

N2Africa Podcaster no. 50

January and February 2018

Introduction

A Golden Anniversary for the N2Africa Podcaster – the 50th Edition! To celebrate we decided to ask for N2Africa staff to select one past article that for them exemplified the N2Africa approach or highlighted a particular key learning. As you read through I think you will agree it is a rich harvest that demonstrates the scientific excitement and the amazingly broad reach of N2Africa across the 11 countries. Currently we are busy finalising the annual report for 2017 which will be the topic of our next Podcaster, but for now we hope you enjoy reflecting on what we have achieved over the past eight years!

Ken Giller

Time for innovation and change

Ken chose this article from a trip he made to Zimbabwe during the first phase of N2Africa which still triggers and intrigues him. In villages in Murewa, farmers were growing all four N2Africa target legumes - beans, cowpea, groundnut and soyabean for different markets in different niches... "I think this is a powerful line for investigation that we still have to explore that demonstrates the need for different seed systems and value chain approaches in the same village - thus bring us back again to a farming systems approach that I consider the foundation of N2Africa's work". This article first appeared in Podcaster 12, January, February 2012.

I had the privilege of spending some time visiting delivery and dissemination (D&D) as well as research trials on agronomy and rhizbiology in Zimbabwe in February. The season started with difficulty in southern Africa, with a 'false start' to the season and then a three week dry period that led to failed early plantings of many crops and late planting periods for others. Nevertheless, there was a lot to see in the fields, and legumes suffer less from the late start to the season as they are mainly planted after the maize crop is established.

It was a real pleasure seeing the enthusiasm of N2Africa staff – I was in the field with N2Africa staff – Talkmore Mombayarara (Agronomist), Isaac Chabata (Farm Liaison Officer), Judith de Wolf (M&E Specialist & Country Coordinator) – as well as with some of our important partners such as the Community Technology Development Trust (Patrick Kasasa), Agritex, and Prof Barbara Maasdorp from Crop Science, University of Zimbabwe who is leading the forages work for N2Africa in Zimbabwe. Some of you may

remember that Barbara won the prize last year for naming the Podcaster! In many ways it was a trip down memory lane for me as I taught many of the NGO and N2Africa staff about legumes and nitrogen fixation together with Barbara when I was Prof of Soil Science in Zimbabwe. I also had a chance to visit Mazvita Murwira and other staff at SPRL who are in charge of rhizobiology research and oversee the inoculant production factory.

We saw some excellent trials and farmer-led demonstrations (see photos), and discussed what was going well, and what the problems were with farmers. The over-riding concern of farmers was access to inputs – such as certified seed, fertilizers, inoculants and credit facilities – as well as lack of ready markets for their produce. During the rich discussions in the field it became apparent that we need to be more reflexive in our thinking and more flexible regarding approaches in N2Africa.

N2Africa started up with a fairly 'top-down' approach of training and demonstrations with lead farmers and then expansion to satellite farmers. The aim was also to drive a 'value chain' approach for the different crops, linking farmers to markets. This model can work well in some places with some crops, and is delivering successes in many countries, in particular with soyabean.

When we probed further about markets, not surprisingly we got different stories about the different crops, but stories that were consistent between the various farmer groups we visited. Indeed a value chain approach seems appropriate for soyabean with the main problem being one of consolidation of the grain harvest into loads for transport to markets – a market coordination issue.

For groundnut the challenges are similar in terms of consolidation of produce. But as opposed to soyabean which is only consumed in small quantities at household level,



Patrick Kasasa of the Community Technology Development Trust discussing a sugar beans demonstration on the field visit



In the foreground you can see the response in soyabean using the SPRL inoculants produced in a D&D trial in Zimbabwe - behind the farmers Catharine Masenda and Annie Musakare is the uninoculated plot (Nhayungwa village, Goto, Hwedza)

people know what to do with groundnuts. They consume them a lot and process them into peanut butter for sale at local level.

The situation was again different with sugar bean, as common bean or *Phaseolus vulgaris* is called in Zimbabwe. Some farmers were growing large fields of sugar bean targeted for a local market of missionary schools. Others complained of problems of keeping seed from one season to the next – not because of post-harvest pests – but because the beans are so popular they get eaten!! So there is generally little surplus, and that surplus can readily be sold through local markets. The other major issue for farmers growing beans is the poor performance in the coarse granite sands that are the predominant soils in most of the smallholder (communal) farming areas. Sugar beans only grow well in the ‘infields’ – the fields close to the homestead that receive regular dressings with cattle manure. But these fields are where the main ‘food-self-sufficiency’ crop of maize is grown. The farmers have the perfect solution – simply planting sugar beans as an intercrop without reducing the density of maize planting. The sugar beans generally grow well under maize and tend to produce more grain than when grown as sole crops.

An N2Africa Inclusive Partnership Case Example in Ethiopia

Endalkachew wolde-Meskel chose to repeat the Ethiopian part of the article on the PPP, from Podcaster 29 (January and February 2015), as the PPP was a useful approach that N2Africa followed to promote the dissemination of legume technology and value chain in Ethiopia. Mapping relevant stakeholders and functionalizing the PPP at the different corners of the country, we were able to reach more than 50,000 of smallholders, made possible smallholders access to inoculants - an essential element of the N2Africa legume production technology. The popularity of inoculants with smallholders in Ethiopia has increased 14-fold, just in the last 4 years. The PPPs approach was also useful vehicle to access grain market for the smallholders and I hope it will remain as a useful footprint of N2Africa project in the future.

Moving on from a “proof of concept” during the first phase of the N2Africa approach at scale, the second phase was designed to scale out the proven legume technologies using a “business led” approach.

What struck me particularly was the issue of markets for cowpea. Essentially, cowpea is grown by most farmers for their own consumption (both the grain and the leaves) and it is liked but not the most popular legume. In contrast with sugar beans, cowpea grows well on the coarse sandy outfields in Zimbabwe, if a little phosphorus can be applied. The varieties being offered by N2Africa are very popular with farmers and there is considerable demand for them locally. But apart from trade in seed of cowpea by some companies very little cowpea is sold on open markets, neither locally nor through the central grain markets in Harare. So cowpea is an important food-security legume for poor and wealthier farmers alike, and one where simply introducing the new varieties and ensuring their dissemination through local women’s groups can have an important impact at household level.

So where does this leave us? I think not with a problem but with an opportunity! We need simply to use differentiated models for the various legumes – a value chain approach for soyabean, a ‘mixed model’ for different varieties of groundnut, and different ‘local niche’ models for sugar bean and cowpea.

For me this is another example in a long line of experiences that demonstrate the importance of spending quality time discussing with farmers. Many seem to think that all of the good ideas come from farmers – and that may often be true – but in my mind it is the *interaction* between farmers, development agents and research that leads to innovation. Time to get your thinking hats on and to reflect on how best N2Africa can adapt to *your* local situations as I know many of you are doing already.

Thanks from me to all of those who gave up their valuable time to spend with me in the field.

And a plea to all you who read the N2Africa Podcaster – please share some of the rich experiences you have with us so that we can learn from each other to develop and test more diversified approaches to achieving our goals!

Ken Giller

Special credit on spear-heading comprehensive partnerships is given to Ethiopia. A good example is the multi-partners, comprehensive ‘Balegreen Spice and Grain Development Plc’ partnership.

Box 1. An N2Africa Inclusive Partnership Case Example in Ethiopia

Balegreen Spice and Grain Development Plc is a nucleus farm involved in both their own and community seed multiplication, in dissemination, bulking, mechanization services, fertilizer and inoculant supply to out-growers linked to and organized through various Farmers Producers Cooperative Unions covering 90,000 smallholder farmer households.

The partnership is further strengthened through an N2Africa solicited USAID funded Alliance for Green Revolution in Africa's (AGRA) Scaling Seeds and Technologies Partnership (SSTP) project grant of \$300,000 to the lead grantee Menagesha Biotech Industry Plc. (MBI), a private sector inoculant manufacturer. The project is entitled "Scaling Chickpea Technologies for Increased Production and Productivity of Smallholder Farmers in Major Chickpea Producing Areas of Ethiopia". It is designed to establish feasible input supply chains and grain market access involving a consortium of Public-Private partners and is part of the larger partnership with Balegreen Spice and Grain Development Plc.



Part of the partnership process; discussion between AGRA Country and Deputy Country Coordinators (left), MBI (center) and the N2Africa team (right)

With the grant support from SSTP to the lead grantee Menagesha Biotech Industry Plc. (MBI) and the overall project management by the Steering Committee composed of the key project partners involving N2Africa, MBI, AGRA Ethiopia, Balegreen and Tsehay Union under the chairmanship of -N2Africa, the project will be implemented for 26 months (from February 2015 to April 2017) in the major chickpea growing Woredas of Amhara, Oromiya and SNNPR regions.

The partnership is structured under four strategic objectives of supporting chickpea and other legumes input production and distribution, capacity building, partnership development and grain market access. Two seed multiplying partners, Balegreen and Tsehay Union will produce and supply 2,700 tons of certified chickpea

seed to the smallholder farmers and the inoculant plant, MBI, will produce and supply over 11 tons of inoculants and provide technical backstopping. By the end of project period the dissemination and commercialization efforts will ensure sustainability of the supply chains. The input distribution channels will use the existing Farmers' Cooperative Unions to initiate local input dealers.

Furthermore, technologies for chickpea and other legumes will be demonstrated to smallholder farmers who will be trained on improved production practices, farming as a business, and linked to high potential and competitive grain buyers mentioned below. This will be achieved through a collaboration among public research and extension organizations (i.e. the National Soil Testing Centre - NSTC and Holeta Agricultural Research Centre-COMPRO II, the Agricultural Transformation Agency- ATA, the National Agricultural Research System entities and the Office of Agriculture for dissemination) and the development partners SNV and Agriterra through their Cooperatives for Change (C4C) project.

On the market side, the partner Agricultural Commodity Supplies (ACOS) Ethiopia has a potential annual uptake of over 33,000 Mt of legumes (mostly haricot bean and chickpea). ACOS has built a successful contract farming model with crop insurance scheme facilitated by C4C to its farmers. The company has three approved chickpea varieties registered in its name for which it has developed a niche market.

As part of the larger partnership, the processor Guts Agro Industry makes different products such as super cereal or CSB Plus-for children, pregnant and lactating women- LIBDEL Baby Cereal (LBC)-for children from the age of six months to two years, Lembo Snacks or corn chips and Plump Nuts used for treatment of acute malnutrition. Guts Agro Industry recently launched a high standard chickpea based Shiro "YANET Shiro", a popular ingredient for sauce. Guts Agro Industry uses maize, soybean, chickpea and haricot bean as raw materials.

The 'modest' but crucial role of N2Africa is defined as technical backstopping, soliciting the AGRA grant, coordination of the consortium, facilitation of market linkages, M&E and to provide evidence of the effect of using improved seeds, inoculants and legume (blended) fertilizers.

The main project outcomes are increased production, distribution and use of quality Kabuli chickpea and other legumes' seeds along with inoculants, NPS fertilizer and improved agronomic practices, better coordination, enhanced technical capacity and awareness of farm communities and hence better use and adoption of technologies to enhance production of chickpea and other legumes.

