



# FEED THE FUTURE

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



## Uganda Seed Sector Profile



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## Acronyms

CIAT	International Center for Tropical Agriculture
CIFMS	East African Center of Innovation for Finger Millet and Sorghum
CRS	Catholic Relief Services
EGS	Early Generation Seed
FAO	Food and Agriculture Organization
FAOSTAT	Food and Agriculture Organization Statistics
GoU	Government of Uganda
IDP	Internally Displaced Persons
IITA	International Institute for Tropical Agriculture
INGO	International Non-Governmental Organization
ISTA	International Seed Trade Association
IDP	Internally Displaced Persons
IITA	International Institute for Tropical Agriculture
INGO	International Non-Governmental Organization
ISSD	Integrated Seed Systems Development
ISTA	International Seed Trade Association
IV	Improved Varieties
LSB	Local Seed Business
MAIFF	Ministry of Agriculture, Animal Industries and Fisheries
MoA	Ministry of Agriculture
MT	Metric tons
NACRII	National Crops Resources Research Institute
NARO	National Agricultural Research Organization
NaSARRI	National Semi arid Resources Research Institute, since Sept 2020 known as East African Center of Innovation for Finger Millet and Sorghum (CIFMS)
NGO	Non-Governmental Organization
NUTEC	Northern Uganda Transforming the Economy through Climate Smart Project
OPV	Open Pollinated Variety (maize)
OWC	Operation Wealth Creation
PASP	Private Agriculture Service Provider
PSP	Private sector Service Provider
QA	Quality Assurance
QC	Quality Control
QDS	Quality Declared Seed

## Executive summary

This profile focuses on four aspects of the seed sector in Uganda and the interactions between them – the (i) formal seed system, (ii) semi-formal<sup>1</sup> or Quality Declared Seed system, (iii) informal seed system, and (iv) emergency seed provisioning. It examines current strategies for seed sector development and makes recommendations for ways in which more integrated, mutually supportive seed systems can be promoted at the broad, sectoral level, to increase smallholder farmers' access to quality seed of improved varieties.

When viewing the full range of staple food crops grown by farmers in Uganda, the majority (85-89%)<sup>2</sup> of seed planted by smallholder farmers comes from informal sources, i.e., farmer-saved seed, and seed from neighbors and local markets. Informal sector seed includes seed of both improved varieties, which is recycled seed from an earlier generation of formal sector seed, and local varieties. The remaining 11-15% of seed planted by smallholders is certified seed purchased through the formal sector seed system. Formal seed is typically purchased from seed companies and agrodealers but can be purchased by Governments and institutions and then provided for free or on a subsidized basis, through government schemes and donor-funded projects. Quality declared seed, (QDS) is considered formal seed, as it is a recognized seed class and is derived from a known source of foundation seed.

Seed of improved varieties that are preferred by farmers commonly flow from the formal sector to the informal seed sector, illustrating the interaction between the two seed systems. The formal seed system is highly differentiated by crop and by seed type (hybrid versus non-hybrid) and focuses largely on hybrid seed for maize and vegetables. Use of formal sector seed by farmers can rise to over 80% for commercial vegetables and 30-40% for maize in high production areas. Therefore, the seed market is highly segmented.

As a means of encouraging more farmers to buy quality seed, the national seed policy was changed in 2014 to allow the production of Quality Declared Seed (QDS), a less stringent seed class than certified seed. This has led to several efforts from the development community to establish farmer seed producer groups to grow and sell QDS seed for potato, beans, soybean, rice and groundnut. QDS has direct traceability to certified foundation seed but requires fewer inspections and has less rigorous production requirements and can therefore be supplied at lower cost to farmers. Typically, QDS is produced through semi-commercial methods, most commonly with technical and financial support from publicly-funded projects. Whilst this approach has been successful in the project context, volumes of QDS seed remain relatively low, ranging from approximately 2,000 – 4,000 MT annually in recent years for all crops, varying according to specific projects for specific crops such as beans and rice. There is little evidence of QDS production being sustainable on a commercial basis, due to weak links to foundation seed and lack of commercial capacity within farmer groups. Although QDS is part of the formal seed system, since it is produced to meet defined quality standards and subject to regulatory oversight, it is often referred to as “semi-formal” because QDS cannot be produced by registered seed companies and therefore is mainly multiplied by farmer seed producer groups.

The formal seed sector provides certified seed, which follows a more rigorous certification process and a clear labelling system. Commercial seed companies mainly focus on the production and sale of hybrid maize, OPV maize, hybrid vegetables, beans and sorghum. In 2017, Uganda produced approximately 22,000 MT of maize seed, of which 80% was hybrid and 20% OPV, as their main income generating products. Commercial seed companies also produce other crops, including beans at approximately 4,000 MT/ year, sorghum and rice at volumes that vary but may range up to several thousand MT/ year, and lower levels of other crops. There has also been a recent interest in African indigenous vegetable seed. The production levels of the non-hybrid seeds are however, at a much lower volume.

Within the Ugandan seed system, there has been a gradual erosion of the quality of certified seed which has been caused by several issues. There have been concerted efforts by Government and the emergency / humanitarian aid sector to provide subsidized and free certified seed to farmers who are deemed unable to afford these high producing seed. The frequent but unplanned procurement of certified seed for humanitarian distribution combined with a weak regulatory system, an under-funded Government inspection

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<sup>1</sup> Semi-formal in the sense that QDS is a recognized and legal seed class but is often produced within a less formal inspection and production system, often with a more informal, farmer-based business model.

<sup>2</sup> Primary data collected from 3 regions in 2013 show that 89% of seed planted by farmers is sourced from informal sources (Table 3), whereas the figure provided in the 2018 Seed Strategy is 85%.



service and challenges with the production of foundation seed causes gaps in the commercial supply of certified seed to farmers, and this combination of challenges has led to a major problem with seed quality and the rise of counterfeit seed on the market. The “fake / low quality certified seed” problem in Uganda (further referred to as fake seed) is endemic and this challenge is, at least partly, driven by the high and short term demands for certified seed from both Government and the humanitarian aid system.

## Conclusions and recommendations

### 1. Weak and missing data

The lack of reliable, up-to-date data for the Ugandan seed system is a considerable barrier for management, quality control, decision making and investment by the private and public sector. As Uganda rebuilds its seed system, the Ministry needs to establish a modern information and management system to contain information about the annual status of the seed systems in Uganda. This information system will help to restore confidence in the overall seed system and provide a basis for monitoring and verifying the amounts of different types of seed moving through the different parts of the seed system, including the early generation seed (EGS) and foundation seed which then feeds into the:

(I) formal certified, (ii) semi-formal QDS, (iii) the informal seed sector and (iv) the seed used for emergency and or Government subsidized interventions.

The lack of data combined with the absence of a seed database and quality verification system has led to a systemic prevalence of fake seed and use of expired seed in Uganda. The high levels of fake seed are undermining the credibility of the commercial seed sector. This issue is unlikely to be resolved without better quality assurance and information management systems that are supported by the seed systems stakeholders, including the government. It is recommended that:

- **Strengthen or develop a more robust seed data and monitoring system:** Uganda needs a modern seed management and monitoring system to collect and compile systematic, centralized data, including more accurate records of quantities of certified seed, QDS, informal seed production and sales, and use of subsidized and emergency seed.
- **Studies / assessments** are needed to provide a better understanding of the seed system:
  - Role of QDS in project-based seed supply, volumes, cost and the sustainability of QDS with Local Seed Businesses in post-project situations,
- **Address the unwillingness of Humanitarian agencies to share data.** Despite best efforts, the humanitarian agencies were reluctant to share their data on the amounts and types of seed they had distributed. This type of information should be readily available and be used by the government to know provide both the levels of emergency seed being procured from the EGS system and the commercial markets. Given the high levels of free seed being distributed within Uganda and being procured in Uganda for distribution to neighboring countries, it would be helpful to know more regarding:
  - The levels of commercial seed being procured by government, international agencies, non-governmental organizations and research actors for free distribution.
  - What are the circumstances in which emergency distribution of certified seed is needed?
  - More evidence is needed to learn about which types of emergency or free seed distribution modalities are most appropriate and which are effective.

### 2. Modernize Early Generation Seed production (EGS)

All seed sectors depend on a functional EGS system, providing breeders and seed companies with high-quality parental lines and access to foundation seed. The opaque systems for production of EGS, the lack of an open and transparent information system for EGS generation and a clear process to maintain quality within the EGS system are all constraints to maintaining and upgrading the seed systems in Uganda. The credibility of the seed sector is underpinned by the ability to provide quality assurance and track production of seed through the system. Lack of information about availability of foundation seed and the informal nature of the foundation seed production, creates problems for all stakeholders seeking to produce either certified or other seed classes.

**Centralized ordering process:** The weaknesses within the EGS system are partly due to the lack of a

centralized and commercially-based process for ordering and receiving known quantities of breeders and foundation seed. The EGS system should be able to provide foundation seed, or parental lines, for at least two years in advance of supply, to synchronize parental lines and foundation seed with the production of certified seed by the seed companies and QDS by local seed businesses (LSBs). This system needs to be an open process and foundation seed producers should have clear production targets according to commercial demand. The management of the EGS production and certification process should ideally consolidate seed orders across the industry, through an open, online system and this process should include both commercial and public procurement, including humanitarian actors who want to buy high quality seed. The EGS system should have routine audits to test the quality and purity of parental lines used to produce early generation seed, using internationally recognized best practices.

**NARO Holdings:** NARO has established an enterprise unit, NARO Holdings, to meet the requirement for a more formalized EGS that provides auditable commercial transactions. There are concerns about underinvestment in this service and whether this new department will have the resources in staff, equipment and management processes to make this venture a success. There are also questions about whether the Government should undertake strong quality control (QC) of its EGS seed systems and be the auditor providing quality assurance of the seed system (QA). Despite these questions, the increased investment in quality control is a positive endeavor to address a clear need.

**Non-exclusive licenses:** To support this process, NARO and the CGIAR should explore additional options to support the use of varieties by offering non-exclusive licenses to private companies. This will help to diversify the source of EGS and strengthen the private sector development.

### 3. Quality assurance should be strengthened:

National regulatory ability to carry out certification must be brought in line with international best practices. There are several areas that need to be strengthened, these include:

- Building an accredited national seed laboratory to support seed testing alongside functional regional laboratories with trained staff who can support seed testing and quality assurance across the country. NARO has facilities and funding from the World Bank to upgrade the national seed laboratory, this task needs to be completed professionally and maintained thereafter.
- Support national inspection and regional seed testing facilities.
- Integrate the private sector into the seed inspection, quality assurance and certification process, to reduce costs for Government and enable scaling of certification.
- Explore prospects for introducing a seed labelling system conforming to best practices and anti-counterfeiting measures that meets the needs of government, private sector and farming communities.
- Strengthen seed procurement processes and policies.
- Raise customer awareness among agro-input dealers and farmers about the value of seed quality.
- Support more efficient and cost-effective seed certification processes to allow sharing of new varieties that are approved in one country with neighboring countries, to reduce time to market and costs for the private sector.
- Work with emergency seed distribution agencies to assess their procurement policies and evaluate the effectiveness of using scarce, certified seed in their free seed interventions.

### 4. Reducing market volatility in seed production rates:

Formal sector maize seed production, combining both hybrid and OPV, reached almost 22,000 MT in 2017 against the 2022 target of 25,000 MT. However, production levels then dropped to just 6,000 MT in 2018. This major shift in production was caused by two factors, primarily a sudden reduction in seed purchased by the government for Operation Wealth Creation OWC. OWC is a government subsidy program that provided free seed to farmers which was suddenly discontinued. There was also a bumper maize harvest at the same time, which sent grain prices to the floor, and in the following season farmers were less interested in maize as a commercial crop. These market factors clearly illustrate how sudden changes in supply and demand can affect seed production and demand levels. Forecasting these events is problematic, as governments enter and exit markets without warning. Weather events are highly unpredictable, and the effects of weather or market shocks are amplified in the seed markets as emergency buyers generally enter the seed market without signaling their intent and generally with limited planning of their operations, which is highly disruptive for commercial market players. Emergency seed

buyers also exit the market rapidly when crises pass, adding to market volatility. Following are some ways to reduce the negative effects of market volatility and how to track trends in the demands and supply of major seed classes:

- **Learning about demand:** Although it is difficult to provide accurate market forecasts for the demand and supply of seed, uncertainty in the markets could be reduced by sharing more information about seed production, procurement, and seed distributions between major agencies. If data was collected annually, from private sector and public procurement teams (government and NGO), then anonymized and shared at the national level, it could provide trends in market demand for various seed types and provide information on geographic demand and demand profiles for different crops.
- **Setting targets:** Better seed information generated and shared by key stakeholders such as breeders, multipliers and seed companies could help in setting national and regional targets for key commercial / food security crops. Information on seed production, can be anonymized to avoid issues related to competition. In Uganda, for example, this market tracking approach could start with maize and bean seed, as these comprise the two largest seed markets by volume. Given the different market strategies for these crops, it would require different methods for calculating seed needs. Hybrid maize is exclusively produced through the private sector and farmers must buy new hybrid seed each year. Whereas farmers can recycle high quality, bean seeds, as they are self-pollinating seed, for 4-5 seasons.

Maize targets could then be used to plan public and private EGS levels destined for the commercial certified seed sector.

Meeting the needs of the beans sector could be achieved through a combination of assessments and interventions that bring together the formal seed companies with informal agencies such as CGIAR who provide considerable amounts of both EGS and foundation seed for the informal markets. The role of emergency agencies will also be important to engage for the true breeding seeds that they are buying.

Working on the targets would help the various players to gather information and assess how close the targets are to reality in order to help coordinate the seed production systems, and work to provide a better match between supply and demand over time. For the less commercial crops, the targets could be assisted through boosting production of foundation seed and multiplying through seed producer groups.

- **Better coordination:** Government, donors and other stakeholders should develop a clearer, agreed understanding of the roles and interactions of the seed sub-sectors (formal, QDS, informal, emergency, etc.) as this could help in building a better understanding about trends in seed demand across the different crops and the seed needs across different geographies within the country. The overall efficiency of the seed sector could be improved by matching different client needs with seed companies, seed producer groups, Local Seed Businesses (LSB's), NGO projects, and local government demands for the EGS supply.

## 5. Semi-formal - Quality declared seed (QDS)

Quality declared seed continues to be used in Uganda, with the aim of opening new market channels that integrate formal, semi-formal and informal seed systems. QDS was developed as a means of attracting new business entrants into the seed market, as it provides a means for selling quality seed of improved varieties, at a lower cost than certified seed and makes seed available in locations that are beyond the formal seed market frontier.

QDS is being used by some projects to promote sales of quality seed in geographies that are not yet served by commercial seed companies. This is a much more market-based approach than projects which simply provide free seed through direct distribution or seed fairs. Commercial seed companies are not allowed to produce QDS, which offers a market opportunity for local seed producer groups. This less stringent seed class is particularly suited to true breeding crops such as beans, rice and groundnuts, sorghum which the private sector struggles to produce and sell at a profit.

Despite the promise of QDS, after nearly a decade of testing in Uganda, there is little documentation

about the volumes sold and the sustainability of QDS Seed Businesses. QDS producer groups are mainly supported through donor projects and these ventures tend to fail when funding is ceased.

- **An assessment of QDS and Local Seed Businesses is required** to determine whether current business models being used by projects to support QDS methods, can launch sustainable seed enterprises through seed producer groups or through business associations between seed companies and larger seed growers. Experiences from different projects and approaches should be shared to learn more about the volumes of seed being produced and sold, and the types of business relationships that were developed with smallholder QDS seed producers versus large farm QDS seed production.
- After testing QDS systems for more than 20 years, more emphasis is needed to assess the business case for QDS and to assess whether QDS can compete in the open market.
- QDS systems are only eligible for farmer seed producer groups and this class of seed is not open to private seed companies. Whilst this favors farmer seed producer groups, are these farmer businesses sufficiently robust to provide seed in a post project context?
- Information is required to determine if current QDS strategies can transition from a predominantly donor-funded seed production system into commercial seed businesses, or whether new business models are required to position QDS in the market more effectively.
- Is there evidence that farmers continue to access foundation seed to continue their seed production, when project networks are withdrawn?
- How well does QDS compete against free seed distributions from nearby humanitarian agencies and NGO projects.
- Do farmers understand and trust this type of seed? Or in the absence of certified seed, do they prefer to buy seed at local markets where traders sell high quality grain as “potential seed”.
- In addition to the questions about whether QDS is a viable business approach, should the donor community be considering investments in alternative seed classes such as standard seed. Standard seed is open to private seed companies which may provide a more sustainable and scalable way of extending the market frontier for quality seed.

## 6. Informal seed systems

The informal seed system is where most farmers go each year to fill the gap in their seed supplies for the next planting season. The informal system does not supply hybrids, so **all** farmers buy their hybrid vegetable seeds and hybrid maize seeds through the formal seed system. However, for the true breeding seed and the vegetatively propagated crops, the informal market offers a diverse range of seed, in terms of types, quality and volumes. Most informal markets have traders who specialize in sales of “potential seed” at the time of harvesting and in some cases, the informal seed system drives the production and spread of new varieties, some of which may later be taken up by the formal seed system.

However, the informal seed system has some major challenges in terms of being a reliable and consistent supplier of quality seed, especially for improved varieties. There is no legal framework for the production and sale of “potential seed” even of unregistered varieties. Despite the reticence of governments and the donor community to explore new innovations and investments in the informal seed sector, informal market channels remain the primary channel that most farmers use to buy non-hybrid seed. .

It is likely that investments in informal seed systems would provide significant benefits, as this market sector supports the largest number of farmers, outside of the hybrid markets. Recent studies by the International Center for Tropical Agriculture (CIAT) in the yellow bean market in Eastern African countries have shown a robust process of investment by the informal private sector in supporting farmers with access to quality seed, expanding the grain markets for yellow beans. When the informal market can coordinate input markets in this way, farmers and consumers benefit from new output market opportunities and this process drives local innovation, production and incomes.

Areas that should be given more attention in the informal seed sector include:

- Test trader to farmer, and farmer to farmer dissemination of improved varieties, especially those varieties developed through public funding, to provide a mainstream means for disseminating varieties especially, those improved varieties are incorporated into local grain / food markets.
- Finding new policy options to enable trained traders to separate seed from grain and legally sell their “potential grain” at a premium.
- Provide simple registration systems and licenses for local traders, agents and farmer groups to aggregate and sell “truthfully labeled” local seed.
- Expose new varieties to QDS farmers as a means of testing and disseminating quality seed of improved varieties, the advantages of this approach was well illustrated in the recent yellow bean corridor analysis, developed by CIAT.
- Find new ways to introduce critical quantities of seed of Farmer Preferred / Market Driven Varieties by seed companies or emergency seed operations then support informal production through farmer to farmer sales and through farmers selling through local traders.

## 7. Emergency seed distribution:

In recent years, a significant proportion of certified seed has been distributed in Uganda through emergency programs and other free hand-outs (e.g., Operation Wealth Creation, and through international aid agencies such as the Food and Agriculture Organization (FAO), NGOs, churches, and politicians). Formal sector seed production appears to be heavily dependent on institutional purchases for emergency seed provisioning, including approximately 5,000 MT exported annually to South Sudan<sup>3</sup>. Many of these distributions appear to be based on an assumed rather than an actual need for seed, and the impacts of recurrent free seed delivery have not been documented. The 2018 National Seed Strategy fails to recognize the negative effects of free and emergency seed distribution on the overall seed system.

Emergency seed provisioning should be designed in ways that support, not undermine, commercial seed sector development in the longer term. Given the high prevalence of low-quality seed in the system, which we believe is largely driven by emergency or subsidized seed distribution, new thinking is required to avoid the disruption to formal commercial certified seed markets by emergency aid. More attention is required to explore the link between procurement policies and compliance used by international aid agencies such as the FAO, versus the actual needs of their target farmers. Compliance systems should not be disruptive to the broader seed system and should not be the driver of the procurement approach. Cash transfers would avoid the current procurement for highest quality seed, being channeled into the humanitarian context.

Organizations involved in emergency response should share their data on volumes of seed procured and distributed each year. Our survey found that some major institutions were unwilling to share this data for this report, despite being major actors in the seed emergency system, despite requests being made to both the local office and the headquarters, to no avail.

As with QDS, more information is required about whether seed distribution methods such as seed fairs and vouchers actually lead to long term seed business opportunities for the private sector, or not, and whether cash systems can provide the same outcome more efficiently. Emergency seed should be reviewed as a matter of some urgency by the Government and donor groups and the following issues considered.

