

N2Africa Podcaster no. 37

May and June 2016

Introduction

I'm just back from Seattle where Fred Kanampiu, Theresa Ampadu-Boakye and Bernard Vanlauwe and I had meetings at the headquarters of the Bill & Melinda Gates Foundation. We were able to discuss progress and learnings with our two senior project officers, Charlene McKoin and Jeff Ehlers. Furthermore, we had meetings to discuss with Sam Thevasagayam the interim Director of Agricultural Development and with other senior staff from a wide range of thematic areas.

Theresa and I presented a “learning lunch” seminar, which was well attended and stimulated a vibrant discussion. Theresa is a natural presenter and she did a fantastic job in presenting our work – topics highlighted included Public-Private Partnerships, the interactive, online data management and M&E systems, inoculant delivery and the discovery research on rhizobia. Our research findings showing that new strains of rhizobium can increase yields in the field of common bean, cowpea, chickpea and (now also some evidence) groundnut, were met with great interest.

Vipula Shukla, senior program officer, who was heavily involved with the discussions around the second phase of N2Africa said “the N2Africa approach is one that other projects should adopt!” It was a superb opportunity to present recent advances in our work through N2Africa and to explore how we can strengthen links with other initiatives funded by the foundation. Many thanks indeed to Charlene for the invitation to showcase our work to the foundation. I hope you have also experienced the positive vibes one gains from such positive interactions. We all left Seattle with new energy and enthusiasm to continue our work with N2Africa.

This Podcaster contains a rich collection of contributions. Louise Sperling, who was on the N2Africa Advisory Committee during our first phase, shares her ideas on ‘last mile’ delivery of new legume varieties to farmers. In addition to updates from N2Africa in Kenya and Zimbabwe, we have news on the Legume Alliance in Tanzania – from George Odour on our collaboration with the African Soil Health Consortium – and on a new project funded through the DFID ‘SAIRLA’ programme to extend the use of multi-media communications in Ghana and Tanzania.

Reflections on legume input supply chains from Louise Sperling

New legume varieties are only useful if they reach the smallholder farmers who need them—and right now our track record is abysmal. The largest seed data set in the world (McGuire and Sperling, 2016) shows that smallholders currently source <1% (actually 0.6%!) of legume seed from the formal seed sector dealers – the channel most often supported by development programs. A whopping



Fred Kanampiu, Theresa Ampadu-Boakye, Bernard Vanlauwe, Ken Giller saying goodbye to Charlene McKoin and Kristina Muller at the Bill & Melinda Gates Foundation in Seattle, May 26th 2016

Astrid Mastenbroek and Kawuma Christine Menya of the Integrated Seed Sector Development project share ideas on how Quality Declared Seed can help to overcome the challenges of poor quality seed which have been painfully experienced by N2Africa in Uganda. The increasing spread of Aflasafe™ to combat aflatoxin in groundnut is highlighted from Tanzania, together with announcements of new reports and conferences.

This is a busy time across the N2Africa countries, so we wish everyone all success with their work. As we're just about to go to press with this issue, we heard that Dr Amaral Chibeba from Mozambique has been awarded his PhD in Brazil. Congratulations to both Amaral – our first N2Africa PhD graduate – and his supervisors Mariangela Hungria and Steve Boahen. We'll bring you more details on Amaral's PhD in the next Podcaster.

Please do share your news with us. If you feel that the work in your country is under-represented in the Podcaster then we rely on you to change this. We are looking forward to receive your contributions!

Ken Giller

65% (64.4%) of the seed sown comes from local markets, a venue we have not yet begun to harness to move our new varieties.

So, along with seed supply development, novel delivery mechanisms are urgently needed to reach our varied clienteles. These include the malnourished, those seeking

to improve their soil fertility and even farmers in stressed regions. We do, after all, claim that some of our varieties are suited especially for drought prone zones. Simple messages might help us break through what are especially conceptual barriers.

Simple message 1. Legume Seed is not Maize Seed. Farmers do not need to renew their bean seed season after season. They are looking first and foremost to buy new varieties, new germplasm. New business models are needed for the legumes. Business models that sell ‘germplasm’.

Simple message 2. Farmers are buying legume seed, and in huge quantity. It is a myth that farmers do not buy legume seed. In fact, 2/3 of the legumes smallholders sow are bought – season after season. For crops like common beans, seed purchases rise to over 80%. Hence, **there is a massive market opportunity and customer base that needs to be captured.**

Simple message 3. Moving to impact-oriented seed systems means Thinking SMALLHOLDER FARMER.

Design features that actually cater to our client base include:

- **Packing small.** Allow farmers to buy seed (germplasm) 100, 250 g 500 g, 1 kg packages. Those interested to quantity can always buy multiple packages, or the occasional larger packs 5, kgs, 10 kgs.
- **Going where farmers go.** Mom and Pop stores can sell seed (Nigeria), supermarkets (Malawi), and even kiosks in local markets can reliably sell legume seed.
- **Providing information systems that guide informed choices - and feedback.** ‘Seeing is believing’, that is field demonstrations, are only part of the story these days. Text messaging, radio programs, phone video snips can all help create awareness and enhance demand. But remember that information should always be two-way. If something goes wrong, the seller needs to respond.

