their foundation seed will be sold within a season. Unfair trading practices are likely to develop. Delays in communication may come into play with the result of wastage of so much time that farm calendars may not be followed accordingly. With a working information platform for sharing data on foundation seed availability and demand, there will be a smoother flow of information and ultimately foundation seed for a well-integrated industry. In a bid to avert the aforesaid risk, IITA has tried advertising soybean foundation seed in newspapers and flyers in September and October because there has not been any formal information platform. DARS and SSU sometimes refer the prospective foundation seed buyers to

particular registered producers. In addition, DARS uses demonstrations to create awareness and demand among farmer associations registered to produce certified seed through projects like Strengthening Food Legume Seed Delivery System (SFLSDS) that is within the Agricultural Productivity Program for Southern Africa (APPSA) – Mozambique, Malawi and Zambia especially for beans, pigeon peas, groundnuts, cowpeas and soybeans. Because of the uncertain market for foundation seed, producers plan for small volumes to avert the risk of having carryover seed, hence foundation seed producers do not at all meet the total demand for foundation seed not because of lack of capacity but because the producers do not know the total market demand. This comes about because of lack of proper communication and coordination among actors. The situation is worsened by the disturbance of the seed industry by the opportunistic foundation seed producers.

4.1.3 Weak private/public partnership

Poor governance on the part of STAM also keeps the private/public partnership weak.The private sector seed companies seek profit-making strategies while the public sector DARS and CGIAR centres work in the interest of public welfare. This difference in interests punctuated by lack of communication due to autonomous business behavior among actors disturbs the desired effort complementarity between the private and public sectors putting the two sectors in disarray. While the seed companies produce and supply foundation seed at commercial prices, the public sector also produces and distributes foundation seed at prices lower than the commercial prices. Certified seed producers are attracted to the foundation seed from the public sector because of the low prices. This discourages the private sector foundation seed producers. However, the public sector alone cannot satisfy the total market demand for foundation seed. Subsequently, the supply of foundation seed on the market is relatively low. This translates to low certified seed supply on the market for that particular variety. In the long run, farmers will start looking for alternative varieties. Resultantly, demand for certified seed and subsequently foundation seed for that particular variety becomes low.

4.1.4 Low technology adoption and development of a culture of using farm-served seed

The seed industry acknowledges that lack of knowledge in agronomic practices; low uptake of certified seed; and a deep-rooted culture of using farm-served seed among farmers result

in low crop productivity and income. Subsequently, the farmers have a low purchasing power for certified seed. The low purchasing power breeds cultural misconception that certified seed is expensive which dissuades farmers from using certified seed making demand for foundation seed low.

4.1.5 Negative side effects of FISP

FISP empowers farmers to access certified seed of their choices in particular crops at very low prices. Demand for certified seed and subsequently foundation seed of such crops have increased tremendously. As a result, there has been unprecedented mushrooming of seed companies and parallel increase in the productivity of the promoted crops, a trend towards food security and poverty alleviation. However, FISP targets particular crops. Demand for seed for such crops goes up. Non-target crops like sorghum, millets, sunflower, cassava, sweet potato and Bambara nuts are sidelined. Demand for foundation seed for such neglected crops is low even in the agro-ecologies where those crops are well adapted. Socioeconomic benefits accruing from production of those neglected crops in the areas where the crops are adapted are unwittingly foregone. This is contrary to the concept of 'one village one product' which is a strategy for mitigating negative effects of climate change like food insecurity.

FISP prices for certified seed are pegged high, as explained earlier. This upward shift in the prices does not occur in accordance with the forces of supply and demand. It is due to the distortion of the market structure caused by FISP. The high prices of certified seed causes prices of foundation seed to go up as well as it is generally believed that foundation seed costs more than certified seed. This reduces the foundation seed consumers' buying power, a direct cause for reduced demand for foundation seed.

Of late seed companies have experienced late payments for certified seed distributed under FISP. This has been a threat to further seed company investments. This development is causal to reduced volumes of foundation seed demanded or stagnation and indeed even closure of some seed companies.