- All free distribution of seed should follow a seed systems security assessment.
- Agencies who provide subsidized or free seed to farmers and refugees should declare their levels and sources of procurement; This data should be submitted to MAAIF on an annual / seasonal basis.
- Humanitarian agencies should review their **procurement policies** in the light of the Uganda case, and adapt methods to avoid market distortion in the formal seed sector
- The ongoing **e-voucher** pilot is encouraging, and this is one approach to motivate more farmers to

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<sup>3</sup>Although this is higher than the official export figures quoted elsewhere in this report, data collected from seed companies and others reveal that the seeds exported to South Sudan include crops and varieties that are not captured by official figures (greengrams, for example).

test then buy into commercial certified seed.

- Where farmers need access to seed, test the use of **cash transfers** so that farmers can buy seed locally. Over time, it seems reasonable to switch seed distribution to cash transfers at the time of planting. This will go a long way to reducing market distortions caused by unplanned emergency seed procurement.
- Emergency seed provisioning should be programmed according to estimated volumes required for upcoming production seasons. (Note that immediate prior season production does not generally allow enough time for adequate quality assurance testing, processing, packaging and transportation.)

## 8. Counterfeit and poor-quality seed

The problem of fake seed is partly driven by the high demand for emergency seed, used in free distributions. Much of the demand for seed is thought to stem from the aid system, based on an assumed need for seed (which often comes from food security data, not seed security data), combined with direct seed distribution rather than local market-based response options.

- **Addressing fake seed** requires not only more effective seed inspection and labelling but also a better understanding to develop ways in which seed is incorporated into the emergency aid system and determine why seeds are being given to farmers rather than cash at the time of planting along with technical advice on the merits of quality seed and diversification.
- **Procurement systems:** Many large aid agencies have become bound to buying certified seed by their procurement systems, i.e., they have internal quality criteria, which requires them to buy the highest quality seed that is available on the market, so that they can provide a product of known quality to their beneficiaries. These are often highly vulnerable farmers, working in marginal land that receive seed aid on a short-term basis. Unfortunately, this unpredictable and short-term procurement system drives the market for counterfeit seed in two ways: (i) buying large amounts of certified seed, in an unplanned manner, means that seed destined for the more commercial farmers or agrodealer channels suddenly becomes unavailable and this vacuum in the market drives counterfeit supply; and (ii) seed suppliers and other intermediaries also provide fake seed or for example expired “certified” seed to aid agencies who then distribute for emergencies.
- **Empowering Ugandan farmers:** new ways are required that enable farmers to speak up and be heard when they have purchased or received low quality seed. The ability of farmers to recognize and have effective labels that prevents the spread of fake seed, will all help to drive higher levels of quality seed in the market and deter those who are producing and/or selling sub-standard seed.

**Regulation by the seed certifiers.** When fake seed is recognized in the system, the seed regulators need to act and enforce standards. Holding counterfeiters, or suppliers of low-quality seed, accountable by removing licenses and declaring fines will deter would-be counterfeiters from selling low quality goods into the commercial markets.

## Introduction

This seed sector profile is unique in that it examines not only the formal, semi-formal, and informal seed systems, but also the emergency seed provisioning. This study explores the performance of these different systems and the interactions between these four aspects of the seed sector.

The profile aims to address the main questions below:

1. What quantities / proportions of seed are moving through the formal, semi-formal, informal and emergency seed systems?
2. For the major crops, what level of demand is being met by the formal and informal systems respectively?
3. What are the trends in seed distributed within these systems?
4. Is there a coherent and effective strategy for government, the private sector, NGOs and humanitarian agencies to increase farmers' access to quality seed of diverse crops through support to the different seed systems?
5. What are the interactions between the formal, semi-formal, informal and emergency seed systems, both positive and negative?
6. What are the priority challenges and opportunities that should be addressed at the sectoral level to promote greater access to and use of quality seed of improved varieties by smallholder farmers?

To answer these questions, data was gathered through an initial scoping study and an intensive desk study followed by a series of key informant interviews that took place from February to June 2020. This process allowed the team to compile quantitative data in relation to the formal, semi-formal quality declared seed (QDS), informal seed sectors, and emergency seed provisioning. This report also combines a review of recent literature and reports and requests to key informants and other stakeholders.

## 1. Lack of data and robust data sources

One of the major challenges in aggregating the information for this profile study was the lack of national-level, up-to-date, centralized data. This problem was particularly acute for the semi-formal QDS, informal sector, and emergency seed provisioning. Given the need to pull information from a range of sources, the information in the tables and figures presented have been checked for internal consistency as far as possible, though further validation with stakeholders is required to generate a consensus, where there is a lack of data.

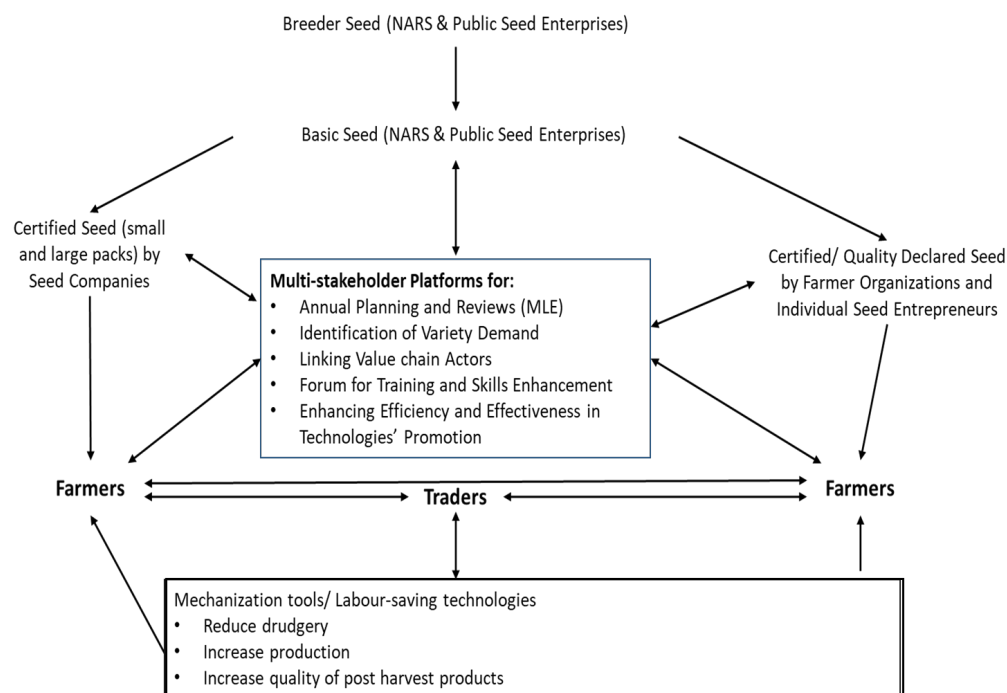
Some of the figures relating to the informal sector are based on small, localized samples rather than more representative surveys. Some of the figures relating to emergency seed provisioning are estimates that have been triangulated through information obtained from key informants, available documentation and calculations explained in the text. Before making this profile publicly available, it is necessary to verify the data with key stakeholders.



## 2. Seed production of improved varieties

The information in **Figure 1** and detailed information in **Annex 1**, illustrates the seed supply chain map for improved varieties in Uganda, which includes the production of certified seed, largely maize,<sup>4</sup> by NARO and the formal sector seed companies and the production of QDS, for a range of crops, including beans, soybean rice and Irish potatoes, by famer groups and individual seed entrepreneurs.

**Figure 1: Seed Actors Map in Uganda showing integration and partnerships**



Total certified seed production for 2019 for the top ten crops, excluding cassava and sweet potato, was over 25,000 MT (**Table 1**). Though there is no centralized data, we estimate that total QDS produced in 2019 produced under project support was likely to have been between 2,500 - 5,000 MT<sup>5</sup> for all crops.

**Certified Seed:** Certified seed comes from a known origin; it is multiplied through a system that requires multiple inspections and is approved by government seed inspectors prior to being sold or distributed to farmers. The small number of seed inspectors in Uganda, (**6 staff**) is a serious constraint, as is the limited capacity to produce early generation seed (EGS). Most EGS is produced by NARO, which recently registered NARO Holdings, Inc., for the sole purpose of producing and selling EGS. Despite plans to upgrade EGS production, this strategy has been hampered by a lack of resources, labor, testing laboratories, and general lack of basic infrastructure, such as irrigated EGS fields, to produce the quality and quantity of seed required on a reliable basis. There is also a lack of qualified or skilled out-growers.

There are 33 registered seed companies in Uganda. These include 13 registered multinationals, including one African multinational, of which six are involved in the production of crop seeds and seven are involved in sales of hybrid vegetable seeds. There are an additional six private companies, including three Ugandan companies that operate regionally, 12 local private companies, a subsidiary of a Kenyan parastatal, and an NGO that is registered as a seed company. Out of the total 33 registered seed companies, 23 produce and sell maize, 13 produce and sell sorghum and 12 produce and sell beans.

In 2019, total production of certified seed for the top ten crops was 25,859 MT, comprised of 14,341 MT of maize seed of which 80% was hybrid maize, 4,385 MT of bean seed, 4,347 MT of sorghum seed, 1,404 MT of

<sup>4</sup> Vegetables are not included here because they are not among the top ten food crops (by area planted).

<sup>5</sup> The QDS figure includes production by: (i) the LSBs supported by ISSD (Table 2); (ii) PRELNOR; (iii) rice QDS supported by NU TEC MD; (iv) bean QDS supported through the CIAT-Pan African Bean Research Alliance (PABRA); and (v) groundnut QDS supported by ICRISAT. Further details are provided in Annex 3.

rice seed, and smaller quantities of other crops (**Table 1**). This is an estimated 3.95 million farming households<sup>6</sup> in Uganda and this equates to approximately 6.5kg of certified seed per farming household. The total volume of certified seed has more than doubled over an eight-year period.

As illustrated by the information in **Table 1**, annual certified seed production for maize, beans and sorghum increased steadily up to 2017 and then dropped suddenly in 2018. These changes are thought to coincide with the expansion and subsequent winding down of the national agricultural inputs distribution program, Operation Wealth Creation (OWC) (**Annex 2**). Whilst bean and sorghum production increased substantially in 2019, surpassing the earlier production levels of 2017, maize production has not recovered so quickly: the level of maize production in 2019 was only two-thirds of that for 2017 (**Table 1**), suggesting that maize production was particularly badly affected by Operation Wealth Creation and the effects of a bumper harvest that lowered maize commodity price in the previous season.

**Table 1. Volume of certified seed produced by formal sector, 2011-2019**

Certified seed in metric tonnes (MT) for the top 10 crops over 7-- year period									
Year	2011 <sup>7</sup>	2012	2013	2014 <sup>8</sup>	2015 <sup>9</sup>	2016 <sup>10</sup>	2017 <sup>11</sup>	2018 <sup>12</sup>	2019 <sup>13</sup>
Maize	7,364	N/A	N/A	14,000	18,000	18,088	21,959	6,166	14,341
Beans	1,577	N/A	N/A	4,000	2,957	1,213	3,794	899	4,385
Millet	41	N/A	N/A	200	12	6	19	N/A	N/A
Sorghum	430	N/A	N/A	900	1,857	N/A	2,302	660	4,347
Groundnuts	233	N/A	N/A	500	N/A	N/A	N/A	30	792
Sesame	92	N/A	N/A	50	N/A	29	N/A	160	505
Rice	1,855	N/A	N/A	2,000	N/A	475	N/A	25	1,404
Cassava	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sunflower	133	N/A	N/A	140	N/A	N/A	N/A	N/A	85
Sweet potato	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
<b>Totals</b>	<b>11,725</b>	<b>0</b>	<b>0</b>	<b>21,790</b>	<b>22,826</b>	<b>19,811</b>	<b>28,074</b>	<b>7,940</b>	<b>25,859</b>

**Quality declared Seed:** The Government introduced QDS as a second seed class in 2014, to encourage new entrants into seed production such as farmer-based seed producer groups, as QDS is not open to commercial seed companies. For this reason, QDS is often considered a semi-formal seed class as it aims to support the production and access to seed that is currently beyond the market frontier provided by the formal certified seed sector.

The introduction of QDS was regarded as a positive policy change that has led to the increased production and availability of quality seed of improved varieties. Several other countries including Ethiopia, Tanzania and Zambia have adopted the QDS seed class and this allows new types of business partnerships between the formal, semi-formal and informal sector to expand the market frontier for improved quality seed.

At this time, virtually all QDS comes through projects implemented by research organizations, NGOs and government organizations (**Table 2**). These activities support farmer seed producer groups, often known as Local Seed Businesses and individual farmers to produce and sell seed that can be directly traced to foundation seed. The QDS strategy, has the clear advantage over other forms of seed exchange and free delivery mechanisms, in that it is a market-based approach, and the desired outcome of introducing QDS is to establish sustainable local seed businesses to enable more farmers to access quality seed over the long term. Unfortunately, there is no centralized data where levels of QDS production and sales are logged. The data gathered through this study from the main development projects that support QDS production are presented in **Table 2** below.

<sup>6</sup> Uganda Bureau of Statistics 2018. A crop farming household is defined as a household headed by a person who owns, works on or operates an agricultural enterprise that cultivates land and crops for a livelihood.

<sup>7</sup> Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) annual report

<sup>8</sup> Ibid

<sup>9</sup> Ibid

<sup>10</sup> Ibid

<sup>11</sup> TASAI Uganda Brief, 2018

<sup>12</sup> USTA compilation, but 2018 data appears incomplete

<sup>13</sup> USTA compilation

Having lower production costs than certified seed, QDS is an attractive business opportunity for local seed production and sales, especially in areas beyond the market frontier of commercial companies. In 2019, QDS production was focused on soybean, rice, beans, and groundnut. The data in **Table 2**, shows varying production levels from year to year. The increases in production are thought to be new projects providing support to QDS production (e.g., rice and soybean in 2019), as well as increases in on-going production. The decreases in production are thought to be a combination of inconsistent donor funding levels, severe weather events or lack of data collection missing data and/or reductions in production due to marketing or production challenges, such as lack of access to early generation seed.

**Integrated seed systems development (ISSD):** One of the main proponents of the QDS strategy has been the ISSD team, who have a large presence in Uganda. They have been working with 100 farmer seed producer groups, with plans to expand up to 200+ seed producer groups, to generate and sell QDS in their areas of operation. The ISSD project support ended in 2019 but built a large network of local producers and this team mainly focused on bean production in associate with CIAT.

**Farmer groups v large farmer production:** In the case of the “Northern Uganda Transforming the Economy through Climate Smart Agriculture Market Development” (NU-TEC MD) Project, rice QDS production was tested with farmer seed producer groups and a small number of larger scale farmers. The NU-TEC MD team indicated that the best results were from the larger farmers who produced more seed, more efficiently. NU-TEC MD’s pro-poor value chain approach and the promotion of a carefully selected rice variety (Nam-Che-5) meant that smallholder farmers were willing to pay for quality seed.<sup>14</sup> A similar model is now being used for soybean QDS under the NU-TEC MD project. The key issue to note in these cases is that NU-TEC MD is building both an input and output marketing approach, which helps farmers to quickly benefit from the higher yielding, new varieties. While the QDS results have been encouraging, the long-term business viability of QDS producer groups remains uncertain. The QDS seed class is not open to commercial seed companies and therefore the pathway to scaling QDS. Even by successful QDS producers, who are only allowed to operate in a limited geography, only a few groups manage to transition from project supported groups to fully commercial local seed businesses.

In Kenya, the government has taken a different approach to reducing seed costs and recently passed regulations for an alternative and less stringent certified seed class, called “standard seed”. This class of seed is open to commercial seed companies but, as with QDS, requires less investment to produce than certified seed due to having fewer isolation and inspection requirements for certification. The standard seed class is being tested with support from S34D, and in the future the two approaches should be compared in terms of their uptake by private and public entities and their ability to expand the market frontier for quality seed of improved varieties, in ways that are both scalable and sustainable.

**Inter-sector interactions:** The QDS seed option provides research and development agencies with a way to introduce new varieties into the general production – market system, at lower costs. This semi-formal channel offers a means of testing new varieties with considerable numbers of farmers. QDS can complement certified seed production and, perhaps more importantly, it may provide a means for farmers to test and select varieties that are also valued by consumers. Seed companies can use this information in selecting varieties for their certified systems, with lower cost for product testing.

**Expanding the market frontier:** The QDS approach offers a lower cost means of establishing seed producer / seed market groups in geographic regions that are not currently well served by the commercial seed companies and associated agro-dealers. Again, this expansion of the market frontier, for higher quality seeds of new varieties, paves the way for more formal seed systems to follow the market as demand for specific varieties mature.

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<sup>14</sup> Palladium, 2020. Enhancing Rice Productivity in Northern Uganda: A NU-TEC MD Case study.

**Table 2. QDS production by ISSD, NU-TEC MD, CIAT-PABRA and ICRISAT, 2013-2019**

Crop	Seed produced in MT (Season A + Season B)						
	2013	2014	2015	2016	2017	2018	2019
Beans <sup>15</sup>	69.7	337.6	139.6	2,450.2	844.1	4,205.2	730.1 <sup>16</sup>
Finger millet	10.2	2.5	4.1		8.0	1.3	5.2
Sorghum <sup>17</sup>	51.0			3.0	220.0	350.0	
Groundnut <sup>18</sup>	11.9	13.7	43.8	3,351.3	572.7	745.0	103.8
Sesame	19.3	70.4	42.8	83.7	40.2	20.0	79.1
Rice	111.1	26.4	27.4	29.4	104.4	144.5	883.2
Cowpea			0.2	-	-	-	1.7
Green gram	-		2.3	-	5.0	7.2	7.6
Pasture	0.2	0.8	1.1	1.8	3.5	7.2	5.7
Pigeon pea	1.6	0.2	1.8	4.9	6.1	5.9	6.3
Soybean <sup>19</sup>	16.2	16.0	15.7	59.5	38.4	145.7	909.2
<b>TOTALS</b>	<b>296.2</b>	<b>467.6</b>	<b>278.9</b>	<b>5,983.6</b>	<b>1,842.2</b>	<b>5,632.0</b>	<b>2,002.0<sup>20</sup></b>

Source: ISSD Annual Reports; personal communications with ICRISAT, CIAT-PABRA and NU-TEC MD.

**Setting seed targets:** For any given country, it should be possible to set basic targets for seed production of the major food and commercial crops, in terms of the amounts of seed required to support a steady increase in national crop production levels or to meet the needs of the more commercial farmers. If the seed requirement can be achieved through a combination of certified and QDS seed, then the use of formal and semi-formal seed systems may encourage more farmers to buy quality seed on a regular basis. This can increase overall productivity and be used as a means of accelerating varietal turnover.

For maize production, the tendency is for farmers to buy hybrid seed every year to maintain productivity. Hybrid maize seed production can only be sold as certified seed and is not allowed under the QDS system due to the high certification standards. Government and the seed companies may want to set hybrid maize seed targets along with strategies to increase demand for high quality seed, as a means of boosting food security and or incrementally growing the maize export market. In 2017, the private sector produced nearly 22,000 MT of certified maize seed, which contributed to a bumper maize crop of over 2.7 Million MT (FAOSTAT). Kenya in comparison is producing more than 50,000 MT of certified maize seed, mainly hybrids to grow approximately 4 Million MT, but Kenya still needs to import maize to support their growing population. If Uganda continues to grow sales of quality maize into the Kenya market, they can continue to grow the maize seed market.

For beans, the seed requirement calculation is different because beans are self-pollinated and farmers can recycle the seed for up to 4 to 5 seasons without a major loss in yield. In this case, the volume of total seed required in the system each year to produce 1.0 Million MT of grain is approximately 60 MT, which divided by 5, (the recycle years) suggest an annual requirement of 12 MT of quality seed. At present seed companies produce approximately 4,000 MT of formal, certified bean seed per year which suggests that farmers would have to recycle their seed for nearly 10 years, due to lack of seed.

However, in addition to the seed company production, QDS production has produced from 2,000 MT up to 4,000 MT per year, which when added to the seed company production of 4,000 MT could provide up to 8,000 MT per year, which then enables farmers to recycle their seed every 5 years. If QDS can consistently produce half of the seed needs per year then, if the costs are reasonable, it makes sense for Government and the development community to support the additional public sector investment in this alternative seed class, as this helps to maintain better quality seed in the system and will lead to higher levels of productivity and a

<sup>15</sup> Figures for beans include data from ISSD and CIAT-PABRA.

<sup>16</sup> This figure is for ISSD-supported groups only; 2019 data from CIAT-PABRA partners was not available

<sup>17</sup> Figures for sorghum include data from ISSD and ICRISAT.

<sup>18</sup> Figures for groundnut include data from ISSD and ICRISAT.