Fully commercialized BNF technologies in Kenya

Farmers in west Kenya enjoy ready access to commercialized BNF technologies, in large part due to the efforts of N2Africa and its strategic partnership with both the private sector and the WeRATE network of farmer associations. Commercial partnership with MEA Fertilizers Ltd. has led to the manufacture and distribution of BIOFIX legume inoculant and blending of Sympal, a fertilizer specifically designed for symbiotic legumes.

BIOFIX legume inoculant resulted from product licensing by the University of Nairobi MIRCEN laboratory, one of N2Africa’s earliest partners. Now, the inoculant is produced at MEA’s factory in Nakuru for several legume hosts (soyabean, bean, pea, green gram, lucerne and others) in a variety of packaged quantities (10, 20, 50, 100 and 150 g). MIRCEN continues to offer quality control inspection



Open market sales central Kenya

And surely there are other features. Some new businesses now bundle seed with other products, like micro-insurance, or fertilizer. Others are offering forward payment mechanism (via scratch cards), to help farmers incrementally save – so as to buy large volumes of seed.

In all of this, we ask “What is our goal?”. It should be:

1. To put on offer lots of LEGUME crops and varieties;
2. To make sure they get to ‘the last mile’ geographically;
3. To offer options that can reach the range of clientele, including the poor, the malnourished, and those facing tremendous climate variability.

Louise Sperling, Catholic Relief Services

McGuire, S. & Sperling, L. (2016) [Seed systems smallholder farmers use](#). *Food Security*, 8, 179-195.

with the most recent tests, averaging over 5×10^9 colony forming units (CFU) per gram! N2Africa designed software used in the analysis and distribution of these quality control results and worked with “last mile” stockists to display BIOFIX in glass-fronted refrigerators. It also worked with MEA to develop a product return policy, where unsold stock at the end of each season is replaced with fresh stock the following one. Production of BIOFIX exceeded 10 tons in 2015, sufficient to treat over 20,000 ha. Not all is being used in Kenya as the product is also exported to Rwanda, Tanzania, Uganda and Zambia. The efficacy of BIOFIX applied to soyabean and climbing bean was firmly established during the first phase of the project. Nowadays our technology tests no longer include non-inoculated plots, so that other less-established management options may be examined in greater detail.



Photo 1. Sympal production at the MEA blending facility in Nakuru, Kenya

Sympal is a fertilizer blend developed by N2Africa and commercially produced and distributed by MEA. It contains no mineral nitrogen, but offers a balanced supply of phosphorus, potassium, calcium, magnesium, sulfur and zinc. This fertilization strategy optimizes biological nitrogen fixation by assuring that mineral nutrient supply remains non-limiting. This blend was formulated by N2Africa, proto-types packaged by MEA and distributed free-of-charge, tested and refined through on-farm testing by WeRATE and the final product then produced at MEA's blending facility in Nakuru. Selling Sympal presents no challenge, especially for use on inoculated soybean, because the plants become dark "blue" and yield increases by about 700 kg ha⁻¹. Appreciation of Sympal extends well beyond our network as over 128 tons of this product were blended and marketed by MEA over the past few years. It is available in 2, 10 and 50 kg plastic lined woven polythene bags. Sympal is very effective when applied to inoculated pea as well, but less so with bean. As a result, MEA formulated and markets a sister product "P Mabau" that combines Sympal with 10% mineral nitrogen. Use of this new product on soyabean at 125 kg ha⁻¹ on 25 farms in west Kenya during 2015 slightly increased yields, but not sufficiently to offset the fertilizer's higher price.

Grain legume seed is widely produced and marketed throughout Kenya by several seed companies. These seeds include bean, pea, green gram, forage and fodder legumes and most recently soyabean. N2Africa and WeRATE conducted widespread testing of soyabean in west Kenya, examining several traits such as seed size, protein and oil content and "dual purpose" growth habit. Ultimately, varietal choice was largely determined by tolerance to Asian Rust, a foliar fungal disease outbreak that occurred after soyabean production grew in popularity. Two soyabean varieties, SC Saga and SC Squire, developed by Seed Co are extremely resistant to rust. SC Saga was licensed for distribution in Kenya in 2014 and is first appearing on stockists shelves in west Kenya. Meanwhile,



Photo 2. Soyabeans delivered to a marketing collection point in west Kenya contained in N2Africa branded grain sacks

WeRATE members continue to produce seeds of locally preferred varieties, particularly SC Squire and SB 19, through community-based efforts. Our work with climbing bean also led to the recognition and commercial release of climbing bean cv "Kenya Muvano", a very aggressive variety first sourced from Rwanda and now distributed by Kenya Seed Company.

Last-mile input supply is an important principle within N2Africa and is being achieved in west Kenya through several mechanisms. WeRATE conducted agrodealer training of members belonging to the West Kenya Chapter of the Kenya AgroDealer Association (KENADA), sensitizing many stockists to BNF technology products for the first time. Next, twelve One-Stop Shops were initiated among WeRATE members, allowing for BNF technologies to be directly marketed to farmers that participate in our grain legume outreach. WeRATE also initiated the Agricultural Technology Clearinghouse, a semi-annual event that brings together representatives from farmer associations, input manufactures and distributors, and the development community to discuss which input products are performing best and which new products are becoming available. This mechanism effectively links input suppliers and buyers and allows for research organizations to design on-farm technology tests around recently (or soon to be) released products. Input manufactures recognize the potency of the Clearinghouse and bring numerous product samples for distribution by technology testers, sometimes unannounced, creating a circus atmosphere. Self-sponsored participants from Rwanda and Uganda replicate the Clearinghouse in their home countries. Assistance to Kenyan soyabean producers continues through a recently-formed

national task force that adopted production guidelines developed by N2Africa and arranged for wholesale distribution of BIOFIX and Sympal to key soyabean-producing counties.

