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Seed system development in the West Nile region of Uganda

Presenting a historical research perspective

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"No single stakeholder alone can handle the challenges of West Nile's seed sector. Each of us has a different role to play," said **Gertrude Badaru, District Agricultural Officer of Arua, at a sensitisation meeting for Quality Declared Seed (QDS) held September 2015 at the Royal Crane hotel in Arua.**

The weather in West Nile region is favourable for crop production but limited access to good quality seed is a major production constraint. Several approaches have tried to improve seed delivery systems yet vibrant community seed production and delivery systems require combined efforts from seed sector actors. Also important is the presence of well-organised groups or individual seed producers with proper governance, strong institutional linkages and business skills. Researchers should be involved in all stages

of the seed value chain as they can provide technical backstopping, and develop innovations and technologies.

Limited access to good quality seed in West Nile

Crop farming is the main economic activity in the West Nile region of Uganda. Staple crops include beans, cassava, groundnuts, maize, rice, sorghum and sweet potatoes. The climate favours at least two production cycles (March-June and July-September) in a year. However, limited access to good quality seed is the major constraint to crop production. Although there are 23 registered national seed companies supplying certified seed, none are based or have branches in the region. Whilst a few input dealers sell seed of some crops with very high market demand (e.g. hybrids), these are expensive and only affordable for a few farmers. The prevalence of counterfeit seed sold on the market is increasing. This is frustrating for farmers buying expensive seed. As a result, most farmers depend on home-saved seed from previous harvests, exchanged with neighbours or purchased from local grain markets.

The ZARDI's mandate is to conduct adaptive research. To date it has identified a number of well-adapted crop varieties with a potential to provide farmers with better yields. But awareness and adoption of these technologies has been low. This is because farmers could only access these technologies through a sustainable seed delivery system in the region. The Abi ZARDI has played a variety of roles in several different seed delivery systems introduced in the West Nile region and experiences are shared below.

Research controlled seed multiplication schemes at Abi ZARDI

The ZARDI has conducted on-station research on seed production during the last few decades and this concentrated on seed multiplication for highly demanded and adopted varieties in the region. However, only a few farmers who could afford to travel to the institute were able to access this seed. Income from seed sales is used as non-tax revenue to manage the institute. Therefore every season, the institute invests in production of basic seed to enable farmers to buy and plant high quality seed. In this case, there is no binding agreement between the ZARDI and the individual farmers buying the seed. The ZARDI is responsible for the quality of seed sold and the farmer is responsible for the quality of grain or seed he or she produces and sells.

The advantage of this system is that there has been no seed adulteration within the ZARDI. The system increased awareness of available technologies within communities in the region. However, it is important to mention that ZARDI provided limited follow up for farmers using the seed and almost no capacity building. Farmers thus have limited knowledge about production and handling of seed to attain the best quality. The major-

ity of farmers produce grain except for those producing cassava planting materials, who usually seek guidance from researchers. There was little dissemination and awareness of technologies through this system. As a result, scientists looked for better ways to involve farmer groups thus introducing community seed multiplication schemes.

Adaptive research with seed multiplication

Since 2002, ZARDI scientists selected well-organised farmer groups to host on-farm adaptive trials. The ZARDI coached farmers in management of scientific experiments as well as quality seed production. As farmers interact with different crop varieties in experimental sites, they can identify varieties that perform well and are better adapted to specific agro-ecological zones. These farmer groups then multiply selected seed varieties to increase seed availability within the community.

The farmers' role is to provide and prepare land, and plant and manage seed fields until harvesting with guidance from scientists. Researchers provided foundation seed at the start of every season and technical backstopping on quality aspects of seed production. This increased availability and dissemination of seed within communities with established adaptive trials. But there was a limited number of farmer groups involved and the acreages and quantities of seed produced was small.