<sup>19</sup> Figures for soybean include data from ISSD and NU-TEC MD.

<sup>20</sup> Total QDS for 2019 is likely to be higher than the figure cited here once the data from CIAT-PABRA is included.

faster rate of varietal turnover, which also advances yield and protects the crop from new pests and disease. Even with a seed production level of 8,000 MT, there appears to be room for additional higher quality bean seed, and it is perhaps in this space, that the role of informal traders can play another important role in purchasing and distribution of quality seed also needs to be considered, as explained below. The use of targets and monitoring actual levels of production and sales of seed for the leading crop could provide an effective means of strengthening overall food security, marketing and investments in seed at the national level.

### 3. Distribution and diffusion of quality seed of improved varieties

**Certified seed** produced by formal sector seed companies is sold commercially through networks of agrodealers. Existing data suggests that there were approximately 3,000 agrodealers in 2017, including 600 hub agrodealers (wholesalers). Using current population figures, it is estimated that one agrodealer serves approximately 3,000 farmers. Commercial sales to farmers can be extended through market-based programming approaches, as described below.

Certified seed is also sold to ‘institutional buyers’ which include governmental and non-governmental organizations, as well as agencies such as the FAO. These institutional buyers distribute the seed to farmers, often as part of emergency aid interventions, and usually for free.

Certified seed channels provide opportunities for new varieties to be introduced into the marketplace and seed companies are keen to support farmers with new varieties that offer special characteristics such as drought and disease tolerance, alongside steadily increasing yields. However, in many cases, seed companies stick with some “workhorse varieties” that have already been promoted to farmers and provide reasonable yields, as changing varieties increases their marketing and production costs. This reluctance of seed companies to invest in the promotion of new varieties is one of the causes for slow rates of varietal turnover. Governments are also reluctant to place term limits on old varieties, but they may need to do this if they want to support a continuous upgrading in the seed stock.

**QDS** must be sold by the seed producer groups, for use within a defined local area, such as a district or two to three adjacent districts. Commercial seed companies and agrodealers are not allowed to sell QDS. The expectation is that local seed businesses (LSBs) and farmer groups, or individual farmers sell their QDS seed directly to local farmers. QDS is also purchased for use in emergency seed distribution.

In some cases, LSBs sell directly to farmers affected by crisis, e.g., through seed fairs involving vouchers for affected farmers. In other cases, institutional buyers, projects and even the private sector reportedly purchase or use QDS in free distribution channels. More data is needed to determine whether the current QDS distribution mechanisms are operating as they were intended, and whether QDS is effectively accessible to smallholder farmers on a regular basis and outside of the project context.

QDS offers breeders and project managers with an opportunity to inject new varieties into the system and test their adoption. The challenge with this means of distribution is sustainability, in which case farmers make accept a new variety but be unable to refresh the seed, given that most projects have a maximum duration of 3-5 years.

**Free, direct seed distribution:** In 2015, NARO estimated that 50% to 70% of all certified seed available for sale (approx. 11,500-16,000 MT) was distributed for free through Operation Wealth Creation (OWC). OWC has been winding down in recent years, and this appears to have had a major effect on commercial sales and production, as described in Section 2.1 above.

At the local level, agrodealers complain that farmers are unlikely to purchase seed if they receive free seed from government- or donor-funded programs. The replacement of OWC with the Agricultural Cluster Development Project (ACDP) suggests that the government is now shifting away from direct distribution of free seed towards more commercially oriented, though subsidized sales of seed through agrodealers (see Section 2.7). However, free seed is still provided through emergency aid interventions (possibly as much as 15,000 MT – see below) and in much smaller amounts through the Parliamentary Food Security Program (an estimated 2.5 MT of maize, beans, rice) and through a portfolio of agricultural development projects supported by the donor community.

Free seed distribution through emergency programs has historically shaped the Ugandan seed sector. Large scale distributions of free seed began in the late 1980s, at a time when Uganda was recovering from a protracted period of unrest and when the seed industry was relatively small. Large quantities of seed were procured by humanitarian agencies for distribution among internally displaced people (IDPs), particularly in the Acholi and Lango sub regions of northern Uganda. The fledgling seed industry was unable to meet the scale of the demand, seed quality was poorly regulated, particularly given the urgency with which seed needed to be procured, and government allowed ordinary trading companies to supplement the efforts of the seed companies, especially for the crops the formal seed companies were not able to supply. The involvement of trading companies in the relief seed business is widely thought to be the origin of poor quality, counterfeit or

fake seed.

Today, emergency seed aid continues to target refugee and host communities in the north-west and western regions in Uganda and areas that are affected by flood and/or drought. Obtaining accurate data on the quantities of seed distributed through emergency programs has proven difficult to obtain and several large agencies were unwilling to share their data on seed distributions.

Based on interviews and the data that we have been able to collect, we estimate that approximately 4,000 - 5,000 MT of seed are distributed in Uganda annually through emergency programs, though one government official suggested that the figure could be as much as three times higher, up to 15,000 MT. Uganda is also the epicenter of humanitarian support for many of the surrounding countries including South Sudan, DRC and Burundi. Considerable amounts of fake seed is also shipped to these countries, especially during periods of shock, when food aid is automatically followed by seed aid.

**Relief seed procurement policy:** FAO and some of the larger NGOs engaged in direct seed distribution for emergency or relief purposes have, over time, developed procurement protocols which require that they buy the best seed that is available on the market to ensure high germination and production for farming communities that are in food insecure zones. This requirement has led many organizations to follow internal compliance regulations to buy certified seed for distribution to project participants and refugees. This drives a zero sum game, in the sense that irregular and unplanned buying of certified seed for humanitarian needs, removes seed from the market that was destined for commercial farmers. It is this vacuum that can be replaced with low quality seed.

The high level of free seed distribution by the government and humanitarian organizations, possibly accounting for as much as one-quarter of total certified seed production, represents a significant level of seed demand, and there is concern that the vacuum created by a sudden and irregular purchase of certified seed, acts as a driver in pushing up the levels of counterfeit (fake) seed in the market. The effect of procurement compliance, driving the selection and procurement of seed types could be addressed if humanitarian and relief agencies used alternative buying mechanisms. Alternatives include policies that mean humanitarian agencies can only access certified seed, through advance contracting. Humanitarian agencies could also make a switch from direct distributions of free seed to more market-based strategies that support the existing seed sector, such as shifting from direct seed distribution to cash options, so that farmers in an emergency situation can buy seed from the formal and informal markets, which would be less distorting within the certified seed marketplace.

**Seed Fairs and Vouchers:** As a bridge between free seed provision and direct seed distribution, which crowds out local private agrodealers and seed suppliers, many humanitarian organizations use seed fairs or agricultural input fairs. At these fairs farmers and agrodealers and – in some cases - LSBs are invited to a specific location, at a set date, to exchange seed, the idea being to crowd in the private sector.

At the seed fair, participants exchange paper vouchers for seed from various vendors. The vouchers are provided to identified and selected participants by the humanitarian organization or project team. Typical values of the seed vouchers are between \$20 and \$40 but may be as high as \$70 if the fair includes seeds, fertilizer and basic tools. The voucher approach provides alternatives for the farmers who can exchange their vouchers for their preferred crop, seed type, and brand/producer from the range of inputs available at the fair. Under this approach, farmers are not compelled to exchange their voucher for certified seed, as they can select QDS or even farmer seed. This approach puts less market pressure on the limited stock of high-quality seed at the national level.

Seed vouchers and fairs are also used by some agencies, particularly NGO's as a way to introduce new varieties into a region, where farmers may have recycled seed for many years. This is particularly useful for the self-pollinated crops. Seed fairs also offer an opportunity to provide training to farmers in the use of nutrition dense crops, such as orange fleshed sweet potato, and iron rich beans, which can improve dietary diversity.

As with QDS, the seed fair strategy, has not provided any evidence that this approach leads to long term business opportunities for the LBS's or the commercial seed sector and the agro-dealer networks. It is for this reason that both development agencies and the more progressive humanitarian agencies are exploring more market-based strategies to build longer term solutions that link farmers with private sector seed channels.

Market-based seed distribution mechanisms: The use of **e-vouchers** is a more recent strategy that provides a

more market-based distribution mechanism, and this method is being piloted through the Agricultural Cluster Development Project (ACDP, 2018 – 2025), a World Bank-funded government subsidy scheme, which is replacing OWC. The use of e-vouchers allows eligible farmers to exchange their conditional e-vouchers to purchase agricultural inputs from participating agrodealers, but importantly at their points of sale. This approach brings the client to the market and aims to establish long term business relations between farmers and agro-input suppliers.

The electronic voucher requires that farmers also provide a cost-share when buying inputs, as the voucher provides an initial subsidy of 67% of the cost of farm inputs in year 1, and the value of the subsidy declines to 50% in year 2, and 15% in year 3 and is phased out in year 4. Though the quantities of seed distributed by ACDP remain relatively low (approximately 1,000 MT in 2020A), with just 29 agrodealers involved in the pilot e-voucher scheme, this may increase.

The FAO has successfully used the e-voucher approach in Mozambique following hurricane Idel, and the advantage of this approach is that the system had been established prior to the crisis, the FAO team were able to top up the vouchers virtually, at distance, so that the farmers could then go to the input dealers and buy fresh seed to replant the fields. Although this system requires a card, and phone link for the use of the e-voucher, mobile technology is spreading so quickly throughout Africa, that this system, whether e-voucher or mobile money-based, is likely to replace all other physical seed transfer in the next 3-5 years.

**Cash:** Humanitarian agencies that provide support to refugees and host communities in Uganda are shifting from physical asset transfers to providing farmers and project participants with cash. These transfers can be made at specific times of the year, such as the lean season, to support access to food and at planting time to support access to seed. At present, there appears to be a reluctance to shift to cash for seed transfers in Uganda. The reasons for this are unclear, but humanitarian agencies are often cautious about shifting from physical transfers to cash transfers for fear of funds being repurposed.

Nevertheless, the transition to cash is almost inevitable, as it is quicker, better targeted and more efficient. Humanitarian and development agencies which use cash, can then place more effort on working with vulnerable communities to provide evidence of the value of using quality seed. The teams can focus on awareness, creating demand for quality seed and linking farmers with local seed input suppliers and market traders who can offer farmers quality seed. Cash transfers can be complemented with farmer training about the differences between high quality and low-quality seed, and farmers can be given access to demonstration plots to see the performance of different crops and seed types.

Cash allows farmers to make decisions on the best “value” seed options for **them** in their locality. Although there is limited use of cash for seed transfers in Uganda, evidence from elsewhere shows that farmers tend to buy good quality grain from other farmers and in the local markets, with some of the more progressive farmers buying higher quality “certified seed” through agro-dealers or their local agents. This approach again puts less pressure on the certified seed market and reduces the prospects of fake seed escalation. It should be noted that lower quality seed may have lower germination rates and lower productivity than certified seed.

**Market linked agent models:** Both humanitarian and development agencies are increasingly being asked by donors to establish more sustainable and scalable strategies for the provision of services to vulnerable communities. In response to this demand, agencies such as CRS have worked on transitioning public and project funded agents providing financial services, advisory, crop inputs, animal health care and output market linkages, into fee-for-service agents.

The successful break through with fee-for-service savings and loans agents into private sector service providers (PSP's) led to continued innovation with Private Agricultural service providers (PASPs). These agricultural agents have focused their fee-based strategies on advisory and commission options with inputs, including seeds, fertilizer and agro-chemicals. The major advance in deploying fee-based agents, is that they can effectively extend the market frontier for quality inputs into project zones, as the technical assistance in those areas, works to aggregate demand for improved technologies.

The use of fee-based agents and the integration of technology platforms to identify clients, link clients with quality inputs and can scale out this type of support using mobile money platforms. The establishment of networks of PSP's and PASP's offers the private sector with a new type of sales force which can support a



much larger client base, in new geographies at affordable rates.

The key issue is that the use of cash, and the use of fee-for-service agents is a more market-based approach, and these methods avoid the market distortionary effects than the physical seed system, which are having major negative effects on the commercial seed system.

**Informal seed system distribution:** Farmer-to-farmer dissemination of improved varieties is also known to be an effective means for disseminating varieties that are regarded by farmers as desirable or have special traits. Where improved varieties have been incorporated into local grain / food markets, farmers can then also acquire seed of improved varieties from informal grain traders.

For those crops which farmers regularly purchase as seed from local markets, it is not uncommon for traders to distinguish seed from grain and sell it at a premium. Although difficult to quantify, these traders play an important role in the dissemination of quality seed of improved varieties, especially when traders are linked to breeding teams, as illustrated in the recent yellow bean pilot project, developed by CIAT.

#### **Summary of findings in terms of seed channels and access to new varieties.**

- **Agro-dealer supported certified seed systems** are demand led and private sector driven. This seed system links EGS with seed companies and agrodealer networks, establish direct channels to supply farmers with regular and sustainable access to quality seed of improved varieties. This approach has proven to be highly effective for hybrid crops, but for many smallholder farmers, shows less success to date with self-pollinating and vegetatively propagated crops. **(market based)**
- **Quality Declared Seed** is a demand-led approach that is publicly funded, and like certified seed links EGS to farmer producer groups, who then offer farmers with access to new varieties at a slightly lower price than certified seed. Projects offering QDS are often located in areas not well served by the private sector. The QDS model is a means of providing quality seed of improved varieties at lower cost than certified seed, but the QDS system, when linked with short term projects, has not yet created a sustainable business model. Scalability of this approach has not been proven. **(market based)**
- **Fee for service Agent models:** publicly funded projects that train fee-for-service agents who sell seeds on a commission basis. They are linked to formal certified seed agro-dealers and therefore extend the market frontier of the certified seed sector and provide a legal sales point as they operate under the license of the registered input suppliers. **(market based)**
- **E-voucher schemes** where farmers can only redeem through approved sellers, such as agrodealers, may help to strengthen formal seed systems, if used on a regular basis. **(subsidized, but market based)**
- **Informal traders:** Introducing new varieties propagated using non-hybrid seed, through non-traditional actors such as retail traders and wholesale traders, could provide a new way to introduce and bulk seed, through the farming and trading system. However, this approach is not linear, difficult to standardize and may require an entirely new approach from the public sector. CIAT is exploring this option, but the approach may be difficult to implement. **(informal market driven)**
- **Free seed** distribution programs offer farmers, especially the more vulnerable farmers, a short term and opportunistic means of accessing quality seed and new varieties. Such programs however have no long term means for building market-based relationships with farmers. This approach crowds out the formal, private seed channels, which then may reduce farmer access to seed on the long term. **(supply driven)**
- **Seed fairs and vouchers** can potentially help to strengthen both formal and informal seed systems. However, most voucher-based seed fairs are individual events, which are effective in assisting farmers in time of need with access to seed from guest suppliers. The seed voucher / fair system shows little evidence of building repeat or long-term business links to formal seed networks. **(supply driven)**
- **Cash transfers** provide physical cash or mobile money, that farmers can use to buy inputs from either formal outlets, informal markets or neighbors. This strategy provides absolute flexibility in terms of accessing the most appropriate types of seed by farmers. **(supply driven)**

## 4. The informal seed system

Data collected from three geographical zones affected by crisis in 2013 showed that **89% of seed** planted by smallholder farmers came from the informal sector. This seed was either self-saved, or sourced from family, friends, or local markets, with some variation between different crops (**Table 3**).

**Table 3. Sources of seed by smallholder farmers (% of total), based on data collected in 2013** <sup>21</sup>

	Informal or farmer seed			QDS	Formal certified seed		
	Saved	Family/ friends	Local market	LSB	Agro-dealer / Seed company	Government	NGO Project
Maize	54	4	30	3	5	2	3
Beans (common)	46	2	43	2	2	3	2
Cassava	55	31	3	0	3	7	1
Groundnut	46	3	42	2	5	2	1
Sorghum	49	3	39	4	3	1	1
Sweet Potato	53	37	4	-	6	0	-
Sesame	27	4	62	2	2	2	1
Finger Millet	61	5	32	2	0	-	-
Rice	17	7	46	8	14	2	6
<b>All crops</b>	<b>41</b>	<b>13</b>	<b>35</b>	<b>2</b>	<b>5</b>	<b>2</b>	<b>2</b>

Source: ISSD Uganda, 2014.

Sesame, rice, beans, and groundnut were the crops sourced most from local markets. The overall quantity of both formal and informal sector seed planted each year for the top ten food crops<sup>22</sup> (excluding vegetatively propagated crops) is estimated at 113,900 MT in Uganda (**Table 4**), making the informal market the largest source of seed for the farming community.

We have not included the production of planting materials for vegetatively propagated crops, such as matooke bananas, cassava, sweet potato or yams. These are more complicated to measure by volume and weight, compared with basic grains and legumes. The team recognizes the importance of these crops in terms of food production and commercial value. The seed systems for these four crops are all firmly embedded in the informal system. The reader should also be aware that the level of hybrid maize seed may rise considerably in high maize production zones. Although the quality of seed within the informal sector is highly variable, the informal sector is thought to provide an effective means of accessing planting material, and offers a way of accessing new varieties, particularly for true breeding crops which are regularly purchased from informal traders (e.g., beans, sorghum groundnut, rice, sesame, soybean, cowpea, pigeon pea).

**Licensing issues:** A key barriers to expanding and strengthening sales of quality seed through informal markets, is that “legal sales” of seed generally requires some form of licensing. The license requirement is to protect plant breeders rights, supports plant variety protection, and protect the intellectual property of branded seeds and the commercial investments made by private sector companies in operating registered formal businesses. Seed companies and agro-dealer networks take out licensees with the seed certifying agencies in a country to protect their investments in seed sales. The legal framework for sales of seed also protects the consumer, i.e., the farmers from buying poor quality seed, or seed that has low germination rates, and does not meet recommended seed quality standards in terms of genetic purity, moisture content, pest and disease levels and impurities.

Few countries in Africa have seed classes that actively promote local seed classes beyond the certified seed class, see **Table 4** below. The central premise of the formal seed system is that there is a clear distinction

<sup>21</sup> Baseline Study on Farmers’ Access to Seed and other Planting Materials in Uganda, 2014. Appendix 3. This data comes from a sample of 905 smallholder farmers from three zones, West Nile, South Western and Northern. Though the data was collected in 2013, this is the most detailed and comprehensive data available to date. Subsequent subsidy program data, particularly for maize, indicates significantly higher levels of formal sector seed distribution.

<sup>22</sup> The top ten food crops (in order of estimated area planted) are: maize, common beans, cassava, groundnut, sorghum, sweet potato, sunflower, sesame, finger millet, rice (Table 3)

between ‘seed’ and ‘grain’.

Despite the legal context, almost all farmers in Africa re-use their home saved seed. Farmer seed is regularly shared and sold within communities and farmers go to their local markets each year to buy seed for a wide range of crops from traders who have selected the best grain from one season so that farmers can access seed for the coming planting season.

There are some efforts, such as the use of Standard Seed (SS), Quality Declared Seed (QDS) and “Truthfully labelled seed” (TLS), to offer farmers access to better quality seed at a lower price than certified seed. These efforts are intended to improve farmers access to seed. However, these alternative seed classes have not met with great support from Governments or the private sector.

**Table 4. Types of seed classes used by breeders, seed companies, traders and farmers**

Types of seed	Basic definition	Who manages
Nucleus seed	Genetically pure seed without any impurity. Obtained from a few healthy plants growing in an isolated plot	Research, specialist, genetic stock
Breeders seed	Breeder seeds are produced by mutual multiplication of different pure line. Seeds with desired quality traits are selected and certified as Breeder seeds.	Research or private sectors breeders
Foundation seed (pre-basic)	Multiplied Breeder seed which can be clearly traced to Breeder seed are called Foundation Seeds.	Public or private companies
Registered seed (basic)	The progeny of the foundation seed certified by a government agency which is suitable to produce certified seeds.	Public or private companies
Certified seed	Certified seed is the progeny of foundation seed and must meet the standards of seed certification. <i>This is the main type of seed sold to farmers through formal input supply markets.</i>	Public or private companies specialized farmer cooperatives
Standard seed	Standard seed is the progeny of foundation seed and must meet the standards of seed certification but has lower levels of inspection and costs less to produce than fully certified seed.	Public or private companies
Quality declared seed	Seed produced by a registered seed producer which conforms to the minimum standards for the crop species	Farmer groups, farmer co-ops, NGO's
Truthfully labelled seed	Production procedure is same as certified seed. No Seed Certification Agency is necessary	Farmer groups, Farmer co-ops, NGO's
Grain	Progeny of certified seed	Farmers
Improved / Market “seed”	Seed that is selected by local traders, cleaned and held over until the next planting season	Traders
Farmers own seed	Seed that farmers recycle from their grain. Generally, the best quality and largest grain that is used as seed	Farmers traditional

Despite the high levels of farmers using informal markets, as with all informal systems farmers have no quality assurance, idea of origin or quality of the seed they buy and they have few measures for recourse if the seed fails. The consistency of seed from the informal markets supply will be more variable than with formal sector production, but the seed is low cost, accessible and farmers who buy local seed, know it will be from an adapted variety or landrace. Information on how varieties are selected for rapid multiplication in the informal system are difficult to assess and the informal market system works in ways that are difficult to standardize.