4.1.6 Slackened regulation on importation of parent materials

Some companies import certified seed or breeding lines for production of certified seed of hybrids that have proved adaptable to Malawian agricultural systems when the regional seed

harmonisation is not yet in effect. This reduces sales of locally produced certified seed contrary to the 'buy Malawian' campaign. In this way, demand for foundation seed of the locally bred varieties is also reduced. When a seed company imports parent materials for certified seed from partner supplier companies across national boundaries, demand for foundation seed for locally bred varieties is reduced. Additionally, import and export permits as well as phytosanitory certificates are requirements that may delay the transactions. Malawi, with the unimodal rainfall pattern, has very narrow windows for seed production and sales. Any hiccups in the production, processing and delivery system of certified seed are potential causes of a company missing a proportion of the already narrow window or the entire season of seed production or sales. This will mean reduced demand for both the imported and the local foundation seed.

4.1.7 Influence of funding institutions

In some funded projects, volume of foundation seed for a particular variety to be produced is dictated by the total land area dedicated to that crop in the predetermined zone of influence. Unless there is a parallel program to produce foundation seed for the rest of the areas in the country, there will be no supply of foundation seed for that particular variety in those other areas during the entire life of the project. Grain producers will have switched to other crops. The demand for certified and foundation seed of that particular variety or crop will have dwindled till such a time that the project activities are rolled out to other parts of the country. This happens especially when the project is run by an only institution mandated to work on that particular crop. A typical example was the case of the recently wound up IITA USAID-funded soybean seed systems project which was a component of the larger Feed the Future/Integrating Nutrition in the Value Chains (FtF/INVC) project. Other dimensions of the above cited funded project are that foundation seed production was constrained by a revolving fund to be created and the foundation seed storage facility to be provided from within the confines of the donor funding. Poor resource allocation and management in DARS limit volume of foundation seed produced. These scenarios are a disillusionment particularly for big institutions like IITA and DARS that have capacity to work on huge volumes of foundation seed. Furthermore, these scenarios are also retrogressive for crops that are gaining popularity to become important cash crops like soybeans and pigeon peas.

4.1.8 Absence of breeders' rights and variety licensing

Breeders' rights and variety licensing are associated with financial benefits through loyalties to the breeding institutions or individual breeders. Therefore, these institutions create a conducive environment for increased creativity among breeders. When breeders' rights are instituted, many varieties are channeled through the pipeline for release, licensing to foundation seed producing companies and popularization. Therefore, production of breeder and foundation seed increases. DARS confesses that in the absence of variety licensing and the associated benefits, breeders have been reluctant to release breeder seed to seed companies to produce foundation seed. Following this trend, production of foundation seed has been minimal. Essentially, demand increases with supply. Maize breeding department of DARS and CIMMYT are currently licensing maize varieties to seed companies to exclusively produce foundation seed for commercial distribution. According to DARS this is a welcome development to incentivize breeders to develop more varieties and produce more breeder seed for distribution to foundation seed producers. This will increase foundation seed supply.

4.1.9 Absence of risk-aversion mechanisms

Foundation seed producers say that they engage themselves in the foundation seed production activities at their own risk as according to the current situation, certified seed producers are not under any obligation to buy the foundation seed. The absence of a workable information platform and the poor governance in the seed industry makes the industry unattractive to insurance companies. Therefore, foundation seed producers tend to produce smaller volumes as a means to reduce the risks and uncertainties in the business, keeping the supply of foundation seed low. One of the mandates of STAM is to control seed production and marketing. Therefore, seed companies are of the opinion that STAM needs to be empowered through capacity building to facilitate and oversee contract agreements, reinforced with commitment fees, between producers and buyers of foundation seed. This risk aversion mechanism will cover both the producer and the buyer with a resultant increase in demand and supply of foundation seed. STAM would best perform this task in collaboration with SSU which is already on the ground as a seed quality control body.

ICRISAT and IITA depend on donor funding and revolving funds for pigeon pea and soybean foundation seed productions, which have to be protected against all forms of risks. Producing

relatively low volumes that will sell is a risk-aversion and programme continuity strategy in this current environment where demand cannot be accurately established. Therefore, production volumes are small perpetuating the cyclic low supply and demand situation.

4.1.10 Inadequate breeding institutions as well as breeders on the ground

Few breeding institutions with financial constraints have fewer breeders than required. DARS legume commodity team (LCT) has very few breeders on the ground handling many projects yet all, but one groundnut breeder, are yet to go on study leave. This problem is compounded by the fact that IITA which is mandated to do research on soybeans does not currently have a resident soybean breeder. This condition frustrates collaborative breeding work on soybeans with DARS, negatively affecting foundation seed production. Scarcity of foundation seed is a discouragement to certified seed producers. Certified seed consumers start looking for alternative enterprises. Consequently, demand for foundation seed lowers.