Tamiru Amanu, N2Africa Business Development Officer in Ethiopia

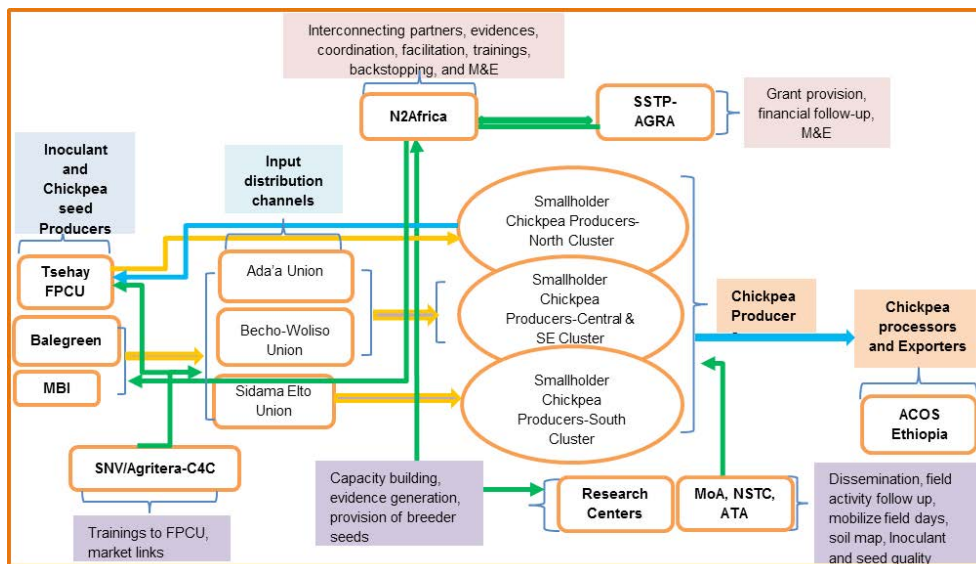


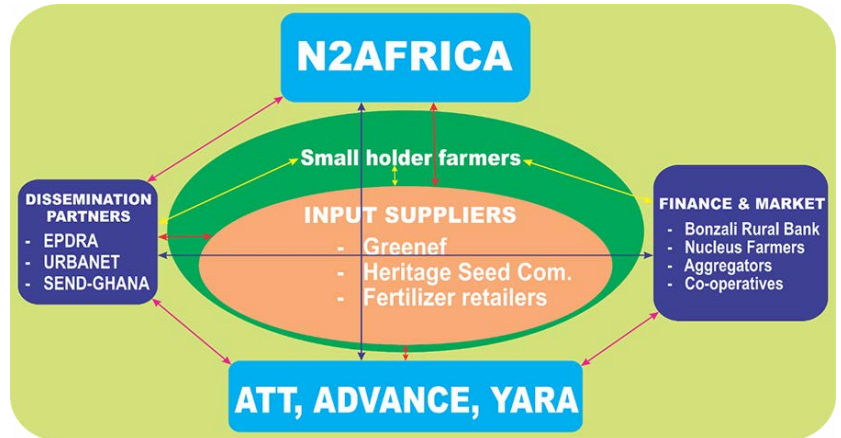
Figure: Flow chart of inputs, services and grain product between different chickpea value chain actors

Private-Public Partnership improves farmers' access to legume fertilizers in northern Ghana

Samuel Adjei, Nsiah, Country Coordinator of Ghana, selected this article because our partnership has resulted in the development of a special fertilizer blend for grain legume crops in Ghana. Besides, this fertilizer blend has been adopted by the Ministry of Food and Agriculture in Ghana for use in the production of soyabean in Ghana within the framework of the government flagship program "Planting for Food and Job". This is also a landmark achievement because for the first time in Ghana, legume fertilizer has been included in the government's fertilizer subsidy program in Ghana. This article first appeared in Podcaster 44, February and March 2017.

Grain legume production in northern Ghana is characterized with low yields due to declining soil fertility, inadequate use of farm inputs and lack of good quality inputs including certified seeds, phosphorus fertilizers and rhizobium inoculants.

The international Institute of Tropical Agriculture (IITA-N2Africa) has designed and facilitated a multi-stakeholder partnerships with 14 of its partners with the aim of enhancing technology dissemination and scaling up, building capacity of smallholder farmers and other actors and promoting sustainable input supply and output market.



Diagrammatic representation of input distribution and marketing of soyabean model



On the two photos: Soyabean technology dissemination activities in Yendi, Ghana



						AGRO-INPUT DEALERS	DISSEMINATION PARTNERS
Designed and facilitates the partnerships, provide technical backstopping and build capacities of partners	Provide grants to partners (Greenef and Heritage seed company) in a form of equipment and seed money for soil testing and seed production	Produces and distribute legume fertilizers to agro-input dealers for sale to farmers	Produces and distribute certified seeds to agro-input dealers for sale to farmers, supply foundation seeds and other inputs (fertilizers and inoculants) to legume seed out-growers for the production of certified seeds	Import and distribute inoculants and legume fertilizers to farmers	ADVANCE II Project-Link Nucleus farmers to input and out-put markets, Link nucleus farmers to credit institutions and build capacities of farmers	supply agro-inputs (seeds, legume fertilizers) to farmers	Disseminate technologies to farmers, build capacities of farmers and link farmers to input/output markets and credit institutions

Responsibility chart of the actors in the N2Africa Soyabean-PPPs model in Ghana



Outcomes and lessons learnt:

- Multi-stakeholder workshop on sustainable input supply and output markets enhanced and facilitated the design, coordination and implementation of the PPPs;
- Joint on-farm trials with inputs suppliers created awareness of need, demand and market for legume fertilizers (e.g. involvement of YARA in fertilizer trials);
- Farmers access to legume fertilizers enhanced, and market for legume fertilizers in northern Ghana created. According to the manager of YARA fertilizer depot in northern Ghana, sales of legume fertilizer increased from about 15 tons in 2015 to more than 200 tons in 2016;
- General collaboration and Business relationships among the partners strengthened (e.g. Greenef and Heritage seed).

Conclusion and way forward:

- Packaging of fertilizers in smaller quantities (e.g. 25 kg instead of 50 kg) to meet the needs of farmers who cannot afford the price of the 50 kg bags;
- Improve on the system of quantification and accuracy of input demand information to enable suppliers meet the demand of farmers;
- Strengthen the capacity of inputs suppliers to meet different demands of their clients.

Samuel Adjei-Nsiah, Country Coordinator Ghana

Testimony of success on collaboration between YARA and N2Africa through the PPP in northern Ghana

Our collaboration with N2Africa started when N2Africa through the ADVANCE Project sought to compare the yield of inoculated soyabean with uninoculated soyabean and also with inoculated soyabean and phosphorus fertilizer. YARA therefore decided to develop a nutrition solution for legumes. We however realized that this will not be successful without important actors with similar interest like N2Africa. This is how we started collaborating with IITA.

First, IITA made a request to YARA to make available TSP at its depot in Tamale for trial purposes. However, we decided to include other P fertilizers in the trial. IITA then requested to make TSP available in the retail shops in some farming communities for sale to farmers for their legume crops. It was not easy for us to accept this request because first TSP is an important raw material for the production of other fertilizers and we also felt that it is an expensive fertilizer and not within the reach of average farmer and finally YARA believes TSP is not balanced enough nutritionally for the legume. However with persistence from IITA through the coordinator, YARA obliged and made available the TSP fertilizers through its distribution channels in some selected locations accessible to farmers. The distribution channels included the following:

<u>Agro-input supplier</u>	<u>Location</u>
Greenef	Tamale and its surroundings
Gumaya enterprises	Central Gonja
Antika	Upper West
AA Zaab	Tamale and its surroundings
Simple Prince	Upper East Region
Moruuk Combine	Yendi and its surrounding

Through this arrangement we were able to sell more than 200 tons of TSP in 2016 compared with less than 15 tons sold in 2015.

Milestones achieved include:

- Farmers are beginning to appreciate legume crop nutrition
- Through the trial it is beginning to emerge that high P alone could not be the solution for legume nutrition. It goes with other nutrients in balanced proportion.

Mr. Mahama Abdul-Rahaman, YARA Marketing Manager

Indigenous status of rhizobia in Nigeria: Does this aid its symbiotic performance with cowpea?

For Nigeria Nkeki Kamai chose this article from Podcaster 39, September 2016 as from recent developments in Ojo's work the answer to that question is YES. If a functional inoculant for cowpea can be developed from work of a N2Africa student then this is one of the greatest news for Nigeria. Remember Nigeria is the largest producer, the largest consumer and the largest net importer of cowpea in Africa.

The success of cowpea response to inoculation with effective rhizobia strain in presence of indigenous rhizobia depends on three factors; population density, effectiveness and competitive ability of native African rhizobia. The major aim of my research is to explore the potential benefits of rhizobia inoculation with cowpea in Northern Nigeria (Picture 1).

This study investigated the response of cowpea cultivar to inoculation with different rhizobia strains. Cowpea cultivar IT97K-499-35 was inoculated with ten different rhizobia strains and two controls (twelve treatments in total), in soil (autoclaved) collected from field without history of cowpea cultivation and inoculant usage. The history of the soil is indicated in Table 1, showing that the soil contained the appropriate level of rhizobia necessary to nodulate cowpea



Picture 1. (A) Growing rhizobia strains, (B) Ojo Comfort in the greenhouse with growing cowpea, (C) Growth response of cowpea to three different treatments

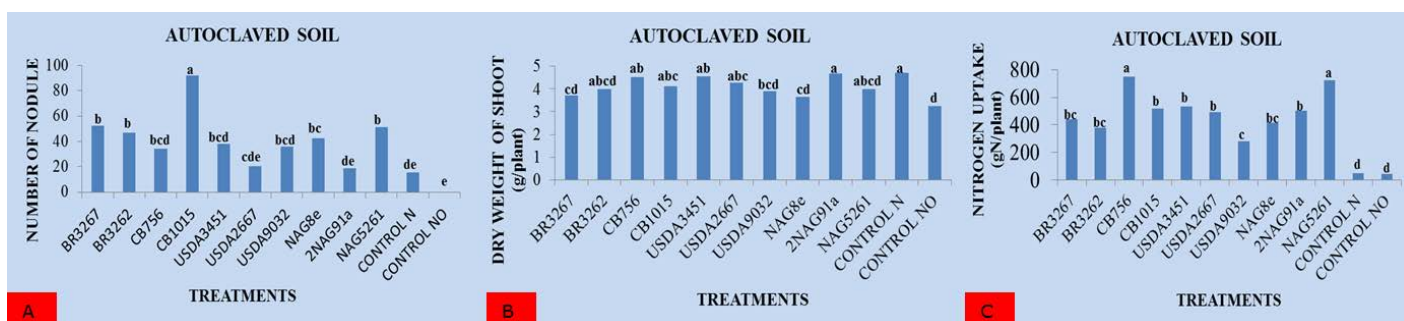
(100 rhizobia cells gram^{-1} of soil). As shown in Picture 1A, rhizobia strain CB 1015 nodulated cowpea the most while there was no significant difference in the dry weight of shoot (Picture 1B) of rhizobia strain 2NAG91a and treatment control N (without inoculation but with KNO_3). In Figure 1C, rhizobia strains CB756 and NAG5261 fixed the most nitrogen compared to the other treatments applied in this experiment. As indicated by the result of shoot dry weight, cowpea showed positive response to inoculation with strain

Table 1. Soil physico-chemical properties and number of rhizobia per gram of soil

Parameters	Soil
pH (H_2O)	5.900
Sand (%)	65.200
Silt (%)	13.200
Clay (%)	21.600
Total N (%)	0.242
Organic carbon (%)	1.898
Available phosphorus (ppm)	1.069
Na ($\text{cmol}(+) \text{kg}^{-1}$)	0.046
K ($\text{cmol}(+) \text{kg}^{-1}$)	0.296
Ca ($\text{cmol}(+) \text{kg}^{-1}$)	5.296
Mg ($\text{cmol}(+) \text{kg}^{-1}$)	1.401
CEC ($\text{cmol}(+) \text{kg}^{-1}$)	7.040
Exchangeable acidity ($\text{cmol}(+) \text{kg}^{-1}$)	0.000
Zn (ppm)	9.926
Cu (ppm)	4.000
Mn (ppm)	124.84
Fe (ppm)	82.745
MPN (Number of rhizobia gram^{-1} of soil)	1.7×10^2

2NAG91a compared to the treatment with KNO_3 (control N) and without nitrogen source (control NO). These strains (CB756, NAG5261 and 2NAG91a) are all indigenous to African soil. The performance of the Brazilian strain (BR 3262 and BR 3267), known to be highly effective with cowpea, performed less compared to these indigenous African strains. Consequently, there is a need to identify elite strains of cowpea that are indigenous to African soils and develop them as inoculant for cowpea.