Demand-driven technology supply is not being overlooked. Basically, adoption levels of production inputs are determined by the production levels and marketing of commodities they accommodate. The Early Impact Assessment of N2Africa (2013) reported that outreach efforts led to the increased production of over 12,000 tons of soyabean per year in Kenya and that the adoption of N2Africa's recommended practice was 61% among its outreach clients.

Information plus ... the journey towards sustainable change in legume technologies

George Oduor from CABI explains an new approach to sustainable change in legume technologies.

The goal of any long-term development project is to create sustainable changes in awareness, attitude and ultimately behaviour. In the first phase of the Africa Soil Health Consortium (ASHC) soil fertility projects, messages especially to farmers were developed in order to facilitate these changes. The ASHC team helped to develop print-ready materials that the organizations agreed to reproduce and distribute. N2Africa was one of the most active partners of ASHC during this phase.

Many institutions took up the offer of development support. However, in practice we had to deal with the frustration that our partners did not get the materials out into the field, and could not meet their part of the deal. Whilst this is disappointing, we hope that the training received will create a sustainable change in the way research institutions package technical information in more appropriate and farmer-friendly ways. A legacy of a web-based integrated soil fertility management (ISFM) library containing over 300 resources was also developed.

In the second phase of the ASHC project, CABI and the Bill & Melinda Gates Foundation corrected the structural flaw in the approach used in the first phase by ensuring stronger and more sustainable delivery. The core focus on integrated soil fertility management remained. Just like the assumption that farmers will find the best solutions (combination of selected improved seeds and varieties, application of organic matter and fertilizers, the use of legumes in rotation and the adoption of good agricultural practices) for their farms. However, the ways of working have changed significantly.

ASHC is now charged with forming, and working within, partnerships to ensure that soil fertility messages are disseminated, at scale, to smallholder farming families.

Currently, soyabean production and marketing is monitored through the activities of WeRATE members by a seasonal survey. Over the past year, these members have bulked and marketed over 478 tons of produce through their collection centers with prices ranging between \$0.38 and \$0.75 per kg. These data do not include the production and sales by individual group members and other farmers away from these collection centers, but certainly indicate that soyabean production and marketing is becoming a viable concern. More attention is however needed to full evaluate the impacts of N2Africa in terms of its fullest production and marketing impacts.

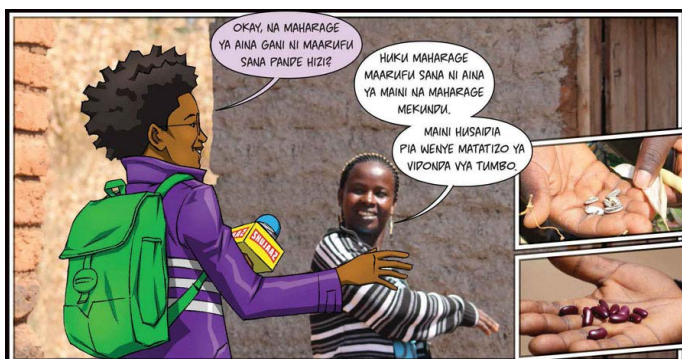
Paul L. Woomer, Josephine Ongoma and Teresah Wafullah

In short:

- The new approach is based on a series of campaigns sharing the same technical information in different media;
- The messages in the different media are nuanced, so that they meet the information needs of different members of the small-scale farming households.

We are looking for evidence of what combinations of media, and in which circumstances, result in changes in attitude and behaviour in small-scale farming families. We are also interested in the impact that diffusing agricultural information through different family members will have on how decisions are made. Simply put; Will young people and women in farming families be empowered by accessing good quality farming information?

In late 2015, we wanted to pilot the campaign approach. We first approached N2Africa, with whom we started working together on a pilot campaign promoting common bean technologies to small-scale farmers in northern Tanzania. Subsequently, Farm Radio International came on board to recruit a suitable radio station. Shujaz (Well Told Story, see [Podcaster 33](#)) worked with us to develop two story lines in their comic and social media platform, showing how a young farmer and an agro-dealer were working with improved legume technologies.



A picture from Shujaz



Our research partners were IITA and I-logix, a Nairobi-based firm. I-logix were asked to undertake a major telephone research pilot with over 3,000 farmers. This research was to identify how farmers felt about different legume technologies, especially those relating to market-ready inputs (improved seed varieties and fertilizer). At every stage of the campaign, Selian Agricultural Research Institute (SARI) and Wageningen University gave technical support.

A realistic danger in development communications is that some believe that information is the silver bullet and that better communications will lead to a permanent change in farming practice in Africa. This is not true. And as development communications professionals we need to assert that information is essential, but not sufficient to bring about sustainable change. The reasons farmers do apply new technologies vary. However, farmers are rational and they need to have access to both input and output markets to make investments viable.