4.1.11 Inadequate SSU capacity

SSU is the only seed quality controlling body in Malawi with legal instruments to enforce the seed act. However, SSU has expressed distress over its limited technical staff, mobility and laboratory space as well as equipment. As such, SSU's emphasis is on the crops that are popular with well-developed seed systems and most promoted by FISP. The demand for seed of the non-target crops is low. Foundation seed producers are not willing to take the risk of producing seed that may not sale. The demand and supply of such neglected crops remain low.

4.2 What is working well in the seed industry?

Despite the current shortcomings of the seed industry, the seed companies celebrate a number of things that are working well. The very existence and maintenance of the structures of the seed systems though not well-coordinated has kept the seed industry alive. The political will to develop the legume industry followed by the establishment of the Legume Development Trust (LDT) has kept all the components of the seed value chains active though too disjointed to drive the economy effectively. The seed industry welcomes the birth of local foundation seed producers namely ExAgris and Multi Seed Company (MUSECO) as these

entities will alleviate the problem of foundation seed supply. However, since these companies produce both foundation and certified seed, they need to be monitored closely as they may abandon their business integrity to honour foundation seed orders with certified seed in the event of poor cash flow or ambitious accumulation of wealth. Such business behaviour will have immediate and far-reaching repercussions on grain, certified seed and subsequently foundation seed production and supply.

5.0 Recommendations

Considering what is working well in the seed industry in relation to the aforementioned shortcomings, the following recommendations have been made with the objective of improving the industry to a vibrant one:

5.1 Registration of all the key actors in the industry with STAM

All the actors in the seed industry need to register their membership with STAM so that they can be linked up along the seed value chains. Opportunistic seed producers and traders are not registered with STAM for full time activity in the industry because they produce and sell seed only when conditions warrant success and partly because the seed company registration fee of over MK0.5 million is prohibitive. Upcoming small seed companies take time to register because of the high registration fee unless they are attracted to the seed sales through the FISP program. Seed companies feel that a downward revision of the registration fee would attract the opportunistic seed producers, thereby clearing the information and seed pathways in the industry giving way to proper communication, coordination and good governance. The comprehensive data base of actors in the industry would show names, location, crop, variety, quantity of seed produced and demanded in a unified directory. This information made available to all actors on STAM website will link suppliers to buyers and enable them share market information. The supply and demand for foundation seed disaggregated according to the companies, crop and varieties will be made available and accessible to all players in the industry on the STAM website. Well informed about the demand for foundation seed, producers will produce volumes according to the demand. Registration of all the key actors with STAM as an information hub will constitute a recipe for breaking the autonomy, enhancing sound private/public partnership and good governance of the industry.

5.2 Strengthen the role of STAM as an information hub in the seed industry

The performance of STAM as an information hub will improve with advancement in communication, most probably through creation of a website. Advocacy on seed issues and creation of awareness on the demand and supply will be more effective through the website. As such, uptake of certified seed will likely improve to trigger increase in demand for foundation seed. As actors register on-line, STAM will easily create a data base of breeders, foundation and certified seed producers and traders indicating crop, varieties and volumes dealt with annually. This information will be a valuable tool to the key actors for decision making on where to buy or sell seed of a particular crop variety. Additionally, STAM will appropriately place new entrants into the seed systems for a more vibrant industry that will trigger uptake of certified seed and increased demand for foundation seed.

5.3 Strengthen coordination among key actors in the seed industry

Once all the actors in the seed industry are registered with STAM while a workable information platform is in place, breeders and foundation as well as certified seed producers will respond to each other's demands in order to collectively satisfy the farmers' seed requirements. This information platform will create a coordinated environment for a vibrant market-oriented seed business. All actors with genuine business intentions will register or remain in the industry. DARS, CGIAR centres, the university and SSU, as components of public sector on one hand and the foundation and certified seed producing companies, as a private sector on the other, will work together in a perfect complementarity to serve the public. The sound private/public partnership will create a conducive environment for regulating prices of the different classes of seed for supply to be in harmony with demand. With full knowledge of the other actors in the industry, each player will be able to communicate what they can supply or demand on the market at prices dictated by the supply and demand forces. Chances are that production of breeder, foundation and certified seed will be according to total market demand. In a competitive market condition, the seed companies should be able to meet the costs of their parent seed materials and other inputs in time for business continuity.