Ojo Comfort, Wageningen University, The Netherlands (Click [here](#) for her 2015 update)



Means followed by equal letters for each measured parameter were not significantly different based on Fisher t-test ($P < 0.05$). 0 = no detection, Control N = without inoculation, but with KNO_3 , 0.05%, Control NO = without inoculation and KNO_3 , 0.05%

Figure 2: Effect of inoculation of rhizobia strains on cowpea cultivar IT97K-499-35 at eight weeks after inoculation: (A) Number of nodules, (B) Dry weight of shoot (g plant^{-1}), (C) Nitrogen uptake (g N plant^{-1})

My journey into agripreneurship, Borno State, Nigeria

Nkeki Kamai is proud of this article as it gladdens his heart that youths especially a female one for that matter was taken off the streets of Borno State by N2Africa Project and not just becoming self-employed but engaging other youths. This is so important because of the fact that recently most of the suicide bombers in Borno state are females. (First appeared in Podcaster 46, June 2017)

My name is Mercy Haruna Wakawa. I am from Borno state Nigeria and I studied Food Science and Technology at the University of Maiduguri. Like every other Nigerian youth I was full of dreams and enthusiasm for a robust working career and livelihood after graduating from University. I

searched endlessly for corporate jobs that are no longer available for my generation. My dreams suddenly collapsed as I came face-to-face with the reality of vanishing job opportunities and an increasing rate of youth unemployment in my country.

The story of my journey into agribusiness is intrinsically linked with the International Institute for Tropical Agriculture (IITA) and the N2Africa project. This is because after so many futile efforts to get a job, and almost at the point of giving up on everything, IITA gave me a rare opportunity to participate in an enterprise development training alongside other youths from Borno state in September 2014.

I was a bit reluctant and did not expect that anything meaningful would come from it. The training was organized by IITA Youth Agripreneurs (IYA), at the IITA Kano Station. It was three weeks of mind-changing intensive training covering topics in agribusiness, entrepreneurship, ICT in agribusiness, fish farming and science-driven agricultural practices.

Based on my background (but initially against my wish) I was counselled and mentored to venture into the post-harvest processing of groundnut. The business took off in January 2016. I was given a starter package by IITA/N2Africa project in the form of machinery and working capital which is worth 2.5 million naira (almost 8000 USD). Groundnut processing is a profitable business, as a good one ton of groundnut seed will produce an average of 450 litres of oil and 400 kg of groundnut cake which is a major raw material for animal feed mills. Confianza Global Resources is currently employing four youths from the host community. The business has also created livelihood opportunities for many women in sludge processing and marketing in neighbouring communities.

A major challenge of the business is the periodical stop in production due to the seasonal nature of groundnut. During the lean season there is scarcity of raw material and my inability to stock-pile at harvest because of low capital often affects my production.



My advice to young entrepreneurs out there is to always believe in their capacity to succeed and not to be discouraged if they are taking only small steps at this moment, because they do not know where it will take them. My most satisfying accomplishment in business is creating job opportunities for youths, providing market for groundnut farmers, and providing a solution to the customers yearning for genuine products of processed groundnut. Good and properly refined groundnut oil and cake is highly nutritious both for human and animal consumption.

The sky is my starting point and this is a step for the journey ahead. My life as an entrepreneur is an interesting one: when you have challenges you have to face them, and where you see opportunities you have to explore them. It is really challenging but eventually rewarding to be an entrepreneur. My life as an entrepreneur is about working round the clock.

In the next 10 years I want to be one of the key players in groundnut oil production. I would like to experiment with backward integration such that I can develop the capacity to produce my raw materials directly on my farm, and possibly also establish livestock production units that can utilise the groundnut cake from my mills as feedstuff. I will then be in a position to employ more youths, not only from the host community but youths all over Nigeria and Africa at large.

Mercy Haruna Wakawa, Managing Director at Confianza Global Resources

N2Africa partners develop a strategy to achieve sustainability in Tanzania

Freddy Bajjukya chose this article from Podcaster 42, December 2016 because N2Africa has been successful in creating partnerships for research and development in all countries where the project is implemented to ensure that farmers benefit from symbiotic N₂-fixation by grain legumes. However, ensuring strong incentives for partners was considered a challenge. In this article, we presented a case where the interests of all stakeholders were aligned and the relationships among partners fostered so that they grew to be mutually beneficial. We now see partnership among our partners being continually cultivated, growing stronger and productive, and there is a clear and mutual understanding of the contribution and roles of each partner appearing in this article. Challenges are inevitably there; but we see most partners trying to create a stimulating environment conducive to collaboration for innovative solutions.

“Sustainability” was the theme of the third N2Africa Tanzania review and planning meeting, that took place on October 19th-20th, 2016 in Dar es Salaam, Tanzania. The meeting brought together 34 participants drawn from

partner institutions. Representatives from Rural and Urban Development Initiative (RUDI-IBB project); BRAC-Tanzania; Clinton Development Initiative (CDI); Building Rural Incomes Through Enterprise (BRITEN); Faida-market



Link (FaidaMali); Africa Fertilizer Agribusiness Partnership (AFAP); Farm Radio International (FRI) also representing projects Scaling-up Improved Legume Technologies (SILT) and Gender and Legume Alliance (GALA); Agricultural Research Institutes Uyole, Makutupola, Selian and Ilonga; District Councils of Hai, Moshi, Lushoto and Kongwa; N2Africa-Tanzania team and N2Africa technical teams comprised of Senior Business Development Officer, M&E Specialists and three MSc students who are supported by the project attended the meeting.

In his opening remarks, Dr Freddy Baijukya, N2Africa Tanzania Coordinator, appreciated the commitment and effort made by partners in the process of diffusing the legume technologies to smallholder farmers. He said “through partnership, N2Africa has expanded the area of operation, reached many institutions working on legume development creating an opportunity to reach more farmers with legume technologies”. He told the participants that, while the project had successfully institutionalized its approaches, it remained a challenge to ensure sustained delivery of legume technologies.

In their remarks, representatives of BRAC, BRITEN, FaidaMali and CDI appreciated the partnership that N2Africa had built and emphasized on the need to ensure that farmers have access to knowledge, improved seeds, fertilizers and inoculants and markets for their produce. They emphasized the need to link agro-input dealers and last mile networks in supplying legume agro-inputs to farmers and agri-business clusters established. Furthermore, they iterated the importance of establishing actual input and output demand in order to create a climate, in which the private sector is attracted to invest in small-scale farmer supply chains.

Edward Baars, the Senior BDO, presented the strategy for input demand projection. He said the Tanzanian combination of partnerships is qualified to deliver activities related to making input supply chain more effective, predicting demand, stimulating supply and delivery and linking farmers to agro-dealer networks. He presented the case of the Legume Alliance (e.g. iLogix, AFAP, ASA, Farm Radio, Shujaaz, CABI, KIT, SARI, CRS and N2Africa) to show how different combinations of partnerships can deliver. He urged partners to upload farmer and retailer databases with mobile phone numbers to the ICT platform. This database allows to take a representative sample of farmers in the target areas to assess the demand for inputs by conducting computer aided telephone interviews (CATI). He also emphasized the importance of creating awareness and use of the improved database system for different partners.

Theresa Ampadu-Boakye, M&E Specialist, emphasized the importance of collaboration to achieve impact. She indicated that most partners were specialized in particular topics and needed to come out of their closets. She suggested that partners working in the same area should

capitalise on each other and collaborate more closely in the coming season. Partners clearly indicated in their work plan 2017 which new modes of collaboration between partners were developed and what was expected from each partner (Table 1).

Closing the meeting, Mrs Joyce Kessy, District Crop Officer for Hai, on behalf of the participants, thanked the organizers for a successful meeting and N2Africa for its continues efforts to increase legume productivity in smallholder

Table 1. Suggested mode of collaboration of partners in Tanzania, where partners with different capacities serve each other

Partner	Capacities	Whom to partner with
BRITEN	Commercially rural agro business, focus on input and output value chain and strengthen business skills	Build capacity of farmers working with ARI Ilonga, ARI Uyole, BRAC, CDI and CRS to produce Quality Declared Seed (QDS) on business skills Assist BRAC, CDI and CRS to predict input-output demand, as well as building marketing skills of farmer groups
BRAC	Micro-finance, capacity building and training farmers	Assist farmers working with research institutions (ARI Ilonga, ARI Makutupora) to produce QDS and farmer working with CDI to access finance for their business
RUDI	Farmer organisation, networking and partnership	Assist CDI, RUDI, BRITEN business skills, financial support from BRAC, AFAB (production of leaflets and content development of media events)
FaidaMali	Market linkages	Assist ARI Selian in QDS, BRAC (supporting the groups), Local government (support group identification), ASA (QDS for common bean)
ARI Uyole	Technology development, quality seed	Provide quality seed of soyabean and common bean and to BRAC, CRS, CDI and RUDI for production of QDS Provide recommendations from agronomic trials for scaling
ARI Makutupora	Research, quality seed	Assist ARI Ilonga, BRAC in implementation of the demonstration and adaptation trials on cowpea Provide recommendations from agronomic trials for scaling
ARI Ilonga	Research, quality seed	Provide quality seed for production of QDS to BRAC
ARI Selian	Research, quality seed	Provide quality seed of common bean to Local Governments (LGA) of Moshi, Lushoto and Hai to produce QDS and breeder seeds to ASA to produce foundation and certified seeds Provide recommendations from agronomic trials for scaling
Legume Alliance and SILT- project	Packaging message and production of extension material	Production of leaflets and content development of media events



Picture 1. Partners Southern cluster discussing collaboration to improve their work plans 2017, Dar es Salaam

farmers. She reminded participants to observe and implement the developed work plans 2017, as they were realistic.