Informal systems, however, offer research organizations, such as the Consultative Group for International Agricultural Research, with a more rapid and low cost means of testing, disseminating and potentially multiplying their new varieties compared with going through the formal systems. This is particularly for crops that have low rates of uptake from the commercial sector. The informal market essentially offers a low cost, low risk distribution channel to farmers.

The informal marketing approach, however, suffers from several major challenges in terms of marketing strategies. Despite the success of some varieties, such as the yellow bean, being traded in local or regional grain markets and being adopted at scale, the market uptake process is unpredictable. Seed volumes available in the market can be highly variable, varieties are regularly mixed which makes purity complicated and seed quality and health may be compromised. The pace of varietal turnover and market penetration is generally slow in the informal sector and it is a difficult market to regulate. Nevertheless, if those characteristics of the informal system are acceptable, this seed delivery approach can be fruitful.

Despite the high usage of informal markets and the potential for using this market for seed delivery innovation, most seed regulators are not interested in developing policies and processes for informal markets and there is major resistant from the licensed organizations to allow deregulation in the seed market, even if the majority of farmers would benefit from such a move. It will take courage to deregulate seed systems, but it could be a highly effective means of increasing food security in the future. It is an area that needs further study and cost-benefit analysis.

## 5. Current strategies

The 2018 Uganda National Seed Strategy was originally drafted and validated in early 2015 with the aim of operationalizing the National Seed Policy, which was initially drafted in 2014. The 2018 National Seed Strategy presents a set of integrated production targets by crop and by sub-sector. In the strategy, it was envisioned that by 2022 the formal sector would provide 100% of hybrid seed and varying proportions for other crops (from 2% to 40%), and that QDS would provide 10-15% of annual seed use for all crops except hybrids, essentially replacing some of the informal and recycled seed.

As indicated in the TASAI report, capacity in the Ugandan public sector to support EGS and seed certification is under-resourced, and structures are outdated. The seed industry is seeking to upgrade EGS, expand the number of inspectors, improve data and grow the market for quality seed. At the same time, government and international agencies play a major procurement role in the formal sector and erratic market procurements are fueling high levels of counterfeit seed.

Although the 2018 strategy aimed to achieve an integrated seed system within a 5-year time frame, flows of seed through emergency programs, free seed hand-outs, project seed production and government subsidies are neither acknowledged nor addressed.<sup>23</sup> There is also insufficient emphasis placed on improving the systems and resources to support a robust EGS upgrade. Although the strategy does not elaborate on the challenges associated with emergency seed provisioning, it states that clear guidelines for emergency seed supply and strategic seed stocks will be established, but neither has been implemented. As such, there is a fundamental contradiction within the strategy. It aims to ensure continued availability of good quality seeds for commercial farming needs and to respond to localized or national calamities, but it does not show how these will be produced or distributed in relation to the planned integration of the formal and informal systems.

In practice, seed and other agricultural inputs have been distributed for free to large numbers of semi-commercial farmers, and seed from the seed companies is also being distributed among refugee and host communities as part of the overall emergency response plan to address immediate needs and prevent asset depletion among the new arrivals. Agricultural inputs including seed, small livestock, and non-agricultural income-generating opportunities are provided to buffer against food rationing caused by increased emergency influxes. These inputs are procured from the market on short term contracts, with no integrated plans to offset market distortion.

A range of development and research partners are supporting the implementation of the National Seed Strategy in different ways, through support to the formal sector (**Table 18**), to QDS production (**Table 24**), and to the informal sector (**Table 25**).

Implementing partners are all exploring ways to develop last mile business models for more profitable and sustainable delivery, and improved access to quality seed. This area of work is primarily focused on linking input markets to output markets through a value chain approach, meaning that most agencies and private sector are working on a seed-plus approach. This input and output marketing model appears to have been successful for rice QDS within the NU-TEC MD project (Palladium, 2020), as summarized in Box 1, Annex 3.

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<sup>23</sup> What is referred to in the strategy as ‘non-market seed distribution mechanisms’ relate to seed exchanges within farmer networks, not free seed distribution from NGOs or government.

## 6. Opportunities and challenges for a more integrated seed system

### 6.1 Improving seed systems processes and data systems

The lack of reliable, up-to-date data for the Ugandan seed system in its entirety is a barrier for successful management, decision making and prioritizing investment from the public and private sectors. As Uganda invests in its seed system, the MAIFF needs to establish a modern information and management system that restores confidence in the seed system and be able to provide data to verify amounts of different types of seed moving through the system, including early generation seed, (EGS), formal certified, semi-formal QDS, and seed used for emergency and or Government subsidized interventions.

The lack of data and lack of a shared implementation plan, by Government, private sector, International Agricultural Research Centers and the INGO communities, and the inability to support an inclusive national seed data system is challenging given the outdated existing structures within the Government seed agencies, a lack of equipment, modern management systems, and insufficient staffing to support a growing, modern seed industry. The process of reform is also complicated by the over-riding problems associated with high levels of fake seed. This issue is unlikely to be resolved without better information management and quality assurance systems that are supported by all the seed systems stakeholders, especially government and private sector.

To support a process of rebuilding capacity and confidence, the following recommendations are put forth.

#### **Recommendation 1 - Strengthen seed monitoring systems:**

- **Better data systems:** Uganda needs a modern seed management and monitoring system to collect and compile systematic, centralized data, including more accurate records of quantities of certified seed, QDS and emergency seed. Given the high levels of counterfeit seed, humanitarian agencies should report on their investments and distribution modalities for emergency seed, including seed distributed in Uganda and seed that is purchased in Uganda for export to neighboring countries.
- **Studies / assessments:** Needed to provide a better understanding of the seed system: Role of QDS in project-based seed supply, volumes, costs and the sustainability of QDS with Local Seed Businesses in post-project situations,
- **Address emergency seed situation:** There is an urgent need in Uganda to review the circumstances in which emergency seed might be needed, and specifically which emergency seed distribution modalities are most appropriate and have the least distortion on local and national seed markets. If most seed companies in Uganda are only profitable with considerable public procurement, then more standardized systems should be enacted, to avoid public procurement methods that disrupt the commercial markets which aim to supply quality seed to the commercial farming community, which wants to buy quality seed.

### 6.2 Modernizing the EGS system

The weaknesses within the EGS system have built up over time. The problems are related to lack of investment in the EGS systems, lack of departmental integration, weak links between government and the private sector and the general lack of clear, standardized processes to support the production of early generation seed across crops and with appropriate levels of quality assurance.

The EGS system would benefit from a general review and a plan to upgrade the system, with key infrastructure, such as irrigation, isolated production sites, cold storage, seed testing facilities, hiring and training of dedicated staff to support production and quality assurance and most importantly, a set of clear and robust processes, with financial plans, to manage EGS production and certification. Ideally this upgrading to the EGS system would facilitate coordination of procurement between NARO, the MAIFF seed unit and the seed industry.

#### **Recommendation 2 - Strengthen the national EGS system:**

- Provide support to NARO and the Seed unit to map current EGS and certification processes and identify critical challenges or “hazard points” within the system and the generate viable upgrading solutions.
- Develop more robust mechanisms and processes for pre-booking foundation seed with NARO and link EGS sales to NARO Holdings, avoid direct contracting of research staff to produce special EGS seed lots.

- Support USTA and re-examine prospects for deploying a digital platform to improve the coordination of production of EGS seed and ability to plan within the seed sector. However, this final method, should only be applied once robust systems are put in place, as digital systems work to amplify the workings a system meaning that it can improve a good system but also worsen a bad system.

### 6.3 Strengthen the quality assurance system

#### Recommendation 3 - Strengthen seed quality assurance:

- The first step in strengthening seed quality assurance is to develop and operate a strong, ISTA-certified national seed lab to:
  1. serve as a national reference lab and resolve testing disputes.
  2. carry out the required audit processes needed to outsource quality assurance activities.
  3. train regional and private sector laboratory personnel; and
  4. represent Uganda in international seed quality assurance organizations.
- **Scaling and quality:** To take the quality assurance activities to scale, reduce costs, improve timeliness of quality assurance activities, and support the integration of the private sector into the seed quality assurance process, NARO, MAIFF and private sector should review trends in neighboring countries which are establishing public-private sector seed quality assurance processes.
- **Who does what?** The roles of the players should be clarified, for example, mandating that Government produce higher and better levels of EGS, while the private sector is given the mandate for production of certified seed. New quality assurance systems should explore prospects for introducing traceable and tamper-proof seed labelling from parental lines through to certified and QDS seed – labelling that meets the needs of Government, private sector and the farming community. MAIFF should also adopt international seed quality assurance best practices which would encourage more efficient seed-related cross-border trade, increase the size of the seed production volume in Uganda targeted toward commercial seed exports, and accelerate access to new varieties.

### 6.4 Reducing market volatility for formal seed

The production and marketing of formal seed classes including certified seed and QDS can be a challenge due to unpredictable buying and / or low demand. Formal sector maize seed production (both hybrid and OPV) reached almost 22,000 MT in 2017, against the 2022 target of 25,000 MT, but dropped to just 6,000 MT in 2018, due to reduced seed purchased by the Government's Operation Wealth Creation strategy. Demand for certified maize seed was also low in 2018, due the bumper harvest in 2017, which suppressed maize prices.

The nature of demand must be clearly understood, including how it varies for different crops. The government and private sector should devise plans for different crops, and if targets are to be set to achieve national production goals for key crops such as maize, beans, rice, etc., then the various stakeholders should work together to establish crop strategies and related seed programs. Clearly, strategies and targets for hybrid maize crops, which needs seeding every year, will be different from self-pollinating crops such as beans, where seed can be effectively used for up to 4-5 seasons (although three seasons is the general recommendation), without a major deterioration in productivity. The supply of quality bean seed is being met through a combination of formal, informal and emergency measures but could be managed more effectively with improved data sharing. Planning for seed production should also work in conjunction with emergency seed distribution agencies to assess their procurement policies and evaluate the effectiveness of using scarce, certified seed in their free seed interventions, which will also affect production and marketing strategies. Market-based approaches suffer long term damage when trying to compete with free seed.

#### Recommendation 4 - Better coordination across the seed sectors:

- Government, donors, research institutions, NGOs and other stakeholders need to develop a mutual understanding of the roles and interactions of the seed sub-sectors (formal, QDS, informal, emergency) and the nature of seed demand across the different crops and sub-sectors. The overall efficiency of the seed sector can be improved by aligning EGS needs with multiplication of certified seed and subsequent marketing and distribution strategies used by seed companies, LSBs, NGOs, and local governments, which buy and sell or distribute quality seed.

## 6.5 Quality declared seed (QDS)

QDS has been tested in east Africa for the past 20 years and more recently, in 2014, was introduced into Uganda, as a means of providing quality seed to farmers who were either unable to afford certified seed or were beyond the market frontier of certified seed. The QDS channel is being used by development projects and research teams, such as the Consultative Group for International Agricultural Research (CGIAR), to offer farmers access to better quality seed than is available through the informal seed system and to promote the production and distribution of improved varieties. The Integrated Seed Systems Development project (ISSD), CIAT ABC, and the NU-TEC MD project have been especially proactive in supporting QDS distribution of bean, rice and soybean seed, at levels of approximately 2,000 – 4,000 mt / year.

The production and distribution of QDS also provides projects and repeated emergency seed interventions with an alternative to annual distribution of free certified seed, which we argue is a possible cause of increased fake seed. In these cases, the projects and emergency teams can establish local seed producer groups or LSBs to grow the seed required locally, which supports local business and extends the market frontier for new varieties. The introduction of QDS provides a new means for disseminating lower cost, quality seed of improved varieties among informal seed systems at the local level. This is particularly effective for true breeding crops such as beans, rice and groundnuts, where the private sector struggles to make profit.

However, the more critical question for QDS is its sustainability, particularly when donor funds cease to support activities. There is little documentation about the sustainability of the QDS approach and Local Seed Businesses. QDS is almost exclusively supported through donor projects and because commercial seed companies are not eligible to sell this class of seed, there is not a clear pathway for scaling QDS. This is a serious risk for its sustainability.

An alternative option to QDS is standard seed which, like QDS, is a class of seed that has lower quality assurance requirements than traditional certified seed and is therefore also cheaper to produce. Standard seed has the advantage that this seed class can be offered by both LSBs and seed companies. In addition, unlike QDS, standard seed is not geographically restricted by market locations. The potential for standard seed is currently being explored by S34D in Kenya, with the Government of Kenya.

### **Recommendation 5 - Evaluating QDS performance:**

- After seven years of QDS investments in Uganda, an assessment of QDS and Local Seed Businesses is required to determine whether current QDS models are meeting their volume targets and whether they are sustainable when project funds cease. More evidence is also required to determine if the current QDS distribution channels are effective for both LSBs, research organizations and projects, especially those that span the divide between emergency and development. Experiences from different projects and approaches should be shared for joint lessons to be learned and applied where necessary.

## 6.6 Greater investment in the informal seed sector

Most investments in the seed sector over the past 30 years have been to support the formal seed sector, and there have been limited efforts by governments and the donor community to explore innovations in the informal seed sector, despite this being the seed system that most farmers use to access non-hybrid seed.

It is likely that investments in informal seed systems would provide significant benefits to farmers, especially the more vulnerable farmers who are currently unable to access formal seed, cannot afford formal seed or are at present unwilling to regularly buy formal certified seed.

### **Recommendation 6 - Evaluate alternative methods of new legal frameworks to support greater access of farmers to informal seed**

- Test new ways for trader to farmer, and farmer to farmer dissemination of improved varieties, to provide a new mainstream channel for disseminating varieties especially, those improved varieties that are targeting local grain and food markets. This approach could play a significant new role in supporting a higher level of varietal turnover, for those new varieties that are developed through the public sector, such as the CGIAR, NARS and local Universities.
- Find new policy options and ways to enable trained traders to separate seed from grain and legally sell their “potential grain” at a premium.
- Provide simple registration systems and licenses for local traders, agents and farmer groups to aggregate



and sell “truthfully labeled” local seed.

- Expose new varieties to QDS farmers as a means of testing and disseminating quality seed of improved varieties. The advantages of this approach was well illustrated in the recent yellow bean corridor analysis, developed by CIAT.
- Find new ways to introduce critical quantities of seed of Farmer Preferred / Market Driven Varieties by seed companies or emergency seed operations then support informal production through farmer – traders – farmers.

### **6.7 High levels of emergency seed provisioning.**

In recent years, a significant proportion of certified seed has been distributed through emergency programs and other free distribution programs (e.g., Operation Wealth Creation, and through NGOs, churches and politicians). We calculate, that levels of free distribution of certified seed, which was multiplied through private sector companies, was at the level of 5,000 – 10,000 MT / year for maize alone in 2017. According to one key informant, this figure may have been as high as 15,000 MT in a market size of 25,000 MT.

Formal sector seed production by the private sector appears to be heavily dependent on institutional purchases for emergency seed provisioning, including approximately 5,000 MT exported annually to South Sudan. Although this is higher than the official export figures quoted elsewhere in this report, data collected from seed companies and others reveal that the seeds exported to South Sudan include crops and varieties that are not captured by official figures (greengrams, for example). Many of these distributions appear to be based on an assumed rather than an actual need for seed, and often fail to understand how informal seed systems operate in allowing farmers to acquire seed, ‘potential seed’ and planting material from other farmers and local markets. The impacts of emergency use of certified seed have not been well documented. The 2018 National Seed Strategy fails to recognize the effects of free and emergency seed distribution on the overall seed system.

#### **Recommendation 7 – Evaluate the need and role of free emergency seed:**

- Emergency seed provisioning should be programmed according to actual needs and designed in ways that are consistent with broader aims and visions relating to the national seed sector development. New thinking is required to avoid the disruption to formal commercial certified seed markets by emergency aid, and more effort needs to be made to understand how contractual compliance is affecting decisions by international aid organizations and NGOs about which types of seed to buy. MAIFF should consider establishing working groups with the leading seed distribution agencies to enable better access to data on procurement methods, amounts and pipeline demands. Where procurements are at levels that are likely to cause market distortion and drive fake seed transactions, alternative strategies such as e-vouchers and / or cash should be considered.

### **6.8 Addressing (fake), counterfeit, expired and poor-quality formal seed**

Fake seed is generally defined to be a combination of expired certified seed, some QDS that has been illegally purchased and re-packaged and in the worst case, grain that is cleaned, packed and sold as certified seed. The government estimates that fake seed in Uganda accounts for 30-40% of all seed offered for sale<sup>24</sup>. Such high levels of fake seed in the marketplace act as a pervasive disincentive to farmers purchasing certified seed from seed companies and agrodealers. The reluctance of farmers to purchase seed from agrodealers reduces overall yields and the potential for the uptake of improved varieties, notably among farmers who do not receive relief seed.

There have been attempts to reduce the levels of fake and counterfeit seed through labelling seed packs and training of additional private sector inspectors. These attempt, to date, have had limited success. The Ag Verify program, which attempted to introduce digital labelling was not supported in Uganda. At this time, Uganda does not have a seed quality verification system, or a hotline to call if farmers buy low quality seed which fails to germinate, is impure, of the wrong variety, or has low yields. This is in stark contrast to the seed systems in Kenya, which have both digital labelling of seed packs and hotlines for farmer feedback.

The problem of fake seed is driven by several factors: (i) questionable purity of EGS parental lines, and little to no quality assurance at the EGS level; (ii) lack of adequate EGS volumes and generally inconsistent supply

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<sup>24</sup> Uganda National Seed Strategy, 2018.

of EGS to commercial seed companies; (iii) high demand for emergency seed which follows procurement policies to buy the highest quality seed on the market; (iv) government interventions to provide farmers with free seed; (v) lack of standardized and well-implemented quality assurance processes; ; and (vi) sales of grain packaged as certified seed by unscrupulous dealers.

Much of the demand for certified seed for emergency use is thought to stem from the aid system itself, based on an assumed need for seed (which often comes from food security data, not seed security data), combined with the prevalence of direct seed distribution rather than more localized market-based response options.

Reducing the prevalence of fake seed requires reducing the demand for seed that is used for emergency direct seed distribution and replacing this with: (i) effective market-based emergency seed provisioning modalities based on actual rather than assumed needs of farmers affected by crisis (see Recommendation 4); and (ii) the use of either voucher systems or cash, which allows emergency program beneficiaries to choose and buy the best seed that is available in their location.

#### **Recommendation 8 - Multi level approach to reducing fake seed:**

- Addressing fake seed needs to span multiple efforts, including the adequacy and integrity of the EGS system, the development and application of stronger quality assurance processes including labelling practices, and understanding and addressing the ways in which seed is incorporated into the emergency aid system.

#### **Recommendation 9 - Empowering Ugandan farmers with feedback loops:**

- The overall seed system in Uganda requires empowering the end-users, farmers, to notify the seed regulator if they have received counterfeit or low-quality seed. Giving advance warning to seed producers, aid organizations, and agrodealers that farmers will be able to report any experience with fake and/or low-quality seed will serve as a strong deterrent to those who knowingly violate seed quality standards when supplying seed. This approach has been implemented successfully in Kenya and coupled with other measures such as scratch-off labels, has materially reduced the levels of counterfeit and low-quality seed in the market.

#### **Recommendation 10 - Work with seed stakeholders to control quality through better labelling.**

- Government agencies should explore how other countries in the region have successfully introduced smart seed labels so that farmers can verify if the seed they have bought is genuine, and currently certified. There are several labelling systems that are linked with mobile phone applications, such as MPedigree, or seed assure, that provide farmers with an immediate verification of the authenticity of the producer, the variety, and the certification status.

#### **Recommendation 11 - Regulation by the seed certification agency.**

- When fake seed is recognized in the system, the seed regulator / certification agency needs to act to enforce standards and rules. Holding counterfeiters and suppliers of low-quality seed accountable by removing licenses and/or implementing fines or stronger penalties will deter would-be counterfeiters from selling low quality goods into the commercial markets.

## Conclusions

**Formal seed system:** Uganda has real challenges in the formal seed system. The early generation seed systems, which provides the foundation seed for all the seed systems in the country, is under-resourced and this places a major question on the ability of the leading seed sector to maintain quality seed. The quality control and quality assurance systems are weak, and this is a major factor in the production of low-quality seed on the market. The lack of stakeholder support and coordination between the public and private sector also limits the rate of growth of the seed sector.