5.4 Employment of risk-aversion strategies

Once all the key actors have registered their businesses and are using the information platform, they collectively need to establish a system tailor-made to avert seed business risks. Small local seed companies believe that once risk-aversion strategies are in place, seed supply will be in harmony with demand. Some seed business ideas abort while some small companies are either closing up or stagnate because they are not well protected against business risks and uncertainties. Seed companies contemplate that contractual agreements, reinforced with commitment fees, between producers and consumers of breeder, foundation and certified seed will cover both the producers and the consumers. Such agreements would best be entered into at least ten months in advance preferably in June to allow the contractor prepare for the season. Seed companies consider the many risks in the lucrative seed business worth involving insurance companies to cushion the key actors against shocks from floods, fire, theft and other catastrophes as well as slackened regulation on importation of parent materials and negative side effects of FISP alluded to earlier on.

5.5 Strengthen STAM as a lobbying body for the seed industry

By virtue of its mandate to control seed production and marketing, STAM with the help of SSU and the rest of its membership should keep records of foundation seed production volumes by crop for each producer. This information will be communicated through the website to registered foundation seed consumers for their action. Foundation seed consumers will opt to buy from registered producers as they will feel protected in terms of quality of seed that they buy. This process will purge opportunistic 'certified seed' producers and traders. As a result, the real demand for foundation seed will be reflected on the market for the action of the foundation seed producers. With accurate records of foundation seed, STAM should be able to lobby for cross border trade for all classes of seed.

5.6 FISP to be further extended to other important crops or abolished - Correction of market distortion

FISP targets particular crops. Demand for seed for such crops is high. Unfortunately, not all agro-ecologies are suitable for the crops that are promoted by FISP. Non target crops are neglected and made unpopular even in the agro-ecologies where they are adapted.

Therefore, demand for seed for such neglected crops like sorghum, millets, cassava, sweet potato and Bambara nuts is lowered. The socioeconomic benefits of such crops are foregone unwittingly. This contravenes the concept of 'one village one product' which is a sectoral approach to mitigating impacts of climate change'. If FISP is extended to other important crops, or indeed abolished the playground will be levelled for all crops to play their roles in serving humanity according to their adaptability and market preference. The actual demand for certified seed of those neglected crops will be resuscitated and the seed industry will supply foundation seed accordingly.

5.7 Introduce breeders' rights and variety licensing

Breeders have been reluctant to release breeder seed to seed companies for production of foundation seed unless with institutionalization of breeders' rights and variety licensing for loyalties. This has contributed to low supply of foundation seed. DARS and the CGIAR centers, are already lobbying for introduction of breeders' rights. The concept of variety licensing to companies has recently won the support of breeders in Malawi as loyalties paid by licensee companies to the breeders is an incentive to them and a business stimulus to the licensee companies. The licensee companies work towards producing the seed volumes that are compliant with the acceptable quality standards for the best monetary returns. As a result, supply of foundation seed improves to meet the market demand. DARS maize breeding section and CIMMYT are already licensing out their improved maize varieties for loyalties. Breeders' rights would have similar impact on breeder and foundation seed supply.

5.8 Capacity building

Seed companies admit that it is the responsibility of all the key players in the industry to develop their capacities in whatever they are engaged along the seed value chain. Capacity building among key actors along the seed value chain will improve product quality, quantity, delivery and the subsequent demand for the product.

Seed companies profess that seed crop rejections by SSU, high volumes of carryover seed and low adoption of seed of improved varieties by smallholder farmers are indications of low capacity in their seed business. Seed companies and their associated agro-dealers need to develop their capacities in seed production and quality control to complement SSU efforts in reducing seed crop rejections. Seed companies also need capacity building in product

development and marketing to increase adoption and demand for seed of improved varieties, reduce volumes of carryover seed and thus increase profit margins for their very survival. The capacity of SSU is low especially in laboratory space and mobility. It is believed that delineating SSU from the public sector so that it operates as an autonomous business-oriented entity will stimulate investment for capacity building in laboratory space and mobility for improved coverage and effectiveness.