Picture 2. N2Africa review and planning meeting 2016, Dar es Salaam

Freddy Baijukya, Country Coordinator Tanzania, Minke Stadler and Mwantumu Omari

Field learning visits to N2Africa project action sites in eastern Uganda

This article (Podcaster 44, March 2017) was chosen by Peter Ebanyat as it shows the intended outcome of the project intervention. Thus from the article- N2Africa is a downstream action project that reaches smallholder farmers and supports them build and use appropriate linkage strategies to exploit opportunities along grain legume value chains to improve their livelihoods.

On 1st March 2017, almost 80 workshop participants attended a field learning visit for the N2Africa and TAMASA projects. The learning visit aimed to provide the participants the opportunity of learning about the project implementation progress and through reflections, establish personal and collective learning for better implementation. Moreover, having both projects participants go together on the learning visit, allowed cross learning. The N2Africa project is implemented in eight districts in eastern Uganda, and fall within mainly two contrasting agro-ecological zones of the Southern and Eastern Lake Kyoga Basin covering the low lying rolling plains and the Elgon Farmlands covering the highlands. The low lands are dominated by annual cassava-based farming systems with rice cultivated in valleys. Maize, groundnut, soyabean and to some extent bush beans are integrated in the cropping systems. The perennial coffee-banana farming systems dominate the highlands with maize and common beans being integral components of the cropping system up to the mid-altitude zone.

Project implementation in the region is led by the dissemination partner, Churches Action in Relief and Development (CARD) Uganda in partnership with farmer associations/groups and facilitates linkages to input traders and produce buyers around the focus crops, common bean, soyabean and groundnut using various models.

From Mbale, the workshop venue, four groups of participants went on a learning visit to one action site Kibuku, Bukedea and Tororo in the low lands and Kapchorwa in the highlands. The different learning visit sites provided an opportunity to learn from farming communities and partners the different models used for dissemination, and access to input and output markets. Producer-collective model is employed by cooperatives in Bukedea, Kibuku with minor differences in strategies, while the the buyer led model is used by AgriNet in Tororo. Surprisingly, these cooperatives don't suffer the common problem of side selling as it is in some regions because of clear guidelines on bulking.

Some learnings from these visits are presentend in boxes.

The first learning visit group went to **Kibuku District** and interacted with the members of Kagumu Area Cooperative Enterprise (ACE) to learn about how to increase access to output marketing through bulking as well as aggregated demand for inputs as means for input access. They apply the producer-collector model and have a store for bulking produce and guidelines for bulking Farmers are mobilised into Rural Producer Organisations (RPOs) and linked to the main cooperative.

Field visit to Kagumu area cooperative enterprice, Kibuku District

Kagumu Area Cooperative Enterprise (KACE) was established in 2009 and comprises of five Rural Peoples Organisations (RPOs) with a total membership of 600. Leadership is trained in governance and leadership skills by Uganda Cooperative Alliance. The main crops KACE is engaged in



The Kagumu ACE bulking centre

through accountability and transparency. For the latter a general meeting is organized once every year for the leadership to account for their stewardship and leaders are trained in governance and leadership skills. The cooperative works on its sustainability by the establishment of strong financial capital to make the cooperative self-financing, by the establishment of better linkages with other partners, through capacity building of its members and by putting up an input supply system.

Opportunities for KACE are the management by professionally trained staff, linkage to markets, the permanent store for storage of farm produce, and the existence of the SACCO for financial services to members. **Challenges** are the unreliable market, low production by members to attract large buyers and limited capacity of the cooperative to bulk produce. **Future Plans** consist of the establishment of input supply shops, identification of potential farmers for seed production, establishing a partnership with agricultural research institutions for technology dissemination to the cooperative members, value addition to the produce and linking with more reliable markets.

Samuel Adjei-Nsiah, IITA, Ghana Country Coordinator N2Africa

are groundnut, soyabean, maize and cassava. Services rendered to members by KACE include capacity building through demonstrations of improved technologies by N2Africa since 2014, providing access to input and output market, improving members' access to finance, linking members to strategic partners including government and development partners, post-harvest technologies and providing bulking services with a permanent store for produce. A credit union (SACCO) was established in 2012 to offer financial assistance to members and non-members in the communities.

Every ordinary member of the cooperative is obliged to sell 20% of his/her produce to the cooperative, while board and committee members have to sell 30%. Members are educated on the benefits of collective selling to reduce side selling. Farmers who are in need of immediate cash are assisted by the cooperative to enable them to store their produce.

New markets are assessed by the market committee, which travels to cities and market centers to source and negotiate markets for the cooperative. The criteria used to determine profitable enterprises are food security, risk, availability of market, availability of technologies and profitability. Enhancing cohesion and confidence of members is achieved

The second learning visit group visited Basar Integrated Farmers' Association in **Kapchorwa**. The association joined the project in 2013 growing climbing beans with 15 members and rose to 30 members. The group first embraced and popularised diversification of the production systems with newly introduced climbing bean varie-

ties and later in 2015 mobilising other farmers to form the Association and are transitioning to a cooperative to take advantage of collecting marketing of produce but also to specifically tackle the challenge of poor quality inputs seed and fertilisers, and addressing postharvest constraints, in particular storage, pests.



Lead Farmer explaining where and how to plant the common beans and nutritional value of the beans, they ate whatever they harvested and did not have anything left to sell. They plan to grow climbing beans again this season, but the small yield led to a lack of seed and the farmers did not know where to buy new seed. Community-based seed multiplication is therefore a point of action in this area. In addition, the farmers who managed to store seed, saw their seed being eaten by bruchid beetles. Triple-layer, airtight bags (PICS bags) for storage of the beans will be introduced by N2Africa in the coming season. The farmers assured that with larger quantities of seed available, they would plant a larger area with climbing beans. At the same time, the cooperative lobbies for extended cultivation of climbing beans among other farmers in the area. As traders from Kenya are already looking for beans in Kapchorwa district, the farmers hope to increase production volumes and are confident that there will be a ready market to sell their produce.

Esther Ronner, Wageningen University & Research, The Netherlands

Diversification of production systems - climbing bean production in the intensively cultivated Mt. Elgon highlands

In the learning visit to Kapchorwa District, beautifully situated on the slopes of Mt Elgon in between the coffee and bananas, we visited Basari Integrated Farmers Association. This association was founded in 2011 and focused on horticultural crops, maize, bush bean and poultry. In 2013, N2Africa started working in the area and introduced the farmers to different climbing bean varieties, inputs and staking methods. Since farmers realized the new varieties and agronomic practices boosted yields compared with their locally grown variety, the association became interested in the commercial production of climbing beans. The number of members increased from 16 to 30, and the association was registered as a cooperative. Their aim is to venture into bulking and collective marketing of climbing beans.

During the visit, we found out that commercial climbing bean production did not take off yet. The farmers grew the improved varieties but, faced with drought, got smaller yields than expected. And as they appreciated the taste

The third learning visit group visited Koena Farmer's Cooperative in **Bukedea District**, which is made up of 25 farmer groups. The producer collective model is used in by the cooperative but has emphasised value addition to increase gains from output markets, and has a sales outlet shop located in Bukedea town. They have milling machines

for cassava and maize, have engaged more women and also provide milling services to the community at a fee and for maize portable threshers which can be easily moved around. This cooperative also engages in direct contract farming in production of sorghum for a beer company, Nile breweries.

Producer-led model (with some value addition), Koena Cooperative society, Bukedea District

Koena farmers' cooperative is one of N2Africa partners and focuses on groundnut, maize and soybean value chains. It is composed of 247 members from whom the majority are enthusiastic and energetic women. Indeed, empowering women is one goal of the cooperative.

The cooperative was characterized by strong social capital. Composed by members of two religions (Muslims and Christians) speaking 3 different languages, the impression that visitors had is that members are unity towards the common goal of improving their livelihoods through cooperatives.



During the field visit we learned that farmer members of the cooperative are engaged in:

- Value addition with maize and groundnut (processing them into posho and peanut butter). They already provide services to the community through processing equipment but need appropriate technology to scale-up soya and maize products and marketing strategy to tap into opportunities locally with processed products such as posho flour to schools;
- Bulking and marketing of produce particularly with maize and groundnuts. Side selling has been reported as one of bottlenecks often when trying to link farmers to the market using sales arrangements. We learned that the cooperative has adopted a bulking strategy and hence no side sales (1/3 of produce retained and 2/3 marketed through bulking);
- Involved in village savings and this is happening in 14 farmer groups out of the 25;
- The cooperative owns a market outlet shop in Bukedea where posho and butter is being marketed.

Wilson Leonardo, IFDC, Mozambique (Photo: Martin van Ittersum)

The fourth learning visit group visited Agrinet a private business partner, in **Tororo** that employs the buyer led model with a specific quest to mobilise quality produce from the farmers. The company has since 2014 been engaged in soyabean grain from N2Africa farmers even to as far as northern region.

handling and business skills and quality improved seed. They process maize and animal feeds with soyabean the company also conducts training in post-harvest handling and facilitates access to improved seed. They face a major challenge in developing sustainable partnerships with producer groups/associations and low volumes of produce due to dishonouring of contracts by producers. How to deal with these were subjects of interest in establishing sustainable partnerships.

AgriNet a business established in 2008 is a key partner in the marketing segment of the value chain and work through a network of commission buying agents across the country they are a pulling force for increasing production and provide embedded services in especially in post-harvest

Connetie Ayesiga (Business Development Officer) and Peter Ebanyat Country Coordinator, IITA Uganda

Buyer led model for Improved Market Access of Soyabean in the Eastern Region

During the learning visit to Tororo, we visited AgriNet, a business enterprise that was established in 2008 to fill a gap in the agricultural marketing chain. Their focus is to understand how markets work and being able to manage and /or cope with the market dynamics. For the past 5 years, AgriNet has offered innovative market linkage solutions and services for agribusiness value chain actors including smallholder farmers, traders, and large-scale processors and exporters. It is their ability to keep learning by doing and innovating that sets them apart and progressing. Their flagship products and service include agricultural market intelligence; transaction security service, product marketing, agro-processing and value addition. They work through a network of buying/commission agents across the country and their main activities are buying and selling of grain and processing of animal feeds with maize and soya bean at their plant in Tororo District, situated 60 km South of Mbale.

AgriNet entered a strategic partnership with N2Africa dissemination partners (WVU and CARD-Uganda in 2014 to buy soyabean, and stimulate production, improve post-harvest handling and access output markets in northern and eastern Uganda.



It is through this partnership that farmers are able to produce soya with a guaranteed market. And through the partnership, AgriNet has been able to buy over 200 tonnes per year even though their demand was 300 tonnes last year. These volumes were hampered by side selling on the part of farmers but also failure to honour contracts that have led to farmers selling to other buyers.

Since AgriNet was established, over 4000 smallholder farmers have been linked to them for market access across the regions with over 800 direct beneficiaries from N2Africa. These farmers have received trainings in post-harvest handling, improved soyabean seed and assured market for their produce. However AgriNet still faces many challenges that include; Low volume of product from farmers which leads to underutilization of their plant, Low quality of produce, Weak relationship between farmers and AgriNet leading to lack of honouring the buyer agreements and low capital for investment.