Overall, the Government regulatory agency is not functioning effectively and requires considerable investment and policy support to bring the seed unit up to an internationally accredited standard. These factors have the effect of reducing confidence in the seed system. The lack of unified support in the seed sector by the Government and clear policy to support and protect the certified seed market has led to demise of the seed industry as a whole and much needs to be done to re-introduce sound systems and procedures that are necessary to restore both confidence and quality. Key areas for consideration include (i) establishing a centralized and commercial unit for ordering and receiving known quantities of breeder and foundation seed, (ii) investing in NARO Holdings, to improve the EGS process, (iii) explore non-exclusive licenses to private companies to diversify the source of Early Generation Seed and strengthen the private sector development.

**Semi-formal system:** Uganda is a leader in the use of the semi-formal Quality Declared Seed approach, which has been supported by various agencies for nearly a decade. The approach has shown progress and claims production levels of nearly 4,000 5,000 MT per year. Despite this level of success, QDS does appear to be dependent on donor support, and it is not clear if QDS has real commercial prospects when projects exit. The lack of commercial success may be due to the project implementation method, which is too heavily subsidized, or that the business model needs further innovation to enable the local seed businesses to transition to sustainable business strategies. The QDS approach needs further analysis to assess whether this strategy has commercial merit, or whether other options such as Standard seed, which is supported by private seed companies would be more successful.

**Informal seed system:** The informal seed system supports most farmers in Uganda with viable seed for virtually every crop type. Despite the expansive role of this system, particularly in supporting the non-hybrid seed market, the lack of regulation and licensing in the informal market means that governments and particularly the formal private sector are reluctant or unable to invest in this system.

We conclude that greater investment in informal seed strategies could provide farmers with better access to quality seed, especially if NARO and the government were to support ways of improving informal seed actors for target crops in parts of the country that are not well served by the commercial seed markets.

Improving informal seed access could include deregulating the seed market for specific crops, which are not of interest to the commercial seed market. Providing training to key actors in the informal markets, such as lead traders who store seed from season to season could also maintain better quality of seed from season to season. A provisional seed license could provide new avenues for local seed actors to sell seed and more innovation in the informal sector that involves traders and major grain buyers, could open new market channels that leverage the informal private sector

**Emergency seed system:** Uganda has one of the largest humanitarian seed sectors, one of the largest buyers of certified seed. However, once procured, this seed is shared to farmers for free and continued scale procurement over the years has distorted the commercial markets. It is thought that anywhere from 30-50% of the certified seed that is sold is either, counterfeit, expired or simply low-quality seed. This level of “fake” seed is increasingly undermining the formal sector and is leading to the private sector focusing on humanitarian customers rather than the more discerning private customers.

The government needs to work with the certifier to take steps to address the fake seed issue, if the country is to have a viable seed sector. Certifiers must take action to sanction companies that are selling counterfeit goods by imposing fines, removing their licenses and declaring such actions in the national media. Humanitarian agencies should work to address the fake seed situation as well. They could start by sharing data on their levels of procurement made by humanitarian agencies, and providing open site data on where free seeds are distributed to and in which seasons. Making changes to their procurement system will provide humanitarian agencies with options for providing seed to people in need without distorting the certified seed market. If the government and humanitarian agencies invest in the EGS system, and organize procurement

systems that strengthen the production of foundation and certified seed, to meet their needs, they will be able to show that they buy seed that has been grown specifically for their needs. The emergency led agencies also need to consider new approaches for distributing seed, allowing more vulnerable farmers to use the informal markets and shift from physical seed to cash transfers.

## Next Steps

### 1. **Improve coordination across sectors and data sharing**

- Strengthen seed monitoring systems across the seed sectors
- Strengthen the national EGS system (NARO-holdings)

### 2. **Strengthen formal system and linkages to informal sector delivery**

- Improve seed quality assurance
- Strengthen regulation by the seed certification agency
- Evaluating QDS performance to bolster formal seed sector
- Work with seed stakeholders to control quality through better labelling

### 3. **Innovate with the informal seed system actors**

- Link formal to informal for effective dissemination of quality seed of improved varieties
- Consider new types of licensing to monitor and improve the quality of informal seed

### 4. **Multi-level approach to reducing fake seed**

- Evaluate the need and role of free emergency seed with respect to volatile seed markets
- Empower Ugandan farmers with feedback loops so that low quality seed can be identified and address by the certifier

## Annexes

### Annex 1. Formal Sector Overview

This overview focuses on the top ten staple food crops (by area planted) excluding matooke banana that are planted annually by smallholder farmers, as listed in Table 5.

**Table 5. Top staple food crops planted seasonally by smallholder farmers (SHFs)<sup>25</sup>**

Crop	Ha planted <sup>26</sup>	% of arable land	Planting rate (kg/ha)	Estimated annual seed use <sup>27</sup> (MT)	Yield (MT/ha) <sup>28</sup>
Maize	1,130,966	17.6	25	28,274	2.6
Beans (common)	627,254	9.77	55	34,499	1.65
Cassava	501,650	7.8	10,000 stakes, 1 foot long	5,016.5 million stakes	5.3
Groundnuts	463,968	7.2	80	37,117	0.5
Sorghum	446,039	7	10	4,460	0.6
Sweet Potato	363,017	5.65	N/A	N/A	4.2
Sunflower	250,000	3.9	5	1,250	0.98
Sesame	210,000	3.3	2	420	0.66
Finger Millet	147,625	2.3	3	443	0.7
Rice	92,960	1.45	80	7,437	2.8

Note: Total arable land = 6,417,212ha<sup>29</sup>. Total number of households planting crops = 3.95 million<sup>30</sup>; 77% of smallholder farming households are led by men and 23% by women<sup>31</sup>

#### A1.1 Formal sector seed production

There are two legal seed classes in the country<sup>32</sup>, certified and quality declared seed, as detailed in Table 6. Certified seed covers all crops under compulsory certification, as listed in

**Table 6. Classes of formal sector seed**

Class	Definition of seed class	Crops covered in seed class
Certified	Certified seed is seed which has been officially inspected, sampled and tested by NSCS, and is subsequently officially approved as meeting the required certification standards. Certified seed includes commercial seed in addition to all generations of EGS.	Covers all crops under compulsory certification (see Table 6). Note that Certified 2 <sup>nd</sup> Generation exists for non-hybrid crops under compulsory certification as certified seed.
Quality Declared Seed (QDS)	Seed produced by registered producers (individual or farmer groups) from basic seed and conforms to the minimum standards for variety purity and germination	Crops for which certified seed is not readily available to farmers. In 2017, LSBs were reported to have produced 237 MT of bean seed <sup>33</sup> . See Annex 3 for information about the production of QDS by Local Seed Businesses (LSBs)

<sup>25</sup> Banana and plantain are also popular food crops in Uganda and are grown on 127,614 and 885,567 hectares respectively (15.8% of the total arable land.) but are not included above since they are not planted seasonally.

<sup>26</sup> FAOSTAT 2018.

<sup>27</sup> This refers to the amount of seed that is required for planting by farmers each year. Figures for annual seed use have been calculated by multiplying the total area planted by the planting rate. All figures have been rounded to the nearest metric ton.

<sup>28</sup> FAOSTAT 2018

<sup>29</sup> FAOSTAT 2018. Arable land is defined as 'land under temporary crops (double-cropped areas counted once), temporary meadows for mowing and pasture, land under market and kitchen gardens and land temporarily fallow.'

<sup>30</sup> Uganda Bureau of Statistics 2018. A crop farming household is defined as a household headed by a person who owns, works on or operates an agricultural enterprise that cultivates land and crops for a livelihood.

<sup>31</sup> Uganda National Survey and Segmentation of Smallholder Households report of 2016,

<sup>32</sup> National Seed Policy 2018, Seeds and Plant Act 2006, Uganda Early Generation Seed Study, 2016

<sup>33</sup> TASAI Uganda Brief, 2018

**Table 7. Second Schedule Crops** <sup>34</sup>

Prescribed seed under compulsory certification

Cereals	Maize	Fruit and vegetables	Pineapples
	Wheat		Apples
	Barley		Mangoes
	Sorghum		Oranges
	Millet		Bananas
	Pearl millet		Oranges
	Rice		Pawpaw
			Passion fruit
	Avocado		
Pulses	Beans	Oil crops	Sunflower
	Chickpea		Soybean
	Cow pea		Ground nut
	Pigeon pea		Sesame
Pasture legumes	Silver leaf desmodium	Root crops	Irish potato
	Green leaf desmodium		Sweet potato
	Siratro		Cassava
	Stylo	Fiber crops	Cotton
Beverages	Tea		
	Coffee		
	Cocoa		

The total volume of certified seed produced for the top ten crops has varied considerably in the past five years, reaching a total production of just over 28,000 MT in 2017, and then dropping to less than 8,000 MT in 2018 (**Table 2**). Data from 2017 suggest that 7.11 kg of certified seed was produced per farming household. This is approximately twice that of Tanzania but half that of Kenya (**Table 8**). However, annual certified seed volumes in Uganda appear to have more than doubled in roughly an eight-year period.

**Table 8. Comparison of certified seed production in Uganda, Kenya and Tanzania**

Certified seeds per HH in 2017			
	Volume of certified seed (MT)	# of households	Seed per HH (Kg)
Uganda	28,074 <sup>35</sup>	3,950,000 <sup>36</sup>	7.11
Kenya	55,925	3,500,000 <sup>37</sup>	15.98
Tanzania	32,346	8,549,667 <sup>38</sup>	3.78

### A1.2 Seed imports and exports

Available TASAI data <sup>39</sup> for the top four crops showed 7.8% (2,207 MT) of total production of seed for

<sup>34</sup> Uganda Seed and Plant Regulations, 2010

<sup>35</sup> TASAI Uganda Brief, 2018, data from top four crops

<sup>36</sup> Uganda Bureau of Statistics 2018

<sup>37</sup> Agricultural Sector Transformation and Growth strategy 2019

<sup>38</sup> 2016/2017 Annual Agricultural Sample Survey, National survey and segmentation of Smallholder Households in Tanzania, 2016

<sup>39</sup> TASAI Uganda Brief, 2018

maize, beans, sorghum and finger millet was exported (Table 8). A total of 1,937MT (88%) of the 2017 exports was to Southern Sudan.<sup>40</sup> Other exports were to DRC and Rwanda. Maize exports dropped from 1,305 MT in 2017 to 515.5 MT in 2018 (which appears to be consistent with the overall drop in production shown in Table 1) and then increased to 2,869.9 MT in 2019, accounting for 20% of total maize seed production for that year, compared to 6% in 2017. This increase in the proportion of maize exports is thought to be due to a combination of factors, including increased demand for seed from South Sudan (see Annex 6), challenges in the marketing of maize seed within Uganda following the winding down of Operation Wealth Creation, and a reduction in the overall amount of maize seed produced.

Data available on seed imports are presented in **Table 9** and **Table 10**, which show that maize and vegetables are the only crops imported in significant quantities. In 2019, just less than 1,500 MT of maize was imported, mainly through the regional private companies and multinationals. It is thought that some of the imported maize seed (notably from Kenya) is being used in emergency seed distribution programs.

**Table 9. Seed imports and exports (2017)**

Crop	Total amount produced in 2017	Amount exported in MT in 2017	As a % of total production	Amount imported in MT in 2017
Maize	21,959	1,305	6.0%	967
Beans	3,794	56	1.5%	N/A
Sorghum	2,302	842	37%	200
Finger millet	29	4	13.8%	N/A
Total	28,074	2,207	7.8%	1,167

Source: TASAI Uganda Brief, 2018

**Table 10: Maize Seed Exports from Uganda (2018 - 2020)**

Name of Crop Seeds or Variety	Volume (MT) of Seed Exported			Country of Destination
	2018	2019	2020	
Maize Seeds (Hybrids & OPVs)	515.5	2,869.9	[938.4] <sup>41</sup>	South Sudan, DRC, Burundi, Kenya, Tanzania.
Maize Germplasms	550 kg	170 kg	235 kg	To USA (23kg), South Africa (57kg), South Sudan (23kg), and to Mexico (132kg).

**Source:** Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) / National Seed Certification Services (NSCS) exports records at Namalere, August 2020.

<sup>40</sup> The crop seeds regularly distributed in South Sudan include maize, sorghum, sesame, groundnut, cowpea and beans, a large proportion of which come from Uganda.

<sup>41</sup> MAAIF/NSCS Namalere records up to mid-August 2020.

**Table 1. Uganda Seed Imports (2018-2020)<sup>42</sup>**

Crop/Variety Imported	Volumes (MT) of Imported Seed per year			Country of origin
	2018	2019	2020 <sup>43</sup>	
Maize	515 <sup>44</sup>	1,497 <sup>45</sup>	1,060	Major seed import sources include RSA, Zimbabwe, Kenya, Tanzania. Zambia, Ghana.
Sorghum	-	-	13 <sup>46</sup>	Imported from Israel and some from Kenya.
Millet	-	-	5 <sup>47</sup>	Imported from Israel.
Assorted Vegetable Seeds	-	195 <sup>48</sup>	44 <sup>49</sup>	Imported from Netherlands, Denmark, South Korea, Mexico, USA, Chile, Italy, Dubai, South Africa & China.

Source: Ministry of Agriculture, Animal Industry & Fisheries (MAAIF) / National Seed Certification Services (NSCS) exports records at Namalere, August 2020.

### A1.3 Formal sector crop seed producers

The latest data available on Uganda registered seed companies are presented in **Table 12**. These include 13 registered multinationals (including one African multinational), of which six are involved in the production of crop seeds, and seven are involved in vegetable seeds. There are six regional private companies (including three Ugandan companies that operate regionally) and 12 local private companies, plus a subsidiary of a Kenyan parastatal, and an NGO that is registered as a seed company. Out of the total 33 registered seed companies, 23 produce and sell maize, 13 produce and sell sorghum and 12 produce and sell beans. Though not yet included in the official documentation, there are reportedly two Local Seed Businesses that have recently registered as seed companies to produce QDS.

<sup>42</sup> National Seed Certification Services (NSCS) Database. Ministry of Agriculture, Animal Industry and Fisheries (MAAIF), August 2020

<sup>43</sup> Data up to Mid-August 2020.

<sup>44</sup> Maize seed imports for the months of August, October & December 2018.

<sup>45</sup> Consolidated imports for the months of June up to December 2019. Imports for the month of October were not captured.

<sup>46</sup> Import data from Kenya (3024 kg) and Israel (10,00kg) in January 2020.

<sup>47</sup> A one-off import from Israel in January 2020.

<sup>48</sup> Assorted vegetable imports for 8 months in 2019. Data for the months of February, March, April & May 2019 was not captured.

<sup>49</sup> Assorted vegetable imports from January up to mid-August, 2020.



**Table 2. Uganda registered seed companies<sup>50</sup>**

Category	# in category	Comments
Global multinationals	12	Only 5 seed companies (Corteva Agriscience, Limagrain, Syngenta, Monsanto/Bayer and Advanta) are involved in the production of crop seed. The rest (7) are involved in vegetable seed
African multinationals	1	SeedCo is the only seed company under this category in Uganda. It is a Zambian company with presence in most African countries
Kenyan parastatals	1	Elgon seeds is a subsidiary of Kenya Seed Company, a Kenyan parastatal
Regional private companies	6	These are companies registered in their respective countries but have since expanded their seed business to neighboring countries in the region. Local Uganda seed companies under this group are NASECO, FICA and Victoria Seeds. Kenyan seed companies with presence in Uganda are East Africa Seed, Western Seed and Kenya Highland
Local private companies	12	These are locally registered seed companies that produce crop and vegetable seed for local market and surplus for export to the neighboring countries. Most of them are active members of Uganda Seed Trade Association (USTA)
NGOs registered as seed companies	1	BRAC an international social enterprise that promotes smallholder farming through provision of credit facilities for purchase of quality inputs
TOTAL	33	Most of these seed companies produce and sell maize seed (23) followed by sorghum (13) and beans (12)

#### A1.4 Seed inspectors and efforts to curb fake seed

The National Seed Certification Service (NSCS) is the government entity mandated to handle seed certification, under the Ministry (MAAIF). It does not have autonomous status. Seed inspection in Uganda is hampered by inadequate number of inspectors, among other factors such as low-capacity building and possibly fraud, leading to poor seed quality assurance and fake seed in the market. See **Table 13** for details. Fake seed is estimated to account for 30-40% of seed sold. Current efforts to address fake seed include the use of (non-smart) labels and a Code of Conduct for agrodealers.

<sup>50</sup> TASAI 2018, Access to Seeds Index, and Uganda EGS Study 2016

**Table 3. Seed inspectors and fake seed**

Topic	Data / Answer <sup>51</sup>	Trend <sup>52</sup>	Comments
# of active government: a) seed inspectors b) seed samplers c) seed analysts	a) 9 seed inspectors b) In 2014, Uganda was said to have only one seed sampler, who doubled up as c) a seed analyst <sup>53</sup>	Uganda had 6-7 seed inspectors from 2007 to 2017 but added 2 in 2018	The number of inspectors is very low compared to neighboring countries such as Kenya and Tanzania. Kenya has 60+ seed inspectors.
% of field inspectors/samplers located outside HQ <sup>54</sup>	All inspectors/ samplers/ analysts work at HQ at Namalele, outskirts of Kampala and Entebbe airport. The number of Phytosanitary officers at border points is unknown.	No change	MAAIF employs phytosanitary officers and deploys them at all border points to handle phytosanitary services and seed imports, but the numbers are not known.  Since NSCS is under MAAIF, it is not clear if more seed inspectors are at district levels where MAAIF offices are.
Are authorized seed inspectors, samplers, analysts allowed?	No	N/A	N/A
If yes, # of active authorized: a) seed inspectors b) seed samplers c) seed analysts	N/A	N/A	N/A
Prevalence of fake seed <sup>55</sup>	Fake seed is common, at an estimated 30-40% of seed sold <sup>56</sup>	Perhaps static, but definitely not improving.	Significant volumes of relief seed are estimated by many market observers to be fake or low quality
Efforts/tools to curb fake seed <sup>57</sup>	Seed companies use labels (non-smart) provided by MAAIF on seed packages  UNADA has an Agrodealer Code of Conduct	No significant reduction of fake seed	The labels are managed by USTA for the MoA. The program was spearheaded by USTA with the support of DANIDA and serves to generate USTA data for volume of seed produced  UNADA members sign and undertake to abide by code of conduct, which among other requirements advocates for ethical business practices

### A1.5 Early Generation Seed (EGS)

Most EGS is produced by NARO, which recently registered NARO Holdings, Inc., for the express purpose of producing EGS. EGS production is hampered by a lack of resources, manpower and infrastructure for quality seed production and of the right quantity; there is also a lack of qualified/skilled out-growers. There is a low demand for EGS for crops other than maize and beans. **Table 14** lists the various EGS producers for the key crops and the main challenges.

<sup>51</sup> TASAI Uganda Brief, 2018

<sup>52</sup> Ibid

<sup>53</sup> Ibid

<sup>54</sup> Ibid

<sup>55</sup> Ibid

<sup>56</sup> Joughin, "The Political Economy of Seed Reform in Uganda," January 2014

<sup>57</sup> TASAI Uganda Brief, 2018

**Table 4. EGS Producers and challenges**

Crop	Primary producer(s) <sup>58</sup>	Other producers <sup>59</sup>	Challenges <sup>60</sup>
Maize	NARO – NaCRRRI, IITA, AATF	Seed companies	Most EGS is produced by NARO which lacks resources, manpower and infrastructure for quality seed production and of the right quantity. Lack of qualified/skilled out-growers Seed companies over reliance on NARO (very few seed companies produce own EGS) <sup>61</sup>
Beans	NARO – NaCRRRI, CIAT	Seed companies, CBOs	Over 27 varieties released but very low quality and quantity of EGS reaches seed companies and farmer groups for production of QDS
Rice	IARCs, NARO, Africa Rice	Seed companies, CBOs	Low demand for basic seed (for both lowland and upland rice) Unpredictable seed demand making it difficult for forecasting for EGS and certified seed
Sesame	NARO – NaSARRI	Seed companies, CBOs	Demand for EGS is low as only 2 seed companies produce certified seed in the northern part of Uganda
Finger millet	NARO – NaSARRI	Seed companies, CBOs	Low demand for EGS as only one seed company is actively involved in production of certified seed

### A1.6 Legislative environment and private sector advocacy

The Uganda Seed Policy was ratified in 2018. Seed laws and regulations are enshrined in three acts (National Agricultural Systems Act 2005, Seed and Plant Varieties Act 2006 and Plant Variety protection Act 2014) and the Seed and Plant Regulations of 2010, updated and amended in 2016 to conform with COMESA regulations. Further information is provided in **Table 15**. Uganda is a member of the East Africa Community (EAC), but there has been a delay harmonizing the EAC standards. The country is also a member of the International Seed Testing Association (ISTA), and the Uganda National Seed Certification Service (NSCS) is accredited with the Organization of Economic Cooperation and Development (OECD) seed scheme.