The 2015 pilot was designed to help partners understanding the intricacies of running a campaign. What became clear through the early findings of the I-logix research was that there are significant numbers of farmer who are able to apply improved legume technologies, but that they are frustrated by inadequate supply chains for key inputs. And whilst overall there were indications of strong demand for inputs amongst some farmers, their geographically dispersal made it hard to serve them as a market. So, further work is needed to convert this latent demand into a sustainable input supply system.

During the pilot project in Tanzania, the extent of the problems with the legume technology inputs became clearer. Results of the farmers survey showed very strong farmer preference for improved seed varieties that are still not registered for use in Tanzania. Whilst an informal, unregulated economy is operating at scale to provide farmers with their preferred varieties of seed, projects like ours cannot be seen to be endorsing or circumventing the national systems. So, we cannot provide good agronomic advice to support the unregistered varieties. During the life of the project, we anticipate that pressure from the farmers will result in their preferred varieties being formally registered.

We found that stocks of registered improved seeds are in short supply. By the end of the season, as bean grain stocks reduce, the market price for seed is very close to the price of grain. This tempts many seed growers to sell seed stocks into the grain markets, exacerbating the shortfall in improved seed stocks for the following season.

We discovered that, to build sustainable markets, bean seed dealers wanted to advocate planting new bean seed every year. In reality, seed can be saved for several seasons. Annual seed replenishment from even a fraction

of bean growers would soon wipe out the inadequate seed stocks. So, the Legume Alliance is suggesting production of new seed every three seasons. The logistical challenges of providing bean seed at scale are significant. The Legume Alliance now includes the Agricultural Seed Agency (ASA), which is working to bulk up more seed. In addition, the African Fertilizer Agri-business Partnership (AFAP) will pursue the policy issues associated with matching common bean seed supply and demand.

In 2015, inoculants of nitrogen fixing rhizobia strains were officially registered in Tanzania, with approval for a limited number of legumes. Common bean may well be added to the list, as effective strains of rhizobia are isolated and marketed. Commercially produced rhizobia inoculants are a highly cost-effective legume technology. However, it has a limited shelf life (6-12 months depending on the brand and packaging) and requires special handling on the part of the input supply chain and the farmers themselves. So, there is a lot of work required in building demand and putting in place effective supply chain that are fully informed to work with this new input. There is also work to be undertaken to fully share the benefits – not just on the seasons legume crop, but in terms of realistic claims that can be made about the nitrogen left behind for subsequent crops. This level of economic data helps farmers evaluate the benefits and costs of the different approaches and what they can consider as their best-bet ISFMmix.

In theory, fertilizer for use on legumes should be available. Particularly, P-fertilizers are designed to kickstart the legume into producing nitrogen. However, culturally beans are seen as a crop that needs no fertilizer. Consequently, the economics of fertilizer use in beans needs to be clearly spelt out. Input dealers appear to be reluctant to hold stocks of specialist fertilizers. The Legume Alliance is now looking how to build both demand and supply chains with the support of point of sale material and training in the agro-dealerships and mass extension.

There are real opportunities within the supply chains for improved legume technologies for information to be better integrated. This could include packaging and point of sale material designs that help farmers to correctly apply inputs. This could include simple steps like tape measure printed to help in spacing of seeds at planting and fertilizer application. Or providing clear guidance in each input package on how improved seed + organic matter and fertilizer + good agricultural practices can really boost crop production and replenish the soil.

Over the next four years the partners in the Legume Alliance will continue to review the obstacles to small-scale farming families adopting improved legume technologies. We will be piloting different approaches and including new partners to help us overcome barriers. The next article

describes one of our future research activities, funded by SAIRLA.

The lessons emerging from these scale-up campaigns will be packaged and shared widely. So we have made a considerable investment in monitoring, evaluation and learning to know what is happening. This means we can advise others

on how, and when, to create fully integrated campaigns and what works where. We look forward to sharing our findings here in the future. ASHC is in the process of setting up further partnerships in Ghana, Nigeria, Tanzania and Uganda.

George Oduor, CABI

SAIRLA Sustainable Agricultural Intensification Research and Learning in Africa

Gender and the Legume Alliance: integrating multi-media communications approaches and input brokerage

The project 'Gender and the Legume Alliance: integrating multi-media communications approaches and input brokerage' is implemented by CABI and N2Africa with grant support from the SAIRLA-programme. This five-year programme commissions research and facilitates multi-scale learning with regard to sustainable agricultural intensification (SAI). The project will support several N2Africa milestones related to feedback of the performance of dissemination models, the effectiveness of input supply and marketing systems, themes and models for women-specific dissemination campaigns and the effectiveness and efficiency of various D&D approaches.



N2Africa is implemented through partnerships with value chain projects, so-called Public Private Partnerships (PPPs). This approach grew into a Legume Alliance, coordinated by CABI, whereby the value chain partners use different models for dissemination, input and output supply systems. The Gender and the Legume Alliance project will examine the performance of these models by looking at:

1. The number of farmers practicing SAI;
2. The results (i.e., increased yields or income, improved soil fertility) achieved by smallholder farmers due to SAI practices;
3. The input market, output market and SAI information system's continued capacity to provide appropriate inputs and information on a commercial or sustainable public basis;
4. The extent to which disadvantaged or excluded groups (e.g. smallholder farmers, women, youth, low-income households) practice SAI and acquire related inputs and information services.