Looking into the future, AgriNet envisages being sustainable in 5 years once the farmer-buyer relationship is strengthened. Their target is to market 500 tonnes of produce from the N2Africa farmers this year 2017.

Connetie Ayesiga, IITA Uganda

N2Africa D.R.C.: training farmers in agribusiness

Jeanmarie Sanginga chose this article as his favorite because this farmer's initiative has led some young people to embark on agriculture with small initiatives for income as manufacture of animal feed of which soya is the most important element as source of protein; Soya milk and soya oil! This article first appeared in Podcaster 33, October 2015.

Mr. Berkimas is one of the farmers trained by N2Africa on soyabean processing at IITA Kalambo. After the training he decided to start a small business of soyabean and cassava processing in Kavumu (one of the villages of Bukavu, around 25 km from Bukavu city). Here, soyabean cultivation is common. Mr. Berkimas bought processing equipment worth 4600 US\$ with his own funds. The processing machine takes an hour to transform 120 kg soyabean in 48 liters of soyamilk and 78 kg of waste. The wastes are being used to produce cakes and feed for livestock.

Mr. Berkimas' aims are to add value to soyabean, compete on the regional market and improve his income. He has started with soyabean but also wishes to expand to other



Mr Jean Marie Sanginga, N2Africa country coordinator, visits Mr. Berkimas and his soyabean processing unit

crops like cassava. He wants to be a model to other farmers who want to start a venture in agribusiness. N2Africa promised to continue advising the farmers. Through Mr Berkimas we encourage other farmers to be engaged in this venture for poverty reduction.

Sanginga Jean Marie, Despines Bamuleke and Bintu Ndusha

Test Marketing BNF Technologies: Individual Customer Preferences in West Kenya Action Site: Status June 2017

Paul Woomer preferred to place this new article, saying: "Recently we met about the weak promotion of NoduMax in Nigeria and the team there seemed confused about the importance and approaches of test marketing, and this could help."

Test marketing of BNF technologies through Kenya's One Stop Shop network continues. In this report we examine the purchasing preference of 179 customers at 14 shops in advance of the 2017 long rains growing season. Three BNF technology products: BIOFIX inoculant, Sympal fertilizer and Saga soyabean, were provided to shop operator in return for keeping a detailed log of customers and their purchases. Test marketing was conducted between 2 March and 26 April 2017, but different agrodealers conducted test marketing over different intervals, with some ending and others starting in late March. These logs were compiled and interpreted in terms of total sales by these shops and products, customer purchasing patterns and estimated impacts from use of the BNF technologies sold to farmers.

The test-marketed customers were 45% women and 75% offered their mobile telephone numbers. Information on the test-marketed BNF products appears in Table 1. Sales ranged between 72% and 106% of products provided to agrodealers, with sales greater than 100% resulting

from Sympal fertilizer ordered independently of the test-marketed supply. Stockists also marketed two other soyabean varieties distributed earlier for community-based seed production by the N2Africa project. This practice is risky because shops selling non-registered soyabean varieties are subject to penalties, but nonetheless nearly 1.2 tons of these seed were marketed as well (Table 1).

Table 1. Test-marketed BNF technologies, their sales and estimated field coverage

Product	Amount sold	Percent sold	Coverage ¹	Comment
BIOFIX	18.4 kg	72%	30.7 ha	Mostly sold in 50 g packets, some 10 g
Sympal	2.75 t	106%	22.0 ha	Sold in 2, 10 and 50 kg bags
Saga soyabean	623 kg	89%	7.8 ha	Newly released soyabean variety from SeedCo
Other soyabean	1198 kg	n.a.	15.0 ha	Mostly Squire and SB 19 from previous seasons

¹ estimated coverage based upon BIOFIX at 0.6 kg/ha, Sympal at 125 kg/ha, soyabean seed at 80 kg/ha

Coding and sorting purchasing patterns allowed for eight customer types to be characterized (Figure 1). Our baseline recommendation is that soyabean producers purchase certified seed, BIOFIX inoculant and Sympal fertilizer, and 36% of customers did so. An additional 47% of these customers purchased one or two BNF technologies, suggesting that alternative seed systems and fertilizer strategies are in place, considering that no alternative soyabean inoculant appears in the market. Only 17% of the customers purchased farm inputs that were not among those offered by the test marketing campaign, mostly nitrogen-bearing fertilizers for maize and vegetables. Furthermore all three BNF technologies are acceptable to a majority of customers, with BIOFIX, Sympal and Saga purchased by 61%, 60% and 56% of customers, respectively (Figure 1).

These findings bode well for full commercialization of BNF technologies to small-scale farmers in west Kenya, and is tempered by three factors. First, the One Stop Shops were intentionally located where N2Africa Project worked closely with farmer groups during its earlier activities, creating awareness and demand. Second, these shops were often located away from towns and other agrodealers, and offered a limited range of non-BNF technology products. Finally, the operators of these shops were offered training in marketing and use of BNF technologies, and provided with extension materials and product information. One factor that was not considered is the number of potential customers that visited the shop, but made no purchases.

The impact of BNF technologies distributed through test marketing may also be estimated based upon soyabean seed and assumptions concerning planting density and grain-to-seed increase (Table 2). These inputs cost about

Table 2. Estimated return from customer investment.

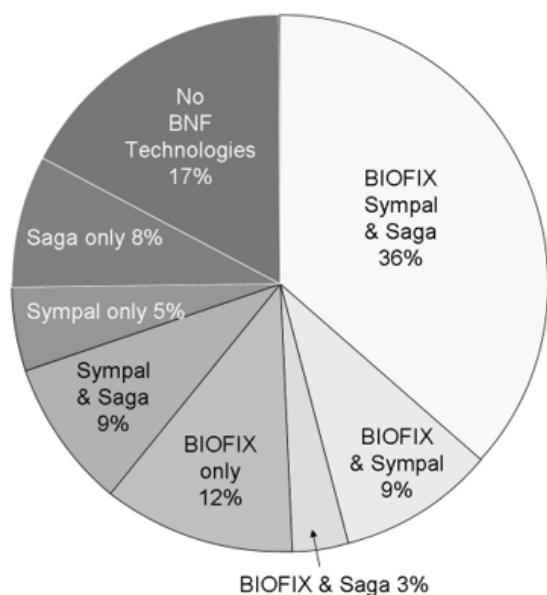
Parameter	Quantity	Comment
Seed sold	1821 kg	Three soyabean varieties
Coverage ¹	22.8 ha	At 80 kg/ha estimate
Yield per ha	2560 kg/ha	At 32 seeds per plant
Total grain	58.3 t	Coverage x Yield
Total revenue ²	\$26,526	At \$455 per ton
Total investment	\$4,092	By all customers
Net revenue	\$22,434	To all customers
Benefit:Cost	6.5:1	Out of pocket only
Average Net	\$125	Return per customer

¹ coverage based upon seed sales only. ² KES 99 = US \$1.

\$4,100 and likely resulted in about 58 t of soyabean grain worth nearly \$27,000. This resulted in a return ratio of 6.5:1 calculated in terms of out of pocket cost only (e.g. excluding unknown labor and opportunity costs). Ironically, this study itself cost about \$35,000 to plan, conduct and analyze so in some ways it may be viewed as not cost effective. Mechanisms are being considered that can streamline test marketing costs in the future, including greater reliance upon electronic submission of data. In any event, every customer of these BNF technologies is estimated to have profited by an average \$125 from their soyabean enterprise (Table 2).

This marketing study signals the successful transition from earlier grassroots BNF technology promotion to commercialized BNF technology provision; a risky move that was deemed necessary to meet established milestones and exit strategy during the final year of Kenya's N2Africa Project. Of the 15 agrodealers participating in the test-marketing campaign, reports were received from 14 (93%). The campaign itself was somewhat rushed because its planned February start was slightly delayed by project funding cycles. One consequence of hurried implementation is that this prevented us from better coordinating the size of product packages from different suppliers to specific N2Africa management recommendations. For example two kg of seed is intended for planting 250 m² of land, but 50 g of BIOFIX inoculates five kg of seed, while 10 kg of Sympal fertilizes areas between 500 m² and 800 m². Out of necessity, we left this for shop operators and individual customers to sort out. Next season (2017-2018 short rains) product sizes shall be better matched with two kg of soyabean seed, 20 g BIOFIX and five kg Sympal all intended for establishing 250 m² plots of soyabeans, and customers can scale up to their respective field areas in a more simplified manner. Finally, and despite this year's planned end of the N2Africa Project in Kenya, we expect this market-oriented approach to technology promotion will continue in Kenya and expand

BNF Technology Purchasing Patterns



BNF Technology Preference

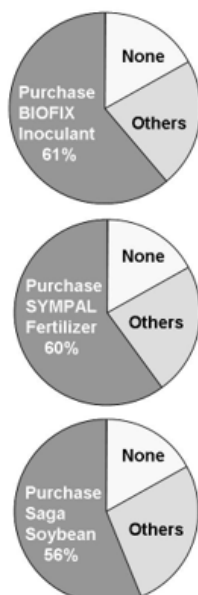


Figure 1. Purchase of 179 individual test-marketed customers

to additional countries through the Technologies for African Agricultural Transformation Project (TAAT) likely to start later this year.

Acknowledgement: We greatly appreciate the participation of the following agrodealers in the test marketing of BNF technologies in west Kenya: AFDP Agrovet, Annapolis Wonder Enterprise, Farmer's Key, Green Belt Shop, Kipeo

Agrovet, Komame Agrodealer, KUGRO Agro-enterprises, MFAGRO Agrodealer Shop, Power Mark, Trendy Forbes Agrodealer, Ugunja Community AgroVet and Ungeint OSS. MEA Fertilizers Ltd. and AgriSeed (Kenya) provided and delivered pre-packaged inputs for use in this study, and offered a modest sales discount as well.

Paul L. Woomeer, Josephine Ongoma and Welissa Mulei (email: plwoomeer@gmail.com)

Strides in inoculant production and distribution in Malawi - the story of AISL

Lloyd Phiphira chose this article from Podcaster 49, December 2017, as this is one the positive stories in as far as N2Africa work in Malawi is concerned. The impact inoculant being produced by AISL to the soyabean production is great.

Prior to 2015, awareness of the advantages of soyabean inoculation was created among farmers in Malawi by N2Africa, but soyabean inoculant remained largely unavailable to farmers. Inoculant production was mostly limited to research (with only a few hundred sachets being sold to farmers) through the government's Department of Agriculture Research Services (DARS). This public institution was unable to scale its production to meet the inoculant demand. This was the situation until 2015, when Agro-Input Suppliers Limited (AISL) stepped in to upscale and commercialize the production and distribution of inoculant branded as Nitrofix. DARS granted them authority.



AISL Laboratory under construction in Kanengo Lilongwe. The expected completion date is January 2018 and ready for use in March 2018.

Since 2015 with an initial production of 20,000 sachets from a temporary laboratory facility and 10 retail

outlets, AISL has managed to increase production to 250,000 and 25 retail outlets by 2017. N2Africa provided technical support, provided training to two technicians at Ibadan's laboratory and facilitated the acquisition of elite rhizobium strains.