Generally, local seed companies lament over the narrow range of locally bred varieties in different crops offering farmers a limited choice of varieties. This is evidenced by the high adoption of varieties egoistically introduced and promoted by the multinational seed companies. The public sector needs to train more breeders or incentivize the breeders on the ground to come up with more of the superior locally bred varieties and foundation seed.

5.9 National participation in regional harmonization of seed regulations

Malawi is commended for its participation in regional harmonization of seed regulations. This will enable the region to pool its breeders in order to alleviate the problem of inadequate breeders at national level and ease the pressure of the need for training more breeders. Varieties which will be supported with regional empirical evidence of their good performance will trigger high demand for certified and foundation seed. The industry will become more vibrant regionally to effectively drive the economies to greater heights.

5.10 Development of a dynamic user-friendly information platform for the industry

The above recommendations suggest that coordination among the actors in the industry is paramount for sustainable removal of blockages in the seed systems; hence the monumental recommendation to develop an information platform that should enable all the key actors in the industry to communicate effectively. STAM and SSU will use this information platform to communicate seed policy and advocacy issues, capacity building opportunities and seed regulatory updates to actors for effective enforcement of regulations in the seed value chain. Seed companies feel that prices of foundation seed suggested by DARS committee on foundation seed production should be communicated to actors through the information platform as a price regulatory mechanism. A regulatory system on prices and advocacy on use of certified seed will have a combined effect of changing farmers' perception that certified seed is expensive. This will result in increase in demand for certified seed with a subsequent

increase in demand for foundation seed. Seed companies will no longer rely heavily on FISP. The distorted seed market structure will likely start to normalise. Information platform will help breeders, foundation and certified seed producers as well as the seed traders in making accurate plans for the future seasons depending on real market demand.

5.10.1 Design and construction of an information platform for foundation seed demand

An information platform is an organized system for the collection, organization, storage and communication of information among the key actors namely breeders, foundation and certified seed producers, certified seed traders, farmers, SSU and STAM. The design of the information platform is such that the key actors are the building blocks of the information platform while their principal roles provide linkages between and among the actors. The linkages create an interdependence network including the private/public partnership. Therefore, the construction of the platform involved connecting the key actors by means of their roles in such a coordinated manner that there is smooth flow of information and seed concerned. The actors complement each other. Fig. 1 shows the schematic information platform depicting key actors and their roles in the seed industry. The arrows represent flow of information and seed and therefore the interdependency among the actors.