The project aims to address the research question: "What strategies are most effective for improving access to and capacity to use market, agronomy and other information and knowledge by poorer smallholders, especially women and youth, to achieve sustainable intensification?" The research project answers this question firstly by testing the hypotheses that different communication channels are more suited to different target groups (men, women and youth). And secondly, that input supply chains are a key

entry point where input and information supply can be linked.

The research activities will be implemented in Tanzania and Ghana. Tanzania relies on the agricultural sector and legume cultivation is widespread, with over half of households growing at least one legume crop. Similarly, in Ghana legumes are important as both food staples and commercial crops.

In order to enhance legume value chains efficiency, it is important to understand:

- How information flows through the legume value chain between chain actors;
- How information flows within smallholder farming households;
- Where information is concentrated or deficient;
- How information flows could be changed to facilitate input supply from private sector parties and farmers in adopting new legume practices;
- What communication channels are more suited for different target groups.

The project will carry out action research, while implementing pilots of integrated communication campaign linked to an input brokerage system. Quantitative data will be collected through household surveys. These surveys will be complemented with Computer Aided Telephone Interviews (CATIs). CATIs are a well-tested methodology using native speakers as enumerators and questionnaires to render responses on subjects like input needs, awareness, practices, challenges and adoption. Furthermore, focus group discussions will be conducted at the community level and family interviews will capture the complexity of local gendered dynamics. iLogix, Kenya will manage the CATI-approach, whereas CABI leads on the evaluation design.

The research outputs are used to enhance the information flows along the value chain and help generating recommendations for decision-makers to foster a sustainable input supply. We will get back with follow up on how the outcomes are used and fitted in with N2Africa.

Edward Baars and Minke Stadler

Smart partnership between soyabean seed and inoculant producers in Zimbabwe

Seed Co Limited, a public listed seed company incorporated in Zimbabwe, is the leading producer and marketer of certified crop seeds in southern Africa. Seed Co develops and releases soyabean varieties for Zimbabwe, Zambia, Malawi and South Africa. The seed house has produced a number of specific and high yielding soyabean varieties that are transforming soyabean production for smallholder farmers. This has been a direct result of production of seed products in ecological conditions nearest and similar to end-users' environments. While improved soyabean seed availability in southern Africa has greatly improved due to the efforts of private sector investments, such as Seed Co, access to quality inoculants has lagged behind, especially for Malawi and Mozambique. Both countries have had to wholly rely on imports from other regions of the world. Yet, there seems to be inoculant production capacity in Zimbabwe that is underutilized. Without quality inoculants, soyabean productivity is only a small fraction of the potential that can be realized.

The Soil Productivity and Research Laboratory (SPRL) under the Department of Research and Specialist Services in Zimbabwe is renowned in sub-Saharan Africa for its long-term research efforts in rhizobiology and inoculant production (see [Podcaster 36](#)). The inoculant factory has

produced quality inoculants that fuelled soyabean production in the commercial sector since the 1960s in Zimbabwe - the N-fixer (see picture). To ensure the high standards are maintained, N2Africa has made investments at the factory through purchasing new equipment, and training for the laboratory technicians as well as graduate students. A major challenge is related to the distribution of the inoculants to the end-users. Often, the marketing of inoculants is centralized at a few provincial or district outlets, making these products highly costly to access, even though the products themselves are relatively cheap. To ensure increased accessibility and sales of its products, the SPRL has partnered with Seed Co and other agro-dealers that sell soyabean seed to systematically sell seed and inoculants under 'one roof'. This strategy effectively removes any other costs that could be associated with accessing inoculants, as farmers incur only the fixed costs (transport, time etc.) that are related to purchase of seed. Thus, the cost of inoculants remain truly at \$5 per ha! This innovation has resulted in many more smallholder farmers being able to invest in soyabean inoculants and producing soyabean successfully.

However, regional integration in marketing of inoculants has remained poor, partly due to current stringent regulations governing the trade in biological products. Apart from a few packets of inoculants that we have exchanged under N2Africa for Malawi, Mozambique and Zimbabwe for research purposes, there has been no substantial commercial volume traded among the countries. The SPRL is currently producing 80,000 units of inoculants, but has capacity to more than double this number to be a major source of inoculants for neighboring Mozambique, that is currently importing inoculants from Brazil, more than 8,000 km away. While current trading in inoculants with international partners could have been informed by past poor capacity with regional production and product quality, N2Africa is investigating whether this is still warranted. Besides the capacity in Zimbabwe, South Africa could be a major source of inoculants in the region.

Regis Chikowo



Issues of poor quality seed on the market heat up in Uganda

In the first phase of N2Africa, activities were aimed at facilitating learning within the project through feedback loops. Experiences from dissemination activities were to be monitored and assessed and findings fed back into research as well as planning for next season dissemination activities. Findings from research were also fed back into dissemination efforts of N2Africa. For the second phase of the project, enabling continuous learning both within N2Africa, between related projects and with stakeholders outside the project has been outlined as characteristic (amongst others). Furthermore, sustainability of input supply and

market systems have been defined as an important learning area (see [N2Africa Monitoring & Evaluation and Data Management Master Plan](#)).