AISL constructed a permanent laboratory which will be fully equipped with necessary laboratory equipment for the production of inoculants. Expected production capacity at the new facility is 1 million sachets. Besides soyabean inoculant, the company started with the development of inoculants for groundnuts and beans, together with the DARS.

AISL invested in the distribution chain by procuring 15 solar energy-driven coolers for proper storage of Nitrofix distributed in 15 of its outlets. Plans are underway to place more coolers in the remaining outlets.



Ultimately, AISL plans to grow and meet the domestic demand through improvements in the laboratory's production capacity and a larger number of outlets over the next 3 years. It will also seize opportunities to export its products to neighbouring Zambia, Mozambique, and Zimbabwe.

Fredrick Kawalewale, Chief Executive Officer for AISL

N2Africa experiences: Mozambique

Wilson Leonardo motivated his choice for this article from Podcaster 49, December 2017: This is a great example showing how results from N2Africa Phase I were used in the second phase. It also shows how sustainability issues were embedded during our intervention in Phase II.

The N2Africa project in Mozambique on its second phase focused on scaling out the legume technologies proven under phase I using a “business-led” approach. The women empowering was one of the main objectives. We showed that women can benefit and make profit with legumes.

Towards the end the N2Africa project focused on scaling out the legume technologies proven under Phase I using a “business-led” approach. This involved engaging government, development organizations, and the private sector, creating awareness on N2Africa technologies and approaches, and facilitating dissemination campaigns. The project focused on soyabean and cowpea agronomy (sowing time, optimal planting density, advantage of improved over traditional varieties, response to fertilizer application, use of inoculants, postharvest handling), the input supply systems, and local capacity building for government extension officers, agrodealers, and individual community seed producers.

More than 25,000 smallholder farmers have been reached by directly hosting on-farm demonstration trials, Train the Trainer training, and field days in Manica, Tete, and Zambézia provinces. Using public–private–partnership approaches N2Africa disseminated four varieties of soyabean and two of cowpea. Market linkages were established between farmer associations and off-takers.

Better seeds is the foundation

Access to new seed varieties is a common and long-standing stumbling block for smallholder farmers in Mozambique. Working with seed companies, smallholder farmers associations and rural agro-dealers, N2Africa Project helped farmers in remote areas in evaluating the performance of soyabean and cowpeas varieties while building long term sustainable supply chains. In remote community of Angónia district, Maria Brigida Miguel Noé, is an emerging entrepreneur who has benefited from the N2Africa, and is making progress in removing the stumbling blocks. Trained by N2Africa on good agricultural practices for soyabean production she is now commercializing seed for



Maria Miguel Noe now provides seeds to her community. Photo credits Wilson Leonardo

other fellow farmers. Initially she received 25 kg of soyabean from N2Africa. In subsequent seasons she bought the seed directly from agro-dealers located at Ulongue, the main village in the district or in neighbouring villages in Malawi. “I decided to set up this business primarily to improve my life by selling seeds but also to help my fellows in the association. Seeing the demand for soyabean seed growing I decided to become the main seed provider in the village, by also growing other crops such as groundnut and maize.”, Maria said, on her business.

Maria is already starting to see her hard work pay off and she is confident of a better future. “With seed business I was able to build a new house, I successfully requested additional land (30 ha) and cattle. Next season when you will visit me you will be surprised with a vehicle that I am planning to buy. It is too expensive to rent a car locally to transport the produce,” she said. Maria is one example of how N2Africa worked towards the Objective 3 of the project: **Empower Women to increase benefits from legume production.** (For more details see also the [IITA Newsletter story](#) highlighting the story of Maria Brigida Miguel Noé).

Support the local institutions to enable sustainability

While inoculants have proven to have high return on investments, inoculant quality is important as better seed to achieve good yields. To address the issue with inoculant quality control, N2Africa Project purchased and equipped an rhizobiology laboratory that was donated to IIAM, the main government research institution in Mozambique. Two newly recruited IIAM technicians will be trained and supported



Chibeba at IITA-Mozambique on basic aspects of inoculant control. Amaral is a former N2Africa PhD awardee. The IIAM technicians will also be trained in Ibadan on rhizobiology with main focus on inoculant quality control and production. This training is planned for the month of December.

[The N2Africa Project Mozambique Exit Strategy report is available here.](#)

Wilson Leonardo, Country Coordinator Mozambique

Knowledge to reach greater heights in Rwanda

Speciose Kantengwa chose this article for the following reason: It illustrates how knowledge can be a starting point for change. It shows sustainability of N2Africa approach: lead farmers in the dissemination of BNF technologies, a lead farmer converted into an agro dealer selling agriculture inputs and providing technical messages to community members. First appeared in Podcaster 45, April-May 2017.

“Before N2Africa started working with us in TWIZERANE farmer’s association, we used to grow crops in a traditional way, no use of improved crop varieties, or fertilizer. The crop yield was always low because of ignorance. After interacting with N2Africa technologies in 2010, I saw the difference between improved technologies and the traditional method of cropping, especially inoculation of soyabean coupled with the use of DAP and planting in row, which significantly increased

our production of bush bean and soyabean crops”. This was remarked by Mr. Celestine who is part of a farmer group of 25 farmers called TWIZERANE. TWIZERANE started to work with N2Africa in 2010, when they hosted two agronomic trials showcasing varieties and other inputs. Until this time, Celestine’s group was only able to grow crops using traditional methods. The scope of activities they would engage in was limited as a result of knowledge deficits.

Mr. Celestine was selected by his group members to become the master farmer (lead farmer) and was trained by the N2Africa project to assist other farmers in BNF technologies. This included participation in study tours organized by the project. *“I attended several training sessions organized by N2Africa around BNF, including a study tour to Western Kenya to visit farmers growing soyabean for collective marketing. From there, I changed my perception of agriculture and moved away from subsistence to professional agriculture. My group TWIZERANE started a community based seed production activity. I started selling bean and soyabean seeds of new improved varieties-SB 24 for soyabeans and RWR2245 for bush beans (produced by the group) to other farmers. As there was no input selling store in our community (Musenyi), I introduced mineral fertilizer (DAP) and pesticides, because farmers were asking for them and advice on how to use them. Since I was trained on agronomic practices, I was capable to help them”.*

Celestine’s aim was to become a certified agro-dealer in his sector of Musenyi, providing access to inputs to his fellow farmers. As a lead farmer, he made it his responsibility to acquire the certification for input distribution. This was consciously set as a goal as it was a major hindrance to the use of any of the inputs introduced in the sector to farmers. To achieve these targets, Celestine filled an application with the Ministry of Agriculture (MINAGRO) in 2014 to obtain a certificate of permission to sell inputs. Relying on the knowledge acquired from working with N2Africa, he also took part in a training organized by the National Agro Dealers Network to become an authorized Agro Dealer.



Mr. Gashirabake Celestine holding his certificate



Mr. Gashirabake Celestine in front of his shop

With this certification, Celestine could now widen his scope of work and even had bargaining power with financial institutions. He applied for and received a loan from SACCO of 1 million RwF and with his savings of 1 million RwF, he started a real business. His bag (50 kg) of DAP increased to 5 bags (250 kg) of DAP and 2 bags (100 kg) of Urea per season. In 2016, he sold 11 tons of fertilizers (DAP and Urea) and seeds (2 tons of soyabean, 1 ton of maize and 1.5 ton of bean). This season, he is expecting to reach 15 tons. Celestine also sells soyabean inoculants, PICS bags, vegetable seeds, agriculture tools, and pesticides. This initiative has provided access to above inputs and its timeliness on seasonal basis to farmers in Musenyi sector. A total of about six thousand (6000) farmers are served on seasonal basis.

“In addition to becoming an agro dealer, the training on linking farmers to market organized in 2012 by N2Africa, I learnt how to calculate interest/benefits”. From there, I started selling my produce to market at a good price. The group TWIZERANE used to produce for home consumption, share what we produce. Illustration: we used to produce 80 -100 kg of bean per 0.2 hectares (terrace) and share it among the 25 members. With improved technologies introduced by N2Africa, we moved from 100 to 400 kg for same land area of bean produced.

On learning, *“I will advise other Agro Dealers to acquire technical knowledge on fertilizers and agronomic practices in order to advise customers on how to use inputs they are buying, extension messages to accompany inputs bought”.* He also iterated that the awareness created in the community through the exposure with N2Africa technologies made sales of fertilizers and seeds more demand driven, this made sales of inputs easy.

Mr Celestine: *“My next step will be to open another shop in the next cell (community) to help farmers from that village because they walk long distance to come to my current shop. Buy a motorbike to facilitate moving around to provide technical advice to other farmers. Extend the current shop to have a separate space for storing fertilizers and seeds and add other items like safety equipment. Also collect soyabean grain from farmers and sell to Soyco Mt Meru Company”.*

Story by Mr. Celestine, Agro Dealer in Musenyi Community in Rwanda

Harnessing N2Africa's nurtured talents among lead farmers for cost-effective technology dissemination in Zimbabwe

Regis Chikowo's reason to select this article from Podcaster 41, October and November 2016: "This speaks directly to what is going on now that active funding has ended in Zimbabwe (N2Africa Phase III)"

As we move into the last year of active farmer engagement, the research team in Zimbabwe has begun tapping into a large knowledge base that has been built by N2Africa in the last 8 years. Informed by 'if we do what we have always done, we will get what we have always got', we recently innovated our dissemination and training approach over the recent post-harvest period (May - October) for our nutrition and marketing initiatives.

In Zimbabwe, we now have lead farmers that are valued for their competencies and knowledge about the legume value chain (from agronomy, production, processing to marketing). We have therefore recognized these competencies. As from July 2016, we engaged exceptionally talented farmers to be the lead change agents in new areas, as we moved to increase the number of farmers benefiting from N2Africa technologies. Between July and September 2016, more than 800 farmers received nutrition and value addition training in areas that we had not offered such training before. We encouraged inter – district learning by facilitating farmers from one district to train fellow farmers in another district (Picture 1).



Picture 1. Mrs Jane Mashonganyika (lead farmer from Wedza District) having a discussion with farmers on the importance of forming Internal Savings and Lending (ISAL) groups for timely seed and fertilizer acquisition in Makoni District

The process

Three lead farmers from each N2Africa intervention site were selected to be at the centre of the training programs. These farmers independently prepared their 'modules' for a two day training session per area. This was a deliberate strategy so we could evaluate the knowledge these farmers had acquired over the years. The training content was then discussed with N2Africa project staff, local extension (AGRITEX) staff and the Cluster Agricultural Development

Services (CADS). In line with our anticipation, the level of knowledge and articulation among all the farmer trainers was excellent.

The training session

The training sessions took two days in each district. On the first day, the farmer trainers started explaining the subject of formation of Internal Savings and Lending (ISAL) groups (Picture 2). The trainers elaborated on how their own ISAL groups were started, until they were registered by the Ministry of Small and Medium Enterprises as recognised community-based agricultural groups. A key goal of an



Picture 2. Mr Francis Nyamhondera explaining about the importance of improved farmer financial organization for efficient acquisition of farming inputs, at a farmer training workshop in Wedza District

ISAL was to provide simple savings and loan facilities in communities that do not have easy access to formal financial services.