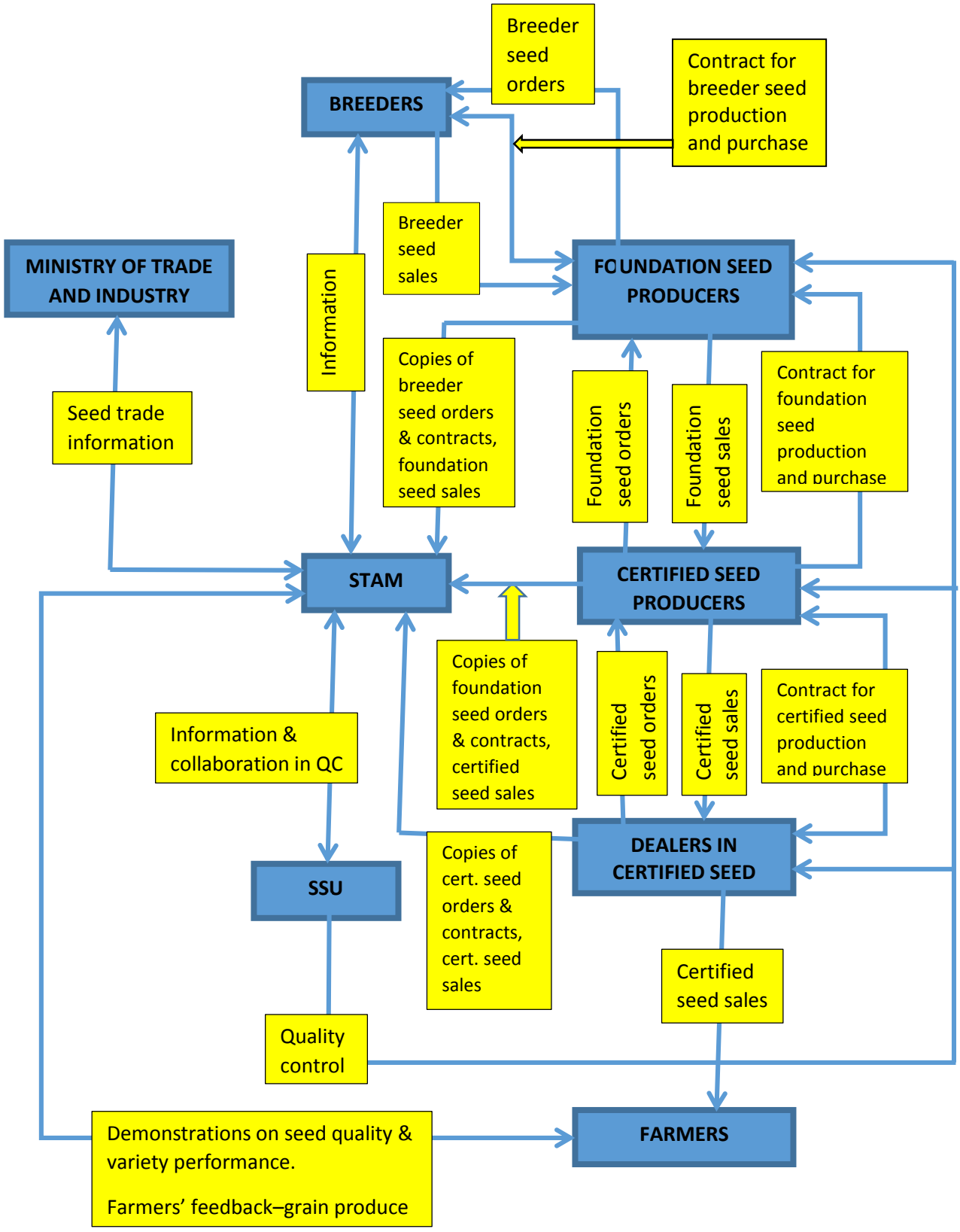

Fig.1: Schematic information platform for foundation seed demand

5.10.2 How the information platform will work

STAM will have a comprehensive record of seed of different crops and varieties that are on the market. This information will be provided by breeders as a way of making the innovation known to the seed industry. STAM members should jointly mount demonstrations to showcase seed quality and varietal performance from their seeds in a participatory mode with an appropriate mix of inputs and practices. The market preference for a certain variety creates demand for certified seed of that particular variety. The high demand for certified seed creates demand for foundation seed which in turn translates in demand for breeder seed. STAM as an information hub for the seed industry will have all information on demand and supply for all seeds on its website. Therefore, the certified and foundation seed producers will access information on the availability of parent materials for their respective products from STAM website. If the materials are available, the seed producers will place orders accordingly. It will be a requirement that orders should be copied to STAM for filing in the information data base. STAM will share this information with SSU for collaborative work on quality control. Parent materials will be bought on condition that they are accompanied with seed quality compliance certificates from SSU. Transaction details will have to be copied to STAM for records in the data base. STAM will share the information on the transaction with SSU for the collaborative work. In the event that an order is cancelled, a copy of the cancellation should go to STAM for further notification to SSU. In case the parent materials demanded are not available according to STAM records, the requesting seed producer should apply for a contractual agreement for production of parent materials from the supplier (foundation and breeder seed producers) of their choices. Just like in placing orders, these applications to the parent seed suppliers should be copied to STAM for filing in the information data base. STAM will share this information with SSU for collaborative work on seed quality control. The contract agreements should be signed between the parent seed producers and the requesting certified and foundation seed producer with copies to STAM. As usual STAM will share the information about the contracts with SSU. Meanwhile the suppliers of foundation and breeder seed should indicate to the requesting seed producers, copying STAM, their capacity and commitment to produce and supply the demanded volumes of seed. Requesting seed producers have to pay commitment fees to the producers of parent materials by end of August. Immediately, SSU will send invoices for inspection fees to the parent seed producers with copies to STAM. The parent seed producers will make payment

to SSU. SSU will issue receipts for the payment with copies to STAM. These transactions will have to be made from June to August of the season preceding the season the requesting seed producer intends to produce seed. After successful seed production, the requesting seed producer should send to STAM data on the volume of seed produced. This data should be realistic so that it compares well with SSU seed yield estimates; otherwise the seed may be rejected. This data on seed yields and sales will constitute historical quantitative data to be available on the information platform for the intended buyer to access but also as reference data in future. Unavailability of the data on seed yield on the information platform will be indicative of the fact that that seed was rejected for noncompliance with quality standards and cannot be taken into the pipeline to the next stage of the seed value chain. STAM may share information on seed trade transactions with the Ministry of Trade and Industry. This information platform will be a dynamic one subject to updating whenever need arises.