Whilst farmers mastered production of quality seed, other important aspects were not addressed. For example, seed testing and packaging. This lowered quality of the seed produced. Farmers' business skills and linkages to other institutions were insufficient. Thus limiting farmers' ability to access other services required for seed production. There was also no binding agreement between

researchers and farmers, which compromised the level of standards adhered to in seed production. These findings led researchers to change the system to include capacity building for seed producing groups in production and business skills, and to encourage farmers to be more committed to seed production.

Community and farmer seed systems

Based on previous lessons learned, seed multiplication projects introduced new seed systems. ZARDI received support from development partners including Alliance for a Green Revolution in Africa (AGRA), the Eastern Africa Agricultural Productivity programme (EAAP) and the Integrated Seed Sector Development programme (ISSD). In addition, government initiatives for research-extension partnerships between National Agricultural Research Organisation (NARO) and the National Agricultural Advisory Services (NAADS) to develop seed systems received support from the Agricultural Technology and Agribusiness Advisory Services (ATAAS) - a World Bank-funded project.

AGRA farmer groups

In 2005, AGRA selected farmer groups from areas where particular varieties had adapted well, irrespective of any previous involvement in adaptive research. Selected farmers received training on quality seed production, record-keeping, savings and marketing. Farmer groups were then linked to sub-county and district production units, agro-input dealers and village saving schemes during stakeholder meetings. At the start of the AGRA project, ZARDI and farmers groups signed a memorandum of understanding with clear terms of reference. Based on yields and adaptability in the region, foundation seed for selected crop varieties such as cassava, rice, beans and groundnuts were introduced for multiplication.

In this set-up, farmer groups are answerable to researchers and district production and agricultural officers for quality of seed produced. Through increased technical guidance and follow-up, this system resulted in increased production and availability of seed compared to previous systems, thus increasing community access to quality seed. Some farmer groups attracted bigger buyers like agro-input dealers and district local governments.

Some farmer groups also initiated the process of registering as a seed company and bought seed from other farmer groups, which helped to further increase dissemination of technologies in the region. An example is Andevuku Farmer's Group in Adjumani district involved in cassava and groundnut production. The group reached the final stages of registering as the "*West Nile Seed Company*" but lacked the mandatory infrastructure and machinery for registration.

However when the AGRA project ended in 2009, some farmer groups were not able to continue in seed production. This was because groups were reliant on free foundation seed and, as a result, not able to generate resources internally to invest and continue in their seed business. However, with growing awareness, demand for foundation seed began to increase and ZARDI was able to produce sufficient quantities.

Large-scale private individual seed producers

This system was supported by EAAP and jointly implemented by ZARDI and the district extension departments between 2012 and 2014. Individuals interested in the seed business - and with the capacity to sustain seed production-related costs - were invited to express interest through an official application to ZARDI.

This seed production system only included farmers with larger pieces of land. Instead of giving farmers free inputs every season, inputs were provided once at the start of the project. After one production cycle, 10% of seed was given to other farmers; the rest was marketed to generate revenues. Farmers can then buy foundation seed for the next season after realising profit from sales. Cassava was the main focus of this system.

Farmers were then linked to district local governments - specifically, the District Adaptive Research Teams (DARTSs) consisting of district production officers and agricultural officers (DAOs) - for support on conducting adaptability studies and to determine best varietal selection to multiply for seed. Both researchers and DAOs conducted field inspections. Farmers were thus answerable to the DAOs for the quality of seeds produced. The ZARDI's role was to multiply foundation seed for cassava to be procured and supplied by zonal NAADs. Instead of conducting regular field visits themselves to provide technical backstopping to seed producers, inspections and verification, the ZARDI built capacity of DARTS who, in turn, supported the farmers. ZARDI scientists were only invited for final verification of varietal purity and health before the seed was supplied to other farmers.

Most farmers in this system have managed to sustain seed production. However they are very few in comparison with the seed demanded and not evenly distributed in the districts. Availability of good quality cassava seed has also increased in most districts as more farmers are continually receiving 10% seed returned seasonally from those who were supplied with seed. But the increment rate is low, since cassava takes a longer time to multiply and some farmers fail to return

the required percentage. With restructuring of the district extension system in the country, the level of extension has also decreased. As a result, support to these seed producers became insufficient. Farmer's business skills are also limited which means that the majority have not been able to sustain seed production.