During the second day, the trainers demonstrated local processing techniques of grain legumes and value addition. Grain legumes were highlighted as a key component for meeting the '4-Star diet', which also includes maize, animal-based products, vitamin A-rich fruits and vegetables. Participants had hands-on opportunities to make their own food products (Picture 3-5). Furthermore, they were encouraged to teach their neighbours using the knowledge they had gained, including volunteering to participate in preparation of meals for school feeding programs.

Lessons learnt

Firstly, after a few training sessions, we were able to identify champion farmers that could be cost-effectively engaged to train more farmers. Therefore, relying on the more expensive 'nutrition experts' to spread processing and value addition technologies is unwarranted at this stage in the dissemination pathway!



Picture 3. Making fritters in Makoni District



Picture 4. Measuring ingredients for nutritional porridge in Hwedza District



Picture 5. Farmer trainers in Murehwa District

Secondly, the training sessions were not only of interest to farmers in the new target areas. We were pretty excited to see that N2Africa lead farmers had acquired so much

knowledge that even AGRITEX workers (*the professionals*) were learning from farmers.

Regis Chikowo, Country Coordinator Zimbabwe and Isaac Chabata, University of Zimbabwe

On Public Private Partnerships and how they can learn about ‘The Market’

Edward Baars chose this as it was a concept that slowly grew into the project by examples towards the capacity of the country teams to replicate and build upon, it also worked well in synergy with Monitoring Learning and Evaluation (MEL), whilst besides showing its capacity to reach output targets, it opened interest to research on its effectiveness and sustainability which in 2018 is a main activity for this learning grant project. First appeared in Podcaster 33, September and October 2015.

N2Africa proudly takes stock of the strategic partnerships established to scale out and sustain its promoted services and technologies. Being implemented in 11 countries, N2Africa sealed 86 comprehensive partnerships with public and private organizations reaching 222,850 farmers in 2015-16 and aiming towards 550,000 in 2018. The partnerships are linked to value chain projects with similar objectives, leveraging resources and creating synergies. In this article we describe how partners view the benefits of partnerships, the various market models used in partnerships and the main challenge different legume value-chain partners encounter: how to generate sufficient supply of produce for a market based approach. Using one specific example, we disentangle the factors that determine supply by farmer cooperatives.

Joined efforts

All project countries formed strategic partnerships. As an example, partners summarized such a partnership for Ethiopia in a poster (on the next page). Ethiopia spearheaded the partnership formation, which was earlier elaborated on in the [January-February 2015 Podcaster \(29\)](#). The ‘Tanzanian Legume Alliance’ poster, showing a large partnership, recently featured in international events held in Berlin, Oxford and The Hague.

During the recent partner planning meetings it became clear that many partners thought the same: *‘we cannot hope to achieve our common objectives on our own’*. They also recognized that there are many challenges ahead to achieve the objectives. The consensus was that when

efforts of various partners are joined and when partners can learn from each other, the chances that goals can be met are higher. Better coordination among partners was therefore high on the agenda when the partnership agreements were signed and put into action. In addition, structures and modes of operations to achieve common goals were agreed upon.

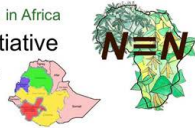
The N2Africa coordination and planning efforts so far already received appreciation. Addis Teshome of IFDC mentioned that *‘with N2Africa to have taken up responsibilities for dissemination, IFDC can now focus better on the marketing aspects for their farmers’*. Abubakari Kijoji of CRS Tanzania stressed *‘N2Africa made an important contribution to the capacity building to our Soya ni Pesa Project’*.

Market models

The first pillar that was mentioned under discussion during annual partner planning meetings in Nigeria, Ghana, Uganda, Ethiopia and Tanzania was always ‘the Market’. Across the partnerships, various models for markets are used. One of the market models that is commonly used in N2Africa is a (variation on) the ‘out-grower’ model. In those cases a strong ‘buyer’ supports its contracted farmers with inputs, credit, training on post-harvest handling, quality control, thereby also focussing on information flows and building trust relations with the farmers. ACOS, seen in figure 1, is one of those cases. Other examples are GUTS Agro Industry Plc, Alema Koudijs Feed Plc (AKF) in Ethiopia; WACOT, Hule and Sons, De Ideal Agro Allied Services,

N2Africa - Putting nitrogen fixation to work for smallholder farmers in Africa
Public-Private Partnerships - An N2Africa Initiative to Ensure Sustainability - Ethiopian example

Tamiru Amanu, Endakachew Woldemeskel and Edward Baars



Introduction

N2Africa designs and develops public-private partnerships to ensure long-term sustainability of

- Knowledge transfer
- Legume technology dissemination
- Efficient input supply chains
- Access to markets.

Partnership Process

The process of partnership development involves a number of steps:

- Map legume value chain actors
- Consult priority actors and support institutions
- Define interests, roles and responsibilities
- Design and develop strategic partnership frameworks (models)
- Sign partnership agreements
- Implement the Partnership Planning document through sub-grants
- Coordinate and govern the partnership
- Enrich the partnership with additional value chain partners & fundraising
- Joint learning and project Monitoring and Evaluation (M&E)

Overview of Public-Private Partnerships in Ethiopia

Capacity Building & Dissemination	SNV, AgriNutra, IFDC, AGRA
Dissemination	ICRISAT, WFP, FAO, ZIGZO
Input supply	Balegreen, N2Africa, ESA, ASEPFI A.P. M&A ETHIOPIAN SEED UNION
Market Access	BULTO AGRO, K&A, ACOS
Production - Input & Market Links	Hunde Chewaqa Farmers Union, Tsehay Farmers Coop. Union, Sidama Eto Union, Awash Mitika Union, Coop. Union Uta Wayu Union, Becho Woliso Union

N2Africa works in eleven countries of sub-Saharan Africa

Funded by the Bill & Melinda Gates Foundation through a grant to Wageningen University, N2Africa supports more than 500,000 smallholders in DR Congo, Ethiopia, Ghana, Kenya, Malawi, Mozambique, Nigeria, Rwanda, Tanzania and Uganda and Zimbabwe to enhance food & nutrition security, household incomes through sustainable intensification and diversification with nitrogen fixing grain legumes

Sustainable scaling

N2Africa's Public-Private Partnerships in four regions of Ethiopia will reach more than 120,000 smallholders by 2018

circulation comics, YouTube and social media to target younger members of the farming families with inspirational ideas on new varieties and good agricultural practices. The article on page 6 of this Podcaster gives more information on the Maharage Bingwa campaign.

In terms of partnerships, the Legume Alliance includes CABI, Farm Radio International (FRI), African Fertilizer Agribusiness Partnership (AFAP), IITA and the Agricultural Seeds Agency (ASA) as partners. The Alliance also cross cuts the N2Africa partnerships with CRS, BRAC-ETG, Faida MaLi-ARI-Selian-Uyole and AGRA-RUDI- the African Conservation Tillage Network -BRITEN. New projects to join the Alliance are the ICT Challenge Fund, Integrated Seed Systems Development (ISSD) and possibly the Integrated Value Chain Development (IVCD) Project.

Recently, the Legume Alliance was awarded the Canadian International Food Security Research Fund (CIFSFRF) - Scale up of improved legume technologies through sustainable input supply and information systems!

The Challenge of supply

Kassahun Bekele of partner ACOS-Ethiopia mentioned, 'we guarantee farmers a premium price for our registered



Figure 2: Comic page Shujaaz

variety of red kidney beans that serves a niche market but we don't always get the quality and quantity we had hoped for'. This usually opens a lively discussion from all angles on how to jointly improve on this. Because the challenge of supply of raw material is a common denominator across partnerships and countries, we deliberate more on the possible causes in the case of ACOS.

The first question we can ask is whether the disappointing quantity of bean supply was caused by an unfavourable climate conditions or high pest and diseases pressure that particular season. But because several other cooperatives in the region reached near 100% delivery of their expectations, we cannot attribute the lack of supply only to these causes.

Could it then have been a lack of inputs? The cooperatives were funded in advance to pay farmers cash on delivery and farmers received credit for seeds and (bio)-fertilizers (to be deducted at harvest time). SNV – Agriterro facilitated a credit scheme for this which will be expanded in 2016. It thus seems that payment and credit facilities were in place. In addition, the cooperatives started their own seed multiplication in sufficient quantities using ACOS variety foundation seed. We therefore do not think that lack of seeds has been a problem. However, in some areas lentils compete with the ACOS variety, and the bean varieties used by ACOS seem to be slightly lower yielding than other bean varieties grown.

MALAM ISAH WAKILI: An Enthusiastic Cowpea Farmer from Nigeria

Theresa Ampadu Boakye, our M&E specialist, selected this article (Podcaster 46, June 2017) because it indicates that projects can do random implementation and still have adoption; meaning, guided selection of project beneficiaries (e.g. selecting beneficiaries who grew legumes only to have participated in N2Africa) will always leave out enthusiastic ones like Malam who would have adopted but would not have had the chance had it not been the project's approach to expand to non-cowpea areas. There should always be room to include such.

It started some time ago in 2012 when the N2Africa project Nigeria extended its dissemination activities to Niger State located in the North Central Zone of Nigeria. There, the campaign was further devolved to Shiroro Local Government Area (LGA) where Malam Isah Wakili lives with his family, in a community called Gwagwa which is largely dominated by the Gwari tribe. N2Africa activities were launched in this area to introduce legumes in a farming system that is dominated by tuber crops and cereals. During this launch, Malam indicated his interest to participate. He was trained as a lead farmer by the project because of his good knowledge and experience in farming and his ability to organize and lead other farmers. This story highlights Malam Isah Wakili's achievements as a lead farmer and commercial seed grower through his involvement with the N2Africa project.

Malam Isah received an N2Africa package with cowpea seed to demonstrate on a variety trial on his farm in Shiroro

We can also ask whether some cooperatives might not be strong enough to produce sufficient quantity of sufficient quality. Some cooperatives are not 'strong' indeed. Currently, they are enrolled in an institutional capacity building program working to improve their performance.

The farmer perspective

The use of improved seeds, (bio) fertilizers and good agricultural practices were disseminated among farmers using demonstration and adaptation plots, Farmer Field Schools and training materials. The N2Africa Learning Monitoring & Evaluation (M&E) tools, including 'technology evaluation' and 'willingness to buy' surveys, are currently looking at the rate of adoption. In addition, they assess availability of inputs and monitor input demand and that can feedback to partnerships' market models. The M&E can be rapidly expanded using Computer Aided Telephone Interviews (CATI).

Way forward

In conclusion, the way forward is to track the results of the joint activities and to start partner planning meetings with a 'situation analysis' from a farmer perspective using ICT based learning M&E surveys complemented by adoption studies from MSc. students. This is already planned for and ongoing in Mozambique, Nigeria, Ghana, Tanzania and Ethiopia.

Edward Baars



Malam Isah in one of his cowpea fields located at Gwagwa in Shiroro LGA of Niger State



The cowpea field is in the early reproductive growth stage

as outlined in the N2Africa agronomy protocol. The objective was to test whether cowpea production would succeed in a humid climate, and to try a crop and soil improvement programme based on a rotation of cowpea and cereals. Malam Isah was guided by the extension agent named Mr. Tanko Mairogo to establish a trial with promis-

ing cowpea varieties (including IT99K 573-1-1 and IT90K 277) and he committed himself to tending the field. The crops performed great and resulted in good yields, and this attracted neighbours and other farmers in the area. Indeed Malam Isah was impressed and he guarded his field devotedly.