The Integrated Seed Sector Development project (ISSD) in Uganda is one, out of many, related projects from which we can learn. ISSD aims to strengthen different seed systems in a country and to support the development of a vibrant, market-oriented seed sector. This article describes issues of poor quality seed in the Ugandan market.

What is the Ugandan private sector doing?

One way in which agricultural productivity can be increased, without significantly increasing land under production, is by planting quality seed. A baseline study done in 2013 by ISSD Uganda indicates that only 11% of the farmers obtain seed from formal sources. The remaining 89% of the farmers obtain seed from informal sources, including own saved seed, local market and neighbours. As seed is a key input to production, supporting the informal seed sector is one way through which development actors can increase agricultural productivity in Uganda (see link [Supporting local seed businesses: a training manual for ISSD Uganda](#)). The Integrated Seed Sector Development project in Uganda has been working since 2013 to bridge the 89% gap in quality seed use by farmers in the rural areas by supporting informal seed production. Since its inception, the project has been working with 30 farmer groups in the south western, northern and West Nile zones of Uganda. The farmer groups have been groomed to become well established entities referred to as 'Local Seed Businesses' (LSBs); their product for the seed market being Quality Declared Seed (QDS). The ISSD project is implemented through the Zonal Agricultural Research and Development Institutes (ZARDIs) of NARO in the three zones mentioned.

What is Quality Declared Seed and how is it going to make a difference to a rural farmer?

QDS is a class of seed produced by local seed businesses (LSBs) that have been coached by ISSD to do technical seed production, to be market oriented, professionally organized and linked to the relevant service providers. The seed grown by these farmer groups is under the QDS-class and it is not marketed by seed companies. Therefore, seed of crops such as maize, rice and sunflower are excluded for LSB marketing. The LSB farmers produce and market seed of cereals (such as barley, wheat, millet and sorghum), legumes, oil crops, root and tubers, amongst others (Table 1). Seed production of these QDS crops is considered unprofitable by seed companies, but the crops remain essential in rural communities mainly for food security reasons. As a requirement, QDS produced within a specific region can only be sold by the LSB within the boundaries of that region. In spite of this seed class being produced by farmers, its quality is assured throughout production by quality checks. These checks include external field inspections, seed testing and tamperproof labeling. As compared to quality assurance for certified seed, the quality checks of QDS have been tailor made to suite a local seed grower while still maintaining the minimum standards of the seed.

Looking at the impact the QDS system as a seed source for rural farmers, the project has noted the following over the three years:

1. An increase in quality seed availability for crops whose seed is not sold by seed companies. Table 1 highlights the quantity of seed marketed by farmers in 2015 in the

three zones (West Nile – Abi ZARDI, Northern- Ngetta ZARDI and South Western – Mbarara ZARDI).

Table 1. Quantity of seed sales by Local seed businesses in 2015 (kg)

Crop	Total amount of seed sales in season 2015A (kg)	Total amount of seed sales in season 2015B (kg)	Total amount of seed sales (kg)
Cereals			
Millet	938	0	938
Rice	17,250	0	17,250
Sorghum	0	0	0
Legumes			
Bean	148,135	75,561	223,696
Cowpea	0	0	0
Pigeon pea	0	1,458	1,458
Green gram	0	630	630
Oil crops			
Groundnut	1,013	2,266	3,279
Soyabean	2,340	4,879	7,219
Sesame	32,154	2,849	35,003
Root and tuber			
Irish potato	13,900	10,900	24,800
Cassava	454,780	14,000	168,780
Other			
Pasture	500	500	1,000
Total	671,010	113,043	784,053

2. An increase in number of rural farmers accessing QDS reaching 24,678 farmers in 2015 (ISSD Annual report, 2015). This is attributed to the growing confidence that farmers have in using purchased seed produced by seed growers, who are accountable to them in case of any quality issues.

The QDS system as a business opportunity to farmers

It has already been highlighted that the QDS system covers crops that are economically not interesting to seed companies. This raises the question why farmers groups would take up such a venture.

The LSB farmers engaged in QDS production are actually doing this for the same reasons as why seed companies produce seed for crops such as maize. It is about 'financial gain'. The farmer groups are able to produce seed of QDS crops, because they have a comparative advantage over seed companies. With support from the ISSD project, the LSBs have been coached to study their local markets and make decisions on crop varieties and quantities desired by local grain producers. Since taking on the QDS business, these groups have seen themselves earning incomes that have made significant contributions to their households.

We consider a very simple approach to see how LSB farmers make more money from seed production vis-a-vis

grain production by focusing on price differences. Table 2 shows the average prices of seed and grain for soyabean, bean and groundnut grown in northern Uganda.

Table 2. Average prices and price difference in seed and grain for QDS crops in Northern Uganda

Crop	Average seed price	Average grain price	Average price difference
Soyabean	2,800/kg	1,300/kg	1,500/kg
Bean	3,250/kg	2,150/kg	1,100/kg
Groundnut	200,000/bag	70,000/bag	130,000/bag

Table 2 shows that a soyabean seed farmer, for example, has an opportunity to make more than twice as much profit as a soyabean grain farmer. This extra income has improved their livelihoods.