Integrated seed systems: the local seed business (LSB) approach

At the end of 2012, a new community seed multiplication approach was jointly implemented by ISSD Uganda in collaboration with NARO in three zones, including West Nile. This ongoing, timely project is supplementing existing efforts in the region.

Integrated seed systems concentrate on building Local Seed Business (LSB) farmers' entrepreneurial and business skills, and on establishing linkages with public and private institutions and service providers involved in the seed sector.

Four out of the ten LSBs selected to pilot ISSD in West Nile had participated in previous seed systems. Instead of supplying them with free inputs as start-up capital, LSBs were technically equipped to produce and market seed through intensive training on quality control, packaging, marketing, governance, resource mobilisation and saving schemes.

This seed system also strengthens LSBs institutional linkages with the Abi ZARDI for research services and the Ministry of Agriculture, Animal Industries and Fisheries (MAAIF) which is mandated to perform the quality assurance role with support from the department of agriculture at the district local governments. Besides the ZARDI, LSBs were also linked to other national research institutes involved in breeding different crops of

interest to LSBs. The Department of Crop Inspection and Certification under MAAIF and Kawanda Seed Laboratory conduct field inspections and seed testing respectively. These services are paid for by the LSBs.

Instead of concentrating on varieties released by research, LSBs chose what seed to produce based on available market opportunities in their communities. To complement rather than compete with existing seed producers, emphasis was put on crops not produced by seed companies.

LSBs provide land for seed production, buy foundation seed and other inputs required for production, and manage fields. LSBs are also responsible for maintaining seed quality and are answerable for anything that goes wrong. The ZARDI offers technical backstopping on quality standards of seed produced. It also ensures availability of foundation seed required by the LSBs.

The system has resulted in self-sustaining LSBs with capacity to produce and market quality seed. This is due to LSB's enhanced capacity to generate resources internally and improved saving mechanisms. Enhanced group governance has improved decision-making in terms of production, marketing and quality control. Functional committees with clear terms of reference help achieve this. LSB capacity to lobby for better seed prices has also increased.

The LSBs have been in close contact with seed experts for three years, although some are not yet comfortable to operate independently.

One LSB chairperson exclaimed in a stakeholder's meeting in Nebbi district: *"What will we do when ISSD leaves us? We will have to travel far to buy foundation seed and we need to be active to access extension services other than that regularly given by ISSD experts."*



Abi ZARDI managed potato seed field at Zombo district farm institute (DFI)



Director Abi ZARDI during Field Inspection of Kuluba LSB

This viewpoint underscores the need to form an umbrella association to coordinate LSB activities after ISSD support has ended. LSB functions, such as foundation seed procurement and quality assurance services are better coordinated and handled using a joint approach rather than all LSBs in the zone operating individually.

ZARDI's changing role

The ZARDI began by working with adaptive research groups in seed multiplication. It then worked with relatively organised groups with some business acumen and linkages to market. Next, ZARDI worked with individual large-scale farmers with some independence in cassava seed multiplication (EAAP, ATAAs) and finally with more independent business oriented LSBs. Under such changing structures, farmers' access to quality seed has increased in the region, complemented by technology dissemination.

Different actors' involvement in the whole seed production and delivery chain is increasing in the region. Researchers, district local governments, private sector partners and agro-input dealers operating within the West Nile region are working together to ensure there is increased access to quality seed of desired varieties within communities.

ZARDI's role has gradually taken shape from directly training farmers, supply of foundation seed, and inspection of seed fields. Towards working with implementing partners and seed growers, and linking seed growers to the source of foundation seed. ZARDI now provides information on the best performing varieties based on adaptive research. Seed producers make their own choices on which ones to grow.