<sup>58</sup> Uganda Early Generation Seed Study, 2016

<sup>59</sup> Uganda Early Generation Seed Study, 2016

<sup>60</sup> Ibid

<sup>61</sup> Uganda Early Generation Seed Study, 2016

**Table 5. Policies and regulatory frameworks**

Topic	Status	Comments
Seed policy <sup>62</sup>	Uganda Seed Policy was ratified in 2018	The policy existed is six different drafts, but final document has since been ratified. It recognizes QDS as a class of seed
Seed law and amendments	National Agricultural Systems Act 2005, Seed and Plant Varieties Act 2006 and Plant Variety protection Act 2014	The three acts are operational and form the basis of seed regulations. Seed laws have been amended to conform with COMESA protocols
Seed regulations	Seed and Plant Regulations 2010 amended in 2016	The regulations are operational and were amended in 2016 to include Quality Declared Seed (QDS)
Legal classes of seed recognized <sup>63</sup>	Breeders, Pre-basic, Basic, Certified 1 <sup>st</sup> and 2 <sup>nd</sup> Generation and Quality Declared Seed (QDS)	QDS is a class of seed recently added in the amended regulations for purposes of making seed readily available to farmers
Membership in regional entities <sup>64</sup>	Member of Common Market for Eastern and Southern Africa (COMESA), East Africa Community (EAC) and African Regional Intellectual Property Organization (ARIPO)	EAC is not fully operational due to delay in harmonizing standards Uganda harmonized its seed laws with the COMESA ones in 2016
Membership in international seed bodies <sup>65</sup>	International Seed Testing Association (ISTA), Organization of Economic Cooperation and Development (OECD) seed schemes	NSCS is accredited to OECD for field seed certification although it remains highly incapacitated
Legal issues currently on the radar screen	Work on operationalizing recently passed seed policy of 2018 ongoing, Genetic Engineering Regulatory Bill 2018 meant to ensure safe development and application of biotechnology was passed in 2018	Bio safety law not fully operationalized

The Uganda Seed Traders Association (USTA) and UNADA are active bodies advocating supportive policy and conducive regulatory environment for its members (see **Table 16**). USTA has a membership of 30 seed companies. The body is well regarded in providing a strong advocacy platform for seed business. Harmonization of Uganda seed laws with COMESA was a huge milestone that laid the foundation for USTA members to trade freely with other members of the regional block. Lack of neighboring country confidence in seed certification is a roadblock though.

Uganda National Agro Dealers Association (UNADA) was formed in 2003 under NGO status to promote and foster efficient distribution of agricultural inputs in Uganda. UNADA's membership is between 2,500 and 3,000 agrodealers. UNADA partners with different development groups such as AGRA, USAID and GoU in member recruitment, capacity building and subsidy programs such as ACDP. The organization advocates for training in safe handling of farm inputs before one is registered as a member.

<sup>62</sup> Uganda National Seed Policy 2018

<sup>63</sup> National Seed Policy 2018, Early Generation seed study, 2016

<sup>64</sup> Access to Seed Index, 2019

<sup>65</sup> Ibid

**Table 6. Private sector advocacy**

Topic	Data / Answer <sup>66</sup>	Trend <sup>67</sup>	Comments <sup>68</sup>
Existence of active seed trade association	Yes, Uganda Seed Traders Association (USTA)	The body was formed in 1999 and has grown since, to current total of 30 seed companies and 3 associate members	The body is well regarded by its members as meeting the objectives of providing a strong advocacy platform for seed business
A. # of “paid-up” members B. % of eligible members	A. 27 of 30 members (82%) are paid up B. 77% (potential of 39 seed companies)	Strong upward: the number of members has grown from 17 to 33 in the past 5 years	Associate members of USTA are non-seed producing stakeholders in the seed sector. The nine eligible non-members are vegetable seed companies.
Status of dialogue with regulator (strength and frequency)	Members rated USTA highly on issues of advocacy and governance (71%)	There is growing confidence in USTA’s ability to negotiate with government on matters of seed policy and regulations	USTA appears to have a very strong relationship with the MoA
Association communication tools for members (website? regular emails from group list? regular meetings scheduled in advance? Etc.)	Has website <a href="http://www.usta.ug">www.usta.ug</a> Is part of farm inputs online platform (see comments)  Regular e-mails and meetings	In 2018, seed companies rated their satisfaction with USTA as “good” at 65% (highest individual factor rating was on democracy at 71% and lowest in resource mobilization at 51%). This was a marginal improvement from the 2015 overall rating of 60.6%.	USTA was instrumental in developing an online agricultural farm input platform in 2016 together with Uganda Agro-inputs Dealers Association (UNADA) and CropLife: <a href="http://www.agricinputsuganda.com">www.agricinputsuganda.com</a>  The platform was initially developed under a USAID project, under Tetra Tech, but the domain has since lapsed
Key advocacy successes in last two years	USTA had strong input into the recently passed National Seed Policy 2018 and continues to engage on the Genetic Engineering Bill 2018		
Current key advocacy challenges	Lack of funds to implement in-house programs, and over dependence on donor support leading to collapse or general slowdown in activities upon exit of donors. UNADA now has reduced organizational mobilization, poor communication (website inactive), and leadership challenges		

### A1.7 Seed distribution through agrodealers and large-scale government schemes

Existing data suggests that there were approximately 3,000 agrodealers in 2017 (almost 80% of which are male owned), including approximately 600 hub agrodealers (wholesalers). Not all agrodealers are registered. With current population figures, it is estimated that one agrodealer serves an average of 3,033 farmers. Additional information on agrodealers is provided in **Table 17**.

<sup>66</sup> Correspondence with Nelson Masereka of USTA, unless noted otherwise

<sup>67</sup> Ibid

<sup>68</sup> Ibid

**Table 7. Information on agrodealers**

Topic	Status <sup>69</sup>	Comments <sup>70</sup>
# of registered agrodealers	3,000	Census taken in 2009 indicated a total of 2,064 and the number is said to have grown to 3,000 by 2017. Not all the 3,000 are duly registered, however. 2009 census noted that only 27% (551) were fully registered, which increased to 1,167 in 2015
# of known hub agrodealers (% of total)	600 (20% of 3,000)	2009 census established 409 agrodealers as hub/wholesalers (20%) and 1,617 (78%) as retailers. This can be extrapolated to current agrodealer estimates to be about 600 hub/wholesale
Areas of low coverage	Urban vs rural	37 % of the agrodealers (766) were based in urban areas whereas 63% (1,298) were in rural areas.
Estimate of seed volume per agrodealer	9.3MT	This is an extremely rough estimate, for illustrative purposes only, calculated by dividing the volume of the top four crops (28,074 MT) by 3,000 agrodealers.
Estimate of farming HH per agrodealer	1,317	Estimated that 3,000 agrodealers service a population of 3,950,000 farming households. Again, this is an extremely rough estimate.
Estimate of customers per agrodealer	3,033	Per the census, it is estimated that one agrodealer serves an average of 3,033 farmers (note that farmers generally buy from more than one agrodealer), and that 83% of farm inputs are sold to small holder farmers, 10% to commercial farmers and 7% to NGOs and Ag Cluster Dev Program. <sup>71</sup>
Changes in agrodealer coverage/dynamics	There has been general increase in agrodealer registration <sup>72</sup>	UNADA believes that more agrodealers are now registering formally with the government since registration is a prerequisite for participation in trainings and the subsidy programs
Agrodealer participation in subsidized seed distribution	Operation Wealth Creation (OWC), and Agricultural Cluster Development Project (ACDP) <sup>73</sup>	ACDP is a new phase of OWC funded by the World Bank. 29 agrodealers are currently accredited to supply farm inputs to registered farmers (90,000) through an e-voucher system, but the effectiveness of ACDP is not known.
Other...	Gender ownership in business	2009 report established that 79% (1,618) of the agrodealers are male-owned and 21% (439) are female-owned

There is very little data available on the distribution of formal sector seed through specific channels (agrodealers, government and NGO programs). In 2015, NARO estimated 50 to 70% of all seed available for sale as having been distributed through subsidy program **Operation Wealth Creation (OWC)** (see Annex 2 for details). In 2017, OWC provided 8,856 MT maize (almost one-third of the national requirement). Under OWC, seed was delivered direct to farmers by the military. OWC is currently winding down; the large drop in the production of certified seed from 2017 (28,074 MT) to 2018 (7,940 MT) (Table 1) is also thought to be related to the reduction in demand from the OWC program.

### A1.8 Variety availability and characteristics

A significant number of new varieties of hybrid maize, beans and rice (both upland and lowland varieties) have been released in the past five years, whereas varieties of cassava, sweet potato, soybean, finger millet and groundnuts that are available on the market tend to be very old (average age of 16-26 years) (**Table 18**). There have been no new OPV releases in the past five years due to the emphasis on hybrids. There have been 22

<sup>69</sup> Ibid

<sup>70</sup> Uganda Agrodealer Census, 2009

<sup>71</sup> Ibid

<sup>72</sup> Fiona Kisakye, UNADA Chairperson

<sup>73</sup> Ibid

new hybrid maize varieties released in the past five years, with an emphasis on drought tolerant varieties under the STMA and WEMA programs.

**Table 8. Varietal release and market availability**

Crop	# of varieties released <sup>74</sup>	# of varieties released in last 5 years	# of varieties regularly available in the market <sup>75</sup>	Average age of varieties planted <sup>76</sup>	Comments, including on special attributes
Hybrid maize	76	22	41	6	Emphasis has been on drought tolerant varieties under STMA and WEMA programs
OPV maize	8	0	-	-	No OPV released in the past 5 years, as emphasis has been on hybrids
Common beans	38	5	13	11	A few varieties have been released in the past years with emphasis on high iron content. Most of the released varieties are commercialized
Sorghum	11	0	8	12	Very old varieties in the market, 4 new ICRISAT varieties were released in 2017 by NARO
Cassava	23	2	14	20	Most varieties released are old with only 2 less than 5 years old
Sweet potato	27	2	13	19	Most varieties in the market are old
Soybean	13	1	2	26	Very old varieties with only one released in past 5 years
Finger millet	7	0	6	16	Very old varieties in the market, no new variety released in past 5 years
Groundnuts	21	0	4	23	Very old varieties, none released in past 5 years
Rice	20	5	5	13	New varieties, both lowland and upland varieties, recently released Common upland rice varieties are Nerica 1, 4 and 10 and common lowland rice varieties are K6 and K85
Sesame	3	0	2	12	There are two common varieties in the market; SERRA and Sesim 1 grown in warm areas of northern Uganda.

### A1.9 NGO & development partner involvement in formal sector

The data in **Table 19** summarizes the activities of the top three donors supporting the formal seed sector in recent years. There have been some notable accomplishments, though challenges remain and systemic change within the formal sector appears to be elusive due to low levels of government support.

<sup>74</sup> Uganda National Variety List 2016, TASAI 2018

<sup>75</sup> TASAI Uganda Brief, 2018, online agricultural bulletins

<sup>76</sup> TASAI Uganda Brief, 2018

**Table 9. NGO & development partner involvement in formal sector (>USD \$500,000 2017 onwards)**

Donor / partner	Activity and timeframe	Intended benefit to sector	Accomplishments to date	Challenges
AGRA <sup>77</sup>	PASS Program 2007 - 2017	Support for breeding, seed production and distribution of certified seed	AGRA supported breeding and EGS production of 59 crop seed varieties, of which 56 have been commercialized. 20 PhD and 34 Masters students in breeding and agronomy were supported. 7 seed companies were supported to produce 99,000MT of seed over the period. AGRA invested \$2.9 million for capacity building for 1,400 agrodealers, and strengthening UNADA from 840 members in 2007 to 2,500 in 2011 <sup>78</sup>	Low adoption of new varieties by target farmers  Lack of government support in providing enabling policy environment for adoption of certified seed
ISSD <sup>79</sup>	ISSD Uganda 2012 - 2020	Support for a vibrant pluralistic and market oriented seed system	Promotion of use of high-quality seed at both formal and informal levels by small holder farmers through establishment of 30 Local Seed Businesses (LSBs) Over 300,000 small holder farmers increased productivity and income	Lack of enough early generation seed for multiplication by LSBs
USAID	AgVerify 2013 – 2017	Support for quality assurance through verification of seed quality, training and deploying private seed inspectors	Over 30 private seed inspectors were trained, but the independent organization was never approved/accepted by the GoU.	There was no government acceptance of the program Weak seed systems
	Feed the Future Uganda Agricultural Activity (Tetra Tech) 2014 - 2018	Delivery of multiple benefits to participating institutions providing agricultural benefits to SHF	Focus was on increasing production of maize, beans and coffee through use of high-quality agricultural inputs. Supported USTA, UNADA and CropLife to institutionalize use of high-quality farm inputs and fight against counterfeits USTA was assisted in setting up Uganda Agro Input online platform In 5 years, the program expanded to reach 25 focus districts (32%) and educated over 20,000 individual Ugandan agricultural sector actors in anti-counterfeit, climate smart and efficient business management practice	The institutional capacity building programs carried out (training of USTA and UNADA) was not adopted as to create systemic change envisaged at the inception of the program e.g., inactive agro input platform under USTA

<sup>77</sup> AGRA Uganda Operation Plan (Final report 2018)

<sup>78</sup> PASS Journey (book)

<sup>79</sup> ISSD reports



## Annex 2. Large-Scale Government Programs Involving Seed

### A2.1 Operation Wealth Creation (2014 – to-date):

Operation Wealth Creation (OWC) was designed to support smallholder farmers to participate in commercial agricultural production (with an associated reduction of subsistence farming) through community mobilization, equitable and timely distribution of inputs and facilitation of agricultural production chains. The OWC program was implemented by NAADS under MAAIF, and military officials were commissioned to provide oversight in the supply of inputs “to cure the inefficiencies that had arisen in the NAADS program”<sup>80</sup>. Seed is bought by NAADS from prequalified USTA registered seed companies<sup>81</sup>, and distributed to farmers by the military. Agrodealers are currently bypassed.

An assessment conducted in 2017 (ibid.) reported the seed is provided late, local crop and livestock priorities are not met, seed is of low-quality and poorly stored, and extension services are inadequate. The seed and other planting materials are distributed to the beneficiaries free of charge. Some of the seed companies involved in seed sales to NAADS/OWC are Equator Seed, FICA Seed, Pearl Seed, Victoria Seed, NASECO and BRAC. Several private businesses used to get tenders but outsource the same to formally registered seed companies; this has since been discouraged. OWC is reported to be winding down and now mainly provides tree seedlings.

It is interesting to note that the winding down of OWC appears to coincide with a significant increase in seed distributed in South Sudan (**Table 26, Annex 6**); much of the seed distributed in South Sudan is imported from Uganda, and the majority of Uganda’s seed exports go to South Sudan.

### A2.2 Agricultural Cluster Development Project (ACDP)

The ACDP is a 7 year subsidy program funded by the World Bank that began in 2018 with an initial 90,000 smallholder farmers. The e-voucher system was officially launched in the first season of 2020 starting with 56,000-acres from 56 districts<sup>82</sup> (an average of 1,000 acres /households per district). During the first season of the farmers' engagement with the project, an eligible farmer is subsidized by 67% of the cost of farm inputs, during the second year/season the same farmer will be subsidized at 50% and in the third cycle will be subsidized at 15%. To be eligible for the e-voucher subsidy program, the farmer must be a member of a registered farmer group; should be able to commit at least one acre of land; and be willing to co-fund for the inputs as per established model i.e., 33%, 50% and 85% during the 1st, 2nd, and 3rd cycles respectively. The package of inputs supplied by the program include improved seeds, fertilizers, herbicides and fungicides depending on the farmers' needs, tarpaulins for drying the harvest as well as bags for safe packing and storage. ACDP began piloting an e-voucher system in 2020 with 29 agrodealers.

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<sup>80</sup> Parliament of the Republic of Uganda (May, 2017). Report of the Sectoral Committee on Agriculture, Animal Industry and Fisheries on the Implementation of the Operation Wealth Creation Programme in Uganda. <http://parliamentwatch.ug/wp-content/uploads/2017/05/AAIF-17-Report-on-the-implementation-of-the-operation-wealth-creation-programme-in-Uganda.pdf>

<sup>81</sup> Naseco, FICA Seeds, East African Seed Co., Pearl Seeds Co., Masindi Seed, Victoria,

<sup>82</sup> Uganda currently has 135 districts in total.

**Table 20. Direct seed distribution through government schemes**

Agency or Initiative	Geographic area	Years actively distributing	No. of farmers targeted	Crops	Approx. volumes (MT by year)
Operation Wealth Creation (OWC) /NAADS	All districts in the country.	Since 2013/14 to date	Maize: 885,600 Beans: 45,000	Maize, Beans, Rice, sorghum, Coffee & Citrus seedlings	For 2017 Maize - 8,856 Beans - 1,359 Sorghum - 180
	460 Constituencies	Every year since 2016	Maize: 97,378 Beans: 18,258 Rice: 6,086	Maize, Beans, Rice	Maize: 196 Beans: 36.75 Rice: 12.25
Agricultural Cluster Development Project (ACDP) <sup>83</sup>	Countrywide, progressing in phases.	2018-2025	56,000 HHs (One acre per household)	Maize, Beans, Rice, Cassava and Coffee.	Enough to plant a combined acreage of at least 56,000 acres annually.

**Table 10. ACDP Seed provided through electronic vouchers**

Agency or initiative	Geographic area (one per row)	Overall value Per Crop (\$)	Number of target farmers HHs	Inputs Seeds + fertilizer	Per acre (Kg)	Total Seeds (in MT) In 2020A
MAAIF / ACDP	Countrywide but for 2020 56 districts have been covered.	200,000	28,000	Maize	10	280
		785,000	55,000	Beans	30	550
		857,000	75,000	Rice	30	225
		2,080,000	28,000	DAP	50	140
		1,760,000	28,000	UREA	50	140

<sup>83</sup> MAAIF, World Bank Funded. See Agricultural Cluster Development Project (ACDP)

## Annex 3. Quality Declared Seed (QDS) and Local Seed Businesses (LSBs)

### A3.1 QDS production

QDS is defined by the 2018 Uganda Seed Policy as “Seed produced by a registered seed producer (individual or a group of farmers) from basic-seed and conforms to the minimum standards for variety purity and germination”. QDS was accepted in the draft national seed policy in 2014 and has been produced by farmer groups since that time. QDS production involves oversight by the District Agricultural Production Department, under supervision and in collaboration with the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF). QDS is inspected at least once, if not twice, by district officers. QDS production currently includes the following crops: beans, groundnut, sesame, sorghum, rice, soybean, Irish potato, sweet potato, cassava, pigeon pea, cowpea, field pea, and vegetables.

Data on QDS production are not yet centralized, so the following three tables provide production figures for three key projects / organizations. Aggregated figures are presented in **Table 22**. Total approximate QDS production for 2018 was over 5,500 MT, and over 2,000 MT for 2019, mainly soybean, rice, beans, and groundnut.

### A3.2 Local Seed Businesses (LSBs) and other QDS producers

As stated in the Policy, QDS producers can be either individuals or groups, but must be registered. Community-based seed producer groups receive training and support through donor-funded projects, some of which are listed in Table 24. Some groups are trained as Local Seed Businesses (LSBs). Some groups are associated with varietal promotion programs through either national or international research centers. Both types of groups are described below, as well as a third model for QDS production by individual farmers.

LSBs typically comprise a minimum of 25 farmers and may emerge from existing farmer groups or from entrepreneurial farmers who see business opportunities in the production and marketing of quality seed. ISSD and other donor-funded projects provide training in all relevant aspects of running the business, including leadership and governance, financial literacy, record keeping, seed production planning, cost benefit analysis (CBA), seed production, post-harvest handling, seed demand forecasting, and marketing, among others. Gender issues are a key priority for some projects such as NIGI, which aim to ensure equal contributions and participation by women and men in LSB activities, including leadership. The LSB training approach aims to ensure that LSBs are technically well equipped, professionally organized, market oriented, and strategically linked. LSBs are supported to access foundation seed (basic seed) through links with NARO.

**Table 11. QDS production by ISSD-supported Local Seed Businesses, 2013-2019**

Note that QDS produced by individual farmers, LSBs and other farmer groups supported by projects other than ISSD is not included here.