Having seen the good performance of the crop in his field and given that cowpea is a rare crop in the area, Malam Isah decided to preserve the seeds with the intention of continuously multiplying these varieties on his own without any further direct involvement and supervision by the project. Occasionally, the extension agent still gave some training to address that cowpea is vulnerable to pests and diseases, especially in a humid climate. Armed with knowledge about the best possible management options, Malam Isah did not hesitate to apply the appropriate agro-chemicals.

The produce from these efforts was usually sold to other farmers who now showed interest in cultivating cowpea and other legumes. In view of this novel idea, he has found a niche for himself as a local agrodealer in cowpea seeds. Malam Isah has a good income from these activities. He has become a dependable agro-dealer in cowpea seeds that other farmers could easily access. In a good season, he could harvest up to 2 ton ha⁻¹ from his farm from which a part is sold to people, a part is preserved for the next season and a part is used for domestic consumption and processed into local dishes.

As such, the introduction of cowpea has brought diversification to a monotonous farming system, cowpea production was adapted to the local farming system through pesticides and crop rotation, and Malam Isah became established as a key figure in the community by linking farmers to the state ADP and seed companies.

Malam Isah's approach to legume production moved from demonstration to a more effective and result-oriented adoption. He did so with inspiring determination, capped with entrepreneurial ability. This all has connected him strongly to the project, in the context of one of N2Africa's principal objectives of **enhancing commercialization and sustainable agro-input supply**.

Malam Isah stands out among the resource-poor smallholder farmers and he is willing to learn, adapt and practice new things and thereby adding value to agriculture even in a rural setting, not minding the daunting challenges farmers face including a low resource base, use of low-yielding crop cultivars, adverse weather events caused by climate change, the menace of exotic pests and diseases and ultimately, low soil fertility. **He said that he got to know that legumes, particularly cowpea and soyabean, could thrive in his location, thanks to the N2Africa project.**



Malam Isah's household and other neighbours who are often nourished by legume recipes

Congratulations!

The project is pleased to have Malam Isah Wakili as one of its numerous farmers and indeed wishes that this outstanding effort will be sustained, and also encourages other N2Africa farmers to take a cue from Malam Isah who can make business in agriculture even at communal level and at low-scale production. We will not relent in our dissemination campaigns until we all get there! **Carry on Malam Isah and best wishes.**

Acknowledgement:

It is with good intention that we recognize and sincerely

appreciate the efforts of the MD and staff of Niger State Agricultural Mechanization and Development Authority (NAMDA) along with the resourceful extension agent who discovered Malam Isah Wakili during the first phase of implementation of the project dissemination in Nigeria. Particularly, we thank Dr. Idris Usman Gbogan-Director of Extension Services of NAMDA for the tireless extension services he rendered and effective coordination of N2Africa project activities in Niger State.

Bassey Ukem and N2Africa project Nigeria Team

From field to feedback, an update on data flows within N2Africa

Fred Kanampiu selected this because as a learning grant, it is key to ensure timely feedback to generate and document learning to steer the implementation of the project. Having an up to date information from the field has contributed to the learning process of the project. This article appeared first in Podcaster 30, March and April 2015.

Learning plays a central role in N2Africa. The success of our dissemination approaches depends on the ability to determine what works, where how and for whom and to adapt activities accordingly. Key to this process of learning, is a system of data collection appeared first Podcaster

30ensures that data is captured from the field and converted into an accessible form as quickly and accurately as possible. N2Africa has worked hard to establish such a system and we are happy to report on recent progress and future plans for improvement.

Our data flows are organized in the following way: our partners use paper survey forms to collect data from the field. The information on these forms is passed on to special Excel forms that are easy to fill and provide a uniform template for data processing. In each country, the responsible data manager collects these forms and uploads them to the N2Africa intranet. From that moment on, the data is centrally stored and backed-up for safety and can be downloaded by all N2Africa staff with an intranet account. Data on the intranet is subsequently checked for consistency and completeness and read into the N2Africa central database. The database is the central point of storage and access for data in N2Africa. All information in the database can be written to Excel workbooks that can be downloaded by N2Africa staff and used in further analysis (Figure 1).

In 2014, this system of data flow was implemented successfully and all countries having contributed data that is now accessible through the intranet. Some of this data was already analysed and the results shared with the country teams. This experience has also taught us some valuable lessons for improvement. The first lesson is that the time and effort involved in passing data from paper to the computer can be a burden on N2Africa staff and partners. It also can lead to delays in data entry, meaning that data is not available for analysis before the next season starts. Another point of improvement is the complexity of the survey forms, which can lead to incomplete and inconsistent data.

With these points in mind, we have undertaken several steps to improve data collection and management in 2015. First, the field books for demonstration and diagnostic trials were greatly reduced and simplified, thanks in large part to the very useful feedback from field staff and partners in the different countries. Second we are starting to implement tablet-based data collection using Open Data Kit (ODK) forms in all countries. Tablet-based data collection has the advantage that it eliminates the need for separate paper forms and electronic data entry sheets (Figure 1). Data is collected directly on a hand-held electronic device and automatically sent to the central database, thereby greatly reducing data turnover time. An added advantage is the possibility to include pictures and to take GPS coordinates directly on the device.

A tutorial document was distributed and a simple training session using the ODK survey form for Focal Adaptation trials was successfully concluded. For 2015, we are aiming to move data entry increasingly to tablet-based capture using ODK. We are looking forward to working together with all N2Africa staff and partners to make this transition a success and together achieve even higher standards of data quality and a more timely delivery.

Joost van Heerwaarden

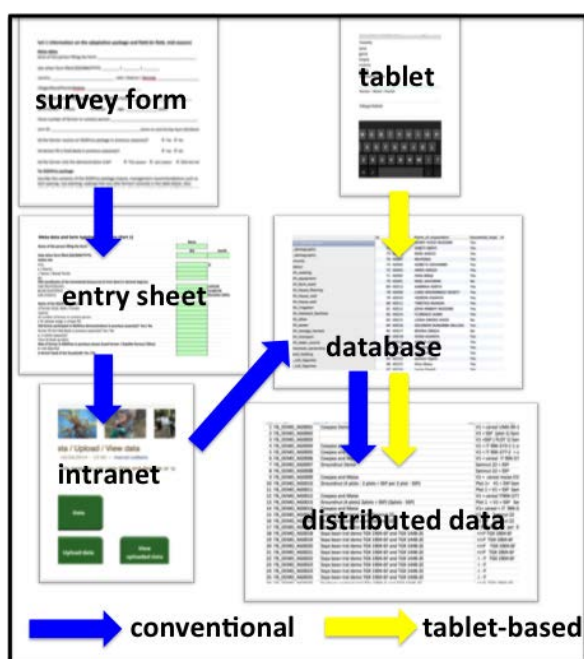


Figure 1. Current and tablet-based data flows

N2Africa in the news

For those who read Dutch: The Belgian EOS Tracé published “[Afrika ontdekt de kracht van kikkererwten](#)”.

Reports and other output uploaded on the N2Africa website

- The N2Africa Vimeo videos that were on the N2Africa website have been made available as mp4 files. They have been uploaded on [YouTube](#) to make them available to a larger public;
- Report “[Tailoring and adaptation in N2Africa demonstration trials](#)” by Eva Thuijsman, Esther Ronner and Joost van Heerwaarden;
- MSc thesis [Response of chickpea \(*Cicer aritenum* L.\) to sulphur and zinc nutrients application and *Rhizobium*](#)

- [inoculation in north western Ethiopia](#) by Beza Shewangizaw Woldearegay;
- MSc thesis [Factors affecting adoption of legume technology and its impact on income of farmers: the case of Sinana and Ginir woredas of Bale zone](#) by Yitbarek Tegegne;
- MSc thesis [Adoption of improved chickpea technologies in North Gondar zone of Ethiopia: the case of Gondar Zuria district](#) by Mesfin Fenta.



N2Africa publications

- “Farmers’ use and adaptation of improved climbing bean production practices in the highlands of Uganda”. 2017. Ronner, E., Descheemaeker, K., Almekinders, C.J.M., Ebanyat, P., Giller, K.E. Agriculture, Ecosystems and Environment;
- “Options for improving the yield and nutritive value of maize and grain legume residues for ruminants in East African farming systems”. 2018. , Mesfin Dejene Ejigu. PhD thesis, The University of Queensland, Australia . Partially funded by N2Africa.

Announcements

13th European Nitrogen Fixation Conference (ENFC)

18-21 August 2018 in Stockholm, Sweden at the München Bryggeriet.

This European based biennial congress brings together scientists focused on biological N₂-fixation (BNF) from diverse research topics of biochemistry, microbiology, computational genomics, plant physiology, and more recently genetic engineering and aquatic microbiology.

The first ENFC was held in Szeged, Hungary, in 1994, with an emphasis on participation by young researchers. The most recent ENFC in 2016 was a clear demonstration of ‘research without borders’ as 294 participants, 30% of which came from outside of the European Union (EU), including 8% from developing countries, attended the 12th ENFC in Budapest, Hungary. A large percent (29%) of the participants were PhD students. The value of the ENFC series has been proven over the years. Although a smaller congress by today’s standards, it has drawn the participation and presentation by leading experts of BNF. The program combines classical topics within the BNF field (e.g. biochemistry, evolution, signal transduction, N₂-fixing symbioses) with highly relevant and timely topics for modern society (e.g. climate change, present and future use of BNF in agriculture).

Satellite meetings and an aquatic N₂-fixation symposia will provide extra benefits for ENFC participants. The end

Related newsletters

- Tropical Grasslands Newsletter no. 6 on “Forages for the Future”;
- ASHC News: ASHC Forges Partnerships to Boost Soybean Production in Nigeria;
- ASHC blog: Three Lessons from Partnership Campaigns in ASHC;
- FAO News: The Decade of Family Farming, an extraordinary opportunity to move towards the eradication of hunger and poverty;
- FAO News: FAO calls for renewed commitment to get Africa back on track to eliminate hunger;
- ICRISAT news: Demand-driven Innovation for the Drylands to “deliver better nutrition for you and economic opportunity for smallholder farmers”.

result of the ENFC is the attraction of a diverse group of participants. Furthermore, support enabling the participation of young researchers will be provided as per tradition.

The ENFC will provide unique opportunities and specialized sessions to share and discuss latest scientific achievements in BNF and the molecular interaction between plants and symbiotic microorganisms. Join us to meet the researchers who will present their hot research topics and key institutions. The venue of the congress is [München Bryggeriet](#), located in Stockholm, Sweden. So in addition to the scientific program and the collaborative discussions, the participants will experience a stimulating social program in the capital of Sweden.

Organizing committee:

Katharina Pawlowski (Chair of the Organizing Committee), Rachel Foster, Stefan Nordlund, Agneta Norén, Ulla Rasmussen.

A Fake International Conference on Nitrogen Fixation

Please ignore all adverts to this conference - “International Conference on Nitrogen Fixation (<https://www.waset.org/conference/2018/06/london/ICNF>)”. There are no experts in the field involved in its organisation and it appears to be a money-making scam!

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

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