Local seed businesses as an alternative route for seed access: Challenges faced in Uganda

In northern Uganda, N2Africa dissemination efforts through demonstrations, adaptations, media events and field days, amongst others, have created demand for grain legume technologies, especially improved soyabean varieties. However, there is a challenge to access the improved varieties from the formal seed systems, because they hardly deal in grain legume seed. N2Africa has a key objective of enhancing input access and supply to smallholders and embarked building capacity of communities to produce and market quality declared seed (QDS) through the Local Seed Business model (LSB). The LSB model provides management practices on seed health and crop diversification, an introduction of improved and tolerant varieties and opportunities for market integration and is championed by Integrated Seed Sector Development (ISSD) (see previous article).

Local seed businesses (LSBs) have been sought, as they fill the gap in quality seed production for especially grain legumes, in which the commercial seed companies show less interest. In many cases, LSBs start from the informal sector as farmer groups or entrepreneurial farmers, who see business opportunities in the production and marketing

What happens with the QDS system when the ISSD project withdraws from the communities?

With the growing success in LSB activities over the year, there was need for ISSD to create a system that will sustain QDS production even after the project is withdrawn from the zones. One of the strategies employed was the engagement of partner organizations that have working objectives related to supporting farmers in processes that lead to sustainable seed availability. ISSD therefore partnered with 14 organizations to out scale the LSB approach in their areas of operation. This was for the purpose of increasing the geographic outreach, engaging in more crops and varieties, as well as involving different types of farmer groups.

Astrid Mastenbroek and Kawuma Christine Menya, ISSD Uganda

of quality seed and who are technically equipped, professionally organized, market oriented and strategically linked to achieve commercial sustainability. In our partnerships with World Vision Uganda and ISSD, we sought to improve seed access with some local seed businesses in northern Uganda now functional producing quality declared seed. In this region, the soyabean seed production meets the created demand through various farmer groups and cooperatives producing soya grain for sale.

Earlier this season (2016A), demand estimates of up to 40 tonnes for improved soyabean varieties (Maksoy 2N and 3N) were received from Apac, Kole and Oyam. Furthermore, N2Africa took the initiative to link the cooperatives with one local seed business in Pader, who provided seed with a quality certificate issued by the Ministry of Agriculture, Animal industries and Fisheries. On this basis, N2Africa placed an order of 2 tonnes of Maksoy 3N seed, on behalf of Aboke Grain Producer Cooperative (Kole district), Oyam Agro Cooperatives (Oyam district) and Bedi Gen Women group (Apac district).



Figure 1 and 2: Discussing the poor seed germination rate at the field of Mrs Dorcus and germination verification tests at the Makerere University, Uganda.

There was a positive response from farmers whereby, in two weeks time, Bedigen Womens' group had sold 425 kg out of 500 kg supplied, Oyam Agro Cooperative had sold 350 kg out of 500 kg supplied, while Aboke Grain producers had sold 300 kg out of 1,000 kg supplied. However, during the season, the cooperatives and group started receiving complaints of no / poor seed germination. This was already a loss of over 5 million Uganda shilling. The poor seed germination caused a backlash for the cooperatives and group, as well as N2Africa and it prompted N2Africa to conduct field verification visits and meetings with the different farming communities that had accessed the seed.

From the visits, it was evident that there was poor or no germination in all the fields that were visited (Figure 1) and efforts to calm the communities were made through meetings. N2Africa took samples to analyse the germination

rate. The results showed that a germination rate of only 10% was obtained, which strongly contrasts with the certification results of 82% (Figure 2). This has been a drawback and this season efforts of ensuring that farmers buy good quality seed has been hampered. We may only suspect that LSB supplied expired soyabean seed (older than 6 months). Clearly, it demonstrates the need for quality assurance and honesty in business.

Our next steps are to discuss issues related to quality assurance and a trustworthy seed supply with LSBs and ISSD. Furthermore, we will devise strategies to have all the quality steps followed by the local seed businesses, to compensate the farmers, to strengthen business relations and to obtain guarantee commitments.

Connetie Ayesiga

Reviving groundnut production with fertilizers and Aflasafe™ in Tanzania

Kongwa district has suitable climatic conditions for growing groundnut and is among the top producers in Tanzania. However, production is being threatened by many factors including declining soil fertility, the changing climate, lack of improved varieties and contamination with aflatoxin - a highly poisonous chemical produced by naturally occurring fungus, *Aspergillus flavus*, found in the soil. Current groundnut yield is estimated at 0.6 t ha⁻¹ against the potential of 2.2 t ha⁻¹.

N2Africa and Aflasafe teams are working in twelve villages of Kongwa District to combine the agronomic technologies with Aflasafe™ biological control to promote better groundnut production. In each of the village, the teams have set up trial(s) to demonstrate the use of improved varieties (Pendo and Mmnanje), organic and inorganic fertilizers such as Minjingu fertilizer, Gypsum and their combinations with Aflasafe™. Aflasafe™ is a complete safe biological aflatoxin control technology, that contains a mixture of four atoxigenic strains of *Aspergillus flavus* of Tanzanian origin. The product was developed by IITA in collaboration with the Agriculture Research Service of the U.S. Department of Agriculture (ARS-USDA), amongst others, and it can effectively reduce aflatoxin concentration by more than 70%.