Crop	Seed produced in MT (Season A + Season B)						
	2013	2014	2015	2016	2017	2018	2019
Beans	69.7	337.6	139.6	184.7	239.8	455.8	730.1
Finger millet	10.2	2.5	4.1		8.0	1.3	5.2
Sorghum	51.0			3.0			
Groundnut	11.9	13.7	43.8	61.3	23.8	55.0	103.8
Sesame	19.3	70.4	42.8	83.7	40.2	20.0	79.2
Rice	111.1	26.4	27.4	29.4	104.4	144.5	237.3
Cowpea			0.2	-	-	-	1.7
Greengram	-		2.3	-	5.0	7.2	7.6
Pasture	0.2	0.8	1.1	1.8	3.5	7.2	5.7
Pigeon pea	1.6	0.2	1.8	4.9	6.1	5.9	6.3
Soybean	16.2	16.0	15.7	59.4	38.4	145.7	363.4
TOTALS	296.3	467.6	278.9	428.1	469.0	842.6	1,540.3

Source: ISSD Annual Reports

Research organizations such as ABC-PABRA and ICRISAT work through community-based farmer groups to multiply and promote improved varieties. Farmers are chosen as seed producers based on their willingness, commitment and crop management skills. The groups function within a broader concept of meeting demand for seed but tying down commercialization by partnership with private sector players involved in grain production. Participant farmers are also trained to understand the difference between grain and seed production, on handling seed before planting, preventing open pollination, identifying off-types and overall handling from farm to market. Data on the quantities of seed produced by these groups are summarized in **Table 23**. Some of these seed multiplication projects have greatly contributed to introduction of highly adaptable and farmer appreciated varieties, informally<sup>84</sup>.

**Table 12. Quality Declared Seed Production associated with newly released varieties (2016-18)**

Crop	Quality Declared Seed Produced (MT)		
	2016	2017	2018
Beans <sup>85</sup>	2,450.2	844	4,205.2
Sorghum <sup>86</sup>	-	220	350
Groundnut <sup>87</sup>	3,290	548.9	690

A third model for QDS production is supported by DFID through the Northern Uganda: Transforming the Economy through Climate Smart Agriculture: Market Development (NU-TEC MD) program. The objective of the program is to increase the incomes and climate resilience of poor men and women in Northern Uganda by a) stimulating sustainable, pro-poor growth in selected agricultural markets and b) improving the position of poor men and women within these market systems by making them more inclusive for poor people. NU-TEC MD takes a pro-poor value chain approach, focusing on profitable crops (e.g., rice, soybean) for which there is high demand. The QDS production and marketing model involves well-resourced individual farmers and cooperatives that are capable of making the necessary investment, as described in Box 1. Seed production figures are presented in Table 23.

<sup>84</sup> <https://www.icrisat.org/seed-systems-models-lessons-learned/>

<sup>85</sup> Data from ABC-PABRA Project partners in Uganda, 2020

<sup>86</sup> Data from ICRISAT Uganda Project partners, 2020. The cumulative total for two years is 570 MT, which is 31.7 % achievement against the project target of 1800 MT. This figure is for one variety SESO 3 that was under promotion.

<sup>87</sup> Data from ICRISAT Uganda Project partners, 2020. This gives a cumulative 4528.9 MT that exceeds the project target of 4000 MT by 13.2%. This total is for five elite groundnut varieties that were being promoted (Serenut 5R, 8R, 9T, 11T and 14 R)

### Box 1. The development of the NU-TEC MD rice QDS model

Nearly one out of every four Ugandan households consume rice and the demand for rice in Uganda is growing. As a commodity, rice has the potential to contribute significantly to household incomes, but the rice market has been dominated by large-scale commercial farms. The major issue hampering small-holder farmers (SHF) productivity was the lack of access to quality and climate-smart or QDS seeds. The improved variety, Nam-Che-5, was identified to have the characteristics preferred by consumers and millers, as well as tolerance to pests, disease and drought, and short maturity cycles. Nam-Che-5 also had a yield potential of 4.8MT/ha, more than double the current 1.6MT/ha being obtained by SHFs. NARO had been selling large volumes of foundation seeds of Namche 5, but only to large-scale farmers, who used the foundation seeds to multiply seeds for own use.

NU-TEC MD designed a seed multiplication business model that would encourage farmer adoption of the Namche 5 variety and increase the production and marketable volumes of the variety among SHFs. The model showed that a seed producer can make profits by producing the seed variety and selling the seeds to neighboring smallholders. Eight businesses signed up during the pilot phase and committed to invest their own resources into the model. During the seed growing period, in order to encourage adoption, partner commercial farms became “farmer schools” for the local community by explaining the benefits of these improved seeds to SHFs. During the pilot phase, in order to mitigate the risks associated with engaging in the new business model, NU-TEC MD offered the following support to partners included: (i) Linkages to the producer of foundation seeds for the seed variety (in this case linkages with NARO); (ii) Technical assistance (TA) comprising of senior rice agronomists and seed inspectors, to ensure that rice seeds produced would meet the specifications required to be classified as QDS; (iii) A performance / milestone-based incentive for production and marketing, including a financial incentive for actors: reimbursements of 30% on production costs (for QDS only) and 20% on costs of selling to SHFs. Such financial incentives were to be gradually reduced and removed altogether by the end of the second year of model implementation.

At the end of the pilot phase, the evidence showed that seeds producers were selling a product that SHFs were willing to pay for because of its enhanced productivity, and the information regarding its benefits quickly spread within local communities. Demand for these seeds increased, and SHFs were able to access QDS which offered improved yields, at an average price of UGX 3,000; 33% lower than the conventional price of UGX 4,500. The seed producers recognized the market potential of these seeds and started to increase acreages so that demand could be met. This created a new local supply chain for rice seed, disrupting the monopoly that existed before the start of the pilot. Approximately 35% of buyers of the rice were women farmers and almost 60% of them reported increased income after the first year. And whereas women produced lower volumes on average than men, they were able to earn higher prices per kilo which is an indication of higher quality and better bargaining power.

In season two, NU-TEC MD replicated the model with additional partners including two local cooperatives that had the capacity to invest in seed production. NU-TEC MD offered an incentive system that rewarded new partners for both the production and marketing of seeds, whilst providing existing partners with an incentive based purely on the marketing of produced seeds. This would allow for continued risk sharing with producers, while testing whether the model can be sustainable. During season two, NU-TEC MD attracted an additional 5 private sector organizations that were ready to invest in rice seed production. During this same period, the original seed partners decided to engage in rice grain production using some of the seeds they produced during the previous period. The number of seed growers have continued to increase. NU-TEC MD has also reduced the level of performance payments such that only new partners get any form of incentive payments. NU-TEC MD has however continued to pay for TA services from NARO and the Ministry for all the partners to ensure that the integrity of the seed production process is maintained.

Source: Extracted from Palladium, 2020. Enhancing Rice Productivity in Northern Uganda: A NU-TEC MD Case study.

**Table 13. QDS production supported by NU-TEC MD Project**

Period	Soybean (MT)	Rice (MT)
2019 season A	238.9	274
2019 season B	306.8	372
TOTAL FOR 2019	545.7	646

Source: Personal communication with NU-TEC MD

### **A3.3 Distribution of QDS**

Community-based seed multiplication groups are generally expected to operate on a commercial basis, though it is often a challenge for them to sell their seed. Some QDS groups produce and sell not only seed but also grain to grain aggregation groups based on mutual agreements<sup>88</sup>. LSBs are trained on how to effectively market their seed directly to communities. The LSB's marketing efforts are supported by District Agricultural Offices who are also involved in promoting the uptake of quality seed of improved varieties. It is not known how effective LSBs are in marketing their seed, nor whether other farmers are effectively able to access QDS.

QDS also has a role in emergency seed provisioning. Donor-funded seed fairs in emergency contexts, for example, can sometimes provide a sales outlet for such groups, particularly if beneficiary farmers are provided with vouchers with which they can purchase seed. Seed fairs tend to be implemented on a one-off, ad hoc basis and are therefore not reliable as channels for the sale of seed or the purchase of seed. A specific priority for the NIGI project in West Nile, on the other hand, is ensuring that the LSBs are linked to the refugee and host communities prioritized in the project.

In addition to these types of linkage arrangements that allow LSBs themselves to sell QDS directly to farmers participating in local emergency interventions, it is known that both NGO and private companies will sometimes procure QDS from LSBs that is then distributed / sold to emergency interventions in neighboring districts. This is not in line with intended QDS distribution modalities.

### **A3.4 NGO & development partner involvement in LSB support and QDS production**

A summary of donor support to QDS production is presented in Table 25.

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<sup>88</sup> East African Grain Council, 2020 – personal communication

**Table 14. Development Partners' support to QDS production and marketing**

Donor/ Development Partner	Project	Crop Focus	Timeframe/ Location	Investment	Comments
Embassy of the Netherlands / ISSD	ISSD Uganda	Beans, groundnut, sesame, sorghum, rice, soybean, Irish potato, Sweet potato, cassava, pigeon pea, cowpea, field pea, vegetables	2012-2016 West Nile, Northern Uganda and Western Uganda		Works closely with NARO and zonal research stations of Abi ZARDI, Mbarara ZARDI, and Ngetta ZARDI
Embassy of the Netherlands / ISSD	ISSD Plus Uganda	Beans, groundnut, sesame, sorghum, rice, soybean, Irish potato, Sweet potato, cassava, pigeon pea, cowpea, field pea, vegetables	2016-2020 West Nile, Northern Uganda and Western Uganda		
Nutrition and Income Generation Intervention (NIGI),		Focus on nutritious crops, but covers all crops produced by LSBs	2019-2020 West Nile		Took over from ISSD in providing support to West Nile Local Seed Business Association (WENISLOSBA) and 43 local seed businesses
DFID / Northern Uganda: Transforming the Economy through Climate Smart Agriculture: Market Development (NU-TEC MD)		Various, including Rice (since 2017)	Northern Uganda: Acholi, Lango and West Nile.	NU-TEC MD is a GBP 19M component of a seven year program	See Box 1 for more details
Farm Africa		Beans and Groundnuts	Central Uganda		Seed Producer groups registered
HarvestPlus Uganda		Beans and Sweet potatoes	Uganda	Funding from both government and several development partners	HarvestPlus as part of CGIAR, Int. Potato Centre (CIP), CIAT and 15 Local Partners support the two programs
Alliance for Science (AfS)	Helping Farmers Grow Quality Seed for the "Neglected" Crops.	Millet, Groundnuts, Sorghum, Beans, Cowpeas, Pigeon Peas and other legumes).	2000 to date. In Central Uganda	Government of Uganda and a host of Institutions like HarvestPlus, NARO and others.	AfS is coordinated by the Bean breeding unit at Namulonge, NARO Institute.
Bill & Melinda Gates Foundation	N2Africa	Legumes, incl soybean	Since 2013	Investment into Uganda is not known	Works through LSBs. Severe challenges with foundation seed

Donor/ Development Partner	Project	Crop Focus	Timeframe/ Location	Investment	Comments
					quality in 2016 <sup>89</sup>
Program for Restoration of Livelihoods in Northern Region, Uganda - PRELNOR <sup>90</sup> Northern Uganda - 9 districts in Acholi sub region.	2015 - 2022 <sup>91</sup>	140,000 HHs	Cassava, Rice, Maize, Groundnuts and Beans	Target to meet seed demand of smallholder farmers in the target districts.	NARO for Foundation seed and LSBs and Cooperatives <sup>92</sup> for certified QDS.

<sup>89</sup> See <https://n2africa.org/local-seed-businesses-alternative-route-seed-access-challenges-faced-uganda>

<sup>90</sup> MOLG, IFAD Funded, See <http://prelnor.molg.go.ug/>

<sup>91</sup> PRELNOR will establish Community Local Seed Businesses as an exit strategy

<sup>92</sup>Including Farmer groups involved in community-based seed multiplication and sell within the community.

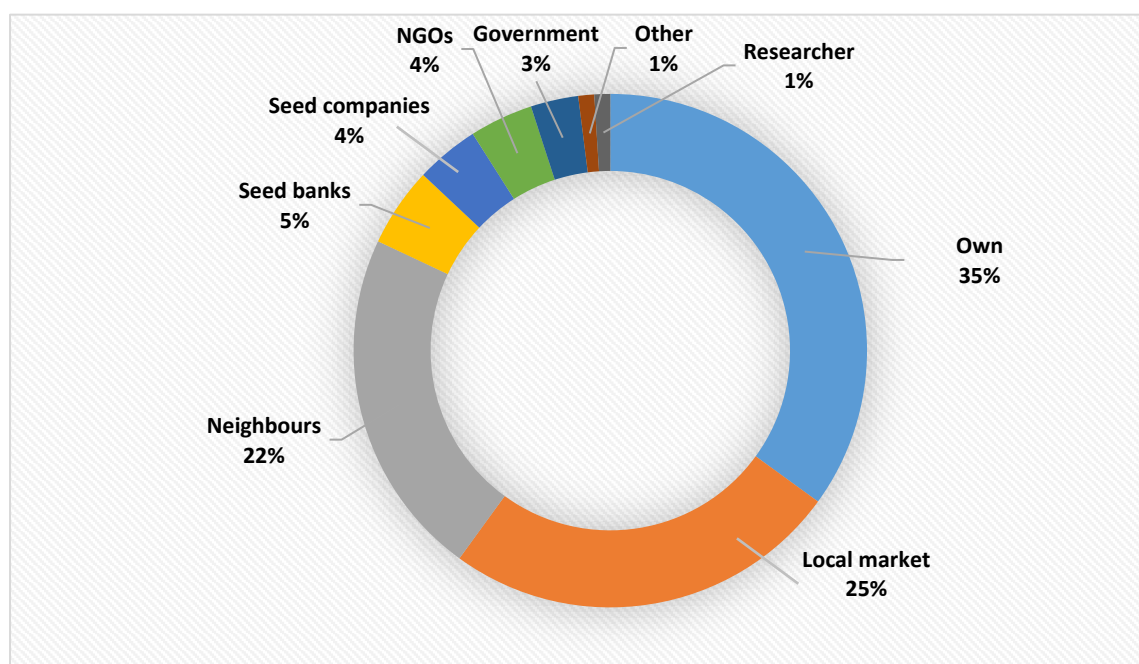


## Annex 4. Informal Sector Overview, including semi-formal, and semi-Informal seed systems

### A4.1 Informal Seed Sources

Informal seed sources account for roughly 85-89% of all seed planted in Uganda (Table 3). The main informal seed sources include farmers' own saved stocks, seed obtained from friends and neighbors (social networks) and 'potential seed' purchased from local markets or grain traders. The relative proportions of seed obtained from these different sources vary by crop, by the relative wealth of the farmer, and whether there were any disastrous events affecting local seed security (e.g., severe drought, floods, population displacement, etc.). A detailed breakdown of bean seed sources is provided by Figure 2; showing that the top three sources of bean seed are own-saved seed, neighbors and local markets<sup>93</sup>.

Figure 2: Smallholder farmers' sources of bean seed in three districts of Uganda<sup>94</sup>



Source: Otieno, Noriega & Reynolds, 2016.

### A4.2 A note on seed quality, seed recycling and seed replacement

The quality of seed from informal seed sources varies considerably, both according to the crop characteristics and the ability of farmers and traders to manage seed. In general, farmer-saved seed is of high quality, particularly if the farmer in question is experienced in selecting, storing and managing seed (as in the case of 'master' farmers). It is easier to maintain the genetic purity of crops that are self-pollinating (e.g., beans, groundnuts, rice, also sorghum) than those that are cross-pollinating (maize).

Seed sourced from traders is generally regarded as grain, not seed, and is therefore of low quality. Some traders, however, distinguish seed from grain and either produce it themselves or purchase it from selected farmers, manage it differently to grain, and keep different varieties separate. In these cases, there is a price differential between the grain and the seed sold by the same trader, and seed is only available as the planting seasons approaches. The distinction between seed and grain in informal markets varies geographically and by crop type and is more likely in crops for which there is a high demand for seed from local markets (i.e., beans,

<sup>93</sup> See also Otieno, G.A.; Reynolds, T.W.; Karasapan, A.; Lopez Noriega, I. (2017) Implications of seed policies for on-farm agro-biodiversity in Ethiopia and Uganda. *Sustainable Agriculture Research* 6 (4) p. 12-30 ISSN 1927-050X

<sup>94</sup> This figure is based on data collected in 2013 from 268 households across three different agro-ecosystems in the districts of Nakaseke, Sheema and Kabale. (Otieno, G.A., Lopez Noriega, I. & Reynolds, T.W. 2016. 'Smallholder access to quality and diverse seed in Uganda: Implications for food security'. Bioversity International. [https://www.biodiversityinternational.org/fileadmin/user\\_upload/Smallholder\\_access\\_Otieno.pdf](https://www.biodiversityinternational.org/fileadmin/user_upload/Smallholder_access_Otieno.pdf)).

groundnut, sorghum, sesame, rice – see Table 3).

Farmers tend to recycle seed from one year to the next, and the seed of self-pollinating crops can be recycled for several years without any significant loss in genetic quality, particularly if farmers practice seed selection and/or roguing at harvest time (as many do). Seed of cross-pollinating crops and even hybrids are also often recycled. Farmers are generally aware of the need to replace seed every few years, though there is little data on how often farmers replace the seed of different crops.

The number of years that farmers recycle their seed can be expected to correlate with data on farmers' source of seed in any one year (following a 'good' harvest, without any disasters affecting seed security). For example, if 66% of farmers plant own-saved seed in any one year (and 33% use off-farm seed, e.g., from local markets or other farmers), then this implies a replacement rate of once every three years. Higher rates of own-saved seed would suggest that the rate of seed replacement is lower. Seed replacement (to refresh seed of the same variety) should not be confused with varietal replacement (to change varieties), though the two often overlap, whether intentionally or not.

### **A4.3 Seed distribution**

Informal markets and social networks are the main channels through which seed is distributed in the informal seed sector. Both systems work well in allowing farmers to access seed affordably, though the quality of seed may be poor in informal markets, as described above. The advantage of seed acquisition through social networks is that farmers can access seed on a loan basis, or in exchange for other items (including labor), or for free, depending on the crop and variety in question.

### **A4.4 The diffusion of improved varieties within informal seed systems**

Informal seed systems continue to be preferred by farmers because of their proximity, affordability and local varietal preferences i.e., tastes and adaptability to agro-ecological zones<sup>95,96</sup>. Links between formal and informal seed systems enable the diffusion of improved varieties within informal seed systems, as explained by the example below.

A farmer who plants 50 kg of certified seed of an improved variety of bean seed would be expected to harvest 600-825 kg. Assuming a harvest of 700 kg, she might sell 40% to the local market (280 kg), consume 30% (210 kg) and preserve 30% as seed (210 kg). In the market, the local trader is likely to sell up to 40% of the 280 kg of grain delivered as seed (112 kg). This means that from the original 50 kg of seed, other farmers can then acquire 112 kg of seed of the improved variety from the local market for planting in the following season. It is also likely that some of the harvest output would be shared with family and friends who might also use this for planting in the following season. If we assume that farmers might refresh their bean seed stocks approximately every two years, and if the improved varieties are appropriate to the local agro-ecology and display locally preferred characteristics, then there is a high chance that farmers would choose to acquire seed of the improved varieties through informal sources. This example illustrates the way in which seed of improved varieties can be diffused through informal seed systems.

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<sup>95</sup> Otieno, G.A.; Reynolds, T.W.; Karasapan, A.; Lopez Noriega, I. (2017) Implications of seed policies for on-farm agro-biodiversity in Ethiopia and Uganda. *Sustainable Agriculture Research* 6 (4) p. 12-30 ISSN 1927-050X

<sup>96</sup> FEWS NET (2017) Uganda Staple Food Market Fundamentals. Washington, D.C., January.

[https://fews.net/sites/default/files/documents/reports/FEWS\\_NET\\_Uganda\\_Staple\\_Food\\_Market\\_Fundamentals\\_January\\_2017.pdf](https://fews.net/sites/default/files/documents/reports/FEWS_NET_Uganda_Staple_Food_Market_Fundamentals_January_2017.pdf)

#### A4.5 NGO, CGIAR and development partner involvement in community seed schemes

Several non-governmental organizations (NGOs) support farmer-saved and community-based seed. These NGOs strengthen the farmers' groups in aspects of seed production, quality assurance, agri-business management, and seed marketing. Hivos and Biodiversity International work together on Community Seed Banks (gene banks) and towards an Open Source System for Seeds<sup>97</sup>: Various other NGOs and private sector actors are working on improving access to seed for farmers.