Originally, only MAAIF inspectors and ZARDI scientists who were well informed about the

varieties grown and their inherent attributes were conducting field inspections. Inspection has now been decentralised and trained DAOs are empowered by NSCS to inspect fields, thus increasing the number of inspectors accessible by seed growers within the region.

The demand for foundation seed from research organisations has gone up with increasing numbers of community seed producers. This has driven research organisations to look for alternative solutions to increase availability of foundation seed. For example, modifying the arrangements under which foundation seed is produced and supplied by research institutes. Based on this, Abi ZARDI in partnership with ISSD Uganda is currently piloting foundation seed production as a business for potato and simsim (sesame).

Another viable option for the West Nile region is engaging LSBs in production of foundation seed under close supervision by breeders. The National Semi-Arid Resources Research Institute tested this approach using groundnuts and the results are promising.

"I supplied LSBs with breeder seed and they were able to produce good quality foundation seed. I can confidently say that LSBs are able to produce foundation seed under breeders' close supervision," said **David Kalule Okelo, the groundnut breeder for NARO Uganda**, at the third breeder's workshop organised by ISSD, at Hotel Africana in Kampala.

It is important to establish an independent research wing to handle production of early generation seed. Also, of importance is to equip seed producers with technical train-

ings in quality seed production, particularly for upcoming seed producers who will need more early generation seed. This will allow researchers to concentrate on the release and evaluation of viable technologies suitable for farmers.

Quality seed availability for farmers

Since their formation in 2012, LSBs have found the seed business to be viable and profitable. This has resulted in more farmers willing to invest:

"In our group, out of the 40 members, only five of us were willing to buy foundation seed to grow seed, others picked up interest in the business when they saw us making money from the seed sales. Now we are about 15 members involved in seed production," says **Adam, chairperson of Andevuku Farmers' Group in Adjumani district** during a meeting with the new seed producing group under the Community Empowerment for Rural Development (CEFORD) NGO in the district.

Seed producers are now exposed to a wider range of technologies. As a result, a number of seed varieties from the ZARDI are now grown by seed producing groups. This has increased their availability and accessibility within the region. A classic example is sesame, cowpea and potato. Before, these were not priority crops for research in the zone so interventions were limited. Due to restricted demand, crops like sorghum and millet were not included for on-station seed multiplication. However, through increased involvement of seed producing groups within the communities, seed demand for these crops has increased and some LSBs are now producing quality seed for these crops.

ISSD activities in the region created greater awareness on seed quality; this has resulted in the enforcement of seed quality control resolutions. Some local governments like Arua and Koboko have developed quality seed by-laws and resolutions concerning counterfeit seed with heavy penalties for offenders. This has resulted in increased interceptions and rejections of counterfeit seed.

"I was supplied with 8 tonnes of what they called K132. When I opened my bags I found a mixture of about five varieties. When I went ahead to conduct the germination test, it was also below the required minimum of 80% and purity was also low. So I decided to write to the executive director of the NAADS secretariat. The seed companies that supplied us were summoned and their contracts cancelled. This made me happy that our new seed quality law is functional. This has actually empowered me to do my job efficiently," says **Mr. Samuel Abiyo, DAO Koboko district (ISSD documentary).**

Farmers' potential to produce seed

Seed producers have become more technically equipped to produce and market seed as a result of intensive training, monitoring and inspections conducted throughout production cycles. Through the project, ISSD has also exposed them to different actors along the seed value chain; supported them to understand market demand and increased their awareness of laws governing seed production and marketing. Overall, this has increased availability of quality seed to farmers in the region.

The level of market competition among seed producers in the region has also increased as seed quality determines whether you penetrate the market or not. Buyers have increasingly more knowledge about seed quality and are enthusiastic about the quality delivered to them. Some of the buyers are also interested in the source of seed and technical capability of suppliers to handle seed, which has challenged seed producers to be more knowledgeable about the seed they produce and supply to be more competitive. For the same reason, formal seed suppliers have also taken to improving the quality of services they deliver to farmers.

Colophon

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