Recently, N2Africa and Aflatoxin teams organized a farmer's field day in the district, to create further awareness on these technologies among the local communities to promote their adoption that attracted over 500 farmers. Peaking at the event, Anfigwege Mwaipopo, the Acting Kongwa District Executive Officer and guest of honor, said farmers adoption of the technologies would catalyze groundnut production in the area and add its market value. Furthermore, Mwaipopo noted that aflatoxin was of particular concern, as it negatively affected the health of the community and reduced the crop's market value. Leon Mrosso, the Central Zone Research Director from ARI-Makutupora, urged farmers to adopt the new technolo-

gies demonstrated to increase their groundnut productivity and enhance their income. He also urged farmers to create awareness among other farmers on the technologies they had seen, especially on the application of Aflasafe™. "Aflasafe™ can help protect farmers and their families from aflatoxin. All farmers should be made aware of aflatoxin and how to reduce it in their produce, including use of Aflasafe™," Mrosso said. Mwantumu Omari, the Tanzanian Business Development Officer for N2Africa, said the project was working closely with farmers to identify challenges in legume production and finding sustainable solutions through research. N2Africa's overall aim is to enable African smallholder farmers to benefit from symbiotic N₂-fixation by grain legumes through effective production technologies, including inoculants and fertilizers.

Reuben Samwel, Research Technician with IITA, explained Aflasafe™ to the farming community. He said the technology was safe and environmental friendly and able to significantly reduce aflatoxin contamination in groundnut and maize at harvest and in storage. He encouraged farmers to use Aflasafe™ - once the technology was registered and made available in the country - , alongside other technologies, such as use of fertilizers, to get a safe product.



Mr. Anfigwegwe Mwaipopo, a guest of honor, Kongwa District Officer

How aflasafe works



Figure derived from the related link: <http://www.aflasafe.com/aflasafe>

The chairman of the village, Mr. Jeremiah Mtua, appreciated the N2Africa efforts and the government in supporting farmers in groundnut production and creating awareness on new improved farming methods. However, he noted one challenge farmers are facing was accessibility of the new improved variety demonstrated.

In Tanzania, the technology is currently being developed in partnership with the biological control unit at the Ministry of Agriculture, Livestock and Fisheries. The experimental Aflasafe™ are being tested in selected areas in Dodoma region and Kongwa district on maize, in Mpwapwa and Kongwa on groundnut, in Morogoro region (Kilombero and Kilo) on maize, and in Mtwara (Masasi and Nanyondo) on groundnut.

Catherine Njuguna, IITA, Tanzania

Reports and other output uploaded on the N2Africa website

The [N2Africa Baseline report](#) was published for Ethiopia, Tanzania and Uganda, establishing the initial status of livelihoods through assessment of household characteristics, agricultural production, nutrition and market access. The report provides a benchmark against which the project will be able to assess the progress and achievements towards the end of the project.

The [N2Africa M&E and Data Management Master Plan](#) is finished and made available. With this Master Plan, a strategic framework allowing for timely feedback loops, desired level of consistency in design (of research and dissemination) and data collection to allow for meta-analyses across all N2Africa countries is emphasised. It also allows for learning across all focal areas of the project, i.e. agronomy, rhizobiology, dissemination, platforms, gender and communications. As it is a living document updates are to be expected based on progress made.

Related publications

[New reports](#) have been uploaded for the ESRC-DFID project that we introduced in Podcaster 36. More are to be expected in the near future.

Moritz Reckling, N2Africa MSc student at Wageningen University in 2011-2013, now working at the Leibniz centre for Agriculture Research in Germany described a win-win situation for environment and economy when growing Legumes in the [Daily Nations' Seeds of Gold](#).

[Beyond averages: New approaches to understand heterogeneity and risk of technology success or failure in smallholder farming](#), a publication by B. Vanlauwe, R. Coe and K.E. Giller was published in Cambridge University Press 2016. This paper describes the challenges facing research, highlighting the importance of variation in evaluating the performance of soil management recommendations, integrating aspects of production risk management within the formulation of recommendations, and proposing alternative approaches to implement agronomic R4D.

Related news

KIT (Royal Tropical Institute) and SNV published an interesting working paper "[Market-based solutions for input supply: 12 making inputs accessible for smallholder farmers in Africa](#)".

Announcement

There is an update on the Second International Legume Society Conference, scheduled to be held at Tróia, Portugal, from 12th to 14th October 2016. Websites: <http://ils.nsseme.com/#meet> and <http://www.itqb.unl.pt/meetings-and-courses/legumes-for-a-sustainable-world/welcome#content>.

The Podcaster is published six to eight times per year – we look forward to receiving news and contributions – particularly from partners. Please send in contributions well in time. Contact address for this newsletter is: N2Africa.office@wur.nl

Please feel free to forward this email to colleagues you believe would be interested. This email has been sent to you by N2Africa, funded by The Bill & Melinda Gates Foundation.

When you change your e-mail address and want to keep receiving the Podcaster, please send your new address to N2Africa.office@wur.nl. If friends/colleagues like to receive future Podcasters let N2Africa.office@wur.nl know as well.