**Table 15. Development Partners support to community-based seed production**

Donor/Development Partner	Project	Crop Focus	Timeframe/Country	Investment	Comments
HIVOS - People <i>Unlimited</i>	Open Source Seed Systems	Beans, Sorghum, Millets, Pigeon pea, Groundnut, Cowpea	2016 - 2020 / Uganda	USD 610,000	Community Seed Banks
Bioversity International	Kiziba Community Seed Bank	Beans, Millets, Forage, Sorghum	2008 - To date. Hoima, Uganda	Resources from Funders of CGIARs worldwide, including IFAD, FAO, SDC, UNEP & GEF.	Part of the project involving China, Ecuador and Morocco.
Bill & Melinda Gates Foundation	Harnessing Opportunities for Productivity Enhancement (HOPE)	Sorghum and Millets	Lira, Northern Uganda	Additional funding amount of \$3,500,000 [the "Supplement"] to complete Phase 1 objectives and activities and develop the Phase 2 proposal)	25 Finger Millet lines with drought tolerant potential were selected for regional trial and evaluation in Uganda
Farm Africa	Beans and Groundnuts farming	Beans and Groundnuts	Central Uganda		Seed Producer groups registered
HarvestPlus Uganda	Fortified of Beans and Sweet Potatoes	Beans and Sweet potatoes	Uganda	Funding from both government and several development partners	HarvestPlus as part of CGIAR, Int. Potato Centre (CIP), CIAT and 15 Local Partners support the two programs
Alliance for Science (AfS)	Helping Farmers Grow Quality Seed for the "Neglected" Crops.	Millets, Groundnuts, Sorghum, Beans, Cowpeas, Pigeon Peas and other legumes).	2000 to date. In Central Uganda	Government of Uganda and a host of Institutions like HarvestPlus, NARO and others.	AfS is coordinated by the Bean breeding unit at Namulonge, NARO Institute.

<sup>97</sup> Seeds remain freely available without patents and leads to 'protected commons', increasing access to seed and biodiversity, safeguarding free access and diverse food systems

## Annex 5. Emergency Seed Provisioning

### A5.1 Historical background

Emergency seed relief in Uganda was seen as a necessary response to over 20 years of internal conflict and displacement that began in 1986/87 and affected the population in most of the districts in northern Uganda (except in West Nile). For the districts of Acholi and Lango sub regions, civil strife displaced over 90 percent of the population who were forced into camps for internally displaced persons (IDPs), where 1.5 million of them became the recipients of institutionally procured seed for food crops. During much of this time, the bulk of the seed that was traded in the country was purchased and distributed to these camps by the government, NGOs, and relief programs. The situation proved lucrative for entrepreneurs who could deliver seed quickly; the pressure was always on speed rather than quality, with several long-term negative impacts. This prevailing situation distorted farmers' seed procurement strategies, undermined local seed and grain market functioning, and compromised the development of more commercial seed supply systems. Essentially, the direct buyer-seller relationship necessary between farmers and seed stockists never developed, and there was little or no "pull" factor to improve the product.

The prevailing conditions needed procurement with short lead times and produce was priced for certified seed. This meant the young seed industry could rarely plan effectively. There was widespread use of grain as seed, as the seed industry suppliers all scrambled for their slice of this poorly regulated, highly politicized pie. The relief business had the excuse that the situation demanded urgency and did not allow time for quality assurance of any given seed, with the result that a market-driven seed industry struggled to find its space. Due to the gravity and complexity of the relief logistical operations, government allowed ordinary trading companies to supplement the efforts of the seed companies specially to supply seed that included seed for the crops the formal seed companies were not able to supply. The involvement of trading companies in the relief seed business is widely thought to be the origin of fake and 'counterfeit seed'.

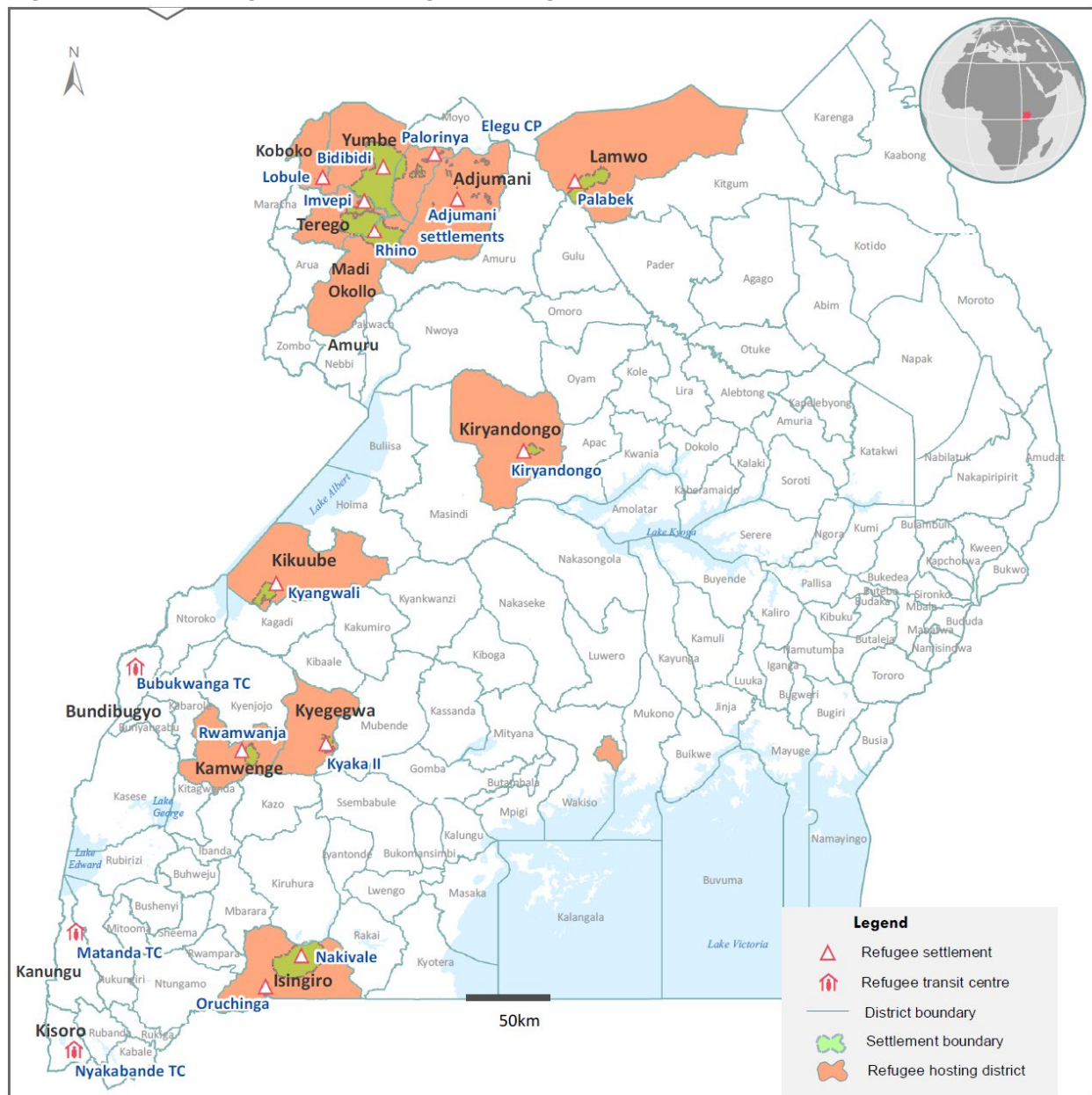
By 2011, all 243 IDP camps in the north were decommissioned, and the government's emergency assistance strategy reverted to a recovery and development model for those affected by the internal conflict in Northern Uganda. Attitudes to seed as an emergency input that were shaped by the emergency response for IDPs initiated in the 1980s in Northern Uganda are still present in the on-going refugee response described below.

### A5.2 Contexts in which emergency seed is currently provided

#### (i) Refugee Settlements and their Host Communities

Uganda is one of the largest refugee-hosting nations in the world, with over 1,400,000 refugees (as of February, 2020). The vast influx of refugees is due to war and insecurity in South Sudan and the Democratic Republic of the Congo, and associated economic crisis and political instability in the region. In Uganda, there are 11 officially designated refugee settlements, ten of them located in the countryside and one in the capital city, Kampala. See map in Figure 3.

Figure 3. Map showing UNHCR Refugee Hosting Districts



Source: UNHCR, UBOS. Created 14 August 2020.

Emergency seed distribution in these refugee settlements is mainly by direct distribution, though some agencies (e.g., CRS, World Vision, Mercy Corps, among others) provide seed vouchers and sometimes cash transfers, part of which they can use for buying agricultural inputs including seed varieties of their choice. Despite a general shift in humanitarian response programming among refugees away from direct in-kind distribution towards cash transfers, there is still a considerable amount of in-kind seed distribution among the refugees and host communities. Total seed provided to refugee camps and host communities has been estimated by one government official to be as much as 10,000 MT per year (including both seed and vegetative planting materials).

**(ii) Post-conflict areas (e.g., Karamoja) with weak or non-existent infrastructure**

Karamoja region located in north-eastern Uganda is a marginal agricultural region with semi-desert like environment. Karamoja has historically been excluded or marginalized from the country's development agenda, and up until about 2012, it was affected by conflict and insecurity, largely related to cattle rustling and the preponderance of small arms. Development efforts since about 2012 have involved a shift from short-term, emergency interventions to longer-term resilience and development programming, and the government has promoted sedentary, crop-based agriculture. More recently, Dec/Jan 2020 the region was invaded by

desert Locusts from Somalia and Yemen.

In this region, a combination of direct seed distribution, seed fairs, seed vouchers, and cash transfers have been employed by various and different government and non-governmental agencies operating in these areas to provide seed to farmers. Efforts to establish and build the capacity of local agrodealers to sell seed on a commercial basis have been hampered by the continued distribution of free seed.<sup>98</sup>

### **(iii) Areas with Recurring Natural Disasters**

Uganda is regularly affected by multiple natural hazards, including droughts, earthquakes, floods, landslides, and volcanoes. Such areas that experience floods and/or droughts are located in the North West (Upper Nile, West Nile) Western Uganda (Kasese and Bundibugyo areas) and Eastern Uganda (Mt Elgon region). In the past 50 years (up to 2014), Uganda was hit by nine (9) large scale events that in total affected more than six (6) million people, and these events are becoming more frequent; the return periods of large-scale disasters that affect at least 25,000 people each is 5.3 years<sup>99</sup>.

Flooding, particularly in low-lying areas, presents the largest risk. Each year, floods impact nearly 50,000 people and over \$62 million in gross domestic product<sup>100</sup>. Droughts affected close to 2.4 million people between 2004 and 2013, and drought conditions in 2010 and 2011 caused an estimated loss and damage value of \$1.2 billion, equivalent to 7.5 percent of Uganda's 2010 gross domestic product. Environmental degradation, underdeveloped irrigation systems, and near-absence of disaster preparedness at the community level are contributing factors to increasing drought risk in Uganda. Climate change, rainfall variability and rising temperatures are expected to lead to higher incidences of droughts and water scarcity.

Emergency seed interventions in response to natural disaster involve direct seed distribution and seed fairs. Total seed distributed in response to floods & droughts has been estimated by one government official to be 5,000 MT per year, including planting material for cassava and sweet potato.

There is sometimes overlap among the different situations in which emergency seed is provided, e.g., drought in Karamoja, or floods in areas with refugees' settlements as it happened in Isingiro district in April this year (2020). Isingiro district is home to two of the oldest refugee camps in Uganda, Nakivale and Oruchinga refugee settlements.

## **A5.3 Agencies involved in emergency seed provisioning**

At least 20 different international and local NGOs and church-based organizations are involved in the provision of emergency seed. FAO is also a key player, both in the coordination of relief seed (through the Livelihood Sector Working Group (LSWG) and in the funding and procurement of seed that is distributed through sub-contracted NGOs. The LSWG was established to enhance coordination and operational effectiveness of livelihood programming in Uganda, particularly among refugee and host populations.

Several NGOs are involved in both emergency and developmental seed programs, including Mercy Corps, Lutheran World Relief (LWR), World Vision and Catholic Relief Services. Over the years, each has developed their own modalities for seed interventions that allow for a transition from emergency seed delivery to more developmental seed interventions. CRS, for example, developed seed fairs and vouchers to allow for greater choice of seed by farmers and a direct link with the seed suppliers (which tend to be agrodealers rather than community-based seed producers or LSBs). LWR worked with a farmer cooperative producing maize and bean seed and now formally registered as a seed company, for certified seed. In Karamoja, Mercy Corps trained a number of agrodealers and tried to establish a more market-driven seed delivery system.

Through the Parliamentary Food Security Program, members of parliament (of which there are approximately 400), provide an estimated 2.5 MT of maize, beans, rice seed through emergency aid interventions.

## **A5.4 Assessment of emergency seed needs and broader policy considerations**

In general, emergency livelihood needs are assessed through rapid livelihoods need assessments, market

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<sup>98</sup> See Vondal, Afferri, Lugwana, et. al.. 2019. Final Performance Evaluation of Northern Karamoja Growth, Health, and Governance Development Food Assistance Project – Final Evaluation Report. USAID: ICF Macro, Inc.

<sup>99</sup> Centre for Research and Epidemiology Disasters (CRED), Catholic University, Brussels, Belgium.

<sup>100</sup> Global Facility for Disaster Relief and Recovery (GFDRR), World Bank Headquarters, Washington. (2018)

assessments, base line assessments and socio-economic assessments, including the use of the household food economy analysis methodology. Only one explicit seed system security assessment was found among the documents reviewed; this was conducted in West Nile by ISSD Uganda in 2015. More recently, ISSD Uganda also released a ‘Seed Alert’ in response to the Covid-19 crisis.

Refugees arriving in Uganda automatically receive seed when they are allocated land; this is part of the government’s strategy to encourage self-reliance among refugees. Self-reliance through agricultural production reduces the need for food aid and helps to promote the peaceful co-existence of refugees and host communities due to decreased strains on food. In general, seed provisioning among refugees is based more on the need to promote agricultural production and self-reliance rather than a detailed assessment of what types of seed are most appropriate, or how seeds can best be provided. There are some notable exceptions, however, for example in the case of the Yumbe Emergency Livelihoods Support Project implemented by CRS, which emphasized climate and nutrition-smart agricultural techniques, including the use of indigenous crops for increased incomes and nutrition.<sup>101</sup>

In situations of natural disaster, seed aid tends to be seen as part of the longer-term recovery process and often follows on automatically from food aid and the provision of emergency items. Specific seed security assessments are rarely undertaken. Instead, there is an assumed need for seed that is related to food insecurity, not necessarily seed insecurity.

The NGOs referred to above that are trying to promote more sustainable seed delivery models in areas affected by disaster and/or as part of the refugee response are thought to be the exception rather than the rule. Their efforts have been hampered by a lack of consistency in the overall approach to emergency seed provisioning and how emergency seed provisioning might fit within the broader seed sector development strategy.

### **A5.5 Seed distribution modalities**

There are two main mechanisms for emergency seed provisioning that are commonly used in Uganda: (i) direct seed distribution (also known as in-kind transfer); and (ii) various market-based mechanisms, mainly voucher-based systems, some of which involve market fairs (also known as seed fairs or agricultural input fairs). Direct distribution is appropriate where seed availability is limited, whereas voucher-based mechanisms are most appropriate where seed is locally available, but access is the main constraint. For both modalities, it is necessary that high quality seed of appropriate, locally adapted varieties is provided, and that farmers receive the seed at a time that allows for timely planting.

Direct seed distribution involves the purchase of seed by an aid agency from seed companies, agro-input wholesalers and/or other suppliers which are then distributed directly to farmers. Tendering procedures for direct seed distribution generally involve standard procurement practices. FAO, for example, advertises their seed requirements for specified crop and varietal types in print media and seed suppliers are encouraged to submit tenders. An important aspect of the FAO procurement system is that it works through the country’s Seed Trade Association to vet authenticity of the suppliers. Payment is made post-delivery and is dependent on quality and germination standards which are tested by a third-party organization. Upon delivery to a specified location, the seed is then distributed by an aid agency to the targeted farmers.

Voucher-based mechanisms allow farmers to purchase the seed of their choice directly from agrodealers or local seed suppliers. Whether electronic or paper, the vouchers can only be redeemed through specified suppliers. In the case of a market fair or seed fair, an aid agency organizes for a series of market fairs to be held on specific days, to which seed suppliers (vendors) and farmers are invited. Farmers are given vouchers (which generally have a cash value, though in some cases might specify a certain commodity type) which they use to purchase seed of their choice from the vendors. At the end of the fair, the vendors claim the cost of the seed that they have sold according to value of the vouchers that they have accumulated from the farmers. Cash has been used instead of vouchers at seed or market fairs. With cash however, there is no guarantee that seed will be purchased.

In the case of the ReHope project, piloted by Mercy Corps, Dan Church Aid and Palladium, the project provided vouchers for partial subsidies on improved seeds through local agro-dealers. This reportedly

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<sup>101</sup> CRS, 2019. Yumbe ERP Livelihoods Support Project: Implementation of Diversification for Nutrition and Enhanced Resilience (DiNER) Fairs in Bidibidi Refugee Settlement

improved agro-dealers' ability to access quality inputs from national seed companies, promoted land sharing between refugees and host communities, and worked with produce trading companies to attract them to the area and assist in developing agent networks<sup>102</sup>.

### **A5.6 Seed exports and imports for emergency response**

Seed from Uganda is also used to meet emergency seed needs in neighboring countries, notably South Sudan, Burundi, and DRC. Some seed companies have supplied seed directly to both DRC and South Sudan through contracts with large humanitarian organizations. Seed has been exported from Uganda for emergency interventions in South Sudan (formerly Southern Sudan) since at least the early 1990s, and it has been reported that one, if not two, of the current Ugandan seed companies were originally established to meet the demand for seed in Southern Sudan. Official figures for 2019 show that 2,869.9 MT of maize seed (hybrids and OPVs) was exported, mainly for emergency seed distributions in South Sudan, DRC and Burundi, and that this accounted for 20% of Uganda's total maize seed production for that year.

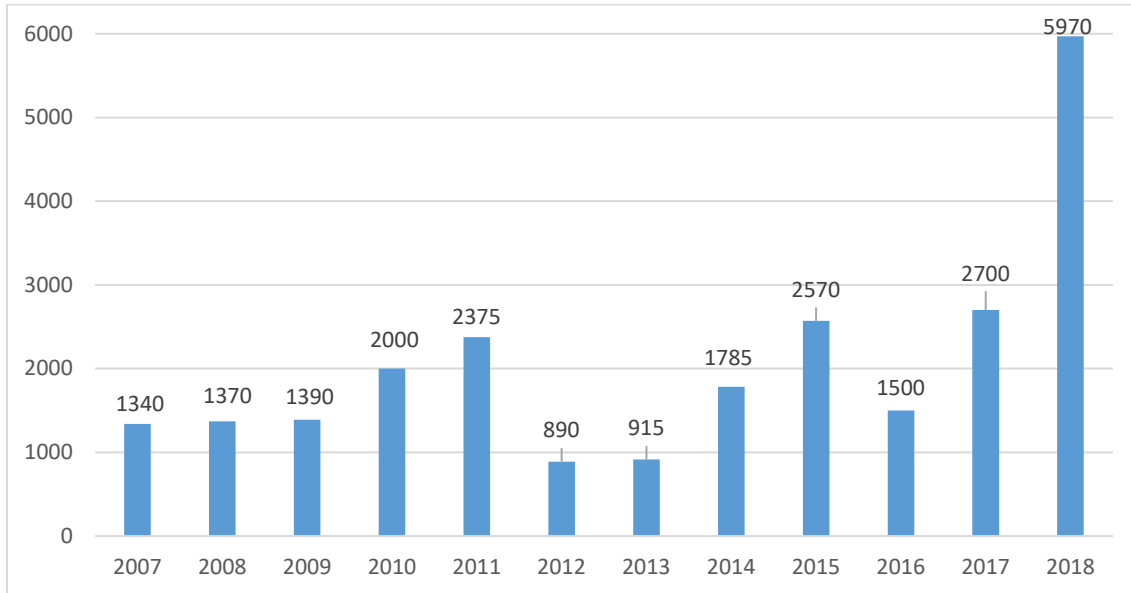
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<sup>102</sup> Mercy Corps, 2018. Refugee Markets Brief: The power of markets to support refugee economic opportunities in West Nile, Uganda.



## Annex 6. Additional data and figures

Figure 4. Quantity (MT) of seed distributed by FAO and its partners in South Sudan – 2007 to 2018



Source: South Sudan Ministry of Agriculture and Food Security et al, 2019. Seed System Security Assessment (SSSA) in South Sudan (Final Report: March 2019).