5.10.3 Information confidentiality

Seed companies may have some pieces of information that they want to keep as confidential. The information platform will have an in-built mechanism that will ensure that any seed company will be able to access only the information related to that company and also information meant for the notice board. The platform will also have a mechanism of automatically sending copies of seed orders, seed sales and contract agreements as well as production volumes to STAM. Such information might be considered confidential and STAM will not make it accessible to any other company unless instructed by the company concerned.

6.0 Conclusions

The seed industry is currently characterized by poor governance on the part of STAM. The poor governance is partly due to the effects of liberalization of seed production and trading and STAM's lack of legal instruments for use in enforcing seed regulations. This condition has led to poor coordination among actors in the industry with the result that there is poor private/public partnership and autonomy among the key actors. Low uptake of seed of improved varieties has been inevitable and therefore, demand for foundation seed has been low. Other factors like slackened regulation on importation of parent materials, side effects

of FISP, absence of breeders' rights and risk aversion strategies have taken advantage of the aforesaid industrial weaknesses to worsen the situation.

Based on the current situation of the industry, improvement will be realized if actors in the industry are registered with STAM and linked up by means of an information platform on STAM website. The linking up will keep them well-coordinated and enable them to communicate actual demand and supply for different classes of seed including foundation seed for a vibrant industry. Capacity building and tailor-made risk aversion strategies along the seed value chain, empowering STAM with legal mandate to enforce seed regulations, institutionalizing breeders' rights and variety licensing to motivate breeders are some of the factors that will contribute to improvement for a vibrant industry.

7.0 Appendices

7.1 Appendix 1: Questionnaire for foundation seed producers

1. To whom do you supply foundation seed?

2. How do you determine seed production volumes? (Seed road map?) Has this method changed over the years? If yes, please elaborate.

3. How do you communicate your foundation seed stocks to buyers? Using what mechanism, what times of the year and on what interval do you communicate your stocks?

4. How and where do you sell the foundation seed?

5. Who determines the price and how is the price arrived at?

6. What is the role of STAM in your foundation seed production? Has this role changed over time? If yes, please elaborate.

7. What are the requirements for the transaction to take place?

8. How are you assured that the demand and volume requested for production will be purchased?

9. What is your role in ensuring that the ordered seed volume is supplied in time? Are you liable if the seed volume is not supplied in time or in the ordered volumes?

10. Are there other factors that influence foundation seed demand?

11. Do you have any control over these other factors? Is so, how do you deal with such factors?

12. Are there any limitations in foundation seed production? If yes, where do the blockages lie?

13. Do you believe that adequate volumes of foundation seed are produced for the market? Please, elaborate.

14. How do you determine price of foundation seed? Do you believe the price of foundation seed is fair or prohibitive? Please elaborate.

15. What are the problems that you encounter in producing foundation seed?

16. Do you coordinate with foundation seed consumers (seed companies). If yes, elaborate.

17. Are there any issues pertaining to production of foundation seed that fail your foundation seed production plans? If yes, elaborate.

18. What arrangement in the foundation seed production would enable you plan your foundation seed production more effectively and efficiently?

19. The mandate of STAM is to control production and marketing as well as promoting the use of certified seed. How does STAM help you increase production and sales of foundation seed?

20. STAM is mandated to be an information hub on seed and related issues. How do you relate with STAM in this respect?

21. What is working well in the production and sale of foundation seed?

7.2 Appendix 2: Questionnaire for seed companies, the foundation seed consumers

1. Who supplies you with foundation (basic) seed? If not ICRISAT and/or DARs, why have you selected this supplier?

2. How do you calculate your foundation seed requirement? What is the method (can they provide an example)? Has this method changed over the years? If yes, please elaborate.

3. How do you communicate your foundation seed requirements to the suppliers? Using what mechanism, what times of the year and on what interval do you communicate your requirements?

4. How do you place an order for the seed?

5. What is the role of STAM in your foundation seed procurement procedures? Has this role changed over time? If yes, please elaborate. What should the role of STAM be in foundation seed procurement procedures?

6. What are the requirements for the transaction to take place?

7. Has the supplier met your demand as per your placed order? If not, what do you believe to be the reasons?

8. What is your role in ensuring that the ordered seed volume is supplied in time?

9. Are there other factors that influence foundation seed supply?

10. Do you have any control over any of these other factors? If so, how do you deal with such factors?

11. Are there any limitations in foundation seed procurement? If yes, where do the blockages lie?

12. Farmers say that certified seed is scarce. What is your comment?

13. How do you determine price of seed?

14. Do you face any challenges in distributing certified seed? If yes, elaborate.

15. Do you coordinate with foundation seed producers (DARS and CGIAR centers)? If yes, elaborate.

16. Is there anything that needs to be improved in your foundation seed procurement procedures? If yes, explain.

17. Are there any issues pertaining to sourcing of foundation seed that fail your certified seed production plans? If yes, elaborate.

18. What arrangement in sourcing foundation seed would enable you plan certified seed production and distribution with surety?

19. The mandate of STAM is to control production and marketing as well as promoting the use of certified seed. How does STAM help you increase production and sales of the certified seed?

20. STAM is mandated to be an information hub on seed and related issues. How do you relate with STAM in this respect?

21. Does your seed company sit on the board of STAM? Is so, how has your company influenced STAM's organizational capacity to meet the interests of seed companies including your own? If your company does not sit on the board, do you believe that your interests are adequately raised and represented? How can this be furthered?

22. How do you distribute your certified seed?

7.3 Appendix 3: Schedule for visits to foundation seed producers and SSU by the consultant

DATE	INSTITUTION TO BE VISITED	TIME	District
19/05/2016	*ExAgris	13:30-14:30	Lilongwe
1st June, 2016	IITA	08:00-09:00	Lilongwe
	ICRISAT	09:00-10:00	Lilongwe
	CIMMYT	10:00-11:00	Lilongwe
	CIAT	11:00-12:00	Lilongwe
	DARS BREEDERS	13:00-14:00	Lilongwe
	SSU	14:00-15:00	Lilongwe

*ExAgris respondent was locked in an equally important meeting at the time of the visit. A copy of the questionnaires was handed out to him to fill out and send it back to the consultant by email. He did so. Therefore, data collection at ExAgris was not by direct contact and dialogue as was the case with the rest of the seed companies

7.4 Appendix 4: Schedule for visits to seed companies by the consultant

DATE	Serial #	SEED COMPANIES TO BE VISITED	TIME	DISTRICT
12/05/2016	1	Peacock Seed	08:30-09:30	Lilongwe
	2	AISL	10:00-11:00	Lilongwe
19/05/2016	3	Monsanto	08:30-09:30	Lilongwe
	4	Demeter	10:00-11:00	Lilongwe
	5	ASSMAG	15:00-16:00	Lilongwe
20/05/2016	6	WASA	08:30-09:30	Lilongwe
	7	CPM	10:00-11:00	Lilongwe
	8	SEED CO	13:30-14:30	Lilongwe
	9	*Pindulani seed	17:00-18:00	Lilongwe
22/05/2016	Travel from Lilongwe to Blantyre			
23/05/2016	10	**Mpatsa Farms	10:00-11:00	Blantyre
	11	Premium Seed	13:30-14:30	Blantyre
	12	SeedTech	15:00-16:00	Blantyre
	Travel from Blantyre to Mangochi			
24/05/2016	13	Funwe	08:30-09:30	Mangochi
	14	Panthochi Seed	10:00-11:00	Mangochi
	15	Evergreen	11:00-12:00	Mangochi

*Pindulani Seed respondent was locked in an equally important meeting at the time of the visit. The interview was conducted in haste during off hours. A copy of the questionnaires was handed out to him to fill out and send it back to the consultant by email. He did so. Therefore, data collection at Pindulani Seed was not by both direct contact and dialogue and asking the respondent to fill out the form and send it back to the consultant.

Despite the letters of introduction and notice of visit to **Mpatsa Farms, the respondents were not in the office at the time of the visit. A copy of the questionnaire was left with the receptionist to be submitted to the responsible personnel for submission back to the consultant by email after filling it out. That was to no avail. The consultant sent another copy of the questionnaire to Mpatsa Farms by email asking the proprietor of Mpatsa Farms to fill it out and send it back by email. That also proved futile. Therefore, the data collection at Mpatsa Farms was not successful.